



RENEWABLE GENERATION

# Green energy & your co-op

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.



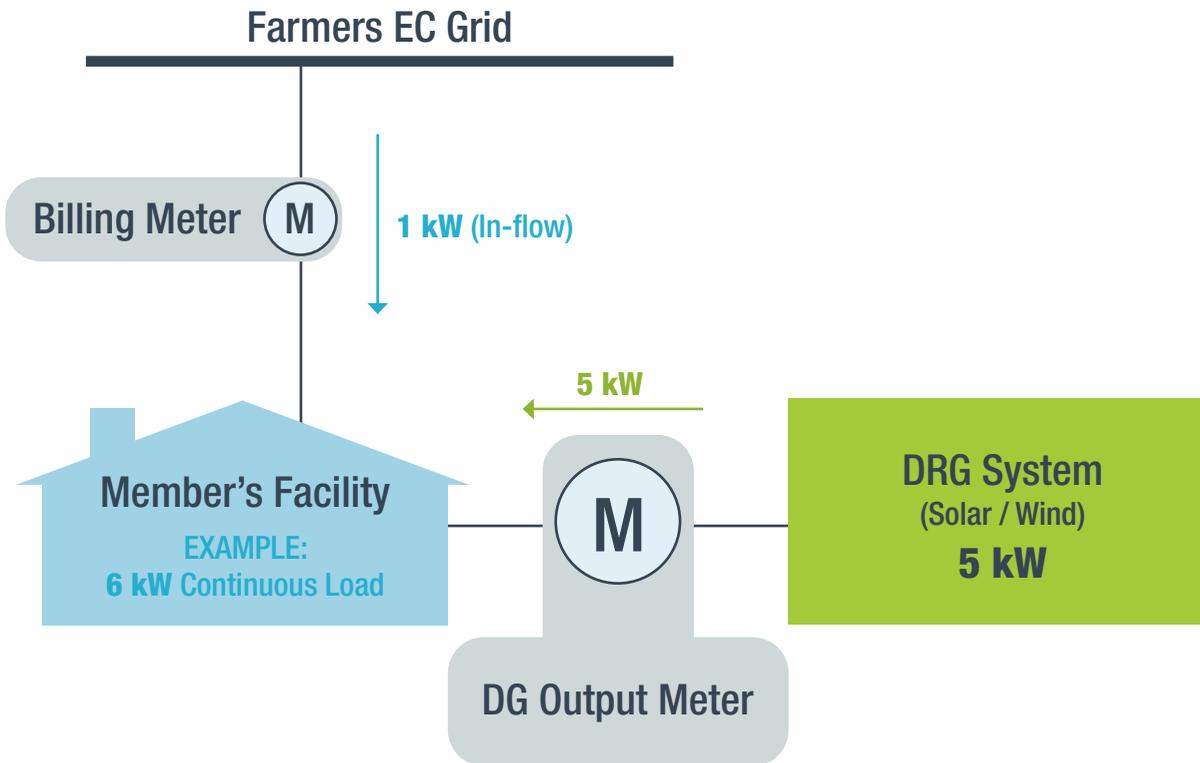
There are a few requirements that Farmers EC has in place in order to maintain safety and reliability for our members and personnel when installing a Distributed Renewable Generation (DRG) system. After the system is installed, a Farmers EC representative will perform an inspection on the system. All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



