Community Solar Project

Ownership Structures and Financing

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Summary

This Community Solar Value Project working paper aims to help utilities understand their choices for structuring and financing community solar programs. The options vary based on the structure of utility (investor-owned, municipal utility, or co-op), state policies, and the upcoming changes to the federal solar tax incentives.

Options also vary based on the key objectives for the community solar program. With regard to community solar program structure, each utility must first decide whether to outsource the community solar program to a third-party provider (outsourced model) or to develop the community solar program internally (utility-driven model). In addition, hybrid models allow utilities to request customized arrangements with third-party outsourced-model providers.

This paper is accompanied by an appendix including one table comparing the outsourced model to a utility-driven model and another summarizing pros and cons of the main financing strategies, which include:

- Bond and debt financing
- Power purchase agreements
- Solar services agreements
- Operating leases
- Flip or buyout structures

In the end, completing a community solar acquisition is not much different than acquiring other utility assets and services. We advise any party that is involved in solar project procurement to consult legal, tax and accounting expertise. Expert legal advice will be required to negotiate and structure these solar development deals, as specific project terms and conditions (T&Cs) related to issues such as ownership structure, financing mechanisms, ownership of the renewable energy credits (RECs) and customer interface must be negotiated with all parties. Laws and guidelines are also subject to change. This working paper represents only a starting place.

The Community Solar Value Project is developing a complete decision framework for utilities interested in "making community solar better." The Project is especially focused on three aspects of the program design process: 1) high-value solar project design and procurement 2) target-market development for community solar programs and 3) increasing utility value through companion demand-response and storage measures that address solar variability and minimize reliance on non-renewable resources for meeting solar customers' needs. This working paper is one tool for that overall decision framework. Through the duration of this project, see www.communitysolarvalueproject.com for details.

1. Introduction

Community Solar refers to any solar project that has multiple participants, co-owners, leaseholders, subscribers, or donors, where each carries a relatively small portion of the total project cost and shares proportionally in the project's benefits.[i] Shared solar programs enable multiple customers to share the economic benefits from one solar project, through their individual utility bills. This strategy has been touted as a way to broaden the distributed solar market to households that cannot host typical rooftop solar systems for a number of reasons, such as lease limitations or shading. NREL has estimated that, even limiting the community-solar market to that segment, a community solar buildout could lead to cumulative PV deployment from 2015-2020 of 5.5-11 GW.[ii] In fact, there is little market research to date about exactly which sectors are most drawn to community solar and why. But the strong growth of community solar over the past few years substantiates its significant growth potential.

For utilities, community solar represents both a potential threat and a major opportunity. If driven by third-party solar developers with little or no utility engagement, community solar could exacerbate net-metering-related revenue losses and risks related to unplanned distributed-solar market growth. In Minnesota, for example, a large community solar effort was revised by policymakers after rollout, to address unforeseen large-scale third-party development strategies.[iii] But since the earliest community solar projects—most in the past decade—utilities generally have held a leadership role in this space. In mid-2015, the Solar Electric Power Association estimated upwards of 80 utilities running or planning community solar programs.[iv] These draw on a range of solar projects, from 10-kW systems to plants of 10 MW or more. They also represent many resource acquisition structures; a great many were or will be completed with outsourced, third-party developer support.

The question of what role utilities will play in community solar in the future depends upon many factors, but one of the most important among them is their approach to solar resource acquisition. For example, the economy of scale that community solar offers, relative to rooftop solar, is no longer a "given," as rooftop competitors find ways to aggregate their own procurement and sales activities. In states that allow community solar projects initiated by customer groups, utilities may find it hard to justify an in-house, utility-driven program, on cost alone.

This working paper is aimed at helping utilities to understand their choices for financing community solar (or for that matter, any distribution level utility solar project). The choices differ based on the type of utility (investor-owned, municipal utility, or co-op), state policies, and upcoming changes to the federal solar tax incentives. This paper provides an introductory overview of the main financing strategies, relative to ownership, power purchase agreements, solar services agreements, operating leases, and working with one-stop-shop third party to develop and finance a program often with the same financing structures. These choices and variations thereof can get complicated; the authors specifically advise that utilities consult accounting and legal professionals in the same manner as they would with any utility acquisition.

