

COMMUNITY SOLAR

Wisconsin

2017

Customers *First!*





CUSTOMERS FIRST

NON-PROFIT

COALITION

The Customers First Coalition is an issue advocacy non-profit organization dedicated to the interests of power customers of all sizes in Wisconsin. Our coalition is a broad and diverse alliance of customer groups, rural electric cooperatives, municipal electric utilities, wholesale energy providers, labor organizations, and an investor-owned utility. Since coming together over twenty years ago, we have advanced a balanced approach to shaping energy policy that promotes consensus among Wisconsin's energy stakeholders and produces sensible solutions to our energy challenges.

The electric energy sector is always changing. That has never been truer than it is today. Through our issue paper series, we hope to provide a valuable informational resource to decision makers and stakeholders involved with electric energy in Wisconsin and beyond.

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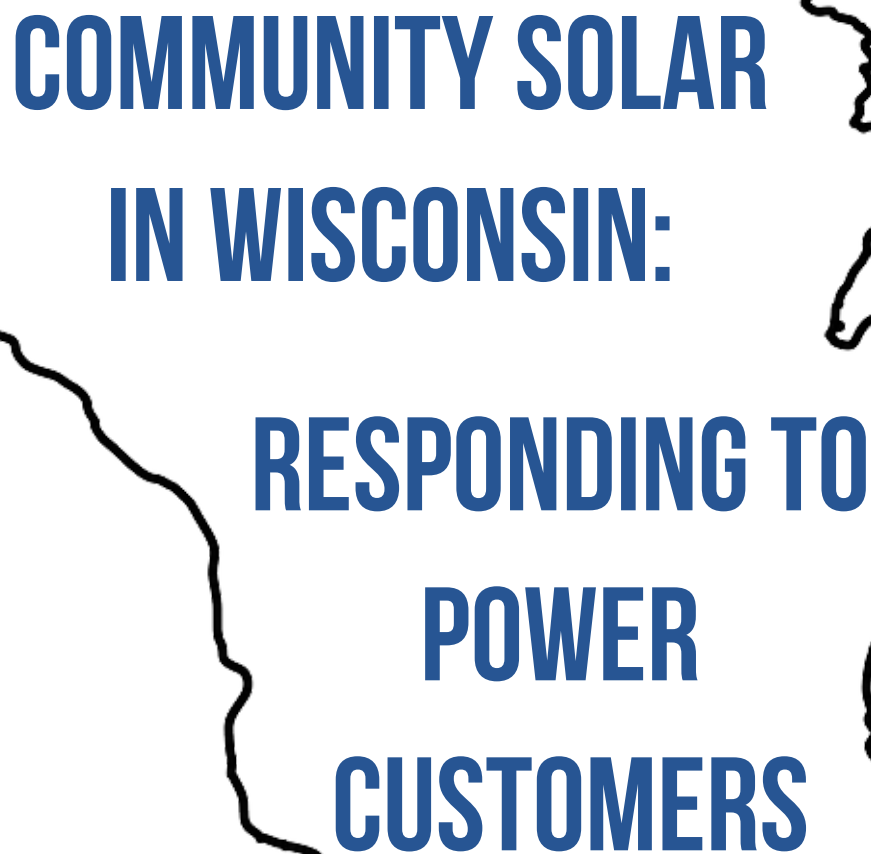
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Customers*First!*

A coalition to preserve Wisconsin's reliable and affordable electricity

**Customers First Coalition Issue Paper Series
Spring 2017**



COMMUNITY SOLAR IN WISCONSIN: RESPONDING TO POWER CUSTOMERS

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Pictured: Bayfield Electric solar garden

RISE OF COMMUNITY SOLAR IN WISCONSIN

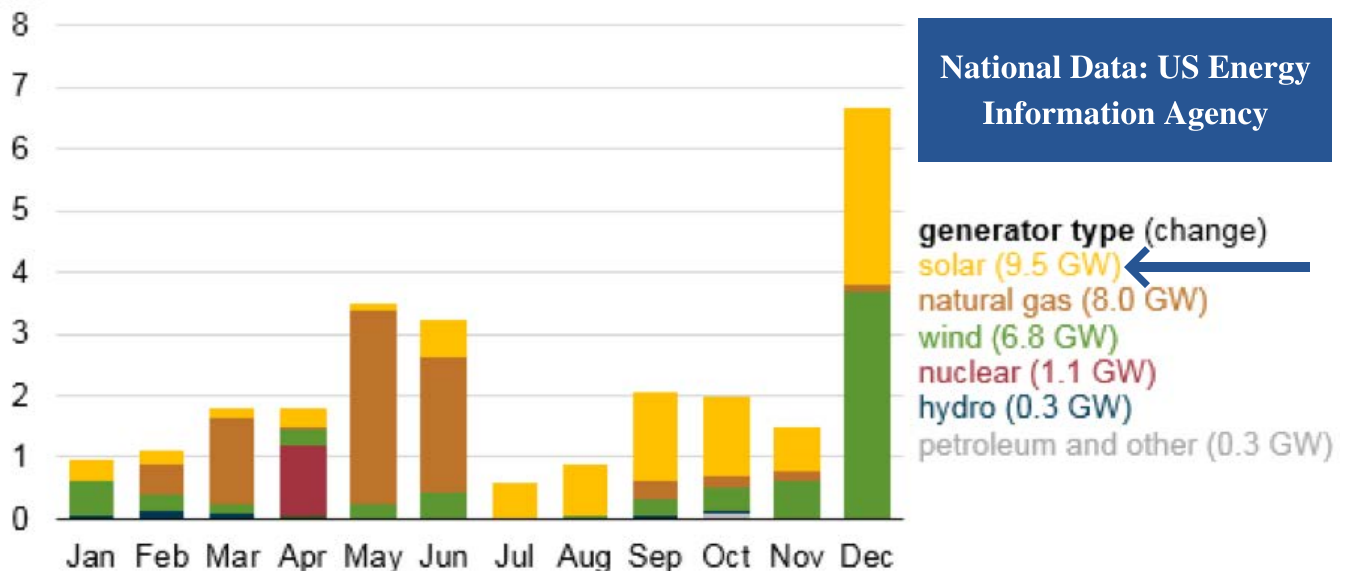


Pictured: Gene and Arlene Radtke are like many Eau Claire Energy Cooperative MemberSolar advocates who display signs near their driveway to show their support

