REGIONAL CARBON SEQUESTRATION
PARTNERSHIP INITIATIVE

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NATIONAL ENERGY TECHNOLOGY LABORATORY

OVERVIEW

In 2003, the U.S. Department of Energy (DOE) awarded cooperative agreements to seven Regional Carbon Sequestration Partnerships (RCSPs), which are tasked to determine the best geologic storage approaches and apply technologies to safely and permanently store carbon dioxide (CO_2) for their specific regions. Geographical differences in fossil fuel use and storage opportunities across North America dictate regional approaches to storage of CO_2 and other greenhouse gases. The RCSPs are focusing on the carbon capture and storage (CCS) opportunities within their specific regions, while collectively building an effective and robust nationwide knowledge base. The RCSP Initiative is being implemented in three phases: (1) the Characterization Phase (2003-2005) collected data on CO_2 stationary sources and geologic formations and developed the human capital to support and enable future carbon storage field tests; (2) the Validation Phase (2005-2013) evaluated promising CO_2 storage opportunities through a series of small-scale field tests; and (3) the Development Phase (2008-2018+) involves the injection and storage of 1 million metric tons or more of CO_2 by each RCSP into regionally significant geologic formations.

RCSP INITIATIVE

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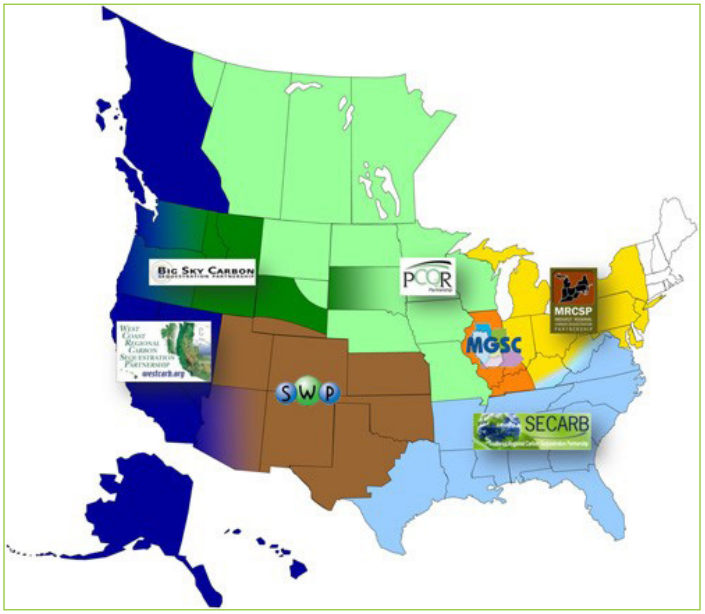
CHARACTERIZATION PHASE

During the Characterization Phase, RCSPs characterized the opportunities for carbon storage and identified CO_2 stationary sources within the territories of the individual RCSPs to assess the transportation infrastructure needed for future deployment, evaluate CO2 capture technologies for existing and future power plants, and identify the most promising storage opportunities that would need to be validated through a series of field projects. June 2005 marked the end of the Characterization Phase and the RCSPs successfully assessed regional CO_2 storage potential for the development of the first Carbon Storage Atlas.

VALIDATION PHASE

The Validation Phase focused on evaluating the most promising regional opportunities to deploy CCS technologies through a number of small-scale field projects. The Validation Phase field test efforts were designed to demonstrate that regional storage formations have the capability to store CO_2 and provide the foundation for larger volume field projects. The small-scale field projects focused on developing a better understanding of CO_2 storage in different storage types and various depositional environments. The data gathered during these small-scale projects provided valuable information regarding specific geologic formations that had not previously been evaluated for CO_2 storage. The 19 small-scalefield projects cumulatively injected more than 1 million metric tons of CO_2 during the Validation Phase that helped to facilitate future CCS opportunities in North America and provided a foundation for the planning and implementation of the large-scale field tests in the Development Phase.



Map depicting the extent of each RCSP region.

Large-Scale Development Phase Field Projects CO_2 Stored Volume:
10,099,133 Metric Tons*
*As of March 14, 2017

DEVELOPMENT PHASE

DOE is supporting large-scale field projects in different geological reservoir classes to confirm that CO_2 capture, transportation, injection, and storage can be achieved safely, permanently, and economically at large scales. Results from these projects are providing a more thorough understanding of permanent CO_2 storage under various geologic conditions. Technical results from these projects help inform regulators as well as future commercial-scale deployment of CCS. The storage types and formations being tested are considered regionally significant and are expected to have the potential to store hundreds of years of CO_2 from stationary source emissions. Development Phase projects are contributing to better understanding of technical and non-technical aspects for future commercial-scale CCS projects, including regulatory, liability, and ownership issues associated with these projects. They also are providing the scientific foundation and technologies needed for successful commercial-scale deployment of CCS. In addition, these efforts have contributed to establishing common assumptions, data requirements, and methodologies for determining geologic resource estimates for CO_2 storage. DOE has engaged with technical experts in the RCSP Initiative to update its Best Practice Manuals (BPMs) to include lessons learned in more recent years, as the RCSPs have progressed to large-scale Development Phase field projects.

RCSP ACCOMPLISHMENTS

- Proved adequate large-scale injectivity and available capacity in regionally important storage reservoirs.
- Provided examples of simulation models and MVA technologies that predict CO_2 movement and confirm confining system integrity.
- Developed and implemented expert panel-based risk assessment strategies.
- Contributed toward developing/evaluating innovative storage technologies for a cost-effective commercial toolbox.
- Contributed to a series of BPMs on major topics associated with geologic storage implementation
- Demonstrated the benefits of early engagement with local communities and stakeholders.

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