

# TODAY'S SMART + SOLAR HOME

Whether you are an enthusiastic adopter of smart home technology or just dipping a toe in the water, staying on top of how tech can improve your home life—and even affect the resale value of your home—is a must.



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**T**HE CONCEPT OF “SMART HOME” seems to encompass so many things, but really the concept is simple: using technology to streamline the performance of your home to make life easier for you. It’s that simple.

Manufacturers continue to make smart tech widgets and appliances ever more intuitive and easy to use. In fact, more than half of all households (55%) say they have at least one smart device or plan to purchase one this year, says a 2017 Coldwell Banker survey on the smart home marketplace.

And once they took that device for a spin, they were 90% more likely to purchase another one. Why? Because it made life that much better. Take popular voice-enabled technologies, such as Alexa or Ok, Google; not only can you play your favorite music or check the weather using these



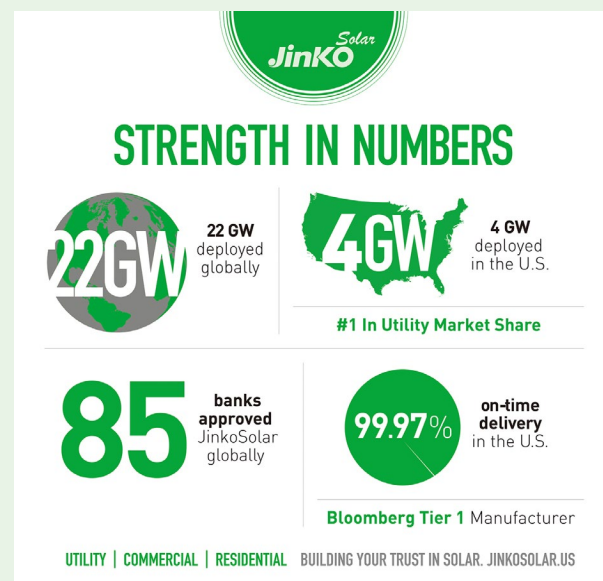
**The owners of this house control their energy production and save money using JinkoSolar panels.**

devices, but soon you will also be able to control most of the appliances, devices, and mechanical systems in your home using them.

The survey lists home security, energy conservation, and lighting control as the top three reasons why homeowners purchase smart home technology, and it reveals that homeowners prioritize on comfort, energy efficiency, security, and healthy air quality. These are important factors to the valuation of your home today as well as its resale value in the future.

So, if you’ve already embraced some smart options for your home, congratulations: you’re halfway there! The next logical step is to take control of your energy production and use by putting solar on your roof and tie it into your connected home. (See the sidebar, page 8, for how to do this.)

Following is everything you need to know about why solar should be an integral part of your connected home plan, and how to do it right so you can start saving money today.



## THE JINKO DIFFERENCE

Not all solar panels are made the same. Here are some facts about JinkoSolar you should use to compare with the panels your installer offers.

- 25-year power warranty
- Publicly traded on NYSE since 2010
- Best-selling module globally since 2016
- Deployed enough solar panels to power more than 3.2 million homes
- Most chosen by banks and utilities
- 16th fastest-growing company according to *Fortune* magazine.
- Top performer in all tests in PV Module Reliability Scorecard by DNV GL Laboratory

# HOW DO I START THE SOLAR PROCESS?

**T**HE INTEGRATION OF smart home with solar lets you control the production, storage, monitoring, and use of energy in your home. Many solar experts will tell you to start your solar adventure by picking a reputable installer.

In fact, the best advice is to understand the differences in panel manufacturers *before* you pick an installer, and here's why: Installers are crucial to getting solar up and running on your roof, but if they supply you with a solar panel from a manufacturer who isn't financially stable, your 25-year warranty could be worthless if the manufacturer isn't around to make good on a claim.

