

# Community Shared Solar

## Expansions Underway in Solar America Communities

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### EXECUTIVE SUMMARY

Community or Shared Solar is expanding rapidly as a model ownership structure for solar PV. By offering customers an option to purchase or lease *part of a larger solar array* instead of having to purchase the entire system, the model greatly expands participatory opportunities to a large new market segment of customers, with very low or no cost to local government.

This market expansion and centralized site model also has profound implications for lowering the costs of installed solar, particularly in regards to “soft costs” – those costs beyond the physical solar hardware itself – such as permitting, inspection, customer acquisition, labor, maintenance, etc. Community shared solar has the potential to lower soft costs in three different ways:

- 1) Greater economies of scale
- 2) Simplified permitting for a single site
- 3) Lowering customer acquisition costs

Though solar enjoys strong public backing, depending on the location, between 75-95% of households cannot feasibly install traditional roof-mounted solar systems<sup>1</sup> for a variety of reasons: they do not own the building in which they live, they have concerns over high upfront costs or operations and maintenance issues, or their roof is unsuitable for solar due to reasons such as permitting issues, HOA restrictions, structural challenges, shading, etc.<sup>2</sup> By participating in a community shared solar project, many individuals who are enthusiastic about clean energy but otherwise are restricted from entering the market can still participate without worrying about upfront investments or the suitability of their roofs. Shared solar’s lowered cost barriers and expanded opportunities can also apply to local businesses and commercial properties who want to participate.

Due to the benefits described above, community solar has seen rapid growth over the past several years. In 2008, there was an estimated 784 kW of community shared solar capacity throughout the United States. By 2013,

Community shared solar is expanding rapidly as a model ownership structure for solar PV. By offering customers an option to purchase or lease part of a larger solar array instead of having to purchase the entire system, the model greatly expands participatory opportunities to a large new market segment of citizens and customers, with very low or no cost to local government. This report provides an overview of the status of community shared solar projects in Solar America Communities as of September, 2014, as well as some of the differences and similarities between the creation and structure of these programs.

this number had increased to 39,327 kW (39.3 MW).<sup>3</sup> This is an expansion of 4,916% in five years, and the model is continuing to grow rapidly.

Expansion of shared solar is underway in at least seven Solar America Communities (SACs) as of June, 2014: Denver, Minneapolis-St. Paul, Orlando, Sacramento, San Diego, Seattle, and Tucson. The Solar America Communities program started in 2007 when the U.S. Department of Energy designated 13 Solar America Cities and then an addition 12 in 2008. Each of the original 25 cities received \$200,000 financial assistance from the DOE as well as technical assistance. This report provides an overview of the status of community shared solar projects in these communities as of June, 2014, as well as some of the differences and similarities between the creation and structure of these programs.

## INTRODUCTION

Polls regularly show citizens affirming their support for expanding the role of solar energy as a source of power. In March 2013, 76% of all Americans said in a Gallup poll that the US should place more emphasis on solar – reflecting more support than for any other energy source.<sup>4</sup> Although solar enjoys this strong public backing, many of these same proponents cannot participate in solar for a variety of reasons outlined below.

### Common concerns from potential solar customers (with sample quotes):

- 1) The perception of high upfront costs of installing a system on one's roof

*e.g. "I can't afford \$15,000 right now for a whole new solar system."*

*"I've looked into financing options but with our credit score it is not really feasible right now."*

*"I like solar, but some people tell me it's a waste of money – I wish I could just try it out for a while and see if it was worthwhile."*

- 2) The lack of ability to participate in traditional solar

*e.g. "I just graduated from college. I am renting for now and I am not really sure where I'll be living in a few years."*

*"I love solar, but my Homeowners' Association prohibits solar installations in our community."*

*"My yard is really shady and my roof is north-facing."*

- 3) Aesthetic concerns

*e.g. "I like the concept of solar energy, but I'm not sure if a PV system fits with the overall landscape."*

As illustrated with the examples above, for years solar has faced difficulty in expanding the market to include people who want to participate in generating cleaner energy, but are just unable to do so. Estimates of the number of households who cannot feasibly participate in traditional roof-mounted solar systems range from 75-95%.<sup>5</sup>

### Enter "Community shared solar"

Community solar programs allow people (homeowners and renters alike) to purchase *shares* of solar power, often in the form of a monthly fee that gives a subscriber credit for a solar panel. Instead of being installed on the purchaser's roof, that panel is operated at a professional off-site facility, in a well-suited location with unobstructed views of the sun. The subscriber receives a portion of the benefit of that solar power based on

their investment, oftentimes in the form a credit on the energy bill.<sup>6</sup>

Community shared solar projects operate under a number of different business models, but subscribers are generally asked to either buy PV power, lease PV panels, purchase PV panels, or invest in a PV project.<sup>7</sup> Programs also vary with regards to the duration of a subscription. For example, some programs require a one-year subscription, whereas others allow for cancelation at any time.

