



Introductory
MEMORANDUM OF UNDERSTANDING
to members considering the installation of a
net metering solar facility.

Carroll Electric exists to serve the Cooperative’s members with safe, reliable, and affordable electricity. The following information is intended to take a brief look at how solar power fits into this mission.

Safe?

Safety is purposely mentioned first in the Cooperative’s mission statement because it deserves top priority. One can reasonably assume a solar array will be installed safely – if a qualified installer performs the work and installs the solar panels appropriately. Choosing a trustworthy installer is very important.

Additionally, members should remain aware of how their solar system is performing once their system is interconnected to the electric grid. Solar system malfunctions such as inverter failures can and have occurred. These malfunctions hold the potential for harm beyond a member’s own property by energizing anything which might be in contact with an otherwise deenergized power line. Because this imposes a paramount concern for safety, the Cooperative presently performs routine inspections at no cost to members who are interconnected to the electric grid. Even though these inspections are routinely performed, the Cooperative does not assume any liability should any of these systems malfunction.

Liability insurance should be given strong consideration by members who interconnect their systems to the grid.

Reliable?

Is solar reliable? The short answer is, **“It depends.”** Dividing this answer over various **time periods** offers a better understanding of what to expect.

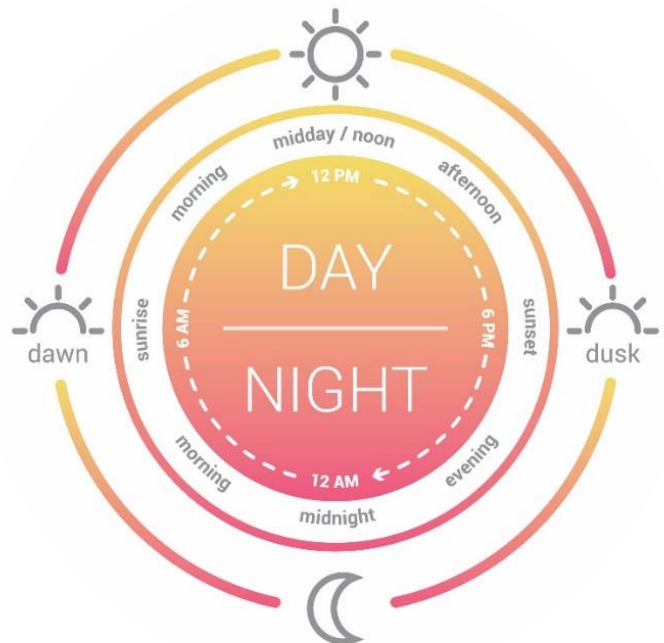
Note: In 2015, we installed our Solar Demonstration Lab. It consists of a variety of solar installations and has proven to be a valuable tool in educating ourselves and our members about solar power.

1st Time Period: 24 Hours

It is well understood that a solar array’s production will generally have maximum production¹ in the middle of the day and no production at night.

By contrast, the maximum demand experienced by the Cooperative occurs early in the morning (during the winter) and late afternoon (during the summer). For 2018, the maximum peak demand at the Cooperative occurred on Jan. 17 at 8:00 a.m. when the Cooperative’s solar lab was producing 0.03% of its rated capacity.

Until large scale battery storage becomes more advanced, existing power plants, transmission lines, and distribution lines are essential to providing reliable electricity 24 hours a day.

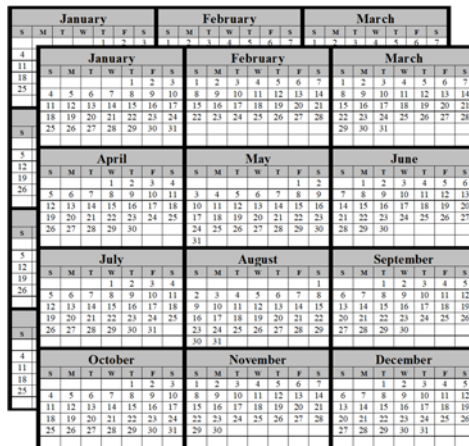


¹ Production of a solar array will vary subject to clouds, snow/ice accumulation, shade, dirt, and equipment performance.

2nd Time Period: 24 Months

The Cooperative's Solar Demonstration Lab experienced **six performance problems** (some of which might have gone undetected without close monitoring) in the first 24 months of its existence. Each issue took weeks, and for some, months to resolve. All the while, solar production was being lost. These types of problems and follow-up repairs continue to occur and are not limited to the first 24 months. Monitoring and repairing the system is an ongoing endeavor.

All innovation must have a starting point. Believe it or not, there was a time, early in the Cooperative's existence (1940s) when members would actually report outages on postcards delivered to the Cooperative by the U.S. Postal Service.



*Today, most of the Cooperative's outages are restored in **56 minutes** or less. During the entire year of 2018, each member (on average) was without power for 2¼ hours...or said another way...had reliable power 99.97% of the time. The Cooperative continues to improve reliability. Perhaps solar power will become more reliable over time.*

3rd Time Period: 25 Years

Two points deserve attention here:

- 1) Availability of a solar array's warranty, as evidenced by the Solar Demonstration Lab, is very important. Many solar arrays have a 25-year warranty, at least on the panels.