Responding to growing power customer demand, Wisconsin utilities are getting creative with utility-scale solar projects. There are currently 19 community solar projects planned or currently serving customers of Wisconsin's rural electric cooperatives, municipal electric utilities and investor-owned utilities. Wisconsin has seen a dramatic increase in community solar projects over the last three years, with all 19 projects expected to be operational by the end of 2017.

Advancements in solar technology and the associated reduction in costs are driving the shift toward new, larger scale solar projects. In fact, the cost to install solar continues to decrease, with a drop of 60% in the last ten years (1).

Scheduled electric generating capacity additions in 2016
gigawatts



1. <http://www.seia.org/research-resources/solar-industry-data>

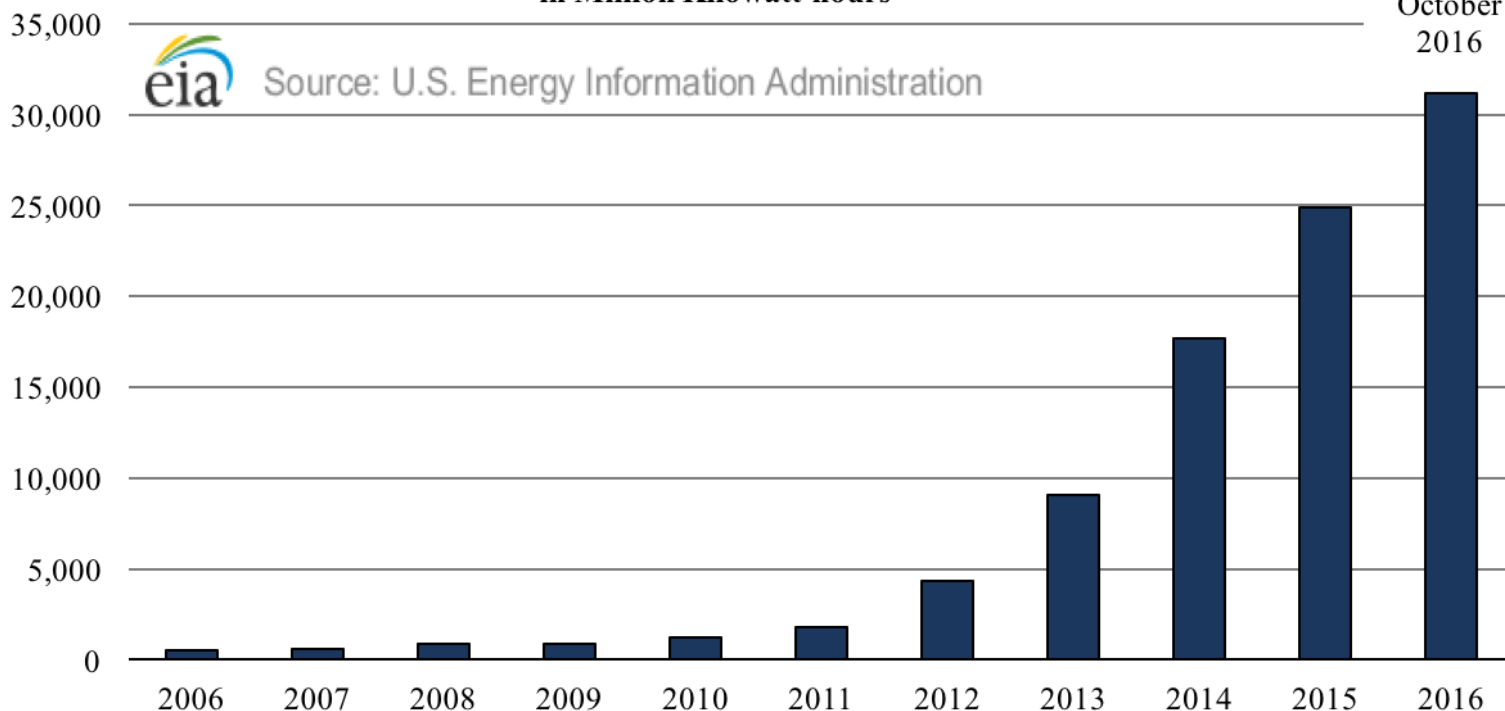
RISE OF COMMUNITY SOLAR IN WISCONSIN

Utility-Scale Solar Generation in the U.S.

2006-2016

in Million Kilowatt-hours

Through
October
2016



As the chart above illustrates, the national growth in solar is trending upward.

