



GOOD FAITH ENERGY

2024

SOLAR SYSTEM OWNER'S MANUAL



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CONGRATULATIONS!

Your new solar system installed by Good Faith Energy (GFE) enables your home to generate its own clean renewable electric energy from sunlight. Your GFE solar electric system has been custom engineered to provide many years of automatic operation without producing noise or air emissions.

The benefits of solar electric power are now yours:

- **Reduced Pollution and Environmental Protection:**
 - Solar energy uses the sun to generate clean, renewable energy. Energy produced by a solar electric system displaces the need for conventional energy generation which produces carbon that negatively impacts our planet. Your solar system is actually helping to reduce pollution in our atmosphere! Thank you!
- **Reduced Utility Bills:**
 - Every kilowatt-hour (kWh) generated by the solar system means less energy needed from the electric utility, which means lower electric bills!
- **Calculate your carbon Offset:**
 - EPA (Environmental Protection Agency) Calculator:
epa.gov/energy/greenhouse-gas-equivalencies-calculator
- **Net Metering:**

IMPORTANT INFORMATION (Please Read)

Please take the time to read and understand this Owner's Manual. It contains useful information regarding the operation of your solar power system. Keep it in a safe place for future reference. Your system is designed to meet all city conditions and codes as well as your satisfaction and pleasure. Although the system is very low maintenance, please remember your solar system generates electricity, and we strongly recommend that you do not attempt to service it yourself.

Now that your system is up and running, don't forget to let your home insurance know that you have panels on your roof and to sign up for a renewable energy buyback plan with an electricity provider in your area (if applicable). As always, never hesitate to reach out to us if you have questions at any point throughout the process!

At your earliest convenience, please consider leaving us a review on one of our online platforms (Google, Yelp, Facebook). Positive online reviews help us maintain our reputation and encourage more people to go solar with GFE. They tremendously help small businesses like ours.



We appreciate your business and look forward to servicing you with your needs for years to come!

Please read this entire manual and associated product manuals before operating your system.

Save These Instructions. This manual contains important guidelines that should be followed when maintaining your system.

- There are no user serviceable parts in your system. Only qualified personnel should service your GFE solar system.
- Use the GFE supplied solar modules and electrical equipment for their intended use only. Follow all manufacturer instructions. Do not disassemble the modules or equipment, or remove any part installed by the manufacturer, as this will void any manufacturer warranties and UL listings.
- Do not drop, allow objects to fall on, stand or step on solar modules or electrical equipment.
- Do not concentrate sunlight on modules with mirrors, reflectors or lenses, or in any other manner. Doing so voids any warranty and the UL listing for the module.
- Do not touch the solar modules or the mounting structure once installed. When these surfaces are exposed to sunlight they can become extremely hot.
- Do not walk, lean, sit or rest heavy objects on solar panels or electrical equipment.
- Solar modules have a protective glass front. Broken solar module glass is an electrical safety hazard. These modules cannot be repaired and must be replaced. If you have a broken module, turn your system off, (see [page 14](#) for instructions) and notify GFE immediately.
- Do not store anything in front of the system disconnects.
- Do not store anything above or below the system disconnects. A minimum of 12" of clearance must be maintained to allow units to naturally cool.
- Call GFE for service immediately if your solar monitoring system indicates a Ground Fault Error.

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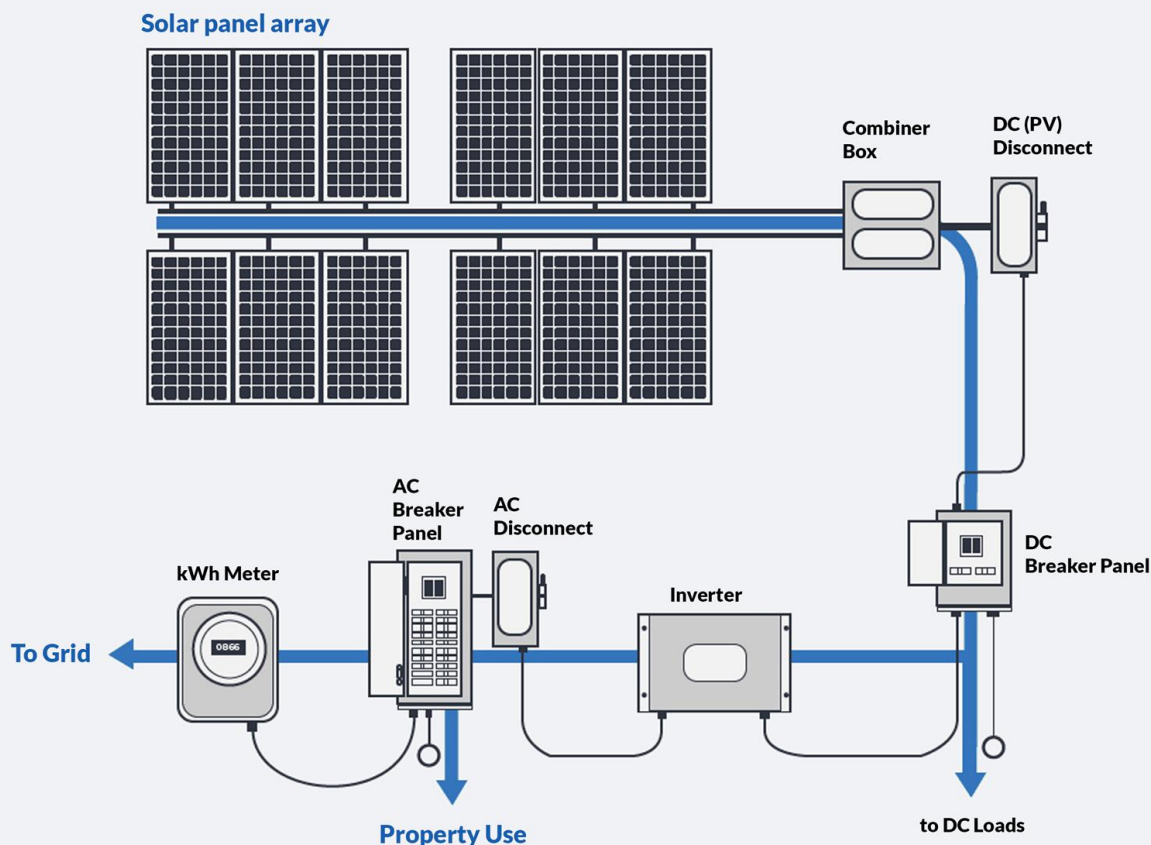
PRINCIPLES OF OPERATION