With regard to community solar program design and project development, each utility must first decide whether to outsource the community solar program to a third-party provider (outsourced model) or to develop the community solar program internally (utility-driven model). Utility views differ on how to pursue community solar development paths. In the past, some utilities opted not to own solar projects because PV was an emerging technology, high priced and had perceived higher project and financial risks. However, solar PV has become a widely accepted technology today with little perceived project risks.

The following sections address outsourced- and the utility-driven models. Two tables in the appendix summarize the differences and pros and cons of each structure and financing options from the perspective of the utility.

2. Financing Choices Under the Outsourced Model

For many utilities that are interested community solar, the option of outsourcing the program to a third-party provider is a viable option. There are now several third-party community solar providers that offer "one-stop-shop" community solar, including fully bundled services related to program design, project development, finance, operations and maintenance (O&M) and marketing. In addition, many third-party community solar providers also offer services related to bill crediting and claim to greatly reduce the utility's administrative efforts and costs. Clean Energy Collective[v] and SunShare[vi] are the two leading companies that are currently spearheading a one-stop-shop community solar offering to utilities. Clean Energy Collective offers a proprietary RemoteMeter™ account management site that allows customers to view their clean energy production in real time and integrates with the utility billing system to immediately credit customers for renewable energy generation. [vii] From the utility perspective, this option allows the utility to roll out a program relatively quickly and to outsource all aspects of program design and development, including the risk of the finding subscribers. This model is similar to third-party energy-efficiency program outsourcing.

Legislation in Colorado and Minnesota has supported the outsourcing model to drive greater solar development. The outsourced model has proven to be very popular with consumer-owned utilities, but less so with IOUs, who are seeking a return on investment. One major drawback is that the utility does not actually own the solar asset. However, it is not uncommon in PPA structures for the utility to have step-in rights, the right of first refusal to purchase, or even the right to take ownership at the end of the term of the contract, when the solar asset is fully depreciated. Leading third-party providers have recently included more customization options than they offered a few years ago. Utilities interested in customization, with greater utility involvement, may find negotiations productive.

A recent Internal Revenue Service (IRS) private-letter ruling suggests that one more possibility—individual ownership of panels in an offsite, community solar project—may offer a new hybrid model. At least two community solar projects, one (the focus of this letter-ruling) at Boardman Hill Solar Farm in Vermont and one at Duck River EMC in Tennessee, have tested this approach, whereby individual participants, who own their panel shares, take advantage of the 30 percent federal residential income tax credit available under Section 25D of the Internal Revenue Code. The Clean Energy States Alliance (CESA) cosponsored the Vermont letter-ruling request and has championed this option, which for now remains available only on a case-by-case basis.[viii]

3. Financing Choices Under the Utility-Driven Model

The utility-driven model assumes that the utility will assume responsibility for community solar program design and project development. Project ownership could be by the utility or by a third party. As more IOUs begin to launch programs and as programs grow in size and importance to the utilities, the market is expected to tilt toward the utility-driven model.[ix] Many IOUs have invested directly in solar projects or developed projects through developer subsidiaries. Both IOUs and developer subsidiaries are able to take advantage of the Investment Tax Credit (ITC) and Modified Accelerated Cost Recovery System (MACRS), in addition to state incentives.

It is important to be mindful of whether the utility is an unregulated or regulated entity and whether it is taxable or not. If the project is owned by an unregulated subsidiary or affiliate, the rate of return would not be regulated and the investment would likely be recovered through

selling energy to a utility. If the project is owned by a regulated IOU, accounting rules usually dictate that the utility must spread the ITC benefit over the useful life of the asset when setting retail electricity rates. This creates a cost disadvantage relative to nonutility developers.[x] Also, a utility-owned project typically achieves a positive cash flow earlier than other financing alternatives, but financing is often run over a longer term.[xi]

The utility-owned model in the consumer-owned utility (COU) sector is constrained by inability to take tax incentives, such as the investment tax credit (ITC) and MACRS.

Under the utility-driven model for both the IOU and COU market segments, the utility is responsible for determining how the program will market and sell electricity to program participants. This involves designing a program that offers a value proposition to the customer that is attractive relative to retail rates, while at the same time balancing the objective of utility cost recovery.

Whether it seeks ownership or not, the utility will have many choices in project finance structure, including bonds or debt financing, a third party PPA, SSA, pre-paid PPA or SSA, lease or flip structure. The following sections outline each of these financing structures.