Multiple surveys demonstrate the popularity of solar power among electric power customers. For example, the Pew Research Center conducted a national survey in June of 2016 that found 89 percent of people support expanding solar panel farms, while only 9 percent oppose it. (2) The U.S. Energy Information Administration (EIA) recently reported that solar made up 37 percent of new generating capacity in the United States in 2016. (3)

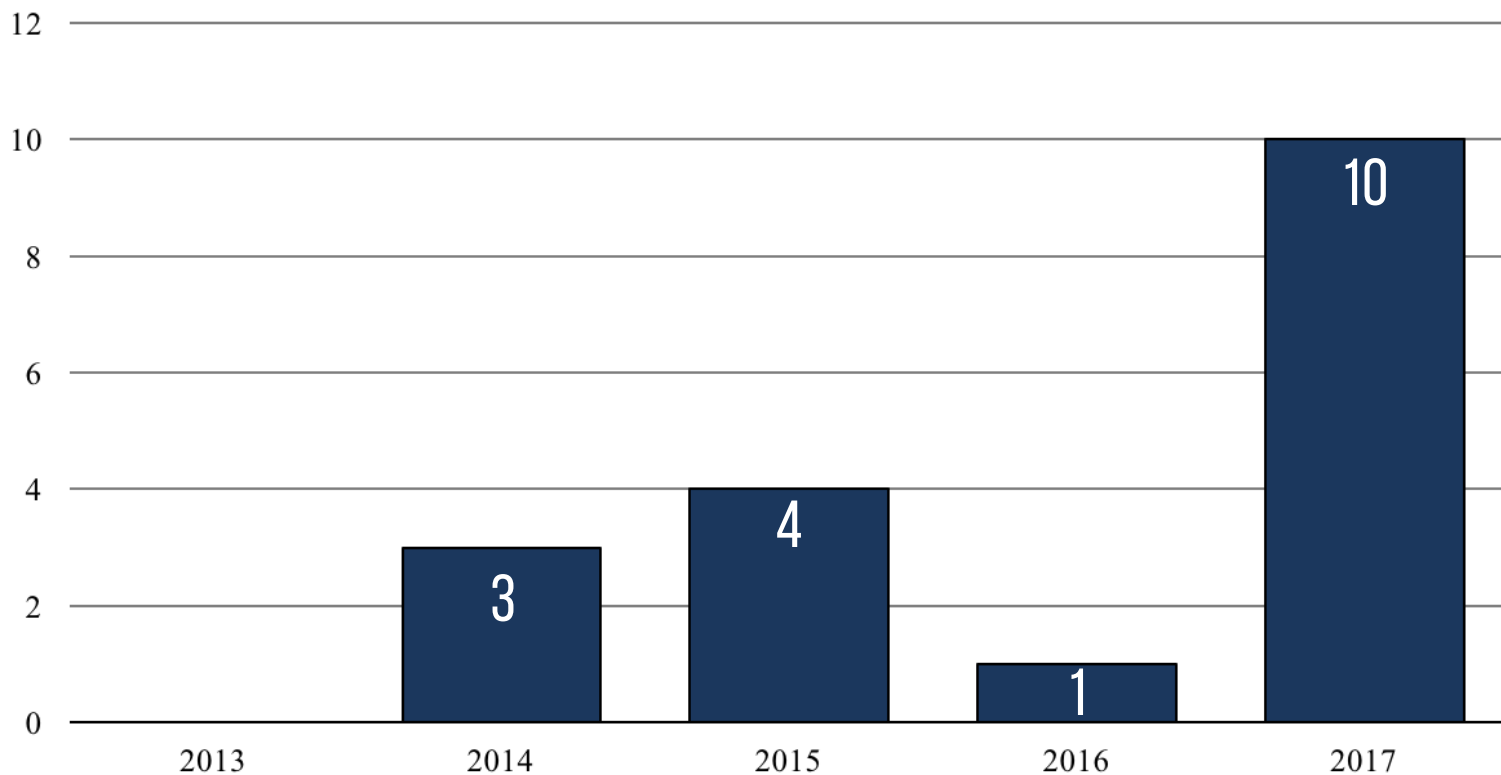


(2) Pew Research Center, Survey Conducted May 10-June 6, 2016

(3) U.S. Energy Information Agency, "Solar, natural gas, wind make up most 2016 generation additions," March 1, 2016

RISE OF COMMUNITY SOLAR IN WISCONSIN

Number of New Community Solar Projects in Wisconsin



Due to the dramatic drop in solar costs and growing customer demand, solar energy use is on the rise.



Pictured above: Robert Kretzschmar, board president of Bayfield Electric

WHAT IS COMMUNITY SOLAR?

Community solar, also known as shared solar and solar gardens, is a solar powered plant that pools resources from multiple members of a community and provides power and/or financial benefits in return. A great benefit of these projects is that they allow utilities to determine the ideal position to maximize solar production and increase the possibility for utility grid integration.

All power customers in a utility or electric cooperative's territory can participate, even those who rent or own property without good sun exposure. Larger solar arrays lead to lower per-unit production costs.



Pictured above: Bayfield Electric's employees and board of directors



Pictured above: River Falls Municipal Utilities solar array groundbreaking ceremony

There are three general models of community solar followed by Wisconsin's electric utilities.

- 1. Subscription Units:** Customers or members can purchase a section of a solar array, a unit, for an upfront cost and receive a credit on their monthly electric bill for the energy output.



Bayfield Electric solar garden



River Falls Municipal Utilities solar array

- 2. Subscription Rates:** Customers pay a small residential subscription fee to lock in a set rate for solar electricity that will not increase for a set number of years, usually 20 to 25, based on the terms of the subscription.

"You can be the force of change because you're a customer and as a customer you can request greener products, greener services."

- Patrick Eagan,
MGE Shared Solar
participant



MGE Shared Solar on rooftop

- 3. Cooperative Project Solar:** Members do not pay a subscription fee. Instead, all members in the cooperative territory share in the cost of the solar energy generation, just like any other energy source (gas, coal, wind).

