



RENEWABLE GENERATION

Solar Power

Installation procedures & guidelines for Farmers EC members

IMPORTANT: Read this document thoroughly.

Then contact Farmers EC at: 903 455 1715
before construction of a distributed renewable
generation system.



There are a few requirements that Farmers EC has in place in order to maintain safety and reliability for our members and personnel when installing a Distributed Renewable Generation (DRG) system. After the system is installed, a Farmers EC representative will perform an inspection on the system. All the following requirements must be met.

Requirements checklist:

- The Agreement for Interconnection contract has been completed and signed by the owner of the DRG system.
- A one-line drawing and system layout diagram has been submitted to Farmers EC.
- A meter socket has been installed on the output of the DRG system (Refer to the Farmers EC Sample DRG One-Line and Sketch).
- The DRG meter socket has been wired to have DRG production flow from bottom-up through the meter. (Refer to the Farmers EC Sample DRG One-Line and Sketch).
- A Visible Lockable Labeled Disconnect (VLLD) device that has a visual break has been installed within ten feet of the utility billing meter. If not, a site directory placard indicating the location of the VLLD has been placed on the Member's equipment beside the Cooperative's billing meter.
- The inverter is UL 1741 and IEEE 1547 compliant.
- Systems more than 15kWdc will require an additional engineering study. A good rule of thumb is to make sure the DRG system does not exceed 110% of your two-year historic maximum demand. **Contact Farmers EC before you begin construction and request a usage history report.**

What happens to the energy I generate?

The energy that is generated by your DRG system will flow through Farmers EC Distributed Generation (DG) output meter and into your home. Your home will absorb all of the energy it needs from your DRG system and pull the rest from Farmers EC grid (In-flow). If your DRG system produces more energy than your home needs, the excess will flow back into Farmers EC grid (Out-flow). This outflow can be seen on the Farmers EC billing meter.

