Salt River Project (Greater Phoenix, AZ)

To meet customer demand for renewable energy, utilities have historically offered green power programs. However, due to their relative cost-effectiveness as resources, most green power programs have traditionally supported the development of wind energy and landfill gas, not solar PV.

In recent years, though, the cost of PV has declined significantly, making it cost-competitive with other forms of renewable power. In addition, customer demand from solar across all utility classes has increased.

Utility-run community solar programs are a key way to integrate solar PV into utility green power programs while addressing utility ratemaking concerns. In addition, these programs help meet demand for PV from all utility customer classes, including those whose residences are shaded, are in apartment complexes, or are otherwise unfit for a rooftop solar installation.

This case study will show how the Salt River Project, the third-largest public power utility in the United States,[i] has used a community solar model to integrate solar into its green power program by increasing access to solar and taking advantage of economies of scale.

The Salt River Project (SRP) and Green Power Efforts

The Salt River Project (SRP) serves 940,000 electricity customers in the Greater Phoenix area.[ii] In order to help meet its self-imposed sustainable energy goals of 20% by 2020,[iii] SRP offers separate solar incentive programs targeting its residential and commercial customers.[iv]

Like most green power pricing programs, the price premium relative to wholesale power paid by SRP is borne entirely by voluntary participants in the program that elect to pay the flat monthly fee.[v]

Arizona's Solar Boom Paves SRP's Path to Community Solar

In recent years, due to the improving economics of solar PV and supportive federal, state and local policies, demand for solar PV in SRP's service territory has grown at a rapid pace. From fiscal year 2012 to fiscal year 2013, SRP's customers added an additional 29 MW of rooftop solar PV, a 69% annual increase.[vi]

Given this increasing demand, SRP began contemplating ways to provide the benefits of solar to its customers in the most cost-effective way possible. Mark Bonsall, SRP's General Manager and CEO, decided that his company

[i] Mellentine, Stephen. "Current Utility-Scale Solar Efforts at SRP" Presentation to DOE Tribal Leader Solar Energy Forum, June 2013. Available at: http://energy.gov/sites/prod/files/2013/06/f2/Utility_Mellentine121911.pdf.

[ii] Ibid.

[iii] Ibid.

[iv] See SRP's EarthWise Energy web page at: http://www.srpnet.com/environment/earthwise/home.aspx

[v] For more information about utility green power programs, please visit NREL's Green Power Network at http://apps3.eere.energy.gov/greenpower/.

[vi] See SRP's *Resource Stewardship*, September 2012. Available at: http://www.srpnet.com/environment/earthwise/pdfx/ResourceStewardship.pdf. See also SRP Sustainability Portfolio, from 2012 Annual Report. Available at: http://www.srpnet.com/about/financial/pdfx/FY12_SPP_Annual_Report_Final.pdf.

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should pursue a community solar program to meet demand for distributed solar. Thus, the SRP Community Solar Program was born.

Genesis of the SRP Community Solar Program

SRP opened the SRP Community Solar Program as a 5-year pilot program to its residential, commercial and industrial customers in late 2011. Through this program, SRP has contracted for 20 MW of utility-scale solar PV from Iberdrola Renewables' Copper Crossing farm in Florence, AZ, which is located in SRP's electric service territory. Of the farm's 20-MW capacity, 8 MW was initially allocated to schools and industrial customers, 10 MW to commercial customers, and 2 MW to residential customers.[vii]

While the program initially targeted all commercial and industrial customers, SRP realized that schools, as public entities interested in a fixed price for energy but unable to directly benefit from tax credits, were excellent potential program participants. For schools participating in the program, the levelized cost of energy from Copper Crossing is 9.9 cents/kWh, approximately 2 cents more than a school's retail rate. For residential participants, the cost of participation is 11.5 cents/kWh, a 1.5 cent premium over the retail rate. Schools, industrial and commercial customers can purchase capacity "shares" equivalent to 35% of their summer peak usage.[viii]

How the Program Works

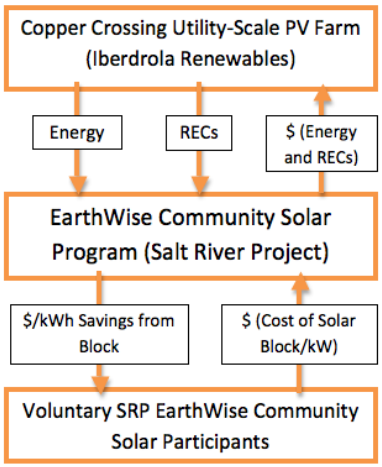

Figure 1: Community Solar Program Structure

How it Works for SRP: From its power purchase agreement (PPA) with Iberdrola, SRP receives both the energy from the solar project and the "environmental attributes" (also known as renewable energy certificates (RECs)). The solar project is interconnected to SRP's grid.