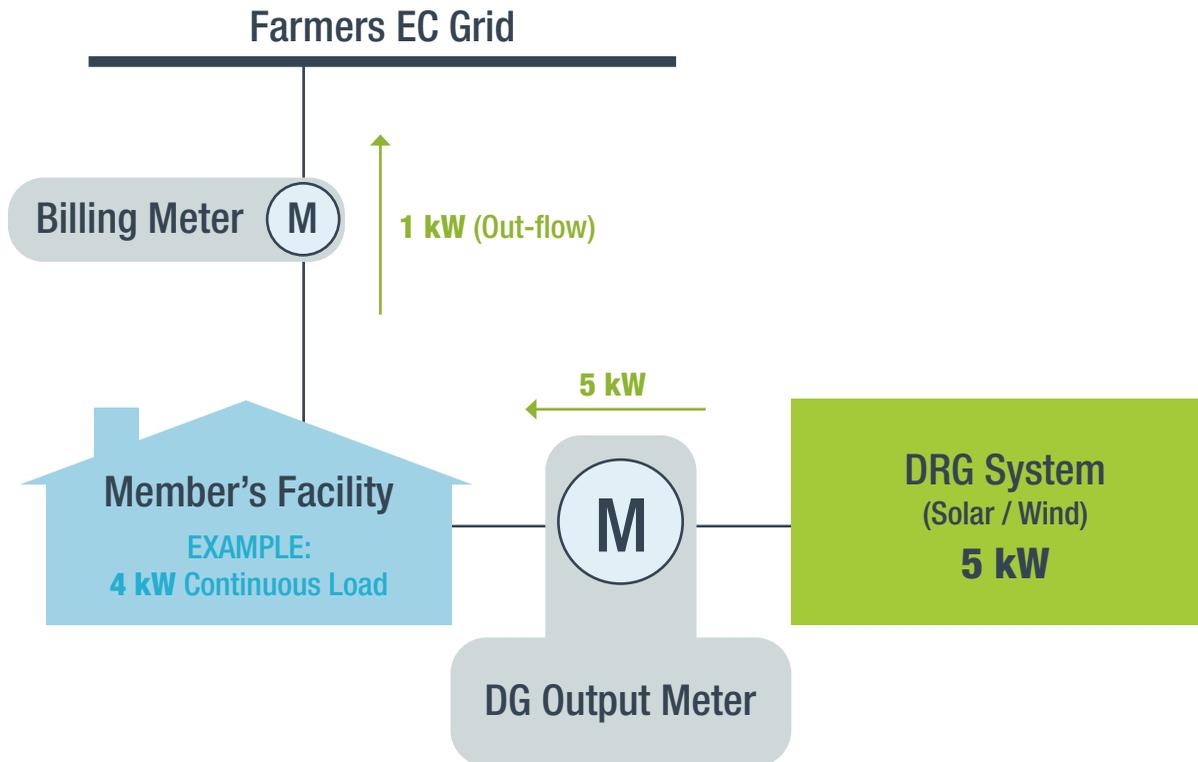
**FIGURE 1.** Member's load is greater than DRG production

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.**

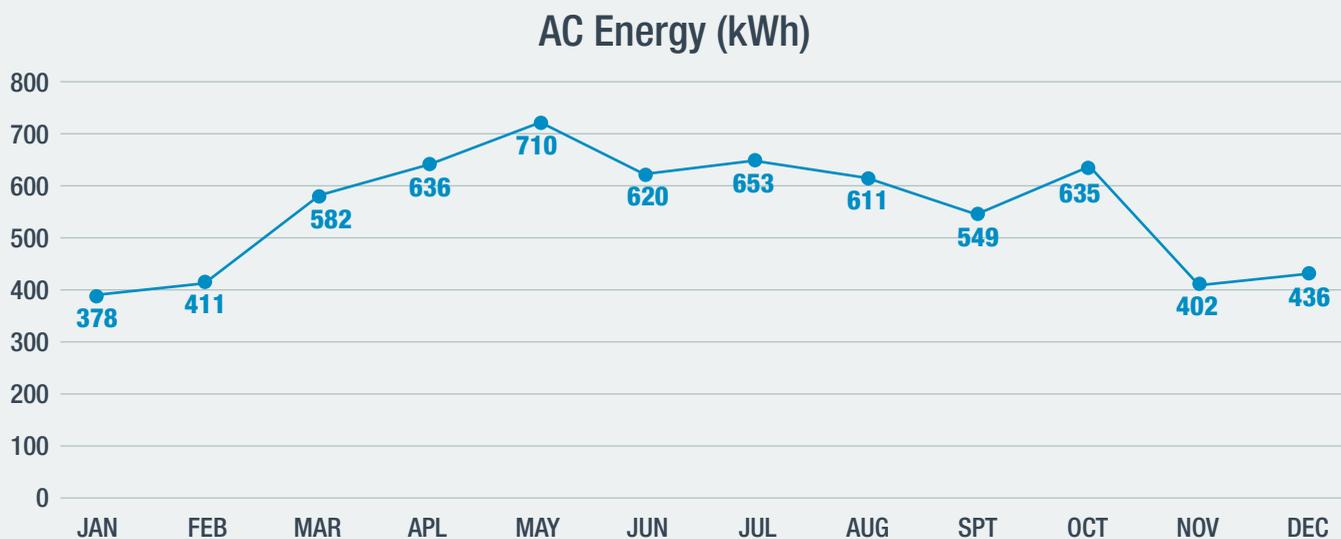
### Why does my inverter say it has produced a different amount than the Farmers EC meter?

