



BEGINNER'S  
GUIDE TO  
SOLAR ENERGY





# Beginners Guide To Solar Energy

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# Why You Should Invest in Solar

Over the past five years, the cost of installing a solar system has gone down significantly. Now, solar energy can power a home throughout the day and greatly reduce how much a family spends on energy each year.

Those who don't take advantage of the natural energy of the sun will always pay for their electricity. Paying for electricity never goes away, no matter how much or little you use.

By harnessing the power of solar energy, you own a major part of the power you use. Choosing a solar system is an investment that immediately begins to pay for itself through the savings you get by generating your own electricity.

Many homeowners pay off their investment in five to six years as a result of savings realized through solar (though results may vary).

To help you select and install your solar system, you can rely on LG's Solar Concierge program. A dedicated Energy Advisor will work with you to find the solar option which best fits your needs.

[Get started today](#)





# The Benefits of Solar Energy

## 01 SOLAR POWER CAN SAVE YOU MONEY

Installing solar panels enables you to generate your own electricity rather than buying it from your electric company. This enables you to save money as every kWh of electricity you use from your solar system is a kWh of electricity you do not have to buy from your electric company.

## 02 ENVIRONMENTAL BENEFITS

By using solar energy, you reduce the need to produce electricity from fossil fuels such as coal and natural gas, which emits carbon dioxide (CO<sub>2</sub>) and other greenhouse gases. This can reduce the potential for global warming and create a more sustainable and cleaner energy mix.

## 03 ENERGY INDEPENDENCE

With your own solar system, you can reduce your reliance on fossil fuels while increasing control over your future electricity needs, expenses, and lifestyle. If you add an energy storage system to your solar array, you gain even more control over your energy usage and costs.

## 04 ENERGY RELIABILITY

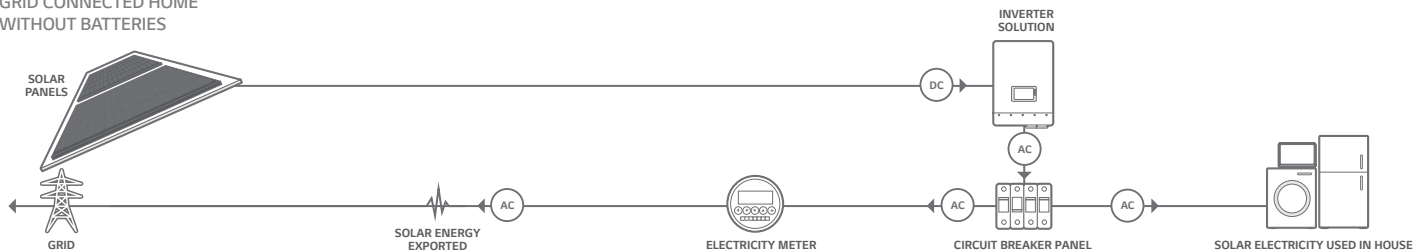
High-quality solar systems are a reliable power source. The sun rises and sets every day, and when the sun shines, solar panels generate electricity. While the weather and seasons vary, the amount of electricity that solar panels generate annually is predictable. LG Solar's high-efficiency panels are designed to capture more of the sun, more of the time, which helps expand how you power your home. You can also increase the financial benefits of your solar system by changing the times you operate your household appliances. For example, turning your washing machine on as you leave home in the morning instead of washing your clothes at night will avoid the higher electricity rates charged by some utilities during peak usage times. Additionally, if you install an energy storage system, you can use the energy generated by your panels at whatever time of day (or night) best suits your needs.