If a renter moves within the same utility service territory, some programs allow a subscriber to simply change over the credit to the new account. Alternatively, a subscriber may re-enroll in the program at a new address. Either way, community solar removes the necessity of moving an entire roof-mounted solar array or trying to negotiate it as a selling point to a new purchaser. Community solar has the ability to dramatically expand the solar market to millions of people and organizations that previously could feasibly participate in the solar market.

### EFFECT ON “SOFT COSTS”

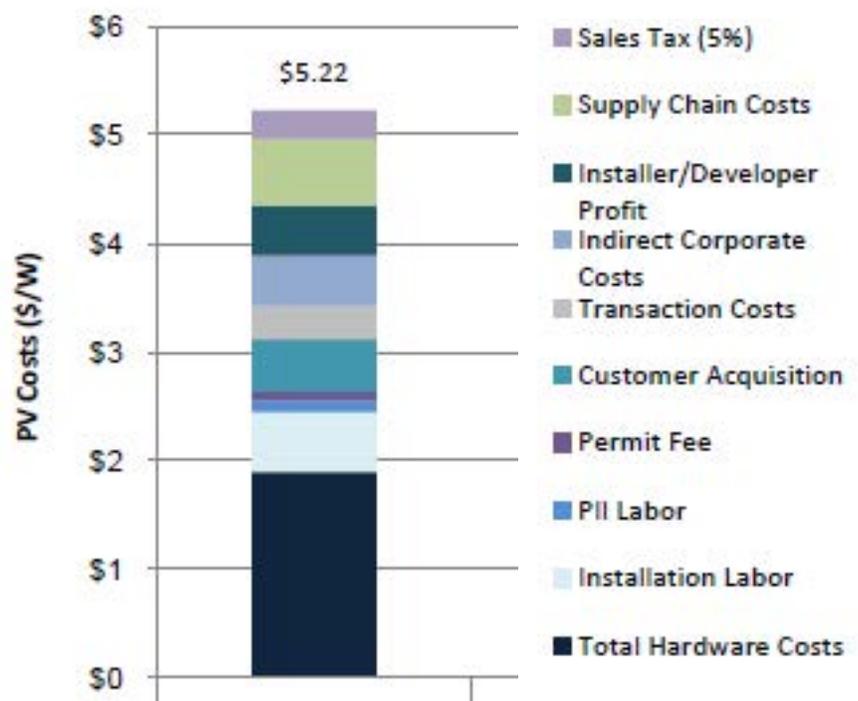
Community shared solar holds great promise for reducing the price of solar. The overall cost of installed solar continued to decline swiftly in 2012 and 2013. Most of the recent price reduction has been driven by precipitously falling module “hardware” costs. However, “soft costs” – permitting, inspection, customer acquisition, labor, maintenance, etc. – have remained relatively flat in recent years.<sup>8</sup> For residential systems, installation labor (\$0.55/W) and customer acquisition (\$0.48/W) account for the second and third greatest soft costs, both of which can be greatly reduced through community solar.<sup>9</sup>

Community shared solar has potential to lower soft costs in different ways:

- 1) **Greater economies of scale**
  - 2) **Simplified permitting for a single site**
  - 3) **Lowering customer acquisition costs**
- 1) Economies of scale

One of the benefits of community shared solar is the centralization of PV systems into a large single installation. Such an aggregation can allow installers to focus on installation and maintenance of a single facility, rather than recruiting, site analyzing, and managing PV installations from hundreds of smaller systems on customer homes scattered across a community. In fact, at \$0.55/W, installation labor accounts for the second greatest soft cost.<sup>10</sup>

Breakdown of Residential Solar Soft Costs



Source: Friedman et al. 2013

Installation and operation prices for solar exhibit significant economies of scale. Community solar takes the demand of individual households (the typical roof-mounted system on a residence is around 4-5 kW) and businesses (10-100 kW) and aggregates them into a much larger system that can typically take advantage of cheaper panel and installation prices.

