

Natural Gas

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Period 1

What is Natural Gas?

~ Natural gas is strong hydrocarbon, which means it is made of hydrogen and carbon molecules. The simplest natural gas is methane which has 1 carbon and 4 hydrogens.

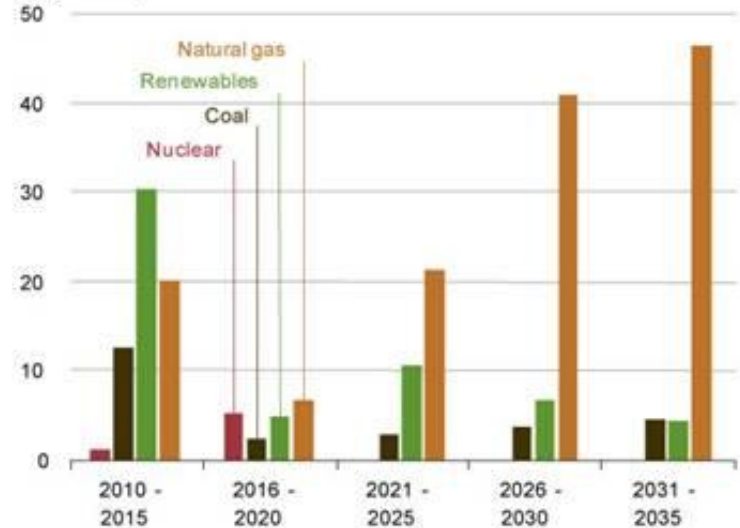
~ Natural gas is very combustible, burns easily, and more cleanly, which explains why it is the second most used source of energy in America.



History

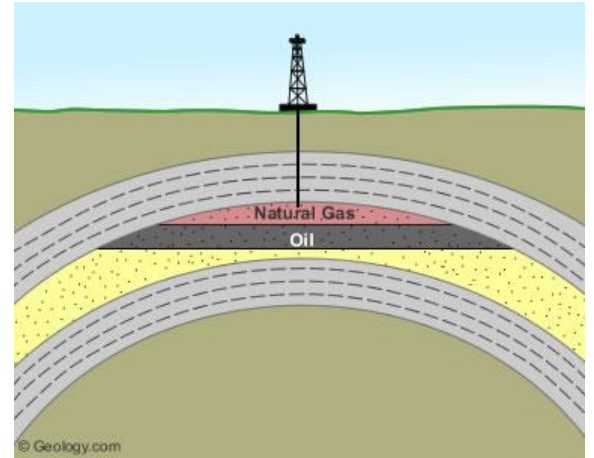
~ In the 1970s and the 1980s most energy was obtained through coal and nuclear power plants, but because of new economic, technological, and environmental changes, natural gas has been one of the main choices of fuel.

Figure 78. Electricity generation capacity additions by fuel type, 2010-2035 (gigawatts)



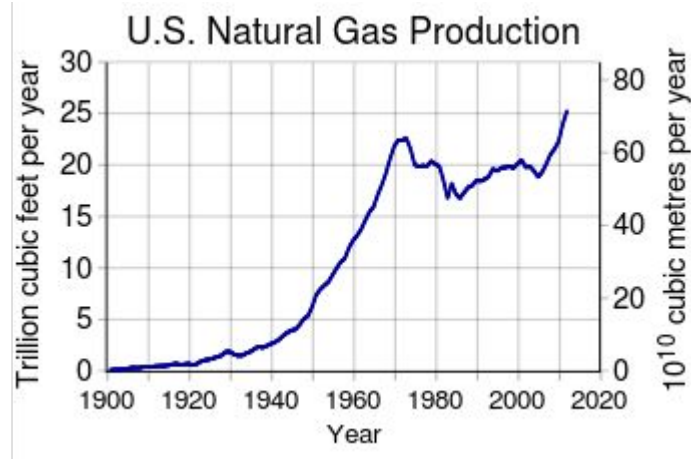
How is it obtained?