Bond or Debt Financing

Utility-driven solar projects may be acquired as turnkey projects or developed and built with varying degrees of involvement by the utility. Often, projects are balance-sheet financed through bond or debt financing.

Applications in Investor-Owned Utilities

Given their creditworthiness, IOUs are able to attract favorable rates for debt and equity financing. Investments toward ownership are recovered through a regulated IOU's rate base and earn the company's weighted average cost of capital (WACC). However, in some states, regulatory commissions are still considering whether to allow utilities to earn a return on assets deployed for one segment of their customer base (e.g., community solar), even if the utility guarantees remaining customers will not be impacted. If the state in question has not issued clear guidance, it may be important to review current policy before starting on a development path.[xii]

California passed its own community solar bill, SB 43, which aims to deliver 600 megawatts of solar energy to customers of the three California IOUs by 2018. The California Public Utilities Commission determined in January 2015 that utilities are not allowed to build and own community solar projects under this program,[xiii] which eliminates the option of an IOU-owned asset via bond or debt financing for this program.[xiv]

Applications in Consumer-Owned Utilities

As stated earlier, public power, municipal and cooperative utilities' inability to take advantage of the federal ITC and accelerated depreciation results in utility ownership being a less attractive financing model for this market segment. Public power utilities may be able to make use of direct subsidy bonds – Qualified Energy Conservation Bonds (QECBs). QCEBs are taxable bonds that enable qualified state, tribal and local government issuers to borrow money at attractive rates to fund energy conservation projects. Processes for notifying state authorities of intention to issue QECBs and deadlines for doing so vary.[xv] Municipal bonds represent another source of financing at attractive rates for municipal utilities. For the bonds to qualify as tax-exempt at the federal level, the municipal utility must own and undertake the building of the project with proceeds benefiting the public. The viability of municipal debt financing depends on the credit rating of the municipality. Most municipal utilities are rated, but obtaining a credit rating may be expensive for small municipalities.[xvi]

Cooperative utilities have the option of financing their projects through co-op financing mechanisms which include the Rural Utilities Service (RUS), the National Rural Utilities Cooperative Finance Corporation (CFC), and CoBank. Cooperatives may work with these entities to incorporate additional incentives into their project financing including Rural Energy for America (REAP) grants and loans.[xvii] RUS provide loans to support on-grid renewable energy systems made to cooperatives that typically use RUS financing.[xviii] REAP grants and loans are provided for the purchase, installation and construction of renewable energy systems to agricultural producers and rural small businesses, often including electric cooperatives.[xix] Cooperatives are also working through the National Rural Electric Cooperative Association (NRECA) on new community solar models. Eligible utilities may wish to explore options through NRECA-sponsored resources.[xx]

Utility-Driven Projects Using Third-Party Financing

In addition to the outsourced and utility-owned community solar program options, the utility also may contract with a third party to own and operate the solar system. This ownership structure allows the utility to benefit from the ITC, MACRS, and any state incentives, as these incentives flow down into the project cost. Since the utility cannot claim the system as an asset, some utilities see this as a major reason not to pursue third-party project ownership structures. In particular, most utilities have a limit on how much they can extend their balance sheets. However, one of the greatest benefits in some utilities' view is avoiding system-ownership risk.

As discussed below, several third-party ownership models exist including PPA, SSA, pre-paid PPA or SSA, lease and flip structure.

Power Purchase Agreement

A power purchase agreement (PPA) is a common financing instrument for utility renewable energy projects today. Under a PPA financing model, a separate taxable entity develops, owns and operates the solar project and the utility purchases the power generated by the project through a long-term contract on a $/kWh basis. This taxable entity monetizes the ITC and MACRS and, in theory, passes along some of the benefits to the utility through lower priced electricity.

In the COU market segment, a municipal utility can typically take advantage of the federal tax benefits by leveraging the third-party ownership market structure. This arrangement is not necessarily easily implemented in all states, as in some states it may subject the system owner to regulation as a utility. The Sacramento Municipal Utility District's (SMUD) initial Solar Shares program (2008) is an example of a PPA financing model. EnXco financed, constructed, owns and operates the solar PV system and provides power to SMUD through a 20-year PPA. Subscribers pay a fixed monthly fee for a given capacity subscription and receive a full retail rate credit for its production.[xxi] Other utilities have developed similar community solar programs.[xxii]

Bond Financing for Third-Party Projects

A municipal utility or local government agency may issue municipal debt and transfer the capital to a developer to finance the development costs of the solar project in exchange for a lower PPA or lease price. Government entities are typically able to issue municipal debt at a lower interest rate. However, COUs wishing to take advantage of this approach directly could be thwarted. Such debt is subject to federal taxes because it is used for private development purposes. [xxiii]

One work-around involves the so-called Morris Model, named after a county in New Jersey that had success with it. The model requires the non-taxable entity to arrange bond-financing and to set up a lease-purchase agreement with the developer. This allows pass-through of tax benefits.