Among all residential and commercial solar projects installed in 2012, median installed prices were \$5.30/W for systems  $\leq 10$  kW, \$4.90/W for systems 10-100 kW, and \$4.60/W for systems  $> 100$  kW. The installed price of utility-scale systems is even lower: among utility-scale projects completed in 2012, the average installed price was between \$3.20/W and \$3.60/W depending on the materials and componentry used.<sup>11</sup>

### Economies of Scale

The price per watt of installed solar in 2012

Small systems (<10 kW)	\$5.30
Medium systems (10-100 kW)	\$4.90
Large systems (>100 kW)	\$4.60
Very large systems (>2000 kW)	\$3.50

## 2) Simplified permitting for a single site

In addition to increased economies of scale, soft costs may also be brought down due to increased simplicity of permitting for a single site. A 2012 study supported by the SunShot Initiative from Clean Power Finance found that more than one-third of solar installers avoided selling solar in “otherwise viable markets” because of permitting issues.<sup>12</sup> For example, installers almost always have to work with more than one public agency, sometimes as many as five, within a jurisdiction for each solar project. Permitting, inspection, and interconnection account for \$0.10/W in soft costs and permitting fees account for \$0.09/W in soft costs.<sup>13</sup>

To achieve a hypothetical goal of 500 kW of new solar power for a community, an installer traditionally may have focused on permitting issues at 100 sites given that a typical roof-mounted array is about 5kW. This repetitive paperwork may be complicated by the installations occurring in different cities, neighborhoods, or other areas subject to differing or separate rules and regulations (some of the homes or businesses requiring special permitting for being near an airport, for example).

Alternatively, many community shared solar projects can achieve that same 500 kW solar goal in a single ideally-placed site. An installer could thus complete the permitting paperwork once for such a project, and then focus more of their attention on actual installation and maintenance of the solar panels.

## 3) Lowered customer acquisition costs

By significantly lowering upfront costs and the duration of the financial commitment, potential participants are less likely to need convincing to give solar a try. With traditional roof-mounted solar, the investment is considerable and it is easy for customers to simply put off participation out of fear of making a bad choice. Community solar offers more flexibility in terms of financial commitments, which allows customers to try out a program that offers lower costs, more choices, and less commitment. For installers and everyone in the solar value chain, this higher “customer capture” rate can allow them to spend less money per customer acquired and thus reduce the overall cost of solar. Customer acquisition costs are currently the third greatest soft cost at \$0.48/W.<sup>14</sup>

In addition to reducing soft costs, community shared solar can also help meet other noteworthy goals, such as:

- Optimal project siting, i.e. the array can be located to maximize benefits to the grid;
- Local job generation;
- Increased public understanding of solar energy;
- Opportunity to test new models of marketing, project financing, and service delivery;

- Provide a return on investment for all parties involved ;
- Provide new value for empty rooftops, vacant land, or even contaminated sites. <sup>15,16</sup>

### POTENTIAL DRAWBACKS OF COMMUNITY SOLAR

Opponents of community solar worry about potential cost shifting and subsidization of wealthier solar participants. Wealthy people have disproportionately high solar uptake and if no fixed utility fee is present for households who use solar, the necessary background grid infrastructure will have to be paid for in a regressive manner by a narrower and lower income group of ratepayers. Some programs, such as the Sacramento Municipal Utility District’s SolarShares, use a separate line item to charge community solar participants for utility infrastructure to address that exact concern.<sup>17</sup> By adding a simple fixed cost to the bill, all ratepayers of the utility have to continue to contribute towards utility-wide infrastructure costs. In such a way, community solar can be developed with fairness to other non-participating ratepayers.

### COMMUNITY SHARED SOLAR IN SOLAR AMERICA COMMUNITIES

The Solar America Communities program started in 2007 when the U.S. Department of Energy designated 13 Solar America Cities and then an addition 12 cities in 2008. Each of the original 25 cities received \$200,000 financial assistance from the DOE as well as technical assistance. Rapid expansion of the community shared solar model is underway in at least seven Solar America Cities as of September, 2014: Denver, Minneapolis-St. Paul, Orlando, Sacramento, San Diego, Seattle, and Tucson.

