Utility-Led Community Solar—A "Win-Win" for Customers & Electric Utilities?

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Introduction

Electric utilities across the nation have been grappling with effective ways to respond to customers who are interested in obtaining electricity generated from solar energy. In recent years, there have been several efforts, some of them successful such as in Georgia, to make it more cost effective for customers to generate their own electricity and sell the excess to the local electric utility.[1]

At the same time, there have been efforts to restructure net metering -- policies which were originally designed to expand distributed generation -- in ways that may discourage the spread of small solar installations such as those used by homeowners and small businesses. Examples include a recent recommendation in an Arizona Corporation Commission proceeding that credit for solar-generated energy be based on short-term cost studies or on the cost of solar power from utility-scale arrays rather than retail rates[2]; the termination of conventional net metering by the Hawaii Public Utilities Commission in 2015[3]; and an amendment to the Kansas net metering statute to effectively reduce, for new installations, the amount utilities pay customer-generators for electricity generated in excess of the customer's needs.[4] Despite these and other well-publicized efforts to restructure net metering rules, the public continues to support solar power.

Pew Research Center found in a mid-2016 survey that the public supports expansion of solar and wind energy production by 89% to 9% and 83% to 14%, respectively. Approximately 41% of those polled said they have seriously considered installing solar panels at home, with the largest percentage (two-thirds) residing in the West and the smallest percentage in the South (35%). The same poll also revealed strong support for more solar panel farms: 89% in favor and only 9% opposed. Support for additional solar energy production is bipartisan and is greater than for other energy sources including more wind farms

[1] Leon Kaye, "Georgia Legislature Passes Landmark Solar Bill," *CleanTechnica*, April 1, 2015, https://cleantechnica.com/2015/04/01/georgia-legislature-passes-landmark-solar-bill/. Last accessed April 2, 2017.

[2] David Wichner, "ACC Judge Backs Move to Scrap Solar Net-metering," *Arizona Daily Star*, October 31, 2016. http://tucson.com/business/tucson/acc-judge-backs-move-to-scrap-solar-net-metering/article_e289a929-4d7a-5e6d-88d2-7d7d9c41b4ce.html, Last accessed April 2, 2017.

[3] National Conference of State Legislatures, "State Net Metering Policies," November 3, 2016, http://www.ncsl.org/research/energy/net-metering-policy-overview-and-state-legislative-updates.aspx. Last accessed April 2, 2017.

[4] Kansas Legislative Research Department, "2014 Summary of Legislation," July 2014, http://www.kslegresearch.org/KLRD-web/Publications/SummaryofLegislation/2014_summary_of_legislation.pdf. Last accessed April 2, 2017.

(83%), more offshore drilling (45%), more nuclear power plants (43%), more fracking (42%), and more coal mining (41%).[5]

Utility-scale solar-generated electricity is generally less expensive per unit than electricity generated at smaller, distributed solar installations, all things equal.[6] Despite the cost differential, a segment of the customer base --residential customers-- apparently would rather have more involvement in procuring and managing its supply than is possible with large, utility-owned and operated solar arrays as evidenced by the fact that the residential sector accounted for approximately 54% of total distributed solar net generation during 2016.[7]

For customers who can neither afford nor take advantage of rooftop distributed generation for other reasons, community solar may provide a sense of connection to the source of their electricity and enable utilities to engage with their customers who have expressed that need.

The National Renewable Energy Laboratory (NREL) defines community solar as:

> a solar energy deployment model that allows customers to buy or lease part of an offsite shared solar PV system. Participants typically receive a monthly bill credit for electricity generated by their share of the solar photovoltaic (PV) system, as if the system were located on their premises.[8]

Community solar is sometimes referred to as 'shared solar' or 'solar garden.' Often, the differing names are used in state law. For example, the Colorado authorizing legislation, one of the first enacted in the U.S., authorizes "creation of community solar gardens."[9] Functionally, there is no significant difference between shared solar and solar gardens.[10]

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[5] Cary Funk and Brian Kennedy, "The Politics of Climate," Pew Research Center, October 4, 2016, http://www.pewinternet.org/2016/10/04/the-politics-of-climate/. Last accessed April 2, 2017.

[6] Solar Energy Industries Association. "Issues & Policies: Utility-Scale Solar Power," http://www.seia.org/policy/power-plant-development/utility-scale-solar-power [stating "What distinguishes utility-scale solar from distributed generation is project size and the fact that the electricity is sold to wholesale utility buyers, not end-use consumers. Utility-scale solar plants provide the benefit of fixed-priced electricity during peak demand periods when electricity from fossil fuels is the most expensive."] Last accessed April 2, 2017.

[7] U.S. Energy Information Administration (EIA), *Monthly Energy Review March 2017,* March 28, 2017, Table 10.6, https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf. As defined by EIA, distributed solar capacity comprises installations of less than 1MW connected to the electric power grid. Last accessed April 2, 2017.

[8] National Renewable Energy Laboratory (NREL), "Technology Development, State and Local Governments: Community Solar," October 7, 2015, http://www.nrel.gov/tech_deployment/state_local_governments/community-solar.html. Last accessed April 2, 2015.

[9] Colorado House Bill 10-1342 (2010 Session) established a pilot solar gardens program.

[10] See, for example, Kennedy Maize, "Solar Gardens: A Fast-Growing Approach to Photovoltaic Power," *Power Magazine,* May 1, 2015, http://www.powermag.com/solar-gardens-a-fast-growing-approach-to-photovoltaic-power/; Jason Coughlin, et al, "A Guide to Community Shared Solar: Utility, Private, and Nonprofit Project Development," NREL, May 2012, http://www.nrel.gov/docs/fy12osti/54570.pdf; and David Feldman, Anna M. Brockway, Elaine Ulrich, and Robert Margolis. "Shared Solar: Current Landscape, Market Potential, and the Impact of Federal Securities Regulation," U.S. Department of Energy, Technical Report, NREL/TP-6A20-63892, April 2015; http://www.nrel.gov/docs/fy15osti/63892.pdf. Last accessed April 2, 2017 (all sources).

Community solar is a form of ownership and capacity can vary considerably. Community solar projects are typically larger than distributed generation projects located on rooftops. Community solar projects average 1 MW, compared to an average of 6.1 kW for residential distributed generation systems, although they can range from 20 kW to 2 MW in capacity.[11] They supply power exclusively to retail customers, in contrast to utility-scale projects of 1 MW or more (using EIA's definition)[12] that may sell electricity to wholesale purchasers. NREL explained the community solar arrangement as letting "customers enjoy advantages of solar energy without having to install a system on their own residential or commercial property. Community solar projects provide distributed solar access and benefits to customers who: have insufficient solar resources (e.g., due to shading, roof size, etc.); do not own their homes; or are unable or unwilling to install solar for financial or other reasons."[13]

Utilities for the most part have added community solar projects recently to their array of services. Many are still trying to determine their impact on customers and customers' satisfaction with those programs.

Community solar appears to be growing. GTM recently projected that over 400 MW of community solar will be installed in 2017, up from an estimated 218 MW in 2016 and 52 MW in 2015.[14] Cory Honeyman, a senior analyst and co-author of an earlier GTM market outlook report on community solar, predicted that the growth of community solar will be led by utilities through 2020. He observed:

> The [growth] is really pegged to the fact that utilities are looking for a way to strengthen their relationship with customers via some kind of solar product offering that keeps customers ultimately on the grid, as rooftop solar becomes an increasingly attractive value proposition. This is a happy medium approach for utilities to get their skin in the game."[15] Utilities may also view community solar as a way to eventually market solar and non-solar products to their customers, including energy efficiency and storage services. [16]

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[11] U.S. Environmental Protection Agency (EPA), "Community Solar: an Opportunity to Enhance Sustainable Development on Landfills and Other Contaminated Sites," December 2016, at 4, https://www.epa.gov/sites/production/files/2016 12/documents/epa_repowering_community_solar_discussion_paper_final_120716_508.pdf. Last accessed April 2, 2017.

[12] EIA, *Monthly Energy Review March 2017,* at ftn. 7.

[13] NREL, "State and Local Governments," [defining community solar], http://www.nrel.gov/tech_deployment/state_local_governments/community-solar.html?print. Last accessed April 2, 2017.

[14] Mike Munsell, "America's Community Solar Market Will Surpass 400MW in 2017," *Greentech Media*, February 6, 2017, https://www.greentechmedia.com/articles/read/us-community-solar-market-to-surpass-400-mw-in-2017. Last accessed April 3, 2017. The projection for 2017 may be an underestimate because the National Rural Electric Cooperative Association projects the addition of 480 MW in 2017 from rural electric cooperative members alone. See also Herman K. Trabish, "As Solar Booms, Utilities Look to Build New business Models with Strategic Investments," *Utility Dive*, March 14, 2017, http://www.utilitydive.com/news/as-solar-booms-utilities-look-to-build-new-business-models-with-strategic/437899/. Last accessed April 3, 2017 (both sources).

[15] Rebecca Kern [citing Honeyman], "State Policy, Utilities Ignite Community Solar Growth," *Bloomberg BNA*, September 22, 2015, https://www.bna.com/state-policy-utilities-n57982058595/.

[16] Herman K. Trabish [citing Honeyman], "Note to Utilities: Here's Why 2015 is the 'Tipping Point' for Community Solar," *Utility Dive*, August 11, 2015, http://www.utilitydive.com/news/note-to-utilities-heres-why-2015-is-the-tipping-point-for-community-sol/403284/. Last accessed April 3, 2017.

This paper is organized into sections as follows:

- Why might community solar be part of an electric utility's outreach strategy?
- What are arguments for community solar from the customer's perspective?
- What are arguments against community solar?
- What are best practices and principles that could potentially align customers' and utilities' interests?
- Can community solar align customer and utility interests?
- What is the status of community solar frameworks in the states?
- Case studies of four community solar projects in Kansas and Florida.
- What are the potential impediments to utilities moving forward with community solar projects?
- Concluding observations.

To provide a context for these questions, this paper cites examples from features in the community solar policies of 16 states and the District of Columbia that provide for community solar in statute or regulation as well as findings from case studies in Kansas and Florida. The case studies include information gathered by the authors during interviews with several officials of two utility companies in each state. We selected Florida and Kansas for our case studies because these states have not restructured their retail markets, have a relatively high capacity for solar energy, and no state-level requirement or framework governing community solar. Moreover, community solar legislation was not considered in either state in 2016.[17] Neither state has a binding renewable portfolio standard. Moreover, both states have net metering requirements.