However smaller projects suffer from relatively high transaction costs, including legal costs.[xxiv] It is also noteworthy that, while some Morris Model projects have succeeded, later applications of the model have run into problems because incentives and markets changed after development, affecting long-term project viability. Risk assessment is an important step

Solar Services Agreements

The SSA structure offers a relatively straightforward alternative to the PPA, drawing a line between the taxable party and the non-taxable off taker. The system owner designs, installs, and maintains the system and signs an agreement with the host, providing solar power and maintenance. Particular SSA qualifications, under Section 7701(e) of the Internal Revenue Code include:

- The service recipient cannot operate the system for the term of the agreement;
- The service recipient cannot be asked to pay for electricity that it did not receive, nor can it benefit from unanticipated operating cost savings;
- If the service recipient desires a purchase option, the price must be set at fair market value at the time of the sale. [xxv]

Different from a PPA, an SSA is an agreement between the system owner and the system site host, not only for power purchase but also for specific services to ensure continued solar service. The solar developer usually works with a bank (or large investor) and forms a project-specific limited-liability corporation. The developer remains the single point of contact for the term of the agreement.

Leases

There are two common types of leases: the capital lease assumes a lease leading to a purchase, and the operating lease assumes that it is primarily for use of the equipment over a specified term, with the possibility of buyout later. A capital lease spreads the costs over a seven- to 10-year term but there is no down payment required. The tax benefits of ownership including the ITC and MACRS stay with the lessee, so this approach is favorable for taxable utilities.[xxvi]

Utilities are familiar with operating leases as they apply to conventional distribution-system equipment, including generators and range from 6 to 10 years. The utility is simply leasing the equipment which it can operate and maintain or outsource the service, while avoiding the long-term ownership risk. Another benefit to the utility is that, subject to IRS regulations, it does not list either the leased equipment or payment liability on its balance sheet and instead treats lease payments as an operating expense. Under an operating lease, the tax benefits are taken by the lessor and the value is passed back in the form of lower lease payments. Unlike a capital lease with a fixed purchase price at the end of the lease, an operating lease allows the utility to buy the system once all the tax benefits are complete for a "fair market value."[xxvii] One drawback of an operating lease is that the lessee must take all the risk associated with the solar equipment output. If for any reason the system fails to produce, the lessor still expects to be paid. Long equipment warranties are often cited as protection from this risk, the original companies involved may prove hard to find in future years.

Flip Structures

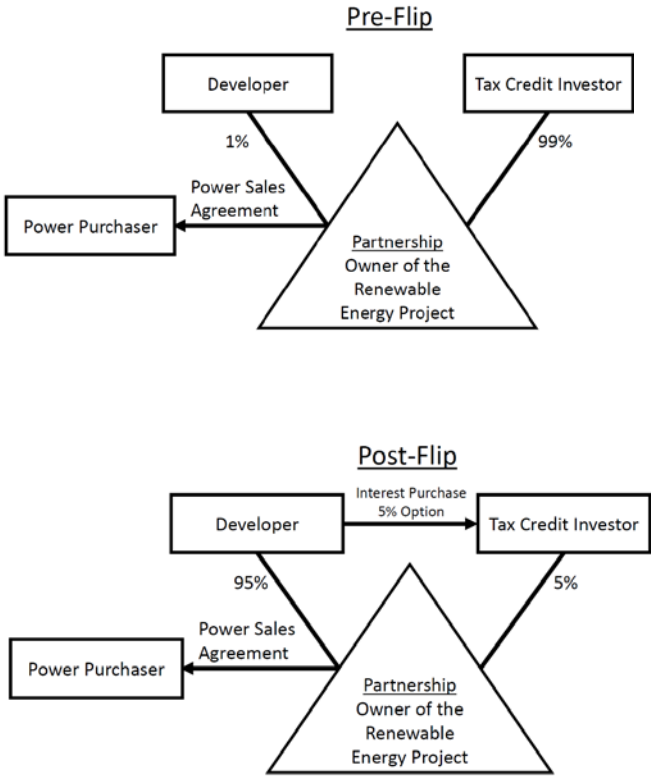

Figure 1. Pre-Flip and Post-Flip Structure.