#### Community Shared Solar Projects throughout the US as of August 2014 (54 total)



Source: <http://sharedrenewables.org/index.php>

#### State Legislation and Solar America Communities

State legislation can help jumpstart community shared solar initiatives by allowing or even requiring utilities to provide community solar as an option to their customers. For example, In Colorado, House Bill 10-1342 passed

in 2010 directing Xcel Energy to expand opportunities for community solar. In September 2013, California Governor Jerry Brown signed SB 43, “Green Tariff Shared Renewables Program,” into law which mandates the expansion of community solar opportunities by the state’s three largest investor owned utilities (IOUs).<sup>18</sup> The law could help expand community solar in the five Solar America Communities of Berkeley, San Diego, San Francisco, San Jose, and Santa Rosa.

State legislation can also make community solar more feasible by enabling virtual net metering. Net-metering accounts for the value of electricity produced by a solar array when production is greater than demand, such as when a homeowner is away in the middle of the day and sun is shining. During such times, the excess energy flows to the grid and the customer receives a credit for those kWh during the billing period.<sup>19</sup> Virtual net metering allows community solar programs to distribute the economic benefits from a shared solar system, by allowing net metering credits generating by a single solar PV system to offset load at multiple retail electric accounts within a utility’s service territory. As with traditional net metering, credits appear on each individual customer’s bill. Virtual net metering is enabled in Colorado, Delaware, Massachusetts, California and Minnesota.<sup>20</sup>

This report first discusses Solar America Cities in states with community solar legislation and then those in states without such legislation.

## **SACRAMENTO**

Sacramento Municipal Utility District’s (SMUD) SolarShares program began in mid-2008 with a 1 MW system constructed by a 3rd party (a private firm enXco – now known as EDF Renewable Energy). SMUD has enjoyed considerable success with this program. They have maintained very high subscriptions levels over the course of the program, customers report high satisfaction, and SMUD has benefited from excellent local and trade press coverage.<sup>21</sup>

SolarShares is designed such that participants must sign a minimum 1-year agreement to purchase capacity based (kW) shares.<sup>22</sup> Customers receive a line-item breakdown of program costs and benefits as part of their monthly electric bill. Part of the solar credit is subsidized from the state, which allows SMUD to sell the power to participating customers for less than it is paying via the power purchase agreement (PPA) price.<sup>23</sup> Customers are still charged a small, distinct, fixed cost on their monthly bill to contribute to the infrastructure and transmission costs of the utility.

Through a survey and extensive data collection, SMUD has learned about the characteristics of its SolarShares customers. For example, 40% earn more than \$75,000 per year and 90% live in single family, owner-occupied homes. Customers tend to be married and tend to stay in their homes longer and use more energy compared to the average SMUD customer.<sup>24</sup> Despite the promise that community shared solar offers for allowing renters to participate in solar, demand in Sacramento is still coming largely from homeowners.

SMUD is currently in the process of expanding beyond the initial subscribed 1 MW of the SolarShares program to up to 25 MW by 2016.<sup>25</sup> A bidder’s conference was held on June 13, 2013 and proposals for expansion were due July 24, 2013.<sup>26</sup>

Although SMUD’s SolarShares is located in a state in enabling legislation, the program has not been driven by statewide legislation as it is a municipal utility and thus not regulated by the state utility commission (CPUC).

## **SAN DIEGO**

San Diego Gas and Electric (SDG&E) is California’s 3<sup>rd</sup> largest investor-owned utility. SDG&E has been a proponent of solar over the past several years, and broke with the two largest IOUs in California, Southern California Edison and Pacific Gas and Electric in of support of the community solar legislation. SDG&E

recognized at the time that its current rate arrangement, particularly regarding its net metering program, was creating an unsustainable cost shift from its wealthier net metering participants to a narrower base of lower income ratepayers. Thus, prior even to the successful passage of SB 43 at the state level, SDG&E had already proposed its “*Connected...to the Sun*” program to the California Public Utilities Commission (CPUC).<sup>27</sup>

*Connected....to the Sun* contains two pilot programs intended to make solar energy available to purchase for residential and small/medium-sized business customers. These programs are currently under review with the California Public Utilities Commission.<sup>28</sup>

- Share the Sun<sup>SM</sup>—Up to 10MW of solar would be available to cover all or part of a subscriber’s electricity use. The subscriber will receive a bill credit for the value of the solar power.
- SunRate<sup>SM</sup>- Subscribers could have energy supplied from local solar projects by choosing this rate, which would be based on the cost of solar energy from local suppliers. Up to 10MW could be available and subscription would require a minimum one-year commitment.<sup>29</sup>

