



Community Supported Solar for Farms

Using the power of third party investment to bring affordable power through solar energy to NH farms

What is CSS?

CSS stands for Community Supported Solar. CSS brings together Farmers, Investors and Champions to use available financial models to help local farms realize the potential of the renewable energy economy.

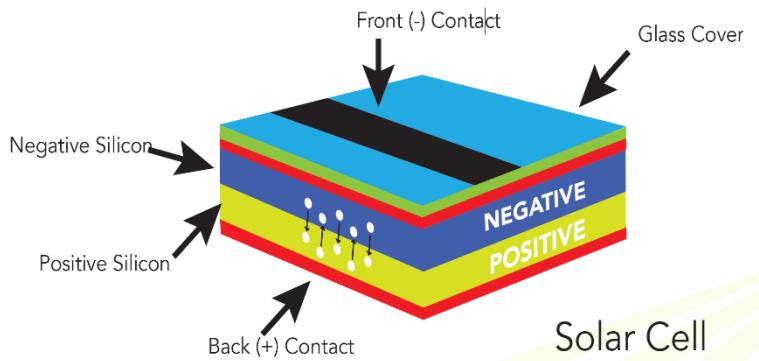
This document is designed to introduce you to CSS. But to understand how CSS works we will be discussing how solar and the financial models work. This document was put together with the guidance of the Monadnock Sustainability Network, a 501c3 based in Cheshire County NH.

How Solar Works

Solar PV (photovoltaic = photo/light, voltaic/electricity) is a process that turns light into electrical current. Solar cells are made up of silicone based cells that separate negative and positive charged particles to opposite sides to create DC power.

When a solar panel is exposed to light the electrical current can be captured to charge a battery, run and electrical device or shared with the grid. The size of a solar system is based on how many cells are placed in panels and how many panels are placed in an array.

Cells and panels are generally measured in watts output and arrays are measured in KW output. How effective a solar array is is based on how much direct sun it gets over what period of time. Other factors are temperature (the colder the better), haze and snow cover on array.



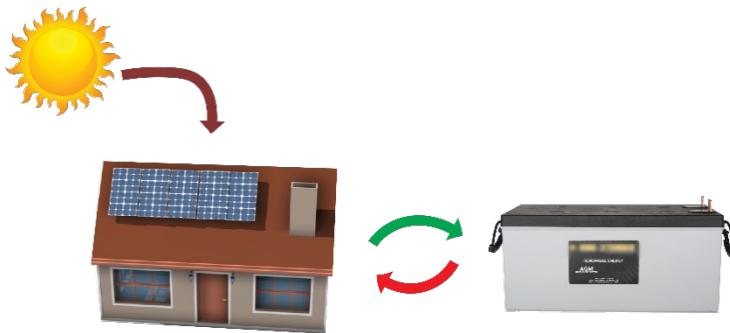
Off-Grid Solar v Net-Metered Solar

Off Grid systems use batteries to store the generated electricity for use when the sun doesn't shine but are not connected to the electricity grid. These are NOT net metered.

Net Metered systems use the grid for their battery. Giving the grid the excess power (not used on the host facility) when the sun shines and receiving power at night.

Off-Grid Solar

Solar panels make electricity. The batteries get charged when the sun shines and release power as needed when the sun goes down.



When solar PV first arrived on the scene it was in the form of battery powered off-grid systems. These systems charged up batteries with electrical current and the power was released as needed for electrical devices.

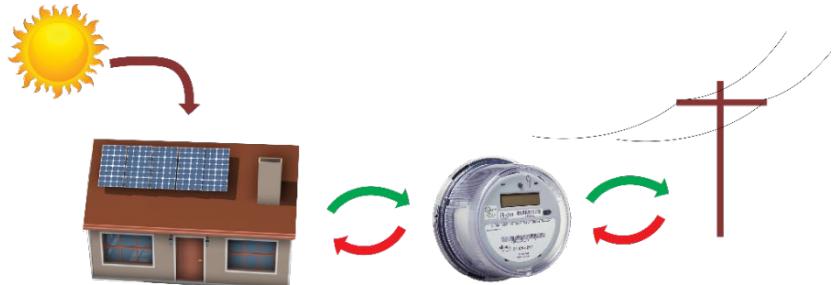
The challenges with off-grid systems were that they involved large and complicated battery systems and needed DC to AC conversion.

Note: PV produces DC power. (Direct Current ... think AA batteries or your car battery). Your household appliances and lights use AC power (Alternating Current). To use PV power in the household the power must be converted to AC power. This requires an inverter. The inverter takes DC power in and

Net-Metered Solar

Solar panels make electricity. The house uses what it needs and sends the remainder through the meter to the grid. At night the grid gives power back to the house.

