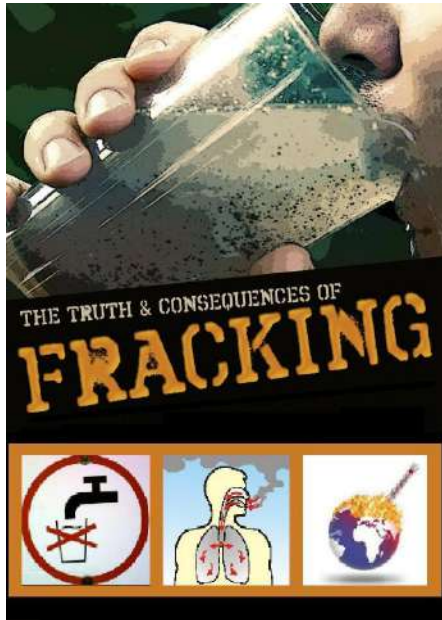


## FRACKING FACT SHEET



*Industry officials and some governments are promoting natural gas as a “clean, green” fuel, but studies show that fracked natural gas can produce as much greenhouse gas (GHG) emissions as coal.*

**What is fracking?** Hydraulic fracturing, more commonly known as “fracking,” is a technique to extract natural gas from harder to access unconventional sources trapped in rock formations such as shale gas, coal bed methane and tight gas. This unconventional natural gas requires more energy and water to extract than conventional gas from easier to access reservoirs and more porous rock formations. This is only one reason for fracking’s heavy carbon footprint.

**Fracking and water.** During the fracking process, millions of litres of water, thousands of litres of chemicals and thousands of pounds of sand are injected underground at very high pressure in order to create fractures in the rock

allowing gas to flow up wells. Fracking operations deplete water sources, and have been known to contaminate groundwater with methane and undisclosed chemicals. Questions have also been raised about the safety of fracking wastewater disposal.

**Fracking and emissions** Proponents of natural gas have said that natural gas is a climate-friendly fossil fuel because it produces less GHG emissions when burned compared to other fossil fuels. According to the Natural Gas Supply Association, natural gas produces half the CO<sub>2</sub> emissions of coal. *But that doesn’t make fracking clean!* The lifecycle greenhouse gas emissions – that is the combined emissions associated with extraction, combustion, and methane and CO<sub>2</sub> releases – means that fracked gas can be as dirty as coal. Fracking releases large amounts of natural gas – which consists of both CO<sub>2</sub> and methane – directly into the atmosphere. In fact, fracking wells leak 40 to 60 per cent more methane than conventional natural gas wells. This happens when water is forced down into a fracking well in order to fracture the rock formations. Methane in particular is a very powerful greenhouse gas. It can trap 20 to 25 times more heat in the atmosphere than CO<sub>2</sub>. Two Cornell scientists who have been studying fracking in the U.S. estimate that in the next 20 years methane will make up 44 percent of the U.S.’s GHG emissions. Along with contributing to global warming pollution, methane leaks kill plants and trees, contribute to ozone formation, and causes natural gas explosions, which have resulted in an average of 17 deaths and 68 injuries per year in the United States alone.

Hydraulic fracturing, or fracking, is a method of forcing natural gas or oil from rock layer deep below the Earth's surface.

### How fracking works ...

Much of the water used in fracking is collected from the well and processed, but some communities have raised concerns that potentially carcinogenic chemicals can escape into drinking water.

- Scientists worry that concrete well casings can crack and leak chemicals.

- 1 – Based on research published this year in *Marine and Petroleum Geology*

Sources: Duke University; U.S. Energy Information Administration; National Research Council; *Marine and Petroleum Geology*  
By Dan Vergano and Karl Gelles, USA TODAY

# OIL

Products from oil (petroleum products) help us do many things. We use them to fuel our airplanes, cars, and trucks, to heat our homes, and to make products like medicines and plastics. Even though petroleum products make life easier — finding, producing, moving, and using them can harm the environment through air and water pollution.

## Emissions and Byproducts Are Produced from Burning Petroleum Products

Petroleum products give off the following emissions when they are burned as fuel:

- Carbon dioxide (CO<sub>2</sub>)
- Carbon monoxide (CO)
- Sulfur dioxide (SO<sub>2</sub>)
- Nitrogen oxides (NO<sub>x</sub>) and Volatile Organic Compounds (VOC)
- Particulate matter (PM)
- Lead and various air toxics such as benzene, formaldehyde, acetaldehyde, and 1,3-butadiene may be emitted when some types of petroleum are burned

Nearly all of these byproducts have negative impacts on the environment and human health:

- Carbon dioxide is a greenhouse gas and a source of global warming.
- SO<sub>2</sub> causes acid rain, which is harmful to plants and to animals that live in water, and it worsens or causes respiratory illnesses and heart diseases, particularly in children and the elderly.
- NO<sub>x</sub> and VOCs contribute to ground-level ozone, which irritates and damages the lungs.
- PM results in hazy conditions in cities and scenic areas, and, along with ozone, contributes to asthma and chronic bronchitis, especially in children and the elderly. Very small, or “fine PM” is also thought to cause emphysema and lung cancer.
- Lead can have severe health impacts, especially for children, and air toxics are known or probable carcinogens.

