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AN ALLETE COMPANY

COMMUNITY SOLAR

User Guide

We're growing solar



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WELCOME

Minnesota Power has built a 40 kW solar array, and has contracted with a solar developer to build a 1 MW solar array to power the community solar garden program. The smaller array is located in Duluth at the corner of Arrowhead and Rice Lake roads. The larger array is located in Wrenshall, Minn.

Minnesota Power customers will be able to subscribe to the program to offset their energy use. Subscriptions are made in 1 kilowatt (kW) “blocks.” The solar subscription blocks represent a portion of the total solar garden generating capacity. When the sun is shining the solar garden will produce energy. At the end of each month Minnesota Power will calculate the total amount of energy produced by the garden, divide that production by the total number of subscription blocks (1,040) and credit customer bills according to their number of subscription blocks. There are three ways to pay for a solar garden subscription (described on page 2).



The Program

Minnesota Power's community solar garden (CSG) pilot program is a simple way for customers to participate in solar without having to install a system on their own home or business. It's a safe, flexible and convenient choice for customers who want to go solar but either rent or don't have a location that is well-suited to generating electricity from the sun.

Subscription Options

Participants can choose from three subscription options.

OPTION 1

\$2,132.15 per kilowatt

Upfront payment. Subscribers pay a onetime fee and receive a monthly energy credit of kilowatt-hours based on their subscription.

OPTION 2

\$15.62 per kilowatt


Fixed monthly subscription fee, which is essentially the upfront payment financed over the length of the contract.

The customer receives a bill credit for the energy produced from their subscription.

OPTION 3

11.15 cents per kilowatt-hour

Fixed charge for each kilowatt-hour of solar energy produced from a subscription. The customer purchases all the solar energy produced from their subscribed amount of capacity.



Each option is generally financially equal to the others over time, given the amount of energy that is expected to be produced from the solar garden. However, there are different risks. For example, customers choosing Options 1 or 2 will pay the same amount, regardless of whether the solar garden produces more or less energy than expected. Customers choosing Option 3 will pay for all of the energy produced, regardless of whether it is more or less than expected.

You're encouraged to choose a subscription size that meets your needs. The total subscription will be limited to 120 percent of the average amount of electricity you used in the 12 months prior to the date of your application to the program.

We'll monitor customer subscriptions for the first five years of the program to ensure that the subscription size you selected is appropriate based on your energy usage.

All community solar garden subscribers will receive a credit on their electric bill for the energy produced from their share of the solar garden. Customers who choose Option 3 will also be charged a fixed fee per kilowatt-hour of energy produced by their share of the solar garden.

The solar garden will produce more energy in summer than in winter, so there may be times when you have more solar energy than you can use in a given month. In these cases, the extra solar energy credits will be "banked" and carried over to be used as a bill credit in months when less solar energy is produced or you use more energy.

The program costs will be fixed over the 25-year life of the program, which gives customers protection against potentially rising energy costs.



Your Bill

What to Expect on Your Bill

All solar garden subscribers will be moved to the same billing cycle to consistently credit bills with the energy produced by shares of the solar garden. Subscribers will be billed on the 15th of each month. Depending on when a customer joins the program, the first billing cycle may be longer or shorter than typical.

Customers who currently have a recurring payment plan (RPP) with Minnesota Power may need to change their payment withdrawal date. We recommend you choose a date that is the same or no more than five days after the due date of your bill.

For instructions, go to www.mnpower.com/PaymentOptions.

Bill Comparison

The sample bills on the next few pages explain the basic components of a standard Minnesota Power bill and illustrate which components will change or be added to your bill once you've joined the community solar garden program.

