

From a Diamond Drill Bit to a Renaissance in American Manufacturing:

5 FACTS

About the Impact of DOE RESEARCH and the SHALE REVOLUTION

Beginnings.

It all began in the 1970s when the **Energy Research and Development Administration**, the predecessor to the Department of Energy (DOE), **partnered with General Electric to develop advanced diamond-studded drill bits** that cut through shale rock more effectively than ever before.



New Drilling Technologies.

Between 1978 and 1992, **DOE invested about \$137 million** in research that **developed the horizontal and directional drilling and stimulation technologies**—putting the diamond drill bit to good use.

The Birth of a Revolution.

In the hands of the private sector, **DOE-funded research and development technologies spurred production of shale gas across the United States**—beginning with the Barnett Shale in Texas in the 1980s. These technologies allowed Barnett Shale **to be the first to produce oil and gas from shale**. From there, the technologies were used in other shale formations, and the shale revolution was born.



Energy Landscape Changes Dramatically.

Rapid growth in U.S. oil and gas production from shales dramatically changed the domestic and global energy landscape. **The United States is now the global leader in natural gas production**. Abundant lower-cost natural gas also **drove down energy costs**—and helped **reduce America's CO₂ emissions**. Natural gas now produces more electricity in the United States than any other energy source.



Renaissance in American Manufacturing.

Greater hydrocarbon production has led to a significant decrease in the cost of feedstocks needed to make petrochemical products like plastic, fertilizer, and adhesives. As a result, **the petrochemical industry**, which was making huge cuts in the 2000s, **has made a sharp turnaround**. This shift will have many positive impacts for years to come because petrochemicals are a foundation of a modern manufacturing economy.



And all this began with diamonds and the development of a drill bit.

Today, DOE continues to fund and promote research to make shale development as economically feasible and environmentally safe as possible. The growth of the shale gas industry and its tremendous impact on the domestic energy sources, the economy, and manufacturing are just a reminder of the significant impact of the work DOE does every day.