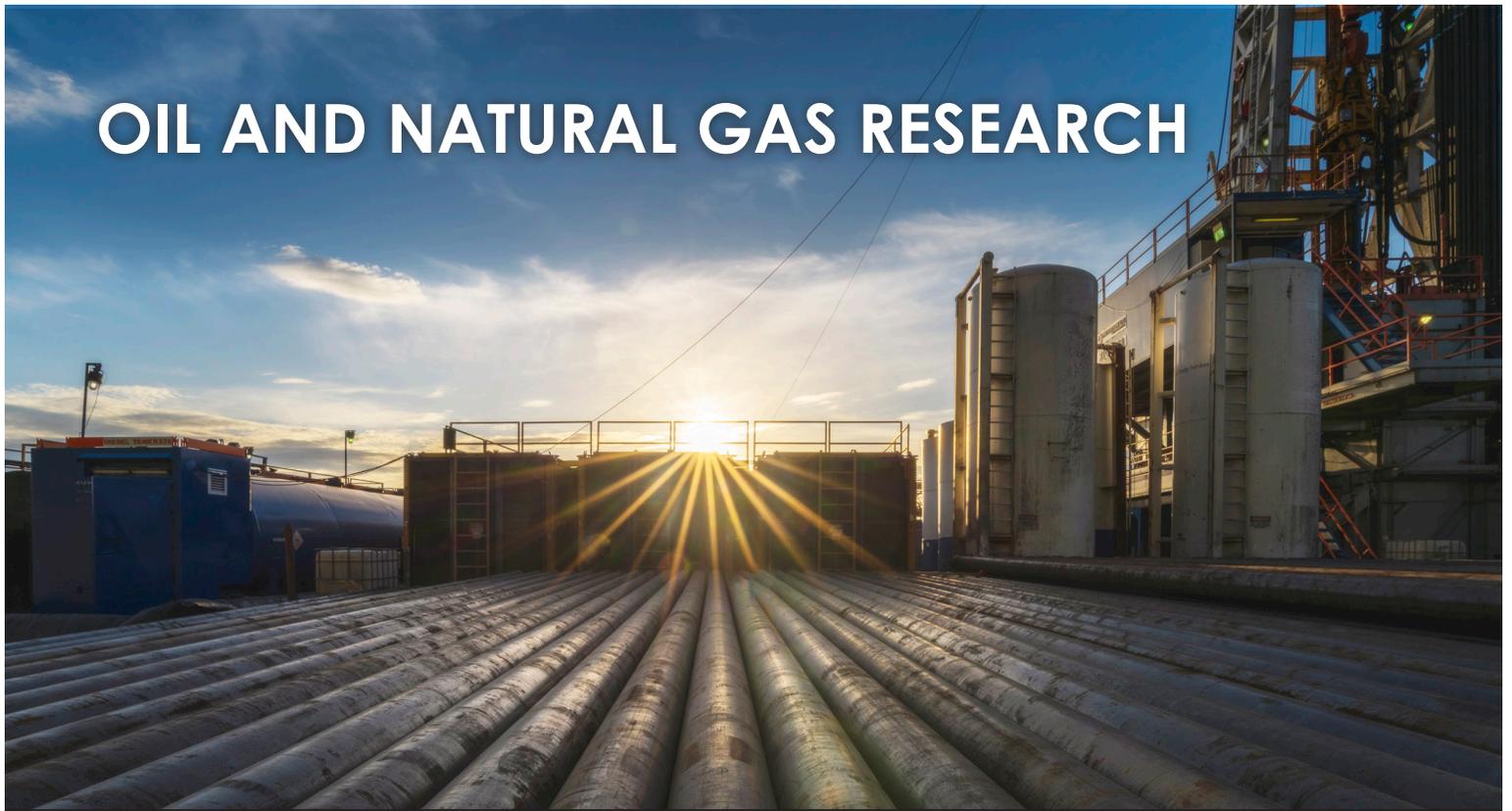


OIL AND NATURAL GAS RESEARCH



NETL's Oil & Natural Gas programs are 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. As we responsibly transition to greater reliance on renewable energy resources, prudent development of our oil and gas resources is essential to ensuring the nation's continued energy resilience, economic strength, and security.