# How a Grid System Works

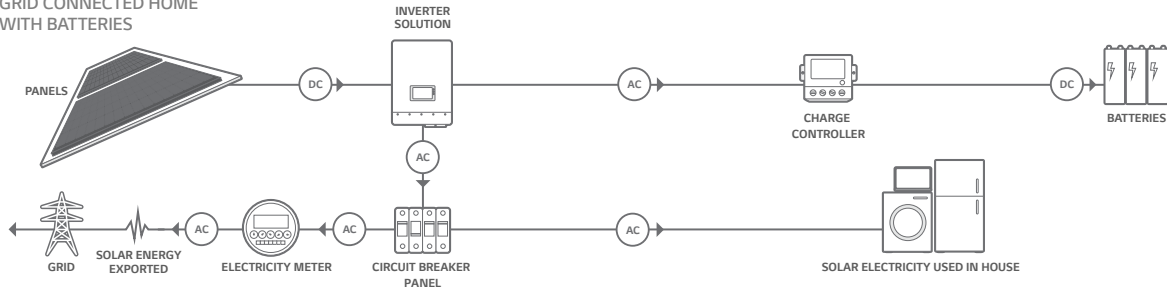
A solar system is made up of multiple solar photovoltaic (PV) panels, a DC to AC power converter (inverter solution) and a racking system to hold the solar panels in place.

Solar panels are generally fitted on the roof facing a southern, easterly or westerly direction.

GRID CONNECTED HOME WITHOUT BATTERIES



GRID CONNECTED HOME WITH BATTERIES



Homes in the United States are connected to the electricity grid via power lines. Our electricity system uses alternating current (AC), but the electricity generated by solar panels consists of variable direct current (DC). To transform the DC electricity into AC electricity for ordinary household use, solar systems use micro inverters attached to each solar panel or a central string inverter attached to a string of connected solar panels.

There is also a third possible inverter solution with power optimizers and a string inverter. These are a variance of the string inverter and the micro inverter. Once you're in the process of getting your solar system, ask your authorized LG PRO Installer for advice on which of these inverter solutions is the most suitable for you.

Today, houses with grid-connected solar systems consume solar-generated electricity first, before switching to the electricity grid if more electricity is required than the solar system can generate. Grid-connected solar systems can also feed electricity back to the grid if too much electricity is generated through your installation for the immediate needs of your home.

Unless you add storage batteries to your system, a grid-connected solar system is unable to store power in your home for use at night. Also, when the grid is down, your solar system will not send electricity to your home unless you have storage batteries.



# Components of a Solar System

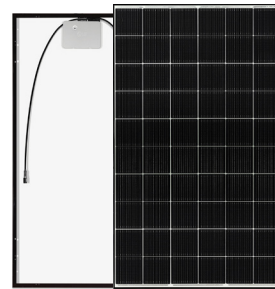
A solar system is made up of several key components, all of which combine to generate electricity, regulate and control the flow of the electricity and to connect and mount the solar system to your home. A grid-connected solar system is comprised of panels, a string inverter or micro-inverters or optimizers with a string inverter, a roof mounting system and electrical accessories including circuit breakers and wires. It is important that all components work together, with no component compromising the performance, safety or life expectancy of any other component.

## SOLAR PANELS

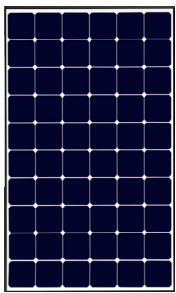
Solar panels on roofs of homes generate clean energy by converting sunlight into usable electricity. This conversion takes place within the solar cells and is a process that requires no moving parts. LG residential Solar Panels are made up of 60 cells in a 10 x 6 format.