Why Might Community Solar be Part of a Utility's Outreach Strategy?

Electric utilities might want to support community solar projects as a means of overcoming some of the negative publicity related to their positions on various regulatory issues important to a vocal subset of customers. In particular, electric utilities' positions toward net metering have generated contentious debates with solar advocates and utility customers.[18] Early efforts on the part of utilities to restructure

[17] Even though no community solar bills were introduced in Kansas in 2016, bills were introduced in three states in closed proximity: Iowa, Nebraska, and Missouri. See Jeffrey J. Cook, "Solar Policy and the 2016 Legislative Session across the States," NREL, March 17, 2016, https://www.nrel.gov/tech_deployment/state_local_governments/blog/solar-policy-and-the-2016-legislative-session-across-the-states . Last accessed April 3, 2017.

[18] See, for example, Roberto Labastida, "Community Solar: an Unlikely Utility Savior," *GreenBiz,* May 2, 2016, https://www.greenbiz.com/article/community-solar-unlikely-utility-savior. Last accessed April 3, 2017.

net metering arrangements occurred in states such as Arizona, California and Hawaii, with relatively high distributed generation adoption rates among customers using solar technologies.[19] For example, Hawaii's Public Service Commission decided to repeal its net metering rules in 2015, offering other tariffs in its place.

Electric utilities have argued in proceedings across the nation that net metering shifts costs from participating customers to those who do not install and use distributed generation. In Kansas, for example, an attempt was made in 2014 to repeal net metering. The result of that effort was the reduction of the maximum allowable capacity of net metering projects and a reduced basis for compensating net metering customers for excess capacity sold to the utility at the end of each month (based on avoided cost rather than full retail rate).[20]

Unlike the Kansas Legislature, Florida's Legislature has not pursued efforts to reduce or limit net metering. Yet, four large electric utilities serving the majority of Floridians generated negative public reactions to their support for a proposed 2016 constitutional amendment. That measure appeared on the November 2016 ballot but failed to receive 60% of the vote as required for adoption. Depending on one's interpretation, that proposal would have either enshrined the existing net metering policy in the Florida constitution or it would have undermined efforts for customers to install solar arrays on their rooftops.[21] Contributing to the negative view of utilities were reports that the intent of the utility-proposed amendment was to confuse voters who were originally expected to face two solar amendments on the November 2016 ballot (only the utility-backed amendment was ultimately placed on the ballot).[22]

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[19] See examples and discussion in Pamela Prah,"States Brace for Utilities, Solar Advocates Clash," *Stateline*, The Pew Charitable Trusts, February 19, 2014, http://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2014/02/19/states-brace-for-utilities-solar-advocates-clash. Last accessed April 3, 2017.

[20] Karen Uhlenhuth, "In Defeat for ALEC, Kansas Lawmakers Pass Net Metering Plan," *Midwest Energy News*, April 7, 2014, http://midwestenergynews.com/2014/04/07/in-defeat-for-alec-kansas-lawmakers-pass-net-metering-plan/. Last accessed April 3, 2017.

[21] Those authors positing the second interpretation included David Pomerantz, "Florida's Amendment 1 Defeat Shows Why Solar Won't be Stopped, Trump or no Trump," *Utility Dive*, November 14, 2016, http://www.utilitydive.com/news/floridas-amendment-1-defeat-shows-why-solar-wont-be-stopped-trump-or-no/430373/; and Amanda Paulson, "On Florida Ballot, a Utility-backed Measure Might Harm Solar Power," *Christian Science Monitor*, November 3, 2016, http://www.csmonitor.com/Environment/Inhabit/2016/1103/On-Florida-ballot-a-utility-backed-measure-might-harm-solar-power. Last accessed April 3, 2017 (both sources).

[22] That seemed to be the conclusion of Florida Supreme Court justice Barbara Pariente who wrote in her dissent from the Court's finding regarding the 2016 solar ballot initiative for Amendment 1: "Masquerading as a pro-solar energy initiative, this proposed constitutional amendment, supported by some of Florida's major investor-owned electric utility companies, actually seeks to constitutionalize the status quo . . . This ballot initiative is the proverbial 'wolf in sheep's clothing'." [citation omitted] Justice Pariente was joined in that dissent by Justices Quince and Perry. Supreme Court of Florida, *Advisory Opinion to the Attorney General Re: rights of Electricity consumers Regarding Solar Energy Choice*, No. SC15-2150, *Advisory Opinion to the Attorney General RE: Rights of Electricity Consumers Regarding Solar Energy Choice (FIS)*, No. SC16-12, March 31, 2016. at 23-24, http://cases.justia.com/florida/supreme-court/2016-sc15-2150.pdf?ts=1459436490. Last accessed April 5, 2017. The Vice-President of the James Madison Institute also suggested that the utilities strategy had a deceptive intent in remarks made at a conference in Nashville on October 2. See Mary Ellen Klas, "Insider Reveals Deceptive Strategy Behind Florida's Solar Amendment," *Miami Herald*, October 18, 2016, http://www.miamiherald.com/news/politics-government/election/article109017387.html. Last accessed on April 3, 2017 (both sources).

While Florida voters rejected the utility-supported solar constitutional amendment, Nevada's voters in the November 2016 general election approved a preliminary measure that would break up NV Energy's vertically integrated structure and permit competition in the retail electric market. Preceding that initiative, casinos in the state, which currently has a traditionally regulated electricity market, wanted to procure electricity from providers other than the incumbent utility and took issue with exit fees imposed by the public utility commission.[23] As the Florida and Nevada examples show, customer trust in their electric utilities can be eroded for several reasons.

Customer trust can also be undermined by rate hikes that are perceived as being unjustified. For example, AARP issued a statement that was very critical of a rate increase approved for FPL which, in AARP's view, would be detrimental to residential customers, particularly those on fixed incomes and modest means.[24] The *Miami New Times* even connected FPL's financial backing of the failed solar constitutional amendment with the rate increase: "After spending most of 2016 wasting more than $8 million on a failed campaign designed to trick consumers into giving up their rights to solar panels, FPL is now patting itself on the back by hiking rates by $811 million dollars, despite already bringing in profits of more than $1.5 billion per year."[25] Gulf Power also experienced what might be considered a customer backlash to its initial proposal in the rate case proceeding to increase fixed charges on electric utility bills. That provision was eliminated in a settlement agreement the company reached with other participating parties. The Florida Public Service Commission received over 1,000 comments from customers. Solar advocates viewed this as a victory for distributed generation because higher fixed charges reduce the attractiveness of that supply option.[26]

A rate increase was also approved by the Kansas Corporation Commission in September 2015 for Westar, the only investor-owned electric utility based in Kansas. Before the Commission approved the rate increase (the result of a settlement agreement for what turned out to be approximately half of the utility's requested amount) the utility had proposed allowing customers to choose between two rate plans that solar advocates considered to be punitive. If a headline in Westar's hometown newspaper was any indication of customer temperament, trust in the utility was low: "Public expresses anger, skepticism toward Westar rate hike plan at hearing."[27] The number of public comments filed with the Kansas

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[23] Associated Press, "Energy Choice Initiative Passes in Nevada," *Reno-Gazette Journal,* November 9, 2016, http://www.rgj.com/story/news/politics/2016/11/09/energy-choice-initiative-passes-nevada/93528566/. Last accessed April 3, 2017.

[24] Patti Shea, "Utility Monopoly Gets Unanimous OK from Government Panel for Unwarranted Rate Increase," AARP, November 29, 2016, http://states.aarp.org/aarp-florida-disappointed-in-public-service-commissions-side-deal-florida-power-light/?cmp=SNO-FCBK-FL-112916. Last accessed April 3, 2017.

[25] Jerry Iannelli, "After Spending $8 Million to Deceive Solar Voters, FPL Shamefully Hikes Rates by $811 Million," *Miami New Times*, November 29, 2016, http://www.miaminewtimes.com/news/after-spending-8-million-to-deceive-solar-voters-fpl-shamefully-hikes-rates-by-811-million-8957975. Last accessed April 3, 2017.

[26] See, for example, Lauren Tyler, "Fla. Solar Advocates Praise Gulf Power Settlement," *Solar Industry*, March 21, 2017, http://solarindustrymag.com/fla-solar-advocates-praise-gulf-power-settlement. Last accessed April 3, 2017.

[27] Jonathan Shorman, '"Public Expresses Anger, Skepticism Toward Westar Rate Hike Plan at Hearing." CJonline.com., July 21, 2015, http://cjonline.com/news-state/2015-07-21/public-expresses-anger-skepticism-toward-westar-rate-hike-plan-hearing. Last accessed April 3, 2017.

Corporation Commission in response to the proposed rate hike exceeded 1,500.[28] The Commission ultimately decided to deal with the solar compensation issue in a separate proceeding.[29]

How might utilities move beyond negative scenarios of the sort described above? One approach has been collaborative stakeholder processes that result in settlement agreements such as the Gulf Power example cited previously. Another promising approach is the development of policies for community solar that benefit both electric utilities and their customers and for utilities to make those policies integral parts of their outreach efforts.

Customer survey responses show that utilities need to be creative in order to retain customer loyalty. The consulting group Market Strategies analyzes residential customers' trust of utility brands (electric and natural gas) based on a survey that measures management performance and customers' emotional attachment using six factors. The survey also measures customers' satisfaction with utility operations Results of the survey are published in an annual report titled Utility Trusted Brand & Customer Engagement ™: Residential a Cogent Reports ™. The report released in July 2016[30] showed that nearly 40% of residential customers would leave their current utility if they had an opportunity, giving utilities an average score of 693 of a possible 1,000 points. Nonetheless, should they decide to make use of it, utilities have a built-in advantage as being trusted resources for their customers. New York's REV report on customer engagement cited a 2013 report of a multi-year, international survey of utility customers that found both customers' perceptions of and the utility's own vision of its role as the most significant energy advisor.[31]

Electric utilities in the U.S. have considered community solar a means of building trust with the customer by providing a sought-after and valued service as technologies and business models continue to evolve. If implemented effectively, community solar may be the sweet spot where customer and utility interests intersect. Community solar projects generally allow utilities to retain customers on the grid and allow customers, even those without their own rooftops or the capital necessary for their own solar installation,

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[28] Dion Lefler, "KCC Approves Westar Settlement; New Rates Will Cost Customers $5 to $7 a Month," *The Wichita Eagle*, September 24, 2015, http://www.kansas.com/news/politics-government/article36377943.html#storylink=cpy. See also Stephen Koranda, "Opponents Voice Concerns over Westar's Kansas Rate Increase Proposal," Kansas Public Radio, July 22, 2015, http://kansaspublicradio.org/kpr-news/opponents-voice-concerns-over-westars-kansas-rate-increase-proposal. Last accessed April 3, 2017 (both sources).