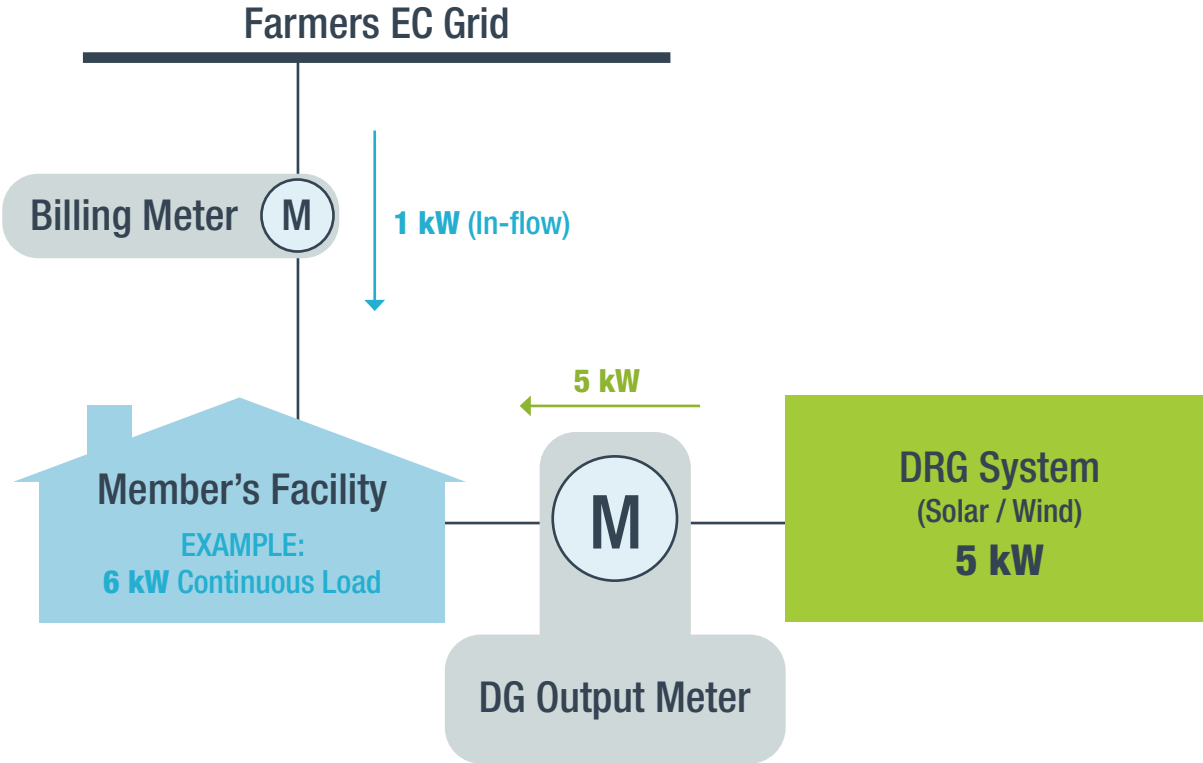


FIGURE 1. Member's load is greater than DRG production

If the example in Figure 1 held true for 1 hour:

- Total energy consumed by the member = 6 kWh
- Total energy produced by the DRG system = 5 kWh
- Total energy supplied by the Cooperative (In-flow) = 1 kWh

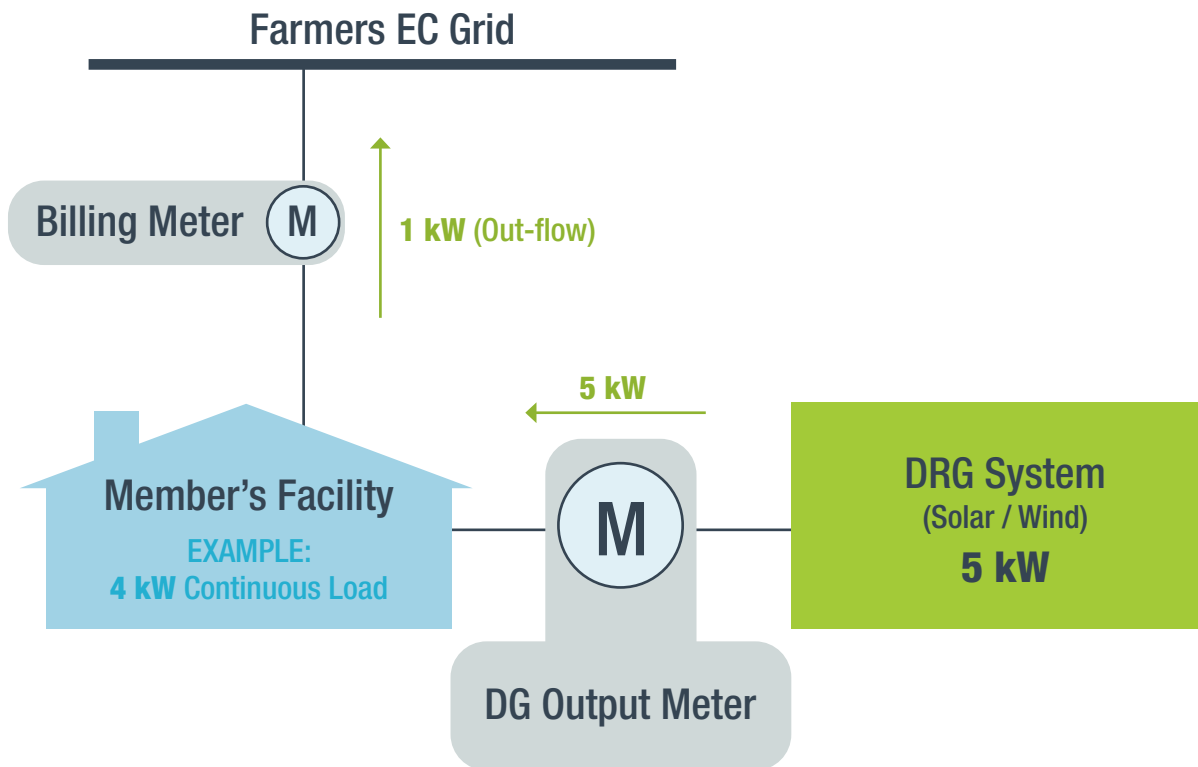


FIGURE 2. Member's load is less than DRG production

If the example in Figure 2 existed for 1 hour:

Total energy consumed by the member = 4 kWh

Total energy produced by the DRG system = 5 kWh

Total energy supplied to the Cooperative (Out-flow) = 1 kWh

Who can I call to install a DRG system?

