

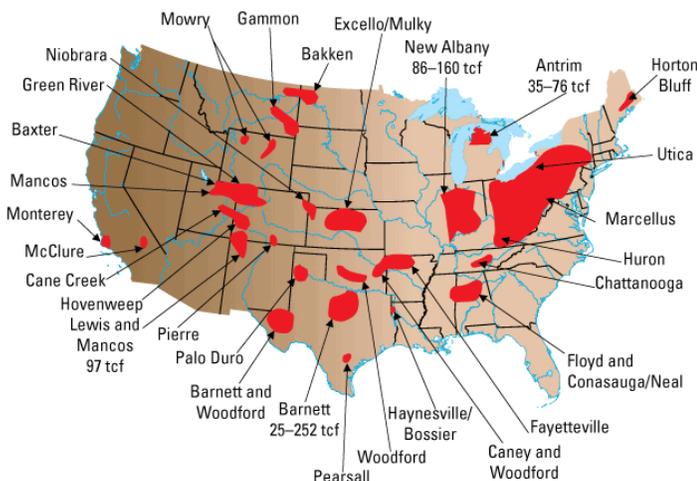
FACT SHEET: Natural Gas

Natural Gas Basics

Natural gas is a gaseous fossil fuel consisting primarily of methane, but includes significant quantities of ethane, propane, butane, and pentane – heavier hydrocarbons removed prior to use as a consumer fuel – as well as carbon dioxide, nitrogen, helium and hydrogen sulfide. Natural gas is not the “clean” fuel it’s purported to be. Toxic metals like lead and mercury can be found organically-bound in natural gas, as can radioactive radon and other toxic contaminants. Natural gas is found “associated” with oil in oil fields, or can be found “non-associated” (dissolved or isolated in fields of natural gas), and in coal beds (as coalbed methane). Since the 1990s, with the development of slickwater hydraulic fracturing, massive shale formations across the U.S. have begun to yield large amounts of natural gas.

In the late 1990s, there was a mad rush to build around 1,000 new power plants, nearly all of them natural gas fired. Grassroots community opposition stopped most of them, but about 400 were built. As gas prices started rising dramatically after in 2000, many of these power plants sat idle or operated only when necessary. Another mad rush of development followed, starting around 2003, as proposals for over 60 new liquefied natural gas (LNG) import terminals were proposed in North America (40 in the U.S.), so that gas could be imported from across oceans, requiring that we go to war for gas as well as oil. Only a few new terminals were built due to a combination of community opposition and falling gas prices – the result of the economic depression plus increased supply from new domestic reserves opened up by hydraulic fracturing.

98.5% of natural gas consumed in the U.S. comes to us via pipeline from the U.S. and Canada. However, natural gas production is nearing its peak in North America. Over the past decade, we’re drilling more and more, but production is leveling off and will drop sharply in the not-too-distant future. The recent shale developments are providing a slight recent surge in domestic production, but the hype will likely be short-lived since the typical shale gas well declines 81% in the first two years of production. World-wide, natural gas production will peak in a plateau between 2027 and 2045, before dropping dramatically.



Natural Gas Worse for the Climate than Coal

Methane, the principle component of natural gas, is 86 to 105 times as potent as CO₂ over a 20 year time frame. Gas is worse than coal for global warming if only 3.2% of the gas leaks from wells, pipelines and compressors, yet leakage rates from gas fields has been found to range from 4-9% and system-wide losses can be far higher.

Hydraulic Fracturing

Hydraulic fracturing is a natural gas extraction process by which water, usually mixed with highly toxic chemicals, is forced down a drilled well at extremely high pressure to create or expand fractures, releasing gas trapped in rock formations. Proppants (small particles such as sand or synthetic beads) hold open the newly-created fractures so that released gas can flow toward the well. The process is also known as fracking or hydrofracking.

When drilling for gas in geologic formations where the gas is tightly bound in rock (“low-permeability gas reservoirs”), hydraulic fracturing is used in combination with horizontal drilling, in which the drill bit is gradually turned sideways to penetrate long distances away from the vertical well bore (hole). Because of the very large quantities of water and pressure needed for this process, it is called horizontal drilling / high-volume hydraulic fracturing, or HD/HVHF.

HD/HVHF is an industrial activity and the areas where it is used become polluted industrial zones. Rural areas are often exploited, but suburban and urban areas are increasingly subjected to an invasion of heavy equipment and dangerous activities.

