



Practical, Environmentally Sound CO₂ Sequestration

Carbon Management Plan

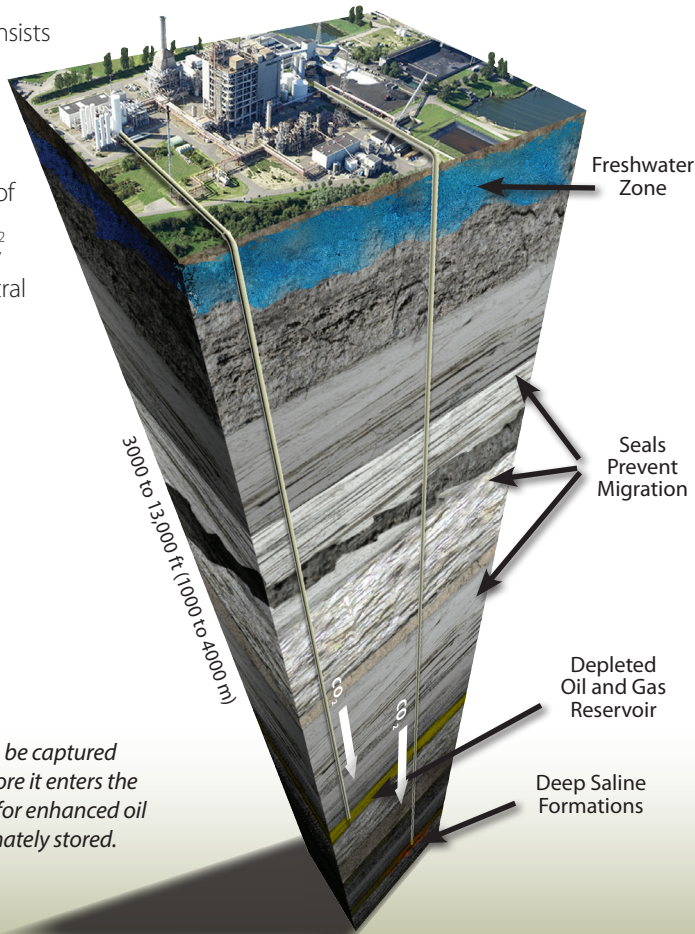
What Is a Carbon Management Plan?

A carbon management plan (CMP) is a strategic document developed for industrial sources of carbon dioxide (CO₂) that enumerates options for capture, transport, and long-term storage of CO₂. This type of plan is often required or expected for permitting new facilities. The Plains CO₂ Reduction (PCOR) Partnership has developed several CMPs for utilities in the northern Great Plains region.

What Is the PCOR Partnership?

The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota and is one of seven regional partnerships operating under the U.S. Department of Energy National Energy Technology Laboratory's Regional Carbon Sequestration Partnership Program. It includes stakeholders from the public and private sectors.

The PCOR Partnership consists of a diverse group of stakeholders working together to better understand the technical and economic feasibility of capturing and storing CO₂ emissions from stationary sources of CO₂ in the central interior of North America.



Anthropogenic CO₂ can be captured and sent to storage before it enters the atmosphere or utilized for enhanced oil recovery and then ultimately stored.

Reducing CO₂ Emissions

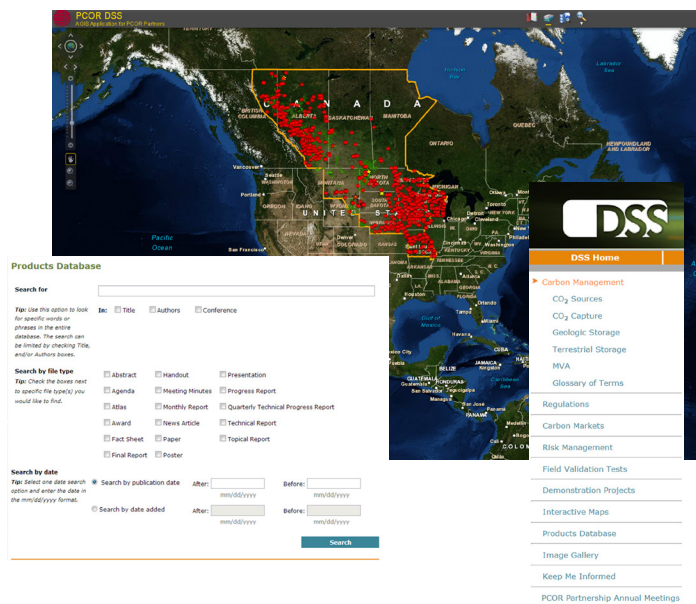
Management of CO₂ from large industrial sources may be desirable in the future because there is increasing concern that anthropogenic (human-made) greenhouse gases entering the atmosphere may affect climate on a global scale. Carbon capture, utilization, and storage (CCUS) could help to control anthropogenic CO₂ emissions to the atmosphere.