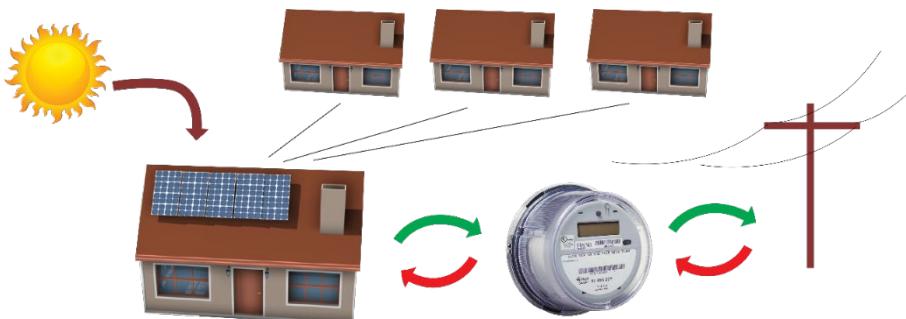
Net metering takes the power from the panels and converts it, through an inverter, directly into AC power that can be used in the home, or the excess can be sent out to the grid for others to use. This eliminates batteries and makes the system more efficient.



At night, when the sun doesn't shine, the utility grid sends the power back to your house that you need. The term net metering comes from this give and give back approach to PV that, if the system is balanced perfectly to supply and demand of the electricity would end up with a net value of zero. Net metering is a process to use the grid as the virtual batteries in the system, but it is also a legislated process with laws behind it. Without, and before, this legislation utilities would likely not allow solar PV to be sent to the grid. Now each state has laws that govern who can add power to the grid and how much power can be added.

Group net-metering

Group net-metering (GNM) uses the concept of net-metering but adds the ability for multiple electric meters at different locations to be legally bound together to be credited for the electricity being generated by the solar array.



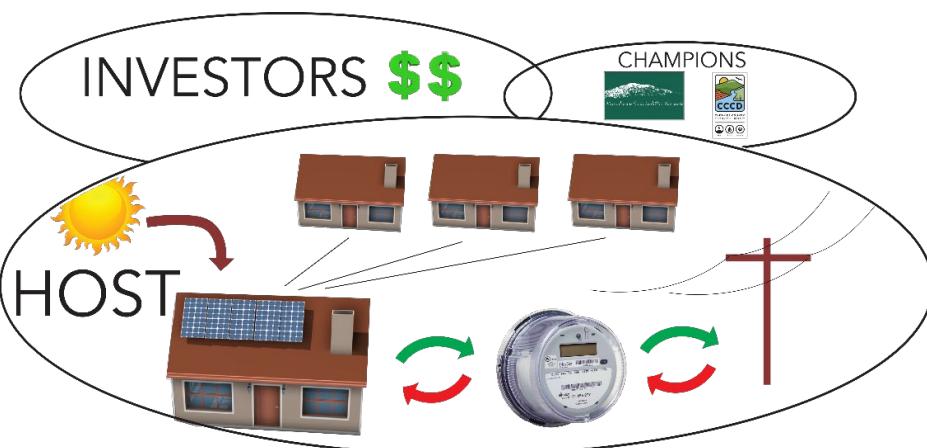
Group net-metering allows for one property with good access and 100% sun exposure to erect an array. The members of the GNM legal structure all agree to tie their meters into the array. There are a number of different scenarios pertaining to who pays for the array, who manages the accounts and

how much individual members benefit from the system. But in the end GNM allows for energy consumers to agree to pay for a system, manage that system and benefit from the solar energy while not necessarily having a solar array on their property.

Community Supported Solar (CSS)

CSS has three groups:

- **Farm Members** (farmers who have Eversource as an electric utility and can see benefit through participating in this project)
 - **Host Member** - Sun Moon Farm LLC of Rindge NH, they own the land where the array will be constructed. They will also be purchasing solar shares and become a member of the Community Supported Solar for Farms LLC
 - **Members** – Other participating farmers who decide to participate by buying a solar share and becoming a member of the Community Supported Solar for Farms LLC.
- **Champions** (interested, supportive parties and organizational structure)
 - **Manager** - Cheshire County Conservation District is the community partner managing this project and will be the Manager of the Community Supported Solar for Farms LLC.
- **Investors** (financial investors interested in providing funds for a return on investment)



CSS (Community Supported Solar) takes GNM a step further. Where typical GNM agreements have the members of the LLC putting up the money to build the array, the CSS solicits investors to step up and fund the array over a period of years and receive a return on investment (ROI). This way the upfront cost to get a system installed is creatively structured to allow for a lower cost for the farm members and a positive ROI for both the investor and farm members.

