

A SURVEY OF HYDRAULIC FRACTURING

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ABSTRACT

Hydraulic fracturing or fracking is a process being used all over the world in order to extract natural gas and oil from the deep sediment layers of Earth. High pressure liquid is injected into shale in order to create new cracks and force open existing fissures and fractures found within the rock. Wells are drilled vertically and horizontally for thousands of feet in order to extract the naturally occurring fossil fuels. Fracking has increased drastically in the United States and has many benefits for the country as a whole. It has eliminated the dependency of foreign resources, lowered the prices of the products, allowed for more exports, and decreased air pollution. Although fracking has its benefits, there are also problems with the process. It destroys the environment, contaminates water supplies, results in small earthquakes, and causes health problems. These problems have resulted in strict regulations, and in some states and countries, hydraulic fracturing has been banned.

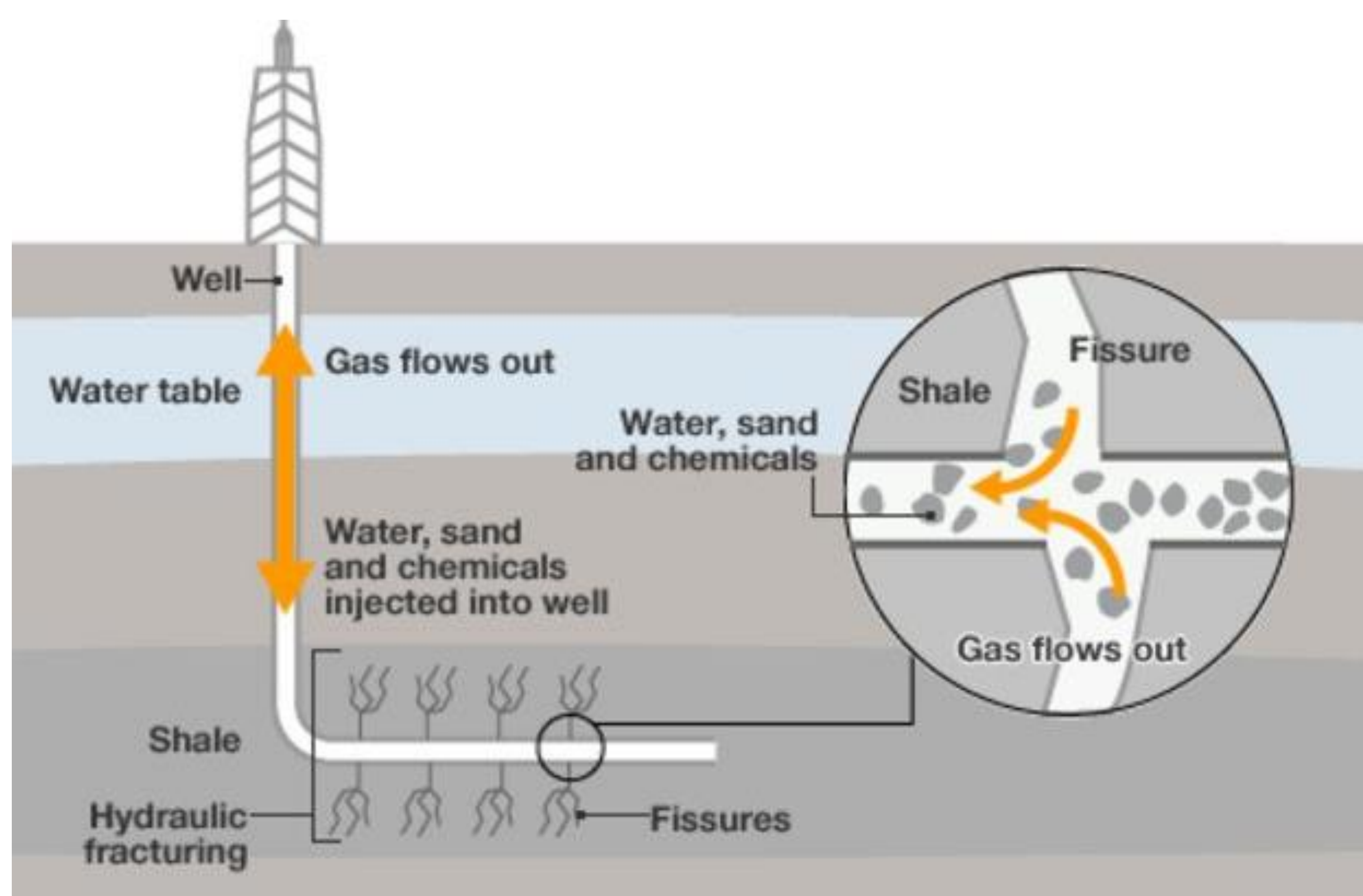


Figure 2. Process of hydraulic fracking

PROBLEMS WITH FRACKING

Fracking is good for the economy but bad for the environment. The process has been proven to destroy and contaminate water supplies, and a large quantity of it is required for the process. It has also produced small earthquakes while causing intense noise pollution. The problem also extends to humans: preterm births, asthma, skin disorders, nasal and sinus symptoms, migraine headaches, etc.