- ~ By using advanced technology, geologists can locate potential spots of natural gas so they can drill a hole in order to suck up the gas through multiple pipes and gas wells.
- ~ Once removed from underground, it is then transformed to a gas processing plant to remove the non hydrocarbons.
- ~ Non hydrocarbons: ethane, propane, and butane

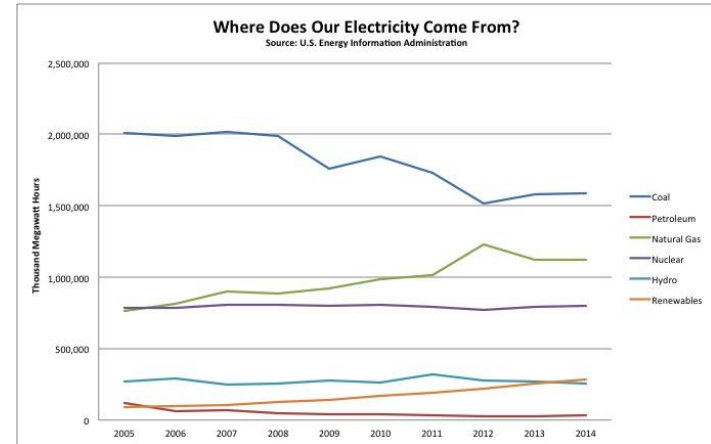


Usage of Natural Gas

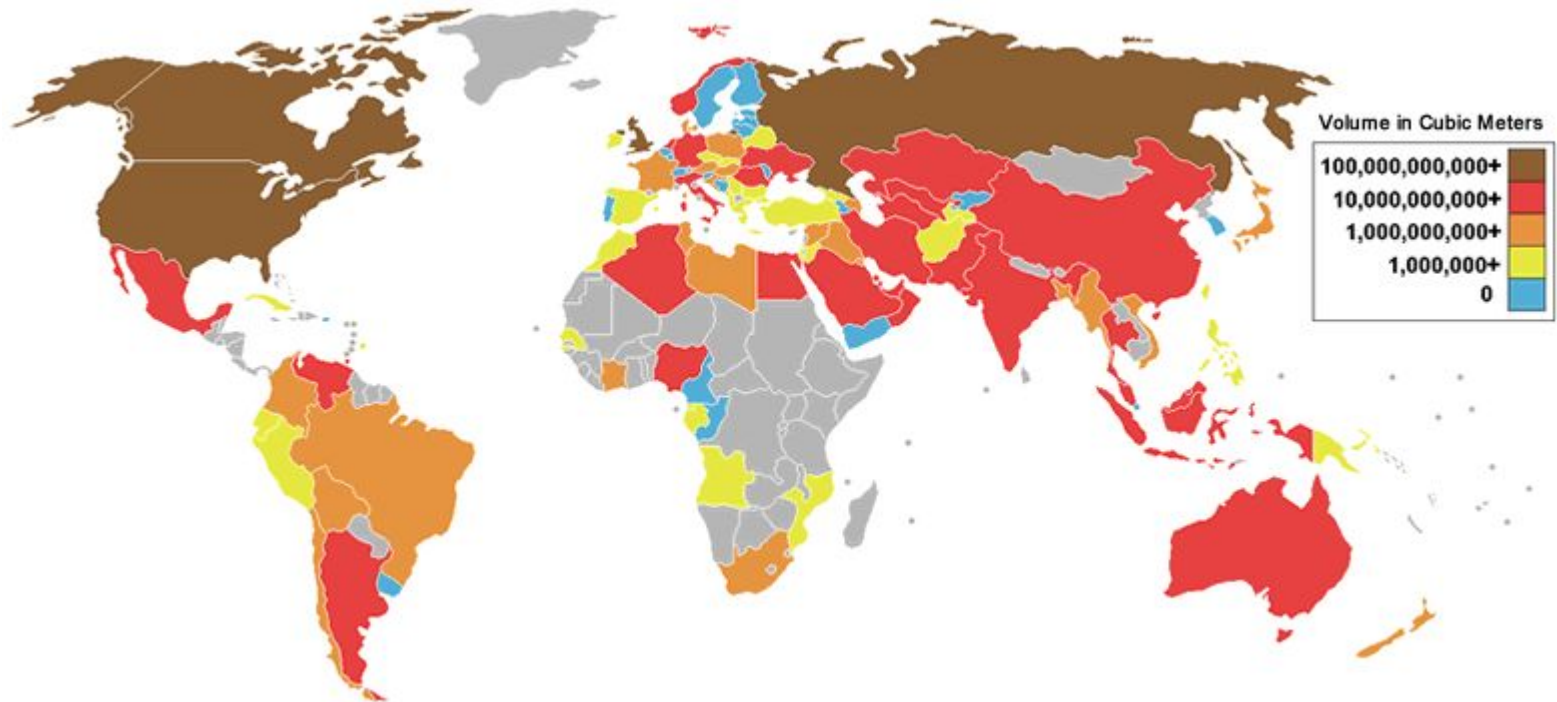
National Usage



Southern California Usage



Global Usage



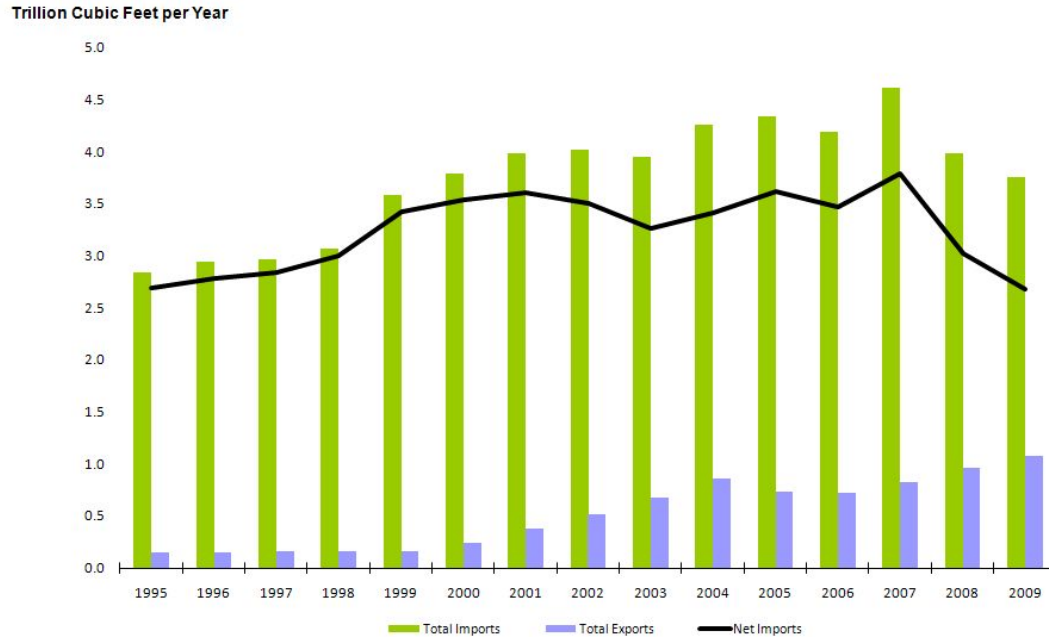
Common Uses of Natural Gas

~Natural gases can be used in both commercial & residential areas, and common uses include: space heaters, lighting, water heating, cooking (stoves or ovens), and cooling systems
~Natural gas supplies about 39% of the commercial sector's 8,368 trillion Btu's of energy



Imported and Exported

Figure SR3. U.S. Natural Gas Imports and Exports, 1995-2009



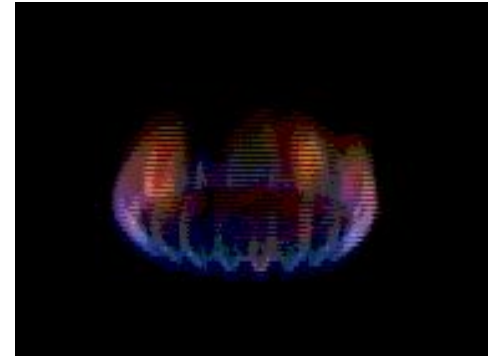
Source: U.S. Energy Information Administration, U.S. Natural Gas Imports and Exports: 2009, Tables SR1

In 2009 there was a 15 percent decrease in net imports from Canada. Despite this decrease Canadian pipeline imports continued to account for the vast majority of U.S. natural gas imports. In 2009 Canadian imports accounted for 87 percent of total U.S. natural gas imports.