Another major benefit of a PPA or SSA is that either is compatible with an option to purchase the solar project later, offering some of the benefits of both the third-party owned and utility-owned project structure. This typically occurs in five to seven years, depending on the agreement. The flip model enables a third-party to develop and own the project initially, taking advantage of the tax credit and accelerated depreciation incentives. The ownership is then transferred to the utility, once these incentives are have been claimed.[xxviii] As shown in Figure 1, after the flip, the utility would have the option to buy out all or most of the tax investor's interest in the project at the fair market value of the tax investor's remaining interest.[xxix] The option to take ownership of the project after the tax benefits are wrung out often has mutual advantages for the developers and the utility, as many solar developers do not want to provide solar energy services indefinitely, and utilities understand the long-term value of generating assets. Such a buy-out allows the utility to obtain the energy generation benefits for the plant's remaining life. This is likely 20 to 40 years, based on the operating history of early solar projects and the warranted life-span of current solar components.

4. Conclusion

Community solar provides benefits to customers, particularly the many customers who cannot site or afford a conventional rooftop system. Interest in community solar is growing fast, driven by many competing visions and market players. For utilities, community solar represents both a potential threat and a major opportunity. This working paper is aimed at helping utilities to understand their choices for community solar program development, including financing mechanisms available for both IOUs and COUs. The choices differ based on the type of utility, state regulations and policies, and tax treatment.

This paper has emphasized project development options that would be open to a utility, whether or not the project were intended for marketing as a community solar project. In addition, it refers to outsourced community solar development options. Third-party providers tap a similar set of development options, though they nearly always have taxable status, and rely on available tax incentives.

With regard to community solar program design and project development, each utility must first decide whether to outsource the community solar program to a third-party provider (outsourced model) or to develop the community solar program internally (utility-driven model). For the utility-driven model, there are a number of project finance structures available, including bond or debt financing, third-party owned PPA/SSA, pre-paid PPAs/SSA, lease and a project flip structure. Although the utility capital structure plays an important role in the decision of how to finance the project, this whitepaper is designed to outline the structures available to support community solar development. Programs operating today have utilized a mix of the options described above. It should be noted that expert legal advice will be required to negotiate and structure these solar development deals, as specific project terms and conditions (T&Cs) related to issues such as ownership structure, financing mechanisms, ownership of the renewable energy credits (RECs), and customer interface must be negotiated with all parties.

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[i] Cliburn, J. and Bourg, J. An Introduction to Community Shared Solar Programs for Public Power Utilities, American Public Power Association, 2013.
[ii] Feldman, D., Brockway, A., Ulrich, E., and Margolis, R. Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation, National Renewable Energy Laboratory Publication No. 63892, April 2015.
[iii] Tarbish, Herman K., Inside Minnesota's Disputed Community Solar Deal, July 9, 2015, http://www.utilitydive.com/news/inside-minnesotas-disputed-community-solar-deal/401804/, Accessed Sept. 22, 2015.
[iv] Personal communications with Becky Campbell, (past) SEPA Community Solar Project Principal Investigator at U.S. Department of Energy Solar Market Pathways meeting, Salt Lake City, Utah, May 5, 2015. See http://www.solarelectricpower.org.
[v] Clean Energy Collective, http://www.easycleanenergy.com/, Accessed June 3, 2015.
[vi] SunShare, http://mysunshare.com/, Accessed June 3, 2015.
[vii] Clean Energy Collective, http://www.pvreasolar.com/learn.aspx, Accessed June 16, 2015.
[viii] Clean Energy States Alliance http://www.cesa.org, Accessed September 23, 2015.
[ix] Capage, Adam. Greentech Media. Community Solar: Key Considerations in Designing a Successful Program, http://www.greentechmedia.com/articles/read/Community-Solar-Key-Considerations-in-Designing-a-Successful-Program, Accessed June 3, 2015.
[x] Chavez, Joseph and Coughlin, Jason. Community Solar Programs in Iowa: Issues and Options, December 2013.