Solar panels are either roof-mounted (in most cases) or ground-mounted. During daylight hours the solar modules instantly convert sunlight energy into electrical energy. Your solar panels are all connected to collectively produce enough energy to operate in one of two ways:

1. A central string inverter on your home converts all the DC electric current to AC current that is usable by your home.
2. Micro-inverters convert DC current from your solar panels directly to AC current at the module-level.

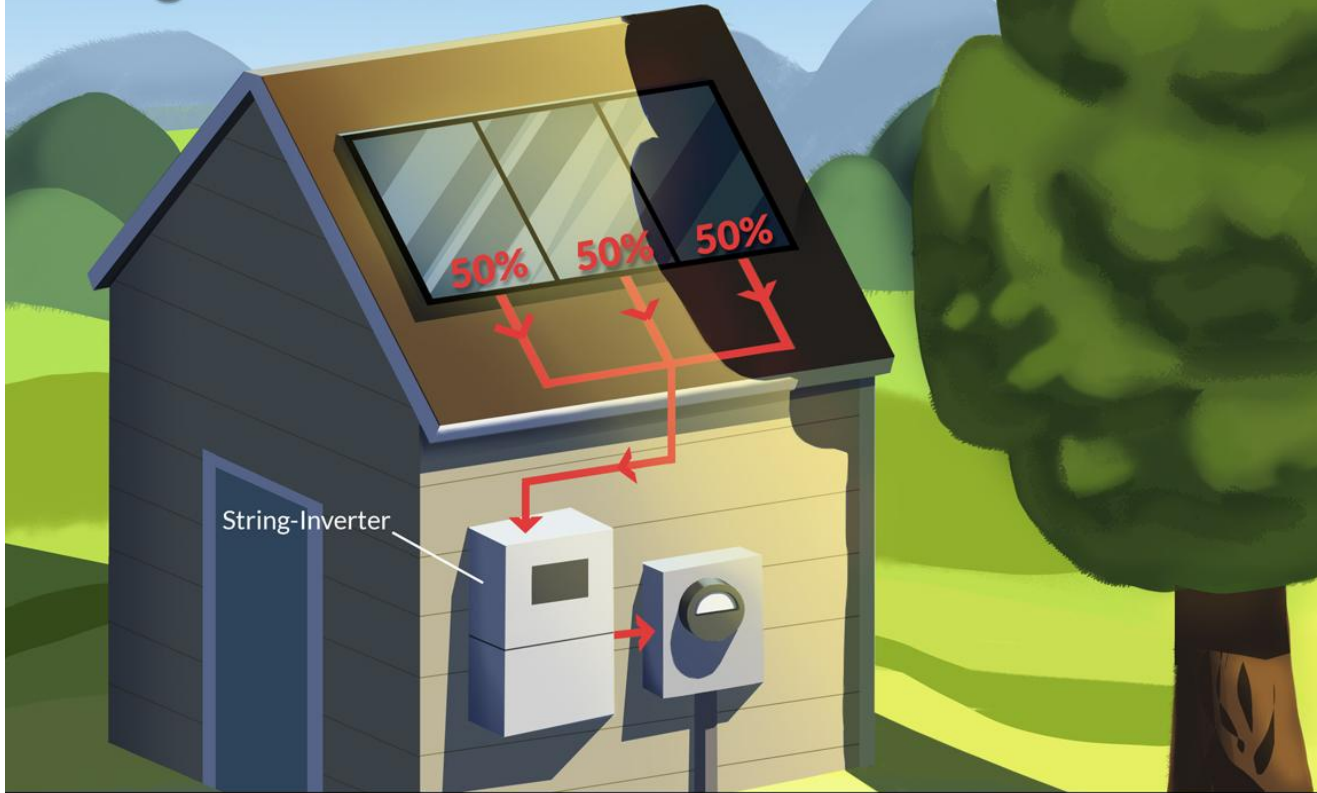
Solar Equipment & Electricity Flow Diagram for Central String Inverters