*In geological terms, a petroleum play is a group of actual or prospective oil fields in the same region that are controlled by the same set of geological circumstances. This term is widely used concerning the extraction of hydrocarbon-based resources.

NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

NETL's 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, unlocking the potential of gas hydrates. NETL works closely with the private sector to collect insight on "pinch-point" issues where advances in technology may prove particularly valuable. NETL then processes this information and uses it to make informed research investment decisions and to assist industry stakeholders in overcoming challenges in each of the following areas:

- Conventional and Unconventional Resources
- Offshore Oil & Gas Production
- Natural Gas Infrastructure
- Methane Hydrates

Through the Oil & Natural Gas portfolio of programs, NETL 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

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 a variety of hydrocarbons (natural gas, natural gas liquids, and oil) from shales and other tight formations. The current portfolio of active projects is balanced among efforts to improve recovery efficiency, develop and test cost-effective ways to characterize the subsurface, and more accurately quantify and validate transformational tools, technologies, and processes.

OFFSHORE

Following the tragic Deepwater Horizon accident and major oil spill in the Gulf of Mexico in 2010, two federal programs evolved. The first was the Gulf Research Program, funded via the RESTORE act as supported by fines paid by the company involved in the incident. This program is focused on offshore environmental restoration and advancement of offshore response capability. The second program is DOE’s Offshore Program, which is focused on spill prevention technology development. The centerpiece of that work is NETL’s Offshore Risk Model project. This big-data, AI/ML project focuses on developing an integrated modeling and data system from the subsurface to the shore, including evaluation of potential risks and identification of knowledge and technology gaps to inform offshore spill prevention efforts. This initiative is currently continuing into Phase 2 as Geohazard and Subsurface Uncertainty Modeling. It has gained the interest from the U.S. Coast Guard, the Bureau of Safety and Environmental Enforcement, and the Bureau of Offshore Energy Management as an aid to decision-making in order to minimize the risk of offshore spills.

NATURAL GAS INFRASTRUCTURE

The United States 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. This program is focused on developing tools and technologies to improve the resiliency and flexibility of natural gas pipeline system components, to monitor, prevent and repair leakage throughout midstream infrastructure, and to capture and utilize natural gas that would be otherwise vented or flared, reducing the loss of valuable resources.

METHANE HYDRATES

Methane Hydrates research is focused on collaborating with industry, academia, international research organizations, and other United States government agencies to advance the scientific understanding of naturally occurring subsurface gas hydrates so that their potential role as a safe and economic energy resource can be more fully understood. Three parallel paths are being pursued: 1) to confirm the scale and nature of the potentially recoverable hydrate resource through drilling and coring programs; 2) to develop the technologies needed to safely and efficiently locate, characterize and recover methane from hydrates through field testing, numerical simulation and laboratory experimentation; and 3) to better understand gas hydrate’s role in the natural environment.

LABORATORY NETWORK

The Department of Energy is developing a cohesive network of field laboratories and industry-operated test sites. These sites are being used to carry out collaborative research that will help find better ways for the United States to extract as much energy as possible, with as little environmental impact as possible, from unconventional shale and other low-permeability rock formations. Furthermore, the sites gather and share valuable scientific data and optimize well completions. For more information on these laboratories and sites, please contact NETL Public Affairs.

NETL is a U.S. Department of Energy national laboratory that drives innovation and delivers technological solutions for an environmentally sustainable and prosperous energy future. Through its world-class scientists, engineers and research facilities, NETL is ensuring affordable, abundant and reliable energy that drives a robust economy and national security, while developing technologies to manage carbon across the full life cycle, enabling environmental sustainability for all Americans, advancing environmental justice and revitalizing the economies of disadvantaged communities. Leveraging the power of workforce inclusivity and diversity, highly skilled innovators at NETL’s laboratories conduct a broad range of research activities that support DOE’s mission to ensure America’s security and prosperity by addressing our energy and environmental challenges through transformative science and technology solutions.

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