How Does it Affect the Environment?

~ Although natural gas is a hydrocarbon fossil fuel, it still does not produce more harm to the environment than burning coal or oil.

~ The new technological power plants today produce between 50 to 60 percent less carbon dioxide than the standard coal plant.



Negative Effects on the Environment

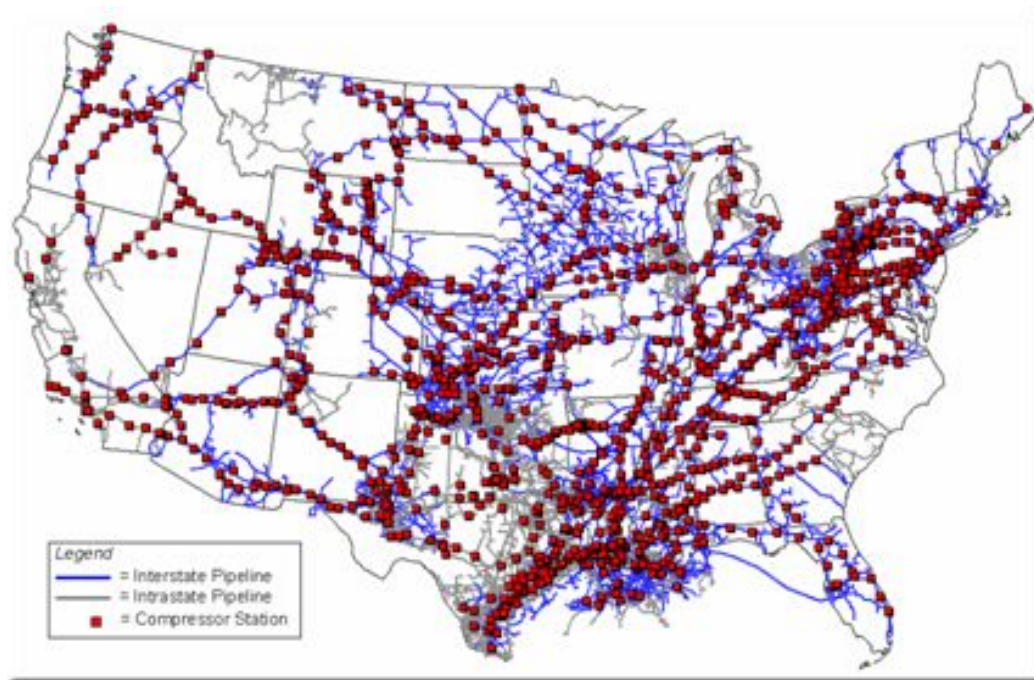
~ One concern is when drilling, collecting, and transporting the gas there is some room for leakage of methane gas that far worse than carbon dioxide. Although it does leak, it is as low as 1 to 9 percent active when collecting and is very uncommon.



What are Some Flaws of Natural Gas?

- ~ The only way to transport natural gas is through extensive pipelines or through highly pressured trucks that transport it across country.
- ~ The trucks are extremely dangerous due to the highly pressurised gas that can leak that has high contents of greenhouse gases.





Solutions to the Problems

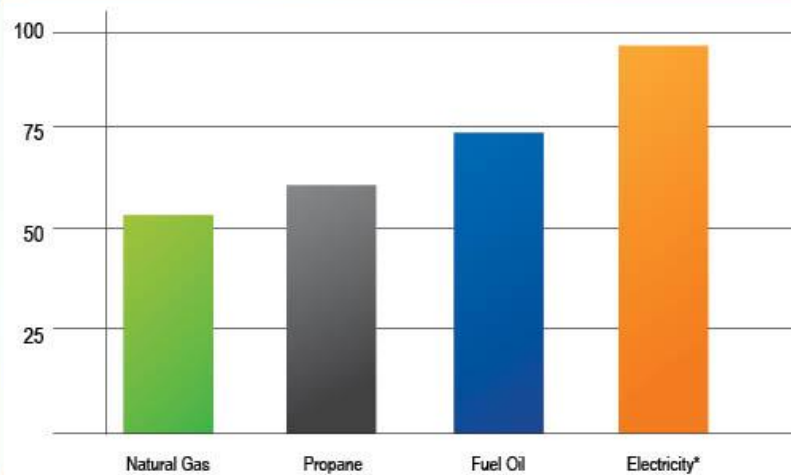
~ Because gas is becoming a major uprising of an energy source, the pipelines are becoming more elaborate and efficient by transporting the gas quicker and at mass quantities.