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.

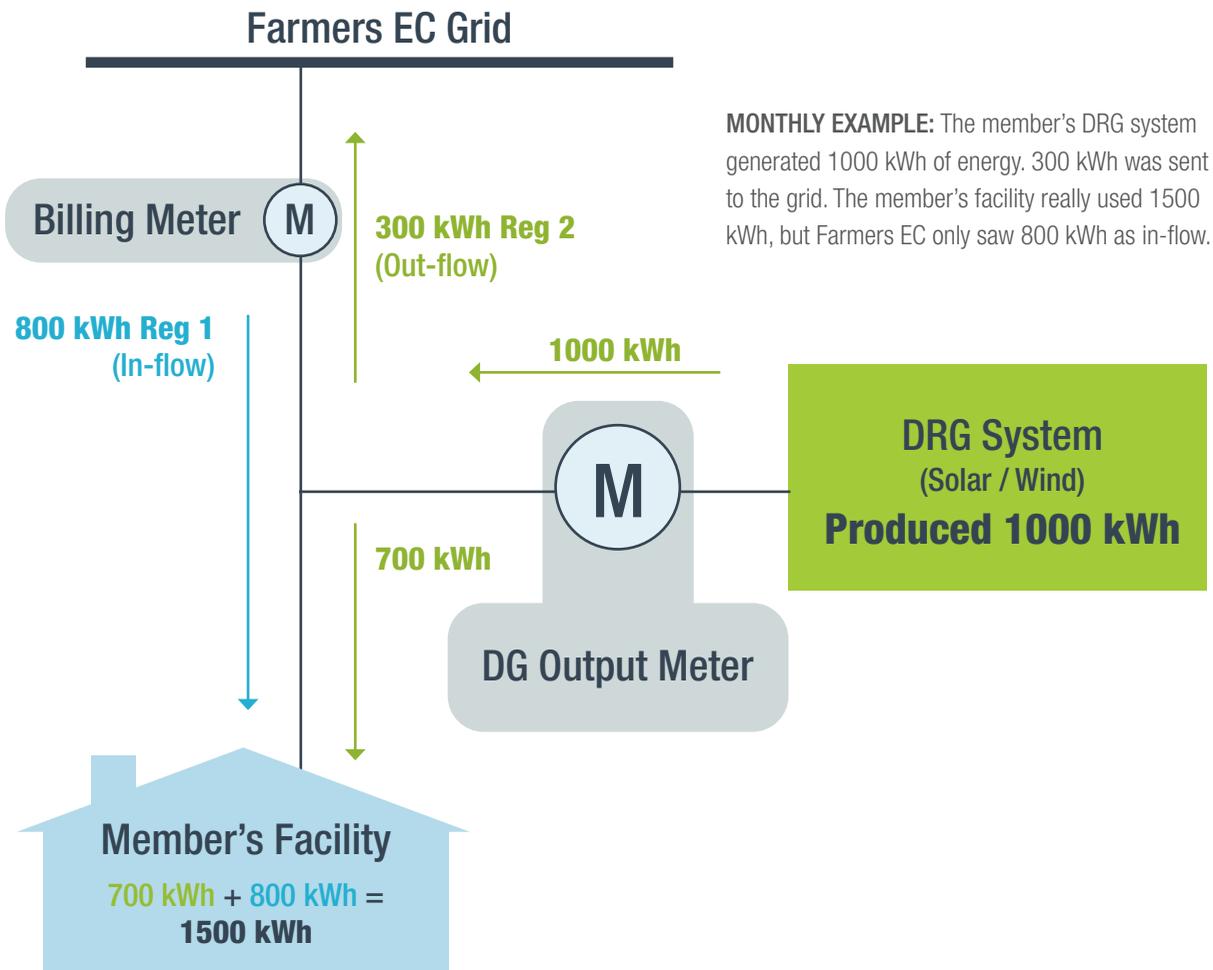
Below is an example of the monthly output trend. You can usually expect a bell curve where system performance is best during summer months and least during winter months. This graph reflects the pvwatts.nrel.gov estimate output a 5 kWdc system would produce in Greenville, TX. It is important to note 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?

