



Natural Gas Fact Sheet

Natural Gas – An Overview

Natural gas is composed mostly of methane, a greenhouse gas so powerful that it is called a “super pollutant.” Methane is 87 times more powerful than carbon dioxide at warming the climate over a 20-year period, and 36 times more powerful at warming the climate over a 100-year period.¹

There are two types of methane: fossil methane and biogenic methane. Fossil methane is associated with oil, gas, and coal deposits. Fracking, the dangerous new oil and gas extraction technique, has facilitated a North American oil and gas production boom while contaminating our air, water, and devastating communities and wildlife. Biogenic methane comes from the decomposition of organic matter. Major sources of biogenic methane include animal agriculture and waste, landfills, and sewage treatment.

Natural gas is primarily combusted in power plants to generate electricity, used in homes for heating and cooking, and used in industrial uses.² Burning natural gas converts

¹ [IPCC] Intergovernmental Panel on Climate Change. 2013. Chapter 8: Anthropogenic and Natural Radiative Forcing. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. AR5 p. 714 (Ch. 8) Table 8.7 (*see Note b.*) The reason the comparisons differ based on the time frame considered is that methane remains in the atmosphere for 12 years before breaking down to carbon dioxide while carbon dioxide persists in the atmosphere for hundreds of years.

² [CEC] California Energy Commission. 2017. Supply and Demand of Natural Gas in California. (2017; http://www.energy.ca.gov/almanac/naturalgas_data/overview.html)

methane to carbon dioxide and releases other air pollutants, like nitrogen oxides, which cause smog. Natural gas cooking stoves are a major source of indoor air pollution including carbon monoxide, formaldehyde, and nitrogen dioxide.³

In order to avoid the worst ravages of the climate crisis and achieve a just transition to truly clean renewable energy, we must eliminate all fossil fuel use over the next several decades. Rapid reductions of super pollutants, such as methane, must be part of any successful climate plan.

Contrary to the claims of aggressive public relations campaigns by the natural gas industry, natural gas is a dirty and dangerous fuel source that must be phased out entirely and as rapidly as possible.

Natural Gas Production Devastates our Health, Communities, and Wildlife

Hydraulic fracturing, commonly referred to as fracking, is a dangerous new oil and gas extraction technique where a toxic mixture of water and many hazardous chemicals are blasted underground at extremely high pressures in order to fracture the rock around a well to increase the flow of oil or gas. In 2005, Congress exempted fracking from the federal Safe Drinking Water Act, removing a key environmental safeguard and allowing this destructive technique to proliferate. Since that time, natural gas production has

³ Nicole, Wendee. 2014. Cooking Up Indoor Air Pollution: Emissions from Natural Gas Stoves. *Environmental Health Perspectives*. 122: A27

boomed in the United States.⁴ Our country has vast natural gas resources that can only be produced through fracking. Absent deliberate policy choices to reverse this trend, natural gas production will likely continue to grow. Today, about two-thirds of all natural gas produced in the U.S. is fracked gas.⁵

Hundreds of toxic and carcinogenic chemicals, many of which are never disclosed to the public due to “trade secret” loopholes, are used in fracking and oil and gas production.⁶ These chemicals poison the air we breathe, the water we drink, and make people sick.⁷ People living near fracked wells are further burdened by heavy traffic and industrial activity, including noise and light pollution. Fracking destroys beautiful natural areas, fragments wildlife habitat, and imperils endangered species. Fracking and the disposal of fracking wastewater underground can induce earthquakes. As the Aliso Canyon disaster⁸ and others have vividly

demonstrated, the storage and transport of natural gas risks further catastrophic damage.

Even absent the climate and air quality damages of burning natural gas, the harms and risks from its production, transport, and storage demonstrate the need for a rapid transition to clean energy.

Burning Natural Gas in Power Plants Can be Worse for the Climate Than Coal

When compared to carbon dioxide emissions from a power plant smokestack, natural gas produces about half as much carbon dioxide per unit of energy as coal. For this reason, natural gas has long been promoted as a “transition,” “bridge,” or “green” energy source. The greenhouse emissions from smokestacks, however, are only one part of the story. To understand the climate damage from burning any fuel source, we must consider the full “lifecycle emissions” of using that fuel, including the greenhouse emissions from production, transport, and storage.

Methane, a super-pollutant, leaks during all phases of oil and gas production. If the methane leakage rate is greater than 2.4% of the gas produced, the climate damage from the methane leakage cancels out any climate benefit that gas achieves over coal at the smokestack.⁹

Historically, methane leaks from oil and gas production were not monitored or measured by state or federal regulators. Yet, study after

⁴ [EIA] U.S. Energy Information Administration. 2017. The United States Now Produces Nearly All of the Natural Gas that It Uses. (10 January 2017; https://www.eia.gov/energyexplained/index.cfm?page=natural_gas_where).

⁵ [EIA] U.S. Energy Information Administration. 2016. Hydraulically fractured wells provide two-thirds of U.S. natural gas production. (5 May 2016; <https://www.eia.gov/todayinenergy/detail.php?id=26112>).

⁶ Colborn, Theo et al. 2011. Natural Gas Operations from a Public Health Perspective. Human and Ecological Risk Assessment. 17: 1039-1056; [PSR] Concerned Health Professionals of New York, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking. 2016. Fourth Edition.

⁷ [PSR] Concerned Health Professionals of New York, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking. 2016. Fourth Edition.

⁸ [ARB] California Air Resources Board. 2016. Determination of Total Methane Emissions from the Aliso Canyon Natural Gas Leak Incident; Conley, S. et al. 2016. Methane emissions from the 2015 Aliso

Canyon blowout in Los Angeles. Science. 351:1317-1320.