[29] For a description of the outcome of that proceeding, see Morgan Chilson, "Westar's Solar Program Offers Environmental Benefits, Potential Savings," CJonline.com, January 18, 2016, http://cjonline.com/news-business-local-state/2016-01-18/westars-solar-program-offers-environmental-benefits-potential and the case study on Westar below.

[30] Market Strategies International. *Utility Trusted Brand & Customer Engagement ™: Residential*, Cogent Reports ™, 2016.

[31] Specifically, an OPower report cited by the Customer Engagement Committee (created to identify and address barriers to customer participation in markets created by the New York REV initiative) found that 77% of customers in the U.S. looked to their utility, rather than government agencies and third-party entities, for information on how to manage their energy. See "Reforming the Energy Vision (REV)Working Group I: Customer Engagement, Staff Report on the Work of the Customer Engagement Committee," July 8, 2014, Attachment 7, at 6, https://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/853a068321b1d9cb85257d100067b939/$FILE/WG%201_Customer%20Engagement_Final%20Report%20&%20Attachments.pdf. Last accessed April 3, 2017.

to obtain electricity generated from a renewable resource. According to a recent article in Bloomberg.com, "The market for community solar could eventually exceed rooftop solar and giant desert solar farms because it can supply low- to moderate-income renters, multi-unit apartment buildings, and homes and businesses with unsuitable roofs.[32]

In addition to reaching customers who otherwise would not have direct access to solar power, some utilities use community solar projects as a way to customize services to customers along the lines of home energy management systems. Utilities are cited as viewing community solar projects as a means of responding to customer demand by filling a niche in the market.[33]

Clearly, the term "community solar" has positive connotations for customers, so much so that Edison Electric Institute (EEI), an umbrella organization for the investor-owned electric industry sector, sought to use that term to describe "utility-scale solar," resulting in some push-back from the solar community.[34] EEI considered this rebranding idea because findings from focus groups suggested that while many participants had no particular opinion of electric utilities, other participants had a negative opinion. The latter group saw electric utilities as monopolies, with no incentives to serve customers and technologies that were dated.[35] The EEI tactic may demonstrate that community solar is still at an early stage of acceptance and understanding by many utilities but that at least a reference to "community" might be a means of improving public perception of utilities.

What are the Arguments for Community Solar from the Customer's Perspective?

There are at least three good reasons for electric utilities to include community solar as part of their overall strategies: 1. customers appear to like the concept if they are familiar with it; 2. not all customers who want rooftop solar can access it or afford it; and 3. in some cases, customers may benefit more economically from community solar projects than from individual solar projects. These reasons are summarized below.

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[32] Chris Martin, "Community Solar Offers Alternative That Utilities Like," Bloomberg.com, September 13, 2016, https://www.bloomberg.com/news/articles/2016-09-13/community-solar-offers-alternative-to-rooftops-utilities-like. Last accessed April 3, 2017.

[33] Stephen Lacey, "Utilities Taking a More Proactive Approach to Community Solar," *Greentech Media*, September 30, 2015, https://www.greentechmedia.com/articles/read/utilities-taking-a-more-active-approach-to-community-solar. Last accessed April 3, 2017. This seemed to be the motivation for Austin Energy which saw community solar as filling a niche particularly for commercial customers. The utility enrolled customers rapidly with little marketing and charged them a monthly premium to participate. See Robert Walton, "They're Not Meters or Ratepayers': Inside Austin Energy's Customer-focused Business Strategy," *Utility Dive*, March 22, 2017, http://www.utilitydive.com/news/theyre-not-meters-or-ratepayers-inside-austin-energys-customer-focused/438650/.

[34] Gail Reitenbach, "EEI Gets Pushback on Proposed Rebranding of Utility Solar," *Power*, March 30, 2016, http://www.powermag.com/eei-gets-pushback-on-proposed-rebranding-of-utility-solar/?pagenum=2. Last accessed April 3, 2017.

[35] Kate Sheppard, "This Messaging Guru Is Helping Utilities Clean Up Their Appearance," *Huffington Post*, updated April 1, 2016, http://www.huffingtonpost.com/entry/messaging-utilities-solar-power_us_56f45cd6e4b014d3fe22b572. Last accessed April 3, 2017.

Customers like solar but are not generally familiar with community solar. Most polls, such as the Pew Research Center's poll referenced above, show wide support for solar energy.[36] However, the questions in such polls may not distinguish between rooftop and community solar. The Shelton Group, however, made that distinction in its survey of 2,001 residential customers which was conducted December 11-18, 2015.[37] The initial questions covered customers' interest in and reasons for using solar power in general. Of those surveyed, 59% replied they were interested in using solar at home. Nearly two-thirds of those who reported being interested responded that lowering monthly energy costs was one of several possible reasons for interest in solar. Other commonly chosen reasons for interest in solar included helping the environment, gaining control and independence from the utility, and making a good home investment, in that order of preference. There was an even split in preferences between rooftop and community solar (after surveyors provided information about community solar lease and subscription options). The most frequently cited reason for preferring rooftop solar was more control (41%) and a preference for owning the system (39%).

The Shelton Group's survey found that after survey participants were provided with information about community solar, 47% said they were interested. Respondents who indicated that they preferred community solar to rooftop solar cited as their main reasons cost-related concerns: they couldn't afford rooftop (39%) and with community solar, there were no associated maintenance costs (39%). The survey findings showed that cost sensitivity was the largest driver of community solar preferences of residential customers compared to control-related issues informing rooftop solar preferences.

In general, community solar programs offer customers the option of making smaller investments compared to much more costly investments associated with rooftop solar installations. Income constrained customers might find that installation of rooftop solar on their property to be financially out of reach. Even if affordability is not an issue, certain customers may derive more benefits from community solar than from systems installed on their properties because community solar installations may realize economies of scale with respect to engineering, procurement, construction, operations and maintenance.[38]

In addition to affordability, access is another reason certain customers who want to subscribe to solar cannot do so: they may be renters, their roofs may be too shaded, or their roofs may be oriented in such a way to preclude optimal exposure to solar radiation. National estimates of customers who have properties that are not suitable for rooftop solar installations vary. However, according to NREL, nearly half of all residential and business customers would fit that description.[39]

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[36] See Funk and Kennedy at ftn 5.
[37] The Shelton Group and Smart Electric Power Alliance, "What the Community Solar Customer Wants," August 11, 2016. See reference to the report at http://sheltongrp.com/how-can-community-solar-be-successful/. Last accessed April 3, 2017.
[38] The National Regulatory Research Institute (NRRI), "The Ecology of Community Solar Gardening: A 'Companion Planting' Guide," August 31, 2017, at 9.
[39] See Feldman et al., at v, at ftn. 10.

What are Arguments against Community Solar?

As with any such initiative, community solar programs can trigger opposition from utilities and customers if they are designed in such a way to shift participant costs to non-participants. Essentially, this is the same set of objections raised in net metering proceedings. This issue of cost-shifting appeared to be one of the reasons that community solar legislation considered in California in 2012 failed to garner legislative support. Ultimately, pilot programs implemented by San Diego Gas & Electric were designed to avoid shifting costs from community solar participants to non-participants.[40] At the heart of the discussion is the question: "who pays?" On the one hand, if costs to participants are too high, customer take-up will be low. On the other hand, if the program design results in cost-shifting, utilities may resist the program, fearing customer and regulator objections.

Like many other types of proposed utility projects and infrastructure, such as transmission facilities, community solar can engender resistance from neighbors--the Not in My Backyard reaction. Such was the case in Watertown Township, Minnesota where a 45-acre plot of agricultural land was to be leased to a solar farm developer. The proposal called for SunEdison, a California-based company, to produce solar power under a contract with Xcel Energy. However, county residents opposed the project before the county commission. They expressed concern about the intended land use, the project scope, the impact on the land, declining property values, the potential dangers such as stray voltage, and the financial viability of SunEdison. [41] The county commission decided to support the project but it did not succeed in eliciting support from the most directly affected customers.

Finally, if cost is the paramount concern of customers who support solar, utility-scale solar is the logical choice, at least based on the price per kWh. The larger projects are also those with which investor-owned electric utilities have had the most experience. The comparison between utility-scale and residential PV is pretty clear-cut, with the former being far less costly to the customer than the latter.[42] With respect to comparisons between utility-scale and community solar, economies of scale also favor the utility-scale projects, all things equal.

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[40] Ian Mathews, Cyrus Pinto, Chris Jenkins, Rick Castro, "Analysis of Community Solar Policy Developments in the State of California:
Recommendations to Advance Community Solar Via the SEEDZ Initiative," Stanford Public Policy Team, December 13, 2012, https://publicpolicy.stanford.edu/publications/analysis-community-solar-policy-developments-state-california-recommendations-advance. Last accessed April 3, 2017.

[41] Melissa Priebe, "Solar Garden Approved Despite," *SunPatriot*, June 16, 2016, https://sunpatriot.com/2016/06/16/solar-garden-approved-despite-opposition/. Last accessed April 3, 2017.

[42] Bruce Tsuchida, Sanem Sergici, Bob Mudge, Will Gorman, Peter Fox-Penner, Jens Schoene (EnerNex), "Comparative Generation Costs of Utility-Scale and Residential-Scale PV in Xcel Energy Colorado's Service Area," Prepared for FirstSolar, The Brattle Group, Inc., July 2015, http://brattle.com/system/publications/pdfs/000/005/188/original/Comparative_Generation_Costs_of_Utility-Scale_and_Residential-Scale_PV_in_Xcel_Energy_Colorado's_Service_Area.pdf. Last accessed April 3, 2017.

What are best practices and principles that could potentially align customers' and utilities' interests?