Large volumes of relatively pure CO₂ may also be used for enhanced oil recovery (EOR) activities, which, while providing secure, long-term storage of carbon, also make CO₂ a marketable commodity with real economic value. CO₂-based EOR is typically conducted through CO₂ flooding, a process by which a fluid stream is injected into the target reservoir in a supercritical state, i.e., at a temperature and pressure at which the CO₂ exhibits the dissolution property of a liquid and the space-filling property of a gas. The optimal reservoirs for which CO₂ flooding should be considered are those in which a significant incremental increase in oil production would result from the injection of CO₂ and long-term/indefinite storage of CO₂ would be ensured.

Drivers for CCUS

A primary driver for CO₂ capture, utilization, and storage is the desire by a growing number of public and private stakeholder groups to reduce CO₂ emissions to the atmosphere as part of a strategy to mitigate global climate change. This desire is reflected in increasing efforts at both the state and federal levels throughout the United States to develop legislation and regulations aimed at carbon management.

A second driver is the use of CO₂ for EOR, which has yielded significant dividends for both buyers and sellers of CO₂ in many oil-producing regions throughout the world. Unfortunately, in some regions, the quantity of CO₂ is insufficient relative to the number of oil fields that are suitable for CO₂-based EOR projects. The sale of CO₂ for this purpose may be profitable, depending on the costs associated with capture and compression of the CO₂ and construction of pipelines and booster stations.



What Information Is Contained in a Carbon Management Plan?

Although each CMP is tailored to meet the client's individual interests and needs, the following key information is typically contained in a CMP:

- Estimation of CO₂ storage capacity for known geologic and/or terrestrial sinks located near the CO₂ emission source.
- Evaluation of current and future potential markets for CO₂, including CO₂-based EOR and enhanced coalbed methane (ECBM) opportunities.
- Discussion of technical and economic issues associated with existing and potential future infrastructure needs related to carbon management, including pipeline and compression requirements.
- Identification of existing local, state, and federal regulations and government incentives that may affect the utilization of CO₂.
- Analysis of intangible factors (i.e., the potential for out-of-state competition or political and/or economic trends in the region) that may affect the CO₂ marketplace.

This information allows industrial clients to make well-informed decisions regarding the potential utilization of CO₂ from existing or planned facilities. The identification of promising CO₂ markets can enable a CO₂ source to capitalize on potential profitable opportunities, such as EOR and ECBM, earlier than other competitors. A CMP also provides the client with an understanding of the magnitude and scope of technical and economic challenges that may be associated with CO₂-flood EOR, ECBM, and geologic and terrestrial carbon storage.

One of the key resources developed through the PCOR Partnership is a Decision Support System (DSS, © 2007–2012 EERC Foundation®), a geographic information system (GIS)-based database trust that provides the EERC and PCOR Partnership members with a tool to evaluate CO₂ storage opportunities in the region. The DSS houses tremendous volumes of data, including CO₂ source locations, emission data, and potential geologic and terrestrial sink locations and capacities.

Would you like us to develop a carbon management plan for you?

The Plains CO₂ Reduction (PCOR) Partnership is a group of public and private sector stakeholders working together to better understand the technical and economic feasibility of storing CO₂ emissions from stationary sources in the central interior of North America. The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota and is one of seven regional partnerships under the U.S. Department of Energy's National Energy Technology Laboratory Regional Carbon Sequestration Partnership Initiative. To learn more, contact:

Charles D. Gorecki, Senior Research Manager, (701) 777-5355; cgorecki@undeerc.org

Edward N. Steadman, Deputy Associate Director for Research, (701) 777-5279; esteadman@undeerc.org

John A. Harju, Associate Director for Research, (701) 777-5157; jharju@undeerc.org

Visit the PCOR Partnership Web site at www.undeerc.org/PCOR. New members are welcome.



Sponsored in
Part by the U.S.
Department of
Energy

