SHALE 101 AN OVERVIEW OF SHALE ENERGY

WHAT IS SHALE?

SHALE IN THE U.S.

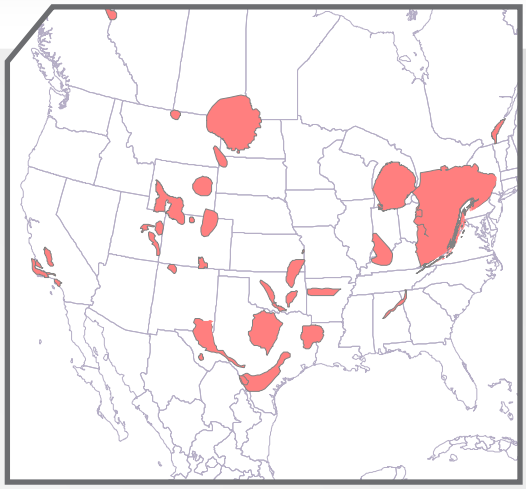
FUTURE GROWTH OF SHALE

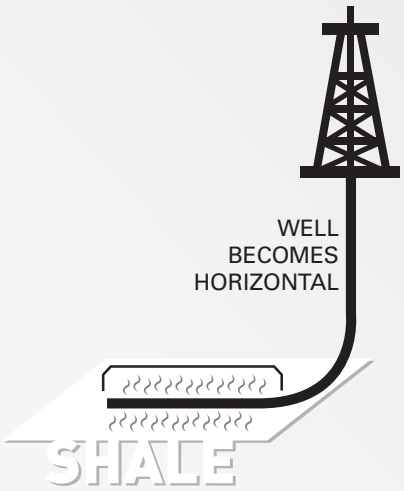
Energy from shale could be a game changer for our economy and for our energy future. Shale is a fine-grained sedimentary rock found in at least 22 onshore shale basins in more than 20 states across the U.S. Shale deposits have long been known to contain large quantities of oil and natural gas, but the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

Thanks to the spirit of American innovation and ingenuity, an environmentally sustainable way to utilize our shale resources has been developed. **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.

Shale may contain both oil and natural gas. Over the last few years, we've seen a rapid increase of energy production from shale, which now accounts for 32% of total domestic oil production and 50 percent of total natural gas production. Shale energy production across the country has increased rapidly in the past few years. This growth is expected to continue; **in fact, almost all the projected growth of U.S. oil and natural gas production capacity through 2035 is expected to come from shale energy development.**

CURRENT SHALE DEVELOPMENT IN THE UNITED STATES





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DID YOU KNOW...

AN ESTIMATED 35,000 WELLS ARE USING HYDRAULIC FRACTURING ANNUALLY.

Because of hydraulic fracturing and the ability to access large amounts of energy in a single well, productivity of shale energy wells today is very high. The full cycle, per-unit cost of energy produced from a shale well is as much as 50 percent less than a conventional well. In addition, the advancements in technology allow for shale wells to have a much smaller environmental footprint because many more wells can be drilled from a single access point on the surface.

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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 2012, shale oil production made up **32 percent** of U.S. oil production, up from **3 percent** in 2000 and **50 percent** of U.S. natural gas production, up from **2 percent in 2000**.
- By 2015, the shares could grow to about 46 percent for shale oil and **65 percent for shale gas**, reaching 63 percent and **80 percent** respectively by 2035.

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. Increased shale oil production is expected to cause net oil imports to decrease nearly 50% by 2020, reducing America's imported oil bill by $185 billion.

THE ECONOMIC IMPACTS OF SHALE ENERGY ARE EXTENSIVE AND GROWING EVERY DAY.

Shale development has brought millions of jobs and billions of dollars to our nation's economy, all while significantly improving the United States' energy security.

BY 2020 SHALE ENERGY DEVELOPMENT COULD SUPPORT

- **JOBS** 3 Million
- **STATE & LOCAL GOVERNMENT REVENUE** $113 Billion*
- **ECONOMIC GROWTH** $417 Billion*
- **LABOR INCOME** $215 Billion*

*annually

Based on analysis published by IHS in America's New Energy Future: The Unconventional Oil and Gas Revolution and the US Economy, Volume II. This study quantifies economic benefits derived solely from extraction, or "upstream," activities. Subsequent analysis will include all activities including consumption or "downstream."