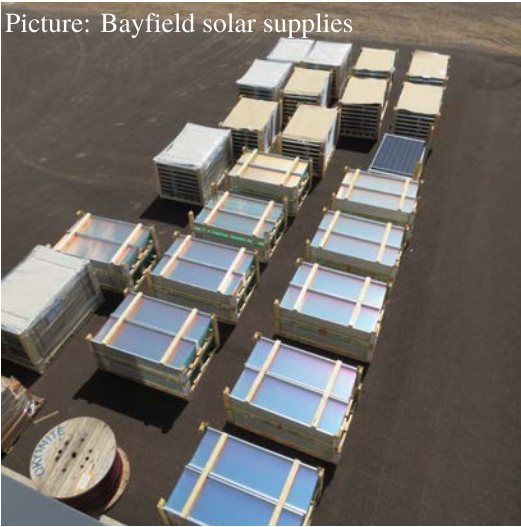


Dunn Energy Cooperative SunDEC array



Riverland Energy Cooperative solar array

Picture: Bayfield solar supplies



SUBSCRIPTION UNIT:

Customers can purchase subscription units for a one time subscription fee per unit. A unit is generally a solar panel or a portion of a solar panel. In Wisconsin this fee ranges from \$356 per unit to \$1,350 per unit for energy output of between 200 and 500 kilowatts per year. Based on the most recent U.S. Energy Information Agency Residential Energy Consumption Survey, the average residential electricity consumption in Wisconsin is about 8,500 kilowatt-hours per year. (4)

Most of these solar agreements allow customers to purchase multiple units, which can cover a significant portion of a home's energy usage. These agreements create a contract that lasts between 20 to 25 years. Some community solar projects offer a financing option for power customers so they can pay for the purchase over time. In addition, there are often opportunities for commercial buyers to purchase larger shares of these options. The minimum purchase is one share. Some utilities have limits on the number of shares a single commercial buyer can purchase to allow as many people as possible to participate in the program.



Pictured: River Falls Municipal Utilities

Most utilities and cooperatives that use the subscription unit model offer buy-back, trade, transfer and even donation options if the customer moves out of the service area or decides to discontinue the subscription. These options can include the opportunity to transfer a subscription to someone buying the customer's home, transferring the subscription to another qualifying account or, in some cases, the utility or coop may repurchase the unit minus depreciation based on the length of agreement remaining. Some even offer the opportunity to donate the subscription to a local non-profit. For some customers, planning 20 to 25 years in advance may seem intimidating and community solar programs are willing to work with customers if things change.

(4) U.S. Energy Information Administration 2009 Residential Energy Consumption Survey



Pictured above: MGE Shared Solar under construction

SUBSCRIPTION RATES:

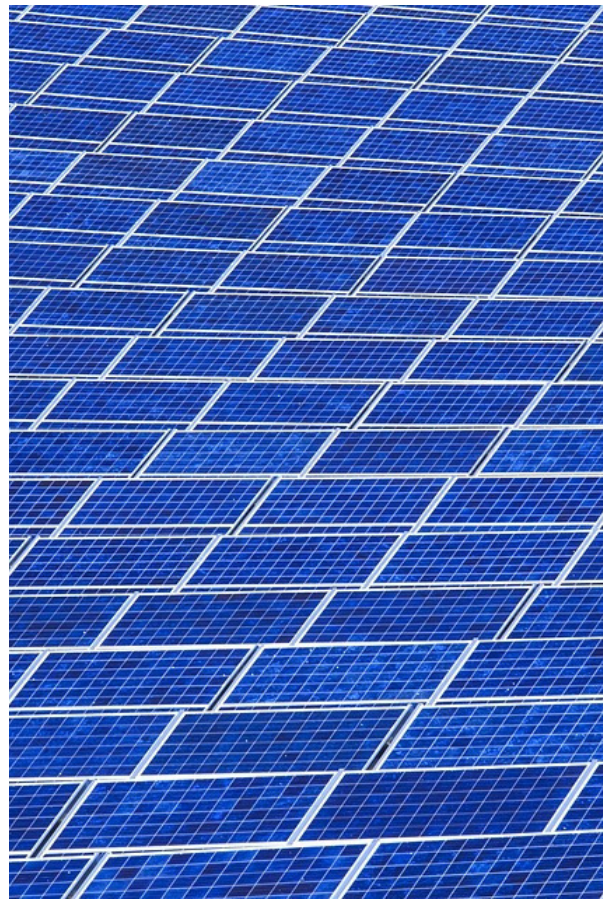
Another model used in Wisconsin requires customers to pay a small subscription fee. The fee is a minimum of \$50, but can be larger depending on the size of the customer's subscription. This will lock in a set rate per kilowatt-hour for solar power for a set period of time, generally around 20 years. The rate per kilowatt-hour for the portion of solar power purchased is higher than the standard electric rate. Because this rate is locked in over a long period of time, the cost could actually wind up being less than the standard electric rate later in the subscription period.

COOPERATIVE PROJECT SOLAR:

Some electric cooperatives are opting to set up community solar projects that all of their members participate in. There is no subscription fee, and instead the project is treated like any other energy generation and the costs are built in to the electric rates.