GRID CONNECTED SOLAR SYSTEM

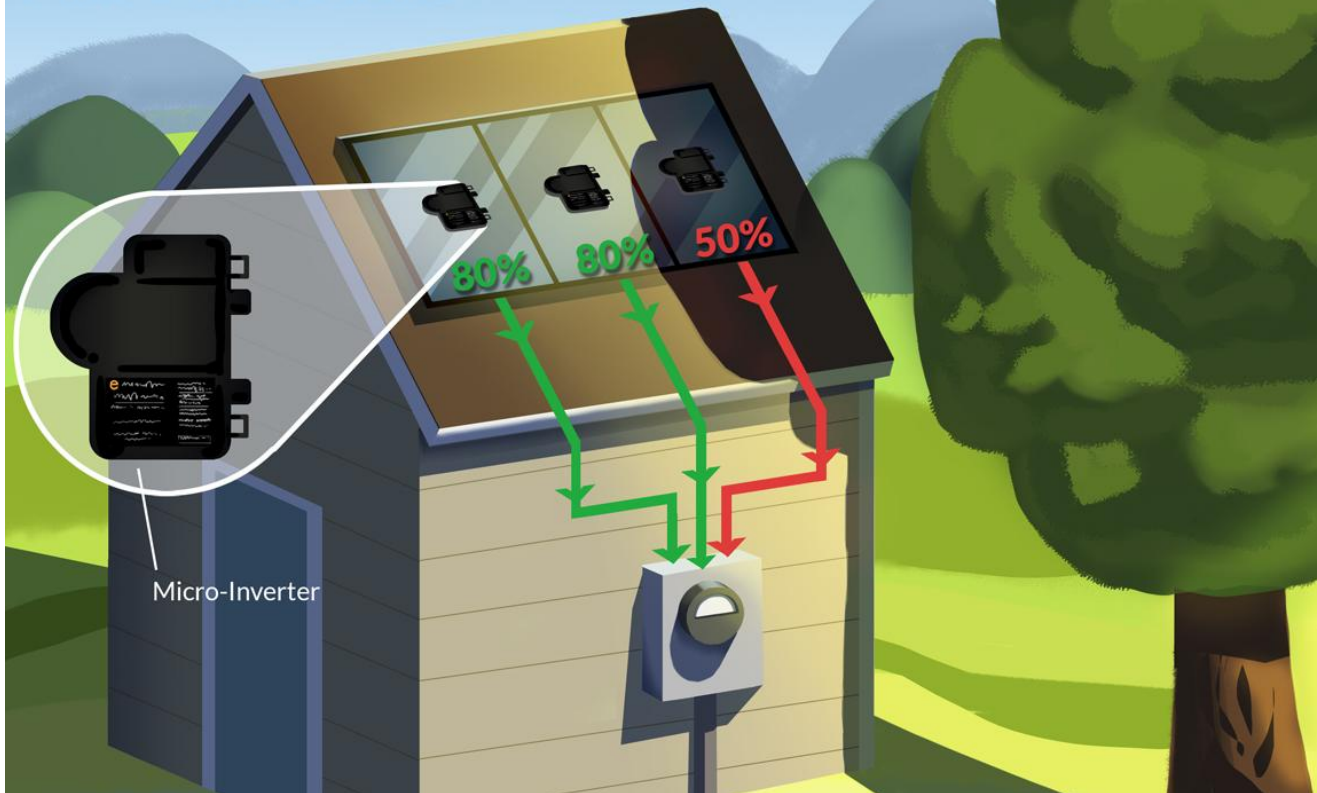


Microinverters vs. String-Inverters

String Inverter:



Micro-Inverters:



4 SOLAR SYSTEM PERFORMANCE & FUNCTIONALITY

During the day, the AC power produced by the inverter can be consumed immediately for electrical energy needs. The solar power is displacing electricity that would have normally been provided by the electric utility company. If more energy is needed than what the solar system can produce, then the extra energy needed is drawn from the utility. At night or during periods of extreme low sunlight, the solar system will not produce energy, and your home will utilize either grid utility energy and/or batteries stored energy.

If your home is not using all of the energy produced by the solar system, the excess power will be sent to the grid through the utility electric meter. Typically, this generates an energy credit that will be used at night to offset your grid energy usage. Your monthly electric utility bill will be reduced by the solar energy generated by the solar system during that month.

