



IEAGHG Information Paper 2016-IP54: US Announces New Awards of \$44 Million for Development of CO₂ Storage Projects under the CarbonSAFE Initiative

The U.S. Department of Energy's (DOE) Office of Fossil Energy (FE) recently announced that 16 projects have been selected to receive more than \$44 million as part of DOE's Carbon Storage Assurance Facility Enterprise (CarbonSAFE) initiative. Projects will work towards development of commercial-scale (50+ million metric tons CO₂) geologic storage sites for CO₂ from industrial sources, and build on the success of the Regional Carbon Sequestration Partnerships' (RCSP) large-scale field projects.

The selected projects under CarbonSAFE aim to develop integrated CCS complexes that are constructed and permitted for operation in the 2025 timeframe over a series of sequential phases of development described as: Integrated CCS Pre-Feasibility; Storage Complex Feasibility; Site Characterization; Permitting and Construction. The selections announced apply to the first two of those phases.

Each project has to identify a CO₂ source as well as the potential storage site. All of the projects are of great interest and relevance, and of particular note (and mentioned at GHGT-13 in Plenary) is one to develop deep saline formation storage for the Kemper project. Most storage sites are onshore, but it is also notable that two are for offshore storage (one in the Gulf of Mexico and another using mineral carbonation in basalts).

The DOE state that the projects will build on the lessons learned from the RCSP large-scale field projects. IEAGHG's modest assistance to the RCSP Initiative is in organising the international peer reviews of the RCSP projects, with the fourth peer review due in January 2017.

The funded projects are listed below (quoting from the DOE website).

CCS Pre-feasibility Projects – Phase I

Ten recipients representing thirteen projects were selected under Phase I. Objectives include formation of a CCS coordination team to address regulatory, legislative, technical, public policy, commercial, financial, and other issues specific to commercial scale deployment of the CO₂ storage projects. The projects will develop a plan encompassing technical requirements, as well as both economic feasibility and public acceptance of an eventual storage project. Descriptions of the Phase I projects, including federal funding are shown below; funding amounts may vary pending final negotiations.

1. Carbon Management Institute at the University of Wyoming (Laramie, Wyoming) — The Carbon Management Institute at the University of Wyoming will undertake two projects (DOE Cost: \$2,385,919):

- A pre-feasibility assessment for secure, commercial-scale CO₂ capture and storage will be performed at the Rock Springs Uplift (RSU).
- A scenario will be considered that includes a CO₂ source assessment based CO₂ capture at Basin Electric Power Cooperative's Dry Fork Power Station, which also houses the Wyoming Integrated Test Center, a CCS test Facility. The project will include a transportation assessment of the existing CO₂ pipeline network and the Wyoming Pipeline Corridor and an evaluation of suitable storage reservoirs within the immediate vicinity of the Dry Fork Power Station.

2. Board of Trustees of the University of Illinois (Champaign, Illinois) — The University of Illinois and the Illinois State Geological Survey will develop a plan to address the challenges, opportunities, and risks involved in building a commercial, integrated CCS project in the Illinois East Sub-Basin region. DOE Cost: \$1,212,187



3. University of Texas at Austin (Austin, TX) — The University of Texas at Austin will perform a commercial-scale initial characterization of a near-offshore storage complex on the inner shelf of the Gulf of Mexico. DOE Cost: \$1,194,383

4. University of Utah (Salt Lake City, UT) — The University of Utah will conduct a high-level sub-basinal evaluation for potential storage sites near the PacifiCorp's Hunter Power Plant. A secondary CO₂ source, PacifiCorp's Huntington Power Plant, will also be evaluated. DOE Cost: \$1,331,228

5. Battelle Memorial Institute (Columbus, Ohio) — The Battelle Memorial Institute will undertake the following three projects (DOE cost: \$3,590,512):

- A commercial-scale Integrated Mid-Continent Carbon Stacked Storage Hub will be developed in Nebraska and Kansas. The project will concentrate on identifying specific stacked storage sites in southwest Nebraska and central Kansas and assessing their potential.
- A pre-feasibility effort will be conducted for developing an integrated commercial CO₂ storage site for deep geologic intervals in the Central Appalachian Basin in the 2025 timeframe.
- An integrated commercial CO₂ storage site for deep geologic intervals will be developed in the Northern Michigan Basin. The project will address the technical, economic, legal, engineering, surface, subsurface, and public acceptance challenges related to implementation of a CO₂ storage complex in this region.