BANS ACROSS THE U.S.

Due to the dangers and harmful effects of fracking, several states across the country have banned the process while other haven't started the practice. See figures 3 and 4 for more details.

HOW DOES IT WORK?

Fracking is a well-stimulating process. The wells are drilled both vertically and horizontally for thousands of feet. Fissures, or small fractures/cracks, are produced in shale rock beneath the surface by pumping large quantities of high pressure fluid. The fluid is a mixture of water, sand, and different chemicals (98-99.5% being water and sand). After the injection process, the high pressure mixture causes fluid to return to the surface through the wellbore. The idea of the process is to create new fractures in the buried shale rock as well as increase the size of existing ones.

REGULATIONS

The regulations on hydraulic fracking is managed on a state-by-state level. The country's Environmental Protection Agency (EPA) has implemented several laws to regulated the process and to ensure that fracking companies keep the environment safe. The "Safe Drinking Water Act" and "Clean Water Act" are two laws that have tried to regulated the discharge of pollutants to large bodies of water (lakes, rivers, steams, wetlands, and coastal areas) used for drinking water by people.

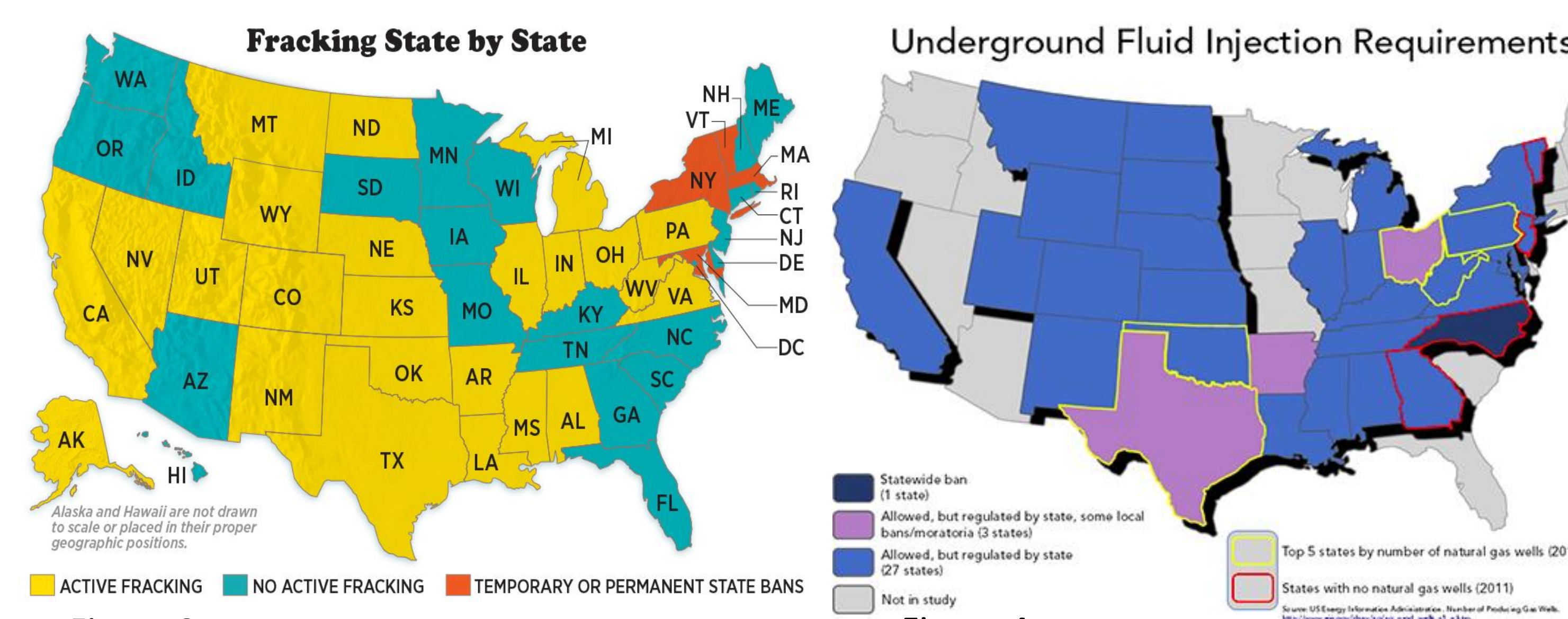


Figure 3.

