

# ENHANCED OIL RECOVERY



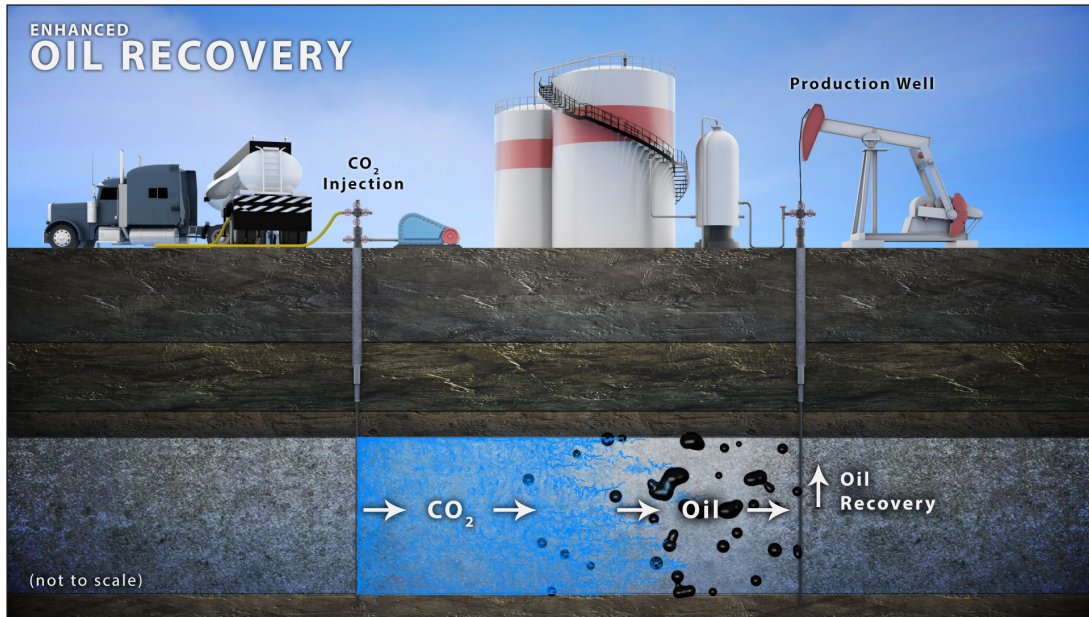
# NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

## OVERVIEW

As the United States continues to pursue the reduction of greenhouse gas emissions into the atmosphere and maintain energy independence, the topic of carbon dioxide (CO<sub>2</sub>) enhanced oil recovery (EOR) continues to be explored as a method for large-scale geologic CO<sub>2</sub> storage, which is needed to mitigate climate impacts. Additionally, recovering incremental oil from conventional fields is an important part of this process.





As much as two-thirds of conventional oil in domestic fields remains unproduced due to the physics of fluid flow that results in oil adhering to matrices in underground formations. CO<sub>2</sub> enhances oil production by mixing with this residual oil saturation and displacing it toward producing wells. During this process, significant volumes of CO<sub>2</sub> become trapped within the reservoir. If the CO<sub>2</sub> used is captured, either from a point source or directly from air, CO<sub>2</sub>-EOR offers an opportunity for greenhouse gas emission reduction.

EOR technologies are also applicable to hydrocarbons in unconventional reservoirs or in tight formations that have unique petrophysical characteristics (such as oil in fractured shales, kerogen in oil shale, or bitumen in tar sands). These constitute a significant potential domestic supply of energy.

In addition, the re-injection of natural gas associated with oil production continues to be investigated as a mechanism for EOR. The use of associated natural gas as an injectate for EOR not only improves incremental recovery, it also reduces further flaring of natural gas, thus representing another opportunity for mitigating greenhouse gas emissions.

NETL is sponsoring field-based research to accelerate the development and application of technologies for enhancing hydrocarbon recovery while offering a significant reduction in greenhouse gas emissions to the atmosphere from both conventional and unconventional reservoirs in fields across the nation. Drivers that provide a clear focus for continuing research, development, and demonstration in this area include:

- Next generation CO<sub>2</sub> EOR technologies that can increase recovery from existing CO<sub>2</sub> EOR projects and accelerate application of the process to other mature oil fields around the country.
- Methods to improve performance, lower costs, and expand storage potential for CO<sub>2</sub> and other gas floods, as well as ways to accelerate their application by independent producers.

## TECHNOLOGY PARTNERSHIPS

NETL maintains research partnerships with industry and academia for field laboratories to catalyze development and demonstration of emerging technologies and methodologies to facilitate widespread application of CO<sub>2</sub> EOR.

For more information, see:

<https://netl.doe.gov/oil-gas/oil-recovery>

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. By leveraging its world-class talent 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.

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