**LG NeON<sup>®</sup>R ACe**



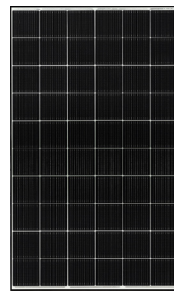
**LG NeON<sup>®</sup>2 ACe**



**LG NeON<sup>®</sup>R**



**LG NeON<sup>®</sup>R Prime**



**LG NeON<sup>®</sup>2**



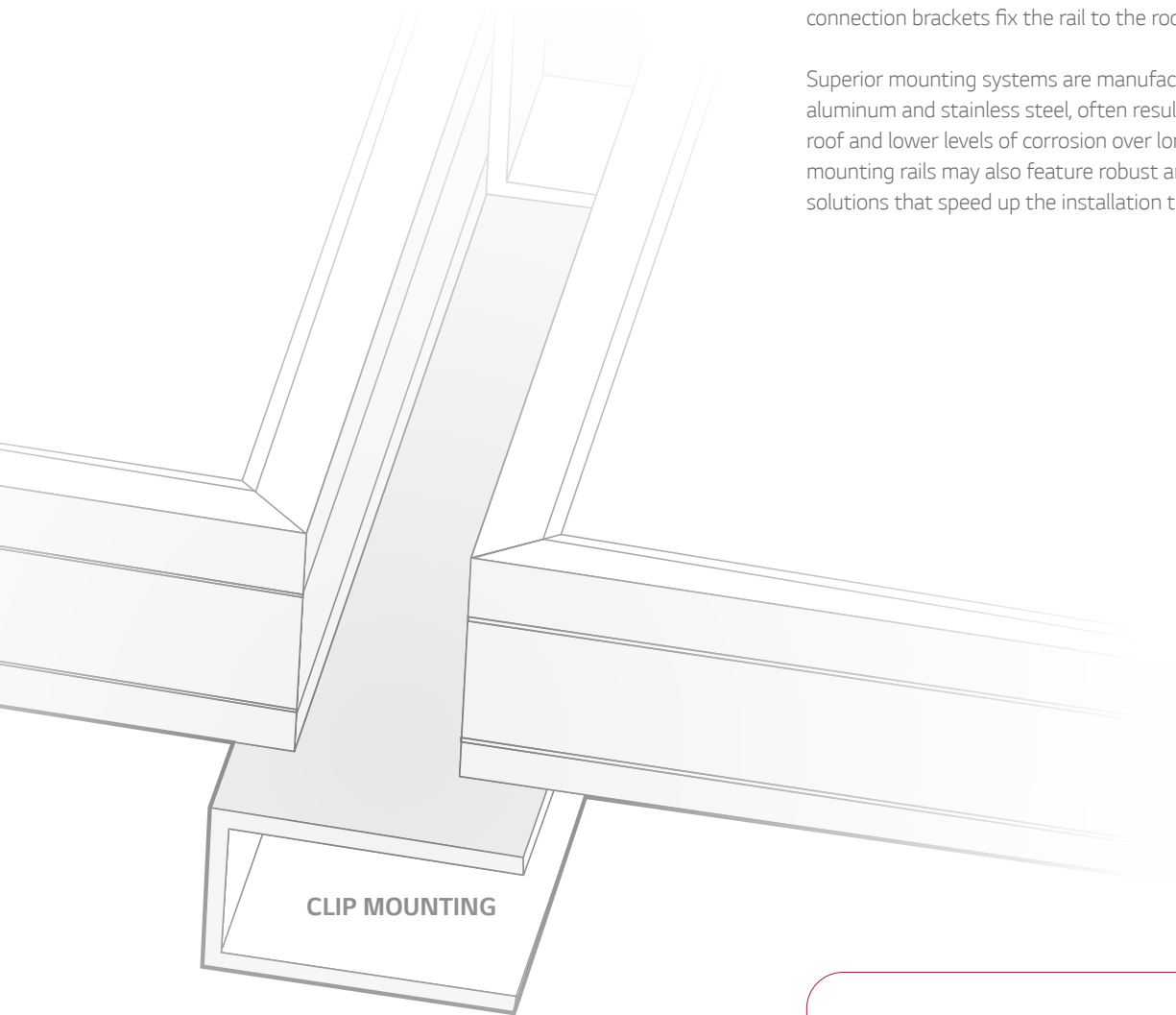
**LG NeON<sup>®</sup>2 Black**



## MOUNTING SYSTEMS

Solar systems are mounted to roofs with a mounting system using various railings, frames and tiles or tin feet. Most mounting systems are made of aluminum with stainless steel hardware and are designed to accept a variety of solar modules on a variety of roof types. Rails with clamps attach the solar panels to the rail and connection brackets fix the rail to the roof (see diagram below).

