

UNCONVENTIONAL RESOURCES



NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

The increasing demand for energy and the need to explore, characterize, and produce cleaner domestic fossil energy resources requires continued research into ways to enhance recovery and minimize risks associated with domestic oil and gas production. NETL researchers are addressing these needs through work under a series of programs and projects categorized as **Unconventional Resources**¹ research.

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Albany, OR • Anchorage, AK • Houston, TX • Morgantown, WV • Pittsburgh, PA



U.S. DEPARTMENT OF
ENERGY



NETL implements this effort as part of DOE's Oil & Gas Program.

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Unconventional resources research within NETL's Oil and Gas Recovery Portfolio is designed to ensure that a reliable, affordable, and secure domestic supply of oil and natural can be developed and produced in a manner that maximizes recovery efficiency while minimizing impacts on the environment.

Despite significant growth in the production of unconventional resources during the “shale revolution,” the mechanisms controlling recovery efficiency in these reservoirs remains poorly understood. Recovery factors, such as the ratio of produced resource to total in-place, are typically low – approximately 20 percent in gas-rich shale reservoirs and less than 10 percent in liquid-rich plays. Increasing the per well recovery factors of these unconventional plays will reduce the number of wells required to economically exploit the resource and lessen developmental impact on the environment.

Three universally accepted drivers provide a clear focus for research in this area:

- Conventional domestic natural gas production is declining and the primary alternative for replacing it (e.g., natural gas from hydraulically fractured shales) involves an increased demand for fresh water and the possibility of induced seismic events related to increased fracturing wastewater disposal.
- Stakeholder interest, concern and attention is increasingly concentrated on solutions that are capable of increasing the percentage of in-place unconventional hydrocarbons recovered and ways to reduce costs associated with reservoir characterization, stimulation, and production.
- Increased use of clean-burning natural gas for power generation remains an essential element of any strategy to help the U.S. transition to a lower carbon footprint.

NETL's research is intended to improve understanding of unconventional resources, increase the recovery of those resources, and mitigate developmental impacts associated with their recovery.

CHARACTERIZING EMERGING PLAYS — NETL characterizes emerging oil and natural gas accumulations at the resource and reservoir level and publishes the information to support effective economic development.

IMPROVING RECOVERY EFFICIENCY — Researchers identify and help accelerate development of economically viable technologies to produce natural gas and oil resources in a more efficient and affordable manner.

MITIGATING IMPACT ON THE ENVIRONMENT — Work is focused on reducing the environmental and operational impacts of oil and gas production.

UNCONVENTIONAL RESOURCE TECHNOLOGIES WILL EXTRACT THE FULL ECONOMIC VALUE FROM OUR NATION'S TIGHT OIL AND GAS RESOURCES BY:

- Reducing domestic natural gas and oil supply cost
- Reducing supply risks for regional manufacturing centers that rely on natural gas for fuel or feedstock
- Increasing recovery per well and per pad, with a concurrent reduction in surface disruption per unit of resource recovered
- Increasing royalty and state tax revenues for oil and natural gas producing states
- Enhancing U.S. energy security, including reduced oil imports
- Strengthening U.S. resource export potential, and maximizing value for domestic energy stakeholders

TECHNOLOGY PARTNERSHIPS

NETL maintains research partnerships with industrial, academic and research partnerships for field laboratories to catalyze development and demonstration of innovative technologies and methodologies for unconventional oil and natural gas development.

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