



Home Electrification Fact Sheet

Induction Stoves & Cooktops

INDUCTION COOKING & CLIMATE CHANGE

Homes and buildings are the second largest source of greenhouse gas emissions in East Bay cities like Berkeley and Oakland. *Electrification* is a prime strategy for combatting climate change: it means ditching natural gas and powering our homes with electricity from an ever-cleaner grid. An induction cooktop or range is a cleaner, safer alternative.

COOKING EXPERIENCE

Speed: Induction burners can boil water nearly twice as fast as gas or traditional electric burners.

Control: Heat can be adjusted up or down instantly, just like a gas stove. The heat can also hold steady at a precise temperature.

Cleanability: The flat, glass-ceramic surface is easy to clean with a soft sponge. Because the surface does not heat up, spills do not become baked-on.

Compatible Cookware: Pots and pans are compatible with induction cooktops if a fridge magnet sticks to them. Many pots and pans are compatible, including most stainless steel cookware, cast iron cookware, enameled cast iron cookware, and some non-stick cookware. Cookware made from aluminum, copper, or glass are not compatible. When shopping, look for the induction symbol.

Kitchen Heat: With other stoves, the burners heat the air around the stove as well as the pot or pan, so the kitchen heats up. Induction cooking heats the cookware only, so the kitchen stays cooler.

Noise: In an induction range, an internal cooling fan generates a small amount of noise. When induction burners are turned to high power, cookware can emit a hum, buzz, or whine, especially if the cookware has loose parts. Cookware with welded-in cladding layers or solid riveting is less likely to produce noise.

Flexibility: You can use an induction cooktop as extra prep space, as it's flat, with no open flame or hot burners. Mobile units can be moved or stored.

WHO USES INDUCTION FOR COOKING?

Chefs: High profile chefs like Rick Bayless, Ming Tsai, Curtis Stone, Wolfgang Puck, and Thomas Keller use induction ranges in their home and commercial kitchens. Bay Area restaurants using induction cooking include Motze, HomeRoom, Prubechu, and Little Sheep Mongolian Hot Pot.

Where: Induction cookers are most common in Asian cities, where efficient units work well in small living spaces. Asians manufacturers have taken the lead in producing inexpensive, induction hotplates and rice cookers. Induction cooking has become popular across Europe and common on cruise ships.

Trends: The New York Times reported a 2010 survey in which 5% of respondents said they had an induction range or cooktop, and 22% said their next range or cooktop would be induction. "Induction cooktops are moving from cult to mass-market status," said Deborah Baldwin in *This Old House Magazine*.

COST & REBATES

Induction cooktops cost more than gas or traditional electric ranges, but their prices continue to drop:

- Portable induction hotplate \$40 - \$200
- Multi-burner induction cooktop \$700 - \$2500
- Free-standing induction stove \$800 - \$4000 (often with convection ovens)

INSTALLATION

Portables have one or two burners, sit on a counter, and plug in to a standard 120 volt outlet. Cooktops and ranges have four to six burners and typically require a 240 volt outlet.

Induction ranges and cooktops do not need as much venting as gas or electric cooktops do, but ventilation is still desirable for any cooking that produces steam, grease, or smoke.

HEALTH & SAFETY

Fire safety: Cooking is the leading cause of home fires. Induction cooktops are much safer because they have no open flame or exposed heating element, which can accidentally catch things on fire. Many induction cooktops have safety features that turn burners off if no pot or pan is detected. One in four fires after an earthquake is related to natural gas leaks, a hazard that induction cooking avoids.

Indoor Air Quality: Gas stoves are a major source of indoor air pollution; they emit nitrogen dioxide (NO₂), carbon monoxide (CO), and formaldehyde (HCHO), which are very unhealthy to breathe. Research from Lawrence Berkeley Lab showed that indoor levels of these toxic pollutants emitted from gas stoves often exceed the safety limits set for outdoor air.

EMFs: Induction cooking creates an electromagnetic field (EMF) of medium-frequency waves in the immediate vicinity of the burner. EMFs drop off rapidly as you move away from the burner. There is no evidence that medium-frequency magnetic fields have long-term effects on health, according to the World Health Organization. The Swiss Federal Office of Public Health offers the following guidelines:

- Use the right size of pan for the cooking zone: pan should cover the cooking zone completely.
- Center the pan in the middle of the cooking zone.
- Don't use damaged pans with buckled or rounded bases.
- If you stand close to or against the range during cooking, use the rear cooking zones or the front cooking zones at reduced power.
- Exposure to EMFs is reduced greatly if you stand at least 5-10 cm away from the burner.
- Use wood or silicon cooking spoons and utensils instead of metal.
- As with any product that creates an electromagnetic field, people with pacemakers or similar implants should consult with their doctor.



*Induction range
Photo credit:
National Renewable
Energy Laboratory*

HOW DOES IT WORK?

Under the ceramic glass surface of an induction cooktop is a coil of copper. When you turn on the power, an alternating electric current flows through the coil and produces an invisible magnetic field. The magnetic field causes the iron molecules in the cookware to move and bump into each other, which generates heat. The heated metal pan then conducts heat to the food or water inside it. The ceramic glass surface remains cool, or slightly warm from contact with the hot pan.

ENERGY EFFICIENCY

There are no Energy Star labels for cooktops and ranges. However, research by the US Department of Energy has shown that induction is the most efficient in its power use. With induction, up to 90% of the electric energy is converted to heat inside the cooking vessel, compared to gas (50%) or electric coils (55%). With gas and traditional electric cooking, much of the energy is lost to heating the stovetop or the kitchen air. The energy efficiency of induction is also elevated because induction heats a pot or pan quicker than other methods.

HOW DO I GET STARTED?

If you're interested in induction cooking, consider these next steps:

- Buy a low-cost portable induction hotplate to try out as an alternative to your gas stove.
- Visit an appliance showroom or test kitchen to view or test drive induction cooktops.
- Check out Consumer Reports induction range comparisons or read reviews of induction ranges and cooktops on appliance dealers' websites.
- Talk to people who own induction ranges about their experience at electrification tours or expos.



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