



Solar - Frequently Asked Questions

How is solar energy generated?

Solar is generated by photovoltaic (PV) systems. PV systems use semiconductor cells, or modules, that convert sunlight directly into electricity. These systems also contain additional equipment like inverters, which change direct current (DC) to alternating current (AC - the type that we use in our homes). The PV cells are connected in the form of flat panels that can be mounted on rooftops or canopies, on the ground, or integrated into roofing shingles and other building materials.

Does a PV system produce electricity all the time?

No. Depending on the season, a PV system typically generates power from 8 a.m. to 6 p.m., reaching its maximum output between noon and 1 p.m. When PV systems are not producing power, your Local Power Company and TVA ensure other resources continue to supply and deliver reliable electricity to homes and businesses.

Can PV systems produce power on cloudy days?

While PV modules generate electricity even when the weather is cloudy, their output is diminished. On a dark, overcast day, a PV system might receive only 5 to 10 percent of the usual amount of sunlight, so the power output would decrease proportionately.

Do PV systems work well in the cold?

PV modules actually generate more power at lower temperatures. Like most other electronic devices, they operate more efficiently when it's cooler. PV systems generate less energy in the winter than in the summer, but that's due to the combination of fewer daylight hours and lower sun angles, not to cooler temperatures.

What factors can impact the performance of my solar system?

There are many factors that can affect the efficiency of your solar panels. These can include the following: shading of your house, the orientation and tilt of your solar panels, how many sunlight hours your house receives a day, the quality of your inverter, and the temperature. Any combination of these factors can significantly impact the amount of solar energy your panels can generate.

How much roof space will my solar system require?

Solar panels vary in size, wattage, and technology. The typical solar panel produces 250 watts of electricity and is sized 3.25 ft. by 5.4 ft. (about 17.5 sq. ft.). Applying these typical specifications, a 5 kW solar system requires around 400 sq. ft. of usable south/south-west facing roof space, which includes additional roof space clear from coverage (to comply with fire safety standards).

What assumptions were factored into the calculations?

The following table lists the assumptions that were used to calculate your estimates. Please note that these assumptions apply specifically to the Tennessee Valley and will differ from national figures.

TN Valley Solar Calculator Assumptions	
TN Valley Capacity Factor – percentage of hours system operates at rated output (this takes into consideration nighttime and other adverse weather/environmental conditions)	18%
Residential Installation Cost	\$3.18/Watt
Small Commercial Installation Cost	\$2.73/Watt
Average Panel Nameplate	250 Watts/panel
TN Valley Avg. Residential Electricity Rate	\$0.0865
TN Valley Avg. Commercial (GSA-1) Electricity Rate	\$0.1062
Valley Avg. Residential Customer Charge	~ \$19.50
Valley Avg. Commercial (GSA-1) Customer Charge	~ \$23.50
GPP Rate for system sizes 10 kW and smaller (Residential & GSA-1)	\$0.09
GPP Rate for system sizes greater than 10 kW	\$0.075
Default Percent of Electricity Usage Covered by Solar System (generation / consumption)	80%
Load Mismatch % (Load loss from Solar (No Program) / Behind the Meter install)	0% - 40% (percentage of generation not consumed by load)
Annual PV Degradation	0.5%
Annual Utility Rate Increase	1.50%
Federal Investment Tax Credit (ITC)	30%
MACRS Bonus Depreciation (2018)	40%
Commercial Tax Rate	30%

What is the difference between Solar (No Program) and Solar (GPP Program)?

The Solar (No Program) option applies when the customer installs solar panels without participating in an incentive program (through partnership with their Local Power Company/TVA). These systems are often referred to as “behind the meter” and generate electricity to help offset the customer’s monthly electricity bill. However, under this scenario, there will likely be times when a solar system is generating more energy than the customer is consuming (i.e. while household members are not at home). The excess electricity that is not being used is put back on the electricity grid; this opportunity loss is referred to as “load mismatch.”

