

# Solar FAQs

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## Q: How is solar energy generated?

Solar energy is generated by photovoltaic (PV) systems that use semiconductor cells, or modules, to convert sunlight into electricity. PV systems contain equipment including solar panels to absorb and convert sunlight and inverters to change direct current (DC) into alternating current (AC). AC is the standard electrical power that we use in our homes and businesses. PV cells are connected into solar panels that are mounted in an orientation to take the most advantage of the sun. That can be on rooftops, canopies, on the ground, or integrated into roofing shingles or other building materials.

## Q: 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 the sun is at its peak. When PV systems are not producing power, your Local Power Company and TVA provide other resources to deliver reliable electricity to homes and businesses.

## Q: Can PV systems produce power on cloudy days?

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

## Q: How much space on my roof will a solar system require?

Solar panels vary in size, wattage and technology. A typical solar panel produces 250 watts of electricity and measures 3.25 ft x 5.4 ft, or about 17.5 sq ft. By applying typical solar panel specifications, a 5 kW solar system requires around 400 sq. ft. of usable south/south-west facing roof area. This includes additional space to comply with fire safety standards.

## Q: Do cold temperatures impact PV systems?

PV systems actually generate more power at lower temperatures. Like most 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 angles of the sun, not to cooler temperatures.

## Q: What factors impact the performance of my solar system?

There are many factors that can affect the efficiency of your solar panels. These include:

- the shading on your house
- the orientation and tilt of your solar panels
- how many sunlight hours your house receives during the day
- the quality of your inverter
- the temperature

Any combination of these factors can significantly impact the amount of solar energy your panels generate.

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## Q: What assumptions were factored into the calculations?

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

### TN Valley Solar Calculator Assumptions\*

TN Valley Private Scale Capacity Factor — % of hours system operates at rated output (takes into consideration nighttime and other adverse weather / environmental conditions)	18%
Residential Installation Cost	\$3.13/Watt
Small Commercial Installation Cost	\$2.27/Watt
Average Panel Nameplate	300 Watts/Panel
TN Valley Avg. Residential Electricity Rate	\$0.1081/kWh
TN Valley Avg. Commercial (GSA-1) Electricity Rate	\$0.1274/kWh
Valley Avg. Residential Customer Charge	~ \$19.71
Valley Avg. Commercial (GSA-1) Customer Charge	~ \$25.16
Default Percent of Electricity Usage Covered by Solar System (generation/consumption)	80%
AC to DC Capacity Conversion Ratio	1.2
Annual PV Degradation	0.5%
Annual Utility Bill Increase	1.3%
Federal Investment Tax Credit (ITC)	22%
MACRS Bonus Depreciation (2020-2023)	100%
Commercial Tax Rate	21%
Load Mismatch % (Load Loss from Solar / Behind the Meter Install)	0 - 40% Percentage of generation not consumed by load

\*Pricing assumptions are subject to change

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

ITC is the Federal Investment Tax Credit (ITC) Program 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 tax credit towards the total investment of their system. This tax incentive will incrementally decrease until the year 2024, when it will cease to exist for residential customers. [Click here for more info.](#)

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## Q: What other solar rebates and incentives are available?

In addition to the ITC and accelerated depreciation (for commercial customers), there are varying rebate and incentive offers, depending on the state where you live. More information about applicable rebates and incentives can be found [here](#).

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## Q: How long will it take to recover my costs?

The time to recover the cost of your solar system installation can vary greatly based on the factors explained above. With the current rate structures and incentives provided, an average residential solar system in the Valley (<10 kW) requires about 26 years to pay off (with ITC applied). After this time, you will receive a return on your investment.

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## Q: 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 depreciation of their solar investment over the course of 5 years and thereby reduce their tax burden. This will, in turn, result in a quicker return on investment for applicable commercial customers. [Click here for more info.](#)

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## Q: 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 and each scenario will be different. Your payback will be impacted by your interest rate and loan term.

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## Q: 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 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.enrgysage.com/how-long-do-solar-panels-last/>*

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## **Q: What type of warranty is provided with my system and what does it cover?**

PV systems 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 manufacturing defects, wear and tear of the panels and environmental issues of 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.

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## **Q: 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.

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## **Q: What happens to my solar system if I move?**

You typically have two options:

1. Take your solar system with you and install it on your new property
2. Sell it with your home

Other things to consider:

1. Impact on your home value (a solar system may increase your value, but that depends on several factors such as market value, area, age of panels, buyer's preference, etc.)
2. Cost of moving and reinstalling your solar system on your new property
3. Condition and characteristics of your new property's roof that could impact the overall cost
4. Shading and sun availability on your new home
5. Location - new location rules and regulations for solar installs (contact your Local Power Company for specific guidelines pertaining to your new area)

We encourage you to contact your solar system installation company to understand your options.

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## **Q: Do TVA and my Local Power Company offer any programs to support customers who want to install a solar system?**

Yes. TVA and participating Local Power Companies offer Green Connect for residential customers installing solar.

Through this program, homeowners can connect with quality installers in their area who are specially trained and approved by TVA. Green Connect provides peace of mind that the installation has safety measures in place for the homeowners and Local Power Companies. Participants also get access to free online solar learning modules.

For more information, visit [GreenConnect.com](http://GreenConnect.com) or contact your Local Power Company.

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## **Q: Can I sell power from my solar system to TVA?**

Through the Dispersed Power Production program, TVA may allow a qualified facility producing up to 80MW of power to sell part or all of the power it produces to TVA for TVA's avoided costs only.

Visit the [Dispersed Power Production](#) website to learn more.

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## **Q: What are some other options for going green?**

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

- Energy efficiency improvements should be made before installing solar. If your home is energy efficient, you will not only use less energy, but if you decide to install a solar PV system, the system can be smaller - saving you more money!
- Purchasing renewable energy certificates (RECs) that support clean, renewable energy
- Participating in community solar offerings and other renewable energy programs offered by your Local Power Company/TVA.

**Please contact your Local Power Company if you are interested in solar or want to learn more about your solar options.**