



Providing Energy Security and Supporting Our Quality of Life

Background

The U.S. Department of Energy's (DOE) Office of Fossil Energy produced the report *U.S. Oil and Natural Gas: Providing Energy Security and Supporting Our Quality of Life*, to recognize the critical role of advanced energy technology innovation in maintaining U.S. economic success and providing a sustainable domestic energy supply for the future.

Over the past two decades, Americans have witnessed a dramatic rise in the Nation's ability to produce the power needed to support a vibrant economy and a modern lifestyle. The United States is now a world leader in oil and gas production.

This report focuses on the important benefits that this growth in oil and gas production has created, in addition to the key advances in technology that have made this growth possible.

Oil and Gas are Essential for America's Needs

Oil and natural gas have an essential role in powering America's economy and fueling a remarkable quality of life in the United States. Together, oil and natural gas provide more than two-thirds of the energy Americans consume daily.

Several key advances in technology have enabled a dramatic increase in domestic oil and gas production, providing energy security and economic benefits to the entire country.

Benefits of Oil and Natural Gas Production

Oil and natural gas are used in many ways that are familiar to consumers, but petroleum products do much more than fuel cars and power homes and businesses.

Natural gas helps decrease carbon dioxide (CO₂) emissions from electricity production while providing secure, on-demand power needed to scale up wind and solar energy. Oil and natural gas also supply high-tech materials that

make renewable, low-carbon energy sources economically feasible.

Additionally, all Americans directly benefit from increased domestic production. Not only is natural gas the largest contributor to the Nation's electric power generation, but oil and natural gas combined are revitalizing the U.S. petrochemical manufacturing industry, supplying high-tech materials, increasing commerce by exporting liquefied natural gas, supporting renewable energy, and creating well-paying jobs across the country.

At the same time, reducing the environmental footprint per unit of oil and natural gas produced by implementing lower-impact extraction technologies has made oil and natural gas competitive with other energy sources in terms of environmental sustainability.



While perhaps less recognized, oil and natural gas also have critical roles in supplying essential products and materials, increasing agricultural productivity, and supporting the expansion of new energy sources. Plastics and chemicals derived from oil and natural gas make food easier to prepare, clothing more comfortable, homes easier to care for, and everyday life more convenient.

Oil and Natural Gas Technology Innovations

More than 40 years of industry and government investments in research and technology development dramatically changed the technical capability of the domestic oil and natural gas industry.

Technology innovations have transitioned the United States away from dependence on energy imports and have alleviated concerns about energy resource scarcity.

Economically recoverable domestic energy resources are now much more plentiful, and the United States has become an influential force in international energy markets.



Five of the key technologies that have driven U.S. oil and natural gas production include:

1. Advances in science and new extraction methods fostered by the shale revolution;
2. Floating platforms and subsea completions that help overcome the deepwater offshore barrier;
3. New geologic settings and sources of CO₂ that support the increased use of CO₂ enhanced oil recovery;
4. Artificial intelligence and machine learning that enable more cost-effective extraction and transportation of oil and natural gas;
5. New technologies that mitigate the environmental impacts of oil and natural gas production.

Opportunities for the Future

Affordable oil and natural gas production will continue to play an important role in America's energy supply for the foreseeable future, which will continue to underpin U.S. economic and energy security. Oil, natural gas, and natural gas liquids are projected to account for the majority of

U.S. energy consumption for the next two decades, even with the steady growth of renewable energy sources like wind, solar, and biomass.

U.S. crude oil production will continue to be dominated by production from tight oil plays—areas where crude oil is contained in oil-bearing

formations of low permeability, often shale or tight sandstone—such as those in the Permian Basin of Texas and New Mexico and the Williston Basin of North Dakota.

And, natural gas production will continue to be dominated by production from shale gas plays such as the Marcellus Shale in the Appalachian Basin and associated gas from tight oil plays.

Investments in research and technology have enabled the United States to become a world leader in oil and natural gas production, yielding valuable benefits enjoyed by Americans in all walks of life. As the United States continues to address new challenges, DOE remains focused on fostering technological innovations that ensure the Nation's strong energy future.

For Additional Information

Visit DOE's Office of Oil and Natural Gas [website](https://www.energy.gov/articles/department-energy-issues-report-benefits-us-oil-and-natural-gas-providing-energy-security) (<https://www.energy.gov/articles/department-energy-issues-report-benefits-us-oil-and-natural-gas-providing-energy-security>) to download the *U.S. Oil and Natural Gas: Providing Energy Security and Supporting Our Quality of Life* report.

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