Pictured Above: Solar arrays across Wisconsin integrate energy with the grid



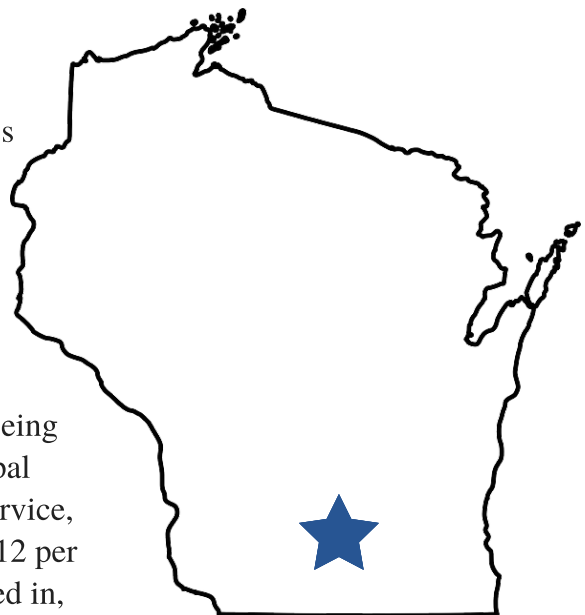
Pictured Above: Solar array panels

MADISON GAS & ELECTRIC SHARED SOLAR



Pictured: MGE Shared Solar

MGE serves much of Dane County, including all of Madison and the isthmus. In 2016, MGE offered its residential customers the opportunity to participate in a community solar project. MGE's project follows Model 2, subscription rates. Subscribing customers paid a one-time subscription fee of \$47.25 per unit purchased. Due to high customer demand, the project is fully subscribed with 282 residential participants. The project is a partnership with the City of Middleton. A 500-kilowatt solar array is being built on the roof of the City of Middleton Municipal Operations Center (MOC). Once the array is in service, subscribing customers will pay a fixed rate of \$0.12 per kilowatt-hour for up to 25 years. This rate is locked in, even if conventional energy prices rise. Although sold out, MGE is still accepting applicants to a waiting list, should any units become available. The waiting list also serves to demonstrate the demand for future projects. Customers can drop out of the program at any time, however the one-time subscription fee is non-refundable.



MADISON GAS & ELECTRIC SHARED SOLAR



The Shared Solar project began because MGE was exploring ways to build a cost-efficient large scale solar project and it was looking for an affordable host site. The City of Middleton was at the same time looking for ways to work toward their goal to have 25% renewable energy in the City by 2025. MGE and Middleton began talking about the possibility to create a partnership to achieve both goals. The size of the Shared Solar project was limited by the size of the roof of the MOC, which was designed to host solar panels.

MGE promoted the Shared Solar program on social media, via email, direct mail and during other contacts with residential customers. Customers could request to sign up online. MGE's residential and community services staff worked with customers to answer questions and process their applications. While the project was under construction, MGE kept customers informed of the progress toward completion using short videos. Once the project was completed, MGE and Middleton hosted an open house at the MOC to celebrate and thank participants.

The declining cost of solar influenced MGE's decision to go forward with the project. MGE engaged in customer research and had specific information about how much customers would be willing to pay to participate. The utility felt it was important to be able to offer the program at a cost customers were willing to pay. If the costs of large projects had not declined and if MGE did not have the low cost host site provided by Middleton, they would not have been able to make the project work.

MGE heard from many participants that they were not in a position to install solar on their own homes. Those not able to move forward on their own included renters, home owners with shaded roofs, and people who felt it was too much to deal with to install panels themselves. This project allows these customers to support and benefit from solar in a way that was not possible before.



Pictured above: MGE Shared Solar under construction

MADISON GAS & ELECTRIC SHARED SOLAR



Shared Solar 282 customers subscribed

- 89% Own Property
- 11% Rent Property
- 12% Multifamily Buildings
- 88% Single-Family Buildings

80% chose to purchase the maximum

Breakdown of kilowatt blocks purchased

Power Grid

Middleton Operations Center
The solar area of the MOC is 69,000 sq. ft. A football field (including the two end zones) is 57,600 sq. ft.

1,728 panels produce 500 kW

500 kW

- can charge about 100 electric cars to go 50 miles each day for a year
- or
- can run about 1,200 typical LED street lamps 10 hours a day for a year

North American Parts

- Inverters Milwaukee, WI
- Mounting System Adams, Ohio
- Solar Panels Guelph, Ontario

