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The California Solar Mandate

Your guide to buying a new home with solar panels in California

What you'll find in this guide:

This guide was created by EnergySage to help California homebuyers navigate the state's new solar mandate, including the key questions you should ask and why they're important.

Backed by the U.S. Department of Energy (DOE), EnergySage helps consumers understand the sometimes overwhelming experience of purchasing a solar energy system for their home or business.

In addition to being the industry's top destination for learning about all things solar (as well as other clean-tech products and services), EnergySage brings competitive quotes from prescreened installers directly to the consumer.

Before we dive into the tips and suggestions, let's first look at what exactly this new law says.

A brief overview of California's home solar mandate

In 2018, the California Building Standards Commission (CBSC) approved a state-wide mandate requiring all new single-family homes, as well as all multi-family residential buildings up to three stories, to install solar panels.

The California solar mandate is the first of its kind in the United States and **went into effect as of January 1, 2020**, along with several other new building codes designed to make new homes in California far more energy-efficient.

The California Energy Commission (CEC) estimates that these new energy efficiency measures will add an average of $9,500 to the cost of building a new home – or about $40 per month over a 30-year mortgage. The price homeowners pay for solar will vary according to a number of factors including the size of the system installed, the quality of the equipment, and the location of the home.

Your savings from these new building codes will quickly cover their added cost. The CEC conservatively estimates that homeowners will save about $19,000 on heating, cooling and lighting bills over three decades.

The next two pages explain why we believe your savings will be much higher and that **you should expect to save tens of thousands of dollars over 30 years as the result of the solar mandate.**

The numbers: Why buying a home with solar panels is a no-brainer

KEY TAKEAWAY: Not only should it be less expensive for new home buyers to go solar as a result of the mandate, you'll also save tens of thousands of dollars on electricity over the life of your panels. How? We breakdown the math below.

The cost of solar has **fallen 23% over the past 5 years**, and thanks to the mandate, Californians should expect to pay even less. Here's why:

Lower cost of labor: Installing solar at the time of construction is significantly easier and less expensive for solar companies than it is to install panels onto an existing home (the roof is solar-ready, they don't have to remove shingles, wiring is easier, etc).

Less paperwork: Installing solar at the time of construction reduces costs associated with basic paperwork for things like permitting and inspections.

Economies of scale: Installing solar on multiple homes at once saves installers time and money.

Greater efficiency: Since new homes are more energy-efficient, the size of the solar panel system can potentially be smaller than retrofit projects, thus less expensive.

Minimal sales and marketing costs: Finally, since panels are now required, solar companies won't have to spend nearly as much on marketing and sales costs.

Because of this, Californians could pay approximately **20% less** for solar when buying a new home as compared to the cost of adding solar to an existing property.

Cost of solar for existing home	Cost of solar for new home
$15,000 - $35,000	**$12,000 - $28,000**

*Note: The above shows the price range for a 5 kW system vs a 12 kW system based on gross cost of buying your solar energy system as of December 2019. For the most up-to-date solar pricing, **go here.***

So why should you be OK paying a bit more for your home **just to have solar?** Let's take a look.

The numbers: Continued

Even if the cost of solar for new homebuyers isn't decreased for the reasons outlined above, solar is still a no-brainer financially.

Using EnergySage's average cost of solar in California from 2019, the following table shows costs and savings of installing enough solar to cover average monthly electric bills of **$120, $200, and $300,** along with the economics of adding battery storage. It compares owning solar panels by rolling the cost into your mortgage, versus not having any solar at all.

What you'll save with a solar-powered home

SMALL 5kW

	Avg. Monthly Electric Bill	30-Year Energy Cost	Upfront Cost for Solar	30-Year Net Savings with Solar
Without Solar	**$120**	$74,300	-	-
Solar rolled into mortgage	$70	$25,400	$14,800	**$49,000 in savings** **+$3,800 from ITC**
Solar + Storage rolled into mortgage	$120	$42,500	$24,800	**$31,800 in savings** **+$6,400 from ITC** **+$2,500 from SGIP**

MEDIUM 8kW

	Avg. Monthly Electric Bill	30-Year Energy Cost	Upfront Cost for Solar	30-Year Net Savings with Solar
Without Solar	**$200**	$118,800	-	-
Solar rolled into mortgage	$110	$40,600	$23,600	**$78,300 in savings** **+$6,100 from ITC**
Solar + Storage rolled into mortgage	$160	$57,700	$33,600	**$61,100 in savings** **+$8,700 from ITC** **+$2,500 from SGIP**

LARGE 12kW

	Avg. Monthly Electric Bill	30-Year Energy Cost	Upfront Cost for Solar	30-Year Net Savings with Solar
Without Solar	**$300**	$178,500	-	-
Solar rolled into mortgage	$170	$60,800	$35,400	**$117,700 in savings** **+$9,200 from ITC**
Solar + Storage rolled into mortgage	$220	$78,000	$45,400	**$100,500 in savings** **+$11,800 from ITC** **+$2,500 from SGIP**

Note: Numbers are rounded to nearest hundred. Assumes ownership of the solar panel system and an annual electricity escalation rate of 3.4%. See Appendix B for more data, sources, and assumptions.

