



the **ENERGY** lab

PROJECT FACTS
Carbon Sequestration

Southwest Regional Partnership on Carbon Sequestration— Development Phase

Background

As part of a comprehensive effort to assess options for sustainable energy systems, the U.S. Department of Energy has selected seven Regional Partnerships, through its Regional Carbon Sequestration Partnership (RCSP) Program, to determine the best approaches for capturing and permanently storing carbon dioxide (CO₂), a greenhouse gas which can contribute to global climate change. The RCSPs are made up of state agencies, universities, private companies, national laboratories, and nonprofit organizations that form the core of a nationwide network helping to establish the most suitable technologies, regulations, and infrastructure needs for carbon sequestration. Altogether, the Partnerships include more than 350 organizations, spanning 41 states, two Indian nations, and four Canadian provinces.

The RCSP initiative is being implemented in three phases. The Characterization Phase began in September 2003 with the seven Partnerships working to develop the necessary framework to validate and potentially deploy carbon sequestration technologies. In June 2005, work transitioned to the Verification Phase, a four-year effort focused on validating promising CO₂ sequestration opportunities through a series of field tests in the seven regions. Presently, activities in the Development Phase (2008–2017) are proceeding as an extension of the work completed to date and will demonstrate that CO₂ capture, transportation, injection, and storage can be achieved safely, permanently, and economically at a large scale. These tests will promote understanding of injectivity, capacity, and storability of CO₂ in the various geologic formations identified by the Partnerships. Results and assessments from these efforts will assist commercialization efforts for future sequestration projects in North America.

The Southwest Regional Partnership on Carbon Sequestration (SWP), coordinated by the New Mexico Institute of Mining and Technology, includes the states of Arizona, Colorado, Kansas, New Mexico, Oklahoma, Texas, Utah, and Wyoming and over 50 organizations. The eight states in the SWP account for about 10 percent of U.S. CO₂ emissions from stationary sources. The region offers significant potential for sequestration in saline formations, unmineable coal seams, and depleted oil and gas reservoirs. Of particular interest in this region is the use of CO₂ for enhanced oil recovery (EOR) in tandem with sequestration, but saline formations offer the highest potential capacity.

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Injection Operations

For the SWP deployment test project, a minimal length of pipeline will be added in order to deliver the CO₂ for deep injection. The SWP is now completing designs for necessary pipelines. Upon completion of the Development Phase test, this pipeline will likely be used for future commercial operations that involve CO₂.

Simulation and Monitoring of CO₂

The project will require extensive monitoring and simulation to determine if the storage operations are effective in trapping the injected CO₂ for millennia. Vertical seismic profiling and microgravity methods will be particularly utilized, given their proven ability to resolve the size of the CO₂ plume. Monitoring, verification, and accounting (MVA) techniques that will be used include repeat 3-D seismic surveys, pressure monitoring, groundwater chemistry monitoring, pressure and fluid sample monitoring from other locations, soil gas sampling, and other methods. A variety of "in house" and commercial/public simulation tools will be used, including GEM, TOUGH2, TOUGHREACT, FEHM, CO₂-PENS, COMSOL, THRUST3D, MRKEOS and SWEOS.

Goals and Objectives

SWP's overall goal is to validate the information and technology developed under the Characterization and Verification Phases relative to research and field activities, public outreach efforts, and regional characterization. Specific objectives include:

- Develop an overall methodology that optimizes engineering and planning for future commercial-scale sequestration projects
- Conduct successful large-scale CO₂ injection projects targeted at Jurassic and older sandstone formations
- Achieve a more thorough understanding of the science, technology, regulatory framework, risk factors, and public opinion issues associated with large-scale injection operations
- Validate MVA activities, modeling, and equipment operations.
- Refine capacity estimates of the target formation using results of the tests

PARTNERS (cont.)

Public Service Company of New Mexico (PNM)

Resolute Natural Resources Company

Sandia National Laboratories

Southern California Edison

Texas A&M University

Texas Bureau of Economic Geology

Tucson Electric Power Company

United States Geological Survey

U.S. Department of Agriculture

University of Missouri

University of Oklahoma

University of Utah

Utah Automated Geographic Reference Center (AGRC)

Utah Division of Air Quality

Utah Division of Oil, Gas, & Mining

Utah Energy Office

Utah Geological Survey

Utah State University

Waste-Management Education & Research Consortium (WERC)

Western Governors' Association

Xcel Energy

Yates Petroleum Corporation

COST

Total Project Value

\$83,542,274

DOE/Non-DOE Share

\$58,261,269 / \$25,281,006

