Report claims U.S. can curb carbon emissions while boosting domestic oil production

24 May 2011

A report from the Massachusetts Institute of Technology (MIT) and The University of Texas at Austin urges the U.S. to accelerate efforts to pursue carbon capture and storage (CCS) in combination with enhanced oil recovery (EOR), a practice that could increase domestic oil production while significantly curbing emissions of carbon dioxide (CO_2).

For decades the oil industry has used CO_2 to extract oil from mature fields, often relying on purchased CO_2 from natural sources. The idea of seeking CO_2 from industrial sources, such as coal- and natural gas-fired electricity plants, has gained currency because of public concerns about carbon dioxide emissions.

Widespread adoption of combining enhanced oil recovery with carbon capture and storage faces major hurdles, including development of infrastructure, regulation and economic incentives to manage supply and demand of CO_2.

The report, "Role of Enhanced Oil Recovery in Accelerating the Deployment of Carbon Capture and Sequestration," the result of a symposium conducted by the MIT Energy Initiative and the Bureau of Economic Geology at The University of Texas at Austin, contends the U.S. can overcome these obstacles with sustained research and policy leadership.

According to the report, the potential for storage of carbon emissions through enhanced oil recovery is vast. Scientists believe the principal zones for combining EOR and CCS could accommodate 3,500 gigawatt-years-equivalent of CO2 from coal power plants. This represents about 15 years of current total output of CO_2 from U.S. coal plants. Recent research suggests the potential for even greater capacity in the Permian Basin of West Texas.

As a tool for enhanced oil recovery, CO_2 injected underground could boost domestic oil production by as much as three million barrels a day by 2030, according to one estimate, an increase of more than 50 percent over current levels. Such a boost to U.S. energy security would simultaneously help reduce the country's carbon footprint.

In a summary for policymakers, Ernest J. Moniz, director of the MIT Energy Initiative, and Scott W. Tinker, director of the Bureau of Economic Geology, make the case for an organized national CO2-EOR program using anthropogenic CO2 to "kick-start larger-scale carbon sequestration in the U.S. and meet sequestration needs for a significant period if CO_2 emissions pricing is introduced."

Use of anthropogenic CO2 for EOR has the potential, write the co-authors, to contribute to domestic energy production while accommodating national carbon sequestration needs "for at least a couple of decades, quite possibly more."

Given the rough equivalence between the amount of CO_2 the energy industry needs for oil recovery and the amount produced by coal-fired electricity plants, the authors advocate "a serious look at scaling up CO_2-EOR with government support."

Government support will be critical in part because of the complex factors that have to come together to facilitate EOR, including regulatory changes and development of a new pipeline system to get CO_2 from industrial sources to oil-field sinks. First-mover CCS projects also face high financial hurdles requiring some form of financial incentives.

The authors strongly urge the Department of Energy to implement a comprehensive research

and development program that:

• Supports ongoing research on the science and systems of CO_2 storage as it relates to EOR.

• Provides a framework for the value propositions that will make CO_2-EOR feasible for power plant, pipeline, and EOR operators and for the government.

• Puts forward principles for resolving regulatory issues.

• Maps out a phased implementation for CO_2-EOR.

More information: A copy of the report, which was just released based on work begun in 2010, can be found at Symposium on the Role of Enhanced Oil Recovery in Accelerating the Deployment of Carbon Capture and Storage.

Provided by University of Texas at Austin