

What You Need To Know About Natural Gas Power

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This is the final article in a [six-part series](#) that explores how we get our electricity and what we need to know about how renewable — and non-renewable — electric power is generated.

[Electricity](#) use is a major component of Americans' ecological footprint, and different energy sources have very different environmental impacts. But we tend to pay less attention to electricity than other areas, like recycling and plastic use, where it feels like individuals have more control. After all, we can't shop for electrical utilities the way we do internet providers.

Yet it's important to understand where your energy comes from and how it affects your ecological footprint.

Natural Gas Power

Although most people think of coal when they think about fossil fuels, natural gas is the largest source of electricity in the United States.

Nationwide, we generate [35 percent of our electricity](#) using natural gas. That's more than coal's 27 percent. Despite tremendous growth in [renewable energy](#) over the past decade, natural gas account for much more U.S. energy production than all renewable energy sources combined. However, reliance on natural gas [varies widely](#) throughout the country. For example, Long Island gets nearly 90 percent of its electricity from natural gas while Hawaii doesn't use it for electricity production at all.

Getting Natural Gas

Natural gas is a naturally occurring fossil fuel that forms, [like coal](#), from the decomposition of biological matter under pressure and heat over the course of centuries.

Unlike coal, which is made up of carbonaceous solids, natural gas is made of methane, an odorless gas that migrates through soil until it becomes trapped in nonpermeable underground reservoirs. The infamous methane smell is actually ethyl mercaptan, a chemical that is added to natural gas to make leaks easier to detect. It is often mistaken for, but is different from, the naturally occurring chemicals that cause the smell of [sewer gas](#).

Like oil, most natural gas is drilled from underground reservoirs in a variety of geological circumstances that can range from fairly accessible, or conventional, natural gas to technologically challenging, known as unconventional natural gas. Some examples of unconventional gas include deep natural gas, shale gas, and coalbed methane. Extraction of each of these and other unconventional gas sources

have unique challenges and impacts.

A much smaller, but less damaging, source of methane is [landfill gas](#), a byproduct of the decomposition of organic matter in a landfill. Landfill gas is a powerful greenhouse gas when it escapes into the atmosphere or is burned. But 60 to 90 percent of landfill gas can be captured for electricity production. This amount does not significantly offset the use of drilled natural gas, but it does make a landfill much more sustainable.

Once extracted, natural gas must be purified to remove water vapor and nonhydrocarbon compounds to make it burn more efficiently. In North America, natural gas is usually [transported](#) through a 305,000-mile system of pipelines, but it can also be cooled and converted into a liquid for shipping or trucking to destinations that are not connected to pipelines.

How Natural Gas Works

The most efficient use of purified natural gas is as a direct power source, such as for heating and cooking, or as an alternative fuel for vehicles. But it can also be used to generate electricity. [Natural gas power plants](#) add gas and air to a turbine, where it combusts and expands. The turbine causes a generator to spin a magnet, making electricity. This process also generates heat, which some natural gas plants recover for use as well.

Using electrochemical reactions instead of combustion, [fuel cells](#) are a much cleaner way to generate electricity than burning natural gas. The chemical that fuels the reaction in fuel cells can be natural gas or hydrogen, which is usually obtained from natural gas. When used to replace of diesel generators at drilling sites, fuel cells can even make natural gas [extraction](#) a little bit cleaner and more energy-efficient.

However, fuel cell-generated electricity is still mostly used for off-grid applications; the technology is not sufficiently developed to be practical or cost-effective as an alternative to natural gas combustion.



The most efficient use of purified natural gas is as a direct power source, such as for cooking. Image: [PublicDomainPictures](#) from Pixabay

Environmental Impacts of Natural Gas

Among fossil fuels, natural gas burns [the cleanest](#). The only emissions from burning purified natural gas are carbon dioxide and water vapor.

Until recently, people considered these byproducts harmless. However, we now know that carbon dioxide is a major contributor to climate change. Despite being unsustainable, natural gas still comes out ahead of other fossil fuels as it releases 45 percent less CO₂ than coal and a third less than oil.

Like other fossil fuels, natural gas is nonrenewable, and it has important environmental impacts besides emissions. While never insignificant, the environmental impact of natural gas drilling can vary widely depending on the accessibility of the gas. A simple vertical drill will have more limited impacts than other extraction methods, which can be devastating. For example, [fracking](#) requires so much water that it can impact local hydrological features; it produces toxic [wastewater](#), which may be radioactive. Fracking can also produce earthquakes. It has also been linked to [health impacts](#) in neighboring communities.

Scientists are currently working to understand how a group of microbes called [methanogens](#) generate methane. If they are successful, they could design electrodes that would allow for microbial “factories” to sustainably produce methane gas.

Developing a biogenic manufacturing method would make natural gas a renewable resource. But it would not solve the problem of carbon emissions from burning natural gas.

What You Can Do

Although consumers don't have much say in shaping the power mix on their electric grid, many energy companies like [Pacific Gas and Electric Company](#) or [Puget Sound Energy](#) do offer customers renewable energy programs. By subscribing to such an option, consumers basically subsidize the utility's purchase of greener power. This helps sustainable energy providers grow to a scale where they become price competitive. Contact your local utility provider to find out if such a program is available where you live.

No matter what source supplies the electricity to your home, the most sustainable choice is to use less of it. If you aren't sure where you could improve, start with a [home energy audit](#) and [prioritize changes](#) based on the results. Many local utility companies also have [efficiency programs](#) to help customers reduce their energy use.

Read part one of this series, [What You Need To Know About Electricity](#).

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