Superior mounting systems are manufactured with higher grades of aluminum and stainless steel, often resulting in less weight on the roof and lower levels of corrosion over longer periods of time. Quality mounting rails may also feature robust anchoring points and design solutions that speed up the installation time of your solar system.



### Metering Your Solar System

There are two fundamental steps to take when connecting your solar system to the grid.

Your electric company will specify what type of meter is required to measure your solar generation and energy consumption. Your LG PRO Installer will be able to explain the details to you. You may be required to pay for the cost of the new solar meter, its installation and the cost of your solar system. Prices for the meter can be a few hundred dollars, so you should make sure that the solar electricity meter supply and the connection are included in the quote for your new solar system.



# Installing Solar Panels for Your Solar System

LG Solar has developed a network of reputable installation companies known as LG PROs. These local installers are trained to install our products, and they are knowledgeable about the sunlight and permit conditions in their local communities. They can help you determine what the best LG choice is for your home. Here's a bit more information on factors they'll be considering:



## TILTING AND ORIENTATION

Solar modules can face anywhere from the East to the South and the West, while still providing good output performance.

Depending on your location in the U.S., your grid-connected LG solar system will generate the most solar electricity when the panels are facing south at the right angle. The optimal angle can greatly increase the connection between the sun's energy and your home, which helps to build an even greater sense of energy independence.

Discuss your electricity usage with your LG PRO Installer so that your usage pattern can be matched with your solar panels' installation. Of course, the orientation, shape and size of your roof also play a major role in where the panels can be installed.

## SHADING

The amount of electricity generated by your solar system directly relates to the amount of sunlight that your solar panels receive. If your solar modules are in the shade, the system will generate less electricity.

Even a single antenna or a chimney shadow on your panels can affect performance, while the overall effectiveness of your solar system is dependent on where you live. In some areas of the U.S., tree coverage greatly reduces the effectiveness of solar panels. If you believe that you may have a shade issue, talk to your LG PRO Installer during your consultation about whether power optimizers or micro-inverters are a potential solution for you.

## MOUNTING

If a suitable roof area is not available at your home, LG solar panels can be fitted to a ground-mounted system in a sun-filled spot on your land. However, you will need to allow for additional costs for a ground mounting system and costs for running the cable safely in the ground. These options can be discussed with your local LG PRO Installer.



## INSTALLING PANELS FOR GREATER PERFORMANCE

LG is confident that our panels will give you years of reliable functionality and an even greater appreciation for solar energy. For decades of low maintenance to your solar system, it is strongly suggested that you purchase high-quality solar panels and quality solar inverters, and ask for high-quality system components in all aspects of your solar system.

Inexpensive solar panels are more likely to experience water ingress, corrosion, hot-spots, failed bypass diodes or junction box failures. These types of failures lead to the write-off of the panel. Lengthy promised warranties are hard to claim if dealers, installers or panel manufacturers have gone into liquidation or have stopped operating.



**LG**  
Life's Good





## How Many Panels Does Your Solar System Need?

An LG PRO Installer will visit your home for a site inspection to check the roof position, discuss your electricity usage pattern, suggest monitor options and, where applicable, conduct a shade analysis to ensure that the right quantity of the most suitable panels is placed in the optimum position. Buyers should insist that their installer also undertake a physical site inspection.

An installer's willingness to visit your home gives some indication of the quality of service you will receive for your purchase. As a result, we advise that you buy your solar system from an LG PRO Installer, and not an Internet-based solar sales agent.

Historically (when Internet solar sales were rapidly increasing), consumers purchased solar systems without site inspections. Sometimes this resulted in their installer highlighting the need for special roof brackets or a breaker panel upgrade before the solar system could be installed. These additions added unexpected costs and time delays to the installation.

Before making your purchase decision, find out who your point of contact will be if you have questions after the installation. Make sure that you ask for a comprehensive written warranty from your LG PRO Installer for the cabling and installation work, not just the panels, inverter and mounting frame.