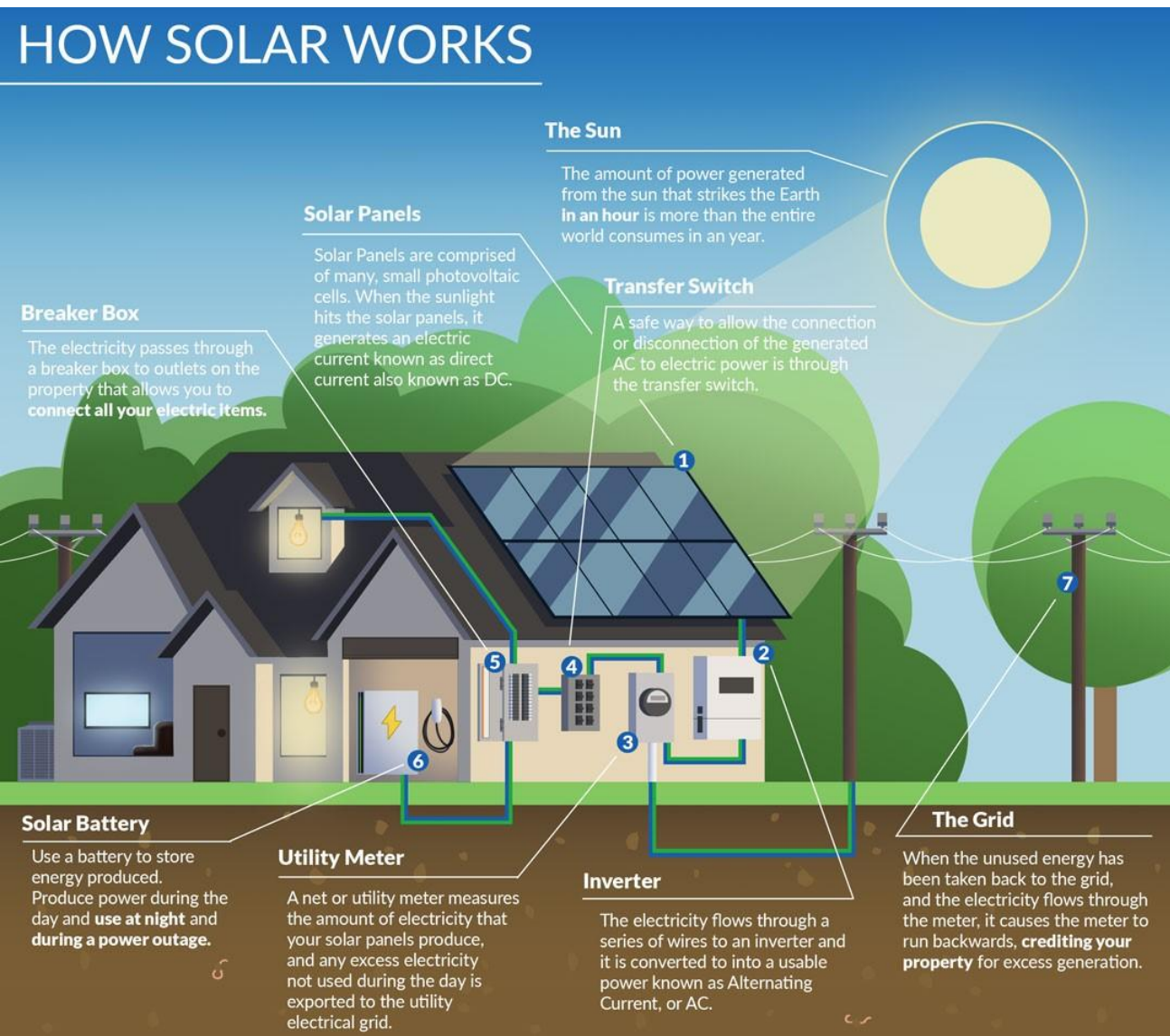
The usable amount of energy credits depends entirely on your local utility's specific guidelines and we will help advise you of that during the solar installation process. Utilities will typically require some form of "Interconnection Agreement" and/or "Metering Agreement" for most residential solar systems before interconnection is allowed.

5 AUTOMATIC SHUT-OFF DURING POWER OUTAGES

For Grid-Tied Solar Systems Only:

In the event of a grid outage (blackout/brownout), in order to prevent damages to utility equipment and/or personnel working on repairing the grid during a power outage, the solar system on your house will automatically shut off. This means that your home will have no electric power while the utility company is working to restore grid power. This is to ensure that no electric power is present on the grid that could inadvertently cause harm and/or damage to utility personnel or property.

Your solar system will automatically restart when utility power is restored. There can be a temporary delay (usually a few minutes) before the solar system returns to normal operation during which it synchronizes and calibrates to the utility grid.





VARIATIONS IN SOLAR OUTPUT

Solar Array Orientation

A solar module typically produces maximum energy facing directly south. True south orientation is assumed when estimating generated energy output values (Northern Hemisphere).