In addition to the investors and the farm members the CSS adds a third party: Champions/Managers. These champions are not-for-profit entities interested in helping farmers install solar and provide assistance in the coordination of members, paperwork and legal structure to get the array built. In this case the Cheshire County Conservation District will be Manager of the farmer owned LLC named Community Supported Solar for Farms.

The CSS structure allows for a framework and process that gives investors a ROI, the farmers an ROI and stable energy costs and allows the 3rd party champions to achieve their mission of supporting farms and increasing locally produced clean energy.

Farm Members Group

The Farmers Members Group is made up of the farmers who have agreed to purchase a share and participate in the project. The participating farms/members will enter into an Limited Liability Company (LLC) named community Supported Solar for Farms with an operating agreement and will benefit from stable low cost electricity. This Farmers LLC will work together with the Manager (CCCD) and investors to take ownership of the array in 6 years through a buyout.

The Farm Members Group will be responsible for:

- Finding a site to build the array. Most likely donated on one of the member's farms. In this case the site has been secured and offered by Sun Moon Farm LLC of Rindge NH.
- Providing investment though the purchase of one or more shares to contribute to the buyout from the investors after six years.

After the buyout happens the farmers group will own the system into the future and members will benefit from net metering based on shares owned in the system.

The system is shown to give solar benefit for 25 years, but is possible to continue to provide power for many additional years after that. The agreement has two possible five year extensions that will be decided by LLC membership when the time comes.

How do the Farm Members benefit?

- Farm Members receives energy savings and price stability
- They own the PV system and get free electricity after the LLC phase is done
- They receive REC funds once the buyout happens
- They harvest clean local energy offsetting greenhouse gasses

Champions/Managers

Champions are the community leaders who want to see solar in their community and are willing to participate in developing the structure of the agreements and the engagement with the Farmers and Investors. In this case the Community Champions are the Cheshire County Conservation District (CCCD) and the Monadnock Sustainability Network. The CCCD will be the manager of the Farm Member LLC. In this role the CCCD has secured a grant

through the NH Charitable Foundation to help create this project. Part of this grant is to provide \$38,000 to the Farm Member LLC for system buyout in year 6.

How do the Champions/Managers benefit?

- They contribute to local economic resiliency
- They receive the satisfaction that the farms are receiving clean, stable, low cost electricity.

Investors

Investors are people willing to invest upfront money to get an array built and receive, over 6 years, depreciation, rebates, tax credits and payments from the Farm Members to achieve a return on investment. Once this ROI is met the Farmer Members will make one final payment to the investors and take ownership of the system. Once the host makes the final buy out the investor is no longer part of the array ownership.

Investors are in a position to benefit from this agreement because they have something the Farm Members does not. They have a need for depreciating assets as well as a tax liability that is sufficient to cover the 30% tax credit offered by the tax code.

How do the Investors benefit?

Investors:

- Earn tax credits
- Earn income on electricity sales to farmers
- Earn Renewable Energy Certificates (REC) funds
- Earn state rebate
- Receive a buy-out after 6 years

Timetable for a CSS project

- Planning - 0-6 months - In this stage interested parties come together to form the host group and investors are pitched. During this time the site location is determined.
- Legal and financial - 6-9 months - Here the paperwork is hammered out and agreements are signed.
- Project Construction - 3-4 months - Once the financing and agreements in place it is time to build the system. This requires little participation from Host or Investors.
- Investor LLC Ownership - 6 years - Here the power is being made and the host PPA (Power Purchase Agreement) is in place.
- Farm Members LLC Ownership - 20+ years - After the buyout by the host at 6 years the host group continues to get free energy from the sun for 20 plus years.

Power Purchase Agreement (PPA)

The Power Purchase Agreement (PPA) is a contract to purchase the solar power at agreed upon rates during the LLC phase between the LLC and the farm that is the Host Member. In this case that it is Sun Moon Farm.

The rate is a return on investment for the investor and generally a cost lower than the normal grid rate for the farmers. In this case Sun Moon Farm will benefit from a lower PPA rate during the time when investors own the system. This is a modest way to thank Sun Moon Farm for providing the land for the solar array free of charge. Once the final payment has been made to the Investors by the Farm Members Group in year 6, all the participating farms will own the system so will keep and share all the benefits from the array through net metering and the PPA will terminate.

Where does the money come from?

43.5% of the money comes directly from the Farm Members Group. The rest comes from investors who have the opportunity to take advantage of financial incentives and models that allow them to tap into pockets of money that the participating farm is not able to.

Those pockets of money are: depreciation of the investment, direct grants from the state, a tax credit of 30% (you need to have a tax liability big enough to get the whole 30%) and the initial RECs until the farmers take over these payments in the 7th year.