Water

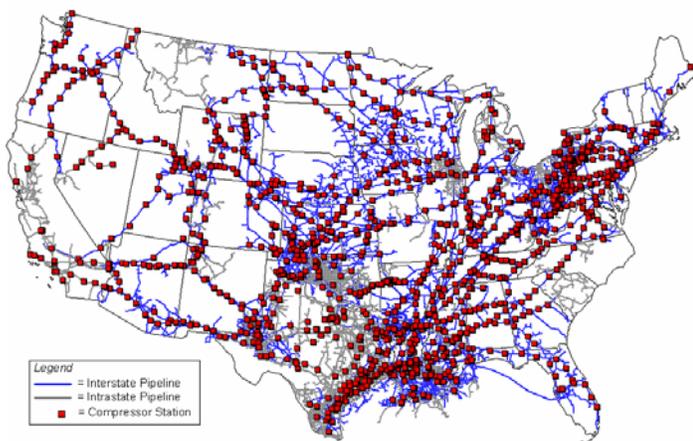
HD/HVHF gas wells can require anywhere from 1 to 9 million gallons of water per “frack.” Wells have to be re-fracked approximately every 5 years to restimulate production. Such high water use creates issues such as where to obtain it, traffic and pollution from getting hundreds of heavy truckloads of water to the drill site, deliberate contamination of the water, and trucking all of the wastewater away to be disposed of somewhere. Wastewater must be stored onsite at least temporarily, leading to repeated problems with leaks and overflow during heavy rains. Additionally, ancient “formation water” may be released in the well completion process. This ‘brine’ is typically far saltier than seawater and presents serious disposal issues. Spills and other unintended releases are inevitable industrial accidents. Clandestine dumping is widely suspected and has been reported.

Chemicals & Sand

The chemicals used in hydraulic fracturing are known to cause a wide variety of health problems. Increasingly, reports from affected areas indicate a prevalence of serious and incurable disorders in people and animals living near natural gas extraction or transmission facilities (pipelines and compressor stations). Even the special sand used as a proppant has a destructive effect on the communities where it is mined. See www.ccc-wis.com

Pipelines & Compressor Stations

Natural gas is transported with networks of pipelines, with smaller gathering lines joining into larger interstate pipelines and branching out again to reach various markets. Pipeline routes are dotted with compressor stations, where energy is consumed to pressurize the gas to keep it moving – sometimes thousands of miles until it reaches its destination. Compressor stations run continuously and are very noisy. Pipelines cut through forests, farms and residential neighborhoods and even run under rivers and lakes, disturbing a variety of environments, sometimes in very damaging ways, like where toxic sediments on lake bottoms are stirred up by “jet trenching” used to bury pipelines in a lake bed. Pipeline routes are frequently established through the process of eminent domain (government taking of private land). The aging pipeline infrastructure leads to frequent leaks, which regularly produce explosions that are costly in property damage and lives lost.



Power Plants

68.5% of natural gas is used for heating industrial processes, homes and businesses. 2.8% is used in transportation. The remaining 28.6% is burned in power plants to make electricity. After approximately 400 new gas-burning power plants were built since the late 1990s, there is now 37% more natural gas electric generating capacity than coal. However, more than half of that capacity is not used (which is why coal provides three times more electricity than gas does).

Natural gas burning power plants are major air polluters, releasing carbon dioxide (CO₂), nitrogen oxides (NO_x), sulfur oxides, fine particulate matter, ammonia, volatile organic compounds and a long list of toxic and hazardous air pollutants, such as lead, mercury, benzo(a)pyrene and polycyclic aromatic hydrocarbons. A single 1,000 MW gas plant can legally release over 3 million pounds of regulated air pollutants a year, including 40 pounds of lead, 28 pounds of mercury and over 33,000 pounds of hazardous air pollutants, many of which cause cancer. This doesn't count CO₂, since CO₂ isn't yet regulated. As little as 0.002 pounds of mercury deposited annually into a 20-acre lake can contaminate fish to a level where they're unsafe to eat.

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Noise

Heavy truck traffic, drilling, and fracking are all extremely loud and invasive for people living nearby. Extraction-related activities go on around the clock, 7 days a week. The development and completion of gas wells continues without letup, with one day of cessation per year: Christmas. In addition to this being intensely stressful, people living near compressor stations can develop a life-threatening condition called vibro-acoustic disease. Compressor stations and power plants (especially the air-cooled kind) are also significant noise polluters.

Air pollution

In addition to the air pollution from power plants, communities near drilling operations, compressor stations and natural gas storage tanks also suffer from polluted air. At drilling sites, this results from diesel exhaust from heavy truck traffic and from the extraction activities.



Invisible gas leakage (made visible) from gas storage tanks at a drilling site in Texas.

Volatile organic compounds evaporate easily from the chemicals used in drilling and fracking, as well as from the extracted gas. In Fort Worth, Texas, in the Barnett Shale, natural gas storage tanks and compressors are thought to have as great a negative impact on air quality and be as great a cause of the increasing smog as all automotive traffic in the Metroplex. Recent video footage taken by the Texas Commission on Environmental Quality using an infrared camera clearly shows fugitive hydrocarbon emissions billowing from storage tanks. Storage tanks are designed for a certain legally-permitted amount of leakage. In the small town of DISH, Texas, where numerous pipelines and compressor stations have been built in recent years, there has been a corresponding die-off of trees, livestock have died of mysterious causes, and humans are developing a range of unusual medical problems.

Regulation

Over decades, the oil and gas industry has lobbied for and gotten exemptions from a wide array of federal laws, including laws requiring environmental impact statements, laws regulating hazardous waste and toxic site cleanup,



laws requiring reporting of toxic emissions and laws to protect the air and drinking water. The industry lobbies to keep nearly all regulation at the state rather than federal level, saying that the states do a good job of regulating. The evidence strongly suggests otherwise.

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www.un-naturalgas.org

www.energyjustice.net/naturalgas/