Farmers EC does not recommend any particular installer. Contact Farmers EC and ask for a list of solar companies and contractors that you can call. The list you get will show all the solar companies that have done work for our members. **Please keep Farmers EC informed if you decide to move forward with a DRG system as there are certain procedures that must be followed.**

Why does my inverter say it has produced a different amount than the Farmers EC meter?

While it is nice having your solar inverters tell you how much they have produced, many of them are not accurate enough for billing standards. This is one of the reasons why we provide a DG output meter to you at no additional cost. Utility grade meters have a less than 0.5% variance in accuracy, whereas some inverters can have as high as a 10% error in metering.

Why does my DRG system produce different amounts each month?

DRG systems rely on many different factors when it comes to system production. For example, if a month was particularly rainy, then there were fewer days of sunshine which means less production from your solar panels. Is there any shade on your panels? Sometimes leaves and other debris can land on your solar panels, reducing total production. Solar irradiance can also be quite different with the changing months. With the approach of the winter solstice, the days become shorter and the nights become longer. These, amongst many other factors, all play a role in your solar production.

Below is an example of the monthly output trend. You can usually expect a bell curve where system performance is best during summer months and least during winter months. This graph reflects the pvwatts.nrel.gov estimate output a 5 kWdc system would produce in Greenville, TX. It is important to note that this is an estimate and you should not base your calculations solely on this graph.

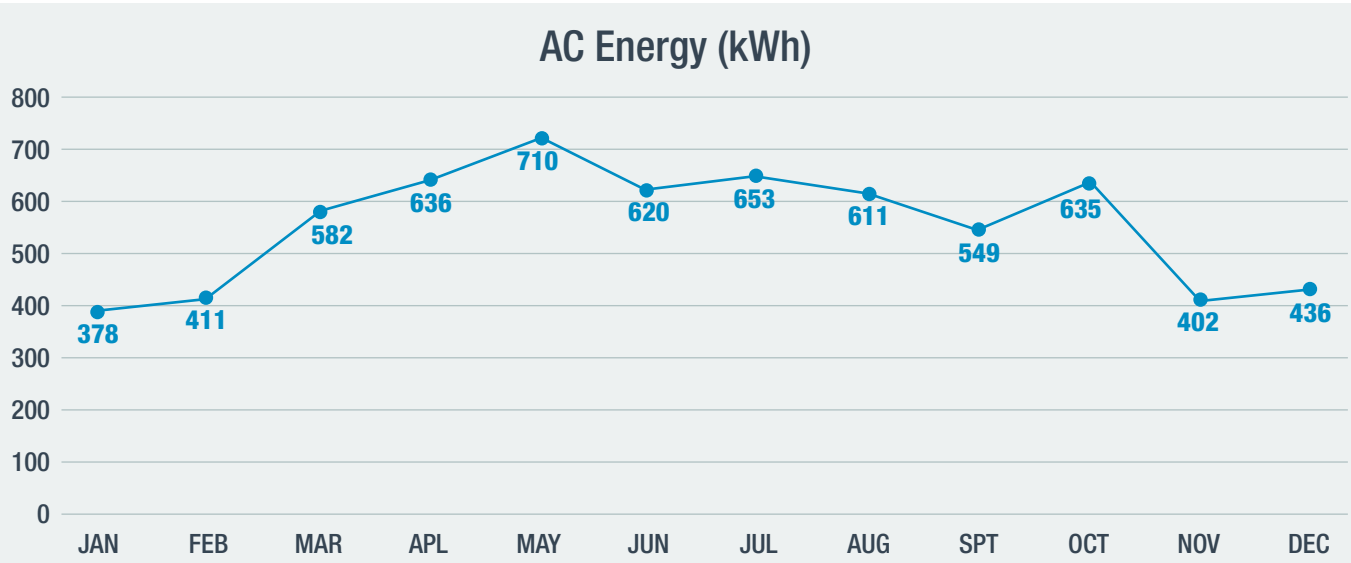


FIGURE 3. PVWatts estimated performance of a 5kWdc system in Greenville TX

Why is the received energy on my Billing Meter different than my DG Output Meter?