Solar Renewable Energy Credits

Solar Renewable Energy Credits (SRECs) represent the renewable energy attributes associated with a solar array. SRECs from the community solar garden will be owned by Minnesota Power and used to comply with the requirements of Minnesota's Solar Energy Standard. In exchange for ownership of the SRECs produced by the community solar garden program, Minnesota Power has included a credit for the market value of the SREC in the subscription prices. In other words, we're purchasing the SRECs from solar garden subscribers in order to help us comply with the Solar Energy Standard. If we don't own the SRECs, the community solar garden would not count toward the Solar Energy Standard.

This pilot program may not be a good fit for customers who require SRECs to meet their energy goals.

Definitions

Solar: There are many types of solar energy. In this program we are referring to solar electricity produced by solar photovoltaic (PV) modules. This technology converts sunlight directly into electricity.

Solar array: An interconnected system of PV modules that function as a single electricity producing unit.

Kilowatt (kW): The instantaneous measure of electric energy. Also, a standard unit for measuring the amount of electricity produced by solar modules under standard conditions. The solar garden uses one (1) kilowatt increments for the solar garden subscriptions.

Kilowatt hour (kWh): A unit of energy measurement over time. This is the unit of measure used for billing electricity on bills.

Solar Renewable Energy Credits (SRECs): The renewable energy attributes associated with the production of solar energy. One SREC is equal to 1,000 kWh of energy produced. SRECs are used to meet compliance standards for utilities, or other claims about using renewable energy for the purposes of marketing.

Subscription: The agreement and number of kilowatt blocks a customer takes for meeting energy needs through the solar garden program.

Block: The base size of the solar garden program subscription. One block of the solar garden is equal to 1 kW of the solar array's capacity. The community solar garden program has 1,040 blocks for customers to subscribe to. Each block will produce energy throughout the year. Total output of one block is estimated to be about 1,600 kWh per year.

OPTION 1

\$2,132.15 per kilowatt

Upfront payment. Subscribers pay a onetime fee and receive a monthly energy credit of kilowatt-hours based on their subscription.

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Name: Jane John
Account: 2222222222

Bill Number: 125542622876
Bill Date: July 19, 2017

**123 MAIN ST
 DULUTH MN** **Residential Service: 20
 30 Days** **Next Scheduled Meter Read: 05/10/2017**

Meter #	Start Date	Start Read	Read Code	End Date	End Read	Read Code	Total Usage
123456789	03/31/2017	25871	Regular	04/30/2017	26642	Regular	771 Kilowatt Hours (kWh) used

Billed for the Last 24 Months

The average kWh per day for this service is 20
 For the same period last year, it was 13
 The average daily cost for this service is \$2.38

Community Solar Garden Upfront Subscription	0.00
Service Charge	8.00
300 kWh @ \$0.05098	15.29
200 kWh @ \$0.06735	13.47
99 kWh @ \$0.08168	8.09
Bos4/Renew/Trans Base Per kWh @ \$0.0106600	6.39
Fuel/Purchased Energy 599 kWh @ \$0.01162	6.96
Interim Rate Adjustment 5.07%	2.95
Affordability Surcharge	0.51
Renewable Adjustment 599 kWh @ -\$0.0009	-0.54
Transmission Adjustment 599 kWh @ \$0.00193	1.16
Boswell 4 Plan Adjustment 599 kWh @ \$0.00035	0.21
Solar Energy Adjustment 599 kWh @ \$-0.00005	-0.03
Resource Adjustment	1.60
Duluth Franchise Fee 3%	1.92
Minnesota Sales Tax 6.875%	4.54
St. Louis County Sales Tax 0.5%	0.33
Duluth Sales Tax 1%	0.66
Total charge this period	71.51

Community Solar Garden: 1 block(s)

1. Current Billing Period Credit: 136 kWh
2. Last Bill Balance Rolled Forward: 36 kWh
3. Current Usage: 771 kWh
4. Total kWh Charged This Bill: 599 kWh
5. Credit Rolling to Next Bill: 0 kWh

The pie chart to the right shows what portion of your monthly bill is related to generation, transmission, and distribution. These are average percentages for the year 2015 for your service category. Individual monthly percentages may vary from the average. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966 or visit www.mnpower.com

