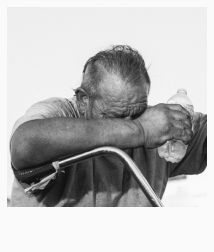
MORE FROM ATLANTIC PLANET

A New Way of Thinking About Climate Change
ROBINSON MEYER

Earth's New Gilded Era
VANN R. NEWKIRK II



Beyond Climate Denial and Despair
LAWRENCE WESCHLER

I'm Leaving the West Coast
KARLEIGH FRISBIE BROGAN

ATLANTIC PLANET

Kill Your Gas Stove

They're bad for you, and the environment. If you can afford to avoid them, you probably should.

SABRINA IMBLER 7:10 AM ET

SERGIY BARCHUK

Heather Price knows her way around gases. An atmospheric chemist at North Seattle College, she studies outdoor air pollution, the flow and change of chemicals in Earth's atmosphere. But she wasn't worried about the gas stove in her own home before her son developed asthma and, at two and a half years old, had to use his inhaler multiple times a day. She started to wonder: Was gas making her family sick?

Price's house ran on natural gas—"gas stove, gas furnace, gas hot-water heater," she says. In American homes, this setup is quite common, but gas appliances—and gas stoves in particular—have costs. Cooking on a gas stove unleashes some of the same fumes found in car exhaust. If those fumes are not vented outside the house, they linger and sneak into lungs.

Price had always thought of residential pollution as coming from nearby trucks or highways, but when she followed up on her hunch, she found a trove of articles about the link between gas and pediatric asthma. Price and her husband decided to move out, to a new, all-electric home in the same zip code. Her family breathed the same neighborhood air; the only thing that changed was their house. Her son's asthma improved almost overnight.

"Just like a doctor can't say your cancer is from smoking for 20 years, there's no way I can say as a scientist that my son's asthma was because of us having gas in the home," Price says. Still, it's her best guess.

[Read: Beyond climate denial and despair]

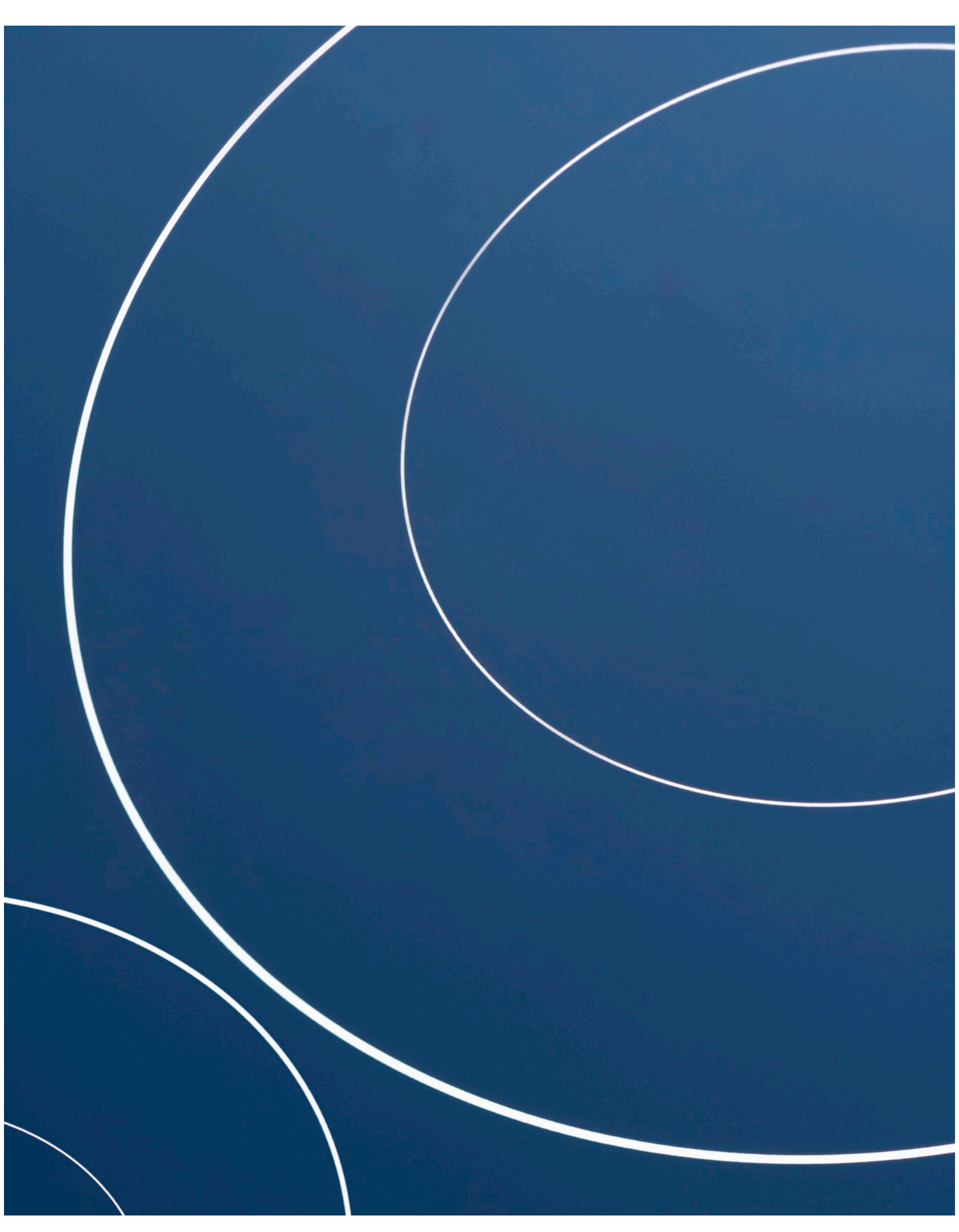
Most Americans these days use electric stoves, but approximately a third cook primarily with natural gas, according to a 2015 report from the U.S. Energy Information Administration. Many of these cooks swear by the blue flame, which can supercharge a cast-iron pan in a way that would put an electric coil to shame. Cooking over a fire may seem natural enough, but these stoves should be a hotter topic: Given advances in induction technology, concerns about the climate, health anxieties, or some combination of the three, should anyone be using one?