## DENVER

In Colorado, House Bill 10-1342 passed in 2010 directing local IOU Xcel Energy to expand opportunities for community solar. Having supported the 2010 authorizing legislation, Xcel began rolling out a community solar program in 2012 known as *Solar\*Rewards Community*.<sup>30</sup>

Reminiscent of the process currently underway in California, the *Solar\*Rewards* program also underwent a state-level review process and approval in 2012 by the Colorado Public Utilities Commission. Since then, community solar has expanded very rapidly. More shared solar projects are underway in Colorado than in any other state.<sup>31</sup>

When it opened the program in August 2012, Xcel was seeking approximately 4.5 megawatts of generation from systems of 500kW or less from solar project developers. Demand was overwhelming: the utility received approximately three times that amount in applications within 30 minutes of beginning the program. Acceptance of applications ended after one hour.<sup>32</sup>

In total, in 2012 Xcel approved applications for 10 community solar projects (“solar gardens”) across Colorado through its “Standard Offer” program and three solar gardens through its “Request-for-Proposals” (RFP) program. Two of these projects are under construction in Denver, sized 400 kW and 500 kW respectively, and both are being organized by the Clean Energy Collective, a developer of community shared solar arrays.<sup>33</sup>

2013 told a similar story: Xcel approved applications for nine solar gardens across Colorado through the Standard Offer program and three applications through the RFP program. One of these projects is located in Denver, sized 500 kW, which is also organized by the Clean Energy Collective. Currently, these projects are working through various stages of the application and construction process.<sup>34</sup>

Despite the high demand Xcel is seeing from solar project developers, legislation currently limits the amount of megawatts that Xcel Energy can accept to nine megawatts per year.<sup>35</sup> Starting in 2014, the Public Utility Commission will determine new minimum and maximum outputs that utilities must purchase from community solar gardens.<sup>36</sup>

## MINNEAPOLIS-ST. PAUL

Similar to California and Colorado, Minnesota has also passed recent statewide legislation promoting the use of community solar. In May, 2013, the state legislature passed a law requiring local IOU Xcel Energy – which provides electricity to more than half the state, including the Twin Cities - to develop a program that would

allow customers to participate in community solar.<sup>37</sup>

Xcel filed its initial plans to operate a community solar program with the Public Utilities Commission on September 30, 2013. Xcel filed its revised plan on May 7, 2014.<sup>38</sup> The law does not specify a timeline for the PUC decision, but once the PUC does approve a program, the utility must begin operating the community solar program within 90 days and credit subscriber accounts within 180 days.<sup>39</sup>

Xcel's "solar gardens" proposal includes the following: solar developers apply to the program, install solar garden projects, and customers chose to subscribe to solar gardens through the developers. Xcel may operate its own solar garden in the future to provide an alternative choice. Subscribing customers receive credit on their monthly bill for their portion of the solar energy produced by the solar gardens.<sup>40</sup>

Minneapolis-based start-up company MN Community Solar has already announced that it will construct a 40 kW array in Minneapolis with locally-made solar panels.<sup>41</sup> The project quickly sold out and construction will begin later in 2014.<sup>42</sup>

Demand for community solar in Minneapolis-St. Paul and throughout the state could be significant. Xcel's current *Solar\*Rewards* incentives programs, which involve more traditional incentives such as rebates, etc., operate near full allocation to customers in Minnesota.<sup>43</sup> Community solar was also gaining interest before the statewide legislation. Minnesota's first community solar array is located about 30 miles northwest of Minneapolis, near the town of Rockford. It is run by a local co-op (Wright-Hennepin) and was also developed by Clean Energy Collective. It is about 32 kW in size, and construction was completed in August 2013.<sup>44</sup>

In the Wright-Hennepin project, participants actually purchase their solar panels for \$869 each, and are then credited back monthly in proportion to the value of the electricity that their panels produce. This model differs from other featured shared solar programs such as SMUD, which maintains ownership of their arrays and instead simply lease them out to participants. Clean Energy Collective's founder Paul Spencer explains that this ownership model was a conscious decision:

"[A lease] was the first model we looked at...We ran the numbers...it's a pretty minimal return over time. You just break even, you don't own the thing anymore, and it goes away. We then ran a comparison to ownership...it's night and day. Over the life of a system, an ownership model will produce nearly 3 to 4 times as much asset value as a lease. That's 3-4 times as much payback to the consumer...we said, 'we gotta figure out how to have people own this.'"<sup>45</sup>

The more expensive upfront price, however, may pose a higher barrier of entry for participation – currently the Wright-Hennepin array is about half-subscribed. Nevertheless, the co-op is already planning further arrays.<sup>46</sup>

## SEATTLE

Washington State has unique legislation when it comes to shared solar. The currently enacted Community Renewables Enabling Act (HB 1301) is small in scope, and provides direct payments of \$.30/kWh to owners of shared renewables systems – including wind and other non-solar renewables.<sup>47</sup> This direct payment is included in addition to existing net metering.<sup>48</sup> The program is subject to the statewide net metering cap of 0.25% of a utility's peak demand (though this will soon change to 0.5% in 2014), and is limited to 75 kW projects or smaller.