The concepts of expanding access and affordability are captured in the principles for an ideal community solar program outlined by the Interstate Renewable Energy Council (IREC) in a 2013 report:

> **Broad based:** "Shared renewable energy programs should expand renewable energy access to a broader group of energy consumers, including those who cannot install renewable energy on their own properties."
> **Tangible benefits to customers**: "Participants in a shared renewable energy program should receive tangible economic benefits on their utility bills."
> **Responsive to customers:** "Shared renewable energy programs should be flexible enough to account for energy consumers' preferences."
> **Complement other renewable energy programs:** "Shared renewable energy programs should be additive to and supportive of existing renewable energy programs, and not undermine them."[43]

Principles, of course, are just that. Defining the base of eligible customers, determining the "tangible" economic benefits, identifying customer preferences, and developing policies that do not undermine but enhance community solar programs involve examining carefully the details of program design.

Can Community Solar Align Customer and Utility Interests?

If electric utilities want to build customer trust and, at the same time, realize benefits from community solar projects, how might their interests be most effectively aligned with those of their customers? As discussed above, building trust means adding value so customers benefit from community solar arrangements. For their part, electric utilities must also benefit, by, for example, adding assets to their generation fleet or engaging with customers as future purchasers of both solar and non-solar goods and services.[44] If the generation cost of electricity from a community solar project cannot be justified compared to utility-scale solar projects, perhaps a community solar investment can be justified as a means of evening out the flow of electricity on the grid, thus avoiding the cost of otherwise needed system upgrades.[45] To align that interest with customer participation in community solar projects, the avoided cost from additional upgrades may be shifted to tangible benefits for those participants.

Vertically-integrated utilities typically consider several issues in developing a community solar program. These considerations are based on the business model most common in states with vertically-integrated utilities where the utility owns, manages, and administers the projects, and administers the bill credits. As reflected in the Community Solar Policy Decision Matrix Guidance for Designing Community Solar

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[43] Interstate Renewable Energy Council, "Model Rules for Shared Renewable Energy Programs," 2013, http://www.growsolar.org/wp-content/uploads/2014/10/IREC-Model-Rules-for-Shared-Renewable-Energy-Programs-2013.pdf. Last accessed April 4, 2017,
[44] See Trabish, at 5, at ftn. 16.
[45] Cassandra Sweet, "Unleashing Innovation: Energy (A Special Report) --- Tap the Sun, Together: Community Solar May be Poised to Take Off," *The Wall Street Journal*, September14, 2015: R.5, https://www.wsj.com/articles/solar-power-sharing-programs-may-be-poised-to-take-off-1442197726. Last accessed April 4, 2017.

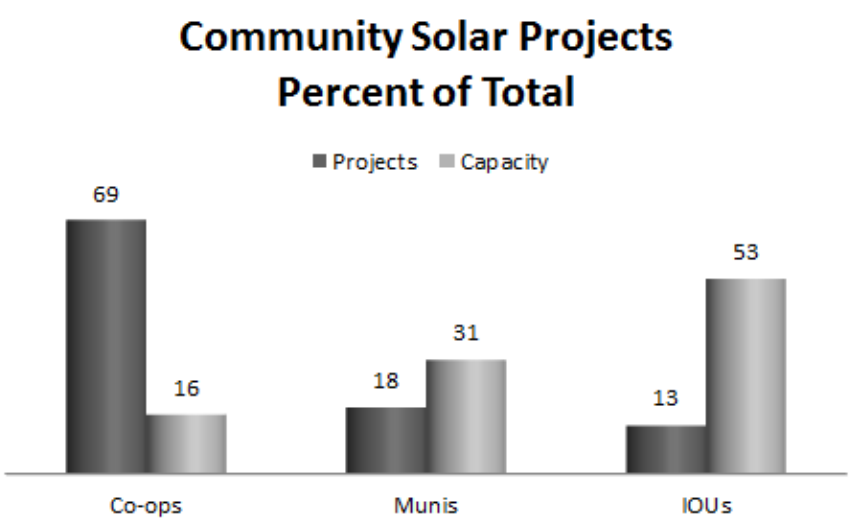
Programs[46], program design considerations include: the structure of the program (size of program and customer selection process); the basis of compensation (valuation of and mechanism for applying credits); customer participation (number of customers, number of allowable shares per customer, carve-outs or limits for different customer classes, and portability of shares); size limits and contractor requirements governing projects; the treatment of low-income customers, and the clarity and transparency of policies related to interconnection, among other items.

What is the Status of Community Solar Frameworks in the States?

Most of our knowledge of community solar comes from states that have adopted laws or statewide rules enabling community solar projects. As of December 16, 2016, 17 states and the District of Columbia have done so, including: California, Colorado, Connecticut, Delaware, Hawaii, Illinois, Maine, Maryland, Massachusetts, Minnesota, New Hampshire, New York, Oregon, Rhode Island, Vermont, Virginia, and Washington.[47] As of September 2014, SEPA found that 31 of the 57 utility-offered community solar projects it tracks were located in states which that had enacted community solar legislation.[48] Except for Colorado, Hawaii, and Washington, all of these states have partially or wholly restructured retail electricity markets. According to one report, community solar is "thriving" in five states: Minnesota, Colorado, New York, Massachusetts, and Maryland.[49]

Rural electric cooperatives have taken the lead with respect to the number of community solar projects administered, followed by municipal utilities and then investor owned utilities. In terms of community solar capacity, however, the relationship between the types of utilities is reversed as shown in the figure below.[50]

[46] Coalition for Community Solar Access, Community Solar Policy Decision Matrix Guidance for Designing Community Solar Programs, November 2016, http://www.communitysolaraccess.org/wp-content/uploads/2016/03/CCSA-Policy-Decision-Matrix-Final-11-15-2016.pdf. Last accessed April 4, 2017.
[47] The Appendix includes a table displaying references to state statutory or regulatory authority for community solar.
[48] Becky Campbell, Daisy Chung, and, Reane Venegas, "Expanding Solar Access Through Utility-led Community Solar," ed. K. Kaufmann, September 2014, at 5, http://www.sepapower.org/media/214996/community-solar-report-ver5.pdf.
[49] Herman Trabish, "The New Guide to the Community Solar Galaxy," December 15, 2016, http://www.utilitydive.com/news/the-new-guide-to-the-community-solar-galaxy/431130/. Last accessed April 4, 2017.
[50] Deloitte Center for Energy Solutions, "Unlocking the Value of Community Solar," 2016, [citing Community Solar Hub, National Rural Electric Cooperative Association, American Public Power Association 2015-2016 Annual Directory and Statistical Report, at p. 6,], https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-er-unlocking-the-value-of-community-solar.pdf. Last accessed April 4, 2017.



Source: Graphic by authors based on Deloitte Center for Energy Solutions, *Unlocking the Value of Community Solar*, 2016.

Cooperatives and municipalities typically do not have to submit proposed projects to a state regulator so they can generally take on community solar projects more expeditiously. A recent example is Ouachita Electric Cooperative of Camden, Arkansas which has only 9,400 meters and plans to build an array of about 4,080 panels on about 5.5 acres of land, enough to power 250 homes.[51]

While investor-owned utilities lag behind co-ops and municipal utilities in offering community solar, some state regulators recently have approved community solar projects. Idaho, Missouri, and South Carolina have not restructured their retail electricity markets and do not have specific community solar statutes or regulations. The Idaho Public Service Commission approved an application by Idaho Power to build a 500 kW project that is estimated to cost $1.2 million to be paid back through customer subscriptions over a 25- year period.[52] The Missouri Public Service Commission also approved Ameren Missouri's request to build one or maybe even two community solar facilities of 500 kW each. Construction is based on subscriptions and the project will not be built until it is fully subscribed.[53] Duke Energy in South Carolina

[51] Ouchita Electric Cooperative, "Ouachita Electric Cooperative to Build Second Solar Array with Today's Power, Inc.," March 2, 2017, http://www.oecc.com/cooperative-news. Last accessed April 4, 2017.
[52] Peter Maloney, "Idaho Regulators Approve State's First Utility-owned Community Solar Project," *Utility Dive*, November 8, 2016, http://www.utilitydive.com/news/idaho-regulators-approve-states-first-utility-owned-community-solar-projec/430002/. Accessed April 6, 2017.
[53] Karen Uhlenhuth, "Missouri Regulator Approves Major Utility's Community Solar Plan," *Midwest Energy News*, October 10, 2016, http://midwestenergynews.com/2016/10/10/missouri-regulator-approves-major-utilitys-community-solar-plan/. Last accessed April 4, 2017.

planned to begin the roll-out of a community solar program in 2017 although details are not yet publically available.[54]

[54] Frank Andorka, "Duke Program Produces 40 MW of Solar in South Carolina," *PV Magazine*, December 23, 2016, https://pv-magazine-usa.com/2016/12/23/duke-program-produces-40-mw-of-solar-in-south-carolina/. Last accessed April 4, 2017.

Case Studies from Florida and Kansas

Utilities in Florida and Kansas were selected for case studies because these states are similarly situated in important ways. Both states have traditionally-regulated electric utilities. Neither has specific statutory authorization for community solar, and in fact, some community solar business models would arguably be prohibited in both states. For example, third-party electricity suppliers cannot sell to retail customers. Retail sales of electricity can be made only by certified utilities and only within their certified service territories.[55]

Community solar projects are new additions to services provided to utility customers in both states. Community solar projects in both states are few, tend to be small, utility-led, and not part of a larger program. Neither state has restructured its retail electricity market. Florida and Kansas are among the 21 states that do not have a binding Renewable Portfolio Standard.[56] Kansas had a statutory RPS until it was repealed in 2015 and replaced by a voluntary goal.[57] Utilities in states with RPS statutes may view community solar as a means of complying with their RPS requirements; neither Florida nor Kansas would have that incentive.

Both states have net metering statutes. Kansas' law changed in 2014 and the treatment of net metering likewise changed for customers who began operating their solar systems after the new law took effect. Put simply, as of July 1, 2014 the basis for compensation was reduced, as was the maximum allowable project size for residential and non-residential customers.[58] Florida's law permits bigger projects to be subject to net metering arrangements and also has a different compensation basis but neither state's net metering law allows excess capacity to be sold back at retail rates.[59]

Clearly there is more potential for large, utility scale solar array siting in Kansas than in Florida because so much of the land in Kansas is relatively sparsely populated. However, in terms of the average photovoltaic solar resources, the states are similar.[60]

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[55] A measure was proposed to amend the Florida Constitution to authorize 3rd-party retail electricity sales in the state but the measure failed to attain the required number of valid signatures for inclusion on the November 2016 general election ballot. This measure may be further circulated for signatures, and if a sufficient number is obtained, submitted for inclusion on the 2018 ballot. See Florida Department of State, Division of Elections, "Limits or Prevents Barriers to Local Solar Electricity Supply." February 2014, http://dos.elections.myflorida.com/initiatives/initdetail.asp?account=64491&seqnum=1. Last accessed April 4, 2017.

