



Your home electrification project

How to switch to electric appliances
without an electrical panel upgrade



Getting ready to electrify your home

Electrifying your home can help reduce your carbon emissions and improve your indoor air quality. But your electrical panel has a limit to the number of electric appliances it can power in your home, and swapping gas-powered appliances with electric options will increase the amount of power you need.

This guide will show you how to estimate the available capacity of your electrical panel and determine if your panel will need an upgrade. We'll also walk through strategies for electrifying without a panel upgrade.

- **Learn more** about your electrical panel
- **Estimate** your available panel capacity and whether it can support your electrification project
- **Save money** and time and avoid a panel upgrade
- **Find resources** to reduce the cost of your electric panel upgrade



SAFETY NOTE: We recommend you consult a licensed and qualified electrical professional if you are uncomfortable assessing your electrical panel.



What is an electrical panel?

Your electrical panel, also known as the main service panel, is the hub for the electricity that powers your home. It takes the incoming power and splits it into individual wires that connect to various electrical devices throughout your home.

The electrical panel box is typically vertical and gray and can be found in your garage, utility room, basement, or outside.

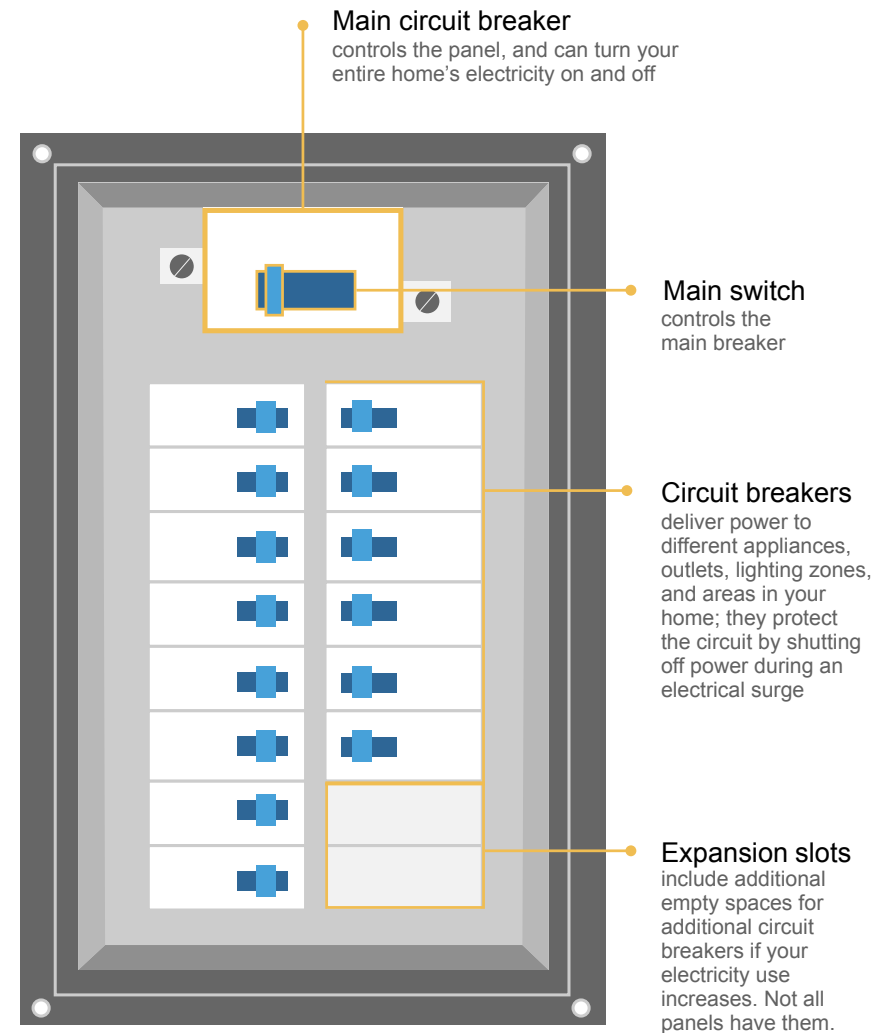
Your panel size reflects its electrical power capacity, measured in amperage. The larger the panel capacity, the more electricity flows through it and the more appliances it can power.

Key terms

Amperage (measured in amps) — Measure of the electrical current that flows through the wires in your home. Your electrical panel's capacity will be measured in amps.

Voltage (measured in volts) — Think of volts like water pressure. Having higher pressure in an electrical wire means that the wire can deliver more energy, similar to higher pressure delivering more water.

Wattage (measured in watts) — Measure of the amount of electricity being used. The power consumption of household appliances is measured in watts.



Steps to estimate if you need a panel upgrade

Here are three considerations for you and your licensed contractor as you scope your electrification project.

Step 1: Determine your electrical panel's capacity

First, you'll need to identify the capacity of your panel, which you can do on your own or with your electrician or contractor.