At least four communities throughout the state have already developed community solar projects. The Solar America Community of Seattle hosts one such project – local public utility Seattle City Light's community solar at Jefferson Park. In 2010 the project was the recipient of a Solar America Cities special

project award of \$300,000<sup>49</sup> specifically to promote community solar.<sup>50</sup>

In 2012, the project was completed with the participation of almost 400 customers of Seattle City Light (SCL). The project featured solar panels located atop newly-constructed picnic shelters. The project now generates more than 25,000 kWh of electricity each year.<sup>51</sup>

Customers face a minimum purchase of \$600 for each portion of about 50 kWh/year, with all customer agreements ending in June 2020.<sup>52</sup> At that point, the state-level production incentive is scheduled to end, casting uncertainty on the program's future financial viability. The expiring incentive may also be contributing to customer confusion and potentially lower uptake.<sup>53</sup> On the plus side, like Orlando's program, Seattle City Light shared solar participants are rewarded with a permanent recognition displayed at Jefferson Park.

In July 2013, SCL announced that they will be expanding community solar by installing 44.4 kW of PV on the roof of the Seattle Aquarium. Official enrollment for the Aquarium project began September 1<sup>st</sup>, 2013 and sold out in six weeks. The project started generating electricity on December 21, 2013.<sup>54</sup> The panels for the project were purchased from a local company in western Washington, with each 24 watt unit of the installation costing SCL participants \$150.<sup>55</sup>

## **ORLANDO**

The state of Florida does not have any known enacted legislation promoting community solar as of June, 2014. The Solar America Community of Orlando, however, recently completed construction of the "Community Solar Farm" – a 400 kW array located over a parking lot at the local municipal utility's, Orlando Utility Commission (OUC), headquarters.

The energy in this program is sold in 1 kW blocks (up to 15 per subscriber) at a premium of \$0.025/kWh above the typical residential rate. These rates are guaranteed for up to 25 years. If the subscribed block generates more power than the owner uses in a month, they receive a credit for the difference on their energy bill. A one-time \$50 deposit is required regardless of how many blocks are subscribed. At the end of two years, OUC will credit the deposit (with interest) back to the owner's account.<sup>56</sup>

The project also features several unique features such as granting subscribers access to a web portal which shows real-time array production, an invitation to attend the ribbon-cutting ceremony, and permanent recognition at the site as an original subscriber and supporter of the farm.

The array was fully subscribed within six days to 38 residential and small commercial customers.<sup>57</sup> It is currently accepting sign-ups for a waiting list for future community solar projects.

## **PORTLAND**

Oregon also does not have any enacted statewide legislation promoting community solar as of June, 2014. Nevertheless, the City of Portland Bureau of Planning and Sustainability (BPS) became interested in community solar in 2011, following the lead of fellow cities in the Solar America Communities network.<sup>58</sup> BPS staff believed that community solar could help the City meet its Climate Action Plan goals regarding the expansion of renewables and its focus on social equity.<sup>59</sup>

BPS attempted a community shared solar pilot in 2012 to develop a replicable model for community-supported solar in Oregon under existing legal and regulatory conditions. BPS issued an RFP in January, 2012 entitled "Request for Proposals for Private-Sector Partnerships to Finance Community-Supported Solar Electric Systems on Public Facilities." Six firms responded to the RFP. BPS awarded the contract to Tangerine Power Corporation. The scope of work included developing a financing model and conducting marketing and outreach for eight

pilot sites.<sup>60</sup>

Without virtual net metering and without utility participation, Tangerine Power developed a financing model that required a third-party tax equity investor to capitalize on the federal tax credits and depreciation benefits, and raising community capital by selling solar bonds to the public. However, the Tangerine program model faced some key constraints, including:

- constraints on who can access the federal tax benefits, which made it hard to find tax equity investor(s) and
- Low electricity rates and a moderate climate, which affect return on investment.<sup>61</sup>