[56] Jocelyn Durkay, State Renewable Portfolio Standards and Goals, December 28, 2016, http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx. Last accessed April 4, 2017.

[57] See 2015 House Sub. for SB 91; repealing binding standards at KSA 66-1258; K.S.A. 2016 Supp. 66-1256.

[58] Database of State Incentives for Renewables & Efficiency (DSIRE), NC Clean Energy Technology Center, Net Metering, last updated August 12, 2015, http://programs.dsireusa.org/system/program/detail/3403 (Kansas). Last accessed April 4, 2017.

[59] See DSIRE, NC Clean Energy Technology Center, Net Metering, last updated November 9, 2015, http://programs.dsireusa.org/system/program/detail/2880 (Florida). Last accessed April 4, 2017.

[60] NREL, "PV Solar Radiation: Flat Plate Tilted South at Latitude," (10 km - static maps (1998 to 2005 data), annual average http://www.nrel.gov/gis/images/map_pv_us_annual10km_dec2008.jpg. See also John Sterling and Ted Davidovich, SEPA in partnership with Recurrent Energy, "Utility-scale Solar: the Path to High-Value, Cost-Competitive Projects," April 1, 2016, Appendix B, at 23,

Finally, both states have elderly populations (65 years old and older) that are above the national average. Older people in owner-occupied housing (23.9% in Kansas and 30.7% in Florida) are less likely than their younger cohorts, on average, to enter into long-term power purchase agreements. The proportion of occupied rental units is likewise similar in both states (34% renter occupied in Kansas and 36% in Florida).[61] Renters, like the elderly, are not positioned to enter into rooftop solar arrangements. Finally, adults under 35 years old tend not to have sufficient financial resources to invest in rooftop solar arrays.

The case studies below describe the experiences of utilities in Kansas and Florida that have developed community solar projects. Two of the four projects profiled are operated by municipal or cooperative electric utilities. Two are operated by regulated IOUs. Table 1 summarizes the projects.

Table 1
Community Solar Case Studies -- Summary

Utility	Type of Utility	Community Solar Project size	Drivers	Customer Response	Third-party developer/operator
Midwest Energy, Hays, Kansas	Cooperative	1 MW	Customer interest	All shares sold within 1 year.	Yes. Handled all administrative and operational aspects.
Westar Energy, Topeka, Kansas	Investor-owned	10 MW 1,200 shares (max 4, 1KW shares per customer)	Customer interest; desire to provide choices to customers; desire to meet the needs of customers without suitable rooftop arrangements.	87% subscribed in first year of marketing (as of time of interview).	Yes. Construction and operation of the facility for 25 years.
Orlando Utilities	Municipal	400 KW	Customer interest; large	All subscriptions	Yes. Handled installation and

http://www.sepapower.org/media/466271/utility-scale-solar-the-path-to-high-value-cost-competitive-projects.pdf. See also Anthony Lopez, Billy Roberts, Donna Heimiller, Nate Blair, and Gian Porro, U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis, NREL, July 2012, Table A-2, at 25, http://www.nrel.gov/docs/fy12osti/51946.pdf. Last accessed April 4, 2017,

[61] U.S. Census, "2015 American Community Survey 1-year Estimates, Demographic Characteristics of Occupied Housing Units," Table ID S2502.

Table 1 Community Solar Case Studies -- Summary					
Utility	**Type of Utility**	**Community Solar Project size**	**Drivers**	**Customer Response**	**Third-party developer/operator**
Commission (OUC), Orlando, Florida			numbers of residences unsuited to rooftop solar	sold in 6 days; waiting list established	operation only.
Gulf Power, Pensacola, Florida	Investor-owned	1 MW (planned)			

The authors interviewed representatives of each utility and asked about the drivers for the community solar project, program design, advantages and disadvantages to the utility, and lessons learned by the utility. OUC and Midwest Energy had fully implemented programs whereas Westar and Gulf Power were in the early stages of their respective projects. Table 2 below shows the four utilities in the case studies and the sources of information for the summaries below.

Table 2 Utility and Sources for Case Studies	
Utility	**Sources**
Midwest Energy, Hays, Kansas	Earnie Lehman, Pat Parke and Mike Morley
Westar Energy, Topeka, Kansas	Don Ford, KCC Order in docket #
Orlando Utilities Commission, Orlando, Florida	Luz Aviles, Sam Phoi, Jennifer Szaro
Gulf Power, Pensacola, Florida	Holly Henderson and Lonnie Noack, FPSC order on Gulf Power

Midwest Energy Case Study

About Midwest Energy:

Midwest Energy, located in central Kansas, is the largest retail electric cooperative in Kansas with approximately 51,000 customers. Midwest Energy also owns and operates electric generation and transmission assets and is a natural gas utility serving 42,000 customers. Annual operating revenues exceed $200 million. Table MW-1 shows the company's capacity resource mix.

Table MW-1
Midwest Energy 2015 Capacity Resources

ENERGY	MW	PERCENTAGE
Contract Coal	150	37
Contract Gas/Coal	155	38
Contract Gas/Oil	4.5	1
Wind	3	1
Hydro	3	1
Owned Generation-Gas/Oil	90	22
Total	406	100

Midwest Energy, Annual Report 2015, https://www.mwenergy.com/assets/images/uploads/pages/2015_Annual_Report-compressed.pdf.

Context for the community solar program:

Midwest Energy began to consider developing a community solar project in about 2011, spurred by internal discussions and responses to customer surveys.

Why the utility wanted to be involved:

Midwest Energy conducts random consumer satisfaction surveys. In 2011-2012, questions were inserted that attempted to gauge customers' interest in community solar. Customers (roughly a third) indicated interest in community solar. Midwest Energy also wanted an opportunity to learn more about community solar projects and solar installations in general.

Given the interest in offering solar as part of its overall energy supply mix, community solar was a small but workable option. Utility-scale solar is viewed as a being more cost-effective than community solar per kWh when the utility controls and contains the delivery margin as is the case with Midwest Energy's project. From Midwest Energy's perspective, rooftop solar is the least cost-effective solar option because net metering and interconnection agreements require the utility to credit customers based on retail cost.

Program design:

In partnership with the Clean Energy Collective (CEC) located in Boulder, Colorado, Midwest Energy opened up participation in its community solar program to residential and commercial retail customers on a first-come, first-serve basis, with 3,960 panels available for purchase. CEC is the project developer and operator. Its ongoing responsibilities include marketing and maintaining system performance.

Midwest Energy's project is 1 MW, with panels mounted on a single-axis tracking system, which, according to the utility, should result in a roughly 30% efficiency gain over traditional roof-mounted panels. The project began producing commercial electricity on Feb. 1, 2015. As of March 2016, all the panels were sold.

Midwest Energy and CEC contributed to a limited pool of rebates, which brought the price of each panel to $891, or $2.92/watt, installed. All maintenance and insurance were included under this one-time price. Customers also can sell their panels or take energy credits with them if they move within the utility's electric service territory. Although the project is relatively small, if a customer moves out of the service area, there is a potential for the customer's asset to be stranded from a cost recovery perspective, i.e. a panel owner who moves but does not sell the panel to another Midwest Energy customer will not realize benefit of credits on his/her electric bill. Customers entered into a solar interest purchase agreement for 20 years with CEC and for its part Midwest Energy entered into a power purchase agreement (PPA) for 25 years.

Each panel produces 0.305kW. Customers purchased individual panels for their own use at that fixed price which rolled in the energy rate. Certain assumptions regarding the energy cost informed the credits provided to the customer on their monthly bills. Energy costs to customers were computed at 10.5 cents a year (of which 0.5 cents is retained by CEC), and the amount adjusts annually based on Midwest Energy's prior-year average retail rate. Customers receive a credit on their bill based on the previous month of electricity that is produced by solar through the community solar project. If there is less solar production in a given month, the customer's credit will be less. The project has a 16-year simple payback for customers and realized a payback of 6% in the first year of production.[62]

Advantages to the utility:

[62] In a recent article, Mr. Morley claimed that savings per panel amounted to $57 a year although the amount fluctuated depending on the weather. See Morgan Chilson, "Westar's Solar Program Offers Environmental Benefits, Potential Savings," *Topeka Capital-Journal Cjonline.com*, January 18, 2016, http://cjonline.com/news-business-local-state/2016-01-18/westars-solar-program-offers-environmental-benefits-potential. Last accessed April 4, 2017.

Customer satisfaction: After implementation of the community solar project the Smart Electric Power Alliance conducted a survey of six utility community solar programs including the Midwest Energy project to gauge customer attitudes toward community solar and certain aspects of their utility's program implementation. Over one-third of Midwest Energy's customer respondents indicated they were more satisfied with the utility as a result of the program. None were less satisfied. That response was much the same as that of the survey respondents as a whole.[63]

Program design with partner: By having CEC assume project management responsibilities, Midwest Energy is not responsible for the maintenance of the panels.

Administrative ease: It is easier for a utility to require participants to purchase panels rather than for the utility to manage customer subscriptions. Because customers had to buy the panels upfront, they tended to be more affluent and less likely to default on their bills.

Cost assignment: The business model is easier to justify to nonparticipants because they do not incur any program costs.

Disadvantages to the utility:
Although Midwest Energy surveyed customers about their potential interest in community solar prior to implementing the program, there was a gap between interest and willingness to pay. The sales effort to enroll participants lasted over a year.