According to Jeff Juger, Director of Business Development at JinkoSolar, there are ways to determine whether a manufacturer will be in it for the long haul. (See "The Jinko Difference," page 2, for what to look for in a manufacturer.) Then, follow these easy steps to choose the right installer.

**1. Make sure to pick a reputable installer**, who you think will exist many years down the line, particularly because the company will likely offer you a maintenance contract which will be worthless if the installer is out of business.

**2. Installers often offer financing packages.** Make sure



**JinkoSolar panels in production. It's important to select a panel that is durable. Jinko offers a 25-year power warranty on its panels.**

they explain things carefully, and if they cannot answer all your questions, then it's possible they are pitching a product they don't fully understand, and thus may expose you to hidden costs or risks.

**3. Ask the installer why they carry certain equipment** and not others, and evaluate whether you think their reasoning makes sense. You don't want to end up with poor quality equipment because your installer wanted to get a cheap version and earn a higher markup.

**4. Don't fall for size as a determinant.** Although the national installers have better marketing, the durability of the system is most important. If the cost of the system is comparable, then smaller installers may be able to provide better localized service.



## MATERIALS MATTER™



### JINKOSOLAR AND DUPONT – LEADING THE WAY TO HIGHER RETURNS AND LASTING VALUE

**DuPont™  
Tedlar®**  
BASED BACKSHEETS

**30<sup>+</sup>**  
YEARS

#### FIELD-PROVEN PERFORMANCE

DuPont™ Tedlar® is the only backsheet material proven to protect solar panels in the field for over 30 years, even in extreme conditions.

#### Jinko Modules featuring DuPont Materials Lower LCOE

- Increase system lifetime
- Maintain higher system power over time
- Reduce Balance of System (BoS) costs

