

National Enhanced Oil Recovery Initiative

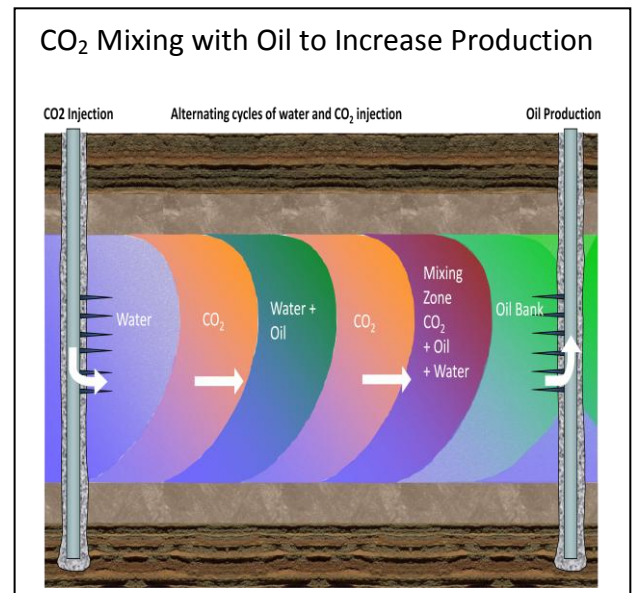
The National Enhanced Oil Recovery Initiative brings together diverse public and private leaders to increase U.S. domestic oil production, energy security, and reduce emissions by capturing carbon dioxide (CO₂) from power plants and industrial facilities¹ and safely storing it in oil fields.

Launched in July 2011, the National Enhanced Oil Recovery Initiative's purpose is to develop and advance policy recommendations to increase U.S. domestic oil production from existing oil fields through enhanced oil recovery (EOR) and to store CO₂ captured from power plants and industrial facilities. The private sector, government and NGO leaders participating in this initiative aim to enhance U.S. energy security, promote job and economic growth, and reduce CO₂ emissions.

How does CO₂-EOR work? CO₂-EOR works most commonly by injecting CO₂ into already developed oil fields where it mixes with and "releases" additional oil from the formation, thereby freeing it to move to production wells. CO₂ is separated from the produced oil in above-ground equipment and re-injected in a closed-loop system many times over the life of an EOR operation.

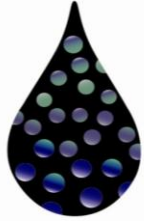
Environmental Benefits

CO₂-EOR, a commercial technology established in North America in 1972, could more than double economically recoverable U.S. oil reserves.²



How does EOR reduce CO₂ emissions? Using CO₂ captured from power plants and industrial sources to enhance oil production has the potential to help the U.S. reduce its emissions by improving the CO₂ intensity of the industrial and power generation sectors. Over the life of a project, for every 2.5 barrels of oil produced, it is estimated that EOR can safely prevent one metric ton of CO₂ from entering the atmosphere.³

A current estimate of CO₂ use for EOR is 72 million metric tons per year; 55 million metric ton of CO₂ come from natural sources and 17 million metric tons come from anthropogenic sources. But the potential for EOR to contribute



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to CO₂ reduction goals is great, as supplies of natural CO₂ are constrained. The volume that could be captured and sequestered from industrial facilities and power plants to support “next generation” EOR could be 20- 45 billion metric tons of CO₂. This is equal to the total U.S. CO₂ production from fossil fuel electricity generation for 10 to 20 years.⁴

Will CO₂-EOR harm groundwater resources?

EOR is governed by federal regulations that require the protection of underground sources of drinking water, under the EPA’s Underground Injection Control (UIC) program. Many states have obtained authority from EPA to administer the UIC program and have laws that meet or exceed EPA’s requirements. Permits issued by the EPA or states require that EOR operators manage their site in a manner that will prevent CO₂ (and other formation fluids) from migrating out of the subsurface confining formation and into drinking water aquifers.⁵

The University of Texas Bureau of Economic Geology’s (TBEG) Gulf Coast Carbon Center has studied the longest running EOR site in the world at the Scurry Area Canyon Reef Operators in Scurry County, Texas (SACROC). SACROC has been operating since 1972 and has injected over 175 million tons of CO₂. TBEG has found no evidence that CO₂ has escaped the EOR site and contaminated groundwater resources.⁶

Furthermore, the International Energy Agency’s Greenhouse Gas Programme (GHGP) Weyburn-Midale CO₂ Monitoring and Storage project is

the site of the world’s largest CO₂ monitoring project. Since 2000 more than 30 internationally recognized research organizations have conducted scientific assessments of the integrity of the geological storage system, monitored CO₂ in the deep subsurface, and tested for any evidence of anthropogenic CO₂ at the surface. None of the studies have detected anthropogenic CO₂ in the soils or groundwater.⁷

What is the land use impact? CO₂-EOR largely takes place at existing oil fields and CO₂ is transported through underground pipelines thus reducing land use impacts.

The National EOR Initiative is committed to building a pathway to a secure and low-carbon energy future through expansion of CO₂-EOR. A bipartisan group of members of Congress have welcomed the Initiative’s recommendations for legislative consideration.

¹ Examples of industrial facilities include fertilizer production, ethanol production, cement and steel plants.

² The US EIA estimates proved reserves of 22.3 billion barrels. www.eia.gov/oil_gas/natural_gas/data_publications/crude_oil_natural_gas_reserves/cr.html Advanced Resources International estimates 26-60 billion barrels of economically recoverable oil are available through CO₂-EOR. ARI, 2011

³ Industry Sources

⁴ ARI, *Improving Domestic Energy Security and Lowering CO₂ Emissions with “Next Generation” CO₂-Enhanced Oil Recovery (CO₂-EOR)*, June 20, 2011, DOE/NETL-2011/1504.

⁵ 40 CFR §144.12

⁶ See the SACROC Research Project website for a complete list of studies. www.beg.utexas.edu/gccc/sacroc.php

⁷ Cenovus Energy, *Site Assessment Weyburn Unit SW30-5-13W2*, November 2011.