Community Sourced Solar. Taking Energy in a New Direction. **mgoe**



Pictured above: MGE Shared Solar on rooftop of the MOC

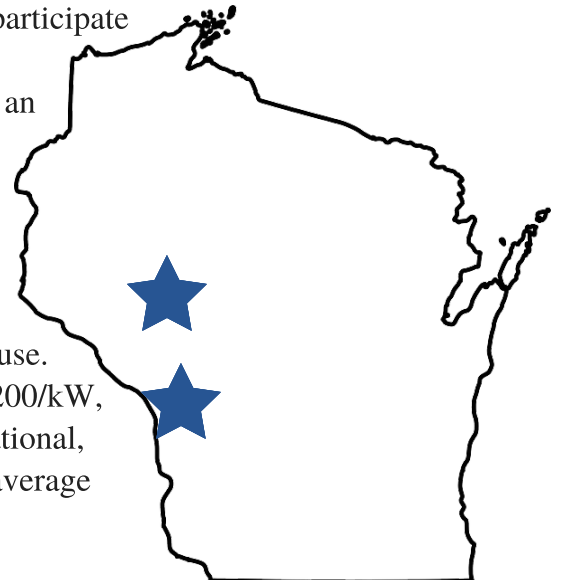
XCEL: SOLAR*CONNECT COMMUNITY PROGRAM

Solar*Connect
CommunitySM



Pictured: Xcel Solar*Connect

Xcel Energy is an investor owned utility headquartered in Eau Claire that serves many areas in northern and western Wisconsin. Its service area extends from Hudson at the Minnesota border east to Abbotsford, and from the western edge of Michigan's Upper Peninsula through northern Wisconsin and south to Viroqua. In 2016, Xcel offered customers the opportunity to subscribe to community solar pilot programs located in La Crosse and Eau Claire. Xcel's projects follow Model 1, subscription units, with a credit for the solar energy appearing on the customer's electric bill. Currently two solar gardens are planned at one megawatt each. The pilot is approved for up to three megawatts total. Any Xcel customer in Wisconsin, both residential and business, can choose to participate in the Solar*Connect Community. The minimum subscription is \$356 for 200 watts, which is about 3% of an average residential customer's annual usage. The price is \$1,780 per kilowatt and customers can purchase a subscription that would produce up to 100% of their average annual usage, up to a subscription cap of 400 kilowatts. A subscription of 1.8 kW would provide 25% of an average residential customer's annual energy use. Customers are required to provide an initial deposit of \$200/kW, with full payment due by the date the solar array is operational, which is expected in 2017. Bill credits are based on the average cost of Xcel Energy's generation fleet.



XCEL: SOLAR*CONNECT COMMUNITY PROGRAM

Solar*Connect CommunitySM



The bill credits a customer will receive will never drop below those offered in 2017. If the cost of Xcel's generation fleet increases over time, customer bill credits for the solar garden subscriptions will increase as well. If a customer drops out of the program, the subscription can be donated to a local nonprofit, or the customer can end participation without a refund. If a customer moves to another residence within Xcel's service territory, the subscription is transferable to the new home. If a customer moves out of Xcel's service territory or otherwise ceases to be a customer, Xcel will buy back the subscription on a depreciated basis.



Pictured above: Xcel Solar*Connect in village of North Hudson




Pictured above: Groundbreaking ceremony for Xcel Solar*Connect

BAYFIELD ELECTRIC COOPERATIVE SOLAR GARDEN



Bayfield Electric Cooperative

Your Touchstone Energy® Cooperative 



Picture includes: Craig Harmes, Dairyland Power; Bill Bailey, Advocate of Bayfield Electric; Robert Kretschmar, Board President; Diane Berweger, Bayfield Electric; Representative Beth Meyers

Bayfield Electric Cooperative serves Ashland, Bayfield, Douglas, Iron, Sawyer and Vilas counties. Starting in 2016 the cooperative began offering community solar to its members. Bayfield Electric Cooperative’s project follows Model 1, subscription units. For a one-time unit fee of \$500, the customer subscribes to a 25 year contract with Bayfield Electric Cooperative. Electrical solar usage is credited to the monthly electrical bill, resulting in money back on every monthly electrical bill for 25 years. If a subscriber moves out of the area or changes plans, units can be sold back to Bayfield Electric Cooperative or transferred to a new home if it is within the coop’s service area.



BAYFIELD ELECTRIC COOPERATIVE SOLAR GARDEN



Bayfield Electric's project got started because of the efforts of dedicated members of the cooperative. It started with a survey in 2015 that asked members if they were interested in doing a community solar project and if they would be interested in subscribing to such a project. The survey results showed that 99% of members who responded to the survey wanted a community solar project. The level of interest helped the cooperative estimate an appropriate size for the project, and they sought bids on the project for 150 kilowatts, 200 kilowatts, and 250 kilowatts. The cooperative estimated that if every member subscribed to the project in the amount they indicated on the survey, a 250 kilowatt array would be necessary. Bayfield Electric wanted to keep the project affordable for members, so a \$500 per unit price was established. This is the equivalent of half of a 410 watt solar panel, or 205 watts per subscription. The term of the subscription is 25 years.

After the subscription terms were established, the cooperative sent subscription agreements to all of the interested members. Bayfield Electric set a subscription unit limit at the equivalent of 90% of an average home's usage. Initially response was slow, but the cooperative held a series of small meetings throughout the service territory to answer member questions and respond to concerns. Subscriptions trickled in until the cooperative put a deadline on the opportunity to subscribe. Once the deadline was in place, subscriptions poured in and they had 68 subscriptions for more than 250 kilowatts in size. The Bayfield Electric board then decided to go to a 300 kilowatt size, which is the size of the array now in operation. The project was member driven and it would not have happened without the members' strong support and commitment.

"Bayfield Electric's solar garden is completely member financed, creating an attractive return on investment for participating members. This was an important selling point for the project that increased its popularity in the community."