The Solar (GPP) option applies when the customer chooses to partner with their Local Power Company/TVA through the [Green Power Providers](#) program to generate solar energy that is sold back to TVA. This results in a monthly credit on the customer’s electricity bill for every kWh of electricity generated. Based on the current GPP incentive, customers will receive a fixed rate credit for every kWh generated for a 20-year term. This serves as a price guarantee for the customer, reducing the risk from potential rate structure changes in the future.

What is the ITC, and how does it impact my solar estimates?

The ITC refers to the Federal Investment Tax Credit Program that was issued by the government to support the development of solar energy in the United States. Currently, the ITC allows residential and commercial customers to claim a 30% tax credit towards the total investment cost of their system. This tax incentive will incrementally decrease until the year 2022, when it will cease to exist for residential customers. Click [here](#) for more info.

What is the MACRS Solar Depreciation, and how does it impact my solar estimates?

The Modified Accelerated Cost Recovery System (MACRS) is a tax advantage mechanism that allows commercial customers to accelerate the depreciation of their solar investment (over the course of 5 years) and reduce their tax burden. This will, in turn, result in a quicker return on investment for applicable commercial customers. Click [here](#) for more info.

What other solar rebates and incentives are available?

Other than the federal ITC and accelerated depreciation (for commercial customers), there are varying amounts of rebates and incentives offered depending on the state you live in. More information about applicable rebates and incentives can be found [here](#).

Can I finance my solar system purchase?

Yes – you can set up personal financing for your solar system installation through your bank or preferred loan company, but each scenario will be different. Your payback will be impacted based on your financed interest rate and loan term.

How long does it take to recover my costs?

The time to recover the cost of installing your solar system can vary greatly based on the several factors explained above. Based on current rate structures and incentives provided, an

average residential solar system (<10 kW) in the Valley takes about 17 years to pay off through the Green Power Providers program (with ITC applied). After this time, you will start to receive a return on your investment.

How long does a typical solar system last?

A typical solar system has a useful lifespan of 25 to 30 years, depending on the local environment and the durability of the system. After this time period, your solar panels will continue to generate electricity but at a low efficiency. Solar inverters have a typical lifespan of around 10-12 years and are generally replaced at least once over the lifespan of a solar system.

Source: <http://news.energysage.com/how-long-do-solar-panels-last/>

What type of warranty is provided with my system, and what does it cover?

Solar panels typically have two types of warranties that are provided by panel manufacturers: a product warranty and a performance warranty. The product warranty usually covers 10-12 years of any manufacturing defects, wear and tear of the panels, and environmental issues on the panels. Since panels become less efficient over time, the performance warranty guarantees a certain amount of solar production for up to 25 years (typically 90% production at 10 years and 80% production at 25 years).

A solar inverter warranty should be a major consideration when purchasing a system (warranties may vary widely by manufacturer). Please contact your solar installer for specific warranty details.

What kind of maintenance does my system require?

Over the course of the system's lifespan, solar panels generally don't require much ongoing maintenance, as there are no moving parts (unless tracking systems are installed). However, inverters and other connected components may require periodic maintenance or inspection. Routine inspections are recommended to ensure your system functions properly.

What happens to my solar system if I move?

You typically have two options to consider: you can take your solar system with you and install it your new property, or you can sell it with your home. Here are some factors you should consider in your decision making:

- Impact on home value (a solar system may increase your home's, but this depends on several factors including market value, area, age of panels, buyer's preference, etc.)
- Cost of moving and re-installing your solar system on your new property
 - Condition and characteristics of your new property's roof that could impact the overall cost
 - Shading impacts on your new home
 - Location of your new home - new location rules and regulations for solar installs (contact your Local Power Company for specific guidelines pertaining to your area)

You are encouraged to contact the company that installed your solar system to better understand your options.

What are some other options to go green?

There are several ways customers can go green to offset their carbon footprint and in some cases, save money. These options include:

- [energy efficiency](#)
- purchasing [renewable energy certificates](#) to support clean, renewable energy
- participating in community solar offerings, and other [renewable energy programs](#) offered by your Local Power Company/TVA.