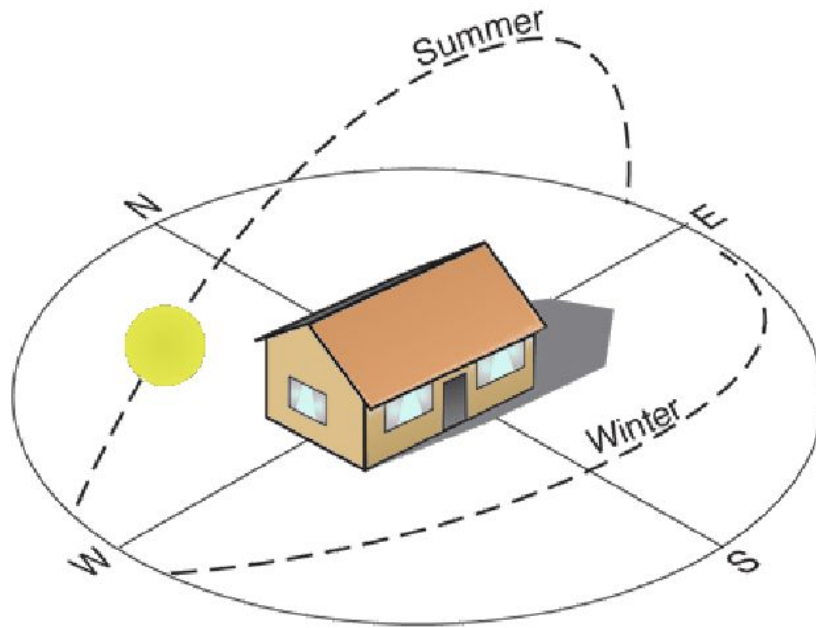
Many homes are not built with roof surfaces facing directly South. As a result, the individual solar arrays can face East or West of true South. Solar arrays with a eastern or western orientation will still produce more than 80% of the potential energy capacity of a southern facing array. Therefore, a slight orientation to the East or West will have a very small effect on average annual energy output.

*The energy output of your solar system will vary depending on the angle of the solar arrays.

Idealized vs Actual Output of Sun Hours

Seasonal Variation in Power Output

In the Winter, even though the day is “bright” to the eye, the angle of the sun relative to the solar panels is low, resulting in reduced energy produced. As the sun moves throughout the sky (East to West), it will eventually be positioned directly above the solar arrays, and the output will rise to a peak value near noon (when the Sun is at its highest point). As the sun descends in the afternoon, the angle of the sun on the panels gets lower, therefore, reducing the energy output of the solar system.



7 PREVENTATIVE MAINTENANCE

If you want to be proactive, monthly visual inspections of your system can be performed from the ground. However, your solar panels will be cleaned with normal rainfall and (unless you notice a significant drop in energy production) this should be a hands-off, maintenance-free process!

Check solar arrays' glass surfaces for debris, dirt, tree sap or bird droppings that may affect the panel's solar performance. We recommend hiring a solar panel cleaning service every 3-5 years to clean your solar arrays if you live in an area with a lot of environmental debris or dusting. I.e., houses near dirt roads that collect road dust around the house.

Check that the solar arrays are not being shaded during daylight hours by vegetation or trees growing around or near the system. Trim vegetation, if necessary, to prevent shading and energy production loss.

Visually inspect the solar arrays from the ground for damage. If you cannot visually see damage on your solar arrays but suspect damage, you can contact your GFE service specialist to schedule a damage inspection.

Solar panels have a rated weight capacity that they are designed to handle and are built to withstand hail, up to 1", falling at terminal velocity. Although hail damage to panels is uncommon, weight/force load factors such as snow, which can be greater than 50 pounds per square foot, and/or falling hail (typically greater than 1" with a terminal velocity of faster than 50 MPH) could cause damage.

Your solar system should be covered under your homeowners insurance. It is very important you communicate to your insurance company that you've added panels to your home by the time they're installed so that they are covered in the event of extreme weather. Should damages occur and you find evidence of damages, i.e., broken glass from solar panels or damaged equipment is discovered, **contact GFE for service immediately**. If you can't see your solar panels from the ground, check your solar monitoring system for irregularities in panel output, as this could indicate damages.

8 MANUAL SHUT DOWN & START UP PROCEDURE

If for any reason you feel that you need to shut down the system, follow the steps detailed below:

Shutdown

OFF

Move the solar AC disconnect switch to the “OFF” position by applying firm pressure to move the lever/switch. The PV (solar/photovoltaic) AC disconnect switch is typically located next to the utility meter and should be labeled “Solar/PV AC Disconnect” or “PV/Solar Disconnect”.

Start Up

ON

Apply firm pressure to move the lever fully from the “OFF” to the “ON” position. The PV/Solar AC disconnect switch is typically located next to the utility meter and should be labeled “PV/Solar AC Disconnect”.