If you can afford to avoid it, probably not.

On the air-quality front, at least, the evidence against gas stoves is damning. Although cooking food on any stove produces particulate pollutants, burning gas produces nitrogen dioxide, or NO_2,, and sometimes also carbon monoxide, according to Brett Singer, a scientist at the Lawrence Berkeley National Laboratory who studies indoor air quality. Brief exposures to air with high concentrations of NO_2 can lead to coughing and wheezing for people with asthma or other respiratory issues, and prolonged exposure to the gas can contribute to the development of those conditions, according to the EPA. Homes with gas stoves can contain approximately 50 to 400 percent higher concentrations of NO_2 than homes with electric stoves, often resulting in levels of indoor air pollution that would be illegal outdoors, according to a recent report by the Rocky Mountain Institute, a sustainability think tank. "NO_2 is invisible and odorless, which is one of the reasons it's gone so unnoticed," Brady Seals, a lead author on the report, says.

Long touted as a bridge toward renewable energy, natural gas is not as dirty as oil or coal but still contributes to carbon pollution, and when leaked directly into the atmosphere—as is often the case with fracking—is a powerful greenhouse gas. The role of gas stoves, in particular, as a contributor to climate change is not so clear-cut. They make up only a small percentage of energy consumed in a gas-reliant home. (Furnaces and water heaters are the real guzzlers.)

But a kitchen with a gas stove requires gas lines in buildings and under streets—a whole infrastructure that can prevent residential areas from switching over to renewable-power grids. "If we don't address it, we'll still be putting in all these pipelines," Seals says.



SERGIY BARCHUK

While electric stoves don't release the equivalent of car exhaust into your home, they do consume more total energy than gas stoves, which can make them a pricier option depending on your local gas prices. The classic electric-coil stove has been commonly used in homes since the late 1920s. Induction stove tops—those black panels etched with an array of cookie-cutter circles—are a more recent development, available commercially since the 1970s.

Induction stove tops work almost like magic. "It makes electrons dance, and their spin heats the pot," says Price, who has cooked on induction for nearly a decade now. While electric-coil ranges heat the surface a pan sits on, induction ranges rely on an electromagnetic field that heats the pan directly, cutting out the middleman. This heating process is also safer, as the cooktop never gets as hot as a flame or a coil.

