



## NRG Energy: W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project

### Background

A need exists to further develop carbon management technologies that capture and store or beneficially reuse carbon dioxide (CO<sub>2</sub>) that would otherwise be emitted into the atmosphere from coal-based electric power generating facilities. Carbon capture and storage (CCS) technologies offer great potential for reducing CO<sub>2</sub> 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 CO<sub>2</sub> 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) will provide financial assistance under CCPI Round 3 to NRG Energy (NRG) to demonstrate the addition of a commercial-scale post-combustion carbon capture and sequestration 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 Plus<sup>SM</sup> technology to capture 90% of the CO<sub>2</sub> emitted from a 60 Megawatt (MW) flue gas slipstream from PGS.

The project will also demonstrate a number of innovative technological advances to the Fluor Econamine FG Plus<sup>SM</sup> solvent technology and captured CO<sub>2</sub> processing systems. The solvent was designed to remove CO<sub>2</sub> 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 solution vapor compression have the potential to reduce the energy requirements of these systems by as much as 20 percent. And finally, efficiency improvements in the supporting balance of plant processes such as process steam generation and CO<sub>2</sub> compression will also reduce energy requirements. These advances are anticipated to lower carbon capture costs and increase system flexibility and efficiency.

### CONTACTS

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### PARTNERS

Fluor  
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University of Texas (solvent testing)  
University of Texas, Bureau of Economic Geology  
Ramgen

## NATIONAL ENERGY TECHNOLOGY LABORATORY

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U.S. DEPARTMENT OF  
**ENERGY**

## PROJECT DURATION

### Start Date

06/01/2010

### End Date

11/30/2017

## COST

### Total Project Value

\$333,608,850

### DOE/Non-DOE Share

\$166,804,425/ \$166,804,425



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



The captured CO<sub>2</sub> will be compressed and transported through a pipeline and sequestered in geologic formations located in the mature oil fields of Texas's gulf coast region via enhanced oil recovery (EOR). Candidate geologic formations have been identified and an analysis of the reservoir's suitability to contain the injected CO<sub>2</sub> is in progress.

## Goals/Objectives

The project goal is to advance CCS technologies from the demonstration stage to commercial viability. The project objective is to demonstrate CO<sub>2</sub> removal from treated flue gas from an existing coal-fired electrical generating station, and the compression and transport of the pipeline quality CO<sub>2</sub> to a sequestration site where it will be used for EOR.

## Benefits

The W.A. Parish Post-Combustion CO<sub>2</sub> Capture and Sequestration Project represents an important step in advancing the commercialization of technologies that capture CO<sub>2</sub> from the flue gas of existing power plants. Standards that limit CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> emissions. Specific project benefits are as follows:

- The capture of up to 400,000 metric tons per year of CO<sub>2</sub> from a PGS flue gas stream.
- Permanent sequestration of the captured CO<sub>2</sub>.
- Increased domestic oil production in the U.S., which contributes to national energy security.
- A path forward for existing coal-fired power plants to continue energy production while meeting environmental sustainability goals.