RESIDENTIAL COSTS	
Generation	58%
Transmission	5%
Distribution	37%

Fuels used to generate electricity have different costs, reliability and air emissions. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966, or visit www.mnpower.com. You may also contact the Minnesota Department of Commerce at www.commerce.state.mn.us or the Minnesota Pollution Control Agency at www.pca.state.mn.us/programs/electricity.html

Community Solar Garden: 1 block

1. The amount of energy produced by the community solar garden solar arrays and credited to the bill.
2. Any excess energy from past months that has not been used to credit a bill yet.
3. The total current electric consumption for the month.
4. The current use minus the community solar garden subscription energy and any unused energy from previous months will result in the total energy charged to the current bill.
5. Any excess energy that will roll forward to the next month's billing.

OPTION 2

\$15.62 per kilowatt

Fixed monthly subscription fee, which is essentially the upfront payment financed over the length of the contract. The customer receives a bill credit for the energy produced from their subscription.

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Name: James John **Bill Number:** 121542542808
Account: 3333333333 **Bill Date:** May 15, 2017

**456 MAIN ST
DULUTH MN** **Residential Service: 20
30 Days** **Next Scheduled Meter Read: 05/10/2017**

Meter #	Start Date	Start Read	Read Code	End Date	End Read	Read Code	Total Usage
123456789	03/31/2017	12621	Regular	04/30/2017	13392	Regular	771 Kilowatt Hours (kWh) used

Billed for the Last 24 Months

The average kWh per day for this service is 11
 For the same period last year, it was 28
 The average daily cost for this service is \$2.38

Community Solar Garden Subscription 2 Blocks @ \$15.62	31.24
Service Charge	8.00
300 kWh @ \$0.05098	15.29
27 kWh @ \$0.06735	1.82
Bos4/Renew/Trans Base Per kWh @ \$0.0106600	3.48
Fuel/Purchased Energy 327 kWh @ \$0.01162	3.80
Interim Rate Adjustment 5.07%	1.64
Affordability Surcharge	0.51
Renewable Adjustment 327 kWh @ \$-0.0009	-0.29
Transmission Adjustment 327 kWh @ \$0.00193	0.63
Boswell 4 Plan Adjustment 327 kWh @ \$0.00035	0.11
Solar Energy Adjustment 327 kWh @ \$-0.00005	-0.02
Resource Adjustment	0.88
Duluth Franchise Fee 3%	1.08
Minnesota Sales Tax 6.875%	2.54
St. Louis County Sales Tax 0.5%	0.18
Duluth Sales Tax 1%	0.37
Total charge this period	71.26

Community Solar Garden : 2 block(s)

1. Current Billing Period Credit: 272 kWh
2. Last Bill Balance Rolled Forward: 172 kWh
3. Current Usage: 771 kWh
4. Total kWh Charged This Bill: 327 kWh
5. Credit Rolling to Next Bill: 0 kWh

The pie chart to the right shows what portion of your monthly bill is related to generation, transmission, and distribution of electricity. These are average percentages for the year 2015 for your service category. Individual monthly percentages may vary from the average. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966 or www.mnpower.com

RESIDENTIAL COSTS	
Generation	58%
Transmission	5%
Distribution	37%

Fuels used to generate the electricity have different costs, reliability and air emissions. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966, or visit www.mnpower.com. You may also contact the Minnesota Department of Commerce at www.commerce.state.mn.us or the Minnesota Pollution Control Agency at www.pca.state.mn.us/programs/electricity.html

Community Solar Garden: 2 blocks

1. The amount of energy produced by the community solar garden solar arrays and credited to the bill.
2. Any excess energy from past months that has not been used to credit a bill yet.
3. The total current electric consumption for the month.
4. The current use minus the community solar garden subscription energy and any unused energy from previous months will result in the total energy charged to the current bill.
5. Any excess energy that will roll forward to the next month's billing.

