



# Electrify Everything: Electric Cooking

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# Electric Cooking



## RECOMMENDATION:

A range (combined induction cooktop and oven) uses less space on your electrical panel than a separate cooktop and oven.

**AVOID:** Don't expose your family to gas cooking fumes, such as formaldehyde and NOx. Always use your exhaust fan when cooking. Get a \$50+ portable induction burner to start using immediately.

**DIFFICULTY:** EASY

**UPFRONT COST:** \$2,000-3,000

**IMPACT:** Low on emissions,  
High on indoor  
air quality

**CONTRACTORS:** Electrician

**DO NOW:** Hold a magnet to your pans, and if the magnet sticks it will work with an induction cooktop. Buy a \$50+ portable induction burner now, and plan to have a 240V / 40A outlet installed before you next replace your stove.

**RENTER:** Buy a \$50+ portable induction burner.

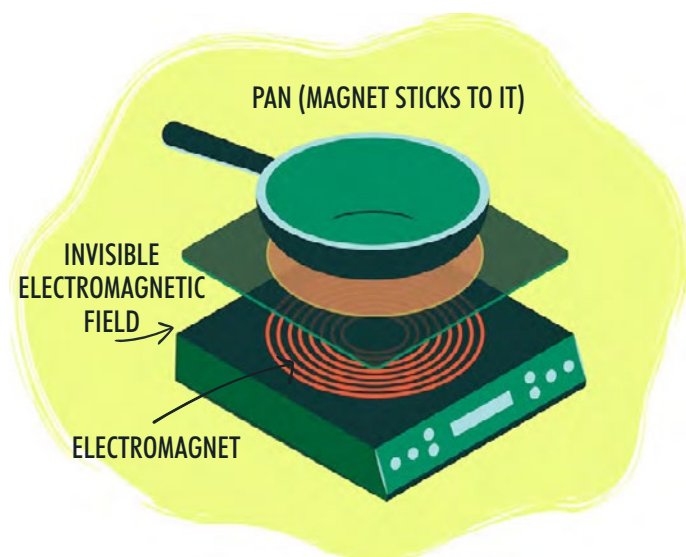
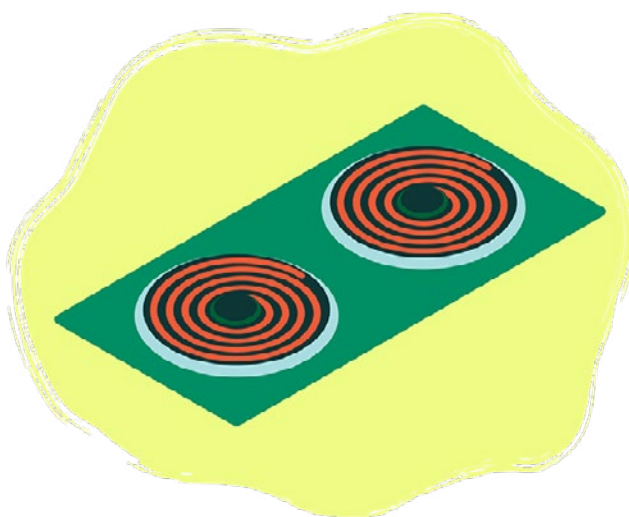
The phrase "cooking with gas" is a marketing slogan first used by the fossil fuel industry in the 1930s, and ever since it has helped people ignore the fact that they're burning toxic, explosive methane (aka natural gas) in their kitchen.<sup>1</sup> It's only recently that the negative health effects of this indoor air pollutant have been getting more attention.<sup>2</sup> But because residential gas customers are so important to the natural gas industry, they are trying to fight electrification.<sup>3</sup>

Let's clarify some lingo: kitchens usually have two main parts, a cooktop for heating pots and pans, and an oven. The cooktop and oven can be purchased and installed separately, for example as a cooktop in a kitchen counter, and a wall oven. If they're combined together in one unit we call it a "range" or "stove" (though a cooktop is sometimes called a "stovetop").

A combo range saves Amps on your electrical service, and leaves more room on your electrical panel for other electrification projects. If you're thinking of splitting up your range in a kitchen remodel, be aware that you might also require an electrical service upgrade.

## INDUCTION COOKTOPS

Electric resistance burners (right) — often in the shape of a coil — have been sold for decades, and it's what you probably think of when you hear "electric stove." They're disliked because they take a long time to get hot, and they're difficult to control. They get hot as electricity passes through a resistance heater, which is how your toaster and hair dryer also get hot. They're not very energy efficient, but at least they're electric.



