

INFORMATION BRIEF

Research Department

Minnesota House of Representatives

600 State Office Building

St. Paul, MN 55155

Bob Eleff, Legislative Analyst

651-296-8961

Updated: October 2017

Xcel Energy's Community Solar Garden Program

High capital costs dissuade many small energy customers from installing a solar energy system. Alternatively, a developer can build a system and sell “shares” of the electricity generated to neighborhood residents and businesses. The 2013 Minnesota Legislature required Xcel Energy to develop a pilot project based on the latter model, called a community solar garden. The statute contained some program guidelines, but directed the Minnesota Public Utilities Commission to determine the details of the program's operation, which occurred in a series of orders issued over the past four years. This information brief describes the salient features of Xcel's community solar garden program by examining selected provisions of those orders.

Introduction

In 2013 the Minnesota Legislature enacted a provision requiring the state's largest electric utility, Xcel Energy, to submit a plan to the Public Utilities Commission under which the utility would provide customers the option to purchase electricity under a community solar garden program. A community solar garden is a neighborhood-scale solar energy system from which nearby residential and other small electricity customers can purchase a subscription that reserves to them a fixed monthly share of the electricity generated by the project. This arrangement removes the significant barrier of large initial capital costs that often inhibits such customers from installing a solar energy system. To date, solar gardens have been most often constructed and owned by a third-party developer, rather than an electric utility.

The legislation specified various parameters of Xcel's community solar garden program, including:

- a garden's capacity—the maximum amount of electricity it can generate—cannot exceed 1 megawatt (MW);¹
- a garden must have at least five subscribers, none of which may consume more than 40 percent of the garden's output;
- an individual customer's subscription can be no greater than 120 percent of the customer's average annual electricity usage; and
- the utility to which the garden is interconnected must purchase all the electricity generated by the garden and must credit each customer based on the size of the customer's subscription.²

The legislation required Xcel to develop a program that met these and other requirements. The commission was granted authority to modify Xcel's plan, provided that any plan it approves must be consistent with the public interest.

Several issues regarding operation of the solar garden program were not spelled out in the statute, including the following questions:

- Should a limit on the overall size of the program be established?
- At what rate should a utility purchase electricity generated by a solar garden?
- How should co-located gardens—aggregations of 1 megawatt projects constructed by a single developer and located adjacent to one another—be treated?
- What should be the purchase rate for electricity generated by a solar garden that is not subscribed by a customer?
- How are credits on a customer's bill resulting from monthly generation exceeding monthly electricity use treated at year-end?

In a series of orders issued between April 2014 and October 2015—and after receiving comments on Xcel's proposed plan from governmental agencies, nonprofit organizations that work on energy issues, solar providers and the state's solar industry association, and almost 200 members of the public—the commission established the details of the program. The commission has continued to modify the program more recently. The table below summarizes the regulations on several key issues under which solar gardens currently operate. The remainder of this information brief provides background information regarding those decisions.

¹ The Solar Energy Industries Association estimates that a solar system with a capacity of 1 megawatt can meet the energy needs of approximately 125 homes in Minnesota, taking into account available sunshine, average household electricity consumption, and average temperature and wind speed. "What's In a Megawatt?" www.seia.org/policy/solar-technology/photovoltaic-solar-electric/whats-megawatt.

² [Minn. Stat. § 216B.1641](#).

Xcel’s Community Solar Garden Program: Selected Provisions

Program Feature	Commission Decision
Statewide Program Capacity	Unlimited
Rate at which Solar Garden Generated Electricity Is Purchased by Xcel and Credited to Subscribers	Value-of-solar rate: \$0.1033 in 2017; \$0.1006 in 2018
Capacity Limits for Co-located Solar Gardens	1 MW
Project Completion Deadline	24 months after Xcel determines that the application is complete
End-of-Year Treatment of Bill Credits	Bill credits are carried forward for at least 12 months; Xcel purchases all outstanding credits as of last day of February
Payment to Solar Garden Operators for Unsubscribed Energy	≥ 40 kW gardens: Xcel’s avoided cost rate, ³ plus 1 cent per kWh for RECs ⁴ < 40 kW gardens: Xcel’s average retail rate, plus 1 cent per kWh for RECs
Contract Length	25 years

Provisions of Xcel’s Community Solar Garden Program

Statewide Program Capacity Is Unlimited

Although Xcel originally proposed limiting the size of the program to 20 MW during its initial two years, the commission decided not to place a limit on the aggregate capacity of solar gardens, in part to maximize the opportunity for developers to take advantage of the existing 30 percent federal tax credit for solar systems, which was scheduled to decline to 10 percent beginning in 2017.⁵ Interest in participating in the program vastly exceeded even the most optimistic expectations, as discussed below.