- Bill Bailey, member of Bayfield Electric



Pictured Above: Bayfield Energy Cooperative's solar garden

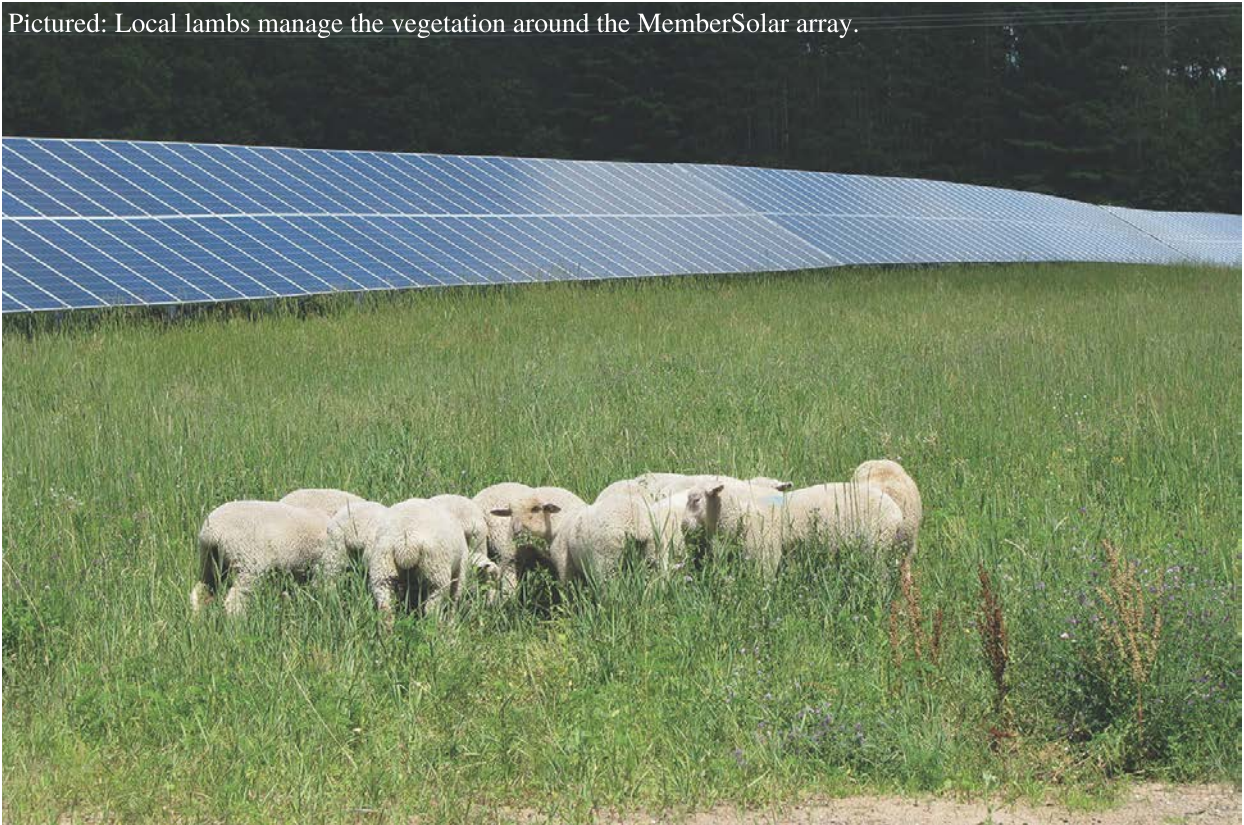
EAU CLAIRE ENERGY COOPERATIVE MEMBERSOLAR

Eau Claire Energy Cooperative

Your Touchstone Energy® Partner



Pictured: Local lambs manage the vegetation around the MemberSolar array.




Eau Claire Energy Cooperative serves about 10,000 people in Eau Claire County and parts of Chippewa, Dunn, Pepin, Jackson, Trempealeau and Clark counties. Starting in 2015 the cooperative began offering community solar to its members. The program is called MemberSolar. Eau Claire Energy's project follows Model 1, subscription units. For a one-time unit fee of \$650, the member subscribes to a contract with the cooperative through 2035. Cooperative members can purchase from one unit up to a maximum of 1,000 units. Members can get financing to pay for their subscription at a special rate through a local credit union. The subscription fee pays for construction and maintenance of the solar facility at Eau Claire Energy Cooperative headquarters. Electrical solar usage is credited to the monthly electrical bill, resulting in money back on every monthly electrical bill for the entire term of the contract.

Non-profit organizations benefit as well, because members can purchase subscriptions to donate to organizations in the cooperative's service territory. For example, a local Lions group purchased subscriptions and donated them to a local township to help defray the cost of electricity at a local softball park for 20 years.



EAU CLAIRE ENERGY COOPERATIVE MEMBERSOLAR



Your Touchstone Energy® Partner 

Member subscribers have several options if they move. One option is to leave the credits with the home, providing added value to the home. If members move within the cooperative’s service territory, they can take the credits with them. If they move outside the territory, the member has the option to transfer the credits to another cooperative member or the cooperative will repurchase the credits on a declining basis of 10 percent per year.

Local lambs are the MemberSolar vegetation management team. In June a local sheep producer brought 25 lambs to graze in our MemberSolar field for the summer. It’s a win-win for all because the lambs do the mowing of the tall grasses all summer. Another team of lambs will arrive this spring.

For the past year and half, Eau Claire Energy Cooperative has utilized the MemberSolar array to help educate people about the advantages of community solar, including meetings and tours for area youth groups, school classes, chambers, local government officials, and non-profit organizations. To help celebrate Earth Day, the cooperative will be holding a special MemberSolar Day on May 13. The event will provide members and the community with information about the project, including tours of the project.



Pictured: Dylan Klindworth, lamb manager for MemberSolar field summer 2016



Pictured: Church that received MemberSolar subscriptions as donations in Eau Claire

RIVER FALLS MUNICIPAL UTILITIES



Pictured: River Falls Municipal Utilities solar array groundbreaking ceremony

River Falls Municipal Utilities serves part of Pierce and St. Croix counties. Starting in 2015 the utility began offering community solar to its customers. River Falls Municipal Utilities' project follows Model 1, subscription units. For a one-time unit fee of \$567, the customer subscribes to a 20 year agreement, which results in a credit on the customer's monthly bill of between \$2 and \$3 per panel per month for the duration of the contract. Subscribers have several options if they move. The customer can transfer the subscription to a new home within the utility's service area, transfer the subscription to another customer, donate the subscription to a non-profit organization, or sell the subscription back to the utility less the depreciation.