[xi] Cliburn, J. and Bourg, J. An Introduction to Community Shared Solar Programs for Public Power Utilities, American Public Power Association, 2013.
[xii] Capage, Adam. Greentech Media. Community Solar: Key Considerations in Designing a Successful Program, http://www.greentechmedia.com/articles/read/Community-Solar-Key-Considerations-in-Designing-a-Successful-Program, Accessed June 3, 2015
[xiii] What is Community Solar, Its Coming to California?, http://www.forbes.com/sites/uciliawang/2015/01/30/what-is-community-solar-its-coming-to-california/, Accessed June 15, 2015.
[xiv] California Public Utilities Commission, Decision Approving Green Tariff Shared Renewables Program for San Diego Gas & Electric Company, Pacific Gas and Electric Company, and Southern California Edison Company Pursuant to Senate Bill 43, http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M145/K822/145822896.pdf, Accessed June 4, 2015.
[xv] Office of Energy Efficiency & Renewable Energy, Qualified Energy Conservation Bonds, http://energy.gov/eere/slsc/qualified-energy-conservation-bonds, Accessed June 1, 2015.
[xvi] Chavez, Joseph and Coughlin, Jason. Community Solar Programs in Iowa: Issues and Options, December 2013.
[xvii] Cliburn and Associates, Strategic Solar Development Opportunities for Electric Cooperatives, Cooperative Research Network of NRECA, Solar Financing, Chapter 7, December 2012.
[xviii] United States Department of Agriculture, Rural Utilities Service, http://www.rd.usda.gov/about-rd/agencies/rural-utilities-service, Accessed June 8, 2015.
[xix] United States Department of Agriculture, Rural Energy for America Program Renewable Energy Systems and Energy Efficiency Improvement Loans & Grants, http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency, Accessed June 8, 2015.
[xx] NRECA Solar Resources Network, https://www.nreca.coop/what-we-do/bts/renewable-distributed-energy/sunda-project/, Accessed September 14, 2015.
[xxi] United States Department of Agriculture, Rural Energy for America Program op cit.
[xxii] Pacific Gas & Electric, Plans to Offer Customers a Community Solar Choice in 2015, http://www.pge.com/en/about/newsroom/newsdetails/index.page?title=20150129_pge_plans_to_offer_customers_a_community_solar_choice_in_2015, Accessed June 4, 2015.
[xxiii] Chavez, Joseph and Coughlin, Jason. Community Solar Programs in Iowa: Issues and Options, December 2013.
[xxiv] Ibid
[xxv] Cliburn, J. and Bourg, J. An Introduction to Community Shared Solar Programs for Public Power Utilities, American Public Power Association, 2013.
[xxvi] Solar World, Commercial Solar Financing Options, Capital Lease, http://www.solarworld-usa.com/commercial-and-government/solar-financing-for-business#Capital_lease, Accessed June 5, 2015.
[xxvii] Solar World, Commercial Solar Financing Options, Operating Lease, http://www.solarworld-usa.com/commercial-and-government/solar-financing-for-business#Capital_lease, Accessed.
[xxviii] Chavez, Joseph and Coughlin, Jason. Community Solar Programs in Iowa: Issues and Options, December 2013.
[xxix] Coughlin, J., Grove, J., et al., A Guide to Community Solar: Utility, Private, and Non-profit Project Development, US Department of Energy, Solar America Communities, November 2010.