#### DuPont™ Tedlar® PVF — film based backsheet

Proven to protect

##### UV LIGHT



- Transmitted
- Reflected

##### TEMPERATURE



- Peak
- Cycling

##### MOISTURE



- Humidity
- Precipitation
- Condensation

##### CORROSION



- Atmospheric Chemicals
- Ammonia
- Marine Environment

##### ELECTRICAL DAMAGE

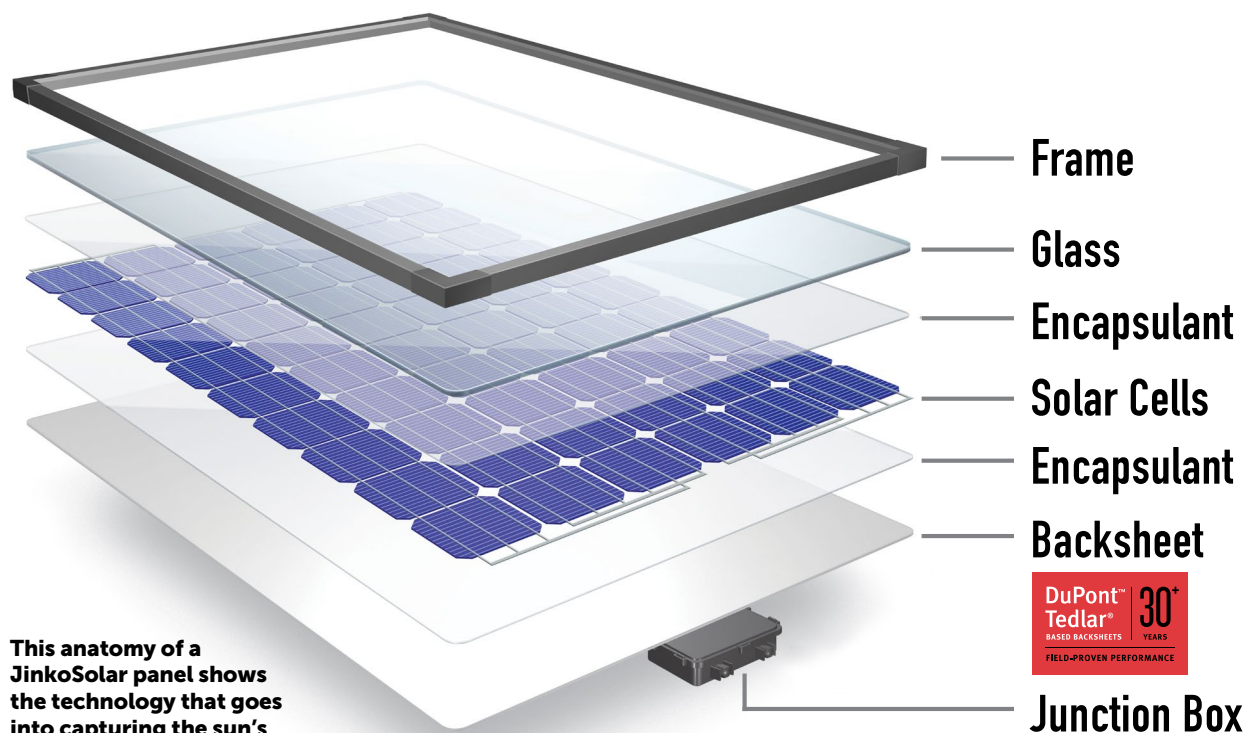


##### PHYSICAL PROTECTION



- Abrasion
- Impact

Jinko customers may specify modules made using DuPont advanced materials



**This anatomy of a JinkoSolar panel shows the technology that goes into capturing the sun's rays and converting them to energy.**

## WHAT WILL GO ON MY ROOF?

**O**NCE YOU'VE DETERMINED an installer, you can pick a system. A solar system is actually very simple: It has panels, a racking system, and an inverter system (either string or microinverter).

Let's start with the panels. A solar panel is made up of several components, which work together to generate electricity. You start with cells, which are the basic units of electrical generation, and string them together. The cells are sandwiched between two layers of encapsulating adhesive and laminated onto a backsheet, which protects the rear side of the cells. Glass protects the top layer and an aluminum frame protects the edges.

A junction box is glued onto the backsheet, which gathers all the electricity generated by the cells and sends them to an inverter, which transforms the power into usable AC electricity, which powers your household appliances and smart devices.

A standard panel for a residential roof is less than 2 inches thick and more than 3 feet by more than 5 feet, weighing just over 40 pounds. With a 25 year warranty, these panels are expected to endure all the harsh environmental conditions on your roof like high winds, snow load, hail, ice, and salt mist, among others.

So how do you know what a premium panel looks like? That's tough. "I work in the solar industry, and when I look at a panel I can't always tell whose panel it is," says Juger. "More or less they look similar. So you have to dig deeper and find out the ingredients. It's just like a pancake; you can make one with half whole wheat flour and one that is made from 100 percent all-purpose flour. One is healthier, but you can't see it just by looking at it."

Here are the proper "ingredients" of a solar panel. It should:

- Be manufactured from tempered, low-iron glass, UV-resistant encapsulant, and DuPont backsheet film. (See "Materials Matter" graphic to understand its advantages, page 3.)
- Be PID-free (resistant to module degradation from humidity)
- Offer a 25-year linear warranty

Once you have selected your panels, then consider the racking system. The racking system is used to attach panels to your roof. They are oriented to get the most direct sunlight possible. They can also be placed in your yard with a ground-mounted system.

According to Juger, there are more types of racking systems than solar panels, but the type of racking system is simply consumer preference. For example, some racking systems have a "black skirt" on the bottom edge to make the system more aesthetically pleasing. "The industry has come a long way with non penetrating racks," he notes. "You should just make sure your roof is



newer because solar panels last longer than 25 years, so you don't want to have to replace your roof before your panels."

Last, consider what type of inverter system you want.

An inverter takes the energy from the solar panels and converts it from direct current (DC) into alternating current (AC). Inverters are typically installed right outside the breaker box, allowing the home to use the solar power first, but if that power isn't enough, use additional power from the grid.