By owning your solar panel and or battery storage system, you are eligible to receive additional savings via the federal solar investment tax credit (ITC), as well as a battery rebate from California's Self Generation Incentive Program (SGIP). For more information on each see page 8 and page 9.

Don't settle: Ask questions; work with builders and solar companies to customize

KEY TAKEAWAY: Solar isn't a cookie-cutter purchase. What works for one home may not work for you and your energy needs. Treat solar like any other product by doing your homework and asking questions.

We strongly recommend working with your realtor, the home builder and or the solar company to customize as much of your home's solar energy system as possible. It's in the best interest of all parties to approach buying a home with solar panels just as they would any other home appliance or upgrade. Your solar panel system is a long-term investment: ensuring that it's sized correctly for your electricity needs, has the right quality equipment, and matches your aesthetic preference is important.

To help homebuyers do this, EnergySage has put together the following list of questions you should consider before buying a home with solar panels. Solar, like any other home product, benefits from some homework. This guide will help ensure you're paying a fair price for the right system to meet your future electricity demand.

Questions to ask before moving forward

How big is the solar panel system and what size should it be?

How do I know if battery storage is right for me?

What should I know about the brand and quality of the solar equipment?

Should I lease or own my solar panel system?

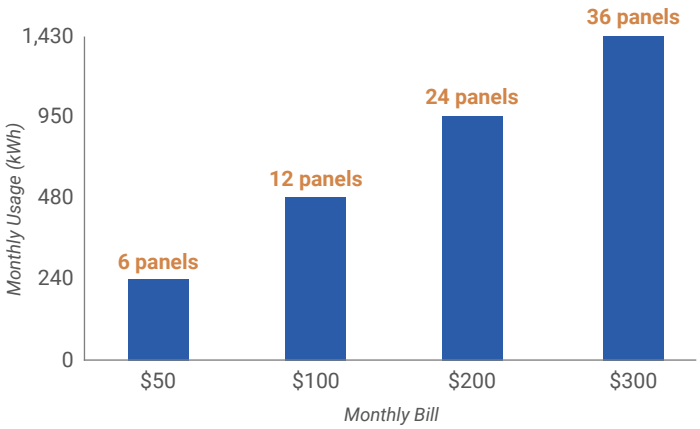
How big is the solar panel system and what size should it be?

KEY TAKEAWAY: Solar isn't a one-size-fits-all purchase. Be sure you're getting the right system size to cover your home's current and future electricity needs.

The size of a solar panel system plays a big role in determining the price and the savings you'll see. Size (i.e. how many panels you'll need) is based on the home's energy usage. A number of factors determine your usage, such as:

- Size of the home and number of residents
- Your home's energy efficiency (e.g. insulation, windows)
- Your electricity needs today (number of appliances and how often you use them) and in the future (such as purchasing an electric vehicle)

To get a sense for what your usage will be in your new home, look at your current average monthly electric bill:



Based on size, below is what new home buyers should expect to pay, and what you would have paid without the mandate. As explained on page 3, prices could be **~20% less**.

APPROX. SYSTEM SIZE	COST FOR EXISTING HOMES	COST FOR NEW HOMES
6 panels (2 kW)	$5,900	**$4,800**
12 panels (4 kW)	$11,800	**$9,600**
24 panels (8 kW)	$23,600	**$19,100**
36 panels (12 kW)	$35,400	**$28,700**

Figure 2: *Gross costs above reflect ownership of system. Savings from federal ITC not included. See Appendix B for more data and sources.*

The CEC anticipates most solar energy systems to range from 2.7 and 5.7 kilowatts (kW) in size since new homes are more energy-efficient. Though sufficient for some buildings, energy needs vary greatly and will likely increase over time. As the buyer and ultimate owner of this system, you should have input in the size of the system.

Work with your realtor, home builder and or solar company to discuss adding more solar panels. For example, talk to them about your plans to go all-electric or to purchase an electric vehicle and ask to see a quote for increasing the size of the system.

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What should I know about the brand and quality of the solar equipment?