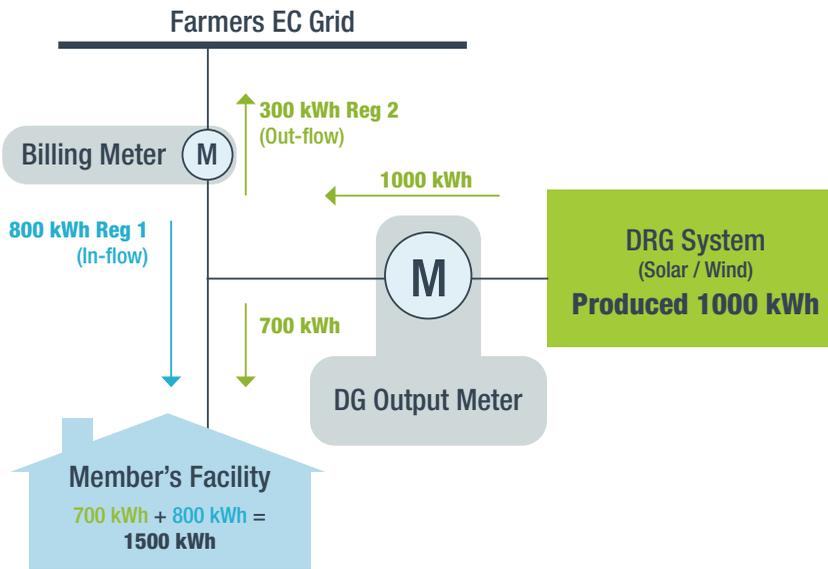
When your DRG system produces energy, it will be used to power your facilities. When your solar system produces more energy than your facility needs, the excess will flow into the grid (Out-flow). Since your facility is consuming a portion of the energy generated by your DRG system, your billing meter 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
<b>TOTAL FARMERS EC BILL:</b> \$165 + \$15 = \$180	<b>TOTAL FARMERS EC BILL:</b> \$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 paid to Rayburn Country Electric Cooperative, excluding the cost of (a) wholesale transmission and (b) wholesale wires.