⁹ Ren, X., et al. 2017. Methane emissions from the Marcellus Shale in southwestern Pennsylvania and northern West Virginia based on airborne measurements. J. Geophys. Res. Atmos. 122: 4639–4653; *see also* Alvarez, et al. 2012. Greater focus needed on methane leakage from natural gas infrastructure. 109 PNAS: 6435–6440.

study has now shown that measured leakage rates are far higher than industry or regulators have previously claimed.¹⁰ These studies show that any climate benefits of burning natural gas for power have been greatly overstated and, it appears, the switch from coal to natural gas is actually worse for the climate than coal.

Despite this powerful new information, the natural gas industry continues to aggressively promote its dirty fuel, often asserting that since methane leakage rates could be reduced in the future, it should still be considered a green fuel choice. For many years, the natural gas industry and regulators have known that methane leakage could be reduced relatively cheaply and easily, yet the industry has not done so and has fiercely opposed regulatory efforts. It is critical to stop or minimize all methane leakage as quickly as possible from all sources including the oil and gas sector, coal mines, agriculture, and waste. The need to do so, however, cannot justify continued reliance on natural gas or any additional investment in natural gas infrastructure.

In California, about half of our electricity comes from natural gas power plants.¹¹ It is essential to immediately halt the construction of new plants and infrastructure and to

¹⁰ See, e.g., Ren, X., et al. 2017. Methane emissions from the Marcellus Shale in southwestern Pennsylvania and northern West Virginia based on airborne measurements. *J. Geophys. Res. Atmos.* 122: 4639–4653; Schneising, O., et al. 2014. Remote sensing of fugitive methane emissions from oil and gas production in North American tight geologic formations. *Earth's Future*. 2: 548–558; Howarth, R.W. 2015. Perspectives on air emissions of methane and climatic warming risk from hydraulic fracturing and shale-gas development: Implications for policy. *Energy & Emission Control Technologies*. 3: 45-54.

¹¹ [CEC] California Energy Commission. 2017. California's Installed Electric Power Capacity and Generation: August 2017 update. California Energy Commission – Tracking Progress.

transition away from all natural gas power to truly clean renewable energy as quickly as possible.

Natural Gas Vehicles are Not a Green Alternative and Must be Eliminated

Natural gas vehicles are not climate-friendly. Any benefits at the tailpipe are countered by methane leakage during production, transport, and storage, as discussed above. Even assuming relatively low leakage rates, replacing petroleum vehicles with natural gas vehicles is worse for the climate today. Because of methane leakage, replacing the gasoline vehicle fleet with natural gas vehicles would be worse for the climate for 80 years.¹² Replacing the heavy duty diesel vehicle fleet with natural gas vehicles would be worse for the climate for nearly 300 years.¹³ Despite the clear fact that natural gas vehicles are not a climate solution, industry groups are working hard to garner subsidies and other advantages for natural gas vehicles.¹⁴ It is critically important to reject misinformation and replace gasoline and diesel vehicles with electric vehicles or other clean alternatives.

Methane Capture Projects Cannot Justify Continued Reliance on Natural Gas

The natural gas industry likes to claim that natural gas can be “renewable,” pointing to small-scale projects that capture methane from animal agriculture or other sources and use it for electricity generation. It is important to eliminate or minimize all

¹² Alvarez, et al. 2012. Greater focus needed on methane leakage from natural gas infrastructure. 109 *PNAS*: 6435–6440.

¹³ *Id.*

¹⁴ [CNGVC] California Natural Gas Vehicle Coalition. 2016. Coalition Board Approves Legislative Agenda and 2017 Priorities. (21 November 2016; <http://cngvc.org/coalition-board-approves-legislative-agenda-2017-priorities/>)

methane emissions. Projects that capture biogenic methane, however, pose their own risk of methane leakage and should only be used as mitigation when no other options are available. Unfortunately, current technology and practices are often insufficient to collect all methane. Moreover, these projects are sometimes ill-conceived and promote natural gas infrastructure.

First, the best way to address methane emissions is to prevent them from occurring in the first instance. Changes such as no longer sending organic materials to landfills and improving agriculture practices can reduce methane emissions. The best and most reliable way to reduce methane from animal agriculture is to reduce meat consumption.

Second, methane emissions that truly cannot be avoided should be captured. Small-scale projects that do so are underway in California and elsewhere. Each project, however, captures only a fraction of the methane produced at the source, emitting the remainder to the air, and does nothing to address the leaks in the pipeline system. Unfortunately, the promise of methane “capture” can lead to practices that actually increase the overall amount of methane produced by the source and consequently the chances of methane leakage to the air.

Furthermore, projects aimed at harvesting biogenic methane promote continued development and maintenance of a natural gas infrastructure when funds and efforts are desperately needed to instead develop and accelerate the transition to truly renewable energy sources.

It is important to note that in many instances, including agricultural projects, polluters can receive “offset credits” for the methane they

capture.¹⁵ These credits can then be sold to other polluters to allow an equal amount of greenhouse pollution that would otherwise need to be eliminated to continue. Thus, claims that “renewable” natural gas is “carbon neutral” or “climate friendly” are usually untrue and certainly cannot justify continued reliance on natural gas.

¹⁵ See, e.g. [ARB] California Air Resources Board. 2016. Compliance Offset Protocol Livestock Projects. (9 November 2016; <https://www.arb.ca.gov/cc/capandtrade/protocols/livestock/livestock.htm>)