³ Under Minnesota’s net metering statute, [Minnesota Statutes, section 216B.164](#), subdivision 3, electric utilities are required to purchase electricity produced by a generator with a capacity below 40kW at the utility’s “avoided cost.” The statute utilizes the federal definition of that term: the incremental cost to the utility of generating or purchasing the same amount of energy from a source other than the net metering generator. See [Code of Federal Regulations, title 18](#), section 292.101, paragraph (b), clause (6), and section 292.304.

⁴ A Renewable Energy Certificate (REC) is a tradable, contractual instrument representing the property rights to the environmental, social, and other nonpower qualities of 1 MWh of renewable electric generation. RECs can be sold separately from the underlying physical electricity generated from renewable sources. Purchased RECs can be used to satisfy part or all of a utility’s obligation under Minnesota’s Renewable Energy Standard (Minn. Stat. § 216B.1691) to generate a specific proportion of its retail electricity sales from renewable energy at specific times, for example, 25 percent by 2025. Under Xcel’s solar garden program, no REC values will be paid if the solar garden receives financial incentives under Xcel’s Solar*Rewards or the state’s Made in Minnesota program, since these programs require RECs to be transferred to Xcel without compensation.

⁵ Minnesota Public Utilities Commission, In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Community Solar Garden Program, Docket No. E-002/M-13-867, *Order*

In 2017, Xcel Began to Credit Electricity Generated by Solar Gardens at Its Value-of-Solar Rate

The statute contained three directives regarding the price at which Xcel is to purchase energy generated by a solar garden and issue credit back to solar garden subscribers. This price was set at the utility's value-of-solar rate.⁶ Until that rate, calculated according to a methodology developed by the Department of Commerce, was approved by the commission, the applicable retail rate was to be used. The statute also requires that any plan approved by the commission must "reasonably allow for the . . . financing" of community solar gardens.

In its April 2014 order, the commission defined the applicable retail rate to include the energy charge, demand charge, customer charge, and applicable riders for the appropriate class, approximately \$0.12 per kWh. That rate was deemed "too low to reasonably allow for the creation and financing of community solar gardens. Rather, developers' uncontroverted statements indicate that a rate of approximately \$0.15 per kWh is the conservative minimum needed to secure financing and make solar gardens attractive to subscribers."⁷

Accordingly, the commission allowed solar garden developers to transfer the solar Renewable Energy Certificate (RECs) associated with the garden's generation to Xcel at a rate of \$0.03 per kWh for gardens with a capacity of 250 kW or less and \$0.02 for larger gardens, resulting in a 2014 applicable retail rate plus REC payments for residential customers of \$0.14033 and \$0.15033 per kWh, respectively.⁸

In its September 2016 order, the commission directed Xcel to pay solar garden operators the value-of-solar rate for electricity the utility purchases from gardens whose applications are filed in 2017 and thereafter. The value-of-solar rate in place at the time an application is completed will remain in effect for the term of the solar garden's operation, adjusted annually for inflation. Updated value-of-solar calculations will be made each year for new project applications.⁹

Rejecting Xcel's Solar-Garden Tariff Filing and Requiring the Company to File a Revised Solar-Garden Plan, April 7, 2014, p. 7. In December 2015, Congress extended the 30 percent credit through 2019, after which it declines to 26 percent in 2020, 22 percent in 2021, and 10 percent in 2022 and beyond, at which point it is available only for commercial, not residential, applications.

⁶ A utility's value-of-solar rate reflects the cost savings realized by a utility when a customer uses solar electricity generated at or near the customer's location rather than electricity generated by fossil fuels at a centralized location and transported to the customer. Among the costs that a utility no longer must pay when customers use small-scale solar energy are fuel costs, costs of pollution control equipment, costs to transmit (long-distance) and distribute (short-distance) the electricity from the generation site to the customer. These savings accrue to all utility customers.

⁷ April 7, 2014 Order, p.15.

⁸ Letter from Amy A. Lieberkowsky, Manager, Rates and Regulatory Affairs, Xcel Energy, to Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, Docket No. E-002/M-13-867, *Re: ARR calculation, Community solar garden program*, March 2, 2015, Attachment A.

⁹ Minnesota Public Utilities Commission, *In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Community Solar Garden Program*, Docket No. E-002/M-13-867, *Order Approving Value-of-Solar Rate for Xcel's Solar Gardens Program, Clarifying Program Parameters, and Requiring Further Filings*, September 6, 2016, p. 14.