OPTION 3

11.15 cents per kilowatt-hour

Fixed charge for each kilowatt-hour of solar energy produced from a subscription. The customer purchases all the solar energy produced from their subscribed amount of capacity.

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Name: Jill John
Account: 4444444444

Bill Number: 005139988022
Bill Date: May 15, 2017

**789 MAIN ST
DULUTH MN** **Residential Service: 20
30 Days** **Next Scheduled Meter Read: 05/27/2017**

Meter #	Start Date	Start Read	Read Code	End Date	End Read	Read Code	Total Usage
123456789	03/31/2017	83571	Regular	04/30/2017	84342	Regular	771 Kilowatt Hours (kWh) used

Billed for the Last 24 Months

The average kWh per day for this service is 2
For the same period last year, it was 3
The average daily cost for this service is \$2.01

Community Solar Garden Subscription 408 kWh @ \$0.1115	45.49
Service Charge	8.00
55 kWh @ \$0.05098	2.80
Base/Renew/Trans Base Per kWh @ \$0.0106600	0.59
Fuel/Purchased Energy 55 kWh @ \$0.01162	0.64
Interim Rate Adjustment 5.07%	0.61
Affordability Surcharge	0.51
Renewable Adjustment 55 kWh @ \$-0.0009	-0.05
Transmission Adjustment 55 kWh @ \$0.00193	0.11
Boswell 4 Plan Adjustment 55 kWh @ \$0.00035	0.02
Resource Adjustment	0.15
Duluth Franchise Fee 3%	0.40
Minnesota Sales Tax 6.875%	0.95
St. Louis County Sales Tax 0.5%	0.07
Duluth Sales Tax 1%	0.14
Total charge this period	66.43

Community Solar Garden : 3 block(s)

1. Current billing period Credit: 408 kWh
2. Last Bill Balance Rollover Forward: 308 kWh
3. Current Usage: 771 kWh
4. Total kWh Charged This Bill: 55 kWh
5. Credit Rolling to Next Bill: 0 kWh

The pie chart to the right shows what percentage of your monthly bill is related to generation, transmission, and distribution of electricity. These are average percentages for the year 2015 for your service customer category. Individual monthly percentages may vary from the average. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966 or visit www.mnpower.com

RESIDENTIAL COSTS	
Generation	58%
Transmission	5%
Distribution	37%

Fuels used to generate the electricity have different costs, reliability and air emissions. For more information, call Minnesota Power at 218-722-2625 or 1-800-228-4966, or visit www.mnpower.com. You may also contact the Minnesota Department of Commerce at www.commerce.state.mn.us or the Minnesota Pollution Control Agency at www.pca.state.mn.us/programs/electricity.html

- Community Solar Garden: 3 blocks**
1. The amount of energy produced by the community solar garden solar arrays and credited to the bill.
 2. Any excess energy from past months that has not been used to credit a bill yet.
 3. The total current electric consumption for the month.
 4. The current use minus the community solar garden subscription energy and any unused energy from previous months will result in the total energy charged to the current bill.
 5. Any excess energy that will roll forward to the next month's billing.

How Community Solar Garden subscriptions affect monthly bills:

	OPTION 1 (upfront)	OPTION 2 (monthly)	OPTION 3 (fixed)
Residential Estimated Average (Home)	\$ 83.46	\$ 83.46	\$ 83.46
1 Block	\$ 67.71	\$ 83.33	\$ 82.88
2 Blocks (50% Subscribed)	\$ 52.25	\$ 83.49	\$ 82.58
5 Blocks (100% Subscribed)	\$ 15.09	\$ 93.19	\$ 90.91
General Service Estimated Non-demand	\$ 87.43	\$ 87.43	\$ 87.43
1 Block	\$ 72.17	\$ 87.79	\$ 87.33
2 Blocks (50% Subscribed)	\$ 56.91	\$ 88.15	\$ 87.24
4 Blocks (100% Subscribed)	\$ 26.40	\$ 88.88	\$ 87.05
General Service Estimated Demand	\$876.07	\$876.07	\$876.07
1 Block	\$864.45	\$880.07	\$879.61
20 Blocks (31% Subscribed)	\$643.74	\$956.14	\$947.02

Canceling or Transferring Subscriptions

While customers are required to sign a 25-year contract when joining the program, options to leave the program at any time without penalty are available.