KEY TAKEAWAY: The quality of your solar equipment – panels, inverters, and batteries – is essential to your system's performance. Use the EnergySage Buyer's Guide to research and compare solar products just as you would for a car or home appliances.

Treat solar panels like any other home appliance

Each piece of equipment has several important qualities to consider, including: *Aesthetics - Efficiency - Degradation Rate - Durability - Warranty Length*


Solar Panels


Solar Inverters


Home Batteries

As such, you and your home builder should view buying a home with solar panels just as you would an essential home improvement like a new dishwasher or stove. Ideally, you'll be able to work with the solar company to customize a system based on your preferences for brand and performance, just like when developing your kitchen, for example. This should be the case for both custom-built homes and newly-constructed homes.

Use a Buyer's Guide for informed decision-making

However, we know that shopping for solar isn't just like shopping for a new refrigerator or granite counters. Most people are unfamiliar with solar brands and lack a reference point for comparing quality, performance, and price. With dozens of manufacturers and hundreds of products, even the most research-oriented shoppers can get overwhelmed.

The EnergySage Buyer's Guide takes the burden off of homeowners by easily allowing you to compare all of today's most popular models of solar panels, inverters, and home batteries.

With this Consumer Reports-style tool, you'll be able to:

- See all equipment made by a specific manufacturer, including a typical price range
- Compare up to 10 different products in a standardized, apples-to-apples format
- Search, sort and filter by rating, warranty, appearance, manufacturer location, and more

Built in collaboration with researchers from the National Renewable Energy Laboratory (NREL), a research group within the U.S. Department of Energy, the guide uses an innovative new rating system to categorize all solar equipment on a five-tier scale to help you easily evaluate options:

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How do I know if battery storage is right for me?

KEY TAKEAWAY: Pairing your solar energy system with a battery makes a lot of sense in California, from both a financial perspective and for powering your home during outages.

Talking to your builder and or solar company about their plans to add a home battery is equally as important.

When you pair battery storage with your solar panel system, you can store excess solar electricity from your panels to use later when they aren't producing power.

A solar + storage system will increase savings and provide resiliency during grid outages, but comes at an added cost: prices are falling, but batteries still cost **$8,000 to $14,000+**.

So is buying a solar home with storage worth the added cost? For most Californians, **the answer is yes** and here's why:

Mandatory time-of-use electricity rates

- All residential electricity customers will soon be transitioned over to time-of-use (TOU) electricity rates, with many homeowners already making the switch.
- On TOU plans, you pay more for electricity during "peak" hours when demand is highest.
- With a solar + storage system, you can reduce the amount of electricity you buy during peak hours by storing extra solar energy and using it when the rates are highest.

Strong state incentives

- California offers homeowners one of the best incentives in the country to install a home battery with their solar panels.
- Thanks to the Self-Generation Incentive Program (SGIP) you can get a cash rebate that'll cover some or all of your home battery costs depending on where you live.

Frequent electrical outages

- California is experiencing an increasing number of power outages due to wildfires and high winds, prompting utilities to shut down the grid.
- Pairing a battery with solar allows you to keep your home running on stored solar energy when the grid goes down. Solar on its own won't produce power during an outage.
- You can also keep producing solar energy and feeding it to your battery during an outage **if your system can "island"**. Talk to your builder and or the solar company to ensure that the system is installed to allow this critical function.

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Should I lease or own my solar panel system?

KEY TAKEAWAY: There are two ways to finance your solar and or solar + storage system. The right choice for you depends on your preferences and financial goals.

Savings with solar will vary depending on how the system is financed. Typically, you have two options: **own** or **lease**.

Solar panel ownership

Owning your solar panel system usually allows you to save the most. If this is the route you take, we recommend rolling the cost of the system into your mortgage. That's because the increase in your monthly mortgage cost by adding solar will be significantly less than your electric bill without solar.

Ownership may be right for you if:

- Your goal is to maximize your savings.
- You have a taxable income to benefit from claiming the federal solar investment tax credit (ITC). You may also be able to claim additional savings via local rebates and incentives.
- You're able to qualify for a higher mortgage to cover the cost of solar or solar + storage, or you have the cash needed to buy the system upfront.

According to the Solar Energy Industries Association (SEIA), homeowners who buy their solar panels are eligible for the ITC the year they move into their newly built home. It's important to note that the ITC is not a discount on the cost of buying a solar energy system, but rather a dollar-for-dollar reduction in your income taxes. For example, if you buy a $15K solar energy system, you will qualify for $3,900 or 26% of the purchase price in taxes after claiming the ITC. Meaning, if you owe $10K in taxes you now only owe $6,100 in taxes by claiming the ITC. The tax credit can be rolled over for several years or refunded if you've already paid your taxes for the year. At the end of 2020, the ITC steps down to 22% before disappearing entirely for homeowners in 2022. We recommend consulting a qualified tax professional if you have specific questions about claiming the ITC.