6. Electric Power Research Institute (Palo, Alto, California) — The Electric Power Research Institute will conduct an initial assessment of the technical, economic, social, and regulatory/policy challenges and solutions that must be addressed to develop a commercial-scale CO₂ storage complex in the southern San Joaquin Valley (SSJV), California. DOE Cost: \$969,136

7. University of North Dakota (Grand Forks, North Dakota) — The University of North Dakota will determine the feasibility of integrating commercial-scale CO₂ capture of industrially sourced CO₂ emissions from Nebraska Public Power District's Gerald Gentleman Station with proximal storage and minimal transportation. DOE Cost: \$1,244,473

8. University of Kansas/Kansas Geological Survey (Lawrence, Kansas) — The University of Kansas and the Kansas Geological Survey project, ICKan, will identify and address the major technical and nontechnical challenges of implementing CO₂ capture and transport and establishing secure geologic storage for CO₂ in Kansas. DOE Cost: \$1,186,504

9. Columbia University (New York, New York) — Columbia University will undertake a project that proposes large-scale permanent storage of CO₂ in deep ocean basalt formations to enable mineral carbonation as a safe and publicly acceptable solution for mitigating anthropogenic emissions. DOE Cost: \$1,189,534

10. Louisiana State University and A&M College (Baton Rouge, Louisiana) — Louisiana State University will develop a multidisciplinary team of stakeholders; analyze the feasibility of an integrated CCS project; and conduct a detailed sub-basinal evaluation of the potential for CO₂ storage in both depleted oil and gas fields and saline reservoirs in South Louisiana. DOE Cost: \$1,052,600

Storage Complex Feasibility Projects – Phase II

Three projects were selected under Phase II for more than \$29 million. These projects will perform the initial characterization of a storage complex identified as having high potential. They will also establish the complex's feasibility for commercial storage (50+ million metric tons CO₂). These selected projects did not require the same pre-feasibility work needed in Phase I projects and demonstrated readiness to move on to the next phase.

The objectives of this phase build upon the pre-feasibility work under CarbonSAFE that focus on one or multiple specific reservoirs within the defined storage complex, and comprise data collection; geologic analysis; identification of contractual and regulatory requirements and plans to satisfy them; subsurface modeling to support geologic characterization, risk assessment, and monitoring; and public outreach. Descriptions of the first round of Phase II projects, including federal funding are shown below:



1. **Southern States Energy Board (Norcross, Georgia)** — The Southern States Energy Board will establish a commercial-scale CO₂ geologic storage complex adjacent to the Mississippi Power Company Kemper County Energy Facility. DOE Cost: \$11,220,537

2. **University of North Dakota (Grand Forks, North Dakota)** — The University of North Dakota will determine the feasibility of developing a commercial-scale CO₂ geologic storage complex in central North Dakota. DOE Cost: \$8,787,622

3. **Board of Trustees of the University of Illinois (Champaign, Illinois)** — The University of Illinois will establish the feasibility of a commercial-scale CO₂ geologic storage complex within the Mt. Simon sandstone formation located in Macon County, Illinois for industrial-sourced CO₂. City Water, Light and Power and the Abbott Power Plant will be evaluated as CO₂ sources. DOE Cost: \$8,906,264

For more information on these project awards see <http://energy.gov/under-secretary-science-and-energy/articles/energy-department-announces-more-44-million-co2-storage> .

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