When your DRG system produces energy, it will be used to power your facilities. When your solar system produces more energy than your facility needs, the excess will flow into the grid (Out-flow). Since your facility is consuming a portion of the energy generated by your DRG system, your billing meter will only be able to see the excess. In the example below, your billing meter will show that the solar generation (REC register in the meter) flowing to the grid was 300 kWh and your DG Output Meter will show 1000 kWh (REC register in the meter).

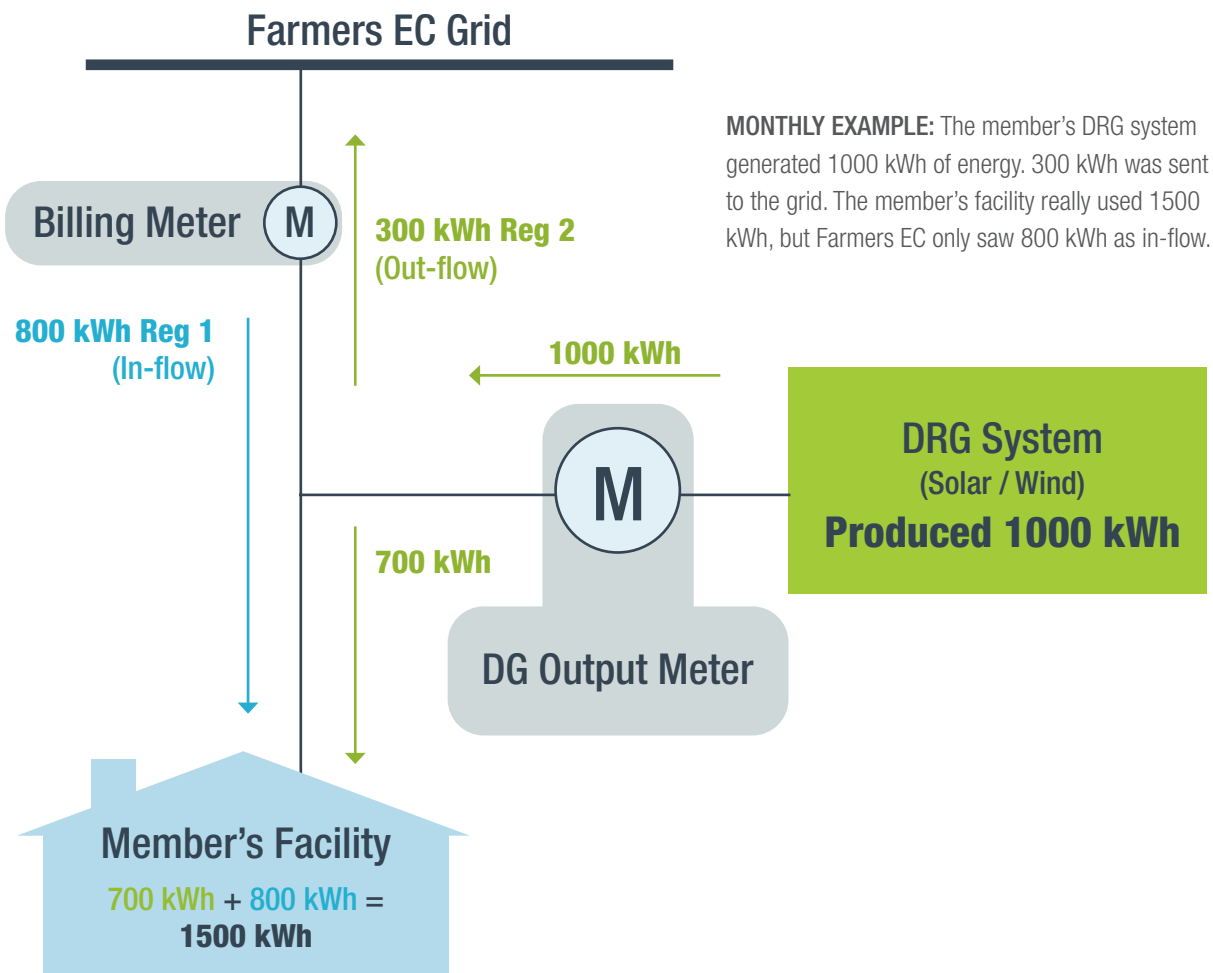
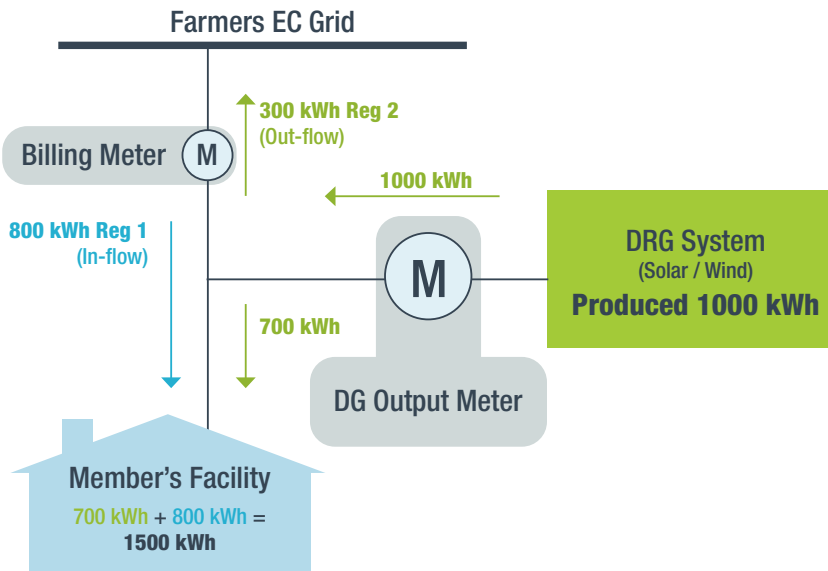