IF YOU FEEL ANY OTHER ACTION IS REQUIRED, PLEASE CONTACT GFE FOR SERVICING NEEDS.

BATTERIES

Solar Paired with Batteries

Batteries installed on your house will provide backup power whenever the grid goes out and/or when you want to use stored energy whenever your solar is not producing enough (cloudy days or night time) power to cover your consumption at the time. This process is automatic and requires no manual intervention. The switch from grid power to battery happens within less than 1 second. Batteries are either connected for partial or full home backup power. If your batteries are installed for partial home backup then the electrical circuits that are dedicated to the critical loads panels will be powered in the event of a blackout. All other circuits will not have power during a grid blackout.

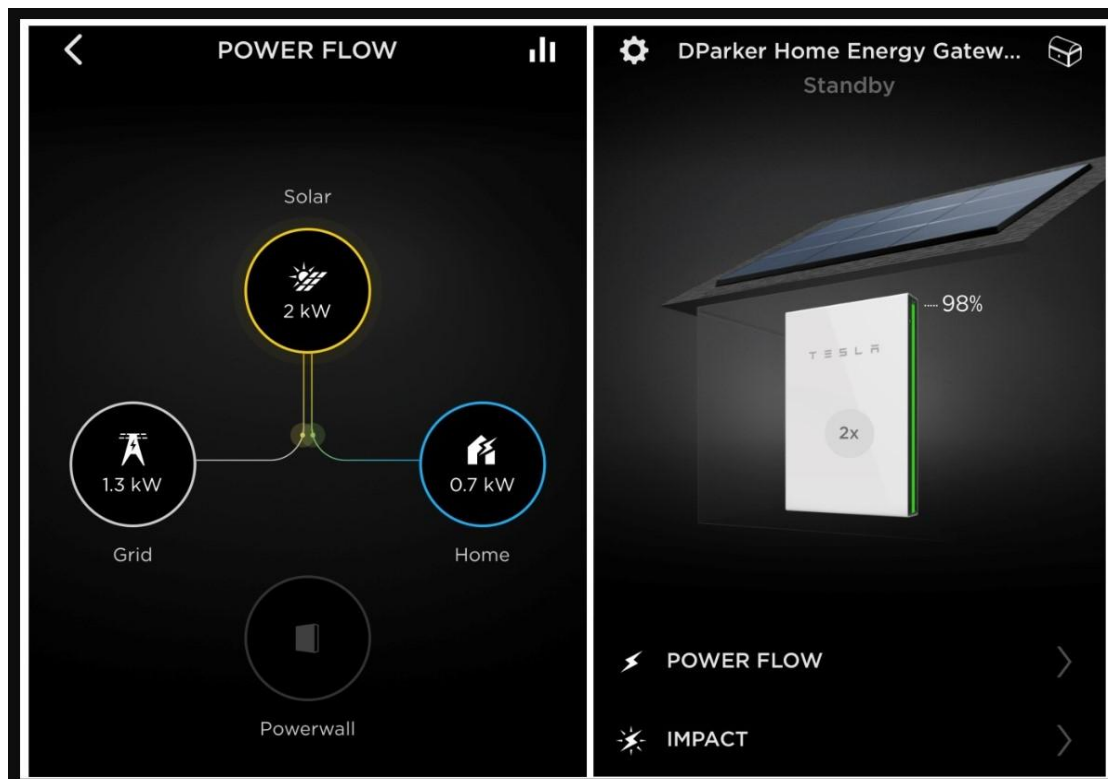


Off-Grid Mode

In off-grid mode, your solar system will provide charge to the batteries while the sun is out. It is important to keep an eye on your batteries' state of charge to insure proper function of your system in off-grid mode. During off-grid mode, your solar system is a micro-grid. If the batteries completely discharge or are very low (less than 20%) then the micro-grid could collapse and the entire system will de-energize.



One technique to ensure your solar micro-grid doesn't collapse in off-grid mode, is by turning off unessential loads or circuits that will drain your batteries' energy. Example: turning off lights that aren't needed, unplug electronics or appliances that have phantom loads (loads that slowly consume energy overtime) that you aren't using. Use larger appliances that are connected to your batteries during the day when sunlight is available. This will ensure that the solar energy will help cover the energy needed to power the appliance while continuing to charge your battery. Maximizing your homes' energy efficiency will ensure you get the most out of your solar and batteries. Loads from HVAC systems are a major consumer of energy. By minimizing HVAC usage you can increase your homes' energy efficiency.



Power Flow

An essential aspect of owning your energy generation system is understanding the flow of power or energy throughout your system. Your daily solar energy output [measured in watts or kilowatts (kW)] at any moment will vary throughout each day. The production patterns and peak energy values will also vary with the seasons (summer to winter).