You can find the capacity of your electrical panel, measured in amps, in a few places:

- Look on your utility meter box (located outside your home) for a label with the amperage reading
- Check the size of the main breaker on your electrical panel for an amp rating
- Look at your electrical panel for a label with the panel's amperage rating



In older homes, electrical panel capacity can be anywhere from 60 to 150 amps. Newer homes, typically those built after 1960, can have panel sizes of 200 amps or more.

Step 2: Assess your home's electric load

Each appliance has its own power draw, given in watts. You can usually find an appliance's wattage on its nameplate, which is typically on the rear of the appliance. When you add up the wattage for each appliance, you will get the **total wattage of all appliances**. This is the total wattage of your appliances if they run full capacity at the same time.

Step 3: Assess your panel capacity and electric needs with your licensed electrician

Since most households don't run all appliances at one time, the next step is to assess how much electricity your home uses in daily life. You can work with an electrician to use electrical interval data from PG&E to determine your maximum daily energy demand. This is your **total panel watts**.

Your electrician can then help you determine the total amps needed to power your current and new electric appliances.

How can you electrify without upgrading your panel?

Replacing a panel with a higher-capacity version can be costly and time consuming. Even if your panel has a lower amperage, you may be able to electrify your home's appliances without a panel upgrade. You'll just need to make thoughtful equipment selections and optimize your current panel's capabilities. Be sure to discuss these tips with your licensed electrician.

Seal and insulate

Sealing air leaks around your home and adding insulation are two of the most cost-effective ways to improve energy efficiency and comfort in your home. By tackling both projects, you can reduce your energy usage and save up to 10% on your annual energy bills.¹

Choose energy-efficient appliances


Using newer, energy-efficient appliances will help you use less energy in your home — which means you will need less power from your electrical panel.

Consider using space-saving circuit breakers

Replacing standard wide circuits with narrower slim breakers can open up space on your panel and allow for more circuits in the panel. Two-pole breakers are used for 240-volt circuits and take two slots in the panel. Quad breakers are similar to two-pole breakers but provide four poles for circuit connection.

Why you may still need an upgrade

Space constraints — If all your available circuit breakers are in use or you have no space to add dedicated circuits for your new appliances, you may need to upgrade.

 **Tip:** If there is limited space on your panel and load is not exceeded, you can consult with your electrician about using a subpanel.

Safety — If your panel isn't safe (e.g., it's older or has older fuse boxes), make the necessary upgrades recommended by a licensed electrician to keep your family and home safe.

Use smart devices to help with panel optimization

A growing number of devices are available to help you manage your electricity demand and ensure you never exceed your overall panel capacity.



Circuit-sharing devices

Circuit-sharing devices enable you to have several outlets in your home share a single circuit. They will automatically prioritize the load, so your outlets do not provide more than they can deliver. For example, a prioritized circuit-sharing device could pause your EV charger when another energy-intensive device is running.



Smart panels

Smart panels are Internet-enabled electrical panels that can provide real-time updates on the energy usage in your home. This information can help you set usage limitations based on your needs and preferences to avoid overloading your panel capacity.



Smart breakers

Smart breakers control individual circuits through smart controls built into the breaker. Most offer WiFi connectivity so they can be controlled remotely and can be integrated with your existing smart home technologies.

Electric load comparison for a sample project

A single-family homeowner in California plans to electrify their 2,400 square feet home with 4 occupants. See how they can complete the project by strategically using load management technology and lower-wattage appliances to fit their 100-amp / 24,000 watts panel capacity.

A licensed electrician can help you assess your panel capacity and plan your project. Avoiding a panel upgrade could save you \$2,000 - \$6,000.

	No Electrification	Standard Electrification (Exceeding panel capacity)	Strategic Electrification (Using smart devices and lower-wattage appliances)
Appliances included and wattage¹	Base energy use ²	Base energy use 7,800	Base energy use 7,800
	Electric clothes washer	Electric clothes washer 1,800	Electric clothes washer 1,800
	Gas dryer	Electric dryer 2,520	Heat pump dryer 998
	Gas stove	Induction stove 13,992	Induction stove 9,984
	Gas water heater	Heat pump water heater (240V) 2,520	Heat pump water heater (120V) 900
	Ducted gas furnace	Heat pump (ducted heating & AC) 2,362	Heat pump (ducted heating & AC) 2,362
	Air conditioner	EV charger 7,680	EV charger 3,840
Smart technologies used to balance electric loads	None	None	Circuit-sharing (EV & dryer) -998
Watts estimation for home's daily energy use³	13,824	42,346	30,358
Total panel watts	10,330	29,352	21,293
Total panel amps	43	122	89
Minimum panel size required	50 amps	125 amps	100 amps
Is a panel upgrade required?	No	Yes	No



¹ Sample appliance wattages. This information can be found on appliance nameplates.