FIGURE 4. The received (REC) register on the meters will see different portions of the overall power production

Does Farmers EC buy my power? How will my bill change?

Farmers EC purchases all power sent to the grid (out-flow) at the current year's Avoided Cost rate. Avoided Cost is a reflection of the wholesale cost of power. Total out-flow is not equal to total solar production however; your home will use much of the energy before it can reach the grid. The DG meter (Distributed Generation) will show total production from the solar system, and the billing meter will show total excess production (out-flow). The billing meter is used to calculate the monthly bill. Below is an example of what the bill might look like with and without a solar system.



EXAMPLE: Assuming a one-month billing cycle, Farmers EC rate of \$0.11/kWh, and an Avoided Cost rate of \$0.05/kWh (these values are for example only and may not reflect current rate values).

Without Solar / DRG	With Solar / DRG
Member's Facility Usage = 1500 kWh	Member's Facility Usage = 1500 kWh
Energy Supplied by Farmers EC = 1500 kWh	Energy Supplied by Farmers EC = 800 kWh
Usage Cost: (1500 kWh) x (\$0.11) = \$165	Usage Cost: (800 kWh) x (\$0.11) = \$88
Basic Charge = \$15	Basic Charge = \$15
	DG Facility Charge = \$5
	Excess Solar Production (out-flow) = 300 kWh
	Out-flow Credit = (300 kWh) x (\$0.05) = \$15
TOTAL FARMERS EC BILL: \$165 + \$15 = \$180	TOTAL FARMERS EC BILL: \$88 + \$15 + \$5 - \$15 = \$93

Total Bill Usage Reduction = \$87

The size of the Solar/DRG system in this example would be roughly 9 kW (kilowatts).