Subscribers can give or sell their subscription to another eligible Minnesota Power customer in a private transaction or relinquish their subscription to Minnesota Power. Because customers on the upfront payment option have made a significant investment, Minnesota Power will purchase their subscription at a depreciated amount if they do not sell or transfer the subscription to another qualifying customer in a private transaction. The depreciation schedule can be found at mnpower.com/UpfrontDepreciation.

If a customer has banked energy credits when leaving the program, Minnesota Power will compensate the customer for each kilowatt-hour of energy at the monthly average amount for the previous 12 months and will include an SREC credit for any unused energy.

Understanding Solar



Solar photovoltaic (PV) systems convert sunlight into electricity that can be used to power your home or business. Basic solar PV systems consist of solar panels, inverters, racking, meters and disconnect switches. A community solar garden uses the same technology while allowing individuals, businesses and organizations to work together to support a larger project and share the benefits from the system. The energy produced by the solar garden is shared by the participants, or subscribers, through bill credits. Installing larger, shared systems instead of many smaller, private systems on rooftops or in yards offers several advantages, including lower costs through economies of scale, increased system efficiency and centralized maintenance.

Solar Production

Solar panels have a general efficiency of 15-18 percent, with the highest rates at 22 percent. The efficiency rate, also known as the capacity factor, represents the portion of time that a solar panel is producing energy. Each kilowatt block subscription for Minnesota Power's community solar garden is expected to produce an average of 1,600 kilowatt-hours per year.

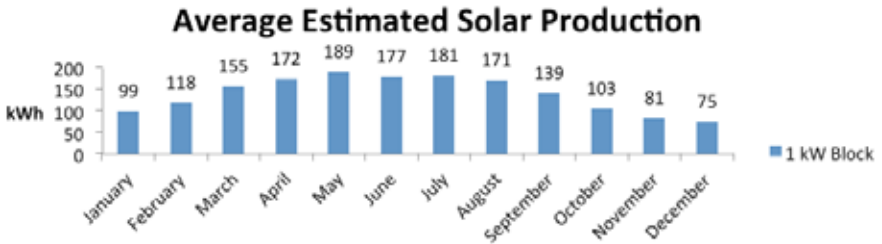
An average residential Minnesota Power customer uses about 8,940 kilowatt-hours per year so a subscription of five blocks would cover 100 percent of the customer's energy needs in an average year.

But in reality, many people use more or less than a typical customer. Customers need to look at their energy usage patterns in order to choose the right-sized subscription to meet their needs.

Seasonal Variation

Solar arrays produce more energy during summer than winter in Minnesota and output also changes from year to year. The chart at right shows an average expected year of solar output for our community solar garden. Seasonal variations can also change from year to year. If a month has greater than average rainfall, it is likely there will also be less sunshine to make energy.

AVERAGE ESTIMATED SOLAR PRODUCTION



System Life

Solar systems are long lasting and our community solar garden program reflects this with its 25-year program life. Solar modules come with warranty periods of 25 years or more, but these products are typically expected to last even longer. Some parts of a system, like the inverter, may need replacement through the course of the system's life. Community garden subscribers don't need to worry about maintenance or repairs as they are the responsibility of Minnesota Power and its contracted services.



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mnpower.com/solarprogram

To contact a Minnesota Power
Community Solar Garden Representative,
call 218-355-3720
or email us: solarprogram@mnpower.com