Xcel's value-of-solar rate for calendar year 2017 was \$0.1033 per kWh, and for calendar year 2018 is \$0.1006.¹⁰

Capacity of Co-located Solar Gardens Will Remain Limited to 1 MW

Xcel's original plan defined a community garden site as the parcel of real property on which the solar system was constructed. However, at the suggestion of SunEdison, a global solar energy company, the commission ordered Xcel to amend that definition to allow a garden site to instead be based on a point of interconnection ("point of common coupling" is the term eventually agreed upon) with a utility's grid, allowing multiple facilities to be installed in close proximity to one another. As the commission stated, "[T]he operator should be able to install solar panels on multiple parcels, connect them to grid through a single interconnection point, and take advantage of the resulting economies of scale."¹¹

The commission's decisions regarding co-location and pricing contributed both to the amount and the nature of the projects proposed by solar garden developers. Xcel began accepting applications on December 12, 2014, and within a month received applications for 75 projects totaling 431 MW. Fewer than one-third of these, representing only 4 percent of the total capacity of all applications, proposed projects at the statutory limit of 1 MW or less. Sixteen proposed projects, representing 58 percent of the total capacity of those applications, had capacities of 10 MW or greater; the largest project sited 40 MW of gardens adjacent to one another.¹²

In comments to the commission, Xcel cited four concerns with what the company called these "utility-scale" projects. First, it stated that larger projects will require improvements to the company's distribution system in order to be interconnected to the grid, which could lengthen interconnection schedules, especially if projects are so large as to require referral to the interconnection process managed by the Midcontinent Independent System Operator (MISO), the organization that dispatches electricity to Minnesota and 14 other states and a Canadian province in the Midwest.¹³

¹⁰ Letter from Lisa R. Peterson, Manager, Regulatory Analysis, Xcel Energy, to Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, Docket No. E-002/M-13-867, *Re: VOS Calculation and Proposed 2018 VOS Vintage Year Bill Credit Tariff Sheets, Community Solar Garden Program*, October 2, 2017, p. 2. In its September 17, 2014 Order, the commission found that Xcel's value-of-solar rate at that time, \$0.1075, was "significantly below the level needed to support the financing and development of solar gardens as required by the applicable statute." Minnesota Public Utilities Commission, *In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Community Solar Garden Program*, Docket No. E-002/M-13-867, *Order Approving Solar-Garden Plan With Modifications*, September 17, 2014, p. 9. The rapid decline in the price of solar panels in the intervening two years now allows projects to be financed at an even lower value-of-solar rate.

¹¹ April 7, 2014 Order, p. 12.

¹² Letter from Aakash Chandarana, Regional Vice President, Rates and Regulatory Affairs, Xcel Energy, to Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, Docket No. E-002/M-13-867, *Re: Supplemental Comments*, January 13, 2015, Table 1, p. 4.

¹³ Letter from Aakash Chandarana, Regional Vice President, Rates and Regulatory Affairs, Xcel Energy, to Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, Docket No. E-002/M-13-867, *Re: Comments*, February 10, 2015, p. 2.

Second, Xcel said that these larger projects are not consistent with the legislature's intent in creating the community solar garden program, which it characterized as expanding "access to the benefits of solar to customers who are traditionally unsuited to rooftop solar . . . , [including] customers who lack access to an appropriate roof location, are unable to afford the upfront costs of an installation, or are discouraged by system maintenance or other considerations."¹⁴

Third, the company expressed concern that large solar gardens would focus on selling to large customers, creating "the potential for entire service classes [i.e., residential and small business] to be largely excluded from participation...."¹⁵

Fourth, Xcel noted that the bill credit rate under the community solar garden program was significantly higher than the price paid at the time by Xcel for solar electricity produced by utility-scale projects acquired under a power purchase agreement resulting from the company's most recent resource bidding process (\$0.0732 per kWh).¹⁶

As these issues were being raised in the first half of 2015, community solar garden applications continued to accumulate, rising to a total capacity of more than 500 MW by April 2, 646 MW by May 18, and 912 MW by June 23.¹⁷ On June 22, 2015, Xcel reached agreement with several stakeholders on the co-location issue.

The agreement, approved by the commission with some modifications, contained the following provisions:¹⁸

- Projects exceeding 5 MW for which applications had been received by Xcel as of the date of the agreement would be scaled back to 5 MW.
- Applications received after the date of the agreement but before September 25, 2015, would be limited to 5 MW.
- Applications received between September 25, 2015, and September 15, 2016, would be limited to 1 MW.
- The commission will determine whether and what co-location limits will apply to solar garden applications submitted after September 15, 2016.

¹⁴ Ibid., p. 4.