Figure 4.

U.S. LEADS IN NATURAL GAS & OIL PRODUCTION

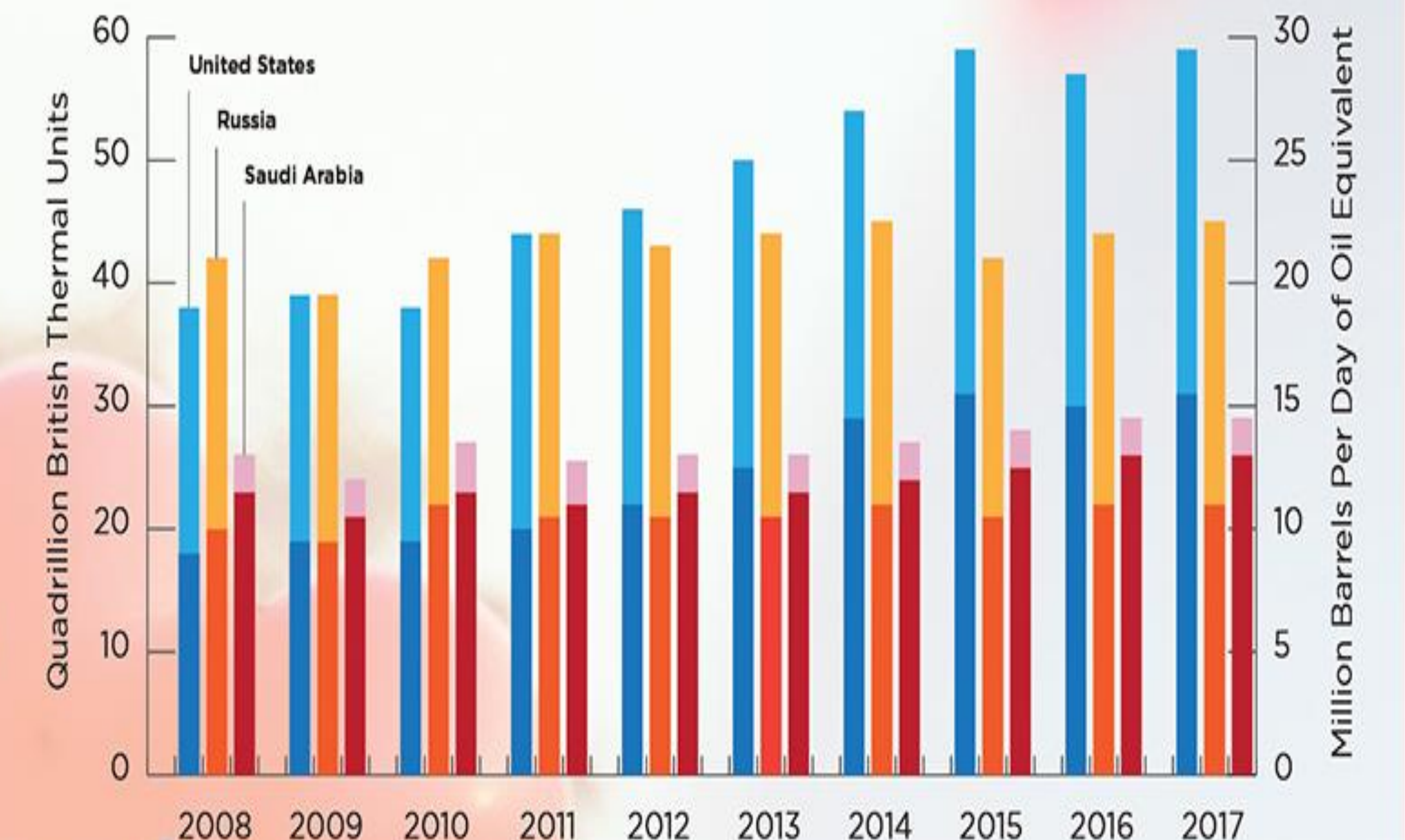


Figure 1. United States leads world production of oil and natural gas production due to hydraulic fracking.

THE IMPORTANCE OF FRACKING

- ❖ As a result of fracking, U.S. production of oil and natural gas has increased dramatically.
- ❖ Fracking has decreased the dependency of the United States' economy of foreign oil and natural gas resources.
- ❖ It has lowered the process of oil and natural gas on the market (more availability = lower prices).
- ❖ The U.S. has turned from an importer of oil and natural gas into an exporter as a result of the process.
- ❖ Fracking has lowered air pollution and carbon dioxide emissions by displacing coal in electricity generation.

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