Solar Rates and Charges

During each billing period for power produced in excess of on-site requirements, as metered by the Cooperative billing meter, the Cooperative will purchase such excess production at Avoided Cost. Avoided Cost means the rate in dollars per kilowatt hours (\$/kWh) equal to the preceding calendar year's average cost of wholesale power.

All Solar/DG facilities will be billed a monthly DG facility charge in addition to their current basic member charge. Refer to the table below to see the DG Facility charge amounts.

Size of Installation	Monthly DG Facility Charge
For Solar/DG Facilities with an Installed Capacity or Nameplate Rating of less than 50 kW	\$5 per month per facility
For Solar/DG Facilities with an Installed Capacity or Nameplate Rating of 50 kW or more, up to less than 1 MW	\$100 per month per facility

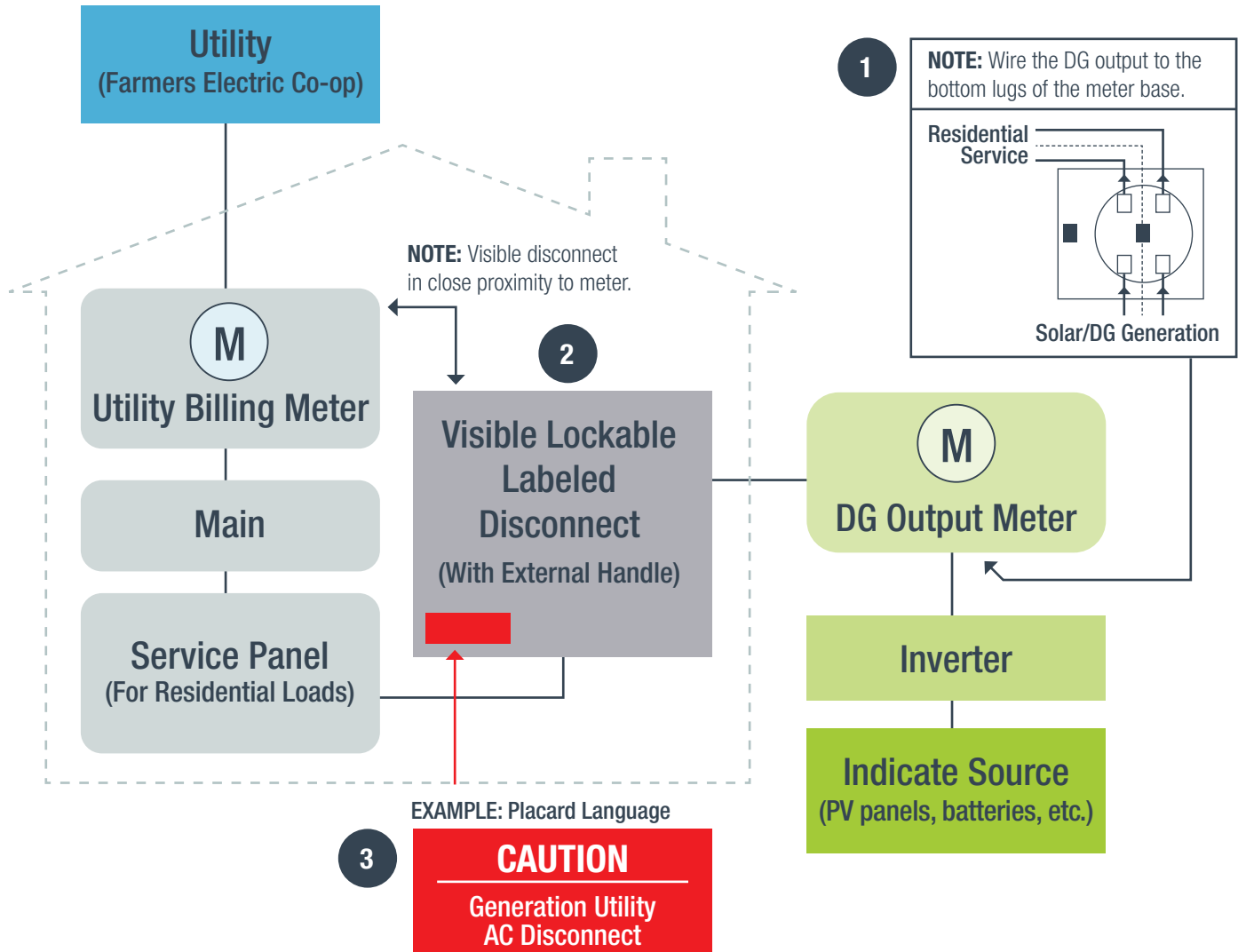
Application and Inspection Charges	Charge
Initial Application and Inspection	\$500
Failed Inspections	\$250 each