Sadly, two of the five solar panel brands represented in the Solar Demonstration Lab, **vacated their warranty in the first two years**. One company, Suniva, filed for bankruptcy protection. Another, tenKsolar, ceased operations altogether. A third company, SolarWorld, filed for insolvency and was bought out by SunPower Corporation. Luckily, SunPower decided to honor existing SolarWorld warranties.



- 2) Solar array production is expected to drop over time. Many solar array warranties allow 3% panel degradation in the first year with an additional 0.7% per year (approximately 20% over 25 years). The Solar Demonstration Lab also supports this expectation, but actually indicates higher degradation rates than the manufacturers' ratings².

The Cooperative's reliability of service is subject to regulatory oversight from a number of government agencies including the Arkansas Public Service Commission and USDA's Rural Utilities Service.

*The reliability of solar arrays has no regulatory oversight. **The Cooperative encourages members to do their own research on the expected lifetime production, warranty terms, and the financial solvency of the companies offering the warranties.** Searching the internet for "solar bankruptcies" and the brand of the solar array(s) you are considering would be a simple place to start.*

² Over the last two years, the Solar Demonstration Lab has seen a 2% - 4% drop in production which does not appear to be explained by weather conditions or down time from performance issues.



Affordable?

Like conventional power plants, solar arrays are not cheap on the front end. Using reasonable assumptions about the future is one of the reasons the Cooperative’s residential rates are 25% below the national average.



Making reasonable future assumptions about a solar installation can help determine when or if you will get your money back and begin to see savings. These assumptions are important whether you are borrowing the money, leasing, or investing your savings.

The ECONOMIC ANALYSIS for installing solar is complicated. We recommend you answer the following questions to assure the assumptions used today support your decision into the future:

Questions to Ask	ECONOMIC ANALYSIS
<p>1. What is the assumed value of savings per kWh in the ECONOMIC ANALYSIS?</p> <p>The Cooperative can provide account-specific information upon request.</p> <p> CAUTION: The Cooperative has seen vendor proposals to our members which do not use the correct amount of savings for each kWh. Electric rates can be very complicated and vary dramatically between various utilities and classes of customers.</p> <p> CAUTION: Vendor proposals to its customers sometimes not only distort the initial savings, but then inflate the distortion by as much as 4%-10% per year. Simply stated, this type of trend is historically inaccurate. Based on the Cooperative’s actual electric rate data since the 1990s, the historically-accurate inflation rate is less than 1% per year. Using reasonable assumptions is CRITICAL in forecasting future utility savings.</p>	<p>*See NEXT PAGE.</p>
<p>2. Will my income tax liability allow me to realize the full potential value of the investment tax credit?</p>	<p>**</p>
<p>3. Are there any interest charges, liens, or other long-term obligations?</p>	<p>**</p>
<p>4. Should I purchase property insurance to protect my investment from risks like tornados, hail, lightning, etc.?</p>	<p>**</p>
<p>5. Should I purchase liability insurance in case a malfunction of the equipment harms someone’s life, welfare, or property?</p> <p>Net metering customers are liable for any claims that their system has harmed the life, welfare, or property of others. Our field testing reveals net metering systems do not always disconnect themselves from the electric grid during a power outage.</p>	<p>**</p>
<p>6. How can I be assured product warranties will survive a product manufacturer filing for bankruptcy or dissolution?</p>	<p>**</p>
<p>7. Does the product warranty include the cost of labor for repairs?</p>	<p>**</p>
<p>8. Is the expected decline in kWh production described in the product warranty?</p>	<p>**</p>
<p>9. What will be my future responsibility for removing and/or disposing of the system?</p>	<p>**</p>
<p>10. How might ongoing regulatory changes impact how net metering is compensated?</p>	<p>*See NEXT PAGE.</p>

**These questions cannot be answered by the Cooperative. Members must assume responsibility for how these factors/risks impact the future.

*From PREVIOUS PAGE

	RESIDENTIAL Members	Large-Scale Systems ³ COMMERCIAL Members
Indicator of Future Saving per kWh ⁴	2017 = 8.81 cents 2018 = 8.70 cents	4.79 to 5.44 cents depending on class of service (Contact the Cooperative)
Savings per kW of peak demand	This rate class is not demand metered. No savings per kW of demand.	Demand savings, if any, can be very uncertain. Extreme caution should be exercised in estimating these.

Recommended?

As of the end of 2018, only 0.33% of Carroll Electric members have invested in solar generation. Of that small percentage, some have been satisfied. Others have not.

Whether or not something is a good investment is a subjective decision only you can make. The Cooperative's goal is to give its members the information they need to make a holistic decision about their potential investment in a solar net metering facility.

Our experiences with the [Solar Demonstration Lab](#) and the solar industry in general helps provide the data our members need to make an informed decision. If you would like to discuss this further, you are welcome to contact Joey Magnini at 800-432-9720, ext. 1306.

³ Large scale systems may require significant integration costs borne by the COMMERCIAL member. These cannot be accurately calculated by a solar vendor. Commercial members are advised to contact the Cooperative early in the process of evaluating a large-scale system.

⁴ While the savings per kWh is based on the Cooperative's specific data (excluding taxes), **members should be aware that laws and regulations governing the savings for net metering is still evolving.** Specific tax rates will vary based on location and possible exemptions should be reviewed by members to ensure accuracy.