Edwardsport IGCC Plant Proposed Carbon Capture and Storage Project

Carbon Capture and Storage

Duke Energy is currently studying the potential to include a component that will capture and store the carbon dioxide that would otherwise be emitted from the plant. Carbon capture and storage (CCS) involves capturing the carbon dioxide gas, transporting it to a suitable location, and injecting it through a well into deep layers of rock for permanent and safe storage. This technology is considered to be an important part of a larger portfolio of options for addressing energy needs in a future where there will be carbon dioxide regulations. Duke Energy is proud to assist in the efforts around the world to further develop and demonstrate this technology.

IGCC plants are well-suited for CCS because this technology converts coal into a synthesis gas (syngas) and steam. The hot syngas is processed to separate and remove sulfur compounds, mercury, and particulate matter before the gas is finally used to fuel a combustion turbine generator, which produces electricity. In carbon capture, the hot syngas is further treated to separate and capture carbon dioxide. Since this captured carbon dioxide is in a relatively pure and concentrated form, it is ideal for CCS.

The Proposed Study

As the first of its size gasification plant for electricity production, the Edwardsport IGCC Plant was designed with the possibility of a future CCS retrofit in mind by leaving space in the appropriate plant site areas to accommodate the addition of CCS technology. In 2009 Duke Energy received approval from the IURC to conduct a carbon capture front end engineering design study (CC FEED Study) of what it would take to modify the plant in order to capture a portion of the carbon dioxide. The CC FEED Study will develop a process model for retrofitting the plant for capture. This will include an assessment of the impacts of any changes in the gasification process due to the addition of carbon dioxide capture, the necessary piping and instrumentation to support capture, potential changes in the emissions profile, and a revised plant performance evaluation. Based on these assessments, the CC FEED Study will develop a detailed cost estimate and implementation plan for completing the retrofit. Once this information is compiled, Duke Energy and the IURC will have a chance to review the necessary changes and make a determination about next steps. The CC FEED Study began in May 2009 and is due to be completed in March 2011.

Next Steps

In carbon storage, carbon dioxide is injected through a well into deep layers of porous and permeable rock such as those found in saline reservoirs and mature oil fields. Layers of dense, impermeable rock, called caprock, above the injection zone separate the injected carbon dioxide from drinking water supplies and the surface. Since Indiana has extensive saline reservoirs, mature oil fields, and caprock, there are large portions of the state that are potentially well-suited for CCS. In 2009 Duke Energy sought approval from the IURC to conduct a site characterization study of potential locations within these reservoirs for a carbon dioxide storage project associated with the Edwardsport IGCC Plant. Site characterization activities include gathering existing geologic survey data and conducting tests to assess rock integrity in the region – this could include drilling exploratory wells and conducting geophysical surveys over a broad area surrounding the plant to identify an optimum geologic formation and developing computer simulation models.

For More Information

More information on carbon capture and sequestration can be found on the Web site of the Midwest Regional Carbon Sequestration Partnership at http://mrcsp.org.

Duke Energy
526 South Church Street
Charlotte, NC 28202-1802
704-594-6200
www.duke-energy.com