How it Works for Retail Customers: In turn, SRP then offers its residential, commercial and industrial customers the opportunity to purchase 1-kW "shares" (equivalent to approximately 2,500 kWh each) from Copper Crossing at $24.15/month (approximately $288/year). Residential customers, however, can only own shares equivalent to half of their household's annual energy use. For an average SRP customer, this is equivalent to approximately 3 kW, as the average SRP customer uses approximately 14,500 kWh per

[vii] For more information about Copper Crossing Solar Ranch, please visit http://iberdrolarenewables.us/pdf/copper-crossing-fact-sheet.pdf.
[viii] Conversation with Lori Singleton of SRP, 12 July 2013.

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year.[ix] The energy output of these blocks is then net billed against the cost of the block for these customers at the customer's retail rate, as if the PV capacity was directly serving participants. According to SRP, the net resulting premium is approximately $3-$4/month per block for participating residential customers. The structure of the program is summarized in Figure 2.[x]

Additional Program Terms and Limitations

The purchase of the blocks is subject to the following additional terms:

- To ensure that more customers can participate in the program, the output of purchased 1-kW blocks cannot exceed half of a residential customer's annual consumption. For a non-residential customer their share ownership cannot exceed 35%[xi] of their peak demand.
- SRP will not credit excess generation back to participants unless the output from the 1-kW block output exceeds usage during entire monthly billing period.
- Increases in the cost of 1-kW blocks will not occur during the first 5 years of the program but can increase thereafter.
- Customers can opt-out at any time, but cannot opt back into program for 12 months after opting out.[xii]

Advantages of Community Solar for SRP and Its Customers

Community Solar Advantages for SRP

Meeting Demand for Solar with Cost-Effective Local Resources: The program allows customers to easily and quickly "buy" into a community solar project and allows SRP to provide its customers with an opportunity to meet their electricity needs with solar without customers having to invest in a PV system on their own rooftop. In addition, the program helps SRP meet its self-imposed sustainable energy goals with utility-scale solar PV.

Permits Appropriate Cost Recovery: Since SRP's community solar tariff is an amendment to existing tariff schedules, participants still pay all base rates and cost recovery riders (e.g. for fuel, environmental costs, etc.). In addition, as Figure 3 shows, SRP is able to recover the full cost of serving program participants (e.g. both the cost of grid electricity and their solar "share"). Placing the participation cost burden onto participants only ensures that non-participants do not incur any extra costs, which is consistent with traditional ratemaking.

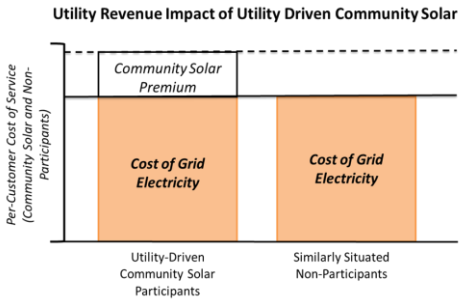

Figure 2: Participant and Nonparticipant Cost Comparison with Community Solar

[ix] U.S. Energy Information Administration Form 861. Available at: http://www.eia.gov/electricity/data/eia861/
[x] Conversation with Lori Singleton of SRP, 12 July 2013.
[xi] Ibid.
[xii] Ibid.

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Reduced Risk of Program Under-Subscription: By limiting the number of blocks or "shares" to half of a customer's annual energy usage, SRP has reduced its exposure to the impact of a sudden and significant drop-off in customer subscriptions to the program, in which fewer customers with more shares could increase the rate of under-subscription.

Community Solar Advantages for Customers

Reduced PV Costs through Economies of Scale, Reduced Operations and Maintenance Costs: Customers do not have to qualify for participation based on income in order to "own" a share of Copper Crossing, nor do they assume any of Iberdrola's responsibility for operating and maintaining the system. The program also allows customers to take advantage of economies of scale similar or greater to that of local group purchasing or "solarize" programs because of the utility scale of the community solar installation at Copper Crossing.

Net Billing Reduces Overall Premium: The utility's net billing of the system's output against the cost of the block allows customers to use the output of the community solar system to recover most the cost of the ownership share, resulting in only a small premium on their electric bill.