Take-away observations:

- If a follow-up project were done, Midwest Energy might wait until there is greater demonstrated demand, and then conduct more of the marketing internally. Such an approach may build upon Midwest Energy's trusted local presence in a largely rural service area.
- To address the laggard enrollment issue, it might be best to consider bigger community solar projects with binding upfront commitments for the purchase of panels. Bigger projects keep costs lower per participant, all things equal, and therefore make participation more attractive. Binding upfront commitments reduce the risk to the utility.
- The customer profile was not what was expected from the initial interest survey. In the marketing phase, farmers were more interested in community solar than urban residents. Retirees were particularly interested and more for financial than for environmental reasons. The initial expectation was that urban and younger customers would be most likely to enroll. However, retirees in particular were attracted to the 6% initial annual payback.[64]
- Marketing issues: As part of its partnership obligation, CEC was responsible for the marketing of panels. However, its marketing effort relied on online/digital outreach whereas direct mail in Midwest Energy's service area in Kansas generally is more effective. CEC was also expanding

[63] SEPA, "Community Solar Programs Benchmark Report [Midwest Energy section],"No date. Provided to authors by Pat Parke, Midwest Energy.
[64] Mr. Morley was cited in a recent news article as saying that businesses purchased community solar panels because they thought it would affect their bottom line. See ftn. 62.

rapidly in the early years of the Midwest Energy community solar project so there was a lot of staff turnover in addition to the lack of familiarity with the profile of Midwest Energy customers.

- Project complexity: Community solar is complex for utilities to explain and for customers to understand. Specifically, SEPA's survey of Midwest Energy, included in the benchmark survey of six utilities with community solar referenced above, indicated that there was some customer confusion about how the credits operated. Customers also have a hard time grasping the benefits of community solar because of the distance between the community solar arrays and their homes.

OUC Case Study

About OUC:

OUC is a municipal electric and water service utility serving a population of 246,000 in parts of Orange and Osceola counties in Florida, including the cities of Orlando and St. Cloud. The utility has $2 billion in assets and an annual operating budget of more than $673 million.

Table OUC-1
AVERAGE OF WINTER AND SUMMER PEAKING CAPACITY OWNED BY OUC
As of January 1, 2016

ENERGY	MW	PERCENTAGE
Coal	762	51
Nuclear	60	4
Gas/Oil	684	45
Total	1,506	100

Source: "OUC: The Reliable One: 2016 Ten-Year Site Plan," Prepared for Orlando Utilities Commission, Table 3-1 April 2016, http://www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/TenYearSitePlans/2016/Orlando%20Utilities%20Commission.pdf. Average capacity computed by authors.

Context for OUC Community Solar Project:

In 2010 OUC convened customer focus groups and many customers expressed interest in solar energy. However, numerous customers live in rental units or in housing otherwise not suitable for rooftop solar. Over half of the housing units in the two cities served by OUC are multi-family units, which generally are not good sites for rooftop solar. In addition to the relatively large number of multi-family housing units, Orlando also has many historic buildings and trees that make many residential structures ill-suited for solar generation.

Why the utility wanted to be involved:

OUC considered community solar to be a way of reaching more customers who were interested in renewables but were not able to install rooftop arrays.

Program design:

OUC's community solar array is located at the Gardenia facility and has a 400 kW capacity. The system was commissioned and developed in October 2013 by ESA Renewables and was subsequently acquired by Spear Point Energy. Spear Point entered into a 25-year PPA with OUC. Shares of the project were sold

to OUC residential and small business customers in one-KW increments with a cap of 15 kW per subscription. All 39 currently active subscriptions were sold in 6 days and a waiting list was established.

The project began operation in October 2013. Only customers with good utility payment records were eligible for enrollment. Customers paid an upfront $50 administrative fee which is refunded after the initial two years in the program unless the customer leaves the service area within the first two years of participation.

Each subscriber enters into an agreement with OUC. The utility has agreed to charge subscribers a fixed rate of $.13 per kWh monthly for the duration of the subscription. There is no fuel cost escalator in the agreements with customers. The PPA kWh rate with Spear Point is $0.18 but OUC was able to reduce the cost to customers to $0.13 by applying the production incentive. The rate of $0.13 kWh was $.015 higher than the average rate at the time the agreements were made but will not escalate for the term of the agreement. For their part, customers receive virtual net metering benefits for the amount of their share of solar production that exceeds their usage. The break-even point for subscribers was projected to be 5-7 years.

Advantages for the Utility and Customers:

Community solar is one of several solar options available for customers of OUC. It is also a means of meeting customer-identified need.

For customers, community solar is an affordable means of investing in solar production with minimal upfront cost and with the knowledge that the rate will be stable and will not exceed the locked-in rate for the duration of the community solar agreement.

Disadvantages for the utility:

More expensive than necessary: The project siting on a parking garage of a third-party-owned site added complexity and expense to the project. The operation and maintenance costs were also included in the budget with the capital costs for the project which made the overall cost per kWh to customers more expensive than would otherwise have been the case.

Customer confusion: The subscription cost for the next community solar project under development will be $.075 per kWh for the all-in rate, due in part to significant reductions in solar project development and operation costs. This new rate may confuse customers who subscribed to the first project at the higher rate of $0.13 kWh.

Take away observations:

- A shorter duration PPA would give the utility more control over costs. The next project will have a 20-year duration.
- Escalator clauses give the utility more control over fuel costs. The next project will provide for a price increase after 5 years.
- The next community solar project will be bigger in order to realize a greater economy of scale and allow for more subscriptions.
- Initially with the first project, there was a concern about shifting costs to non-participating customers. Customers received net metering benefits with the Gardenia project and that issue attracted negative publicity.

- Solar production contributes to the shoulders of customer demand and not to peak demand. Therefore, it is more easily justified, at least for OUC, on the basis of improving customer relations and adding to fuel mix diversity than on aligning the utility's supply with peak demand. This might change once storage costs come down and more storage technology is adopted.

WESTAR Case Study

About Westar:

Westar Energy, the largest investor-owned utility in Kansas, is headquartered in Topeka, Kansas, and serves 704,000 electric customers in eastern and east-central Kansas. Its power plants generate more than 7,000 MW of electricity. Table W-1 shows the company's capacity resource mix.

TABLE W-1 GENERATING CAPABILITY 2016		
SOURCE	**MW**	**PERCENTAGE**
Coal	3,235	43
Nuclear	551	7
Natural gas/diesel	2,357	32
Renewable	1,380	18
TOTAL	**7,523**	**100**
Westar, United States Securities and Exchange Commission, Form 10-K, fiscal year ended December 31, 2016 , http://investors.westarenergy.com/phoenix.zhtml?c=89455&p=irol-reportsannual (under annual report)		

Context for community solar program:

In 2012 Westar started to explore the option of adding solar energy to its resource mix. The company initiated several small projects that involved installing solar panels on the roofs of six company-owned facilities. The company also placed solar arrays at schools, nature centers, and the Sedgwick County Zoo, among others, and undertook efforts to educate and inform students and the public about the benefits of solar energy. See https://www.westarenergy.com/content/clean-energy-kansas/our-commitment/solar-is-rising. Renewables are gaining prominence in Westar's generation mix, with one-third of the retail load projected to come from renewables (primarily wind) in 2017.

Why the utility wanted to be involved:

Westar is interested in offering a community solar option because it gives customers more choice and is based on the premise that customers will feel more empowered if they are presented with additional options. From polling conducted in 2014, Westar discovered that most customers did not know about the proportion of renewables in the company's resource mix. Small solar initiatives, including community solar, engender support for Westar's inclusion of those resources in the company's supply portfolio. The company considered community solar a good option for customers who are interested in solar, but who are not well situated to have rooftop panels because of shade, residence in a multi-family housing unit, or restrictions of their local homeowner association.

Program design:

The design of Westar's community solar program was established in a rate case settlement that permits

Westar to undertake a solar community project of up to 10 MW, provided the project costs accrue to participating customers and are not shared by nonparticipants. Another condition was that the project had to be fully subscribed before construction could begin.

The company entered into a PPA using a 3rd party contractor (SoCore) to build and operate the facility over the 25-year period. SoCore was selected via competitive bid. No escalator provisions were included in the PPA. The project was based on all-in cost, flat pricing for 20 years.

The project is composed of 1,200 shares. Subscribers can obtain a maximum of 4 shares (each share is approximately 1 kW) which approximates the capacity of a rooftop solar installation and estimated production of 140-150 kWh monthly. The subscription shares per customer are limited to the maximum of the subscriber's lowest monthly electricity consumption divided by the estimated output per share. If the customer's consumption in any month does not reach the amount generated from the project, the customer receives a credit based on avoided cost.

Participants pay a set price monthly for the number of kWh subscribed. Subscriptions last for a minimum of 5 years and can extend to 20 years. Subscribers can withdraw from the program after 5 years. The rate is set for the length of the initial subscription. Subscribers pay $29.63 monthly for the residential rate cost per share. Overall, the community solar rate is higher than that paid by non-solar customers. There is no up-front investment. As a precondition for subscription in the project, customers must have a good payment history with Westar.

Westar made the community solar program available to residential and commercial subscribers. At the time of writing, there were 442 subscribers, most of whom are residential customers. Only 2.4% of all subscribers are commercial. Most live in Lawrence and Wichita.

Westar started marketing the project in late 2015 and by early 2017, approximately 87% of capacity was subscribed for. The company publicized the project through bill inserts, social media, word of mouth, but did not do any major advertising.

Advantages to the utility from program/program design:

Community solar provides another renewable resource option for Westar's customers. It complements other renewable energy options offered by the company including distributed generation available through net metering.

Disadvantages to the utility:

The Kansas Corporation Commission refused to allow any community solar project to be rate based. Therefore, community solar subscribers have to be motivated by reasons other than low cost because they pay a premium to be a subscriber.

Take-away observations:

- The subscription price may have been a barrier to subscribers. The company tried to make the cost to customers roughly equivalent to what customers would pay to put panels in their roofs. All the standard riders (distribution, transmission etc.) are included in the overall project cost that formed the basis for subscription pricing.

- If customers are interested in solar for reducing their electric bills, subscribing to the community solar project is difficult to justify. Westar was not allowed by the state regulator to implement a project that shifted costs in any way to nonsubscribers.
- The cost of supplying baseload energy is low on average in Westar's service areas with large-scale wind costs now approximating costs for coal. These low costs are reflected in rates to customers, thus making it more difficult for customers to choose solar options on a cost basis.

Gulf Power Case Study

About Gulf Power:

Gulf Power is an energy provider and subsidiary of Southern Company based in Atlanta. Gulf Power, with headquarters in Pensacola, Florida, serves 449,491 customers in Northwest Florida and has generating capacity of 2,585 MW. Its combined generation and purchased power capacity in 2015 was 4,605 MW, with purchased power accounting for 41% of its energy assets. (See https://www.gulfpower.com/pdfs/our-company/AnnualReport-GulfPower-2015.pdf, at 8.) Gulf Power operates no nuclear plants.