At the end of 2012, program managers concluded that legislative changes, including improvements to Oregon's production-based incentive program, virtual net metering, and securities exemption for renewable energy cooperatives, could offer pathways to community solar that rely less on tax equity investment.<sup>62</sup>

Since then, BPS has experimented with a crowdfunding model called Solar Forward, which offers community members the opportunity to give donations for the development of solar energy systems on public buildings like community centers, schools, and libraries.<sup>63</sup> While this model is not strictly "community shared solar" in that the donors do not share directly in the benefits of the solar installation, the donors do share indirectly by lowering energy costs for their favored public building, demonstrating environmental leadership, and by receiving a tax deduction.<sup>64</sup> So far, this model has funded a solar array on a community center and fundraising for two more sites is in progress.<sup>65</sup>

BPS staff also continues to engage in policy discussions around virtual net metering, securities registration exemptions for renewable energy cooperatives, and the potential for utility-led models.<sup>66</sup>

## TUCSON

Despite not having any legislation at the state level, Arizona has five major community solar projects underway.<sup>67</sup> The Bright Tucson Community Solar Project is one of these installations. Started in 2011, the project has grown from its original 1.6 MW to its current capacity of 4.1 MW and about 800 subscribers. Officials expect to expand the capacity of this program to more than 200 MW by the end of 2014.<sup>68</sup>

The program is run by local IOU Tucson Electric Power (TEP). All utility customers are eligible to purchase renewable electricity in 150 kWh monthly blocks. Each of these blocks adds about \$3 to the customer's monthly electric bill, and the rate that customers pay will remain fixed for 20 years.<sup>69</sup> An advantage to customers is that each block is exempt from two surcharges that the utility applies to electric usage; the utility notes that they may increase these surcharges in the future, so the benefit of being exempt may grow over time.

Unlike SMUD's one year participation requirement, TEP allows customers to purchase or cancel at any time, though only once in a 12 month period. The blocks of solar are also transferrable should the customer move to another location within TEP's service area. Unlike Wright-Hennepin's co-op array in Minnesota, there is no ownership of the panels, but no high upfront cost either.

The City of Tucson is taking advantage of its ability to participate in the program. Tucson already has a current capacity of 4.7 MW on city facilities (non-community solar). In July, 2013, the city received approval from the Arizona Corporation Commission to increase the city's solar usage by up to an additional 10 MW by participating in the Bright Tucson Community Solar program. This was following the March 2013 approval of the agreement by the Mayor and City Council. The City was able to negotiate a premium rate of 1 cent per

kilowatt hour, and can lock in these rates for 20 years, which it estimates will result in avoided utility costs in the range of \$0.8 - \$2.9 million.<sup>70</sup>

There is another large community solar project in nearby Florence, the Copper Crossing Solar Ranch, which also came online in 2011, and has a capacity of about 20 MW. Overseen by the IOU Salt River Project (SRP), many aspects of the program are similar to Bright Tucson's, including a monthly premium of \$4 per month, start/stop options at any time, and fixed rates (for five years instead of 20). The program is considered a pilot, with plans for a summary evaluation at the end of 2016 by the SRP's Board of Directors.<sup>71</sup>

## **LESSONS LEARNED AND REPLICABILITY**

The sheer diversity of communities and shared solar programs underway offers a wealth of lessons learned for other cities and counties interested in the model.

### **Statewide legislation can be key to promoting growth in Solar America Cities and beyond**

Though some community solar projects have been established through electric co-ops, municipal utilities, and other efforts, statewide legislation requiring utilities to offer a shared solar option to their ratepayers seems to be a key component for promoting the widespread growth of shared solar, and unlocking the potential for development in cities and counties throughout a state.

Solar America Communities can often serve as model community solar projects, utilizing their extensive knowledge capital to help promote interest and awareness in successful programs, as well as provide and share technical and policy assistance. Once statewide legislation is established, there is no reason why other local communities cannot participate enthusiastically as well. Indeed, after passing legislation in 2010, Colorado now leads the United States with at least 16 community solar projects throughout the state; only three of which are in the SAC of Denver County.