Please ensure your system is installed per the directions on page 8 to avoid failed inspections.

APPENDIX A: Installer Requirements

NOTE: A system line drawing/diagram along with the Agreement for Interconnection must be submitted before installation.

1. Farmers EC requires a meter socket to be installed on the output of the Distributed Renewable Generation (DRG) system. The meter must be wired so that energy production flows bottom-up through the meter. **The system will not be approved if the meter socket is not wired in this fashion.** A Farmers EC meter will be provided and installed upon system approval at no cost. This is referred to as the DG Output Meter.
2. A Visible Lockable Labeled Disconnect (VLLD) switch must be installed and located within 10 ft. of the Utility Billing Meter. If the VLLD cannot be within 10 feet, a placard signifying the VLLD's location will be allowed.
3. Appropriate signage/warning labels must be in place signifying that there is on-site generation.



Frequently Asked Questions

Q – Should solar power generation be my first option to reduce my energy bill?

A – In many cases, it is cheaper to upgrade your home's efficiency measures thus reducing your bill than to install a solar system. Generally, you want your home to be as efficient as possible, then investigate your solar production options.

Q – What is the process to purchase a solar system?

A – The most important step for you as a cooperative member and homeowner is choosing a reputable, honest installer who will guide you through the sales, installation, and interconnection process, and who will be there for maintenance or repair issues. Once you've chosen an installer and agreed to the sales contract, they will work directly with us at Farmers EC to ensure a safe interconnection. Please refer to this link for the steps in that process. <https://farmerselectric.coop/renewable-generation>

Q – How much will solar system cost at my home?

A – This is largely based on the size of the system you install. A good estimate would be \$3 to \$4 per watt. For example, a 10,000 watt (10kW) system might cost you roughly \$30,000 to \$40,000. There is a federal solar tax credit that can subsidize this cost up to 30% depending on the year. We recommend contacting multiple installers and getting multiple quotes.

Q – How big of a DRG system should I put in?

A – The size of the solar system should be specific to your own usage needs. You will want to take many things into consideration when choosing the size of your solar system. Contractors can help with the process, but it's good to know how to size a system yourself.

STEP 1: Contact the Cooperative and ask for a 12-month usage history. You can use this to gauge your consumption trends. Look at the usage (kWh) and the demand (kW) values for each month.

STEP 2: You can use sites like pvwatts.nrel.gov to model a system. It will give you a monthly estimate on how much a DRG system of any given size will produce based on your geo location and other variables.

STEP 3: Compare the monthly kWh data from Steps 1 and 2 and customize your system to your needs.

STEP 4: If the system is larger than 15 kWdc, verify that the size of the DRG system does not exceed 110% of your maximum historic demand.

Q – Will I still get a bill from Farmers EC if I install a solar power system?

A – Yes. Solar power systems do not produce power at all hours of the day. Even during a normal sunny day, you might have periodic cloud cover, or temporary fluctuations in usage at your home. And of course, after the sun goes down, all your electricity will still come from the grid.

Q – How much money can I expect to save with a solar system?

A – Many factors go into the potential savings including system size, how much electricity you use and what time of day you use it, the overall efficiency of your system, panel location, shading issues and more. But as a general example, households using around 1300 kWh a month installing a 9-kW system might expect about a 40% reduction in the total cost of electricity.