Table GP-1
AVERAGE OF WINTER AND SUMMER PEAKING CAPACITY OWNED BY OUC
2015

Fuel (primary)	MW	PERCENTAGE
Coal	1745	74
Natural Gas	584	25
Light Oil	36	1.5
Landfill Gas	3	0.1
Total	2,368	100

Source: Gulf Power, TEN YEAR SITE PLAN 2016-2025, April 2016, http://www.psc.state.fl.us/Files/PDF/Utilities/Electricgas/TenYearSitePlans/2016/Gulf%20Power.pdf. Average capacity computed by authors.

Context for community solar program:

Renewables from solar production in Gulf's service territory are expanding with solar farms in Pensacola and Fort Walton Beach expected to be in operation by summer 2017 and with construction of a third farm at Holley Field in Navarre. The Pensacola solar farm was part of a collaboration with the naval air station there and the solar farm in Fort Walton Beach was developed with Eglin Air Force. Gulf Power plans to lease the land from these military bases and sublease it to a renewable energy developer, Coronal Energy. Gulf Power projects 120 MW of power will come from these farms, enough to supply electricity to 18,000 homes. (See http://www.pnj.com/story/money/business/2017/01/19/solar-energy-farms-target-summer-launch/96720052/.)

Small-scale solar projects have also been part of the company's plans for its supply portfolio. In terms of community solar, a voluntary photovoltaic rate rider was approved in 1999 which allowed customers

to purchase 100-watt blocks of solar energy for $6 each. The program was not implemented due to insufficient commitments to purchase that number of blocks. No customers were ever charged under the tariff which was suspended in January 2016. Subsequently, Gulf decided to offer another community solar program, Gulf Solar Energy Share, on a pilot basis using a different program design. The Florida Public Service Commission approved that program in March 2016.

Why the utility wanted to be involved:

The Gulf Solar Energy Share program was designed to benefit the customer and to reach people who are otherwise unable to consume electricity from solar resources for whatever reason. The program is expected to enable Gulf Power to learn more about community solar by gathering and analyzing data on customer interest and satisfaction, the duration of customer participation, management of such a program, and program costs and sustainability.

Program design:

The program is intended to be a 5-year pilot project with annual reports to furnish information on participation levels, subscription fee revenues, facility performance, and costs of the program. At the end of five years, Gulf Power will petition the Public Service Commission to continue, modify or terminate the program. The initial project will be 1 MW with an option to construct additional facilities. The program has not yet been implemented. Once the program is implemented, the authors were informed that the numbers are expected to change even though the approach will remain the same as was approved by the Florida Public Service Commission.

Customers will be able to subscribe annually ($99) or commit to five years at $89 a year. Customers will be limited to the number of subscriptions that would not exceed their average annual individual power consumption. If the program is fully subscribed, the subscriptions fees should cover the entire, levelized annual revenue requirement of the solar facility, projected to total $270,000. Subscriptions will not be portable outside the service area. However, if a customer moves within the company's service area, the customer can transfer the subscription to the new bill account. The subscription cannot be transferred to another customer. The number of subscriptions was projected to be limited to 2,880, which was determined by dividing the levelized annual revenue requirement by a 50/50 mix of $99 and $89 subscriptions.

Customers will receive a monthly bill credit per subscription (estimated at the time of filing to be $2.11 per subscription). The credit is calculated by multiplying the projected average annual avoided energy cost by the projected output per subscription and would be re-calculated annually. The company plans to seek recovery of avoided energy costs through its fuel adjustment clause. If the program is not fully subscribed, shareholders will assume the risk of unsold subscriptions.

Gulf Power plans to market the program to its residential, commercial, and industrial customers through targeted e-mails, bill inserts, social media, print, and a video on its website and through social media.

Advantages to the utility from program design/implementation:

A pilot program will enable the company to gather project data without having to commit too many resources to it over the long term. Specifically, the company anticipates getting a better sense of the

customers' actual willingness to pay a premium for solar. To gauge initial interest in community solar, the company retained a market research firm to conduct focus groups and customer surveys. During the marketing research phase of the project, Gulf Power learned that roughly 2% of residential customers interested in community solar and 1% of small commercial customers who were interested in community solar said they were definitely willing to pay a premium. The average annual premium was $346 for residential customers and $414 for business customers. However, customers' indication of willingness to pay in surveys and focus groups may not materialize once customers are faced with program enrollment options.

On a related note, the company anticipates being able to evaluate the marketing costs and other administrative costs needed to realize full subscription to the program.

Disadvantages to the utility:

The challenge to the utility will be to satisfy its participating customers when they will be receiving only roughly one quarter of their subscription fee back in monthly bill credits.

Will other benefits outweigh the lack of a monetary benefit? It is unclear exactly what will propel customers to participate. Program participants will be paying a premium for participation in the program and the bill credits will not completely offset subscription fees.

Take-away observations:

Investor-owned utilities like Gulf Power find themselves trying to make a business case for two different constituents with interests that are not necessarily aligned: customers interested in community solar want to be assured that their needs are met and regulators do not want community solar project costs shifted to nonparticipating customers.

What are the Potential Impediments to Utilities Moving Forward with Community Solar Projects?

Because community solar is a relatively new form of distributed generation, there are still many areas that require further study. However, there have been a sufficient number of program experiences to pinpoint potential problems, both in design and implementation. We list impediments identified in the literature on community solar and interpolate observations from our Florida and Kansas interviews.

Regulatory Approval: In states that have not restructured their retail markets, investor-owned utilities need to seek approval from regulators to proceed with community solar projects. Regulators may be unwilling to spread any excess costs of community solar broadly across all customers absent a compelling demonstration that costs and benefits accrue to the same ratepayers. Westar proposed two community solar projects before a third was approved in a Kansas Corporation Commission order because the Commission did not want nonparticipants to subsidize participants.

Jurisdictional Issue: Although this is not likely to apply to Kansas and Florida, there is a jurisdictional issue in regions of the country where utilities do not own generation and independent suppliers bid into a market at the wholesale level which is under FERC's regulation and managed by RTOs.[65]

Inter-related Nature of Community Solar Design Features: The various features comprising community solar policies need to be considered holistically. If one component is changed, it will likely affect others.[66] For example, the manner in which credits are structured affects customer participation and if the allowed maximum size of the facility is small, the credit rates will go down because there will be a smaller revenue flow. Failure to understand the interactions of these policy features can cause delays in implementation and customer enrollment in the community solar program.

Many community solar programs are associated with net metering arrangements. However, several state legislatures and public service commissions have either made their net metering policies less attractive to the consumer (e.g., Kansas) or rescinded them (e.g., Hawaii). In Hawaii, existing net metering customers were offered an alternative called grid-supply which operates like net metering but changes the compensation to wholesale rates for exporting excess capacity to the grid. New customers can enter into a self-supply arrangement whereby they cannot sell excess capacity to the grid but can use energy storage devices to reduce their electricity consumption. Instead of net metering, Minnesota adopted a value of solar methodology which is applied to community solar projects. Most recently, the New York Public Service Commission issued an order that, among other matters, involved a move from net metering compensation to compensation that is based more on the value of distributed energy resources. This move will take place incrementally and take the form of market transition compensation. The Commission

[65] See Maize at ftn. 10.

[66] Coalition for Community Solar Access, Community Solar Policy Decision Matrix Guidance for Designing Community Solar Programs, November 2016, at 5. See also the observation by Jeff Cramer, the CCSA's Executive Director: "Every major category is a lever. When something changes in one section, it affects others. Raising the credit rate makes project sizes go down. But limiting the size of the project will bring the credit rate down," [cited in Trabish, at ftn.47.]

expressed reluctance to move too quickly with its move away from net metering compensation, noting that the community distributed generation market was in an early stage of development and a rapid change would introduce uncertainty to that market.[67] New York and California tend to lead the nation in terms of electric utility regulatory change. Given New York's as well as other states' changes to net metering compensation, there is no reason to believe that this trend to replace net metering or reduce its benefits to customers will cease. The jury is out on the cost-effectiveness of community solar if net metering is no longer an integral part of community solar arrangements.

Program Design: One of the key questions in designing a community solar program is which business model to use. Because these are early days for community solar projects, particularly in states without statewide policies, we still do not know what the most effective program designs will be.

As the four case studies showed, there are many variations of program designs. Utilities must come up with all-in project costs so they can determine mechanisms (fees, subscriptions, purchase of panels) that would enable them to recover their costs without discouraging customers from participating. Neither OUC nor Westar included an escalator provision in its customer agreements. Both utilities considered the absence of an escalator to be a deficiency that might hamper long-term project viability. OUC also considered the duration of 25 years to be too long.

Land Use: Land availability can be a significant issue for community solar development in urban communities because of the large amount of space needed -- approximately 3 to 12 contiguous acres for community solar projects of 500 kW to 2,000 kW. In crowded urban areas where there is significant competition for open space, site costs may make the overall cost of the project prohibitive. One of the observations from the OUC's initial project in Gardenia was that the use of a garage was an expensive site.

Consumer and Utility Buy-In: If consumers do not find the terms of a community solar project or program to be favorable, they may be less likely to subscribe. However, utilities may also oppose the policy framework if there are features that they find financially unsustainable. For example, Xcel in Minnesota pushed back on community solar at one point, arguing that the compensation and allowable size of project facilities were too high.[68] It is very difficult to find the right balance to attract customers while at the same time protecting the utility's interests. OUC's Gardenia project succeeded in attracting customers because it subsidized the rate to customers by embedding in the customer fee an existing tax credit. If customers have to pay a premium as they must in the Midwest Energy, Westar, and Gulf Power projects, it will take longer to fully subscribe the project. The motivation for a segment of Midwest Energy's customers, many who were retirees on fixed incomes, was the projected payback of 6% for the first year of participation.

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[67] State of New York Public Service Commission, Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and Related Matters, Cases 15-E-0751 and 15-E-0082, March 9, 2017,. Accessed on April 4, 2017.

[68] Frank Jossi, "Xcel Seeks to Put a Brake on Large Community Solar Gardens," *Midwest Energy News*, March 5, 2015, http://midwestenergynews.com/2015/03/05/xcel-seeks-to-put-a-brake-on-large-community-solar-gardens/. Last accessed April 4, 2017.