On a daily basis, your home with solar will consume and produce energy on different levels. This is what your “energy profile” will be throughout the time you utilize and produce power. Whenever you turn on lights, electronics, appliances, you will be consuming electrical energy, these are considered electrical loads. During the day your solar system produces energy that is going to be consumed in one way or the other. The energy from your solar initially goes towards the loads your home consumes whenever you turn them on. If you do not have much turned on to consume energy during the day, then your excess solar energy will either go towards charging the batteries and/or go to the grid where the energy will be consumed. By utilizing smartphone apps you can monitor your energy profile and make changes to your power flow as you see fit.

Load Shedding (Off-Grid Only)

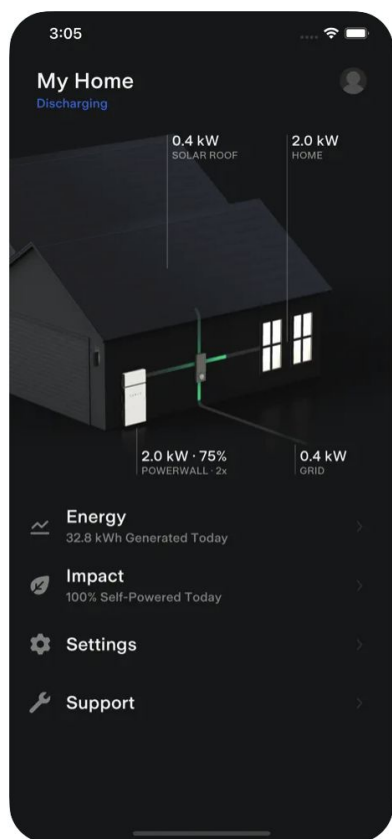
Load shedding occurs when the solar system produces power that exceeds the threshold limitations of the input charge power for the batteries. This only happens in off-grid mode, when the solar arrays' charge output exceeds the battery output/inputs on the system's electrical loads. Load shedding takes place to prevent errors and/or damage from occurring to your home's solar electric system in off-grid mode.

The load shedding process is automatic and requires no intervention. This means that your system will automatically turn OFF certain panels or arrays in the event of a grid blackout. Since the grid is not able to take the excess energy generated by solar panels, the system automatically “turns OFF” certain solar panels to ensure that overloading of the battery does not occur and that the system continues to operate properly. This load shedding process can vary depending on a few factors. Factors include: solar system size output vs. number of batteries installed, sunlight availability, state of charge of the batteries, and home electrical loads.

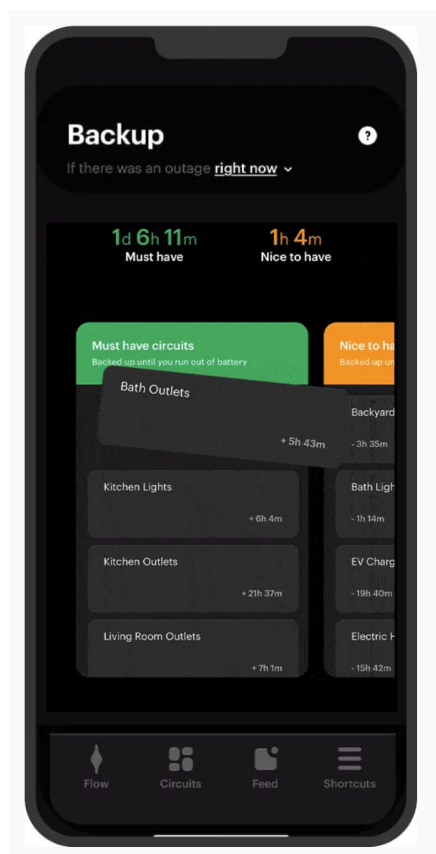
Example: If you have one Powerwall 2, the max input charge is 7.6kW (7600 Watts) in off-grid mode. Then, let's say the home's total solar system size is 15.2kW (15,200 Watts). In order to protect the battery from damage, the system controller or “Gateway” will automatically shutdown certain arrays or modules to lower the solar energy output to 7.6kW max to properly charge and maintain the battery. The solar system will automatically adjust the output to a max output of 7.6kW in off-grid mode for one Powerwall 2 battery. Once utility grid power returns, the system controller will “turn ON” the rest of the arrays or modules so that the system will continue to operate and produce energy as normal.

BATTERY CAPABILITIES

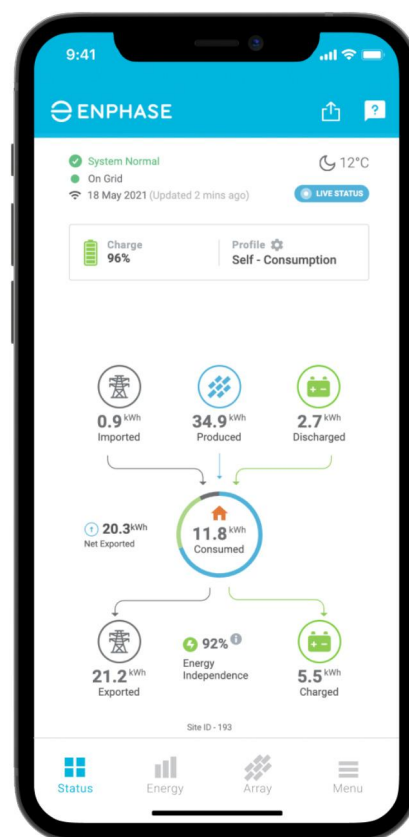
Your solar system equipment is connected to smartphone apps from the manufacturers. These apps allow you to see information about your solar panels and batteries, and how they are performing. These apps also help you manage your stored energy by showing you information about your battery's state of charge, the solar, and/or grid that is connected to it. Your system will be connected to your home's WIFI network, so as long as your home's internet connection is good, data will be uploaded daily from the solar system's computer. You will be able view your energy history and system performance daily to ensure your system is operating as expected.