But switching to induction can have downsides. The ranges only work with certain cookware, such as stainless steel, and also tend to be more expensive to buy than gas or standard electric stoves. Induction also comes with a learning curve, swapping out the visuals of licking flames and the muscle memory of knobs to numbers. When Andrea Nguyen, who wrote the cookbook *Vietnamese Food Any Day*, signed up to do a dumpling demo in Australia, she didn't know she'd be working with induction. The range got too hot, but when she turned it off, the water cooled down so quickly that her dumpling dough turned to glue. "Induction really screwed me over," she says.

Though Nguyen has since become more familiar with induction, she's found that even the most high-end induction stove top can't handle certain dishes. "With stir-frying, the flames lick the bottom of the wok beautifully so you get big heat," Nguyen says. "You can hear it, the *woosh-woosh*, *clang-clang-clang*, and it picks up *wok hei*, that beautiful delicate searing flavor." The flat top of induction can touch and heat only the tiny rump of a flat-bottomed wok. Other cuisines fare better in an electric kitchen: Rucola, an Italian restaurant in Brooklyn, has been all electric since it opened in 2011. The landlord wouldn't allow sufficient ductwork to ventilate a gas-fired kitchen, so "we were pretty hamstrung as far as what we were able to install there," Julian Brizzi, a managing partner, says.

[Read: The heat gap]

Chef Nguyen Tran went all electric in his restaurant Starry Kitchen in downtown Los Angeles. ("Venting a space is very expensive," he says.) After years cooking on induction, he is confident that cooks will be able to figure out how to cook anything on it, even in a wok. "And it might even come out better than it would on gas," he says.

The added cost of proper ventilation means that many lower-income communities bear the brunt of gas-stove pollution. These households are more likely to have less space, more people, and poorer ventilation, and, as a last resort, may turn on gas ovens for heat when a furnace malfunctions. One 2008 survey of 150 asthmatic children living in Baltimore found that almost 14 percent of their homes used gas stoves for heat, which can produce even higher levels of NO_2 than when the stove is only used for cooking. And children of any community are at particular risk, as they breathe more frequently than adults, have a higher ratio of lung surface to body weight, and have immature respiratory and immune systems, according to the Rocky Mountain Institute report. A 2013 study of children living with asthma found that as NO_2 levels increased, so did the severity of their asthma, wheezing, and need for quick-relief medications like inhalers.

In this context, cooking on a gas stove is not a matter of individual preference. Renters have little control over what appliances they use, and many homeowners cannot afford to upgrade a perfectly good stove, let alone afford the extra electricity costs. In addition, the price of electricity is often much higher outside the mainland United States; it costs nearly double in places like Puerto Rico, Alicia Kennedy wrote in the Medium publication *Heated*.

"There should be rebates to trade in your gas stove for induction, particularly in lower-income communities," Price says, adding that her parents, who are on Social Security, can't afford to make the switch to electric appliances. In Singer's eyes, the first priority is to get effective venting range hoods, which transport cooking and burner pollutants outdoors, installed in as many existing homes as possible, and to require them in all new homes. Many hoods only recirculate the air around your home, doing next to nothing. In New York City, Brizzi's range hood in his home kitchen recirculates, as does mine.

Seals's first step would be to establish indoor air-quality benchmarks, and cites Canada as a model. In 2015, the country set indoor long-term-exposure limits to NO_2 to 11 parts per billion—among the strictest in the world. In the United States, California leads the charge to reduce gas consumption, with 30 communities moving toward all-electric building codes as of early 2020, in part because the state has a dedicated agency that sets indoor air-quality guidelines. In other states, Seals says, "it's a regulatory black hole."

If you cook with gas, there are precautions you can take to stay safe. Singer recommends always cooking with a venting range hood or a kitchen exhaust fan, and cooking on the back burners whenever possible. If you fry, use more than one burner, or cook on the front burners, turn the range hood on high. If you don't have a working venting range hood or kitchen exhaust fan and can't acquire one, open the windows to let in the outside air.

We want to hear what you think about this article. Submit a letter to the editor or write to letters@theatlantic.com.