

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Clean Coal Power
Initiative (CCPI 2)

09/2008



DEMONSTRATION OF A COAL-BASED TRANSPORT GASIFIER

Project Description

CONTACTS

Brad Tomer

Director
Office of Major Demonstrations
National Energy Technology
Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507-0880
304-285-4692
brad.tomer@netl.doe.gov

Diane Revay Madden

Project Manager
National Energy Technology
Laboratory
626 Cochrans Mill Road
P.O. Box 10940
Pittsburgh, PA 15236-0940
412-386-5931
diane.madden@netl.doe.gov

Southern Company, through its affiliate Mississippi Power, plans to develop an air-blown Integrated Gasification Combined Cycle (IGCC) power plant demonstration project utilizing a coal-based transport gasifier. This demonstration highlights a technology – the transport gasifier – that has been used successfully for over 50 years in the petroleum refining industry. The transport gasifier has a fuel-flexible design projected to have higher efficiency and lower capital and operating costs than the currently available oxygen-blown entrained-flow gasifiers. The Demonstration Plant will be built in Kemper County, Mississippi and generate electricity using Mississippi lignite.

This project was one of two selected in Round 2 of the Clean Coal Power Initiative to demonstrate advanced power generation systems using Integrated Gasification Combined Cycle technology. The project will utilize two transport gasifier trains each with its own coal feed and ash handling systems. In a combined cycle plant two power generators, or cycles, are used in combination to generate electricity in a very efficient manner. Coal is first heated in a specialized process vessel with air and steam to drive off the gas from the coal. The gas is then cleaned and then used to fire a gas turbine to generate electricity. The hot exhaust gas leaving the turbine is then used to heat water to produce steam to power a steam turbine and generate additional electricity. Using the gas in two different cycles increases the amount of electricity that can be generated from a ton of coal and does so in an environmentally friendly manner.

PARTICIPANT

Southern Company Services
Birmingham, AL

Benefits

The transport gasifier technology offers a simpler and more robust method for generating power from coal than other alternatives. It is unique among coal gasification technologies in that it is cost-effective when handling low rank coals and when using coals with high moisture or high ash content. These coals make up half the proven reserves in both the U.S. and the world. Moreover, the transport gasifier is capable of both air- and oxygen-blown operation. This inherent flexibility will allow future applications of this technology to be readily adapted to other applications beyond power generation such as the production of chemicals used in industrial operations.



ADDITIONAL TEAM MEMBERS

Mississippi Power Company
Gulfport, MS
(Owner)

KBR
Houston, TX

LOCATION

Kemper County, MS

ESTIMATED PROJECT DURATION

142 months

COST

Total Estimated Cost

\$1,625,082,040

DOE/Non-DOE Share

\$293,750,000 / \$1,331,332,040

*Note: The cost above represents only the scope in which DOE is participating under the CCPI. The DOE scope only represents a portion of the total project scope.

CUSTOMER SERVICE

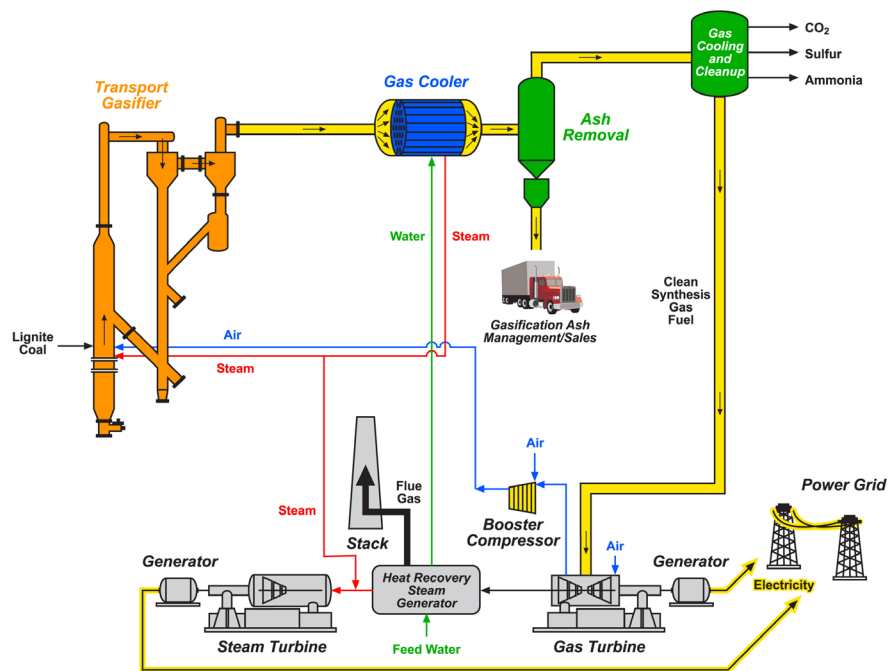
1-800-553-7681

WEBSITE

www.netl.doe.gov

IGCC Transport Gasifier Flow Diagram

This gasifier will also readily adapt to possible future greenhouse gas management requirements that may result from the Global Climate Change Initiative (GCCI). The GCCI's goal is the significant reduction of greenhouse gas intensity of the United States economy over the next 10 years. Analysis shows that the economic benefits offered by the air-blown transport gasifier relative to other IGCC systems, including those that are oxygen-blown, are preserved even when CO₂ capture and sequestration is incorporated into the design. The transport gasifier is further projected to achieve high environmental standards for SO₂, NO_x, particulates, and mercury. Means of reducing water consumption are incorporated in the design and possible gasifier ash utilization applications have been identified.



Kemper County Integrated Gasification Combined Cycle Project Flow Diagram