## How Long Do Solar Systems Last?

The key components susceptible to failure in your solar system are the solar panels, the inverter and some components such as fuses and isolators. LG Solar products tend to have longer life cycles as they undertake more quality control steps, use higher quality cells and solders, have stronger UV protection on back sheets and ensure the water sealing of panels withstands decades of weather-induced decline. Very low-cost panels with less UV-stabilized back sheets, cheaper sealants and more fragile framing can deteriorate faster, and can fail in as little as 2-4 years.

Unfortunately, sometimes lengthy warranties on cheaper products have been unobtainable, as both manufacturers and installers have avoided liability by going out of business. LG is a bankable, global brand. You can trust we'll be around throughout the 25 years of your warranty, and well into the future.

The key warranties to investigate are for product, performance and labor. These cover the power output of the panel, a replacement panel and its transport in the case of a panel failure and the labor costs involved in replacing a panel. Cheaper panels often do not cover transport and replacement labor. Make sure you verify with your installer what is covered in the warranty and ask for the detailed warranty document. LG NeON® 2 and LG NeON® R panels are backed by a 25-year warranty that covers product, performance and labor (labor costs in the rare case of a needed module repair or replacement are covered up to \$450.)





# Solar Panel Sizes

## WHY PANEL EFFICIENCY MATTERS

When consumers evaluate solar panels, they often focus on a measurement called the advertised maximum power (Pmax). This measurement represents a solar panel's theoretical power production under ideal sunlight and temperature conditions. Think of it as the maximum amount of power a user can expect a solar panel to produce in an ideal solar environment. In fact, no solar environment is ideal every day. If you're trying to determine the performance you can expect from a new solar system, regional differences (along with seasonal and weather changes) therefore limit the value of the Pmax measurement.

That's why it's important to consider the **efficiency** of a solar panel. Efficiency is defined as the amount of power produced by the panel per square meter (m<sup>2</sup>) of sunlight at STC\*. A solar panel that produces 200 watts of power per m<sup>2</sup> at STC would theoretically be performing at 20% efficiency. Basically, the more efficient a solar panel is, the more energy it can produce in a given footprint.

LG's latest products have efficiency ratings ranging from 19.6% - 22.0%. Your solar installer can help you determine which model is right for your project.

*\*STC (Standard Testing Conditions) =*

*Irradiance @ 1,000W/m<sup>2</sup> of sunlight; 25°C/77°F cell temperature; 1.5 AM*





# Incentives and Financing for Going Solar

## ARE THERE INCENTIVES AVAILABLE FOR YOUR SOLAR SYSTEM?

U.S. incentives vary greatly based on a homeowner's location. Many great programs are available for people on the local, state and federal level. In order to find out what types of incentives are available to you, LG will connect you with a local LG PRO Installer who can walk you through the options available in your area.

## FINANCING YOUR SOLAR PROJECT

Banks are offering innovative programs to help homeowners finance solar projects. Your bank may already have a unique program designed for solar installations or may offer you traditional financing options such as lines of credit or second mortgages.

