

# OIL AND NATURAL GAS RESEARCH



# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

The Oil & Gas Recovery portfolio of programs is advancing technologies to improve hydrocarbon recovery efficiency, reduce the operational and safety risks of production, improve the performance of our nation's pipeline infrastructure, and characterize resources in emerging and unconventional plays. The prudent development of our oil and gas resources is essential to ensuring the nation's continued energy resilience, economic strength and security.

Our programs combine theory, computational modeling and advanced optimization tools with field experiments and private sector input in the design and validation of innovative technologies to maximize the safe, efficient and economic recovery of the nation's abundant conventional and unconventional oil and gas resources and unlock the game-changing secrets of gas hydrates. We work closely with the private sector to collect insight on "pinch-point" issues where advances in technology may prove valuable, process this information and use it to make informed investment decisions and assist industry stakeholders in overcoming challenges in each of the following areas:

- Unconventional Resources
- Offshore
- Natural Gas Infrastructure
- Gas Hydrates

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



U.S. DEPARTMENT OF  
**ENERGY**



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The Oil & Gas Recovery portfolio of programs is conducting foundational research to improve the production, processing, transportation and storage of our nation's abundant Oil and Natural Gas resources and characterize new sources of hydrocarbons in unconventional and emerging fields to enhance our America's energy resilience, economic strength and security.

## UNCONVENTIONAL RESOURCES

This program develops cost effective technologies with the goal of ensuring a reliable, affordable, and secure domestic supply of oil and clean-burning natural gas that is developed and produced in a manner that minimizes environmental impact. While the definition of the term "unconventional" has evolved over time, this research program is focused on the production of hydrocarbons—primarily natural gas — from shale and other tight formations. The current portfolio of active projects is balanced among efforts to reduce operational impacts by improving recovery efficiency, develop and test cost-effective monitoring technologies, and more accurately quantify and assess the operational risks associated with various elements of the exploration and production process.

## OFFSHORE

While recent estimates of existing oil and gas resources within the United States have expanded, these resources are increasingly harder to locate and produce based on their environment. An example can be found in the current subsalt lower tertiary play. To safely and economically develop and extract these resources, innovative technologies are required. High-temperature and high-pressure (HPHT) conditions, geohazards, the need for increasingly sophisticated seismic imaging to visualize deep and complex reservoirs, flow assurance issues in deep-water pipelines and the demands of operating subsea production equipment under extreme conditions are just a few of the obstacles under investigation within this program that cause these resources to be increasingly difficult to locate and safely develop.

## NATURAL GAS INFRASTRUCTURE

The U.S. natural gas pipeline network is vast, including more than 210 individual pipeline systems that total more than 300,000 miles of interstate and intrastate transmission pipelines. A leak or rupture anywhere in a pipeline system releases methane into the atmosphere and causes a significant disruption in transmission service. This program is developing tools and technologies to improve the resiliency and flexibility of natural gas pipeline components, monitor and forecast leakage throughout the infrastructure chain, improve leakage repair downtime and reduce the loss of valuable resources.

## GAS HYDRATES

Activity in this area is focused on collaborating with industry, academia, international research organizations and other U.S. government agencies to advance the scientific understanding of gas hydrates as they occur in nature so that their role as a safe and economic resource can be more fully understood. Three parallel paths are being pursued: the first, to confirm the scale and nature of the potentially recoverable resource through complex drilling and coring programs; the second, to develop technologies needed to safely and efficiently find, characterize and recover methane from hydrates through field testing, numerical simulation and laboratory experimentation; and the third, to better understand gas hydrate's role in the natural environment.

NETL utilizes several field laboratories as mechanisms to improve characterization of the subsurface and effectively assess novel processes to improve recovery efficiency in multiple basins around the United States. These field laboratories also serve to gather valuable data, optimize well completions, maximize recovery from conventional and unconventional reservoirs and minimize operational impacts to the environment.

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