



the **ENERGY** lab

PROJECT FACTS

Clean Coal Power Initiative (CCPI 3)

NRG Energy: W.A. Parish Post-Combustion CO₂ Capture and Sequestration Project

Background

Additional development and demonstration is needed to improve the cost and efficiency of carbon management technologies that capture and store carbon dioxide (CO₂) that would otherwise be emitted from coal-based electric power generating facilities. Carbon capture, utilization, and storage (CCUS) technologies offer great potential for reducing CO₂ emissions and mitigating global climate change, while minimizing the economic impacts of the solution.

Under the second closing of the Clean Coal Power Initiative (CCPI) Round 3 program, the U.S. Department of Energy (DOE) is providing financial assistance, including funding under the American Recovery and Reinvestment Act (ARRA) of 2009, to industry to demonstrate the commercial viability of next generation technologies that will capture and sequester CO₂ emissions. Once demonstrated, the technologies can be readily considered in the commercial marketplace by the electric power industry.

Project Description

The U.S. Department of Energy (DOE) is providing financial assistance under CCPI Round 3 to NRG Energy (NRG) to demonstrate the addition of a commercial-scale post-combustion carbon capture technology on its existing coal-fired W.A. Parish Generating Station (PGS) located in Thompsons, Texas, southwest of Houston, Texas. The project will demonstrate the ability of the Fluor Econamine FG PlusSM technology to capture 90% of the CO₂ emitted from a flue gas slipstream up to the equivalent of 240 Megawatts (MW) in size. The scale of the project is being increased because the original 60 MW program was determined to be too small to induce immediately significant oil production in most fields. This project scale-up is currently in development and will require additional capital on the part of the recipient.

The project will also demonstrate a number of innovative technological advances to the Fluor Econamine FG PlusSM solvent technology and captured CO₂ processing systems. The solvent was designed to remove CO₂ from coal-fired plant flue gas in which other components such as ash, sulfur dioxide, sulfur trioxide, nitrogen oxides, and oxygen are also present. Additionally, the solvent is readily available, inexpensive, and has relatively low energy requirements. The plant configuration will also allow the testing of advanced solvents being developed by Fluor and the University of Texas. Innovations in process equipment performance such as absorber intercooling and lean solvent vapor compression have the potential to reduce the energy requirements of these systems by as much as 20 percent. And finally, the host unit will not be derated because the power and thermal energy required to operate the CO₂ capture and compression system will be provided by a cogeneration plant comprised of a combustion turbine (CT) with a heat recovery boiler (HRB).

CONTACTS

Michael Knaggs

Director

Office of Major Demonstrations
National Energy Technology Laboratory
3610 Collins Ferry Road, P.O. Box 880
Morgantown, WV 26507-0880
304-285-4926
michael.knaggs@netl.doe.gov

Ted McMahon

Project Manager

National Energy Technology Laboratory
3610 Collins Ferry Road, P.O. Box 880
Morgantown, WV 26507-0880
304-285-4865
ted.mcmahon@netl.doe.gov

David Greeson

Participant Project Manager

Vice President, Commercial
Petra Nova LLC, an NRG Company
1201 Fannin Street, Mail Stop 4114
Houston, TX 77002
713-537-2122
David.Greeson@nrgenergy.com

PARTNERS

Fluor

Sargent & Lundy

University of Texas (solvent testing)

University of Texas,
Bureau of Economic Geology

NATIONAL ENERGY TECHNOLOGY LABORATORY

Albany, OR • Fairbanks, AK • Morgantown, WV • Pittsburgh, PA • Sugar Land, TX

Website: www.netl.doe.gov

Customer Service: 1-800-553-7681



U.S. DEPARTMENT OF
ENERGY

PROJECT DURATION

Start Date
06/01/2010

End Date
11/30/2017

COST

Total Project Value (60 MW)
\$338,607,740

DOE/Non-DOE Share (60MW)
\$166,804,425/ \$171,803,315
(240 MW project cost TBD)

Government funding for this project is provided in whole or in part through the American Recovery and Reinvestment Act.



These advances are anticipated to lower carbon capture costs and increase system flexibility and efficiency.

The captured CO₂ will be compressed and transported through an 80 mile pipeline to the West Ranch Oil Field in Jackson County, TX where it will be utilized for enhanced oil recovery (EOR) and ultimately sequestered.

Goals/Objectives

The project goal is to advance fully integrated CCUS technologies from the demonstration stage to commercial viability. The project objective is to demonstrate CO₂ removal from treated flue gas from an existing coal-fired electrical generating station, and the compression and transport of the pipeline quality CO₂ to a sequestration site where it will be used for EOR.

Benefits

The W.A. Parish Post-Combustion CO₂ Capture and Sequestration Project represents an important step in advancing the commercialization of technologies that capture CO₂ from the flue gas of existing power plants. Standards that limit CO₂ emissions from coal-fired electrical generating stations do not yet exist, but it is possible that this type of regulation may be enacted in the future. The addition of CO₂ capture capability to the existing fleet of power plants will enable those plants to continue to produce clean electricity and simultaneously reduce the impact of CO₂ emissions. Specific project benefits are as follows:

- The capture of up to 1.4 million metric tons per year of CO₂ from a PGS flue gas stream.
- Increased domestic oil production in the U.S., which contributes to national energy security.
- Ultimate sequestration of the captured CO₂.
- A path forward for existing coal-fired power plants to continue energy production while meeting environmental sustainability goals.