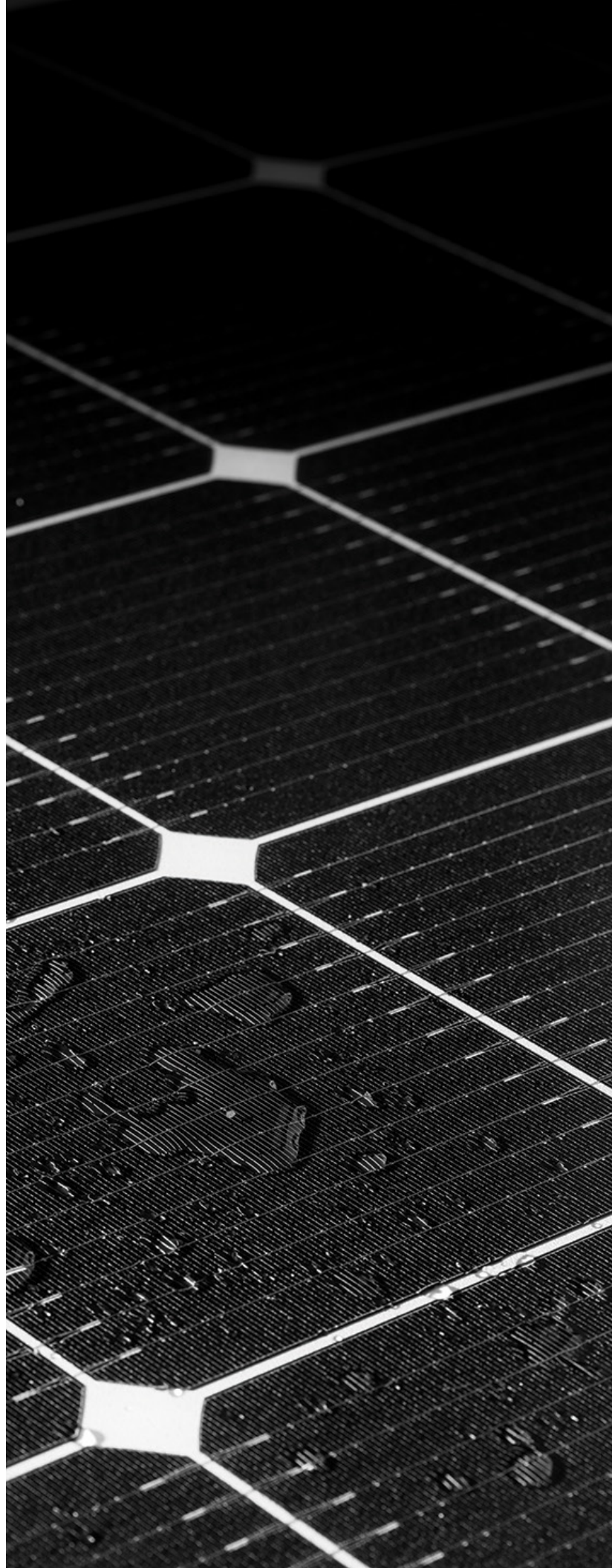
Other specialty financing programs may be available from the public and private sector. Financing your solar project can seem overwhelming. Speak to an LG PRO today to find out what programs may be available for your project.




# Details on How to Choose a Solar Company

It is recommended that consumers use a reputable installer who checks your specific solar system requirements and ensures the connection between the sun and your home is strong. Please see the points below regarding the advantages of using a company promoting high-quality products.

- 01 A reputable solar retail company is more likely to fully evaluate your requirements and explain in detail what needs to be done in order to install your solar system.
- 02 A local diversified company is more likely to be around in the future to service any warranty issues or system upgrades. As we've shared in this educational piece, some solar installers and dealers make big promises, but then vanish.
- 03 If your installer is selling you LG solar panels, then LG is more than likely to service your panels in the future through your local LG PRO Installer. If you choose an unknown brand, again, the manufacturer may go out of business, or the importer may stop importing these panels into the U.S. A safe option is to buy branded solar panels from diversified manufacturers such as LG that have a proven track record.
- 04 A reputable solar company will be fully aware of current electricity supply rules and will provide advice on the best system for your needs and location. Well-established businesses will be more likely to give you the most up-to-date advice.
- 05 If your local installer is aligned with LG, then he/she must install the solar power system to a high standard and act ethically in all business dealings with you, the customer.







## Questions to Ask Before You Buy

Asking your solar installer a few essential questions may make a big difference to the service and benefits you receive. Make sure you get the answers in writing.

- What is the estimated monthly and annual production in KWh of my system in its installation position?
- What is the estimated solar electricity production in the best and worst months?
- Who will service and maintain my solar system? *Get an address and contact details in writing, preferably of someone reasonably local.*
- What are the responsibilities for each party: the installer, manufacturer and consumer?
- Who is responsible for connecting my solar system to the electricity grid? Is it the installer? When will it happen?
- Who is responsible for my meter change? *Make sure this is clarified. Quality companies usually offer to do the whole job.*
- How will the installer credit my solar rebate?
- Can I have a copy of the manual to get a detailed description of the solar panels?