~ Gas can only be transported through sealed containers, so there are not many options for making new ways of moving gas. However, enhancing the pipelines can lead to a more efficient way of getting natural gas to homes.



Gas = Environmental Benefit: Fewer Greenhouse Gasses

Emissions by Fuel Type
(Kg of CO₂ per MMBTU)



*Coal/Electric Power

Why is it a Popular Fuel?

~ Because natural gas is made of carbon and hydrogen it has fewer impurities, is less chemically complex, and has less pollution when combusting.

~ Natural gas is also very convenient because it controls heat well. It supplies long lasting control of cooking temperature, heating water for laundry, and keeping your house warm.

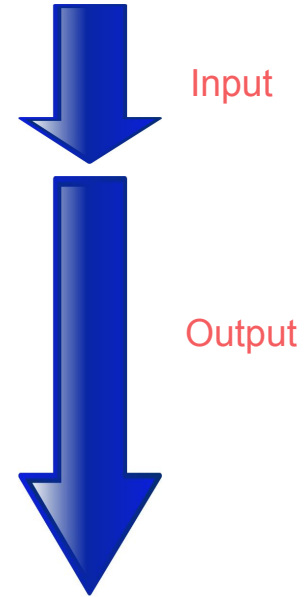


Fuel Mass to Energy Output

~ Kilowatt Hour is a measure of the amount of fuel that is needed to fulfill 1 Kilowatt Hour.

~ The amount of energy needed to fuel 1 Kilowatt Hour is 0.01010 Mcf (and Mcf equals 1,000 cubic feet).

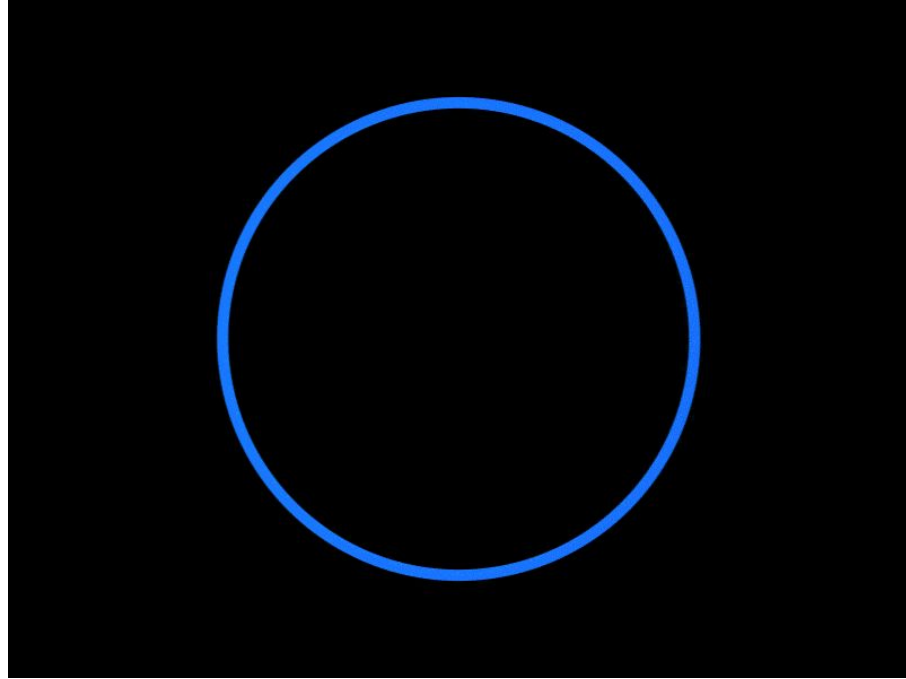
~ 99 kWh per Mcf (1,000 cubic feet) of natural gas is the mass to energy output ratio.



From Natural Gas to Energy

https://www.youtube.com/watch?v=sOKAv_HKkas

Thank you!



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