Improved Customer Access to Solar Benefits: SRP designed the program in order to provide an opportunity to customers that have unsuitable sites for solar PV (e.g. they do not own their home, their home is shaded or does not have a south-facing roof space). As a result, SRP has simplified the process for procuring solar energy for customers that would not be well-positioned to benefit from a rooftop installation.[xiii]

Program Performance

Since the program began in 2011, a diverse array of customers have decided to participate in the program. For instance, schools in SRP's service territory were attracted to the fact that their green rate would be set for ten years. As a result, 102 schools have chosen to participate, subscribing to all 8 MW of allocated capacity. In addition, 2,000 residential customers have chosen to purchase a share, which is equivalent to 4 MW of output from the Copper Crossing plant.[xiv]

Despite the program's success, SRP continues to refine its marketing approach. According to Lori Singleton, manager of SRP's solar efforts, commercial and industrial customers have not participated largely because of the program's premium price. In addition, Singleton notes, nearly 5,000 residential customers expressed interest in participation, but only 2,000 actually signed-up. This is largely attributed to the fact that the program does not pass on actual bill savings to its customers. Overall, low participation rates have led to an 8 MW program under-subscription, with residential taking on more capacity than was initially expected.[xv]

[xiii] Correspondence with Melissa Burger, SRP, 25 July 2013.
[xiv] Conversation with Lori Singleton, SRP, 12 July 2013.
[xv] Ibid.

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While SRP can use the excess capacity to meet its sustainability goals, the utility has begun to investigate customer's interest in program modifications through market research. SRP found that customers were often confused by the structure of the program, and concerned that the program (as a premium program) did not deliver overall electric bill savings. According to Singleton,

"…it's difficult to compete with solar companies that sell their services as a savings, and even more difficult to offer community solar as a competitive alternative to (less expensive) power because the solar companies take SRP's solar incentive."[xvi]

Anticipated Program Changes Based on Customer Feedback

In response to customer feedback, SRP is interested in making changes to its program design to address customer concerns and maximize participation.

Pursuing a Portfolio Approach to Capture PV Cost Reductions: In order to reduce customer costs and take advantage of utility-scale solar PV's sudden cost-competitiveness with other renewable resources, SRP has committed to purchasing an additional 19 MW of solar capacity within its service territory. In purchasing this capacity, SRP plans to offer more cost-competitive utility-scale solar that will, when offered as a "portfolio" to its community solar customers, be more competitively priced.[xvii]

Market and Offer Community Solar as a Bill Savings: As Singleton noted, if community solar can serve as a utility-driven alternative to third-party owned, customer-sited systems, SRP must allow participants to save money, particularly in the initial years of participation in the program. SRP is currently experimenting with several approaches to do so, including structuring the cost of participation in the program to allow customers to save money savings in early on.[xviii]

Lessons for Municipal Utilities

SRP is continuing to learn and adapt to customer desires in the design of its community solar program. Their experience with community solar as a tool for integrating solar PV into green power programs has yielded several key lessons for public power utilities interested in designing a community solar program:

Bigger is Better, Cheaper and Less Risky: Contracting with utility-scale, third-party owned PV projects allows the utility to achieve economies of scale, reduce risk and maximize customer benefit from the reduced cost of solar from the pass-through of incentives for solar PV.

Maximize Savings and Customer Appeal, Minimize Nonparticipant Cost: While many green power programs aggressively market their environmental benefits, it is important for utility green power programs to also market and offer financial benefits as well. In terms of shared capacity owned, the SRP Community

[xvi] Conversation with Lori Singleton, SRP, 12 July 2013.
[xvii] Ibid.
[xviii] Ibid.

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Solar Program has been a relative success, with 12 MW in subscribed capacity.

However, as Lori Singleton notes, SRP's community solar program must offer (and market) real customer savings in order to compete with third-party solar service providers. While SRP has not yet determined how to structure such a program, some key ways to offer those savings in a financially sustainable way would be to:

- Design a program that offers savings to customers, particularly in the early years of participation;
- Allow block ownership to offset variable fuel and other operations and maintenance charges on customer bills;
- Gradually expand block ownership beyond 50% and 35% limits (with a potential value of solar-based bill credit used to offset nonparticipant costs).

A key way to achieve these goals would be to put an appropriate value on the utility's costs and benefits associated with solar energy[xix], which would allow customers to see savings that are not inappropriately paid for by other customers. This valuation approach could, if appropriately structured, be used to both reduce the bills of participating customers and ensure that their savings does not come at the expense of other customers.

Pursue and Secure Top Management Support: A final critical element to SRP's success is the support of SRP's top management. Community solar programs often require significant investments, including upgrades to billing systems, additional marketing expenditures, risks associated with third-party PPAs, and other features that can be resource intensive and against the grain of traditional utility operations. With top SRP management serving as champions, Ms. Singleton and her team have positioned SRP to deliver a balanced, ratepayer-friendly community solar program.

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[xix] For more information on how other utilities have valued the costs and benefits of solar PV, please see the Rocky Mountain Institute's review of value of solar approaches here.