



Big Sky Regional Carbon Sequestration Partnership—Kevin Dome Development Phase Project

Performer: Montana State University
Project No.: FC26-05NT42587
Award Value: \$84,802,384
Project Term: 07/25/2011 - 07/24/2019
Location: Big Sky Partnership Region
Technical Area: Carbon Storage
Website: www.montana.edu

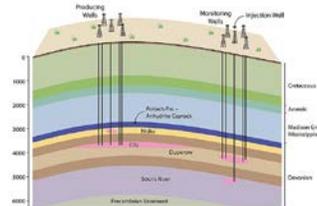


Figure 1. Cross section schematic of the Kevin Dome depicting the CO₂ production zone and injection zone locations with associated wells. (click to enlarge)

Description

The BSCSP is conducting a large volume injection field project within Kevin (pronounced kee-vin) Dome in north-central Montana (Figure 2), with the Duperow (dolostone) Formation as the primary targeted storage reservoir. Naturally-occurring CO₂ is trapped in the Duperow at the top of Kevin Dome, but large areas of the Duperow around the flanks of the dome are saline-saturated, do not contain CO₂, and are available for additional CO₂ storage. Over a four-year period, the project will use up to five production wells to extract one million metric tons of CO₂ from the top of the dome, compress and transport the CO₂ approximately six miles in a 2-inch underground pipeline, and inject it via a single injection well into the Duperow formation downgradient from the CO₂ reservoir (Figure 1). Four monitoring wells will be completed into the Duperow in the vicinity of the injection well. Hydrologic, geochemical, geomechanical, and geophysical data - including comprehensive 3-D, 9-component seismic surveys of the CO₂ production/injection areas, crosswell seismic surveys, and vertical seismic profiling - will be obtained and used to monitor, describe, and predict the behavior of the CO₂ in the formation. After the 4-year injection period, BSCSP will continue to monitor the site for an additional two years. At that time, all commercially-viable CO₂ production wells (including, perhaps, the injection well) would be transferred to a private-sector partner (Vecta Oil & Gas, Ltd.), with all other wells being properly plugged. All data will be incorporated into the BSCSP's existing graphical information system (GIS) framework and the Big Sky Carbon Atlas as well as the U.S. 2012 Carbon Utilization and Storage Atlas. In addition, the data collection techniques and results of the study will be incorporated into DOE's Best Practices Manuals. Information will be disseminated to the public and stakeholders throughout all phases of the project.

Benefits

- Improved understanding of the Kevin Dome geologic feature, which has great potential to serve as a northwestern U.S. carbon storage center because of its unique geologic properties, proximity to present and future sources of anthropogenic CO₂, and similarity to other large domes in Montana.
- Refinement of regional CO₂ resource estimates, given that Kevin Dome and the Duperow formation are regionally significant geologic features.
- Enhanced understanding of geochemistry related to CO₂ exposure. Production well cores will provide geochemical information from millions of years of CO₂ exposure and injection and monitoring well data will provide information on geochemical changes over the project timescale.
- Improved understanding of geomechanical and geophysical characteristics of cap rocks in naturally occurring reservoirs and application of that data to potential geo-storage sites.
- The ability to test advances in surface seismic imaging and pressure changes to monitor reservoir changes during removal of CO₂ from an existing reservoir.

- Improved understanding of the dome's potential as a CO₂ gas storage reservoir. First, to store CO₂ captured from new clean energy plants, and second, to provide CO₂ to mature oil fields in the immediate region of the dome for enhanced oil recovery projects.

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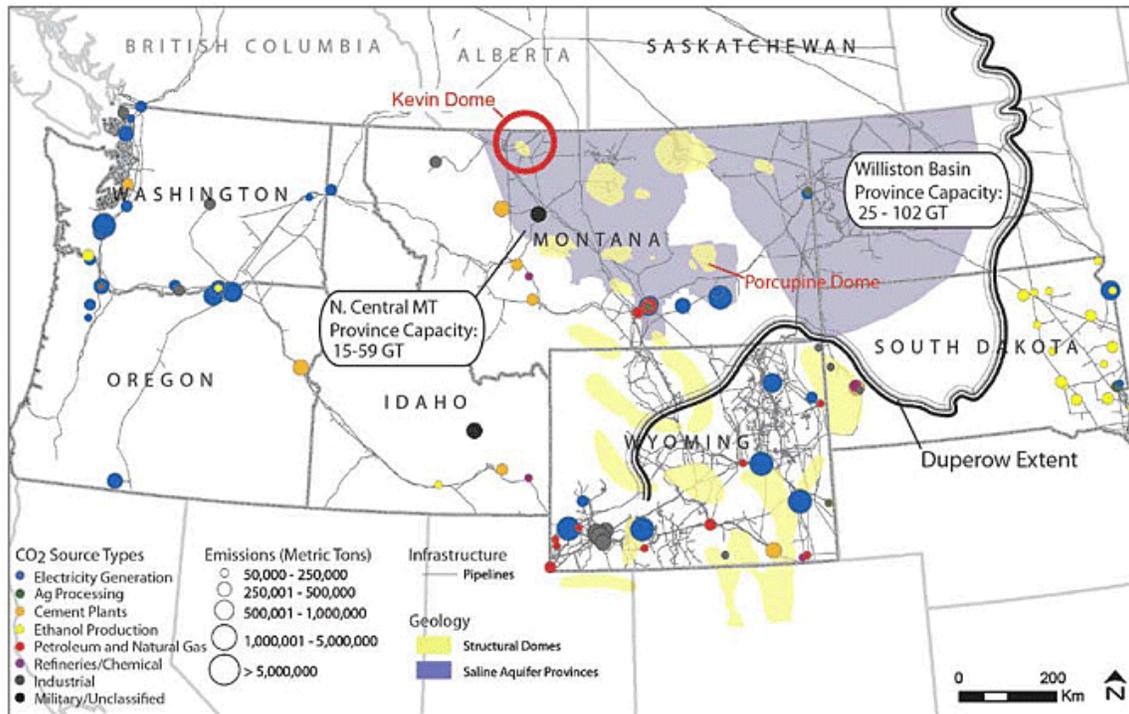


Figure 2. Map depicting the Kevin Dome project location within the north-central Montana province. Potential CO₂ storage resources for the province is estimated at 13.5 to 53.5 billion metric tons. (click to enlarge)

Website: <http://www.netl.doe.gov/research/coal/carbon-storage/projects/nt42587>