¹⁵ Ibid. The Office of the Attorney General noted that such a strategy greatly reduces the marketing costs of solar garden developers, who would avoid dealing with a large number of small customers. In the Matter of the Petition of Northern States Power Company for Approval of its Proposed Community Solar Gardens Program, Minnesota Public Utilities Commission Docket No. E002/M-867, *Comments of the Office of the Attorney General – Residential Utilities and Antitrust Division*, March 4, 2015, pp. 3-4. The same principle would hold true for a developer's administrative costs.

¹⁶ Letter from Aakash Chandarana, Regional Vice President, Rates and Regulatory Affairs, Xcel Energy, to Daniel P. Wolf, Executive Secretary, Minnesota Public Utilities Commission, Docket No. E-002/M-13-867, *Re: Reply Comments*, March 4, 2015, p. 10.

¹⁷ Minnesota Public Utilities Commission, In the Matter of the Petition of Northern States Power Company, dba Xcel Energy, for Approval of Its Proposed Solar Garden Program, Docket No. E-002/M-13-867, *Order Adopting Partial Settlement as Modified*, August 6, 2015, pp. 3, 5.

¹⁸ Ibid., p. 5.

- The commissioner of commerce is authorized to settle disputes regarding the aggregate size of co-located solar gardens.
- Xcel is not required to upgrade its distribution system to accommodate the interconnection of co-located solar gardens.¹⁹

In its September 2016 order, the commission reaffirmed the 1 MW co-location cap. “Allowing co-location beyond 1 MW,” it stated, “would render the statutory limit superfluous, undermine the legislative intent to foster small, widely distributed solar gardens, and create a risk of significant rate increases to nonparticipating ratepayers.”²⁰

Project Completion Deadline Is Set at 24 Months

To ensure that unworkable projects do not tie up valuable solar garden sites or absorb undue amounts of program resources, solar developers have a deadline by which a project must be financed and constructed. Xcel's plan set a deadline of 18 months after an application was determined to be complete; the commission extended it to 24 months.²¹

End-of-Year Bill Credits Are Purchased by Xcel

Solar garden subscribers are compensated via monthly credits on their bills for all solar energy generated, based on their “share” of the total project. Since the size of a subscription can be as large as 120 percent of a customer's average electricity consumption (calculated on the most recent two years' usage), credits may exceed a customer's total bill in a given month, in which case the remaining credits roll over to the next month.

Xcel proposed that any credits remaining at the end of February be forfeited, and that subscribers begin March with a zero balance. However, the commission determined that such a provision would violate the statute's requirement that Xcel purchase all energy generated by the solar garden and that the possibility of forfeiting credits might discourage conservation efforts. It required Xcel to carry all bill credits forward for at least a 12-month period, to purchase all outstanding credits remaining in the billing cycle that includes the last day of February, and to restart the bill-credit system with a zero balance in the following billing period.²²

Unsubscribed Energy Is Purchased by Xcel at Different Rates Depending on Project Size

While the statute requires Xcel to purchase all energy generated by a solar garden, it is silent as to the rate of payment for energy that is not subscribed by customers. Xcel proposed that it receive this unsubscribed energy at no charge, as an incentive to solar garden managers to make

¹⁹ Ibid., pp. 12-13.

²⁰ September 6, 2016 Order, p. 21.

²¹ September 17, 2014 Order, pp. 12-13.

²² April 7, 2014 Order, p. 16.

efforts to fully subscribe their gardens, and pass on the cost savings to all ratepayers via a reduction in the fuel clause rider.

The commission found that not requiring Xcel to pay for unsubscribed energy would increase investor uncertainty, making solar gardens more difficult to finance. It determined that for solar gardens above 40 kW capacity, Xcel is required to pay for unsubscribed energy at the company's avoided cost rate, and at the company's average retail energy rate for smaller solar gardens.²³ The commission also ordered Xcel to purchase solar garden RECs associated with unsubscribed energy at \$0.01 per kWh.²⁴

These provisions also apply to solar gardens receiving the value-of-solar rate for subscribed energy.

Contract Length Is Set at 25 Years

Xcel proposed a 20-year term for solar garden contracts. The commission, concurring with several commentators, ordered that a 25-year term be used in order to be consistent with the Department of Commerce's value-of-solar methodology, which assumes that a solar photovoltaic system will last for 25 years.²⁵

For more information about energy, visit the utility regulation area of our website, www.house.mn/hrd/.

²³ April 7, 2014 Order, p. 17. See fn. 3 for a definition of "avoided cost."

²⁴ August 6, 2015 Order, p. 25.

²⁵ April 7, 2014 Order, p. 22; Minnesota Department of Commerce, Division of Energy Resources, *Minnesota Value of Solar: Methodology*, April 1, 2014, p. 6, <https://mn.gov/commerce/energy/images/MN-VOS-Methodology-FINAL.pdf>.