**SOME STATES REQUIRE INSTALLERS TO HAVE A LICENSE BEFORE INSTALLING A SOLAR SYSTEM.**

**THE FOLLOWING ELEMENTS ARE CONSIDERED WHEN DESIGNING A SOLAR SYSTEM:**

- Your current electricity consumption and future needs.
- The available roof space and optimum panel location.
- The orientation and pitch of the roof(s).
- Impact of shading across all seasons and time of day.
- The structural soundness of the roof.
- Sizing the strings of panels for the correct voltage of the inverter solution.
- Ensuring the design meets building and electrical codes.
- Determining the most suitable location for the inverter and the way the cables are run.
- Considering appropriate monitor options and if batteries are appropriate.





## LG Solar Warranty

### What you should know about the 25-year Performance Warranty

Over time, all solar panels will show degradation and produce less electricity. In order to give buyers some guidance about the level of expected degradation, a warranty is offered by many manufacturers. This warranty lasts, in most cases, for 25 years and guarantees, for conventional panels, an output of around 80% of the original capacity. LG guarantees up to 90.08% efficiency for the NeON<sup>®</sup> 2 and the LG NeON<sup>®</sup> R guarantees up to 90.8% efficiency with a 25-year performance warranty.

Our solar modules are backed by a 25-year limited warranty that consists of product, performance, and labor coverage.

#### Product

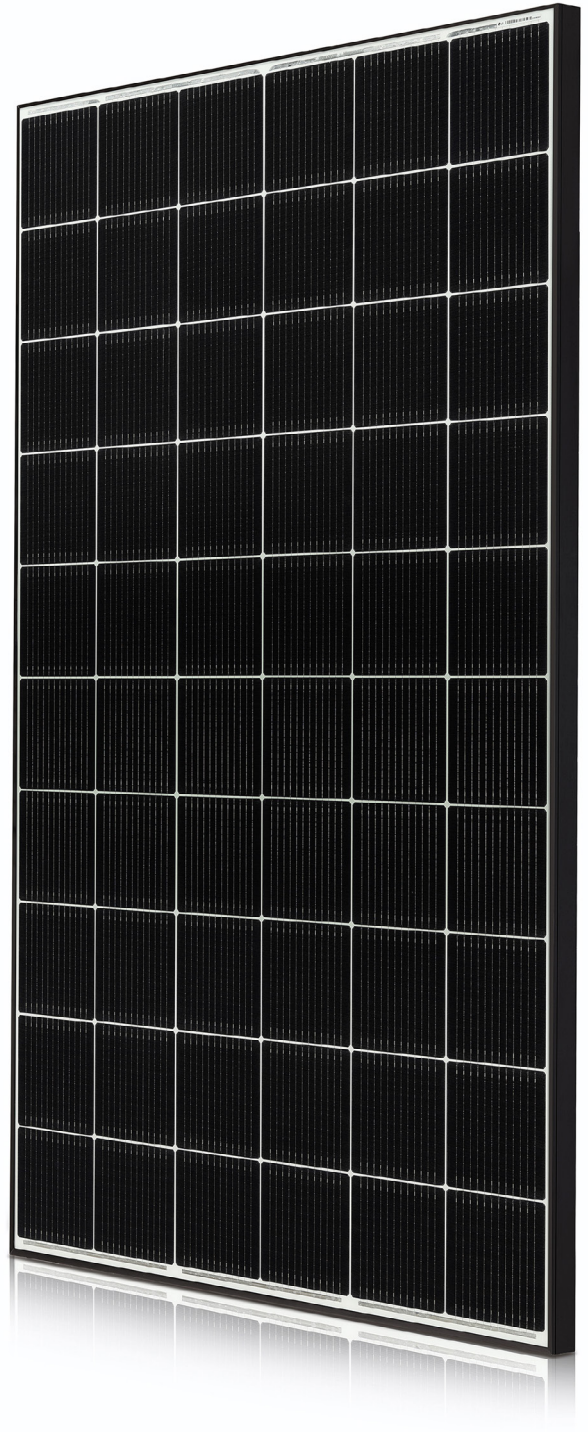
Our commitment to controlling every step of the manufacturing process from start to finish ensures that we build and deliver a quality product every time. Thanks to thorough testing processes, LG ensures that each module off the production line will perform well in real-world conditions. No solar modules leave our factory until our quality-control specialists approve their performance. LG's high standards result in world-class products for our customers. That's why we are able to offer an outstanding 25-year product warranty.