APPENDIX

Table 1. Financing Solar Acquisitions for Community Solar Programs						
	Utility-Driven Solar Acquisitions				Outsourced Third-Party Acquisition	
	Utility Developer	Third-Party Developer; Power-Purchase Agreement (PPA)		Operating Lease	Utility as Prime Point of Contact	Customer as Prime Point of Connection
		PPA	PPA with Flip/Buyout			
Financing Mechanism	Bond or Debt	Long-term contract with a third party for the output ($/kWh) of a solar plant. The Solar Services Agreement (SSA) is similar to the PPA, but may be used for non-taxable utilities.	A contract with a third party for the output ($/kWh) of a solar plant, where the utility takes ownership of the solar plant after a specified amount of time. The Solar Services Agreement (SSA) is similar to the PPA, but may be used for non-taxable utilities.	The operating lease (vs. capital lease or lease-to-purchase) is typical for solar. The utility leases plant for its output, which may vary; lessor takes tax benefits. Eligible for buyout in later years.	Provider offers PPA to utility. Panel or share sale or lease offer is arranged between the provider and customer. Provider may offer full or partial outsourced services to the utility, though the utility usually pays benefits to customers through bill credits. Project typically a Special Purpose Entity under SEC rules.	Provider offers long-term PPA to a local customer(s). The utility pays production-based benefits (e.g., virtual net metering). Typically turnkey development, from EPC through O&M. For other (usually small) projects, the customers form a development entity. Must meet SEC requirements.
PV System Owner	Utility	Third-Party Project LLC	Third-Party Project LLC, then Utility	Third-Party	Third-Party Provider sells or leases shares to utility customers. May offer customer financing, sometimes with utility billing support. Buyout option is atypical.	The leading model provides a PPA to local governments, schools, or large, community-based customers. There may be a flip or buyout option.
Term	Typically 15 to 20 years. Other non-taxable financing may run up to 30 years.	20 years or as negotiated; some PPAs include an escalator, intended to reflect the increasing cost of all electricity. Other terms cover aspects of anticipated yearly output, utility rights to access or control, project insurance, etc.	Flip or buyout at market value typically in 5 to 7 years, once the tax credit and MACRS have been monetized. Allows the utility to capture 10 to 20+ years of additional generation benefits. Several variations available.	An operating lease allows a shorter lease term than a capital lease. At the end of the term, the lessor must renew, remove the system or allow purchase of the system at the market value. Terms cannot be set in advance.	Participants purchase a panel or share from the Provider, or agree to purchase a block of power (kWh/month) for a period of time. Usually transferrable between electric meters within the same utility.	Terms between the provider and participant are similar to those of any PPA. Models often require one large “anchor” participant in order to secure financing.

Accounting	On balance sheet.	Off balance sheet.	Off balance sheet prior to flip; On balance sheet after flip.	Off balance sheet and treated as an operating expense.	Off balance sheet, unless an atypical buyout or flip is arranged.	The utility has no obligation, except for interconnection and distribution utility services.
Price to the Utility	Debt or bond financing arrangements impact pricing, as does the utility's access (or lack of access) to tax benefits. Some models tap unique incentives and low-interest rates. Regulations on IOUs may impact the purchase and its benefits.	PPA has a negotiated rate per kWh ($/kWh) which often includes an escalator; PPA typically contracts for the output of the system, typically with O&M and a performance guarantee included.	PPA has a rate per kWh ($/kWh) which often includes an escalator. O&M and a performance guarantee are often included during third-party ownership. The utility purchases the system for fair market value once incentives have been monetized and takes over the O&M.	Fixed payments with pre-determined or "fair market value" purchase option at end of lease.	PPA or FIT agreement at a fixed rate per kWh.	N/A. The utility is not involved, except as related to the costs and benefits of supporting customer-owned distributed generation.
Payments	Monthly, quarterly, or annually.	Usually monthly; Alternatively, the contract may be pre-paid.	Usually monthly until flip in ownership from third-party.	Usually monthly.	Usually monthly.	N/A to the utility.
Federal Energy Tax Credit (ITC)	Taxable utilities (IOUs) qualify. Non-taxable utilities do not, but hybrid acquisition models with taxable developers may pass through some tax benefits.	Investor's account. The project's access to tax benefits should lead to a lower PPA.	Investor's account. The project's access to tax benefits leads to a lower PPA price.	Capital Lease - Lessee would monetize tax benefits, if taxable; under operating lease, the provider monetizes tax benefits.	Third-party program and project developer monetizes ITC.	N/A to the utility.
Federal Depreciation	Investor-owned utilities may access MACRS (5-year accelerated under current guidelines).	Provider accesses MACRS (5-year accelerated under current guidelines).	Provider accesses MACRS (5-year accelerated under current guidelines).	MACRS (5-year accelerated) or Straight-line depending on the type of lease.	MACRS (5-year accelerated).	N/A to the utility.
Renewable Energy Credits	Utility, unless marketed or sold to participants.	Third-Party Owner, unless negotiated.	Third-Party Owner prior to flip; utility afterwards, unless negotiated.	Typically, the lease provider.	The Provider typically holds, but transfers RECs to the utility.	System owner, unless negotiated.

