



Fact Sheet

Practical, Environmentally Sound CO₂ Sequestration

What Is the PCOR Partnership?

The Plains CO₂ Reduction (PCOR) Partnership is one of seven regional partnerships operating under the U.S. Department of Energy (DOE) National Energy Technology Laboratory (NETL) Regional Carbon Sequestration Partnership (RCSP) Program. The RCSP Program is a government–industry effort tasked with determining the most suitable technologies, regulations, and infrastructure needs for CCS on the North American continent. The RCSP Program initiative is being implemented in three phases:

- Phase I – Characterization Phase (2003–2005): characterized opportunities for carbon sequestration
- Phase II – Validation Phase (2005–2009): focused on small-scale field tests
- Phase III – Deployment Phase (2007–2017): large-volume carbon storage tests currently under way

The PCOR Partnership is led by the Energy & Environmental Research Center (EERC) at the University of North Dakota in Grand Forks, North Dakota. The PCOR Partnership's many public and private sector stakeholders have expertise in agriculture, forestry, economics, energy exploration and production, geology, engineering, and the environment. Since the PCOR Partnership's inception in 2003, its members have provided data, guidance, financial resources, and practical experience with CCS and terrestrial sequestration. The PCOR Partnership includes all or part of nine states (Iowa, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, Wisconsin, and Wyoming) and four Canadian provinces (Alberta, British Columbia, Manitoba, and Saskatchewan).

Phase I activities were completed in September 2005. During Phase I, the PCOR Partnership assessed and prioritized

the opportunities for sequestration in the region and helped to identify and assess the technical, regulatory, and environmental barriers to the most promising sequestration opportunities. At the same time, the PCOR Partnership helped inform policy makers and the public regarding CO₂ sources, sequestration strategies, and sequestration opportunities.



PCOR Partnership region and Phase II and III test sites.

What Is CCS?

Carbon dioxide (CO₂) is a major by-product of energy use. Carbon capture and storage (CCS) means capturing CO₂ and putting it into environmentally sound permanent storage. Terrestrial sequestration is capturing CO₂ from the air and storing it for some period of time in soils or vegetation. Geologic CCS is capturing CO₂ from exhaust or process gas from large stationary facilities like factories and power plants and placing it in permanent storage, usually in underground geologic formations.

Why CCS?

There is concern that the ongoing accumulation of CO₂ and other greenhouse gases in the atmosphere from human activity may affect global climate. President Bush's Global Climate Change Initiative, issued in the spring of 2003, called for an 18% reduction in U.S. CO₂ intensity by 2012. Conservation, more efficient power systems, renewable energy, and CCS are all tools to help reduce CO₂ intensity.

Purpose of the Project

The PCOR Partnership is assisting in the development of technologies to reduce CO₂ emissions to the atmosphere from large-scale sources as well as implementing projects to help reduce the level of CO₂ already in the atmosphere without adversely affecting economic growth or disrupting energy supply. The results of the PCOR Partnership's field tests will be used to 1) demonstrate the effectiveness of using CO₂ to enhance the production of hydrocarbons in reservoirs, 2) exhibit the cost-effective use of oil reservoirs and lignite coal seams for safe storage of CO₂, and 3) establish a means by which carbon markets can facilitate more recovery of oil and gas from the region.

Phase II ran October 1, 2005, to September 30, 2009, and included four field validation tests along with regional characterization, regulatory and permitting activities, and outreach. Three of these field-based demonstration projects focused on injecting CO₂ into geologic formations for the dual purpose of CO₂ sequestration and enhanced hydrocarbon production. The goals of these three demonstrations were twofold: 1) to develop approaches and attendant data sets that verified the ability of the target formations to store CO₂ as well as the potential to produce additional hydrocarbons through CO₂ injection and 2) to develop a scientifically defensible, engineering- and science-based methodology and mechanism by which carbon credits can be monetized for CO₂ sequestered in geologic formations. The monetization of carbon credits will enhance the economics of CO₂ enhanced oil recovery operations in the region. PCOR Partnership activities also support the implementation of technologies to capture CO₂ at existing facilities throughout the region as well as technologies to support safe transportation and geologic CO₂ storage.

The EERC was awarded a research contract from DOE NETL for PCOR Partnership Phase III activities in late September 2007. Phase III is a 10-year project running from October 1, 2007, to September 30, 2017. The activities for Phase III of the PCOR Partnership include two commercial-scale geologic CCS demonstration projects, along with continued regional characterization, outreach, infrastructure development, and regulatory efforts. The PCOR Partnership is currently evaluating the feasibility of injecting up to 2 Mt/year of CO₂ near the Fort Nelson Gas Processing Facility in northeastern British Columbia, Canada. It is also investigating the possibility of an enhanced oil recovery and CO₂ storage project in the Bell Creek oil field in southeastern Montana.

PCOR Partnership Accomplishments

PCOR Partnership accomplishments and activities include:

- A comprehensive regional assessment of CO₂ sources and sinks.
- The development of the PCOR Partnership Decision Support System (DSS, © 2007–2011 EERC Foundation), including a geographic information system (GIS)-based database that provides our sponsors with a tool to evaluate CO₂ sequestration opportunities in the PCOR Partnership region.
- Identification, ranking, and action plans for promising sequestration demonstration projects.
- Recommendations for monitoring and verification systems.
- Outreach materials, including:
 - Over 50 technical topical reports
 - 15 fact sheets on key regional sequestration topics
 - Five 30-minute documentaries for public television:
 - Nature in the Balance: CO₂ Sequestration (completed May 2005)
 - Reducing Our Carbon Footprint: The Role of Markets (completed April 2008)
 - Out of the Air and Into the Soil – Land Practices That Reduce Atmospheric Carbon Levels (completed September 2008)
 - Managing Carbon Dioxide: The Geologic Solution (completed November 2009)
 - Global Energy and Carbon: Tracking Our Footprint (completed October 2010)
 - The PCOR Partnership Atlas, 3rd Edition, Revised, which provides a general overview of CO₂ sequestration, a graphic summary of major regional CO₂ sources and sinks, and summaries of PCOR Partnership activities.
 - Public and members-only Web sites.



Attendees at the PCOR Partnership Annual Meeting held October 19–21, 2010, in Minneapolis, Minnesota.

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 sequestering 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:

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



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