If the solar system is creating more electric energy than the home needs, it can send that power out into the grid. If you live in an area that allows net metering, you can sell the excess energy you create.

There are two types of inverters: microinverter and string. Microinverters are more expensive and you need one for each panel, but offer better monitoring, and usually have longer warranties than string inverters. The plus for string types is that they are less expensive and have fewer points of failure. According to Juger, your installer can make recommendations regarding which type of inverter to use.

JinkoSolar offers a solar panel with a factory pre-mounted microinverter. (See photo, right.) "The integration in the factory can reduce installation time by as much as 50 percent since it is shipped as single unit," notes Juger. "The installer also does not need to stock and carry additional units onto roof. Historically, with a DC panel, the installer would install the inverter in the field, attaching it to the frame of the panel or mounting it on the racks. This requires extra time and labor, and these extra actions on the roof leave opportunities for errors."

The price for this panel, called Eagle AC 60, will be on par with a panel and separate inverter combined, and it will be available at the end of 2017. "Once this panel is out, we would find it hard to believe that anyone wanting a microinverter would not get this product as it has the same benefits with faster installation and a single wrapped warranty," says Juger.

He points out that when the technologies are provided separately, it means two separate warranties: one backed by Jinko and one backed by Enphase. With the integration of the two, there is now just one warranty.

## HOW DO I PAY FOR MY SYSTEM?

**T** HERE ARE FIVE WAYS YOU CAN PAY FOR YOUR NEW SOLAR SYSTEM.

**1. Buy a solar system outright.** This requires upfront cost but can be the most financially advantageous way to go solar. You can take advantage of the federal investment tax credit worth 30 percent of the cost of your system. In this scenario, say you purchase a \$15,000 system. You will get \$4,500 applied as a

credit to your federal tax bill. You must maintain the system (although most homeowners will have the option to sign up for some sort of maintenance package) but if you buy quality panels with a 25-year warranty, you should have less problems.

**2. Enroll in a PACE program.**

If you live in a state with PACE legislation and an active PACE program, you can finance your system this way. PACE stands for property assessed clean energy and is a financing option where you pay back the cost of the system through an additional line item in your property tax bill. PACE can be used to finance solar and other energy efficient items in your house.

**3. Lease a solar array from a company that installs and maintains it.**

This option is like a car lease. Because the solar leasing company owns the panels, you can't take advantage of the tax credit. You may need outside approval if you decide to sell your home with the system, and the prices charged for leasing assume escalation in utility rates that may not occur.

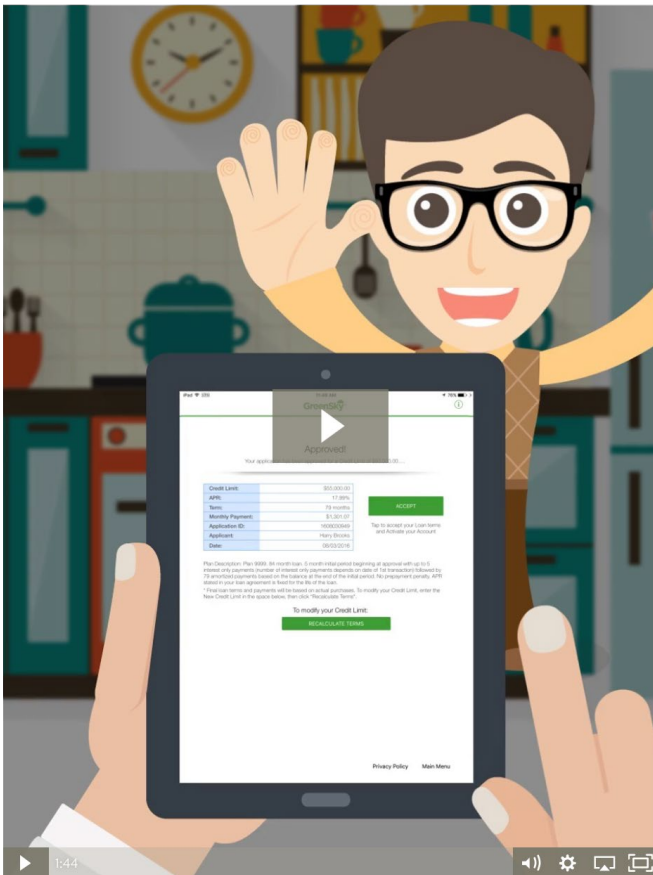
**4. Engage in a Power Purchase Agreement (PPA).**