Leasing your solar panels

If signing a lease or power purchase agreement (PPA), typically the solar company that installed the system will own it, claim the ITC as well as any other rebates or incentives, and they will keep a share of the savings from the system.

A solar lease or PPA may be right for you if:

- You're fine with less savings from solar, and prefer the simplicity of signing a solar lease or PPA without increasing your mortgage.
- You don't have enough tax liability to benefit from the ITC.
- You don't qualify for a high enough mortgage to cover both the new home and solar/storage.
- You're ok signing a 20- to 25-year contract, often with payments that increase annually.
- You're concerned about maintaining the system - a responsibility typically assumed by the leasing company.

We don't know yet what the cost and savings will be for leases and PPAs under the solar mandate. EnergySage will continue to update this guide as lease and PPA pricing data becomes available.

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How EnergySage can help

EnergySage was founded to help American consumers make smarter energy decisions, and to make solar more accessible, transparent, and affordable. To achieve this, we've developed thousands of pages, videos, case studies, as well as ratings and reviews of solar companies, products, and financing offerings. Our commitment to providing this level of impartial educational content allows homeowners to make informed, confident energy decisions.

If you already own a home or planning to buy an existing property and are interested in going solar or getting a battery, our industry-leading online Solar Marketplace is here to help.

LEARN MORE ABOUT ENERGYSAGE

How the EnergySage Marketplace works

Register to get quotes
Register and complete your property profile.

Pre-screened installers submit quotes online
Installers compete for your business.

Compare Quotes Online
Pick the best quote for you and save with solar!

Thank you for reading. EnergySage is backed and supported by the U.S. Department of Energy (DOE) as a three-time recipient of funding through the prestigious DOE SunShot Program. Our most recent grant focuses on making it easier and more affordable to shop for solar online.

If you have additional questions, our expert team of Energy Advisors are here to help! Reach them at solarteam@energysage.com and be sure to connect with EnergySage online.

SOME OF OUR PARTNERS

U.S. DEPARTMENT OF ENERGY · KAISER PERMANENTE · Staples · SEIA Solar Energy Industries Association · CPA CLEAN POWER ALLIANCE

Appendix A:
How does solar work?

Solar photovoltaic (PV) systems – also known as solar panel systems, solar energy systems, solar arrays, or solar power systems – have four main components that convert sunlight into electricity:

Solar Panels

Inverters

Performance Monitoring Systems

Racking & Mounting Systems

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Solar 101: How do solar panels work?

1. Photovoltaic cells absorb the sun's energy and convert it to direct current (DC) electricity.
2. The solar inverter converts DC electricity from your panels to usable alternating current (AC) electricity.
3. Electricity flows from the panels through your home to power electronic devices.
4. Excess electricity from your panels is fed onto the electric grid in exchange for credits on your utility bill, which can then be used to pull energy from the grid when your panels are underproducing to offset the costs of that energy. This is known as net metering.

Top 5 things to know about solar panels

1. Solar panel systems save you money by covering most (if not all) of your electricity usage, protecting you from rising future energy costs, and increasing your property value. In fact, a recent study estimated that adding solar to a home increases your home's value by an average of 4.1%.
2. The cost of solar has fallen 23% over the past 5 years with the average payback period (or ROI) at around 7-8 years nationally.
3. Solar panel systems are highly durable, producing electricity for 30 years or more.
4. Solar requires very little servicing or maintenance, as systems have no moving parts.
5. Solar contributes positively to your local economy by creating high-quality jobs.

Appendix B:
Data, sources, and assumptions

Data Input	Value	Source	Notes
Cost of solar in California	$2.95 per Watt	EnergySage Solar Marketplace	This is the average price quoted by EnergySage installers in 2019 to CA homeowners.
Mortgage rate	4%	Conservative estimate of California mortgage rates based on 2019	We have assumed a 30-year fixed mortgage rate of 4%.
Annual electricity escalation rate	3.4%	Energy Information Administration (EIA)	Accounts for inflation and average electricity rate increases over the last 10 years.
Federal solar investment tax credit (ITC)	26% in 2020	Solar Energy Industries Association (SEIA)	According to SEIA, homeowners who buy their solar panels are eligible for the ITC the year that they move into the house.
Self Generation Incentive Program (SGIP) rebate	$250/kWh	California Public Utilities Commission (CPUC)	A $2,500 rebate is based on the average size of a home battery–10 kWh of stored energy–and SGIP's incentive rate of $250 per kilowatt-hour of stored energy.