The investors also benefit from selling the power back to the host member farm for the first 6 years discounted from what the farmer would be spending buying the power directly from the utilities.

Total Cost of the array:	\$229,520
Investors Contribute:	\$91,808
(using tax incentives, depreciation, and rebates	
CCCD Grant Contributors:	\$38,000
Farm Members Contribute:	\$99,712

Farm Members pay 43.5% of total value.

Farm Members Group Financials

The Farm Members LLC (as a group) invests \$99,712. Over the LLC phase, where the array is owned by the investors for 6 years, the farmers receive power through their utility and it is business as usual. The participating farmers continue to pay their bills and nothing has changed.

After 6 years the Farm Member LLC purchases the array from the investors and take ownership of the array. From this point on the farm members will not pay for electricity of which they purchased shares (e.g. if one share is purchased the farm will receive approximately 5,000 kwh or 4.54% of the array's output for free each year. That is because this has been pre-purchased with the share cost). This will be done through net metering.

CSS Shares

The total farmers outlay and savings are being broken down into shares. Each estimated 5000 KWh produced will constitute one share. There will be a total of 22 shares available. Farmers may purchase as many shares as they want but the total output cannot exceed the total power the farm consumes on an annual basis.

One share costs \$4,523.

After 6 years the farm members group takes ownership of the array. From this point each share will be net metered. The Farmers Group will have the legal framework and accounting backup to do the accounting. The individual shares will not be buying and selling RECs.

Note: These numbers are estimates based on past performances of arrays, current electricity costs, and current funding and grant conditions.

Next Steps

The next step is that we need to hear from you. We need to know your level of interest of joining a farmers group through the purchase of one or more shares.

Once we have a core group of farmers interested we can move on to these steps:

- Farmer Group formed
- Construction and start-up – Working with ReVision Energy as our Contractor. Also working with ReVision Energy's group of impact investors. Working with Sun Moon Farm as the Host Member. Sun Moon Farm owns the land where the solar array will be constructed.
- Investor Ownership for 6 years
- Farmer Buyout in year 6
- Net-metered stable cost electricity to the Farmer Group from year 6-25.

Community Supported Solar for Farms - Sun Moon Farm

Scenario for one share based on the following assumptions:

Using Rates from ReVision spreadsheet - \$0.1178 in year one and subject to 2.5% annual increase

1 share is worth 5,000 kwh or 4.54% ownership of the array

Cost of one share is \$4,523 for 4.54% ownership of the array or approximately 5,000 kwh

Based on this info the pay back period is 12.5 years

Year #	Year	Status	Operating Fee	2% Escalator on Operations Agreement	One time fee for new inverter	Avoided Electricity costs	Balance on Investment
1	2021	status quo (paying eversource bills as normal)	0	0	0	0	(\$4,523)
2	2022	status quo (paying eversource bills as normal)	0	0	0	0	(\$4,523)
3	2023	status quo (paying eversource bills as normal)	0	0	0	0	(\$4,523)
4	2024	status quo (paying eversource bills as normal)	0	0	0	0	(\$4,523)
5	2025	status quo (paying eversource bills as normal)	0	0	0	0	(\$4,523)
6	2026	net metering in pay back period	115	0	0	666	(\$3,972)
7	2027	net metering in pay back period	115	2.3	0	683	(\$3,406)
8	2028	net metering in pay back period	117.3	2.35	0	700	(\$2,826)
9	2029	net metering in pay back period	119.65	2.39	0	717.5	(\$2,230)
10	2030	net metering in pay back period	122.04	2.44	0	735.5	(\$1,619)
11	2031	net metering in pay back period	124.48	2.49	0	753.5	(\$993)
12	2032	net metering in pay back period/ net metering	126.97	2.54	0	772.5	(\$350)
13	2033	net metering	129.51	2.59	0	792	\$310
14	2034	net metering	132.1	2.64	0	811.5	\$987
15	2035	net metering	134.74	2.69	246	832	\$1,435
16	2036	net metering	137.43	2.75	0	853	\$2,148
17	2037	net metering	140.17	2.8	0	874	\$2,879
18	2038	net metering	142.97	2.86	0	896	\$3,629
19	2039	net metering	145.83	2.92	0	918.5	\$4,399
20	2040	net metering	148.75	2.97	0	941.5	\$5,189
21	2041	net metering	151.72	3.03	0	965	\$5,999
22	2042	net metering	154.75	3.1	0	989	\$6,830
23	2043	net metering	157.85	3.16	0	1013.5	\$7,683
24	2044	net metering	161.01	3.22	0	1065	\$8,583
25	2045	net metering	164.23	3.28	0	1091.5	\$9,507