A PPA means the solar equipment is owned by a third party, and you are only charged for the kilowatt-hours of solar power you use. It's a good option if you don't have the money for the up-front installation.

**5. Get a loan.** JinkoSolar thinks that any way of going solar is a great way as everyone's needs are different; however, from a payback perspective, owning the panels is the ultimate way to go solar because of generous federal tax credits and better long-term return on investment. strike "and net metering".



**The Eagle AC 60 panel comes with the microinverter already pre-mounted, which reduces installation time by 50 percent.**



**The GreenSky app makes it easy to secure financing on your new solar system.**

The company has relationships with most of the major residential solar financiers but to make it even more affordable for people to go solar, the company has teamed with lender GreenSky. “The public needs to be educated on the value of solar ownership as good a way (if not better) than lease programs,” says Juger.

The company has an easy-to-use mobile app that installers can use to generate an approval for your loan. Highlights include:

- **Rates are competitive** and amounts up to \$65,000 can be approved quickly.
- **Paperless application process.** Your solar contractor can use three paperless options to enter your information: scan your driver’s license, pull the address information via the GPS locator, or enter it into the mobile device manually.
- **Payment estimation.** Your contractor can help you choose the loan that best fits your needs using an interactive loan tool.
- **A tutorial.** An in-app demonstration walks you through the entire loan process.

[You can watch a short demo of how GreenSky works here.](#)

## WHAT ABOUT...?

If any of these questions pop into your head when you are considering solar, you’re not alone. Here are the most common solar questions.

**How quickly will I start saving or get my investment back?** It depends entirely on how you acquire your system. If you choose a lease, PPA, PACE loan, or solar loan, then you usually start saving right away, since you will likely sign a contract that requires no money down and lets you pay less for the same amount of electricity usage that you were previously purchasing from your utility.

If you choose to pay cash for a system, there will be the upfront investment, which you will quickly earn back within a few years. Once the savings you’ve earned each year equals the upfront investment, there will be many more years of upside. In addition, if you own the system, you will have gotten all of the tax incentives, including the 30% federal investment tax credit.

**Can solar panels be installed anywhere in the United States?** Most locations in the United States get enough sunlight to generate copious electricity from solar panels. Important factors to consider include the rates you currently pay to your electricity provider, as well as what rebates and incentives are available to you, although in several states where electricity rates are high and sunlight is plentiful, you can get a great return on investment even without any rebates or incentives.

**Will my roof support solar panels?** As long as your roof is in good structural shape, usually 10 years or newer, then you can support solar. Otherwise, you should fix the roof before putting a system on that may last for 25 years or more. Complete shade from neighboring trees or other structures is also a problem, though recent JinkoSolar technology has allowed roofs with partial shading to generate as efficiently as others. Finally, it’s ideal that a roof faces south to get the maximum daily exposure to the sun, but again JinkoSolar has technology that can help mitigate losses if your roof faces a different direction.

**How do you connect to the grid?** This is dependent on where you live and your utility provider, but your installer will know.

# SUPPORT IN PERPETUITY

**A**S YOU CAN SEE, GOING SOLAR IS EASY: Simply follow the steps detailed in this article and get started saving on your utility bills. One last thing to consider when deciding your solar route is to consider manufacturers that will offer you support down the road.