- 1** In 1854, the Pennsylvania Rock Oil Company became the first company to drill for oil. Up to that time, crude oil was collected from where it seeped to the surface. People would fill buckets from these seeps and burn the crude for fuel.



- 2** The first successful oil well in North America was in Oil Springs, Ontario, Canada, in 1858. This field is still producing a small quantity of oil today.



- 3** When oil was first drilled for on an industrial scale, it was refined into Kerosene and replaced whale oil in household lamps.



- 4** A barrel of oil is equivalent to 42 US gallons, or 159 liters. This standard measurement was adopted in 1866.



- 5** Only 50% of crude oil is refined into fuel.



- 6** In addition to the products mentioned earlier, ink, clothing, detergents, and bandages all contain oil by-products.



- 7** In 2017 the top nine oil-producing countries were the United States, Saudi Arabia, Russia, Canada, Iran, Iraq, China, the United Arab Emirates, and Brazil.



- 8** The top nine oil producing states in the US as of May 2018 were Texas, North Dakota, New Mexico, Oklahoma, Alaska, California, Colorado, Wyoming, and Louisiana.

- 9** Since 2014, five new oil refineries have been built in the United States. Before that, five refineries were constructed from 1980 – 1998.





# THE EFFECTS OF COAL ON WATER IN THE UNITED STATES

MINING COMPANIES USE  
800-3,000 GALLONS  
OF WATER TO...



EXTRACT - TRANSPORT - STORE - PROCESS - DISPOSE

1 TON  
OF COAL



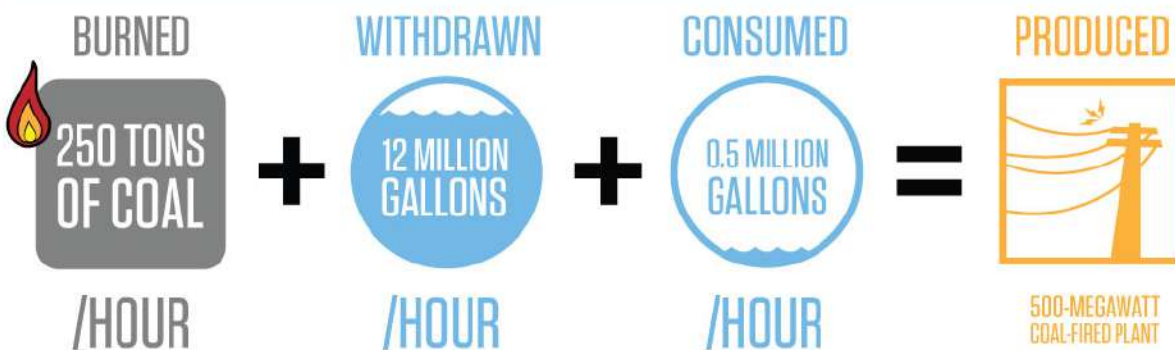
\*55 - 75 TRILLION  
GALLONS WITHDRAWN  
ANNUALLY

AMERICA USES 1 BILLION TONS  
OF COAL A YEAR



\*FUN FACT

▶ THAT'S ROUGHLY EQUAL TO THE  
TORRENT OF WATER THAT POURS OVER  
NIAGRA FALLS 5 MONTHS OF THE YEAR



Resources:

a) U.S. Geological Survey, b) Energy Information Administration, c) Department of Interior,  
d) Sandia National Laboratories, e) Electric Power Research Institute

 circle of blue



## **Coal impacts: air pollution**

The smoke from coal power plants is exceedingly dangerous to human health. When coal is burned it releases a number of airborne toxins and pollutants. They include mercury, lead, sulfur dioxide, nitrogen oxides, particulates, and various other heavy metals. Health impacts can range from asthma and breathing difficulties, to brain damage, heart problems, cancer, neurological disorders, and premature death.

Although limits set by the Environmental Protection Agency (EPA) have helped prevent some of these emissions, many plants don't have the necessary pollution controls installed. The future of these protections remains unclear.

## **Coal impacts: water pollution**

Acid rock drainage from a mine in Ohio.

When you burn charcoal in your grill at home, ash is leftover. The same is true for coal-fired power plants, which produce more than [100 million tons of coal ash](#) every year. [More than half](#) of that waste ends up in ponds, lakes, landfills, and other sites where, over time, it can contaminate waterways and drinking water supplies.

Other water impacts include acid rock drainage from coal mines, the obliteration of mountain streams and valleys by mountain top removal mining, and the [energy-water collisions](#) that occur when coal plants rely too heavily on local water supplies.

Coal impacts: global warming