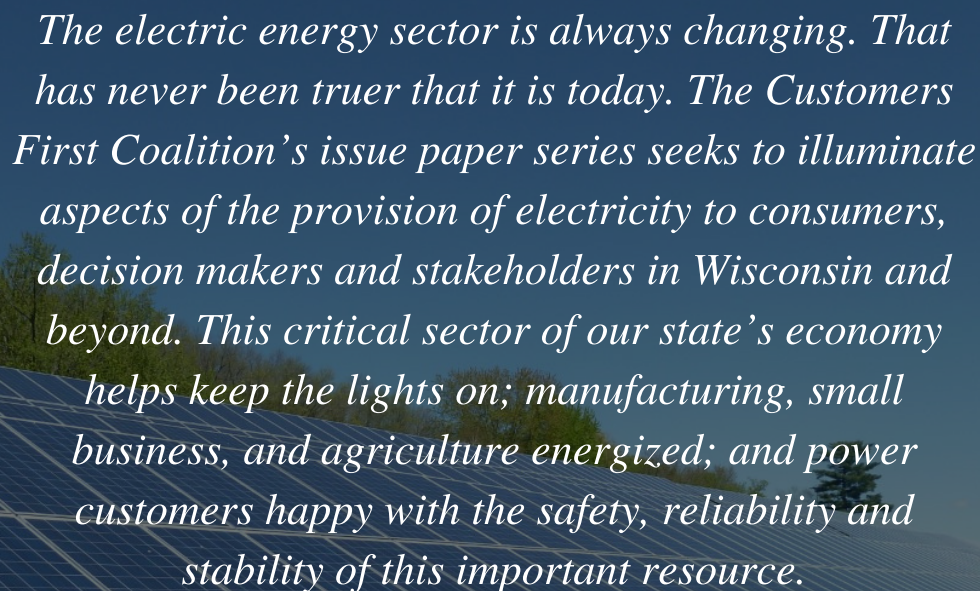
COMMUNITY SOLAR PROJECTS IN WISCONSIN

Utilities and electric cooperatives are demonstrating their commitment to diversify the source of our energy in Wisconsin. The following table lists all of the community solar projects in Wisconsin, the number of units offered, the output of those projects, and the status of each project.

Electric Provider	Location	Current Output in kilowatts	Planned Output in kilowatts	Status	Model
Vernon Electric Cooperative	Westby and Liberty Pole	235	479	Phase 1 completed in 2014; Phase 2 under construction	Phase 1 Subscription Units; Phase 2 Cooperative Project Solar
St. Croix Electric Cooperative	Hammond and Roberts	80	224	Phase 1 completed in 2014; Phase 2 under construction	Phase 1 Subscription Units; Phase 2 Cooperative Project Solar
Barron Electric Cooperative	Barron	80	80	Placed in service 2014	Subscription Units
Taylor Electric Cooperative	Medford	80	80	Placed in service 2015	Subscription Units
Clark Electric Cooperative	Greenwood	40	40	Placed in service 2015	Subscription Units
Eau Claire Energy Cooperative	Fall Creek	670	670	Placed in service 2015; open for subscriptions (57% full)	Subscription Units
New Richmond City Utilities	New Richmond	250	250	Placed in service 2015	Subscription Units
River Falls Municipal Utilities	River Falls	250	250	Placed in service 2015	Subscription Units
Bayfield Electric Cooperative	Iron River	320	320	Placed in service 2016; open for subscriptions (90% full)	Subscription Units
Madison Gas & Electric	Middleton	500	500	Placed in service 2017	Subscription Rates
Xcel Energy	La Crosse, Eau Claire		2,000	Open for subscriptions (90% full); construction underway	Subscription Units
Chippewa Valley Electric Cooperative	New Auburn		250	Construction planned for 2017	Cooperative Project Solar
Dunn Energy Cooperative	Menomonie		100	Open for subscriptions; placed in service 2017	Subscription Units
Oakdale Electric Cooperative	Necedah		200	Open for subscriptions; construction underway	Subscription Units
Polk-Burnett Electric Cooperative	Centuria		250	Construction planned for 2017	Cooperative Project Solar
Richland Electric Cooperative	Viola		100	Open for subscriptions; placed in service 2017	Subscription Units
Riverland Energy Cooperative	Arcadia		150	Placed in service 2017	Cooperative Project Solar
Scenic Rivers Energy Cooperative	Mt. Hope		250	Placed in service 2017	Cooperative Project Solar
Spooon Municipal Utilities	Spooon		400	Construction Planned for 2017	Subscription Units

THE FUTURE OF COMMUNITY SOLAR IN WISCONSIN

The future of community solar in Wisconsin appears bright. The community solar model allows utilities to provide customers with a broader array of energy resource options. The model helps to educate the community about energy issues, while offering the utility valuable insight into the most effective ways for solar to integrate with the grid. As this paper demonstrates, utilities in Wisconsin have navigated the integration of solar generation in a variety of ways. Projections indicate that the cost of solar will continue to fall as utilities seek ways to diversify their energy generation mix. Power customers are playing a pivotal role in the growth of community solar. These projects would not have developed without community support and demand. Within Wisconsin's regulated energy framework, customers are helping to drive positive change and innovation.



The electric energy sector is always changing. That has never been truer than it is today. The Customers First Coalition's issue paper series seeks to illuminate aspects of the provision of electricity to consumers, decision makers and stakeholders in Wisconsin and beyond. This critical sector of our state's economy helps keep the lights on; manufacturing, small business, and agriculture energized; and power customers happy with the safety, reliability and stability of this important resource.

The Customers First Coalition is an alliance of consumer organizations, municipal electric utilities, rural electric cooperatives, wholesale electric suppliers, an investor owned utility, renewable energy advocates, and utility workers.

We advocate for policies that:

- protect the interests of Wisconsin electric consumers of all sizes
- prioritize and safeguard energy reliability
- provide access to affordable electric service at stable prices over the long term
- ensure any restructuring of the electric utility industry benefits all electric consumers



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**COMMUNITY SOLAR:
RESPONDING TO POWER CUSTOMERS**