“Remember, not all companies can support your installer after the sale,” warns Juger. “Make sure the manufacturer supplying panels to your installer has a team that can answer his questions—a local full-service team.”

Juger also notes that from a trend perspective, solar leases may be on the wane. “Homeowners are starting to catch on to the ownership trend,” he notes. “Even national installers you see on TV who have traditionally offered leases have begun aggressively marketing solar loans. There is generally more access to money today than when leases first became popular out of the most recent recession.”

Reputable companies, like JinkoSolar, have many channels to market, including through local installers. “Our reputation and reach combined with great products for solar loans and PACE mean gaining all the benefits of solar ownership is in the reach of homeowners nationwide.”

Take control of your family’s energy system today.

## DID YOU KNOW?

**According to the Solar Energy Industries Association (SEIA), solar prices have dropped more than 63% over the last five years.**

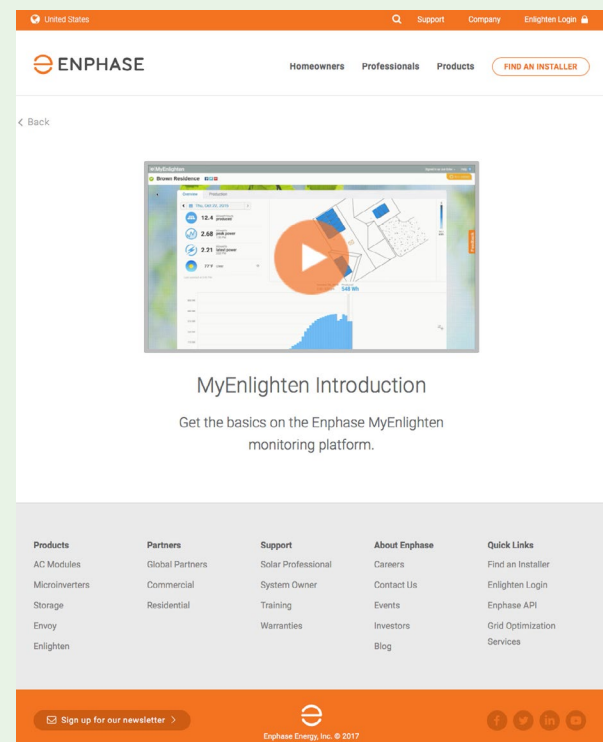
## THE SOLAR CONNECTED HOME

**Connecting solar to smart home technology makes harnessing energy from the sun easy.**

Enphase MyEnlighten is an app that allows solar system owners to track energy production, monitor their system’s health, and share their data with family and friends—all from a simple, mobile-friendly interface.

The system platform lets you:

- Use any device with an internet connection to engage the interface.
- Use one-click sharing with integrated social media buttons.
- View historical weather data to understand variations in performance.
- Verify system health and performance at a glance.
- See when the system is not performing as expected and what can be done to restore performance.
- Compare current performance against a previous day, week, or month.



The screenshot shows the Enphase MyEnlighten app interface. At the top, there's a navigation bar with "United States", "Support", "Company", and "Enlighten Login". Below this is the "ENPHASE" logo and navigation links for "Homeowners", "Professionals", "Products", and a "FIND AN INSTALLER" button. The main content area features a "Back" button and a large video player showing a map of a solar system location. Below the video player, the text reads "MyEnlighten Introduction" and "Get the basics on the Enphase MyEnlighten monitoring platform." At the bottom, there's a footer with links for "Products", "Partners", "Support", "About Enphase", and "Quick Links".

[Watch the intro video here.](#)

# SOLAR MYTHS DEBUNKED!

Don't let the naysayers talk you out of controlling your family's energy.

## **SOLAR MYTH 1: Solar Will Get More Efficient So I Should Wait**

**FACT:** Present day solar panels are evolutionary not revolutionary. The technology has been around for decades but has recently been perfected. When panels become more efficient, it simply means you wouldn't need as many, because they're better at converting. If your roof can already produce sufficient power now, there's no sense in waiting. Once installed, the panels will continue to work for decades.

