

SHALE 101

AN OVERVIEW
OF SHALE ENERGY

WHAT IS SHALE?

Energy from shale could be a game changer for our economy and for our energy future. Shale energy is both natural gas and oil produced from shale, a fine-grained sedimentary rock found in at least 22 onshore shale basins in more than 20 states across the U.S. Shale deposits have long been known to contain large quantities of oil and natural gas, but the resources were not economically recoverable until recently.

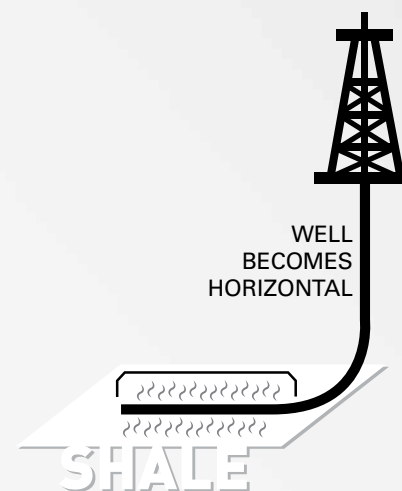
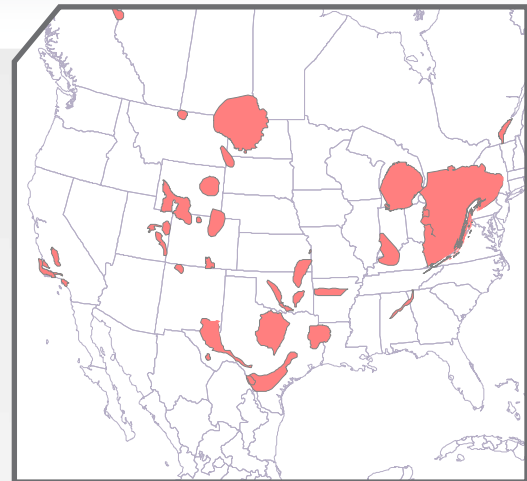
SHALE IN THE U.S.

Thanks to the spirit of American innovation and ingenuity, an environmentally sustainable way to utilize our shale resources has been found. **Energy companies have combined two established technologies – hydraulic fracturing and horizontal drilling – to successfully unlock shale energy resources.** Today, these innovations have led to enhanced, more efficient techniques to release shale energy from this very dense rock located miles underground.

FUTURE GROWTH OF SHALE

Shale may contain both oil and natural gas. Over the last few years, we've seen a rapid increase of natural gas production from shale, which now accounts for over 35 percent of our total gas produced. Shale gas production across the country has increased rapidly in the past few years. This growth is expected to continue; **in fact, almost all the future growth of U.S. natural gas production capacity is expected to come from shale gas.**

CURRENT SHALE DEVELOPMENT IN THE UNITED STATES



Two of the major shale formations are the **Marcellus** and **Utica** formations, which stretch across much of the eastern U.S.

The **Marcellus Shale** formation is one of the largest shale regions in the U.S. and is estimated to be the second largest natural gas find in the world.

- ▲ 400 year-old formation
- ▲ NY, PA, WV, OH, MD
- ▲ Estimated 95,000 square miles and 410 trillion cubic feet of natural gas
- ▲ Most active areas are in West Virginia and Pennsylvania
- ▲ Could supply U.S. consumers' energy needs for hundreds of years.

The **Utica Shale** is a geological formation located thousands of feet below the Marcellus Shale formation. It is thicker than the Marcellus and more geographically extensive.

- ▲ Already proven able to support commercial production
- ▲ KY, MD, NY, OH, PA, TN, WV, VA
- ▲ Also beneath parts of Lake Ontario and Lake Erie
- ▲ Exact size is unknown, however, early testing indicates that it will be a significant source of natural gas.



INSTITUTE FOR 21ST CENTURY ENERGY
U.S. CHAMBER OF COMMERCE

SHALE
Works For US

WWW.SHALEWORKSFORUS.COM

SHALE 101

AN OVERVIEW
OF SHALE ENERGY

The Technology of Shale Energy Production

Hydraulic fracturing has played an important role in the development of America's oil and natural gas resources for nearly 60 years. Recent advances in hydraulic fracturing techniques have enabled exponential growth in the production of shale energy. Hydraulic fracturing is a proven, safe technology that uses water pressure under tight controls to create fractures in rock that allows the oil and natural gas it contains to escape and flow out of a well. **Hydraulic fracturing unlocks oil and natural gas resources in places where conventional technologies cannot reach.**

The Rise of Shale Energy

American innovation and entrepreneurship has created what has become a very robust shale industry in the U.S. The past several years have seen a surge in production along with rapid discovery of large new deposits for future use.

- ▲ In 2011, shale gas made up **34 percent** of U.S. natural gas production, up from **2 percent in 2000**.
- ▲ By 2015, that share will grow to **43 percent**, and will more than double – reaching **60 percent** – by 2035.
- ▲ With the advent of shale gas development, there is enough recoverable domestic natural gas to meet America's needs for at least **100 years** at current consumption rates.

Beyond Energy: The Benefits of Shale

Shale energy is not just a source of fuel for generating electricity or for transportation; it is also a raw material used to manufacture many of the products we rely on every day, such as clothing, plastics, pharmaceuticals and equipment. Many industrial facilities like manufacturing plants use shale energy to power their machines. Natural gas can also be used as a fuel alternative for trucks and buses, and to generate critical backup power for intermittent renewable energy sources such as solar and wind.

The U.S. imported more than \$330 billion in petroleum and related products in 2011, a significant portion from countries where political unrest and turmoil creates volatility. Developing domestic energy sources like shale can provide a more stable energy supply to help limit the effects of international energy related crises.

The economic impacts of shale energy are extensive and growing every day. Shale development has brought hundreds of thousands of jobs and billions of dollars to our nation's economy, all while significantly improving the United States' energy security.

DID YOU KNOW?

An estimated 35,000 wells are hydraulically fractured annually.

Because of hydraulic fracturing and the ability to access such a broad range of source rock with a single well, productivity of shale energy wells today is very high. Although a shale well costs several million dollars to drill and complete, the full cycle, per-unit cost of energy produced is much lower than for a conventional well by as much as 50 percent compared to conventional wells. In addition, the advancements in technology allow for shale wells to have a much smaller environmental footprint than in the past because many more wells can be drilled from a single access point on the surface.



INSTITUTE FOR 21ST CENTURY ENERGY
U.S. CHAMBER OF COMMERCE

SHALE
Works For US

WWW.SHALEWORKSFORUS.COM