Modern "induction cooktops" (such as this portable version, left) are a totally different form of electric burner. Energy is transferred directly from electricity to the iron in a cooking pan through a magnetic field. The induction burner itself doesn't get hot, so there's less chance of getting burned. They heat super-fast and can be accurately controlled — think of it more like computerized cooking.<sup>4</sup>

## CHECK YOUR PANS

Because induction heats pans using magnetism, your pans need to be attracted to magnets. You can check your existing pans using a simple magnet

— if the magnet sticks, the pan should work. Pure aluminum and copper aren't magnetic, but cast iron is, as are some types of stainless steel.

For any non-magnetic items you don't want to replace (e.g. aluminum stovetop coffee maker), you can buy an "induction converter" (aka "induction interface"). It's basically just an iron plate with a handle, where the plate gets hot and heats your item like an electric resistance stove. It's less energy efficient, but it should work just fine.

## SETTING THE INDUCTION HEAT

Most induction stoves use a number that you can adjust (e.g. from 1 to 10 in half steps). It takes a little getting used to, but after that it allows for precise, repeatable heating. Here's an Induction Cooking Temperature Table that might be helpful — [cookeryspace.com/induction-cooking-temperature-guide](https://cookeryspace.com/induction-cooking-temperature-guide). Samsung brand induction cooktops have a "virtual flame" of LED lights as a visual indicator similar to the flame of a gas stove. This is a nice-to-have feature, but it's not necessary to cook well with induction.

## BOTH RENTERS AND OWNERS CAN TRY A PORTABLE INDUCTION BURNER

For \$50+, you can get a portable induction burner that plugs into a regular 120V outlet to start testing out, which will let you immediately start reducing your gas use. If you like it, consider using it with friends to spread the idea. Many professional chefs are switching to induction, and have no regrets.<sup>5</sup> You can watch some testimonials — [youtube.com/watch?v=7p6buePWKII](https://youtube.com/watch?v=7p6buePWKII).

Cooking is a relatively small part of home energy use, but it is an emotional obstacle to going all electric that the gas industry is exploiting. A \$50 portable induction burner can help break through this obstacle. Reducing your indoor air pollution is a pretty great bonus.

## RADIANT COOKTOPS

Most radiant cooktops are similar to old-school coiled electric resistance burners, but covered with a flat surface that's sometimes called a ceramic glass top or smooth top. They are generally cheaper than induction stoves, but their performance is worse. If you already have a radiant stove, you can consider upgrading to an induction stove next time. For now, your cooktop is already electric.



## **ELECTRIC OVENS**

Since the burning flame in a gas oven isn't visible like the flame in a gas cooktop, people have less emotional attachment to their gas oven. In fact, most wall ovens are electric since they don't need exhaust, and many people have experience with electric toaster ovens — electric ovens are basically just bigger versions.

Most electric ovens have a broil heating element at the top for directly cooking solid foods like meat, fish, and fruits and vegetables, like an upside-down barbecue.<sup>6</sup> They also have a baking heating element at the bottom for heating up the air in the oven to evenly surround cookies, cakes, and baked meals with little direct heat that would burn them.

A convection oven is an upgrade that has an extra heating element wrapped around a fan for moving hot air around the oven. This lets you preheat the oven faster, cook things without rotating them, and cook multiple dishes together.

## **ELECTRICAL**

Portable induction burners run on a regular wall outlet with 120V / 15A. But induction cooktops and ovens need appliance outlets that are 240V and 40 to 50A. If you have an electrician come for another electrification job, consider having them run an outlet to your kitchen to make it easier to replace when you're ready to electrify. It should be under \$500, and take several hours to install.



# Endnotes

1. <https://www.motherjones.com/environment/2021/02/how-the-fossil-fuel-industry-convinced-americans-to-love-gas-stoves/>
2. <https://www.vox.com/energy-and-environment/2020/5/7/21247602/gas-stove-cooking-indoor-air-pollution-health-risks>
3. <https://earth.gizmodo.com/leaked-slides-show-the-gas-industry-is-freaking-out-1846822881>
4. "Experiments in Induction Cooking," <https://www.youtube.com/watch?v=T3A11eQ50iE>
5. "Why London's Top Chefs Are All Cooking on £99 Induction Hobs," <https://www.vice.com/en/article/78mvqa/why-londons-top-chefs-are-all-cooking-on-99-induction-hobs>
6. <https://recipes.howstuffworks.com/tools-and-techniques/question228.htm>
7. <https://www.bhf.org.uk/information-support/heart-matters-magazine/medical/ask-the-experts/induction-hobs-and-pacemakers>
8. <https://www.bag.admin.ch/dam/bag/en/dokumente/str/nis/faktenblaetter-emf/faktenblatt-induktionskochherd.pdf.download.pdf/faktenblatt%20>