## **SOLAR MYTH 2: Solar Doesn't Work in Cool, Cloudy, or Foggy Climates**

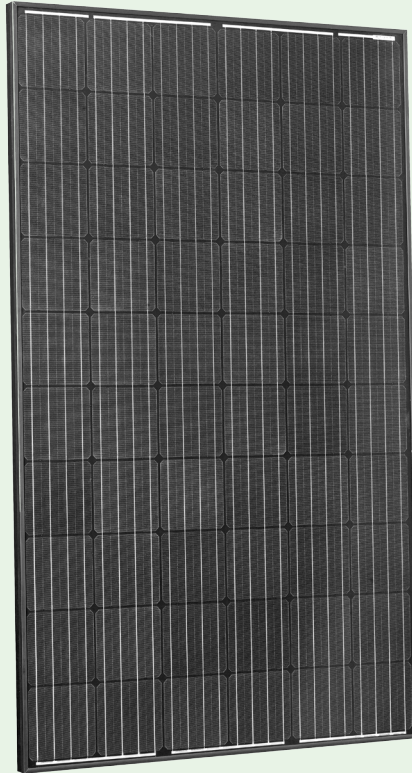
**FACT:** Solar panels work great in ambient light and will produce energy in the fog or on overcast days. In fact, solar panels are actually more efficient at cooler temperatures than hot ones. Although this might seem counterintuitive, heat is not good for electrical production. It's the same reason why LEDs, which are cool, are more efficient than incandescent light bulbs.

## **SOLAR MYTH 3: I Will Have an Excess of Energy that Will Go Unused and Will Be Wasted**

**FACT:** Nearly all modern solar panel systems are connected to the conventional electricity grid. In net-metered systems, your meter spins backwards and your utility company credits you for that power. This grid tied method tends to be the most convenient for homeowners.

## **SOLAR MYTH 4: Solar Panels Will Cause My Roof to Leak, Deteriorate, or Collapse.**

**FACT:** Solar panels actually protect and preserve the portion of the roof they cover. Plus, most solar panels are not attached directly to the roof itself, but rather to a mounted railing system. Solar engineers add sealants to fill in any gaps and often the mounts are surrounded by metal coverings that act as an extra barrier from the elements.



## **SOLAR MYTH 5: Solar Is Still So Expensive That It Will Never Be Able To Pay For Itself**

**FACT:** Many customers notice excellent savings when they go solar. Modern financing options have all but eliminated the barrier to entry for solar, so many households are now able to go solar for little to no money down in most markets. Solar is one of the very few household purchases that could actually offer you short-term and long-term savings.

## **SOLAR MYTH 6: When the Power Goes Out, My Home is Still Powered**

**FACT:** When the power goes out, grid-tied systems go out too. That's because it's not safe to be pushing electricity back out onto the wires while workers may be trying to fix the problem. Your inverter (the big box near your meter that turns DC electricity created by the panels into usable AC

current) recognizes that the grid is out and shuts your system off. A possible solution is a generator or storage system which reduces the worry of ever losing power.

## **SOLAR MYTH 7: Solar Will Look Ugly on My Roof**

**FACT:** In the last 10 years, there's been a growing awareness of how smart renewable energy is from both environmental and economic perspective. So solar panels are finally coming into their own and being regarded as an enhancement instead of an eyesore. Homeowners' associations that used to be steadfastly against solar have changed their policies and are now going solar! In addition, manufacturers are making all-black panels (black frames, black backsheets, and dark-colored cells), which blend into black shingle roofs.

## **SOLAR MYTH 9: Solar Panels Require a Tracking System to Follow the Angle of the Sun**

**FACT:** Tracking mechanisms are important for large-scale ground-mounted projects but are not practical for a rooftop application. Simple, cost-effective and stationary panels on your roof can quickly help you take control of and start saving on your energy.





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