### **Political inclusiveness and a measured approach can be crucial to achieving successful legislation**

Though establishing such a program requires additional work, local utilities may be willing or even eager to participate in the development of these programs if there is a sense of good faith and inclusiveness. Including them in working groups with clean energy proponents and policy specialists may help to generate unexpected alliances, and increase political buy-in from natural skeptics. As was the case with San Diego Gas & Electric in California, utilities may feel that current net metering schemes or other programs are unsustainable, and thus may be willing to work with groups to use community shared solar programs to help reform their rate structures.<sup>72</sup>

Taking a measured approach in the early stages may also be key to enacting a viable program. In California the original community solar bill SB 843 was defeated in part because it called for a perhaps overly ambitious goal of installing 2 GW of community solar. After the legislative defeat in 2012, this requirement was scaled down to 600 MW in the bill's next iteration, SB 43, which went on to pass easily in 2013. It thus may be more crucial to simply "get the ball rolling" by promoting small projects and/or modest public policies, and let market demand help drive capacity growth.

### **Community solar helps meet market demand**

In 2008, there was an estimated 784 kW of community shared solar capacity throughout the United States. By 2013, this number increased to 39,327 kW (39.3 MW)<sup>73</sup> Representing expansion of **4,916%** in five years, and the model is continuing to expand rapidly. Tucson's Bright Solar program alone has grown from its original 1.6 MW in 2011 to its current capacity of 4.1 MW in mid-2014. Officials expect to expand the capacity of this program to **more than 200 MW** by the end of 2014.<sup>74</sup> The California market is expected to add an additional 500 MW in the next 18 months.<sup>75</sup>

## Community solar comes in many different forms

Projects can vary along many different dimensions, from being run by a utility to small-scale co-ops. Some projects seek to attract customers via very low upfront costs, e.g. Tucson Electric Power's \$3 monthly premium, while other models seek to promote community ownership (Wright-Hennepin's model in Minnesota).

### Summary of Community Solar Projects Profiled

City	Subscription	Project Ownership	Length	State level Legislation	Size
Sacramento	Annual lease starting at 0.5 kW, flat monthly fee based on historical energy use and system size	3rd Party	1 year minimum	Yes, but not applicable to municipal utility	1 MW
San Diego	n/a	Utility	n/a	Yes	10MW
Denver	Purchase or lease options determined by 3 <sup>rd</sup> party	3rd Party	Determined by 3rd party owner	Yes	2.9 MW approved in Denver
Minneapolis-St. Paul	Determined by 3rd party, Minimum 200 watts	3rd Party or Utility	Determined by 3rd party owner	Yes	40 KW currently, but no limit
Seattle	Minimum \$150 upfront lease payment	Utility	Credits accrue annually until 2020	Yes	23.4 KW at Jefferson Park, 44. KW at Aquarium
Tucson	150 kWh blocks for \$3 monthly premium	Utility	Cancel at any time	No	4.1 MW
Orlando	1kW-15kW blocks with \$.013/kwh rate. plus \$50 deposit	Utility	2 years minimum	No	400 kW

## CONCLUSION

By aggregating community desire for solar into one large site instead of many locations in different neighborhoods, districts, city or county boundaries, community shared solar helps to democratize opportunities for citizens to participate in the promotion of clean energy for themselves and their communities. Lower up-front costs and commitment lengths of one year or less mean that those who may be on the fence can try solar out and see if they like it, without worrying about if they are making a large-scale financial mistake. In addition, community solar offers the potential to cut soft costs through greater economies of scale, simplified permitting and paperwork, and more fruitful customer acquisition efforts.

For local governments, many traditional methods of promoting solar involved allocating direct grants and payments to specific showcase solar projects, often generating 30-100 kW or less. These projects were often costly financially, as well as politically.

The dramatic increase in solar uptake via community solar is accomplished without expending any or very little city revenues on particular "government projects". Local governments are ideally-situated to help decide what is best for their communities given attitudes toward solar, electric rates, relationships with utilities, local solar resources, interest among community members in ownership vs. leasing, and many other respects. But, the dramatic expansion of community solar is largely due to high latent demand for solar among the public.

Local governments can promote this expansion by much less costly methods such as:

- Advocating for enabling community solar legislation at the state level
- Coordinating with local utilities and planning specialists to work out rate charges and/or siting concerns
- Hosting educational workshops for interested participants
- Offering suitable space on public facilities to serve as a shared solar site

Ultimately, local governments can help tremendously in promoting access to community solar for all of its citizens, democratizing the ability to participate in developing clean energy, as well as promoting a broad new market of willing customers for its local businesses and utilities.

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**Author:** Nathan Otto, ICLEI Intern

**Author:** Melissa Higbee,  
ICLEI Program Officer

**Editor:** Chad Tudenggongbu,  
ICLEI Program Officer



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