Please read this part carefully: *If a salesperson is claiming that you will no longer have an electric bill or claiming with certainty that you will experience a guaranteed reduction (i.e. "you will save 70% on your bill every month!") it is most likely untrue. Please contact us with any questions as we are here to serve you, our members.*

Q – Will my solar system power my home if we lose power from Farmers EC?

A – The answer is almost always no, it will not. Most solar systems are designed to automatically shut down if there is a loss of power from the grid, such as during a storm or a scheduled maintenance outage. This is a safety feature designed to prevent your system from sending power back onto the grid when linemen are working to restore power. There are set ups available where your home can go "off grid" but they tend to be more complex and expensive to install.

Q – How do I lower my power bill with a solar system?

A – There are two ways to lower your bill with solar.

Reduce the electricity you purchase from Farmers EC -

Electricity produced by your solar system will first supply your home, and your home will utilize that electricity before it pulls from the grid/Farmers EC. This utilized solar production should lower the amount of electricity you purchase from Farmers EC as compared to prior bills. You can think of this as a 1:1 rate of return, but only if you USE those kilowatt hours. Keep in mind, the number of kWh's that you produce and use will not show up as a line item on your bill.

We pay you for the extra electricity you don't use - Sometimes you may produce more electricity than your home requires. In this case, the excess electricity will be sent back to the grid, and you will be credited for the "avoided cost," which is the amount Farmers EC would have had to pay for this energy in our normal course of business. Currently the rate is around \$.06 per kWh, and this will show up under "BILLING SUMMARY" on your bill as "DG AVOIDED COST."

Q – How do I know how much solar energy my system produces?

A – Your solar installer should provide you with a software application for your computer or phone where you can monitor your system and production. Your total solar production will not be reflected anywhere on your monthly bill from Farmers EC. The line item mentioned above, "DG AVOIDED COST," is not your total production, it is the excess electricity that your home did not need and sent back to Farmers EC.

Q – What is Net Metering?

A – Net Metering refers to the way an electric utility compensates for excess electricity pushed back to the grid from a solar array. Under Net Metering, a 1:1 credit is created for each kWh you send back to the grid. At the end of the billing cycle, the number of kWh's delivered by the utility is reduced by the total amount of kWh's sent back to the grid. Net Metering essentially means the utility pays the full "retail" rate for electricity they could have purchased for much less.

Q – Does Farmers EC offer Net Metering?

A – Farmers EC does not offer Net Metering to members installing a new solar system. Under the Farmers EC rate program, the member receives compensation for the excess electricity sent to the grid, but it is limited to the amount Farmers EC would have had to pay for that electricity in the normal course of business. Your salesperson likely works with many different utilities and may not understand that Farmers EC does not offer Net Metering for new installations. If their proposal assumes a 1:1 rate for the electricity you will send back to the grid, or if they are claiming that you will not get a bill or it will be reduced to almost nothing, they are overestimating your potential savings. Please refer them to this FAQ, or they can call or email, us here at Farmers EC so that we can all make sure you'll get what you're paying for.

Q – Which installers do you work with?

A – Farmers EC does not maintain a list of installers we recommend or exclude, but we do maintain a list of all solar installers who have successfully built and interconnected systems to our grid. Please contact us and the list will be provided to you. We advise getting a referral from a trusted source, and asking your potential installer for a list of previous and ongoing customers that can give feedback on their personal experiences with the group.

**STILL HAVE QUESTIONS? FEEL FREE TO CONTACT US
AT 903 455 1715 OR EMAIL: DG@farmerselectric.coop.**

Take charge. Reduce your energy use with Farmers EC.

No one has more influence on your energy use and its resulting costs than you do. We're here to show you how to take charge of how you use energy, maximizing the comforts and conveniences of electrical power, while reducing impacts on your budget and the resources we all share.

FIND THE TOOLS, SERVICES, AND TIPS YOU NEED TO LOWER YOUR ENERGY USE IN THE EFFICIENCY HUB AT: FarmersElectric.coop