Compliance with Codes and Other "Soft-cost" Issues: While state-level policies affect the financial viability and cost-effectiveness of community solar projects, many local policies do as well. As NRRI observed:

> Issues need to be addressed such as compliance for building, electrical, and fire safety codes, insurance company treatment, local siting and zoning issues, and tax treatment at all levels of government. Solar developers cannot lose sight of how important these concerns can be: Together such soft costs can easily account for half of the total cost involved with any given solar installation, and up to nearly 2/3 for small, home-scale systems.[69]

Tax Incentives: The federal tax treatment issue is particularly important because the investment tax credit (ITC), a 30 percent tax credit for solar systems on residential properties (under Section 25D) and commercial (under Section 48) properties which is based on the amount of investments in solar property. It has been a big incentive for investments in solar distributed generation and utility-scale solar. It was extended in 2015 for several years but begins to phase down in 2020.[70] The federal tax law was always clear that taxpayers may claim the credit for their investments in solar systems that generate electricity on their own property. There was a lack of clarity, however, regarding whether taxpayers who own only some of the solar panels in an off-site community solar garden can receive the credit. In September 2015, the IRS issued a private letter ruling to a tax payer in Vermont, affirming the individual's eligibility to claim such a credit. However, because it is a private letter only intended for a specific recipient with facts presented for a particular set of circumstances, the IRS's response still raises the question of its applicability to other persons under different circumstances.[71]

Securities Issue: Uncertainty still exists regarding the applicability of the federal Securities and Exchange Commission (SEC) requirements for registration and disclosure of community solar projects. The central question governing applicability of SEC regulations is whether the participant has entered into an "investment contract." In a 1946 decision, *Securities and Exchange Commission v. W.J. Howey*, the U.S. Supreme Court established a test with four criteria to help make those determinations. A project meets the criteria of an investment contract and therefore is considered offering a security if:

> "1. a person invests money or property,
> 2. in a common enterprise;
> 3. with expectation of profits; and

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[69] NRRI, "at 34, at ftn. 38.
[70] SEIA, "Solar Investment Tax Credit," http://www.seia.org/policy/finance-tax/solar-investment-tax-credit.
[71] Adam Schurle, "IRS Opens Door for Community Solar Investors to Qualify for Federal Tax Credits," *Renewable + Law*, September 4, 2015, http://www.lawofrenewableenergy.com/2015/09/articles/solar/irs-opens-door-for-community-solar-investors-to-qualify-for-federal-tax-credits/. Schurle's article analyzes the IRS's private letter ruling. See also GW Solar Institute, "Does the federal Investment Tax Credit (ITC) apply to community solar projects?" No date, http://solar.gwu.edu/q-a/does-federal-investment-tax-credit-itc-apply-community-solar-projects. The GW Solar Institute points out that a private letter ruling "is often interpreted as precedence for how the IRS would rule in similar circumstances," Last accessed April 4, 2017 (both sources.)

4. without the right to exercise practical control over the decisions of the enterprise."[72]

SEC staff in a letter issued to the developer CommunitySun LLC., provided guidance indicating that a participant's interest in a shared solar project is not likely to be a security if the primary motivation of the participant is reducing his or her electric bill and not the expectation of making a profit.[73]

Lack of Clarity and Economic Soundness in Policy Framework: Policies governing community solar can be delineated in laws, regulatory proceedings, or both. If policies are unclear or add too much of a cost burden, however, projects are unlikely to be built. For example, at least according to one report, Maryland's policy is very prescriptive, thus potentially confusing and impeding developers, whereas the economics underlying California's policy do not work. Specifically, subscribers to California's program will receive a credit only for the generation component of the retail net metering charge and must pay for the other components (transmission and distribution).[74]

Economic Viability for Both Utilities and Customers: In some cases, a legal or regulatory framework informs the program design. In other cases, such a formal framework may not exist. Nonetheless in all cases, the economic inflection point for customers to subscribe to a community solar program or purchase panels through such a program and the utility to benefit from it is perhaps the most significant decision utilities will encounter in designing community solar programs. The financing must work. However, as the policy director of CEC explained about the choice between the pay-as-you-go subscription method and the upfront purchase-of-panels method, "There is not a single product that is best in every market because there are so many variables." He observed that pay-as-you go subscriptions are easier for customers but there is no financing cost to the customer if he or she purchases the panels upfront.[75]

OUC's Gardenia facility program proved to be most attractive initially to customers but less so for the utility because the rate to customers was subsidized with a production incentive and there was no escalator for the 25-year duration of the agreement between the utility and the customer. However, if the economic incentives are not attractive to customers, as was the case with Westar's program, it might be difficult to have a program at all.

Utilities are also confronted with the question of whether to pass cost savings to customers if the prices come down. When confronted with that question, OUC chose to reduce the price for a follow-up project but not change the price for subscribers to the initial project. Iowa's Cedar Fall community solar project, Simple Solar, faced a similar question but it involved costs coming down during the course of a project.

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[72] See Feldman et al at 15, at. ftn. 10. See also Eric O'Shaughnessy, "Community Solar: Status, Trends, Legal, and Financial Issues," NREL, Presentation for the EPA Green Power Partnership: An Introduction to Community Solar Programs, March 9, 2016, https://www.epa.gov/sites/production/files/2016-03/documents/webinar_20160309_oshaughnessy.pdf.

[73] See Feldman et al., at 14-16, at ftn. 10.

[74] Herman K. Trabish, "Keep it Simple, States: Community Solar Developers Say Complex Regulations Stifle Growth," *Utility Dive*, October 20, 2016, http://www.utilitydive.com/news/keep-it-simple-states-community-solar-developers-say-complex-regulations/428471/. Last accessed April 4, 2017.

[75] Herman K. Trabish, "Subscriptions or Sales: Which Community Solar Approach Promises the Best Growth?" *Utility Dive*, January 19, 2017, http://www.utilitydive.com/news/subscriptions-or-sales-which-community-solar-approach-promises-the-best-gr/434051. Last accessed April 4, 2017.

The original price per share was set at $399 but the utility reduced the price to $270 as more people enrolled. Initial subscribers were able to buy additional shares at the lower price.[76] Even though the circumstances for the cost reduction were different in the OUC program than in the Cedar Fall program, early adopters may not understand why their shares are more expensive than they are for subsequent enrollees.

Not only do utilities need to consider the cost treatment of similarly situated community solar participants during the course of a project, they also need to consider the treatment of nonparticipants. The argument raised by utilities, that net metering policies shift costs from participants to non-participants, also surfaced in each of the four projects reviewed from Florida and Kansas with respect to community solar rates. In each case, utilities deliberately tried to or were directed to develop a project design that precluded cross-subsidies. If the costs are to be totally borne by community solar program enrollees, will the premiums discourage participation?

Marketing: Educating the public about the terms of a community solar contract can be challenging but necessary if the utility wants to ensure that the customers' expectations are realistic. Simply put, if customers do not understand the terms of the community solar contract upfront, they may end up distrusting their utility. Such was the case with Midwest Energy's customers, some of whom were confused about how the credits worked.

Marketing techniques can be an impediment if they are not appropriate to the utility's customers' profiles. Enrollment in the Midwest Energy program was delayed because the third-party marketer relied too much on digital promotion while customers responded better in that largely rural area to direct mail from a utility known to them.

Inadequate market research prior to development of a program's design can lead to flawed assumptions. For example, prior to its marketing effort, Midwest Energy assumed that urban and younger customers would be most interested in participating in the project. The reality turned out to be quite different. Most of the customers participating in the program are rural and older.

Conclusion

There seems to be a perfect storm brewing in the electric industry: a vocal subset of customers are pushing back against utility-led efforts to increase charges attributed to fixed costs and reduce the benefits of net metering. The number of community solar projects has increased as well. In the absence of a public policy structure into which community solar fits alongside other utility policies, electric utilities, as was the case in Florida and Kansas, face challenges in finding a business model that will promote customer adoption while at the same time preventing cost shifting to nonparticipants and company revenue losses. However, community solar may still prove to be a viable option as utilities develop strategies to gain or retain customer trust.

[76] Kristin Guess, "Solar Garden Continues to Grow," *The Courier*, March 26, 2017, http://wcfcourier.com/news/local/govt-and-politics/solar-garden-continues-to-grow/article_dc1c4926-0929-5d9c-99aa-6b44fc18a8e5.html. Last accessed April 4, 2017.

Conceptual support for solar relative to other energy sources remains high as poll after poll has shown. Utilities in our case studies were motivated to offer community solar programs because they learned that a subset of their customers supported renewable energy and the concept of community solar. They also viewed community solar as another type of service they could offer customers. The case studies of Midwest Energy and OUC, in particular, also showed that certain customers are willing to pay a premium for their electricity with the expectation that they can have more certainty about their electricity bills in future years. Yet the pricing needs to make sense for utilities and their customers both initially and over the duration of the project. As the four case studies summarized above show, that part of the equation remains elusive.

Appendix State Authority for Community Solar		
State	**Statute**	**Regulation/Order**
California	CA Public Utilities Code Division 1, Part 2, Ch, 7.6, sec. 2831- 2834	
Colorado	CRS 40-2-127 --(Pilot program 2010 HB 1284; amended by 2015 HB 1342)	
Connecticut	2015 Public Acts 15-113 (2015 sSB 928)	
Delaware	D.C. Title 26, Ch. 10	Title 26 Delaware Administrative Code 3001
Hawaii	HRS 0269-27.4 (2015 SB 1050/ HB 484)	Docket No. 2015-0389
Illinois	Illinois Public Acts 99-0906 (2016 SB 2814, effective June 1, 2017)	
Maine	35-A, Ch. 36 M.R.S.A.	Maine PUC rules Chapter 325
Maryland	MD Public Utilities Code Ann. 7-306.2 (2015 chs. 346, 347)	
Massachusetts	M.G.L. c. 164, secs. 138-140	220 CMR 18.00
Minnesota	2013 Laws, Ch. 85 (2013 HF 729)	
New Hampshire	RSA 362-A:9	N.H. Code of Administrative Rules Chapter Puc 900
New York		N.Y. PSC Order in Case

Appendix State Authority for Community Solar		
State	**Statute**	**Regulation/Order**
		15-E-0082
Oregon	Laws 2016 ch. 28 (2016 SB 1547)	
Rhode Island	P.L. 2016 ch. 163 (2016 HB 8354/SB 2450)	
Vermont	2012 Act 125 (2012 H. 475) 2014 Act 99 (2014 H. 702)	Public Service Board Rule 5.100
Virginia	2017 Acts Ch. 580 (2017 SB 1393)	
Washington	RCW 82.16.110	