#### Performance

You want quality solar modules to power your home with clean energy for years, so your modules' ability to generate the electricity you need over the long term is critical. All solar panels degrade over time, but LG's products are built to experience low degradation rates. In fact after the first year of installation, our LG NeON<sup>®</sup> R model has a degradation rate of only -0.3% per year, and our NeON<sup>®</sup> 2 has a degradation rate of -0.33% per year.

#### Labor

In the rare case that a module needs to be replaced or repaired, LG won't just cover the cost of the materials; we'll also cover labor costs up to \$450.



# Additional Tips To Getting Started With Solar

Unfortunately, as in any industry, some unscrupulous companies can affect the reputation of professional, positive and reliable suppliers. Please see these helpful hints on how to avoid poor-quality solar system installers.



1. Undertake some solar research via our Frequently Asked Questions (FAQs).
2. Do your research about brands and prices. There are some very cheap offers in the market, but these cheaper deals can hide poor quality equipment. You are looking for a product that lasts at least 25 years so that your financial investment is repaid over and over. Research the companies offering cheap deals.
3. Don't give in to pressure and deadlines. If the salesperson cannot give you the time to make a considered decision, then they might be afraid you will discover something bad about the deal after doing a bit of research. If the company has just arrived in town with a great deal, they might be gone after the install, leaving you to your own local devices. Please buy from reputable solar companies. In the years to come, you might need their solar expertise and support.
4. How big is your roof and how big a solar system can it fit? Remember to allow some reserve space for when you install a solar storage battery for nighttime solar power use, and then again for more battery storage capacity to charge up an electric car in the future. Your quality solar system is built to last 25+ years. Go back 25 years to the days of brick phones, dot matrix printers, and boomboxes to consider what the next 25 years will be like and how your home power needs may grow.

5. Solar systems vary in quality and size, and so does the price. Lower-grade systems may cost you more in the future in repairs and replacements. Use your tax rebate wisely. You are making a 25-year or longer investment, so please consider quality and real warranty support over everything else. And remember, a solar system with a good brand name and performance at the time you sell your home might increase your property value.
6. Panel Types & Certifications: With a wide selection of LG panels to choose from, you can work with an LG PRO Installer to find the panel that suits your home's needs. Choose from our lineup of the NeON® 2, NeON® R, NeON® 2 Black, NeON® R Prime, NeON® R ACe or the NeON® 2 ACe.
7. Solar systems attract government rebates. You should check with the installation companies if the offered panels are eligible for local and federal tax credits. To find out what incentives are available to you, visit our blog page, <https://www.lg.com/us/solar/blog>.
8. Performance Warranty: It's important to purchase a product that is covered long-term by a warranty from a company you trust, so you don't have to worry about paying for repair or replacement costs. We back up our solar products with a 25-year limited warranty that covers product, performance and labor because we believe in the quality of every solar module we design, develop, manufacture and ship to customers.

9. Inverters are a key component of your solar array. There are 2 main types of inverters you can choose from, a microinverter and a string inverter. LG offers panels for both solution types. Check out this two page document detailing the advantages of each inverter system: [https://www.lg.com/us/solar/solar/files/resources/Microinverters-vs-StringInverters\\_Ver06\\_11262019.pdf](https://www.lg.com/us/solar/solar/files/resources/Microinverters-vs-StringInverters_Ver06_11262019.pdf).
10. Quotes & Buying: Do not get pressured by salespersons to sign a deal then and there. Use reputable and established local businesses to install your solar system.

Visit us at LG Solar:



# LG Solar

**When you go solar, ask for the brand you can trust: LG**

For more information, visit <https://www.lg.com/us/solar>



**LG Electronics Inc.**

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