Tesla App



SPAN App

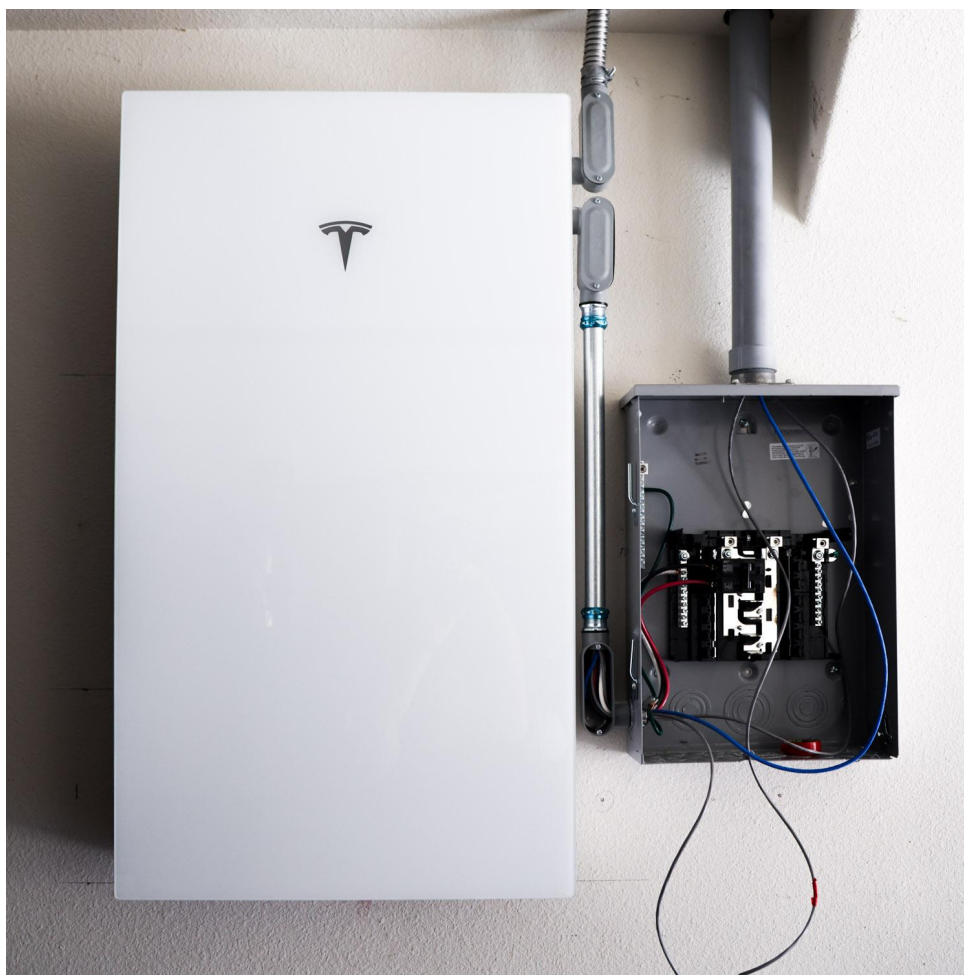


Enphase App

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BATTERY MAINTENANCE

Batteries are installed according to the manufacturer specifications to ensure optimal performance and efficiency. It is important to not cover or block batteries and make them inaccessible. Most batteries require 18" minimum clearance around the battery area. Cleaning batteries should only be done on the exterior surface and only with a microfiber cloth. **DO NOT attempt to open or access the interior of the batteries, as this should only be done by a certified technician and could void the manufacturer's warranty.**



CUSTOMER SERVICE

Annual Service

If you're interested, we offer annual maintenance as an added service to make sure your solar system is performing at its best!

We can check all solar array wiring to confirm there are no loose connections or insulation wear, clean panels if they need it, and survey all solar module mounting.



Or just call us at **972.777.6937** and select customer service, or email us at **info@goodfaithenergy.com**

Leave us a Review!

At your earliest convenience, please consider leaving us a review on one of our online platforms (Google, Yelp, Facebook). Positive online reviews help us maintain our reputation, and encourage more people to go solar with GFE. They tremendously help small businesses like ours.



Thank you for supporting a small business!