² Since most homes won't run appliances all at once, this is an estimation of actual electricity needs for this home.

³ Amps = Watts/Volts, Volts = Watts/Amps, Watts = Volts x Amps

Next steps

If you determine that you need an electrical upgrade, there are programs, incentives, and resources available to help you with the planning and costs:

Energy Action Guide

Review and compare energy-efficient appliances that fit your needs and budget and explore available rebates at [PG&E's Energy Action Guide](#).

GoGreen Home Energy Financing

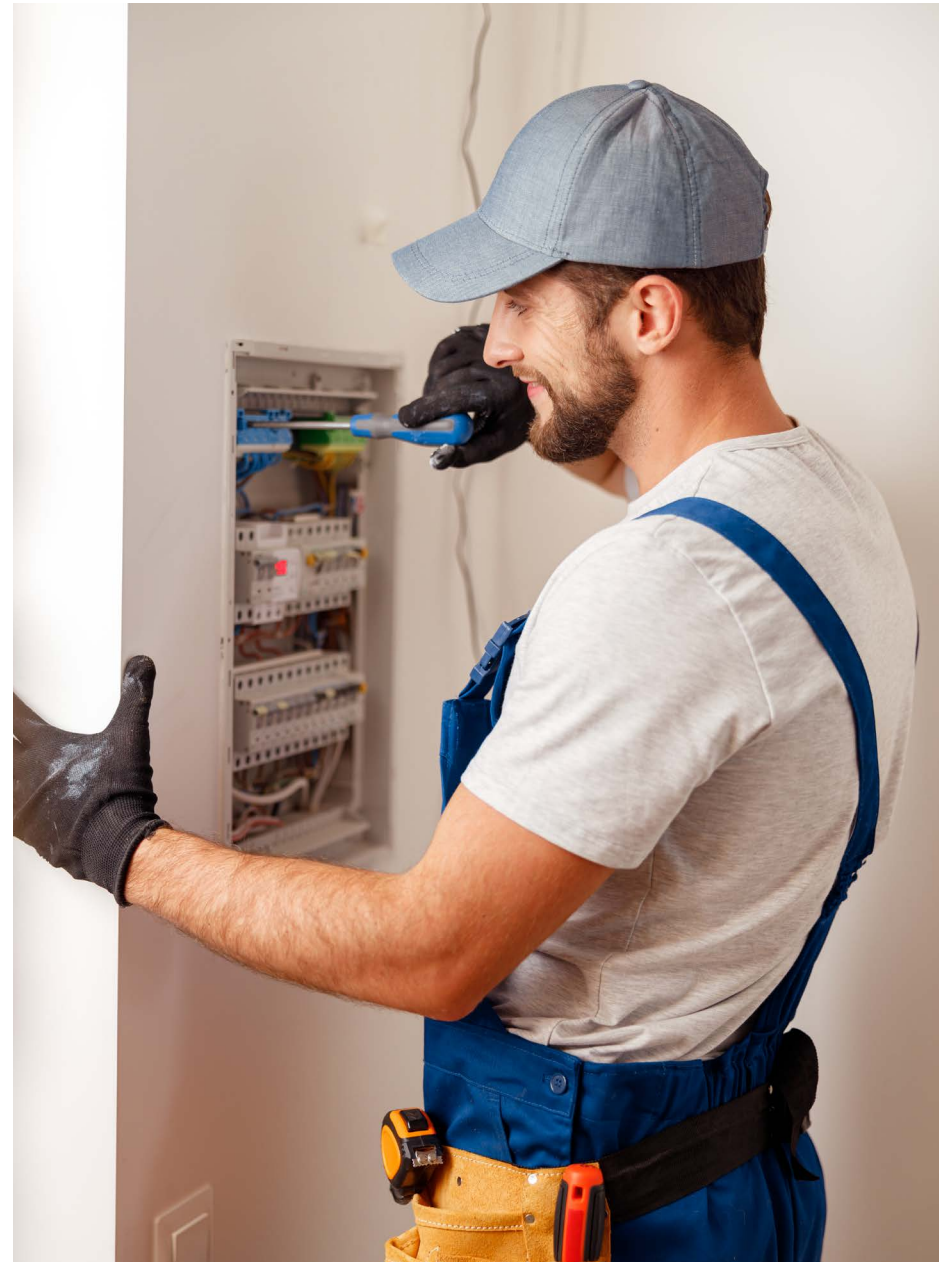
A [state-funded loan program](#) with below market interest rates that helps California residents finance the costs of electrifying their homes, including panel upgrades by a participating contractor.

Residential EV Charging

PG&E residential customers can qualify for rebates on PG&E-approved electric vehicle charging equipment. [Eligible customers may also qualify for additional incentives](#), including up to \$5,000 for a panel upgrade and installation of an eligible EV charger.

Your Projects Platform

When you need to upgrade your electrical panel and modify your PG&E service, first submit your application via our [online platform](#).



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