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

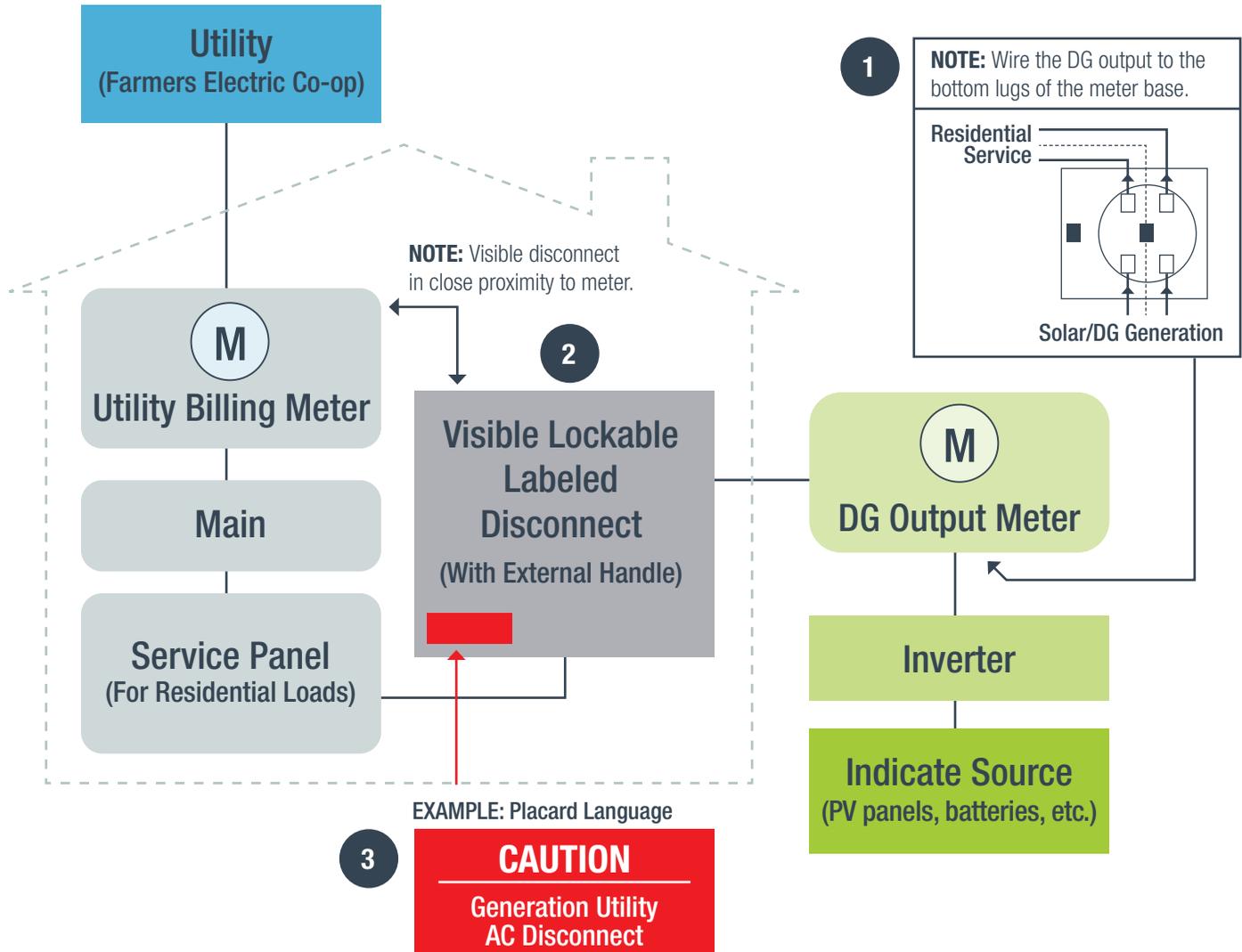
Inspection Charges	Charge
Initial Inspection	\$500
Failed Inspections	\$250 each

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 – How much will solar 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 – 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 – Should solar power generation be my first option to reduce my energy bill?**

**A** – You should always start with an energy audit from Farmers EC to review your home's energy efficiency. This is a service we provide to our members at no cost. 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 – 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 [pwwatts.nrel.gov](http://pwwatts.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.



# 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**