	Table 2: Comparative Summary of Financing Options Community Solar Programs					
	Utility-Driven Solar Acquisitions				Outsourced Third-party Acquisition	
	Utility Developer	Third-Party Developer; Power-Purchase Agreement (PPA)		Operating Lease	Utility as Prime Point of Contact	Customer as Prime Point of Connection
		PPA	PPA with Flip/Buyout			
Pros	Within regulatory guidelines, utilities can earn a rate of return on the solar asset. IOUs may get tax benefits, though normalization which limits the benefit. Municipalities and POUs have access to municipal bonds and QCEBs; Cooperatives may have access to RUS or CFC and CoBank financing, as well as to programs geared for rural development. Some hybrid models take advantage of both tax-exempt financing benefits and third-party tax incentives.	Third-party can take advantage of ITC and MACRS, and will pass some of this benefit to the utility. Utility does not have to take any of the ownership risks. While the lifetime benefits to the utility are not as great as the ownership option, a PPA generally has a lower utility rate impact.	Third-party can take advantage of ITC and MACRS, and will pass some of this benefit to the utility. The utility also can reap the long-term value of the generating asset, after the tax benefits have been monetized.	Utility can treat the project as an operating expense and leave it off its balance sheet and avoid long-term ownership risk. Under an operating lease, the lessor monetizes the tax benefits and it typically passes some of these benefits along.	Allows utility to roll out a program quickly. In the outsourced model, the utility typically has little role in program design, marketing or program subscription, though the program may be utility-branded. Additional services may include support for virtual net metering and customer information apps. Third-party passes through some of the tax benefits.	Usually policy driven, minimally involving the utility. Utility has minimal responsibility. This model is popular with large customers, especially local governments. Also, some community groups or churches may form small shared solar projects if allowed.
Cons	POUs, municipalities or cooperatives cannot monetize the ITC or MACRS benefits directly; IOU must use normalization in accounting for ratepayers. This spreads the benefits over the useful life of the asset (usually 20 years) and shares the benefits with ratepayers. Ownership risks include long-term O&M, managing long-term warranties, insurance for catastrophic events, and removal if the project becomes obsolete.	Third-party debt may be more costly than utility debt. Utility cannot incorporate project as part of rate base and earn a rate of return. Also, the project typically outlives the PPA (producing for 35 years or more), so utilities forego long-term benefits.	Third-party debt may be more costly than utility debt, so if the utility can monetize the tax incentives it may make sense to own the project from the beginning. The more complicated financing model requires tax and legal support, which may be costly for relatively small projects.	Utility must take risk associated with the solar equipment output, as expected to make lease payment regardless of system production. A buyout may be arranged, but not at the time of the original agreement.	Similar to the drawbacks for PPAs, including third-party debt may be more costly, utility cannot incorporate project as part of rate base and project outlives PPA. In addition, the utility loses some connection with its customers, who deal exclusively with the third-party. Consumer-protection risks possible. Some third-party provider's offer limited customization.	Projects present some technical risks and possibly some equity risks as only a small subsector of customers can take advantage of this model; small customers are involved there may be consumer protection risks. Modeled on net metering programs, with the same risks to the utility.

About the Authors:

Andrea Romano is a Senior Consultant with the Navigant Energy Practice in San Francisco. Her work focuses on community solar, solar due diligence, market and policy assessment and program evaluation. Additionally, she has conducted wind and energy efficiency market research, developed potential and forecast models and is focused on the current landscape and development of zero net energy buildings. Andrea also has experience in commercial and utility solar project development.

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About the Community Solar Value Project:

The Community Solar Value Project aims to increase the scale, reach, and value of utility-based community solar programs by using strategic solar technologies, siting, and design, and by integrating suitable companion measures, such as demand-response (DR) and storage into broad program designs. Such measures can address solar variability, so that costly distribution-engineering solutions and regional-level ancillary services can be minimized. Market development for this new model also is being addressed. The project is led by the San Francisco-area energy consulting and analytics firm Extensible Energy, LLC, with support from Cliburn and Associates, LLC, Olivine, Inc., and Navigant Consulting. Utility participants include the Sacramento (California) Municipal Utility District (SMUD), Public Service of New Mexico, and other utilities nationwide. The project is powered by SunShot, under the Solar Market Pathways program of the U.S. Department of Energy. Program Manager: Jill Cliburn, who can be reached at jkcliburn@cliburnenergy.com. Project Officer: John Powers, at john@extensibleenergy.com.

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Disclaimer

This working paper is subject to continued revisions, improvements, and updates.