



Desert Rock Energy Project and a Discussion of Supercritical and IGCC Technology

Background on the Desert Rock Project:

Desert Rock is a 1,500 MW mine mouth power plant being developed by Sithe Global Power, LLC's subsidiary, Desert Rock Energy Company, LLC and the Dinè Power Authority, an enterprise of the Navajo Nation. It is designed to burn low BTU, low sulfur subbituminous Navajo coal. The plant will be located in Northwestern New Mexico at an elevation of 5,415 feet. It will be a very efficient plant with two supercritical pulverized coal-fired boilers operating at a net heat rate of 8,983 Btu/kWh. Very low emission rates have been proposed for this project including 0.06 lb/MMBtu for both NO_x and SO₂ and 0.01 lb/MMBtu for filterable PM, all on a 24-hour average. The plant will also use dry cooling to reduce water consumption by 80%.

Sithe Global Power (Sithe Global) evaluated the potential of modern coal technologies including Integrated Gasification Combined Cycle (IGCC) to meet these objectives and determined that the use of modern supercritical pulverized coal boilers is the best option. This technology is proven, reliable, and highly efficient and, in combination with an extensive array of pollution control equipment, will be a leader in reducing emissions from coal combustion. EPA has stated that Desert Rock will have the lowest emissions of any coal fired project in the U.S. There would be no material difference in emissions including green house gas emissions with an IGCC plant at the Desert Rock site.

Integrated Gasification Combined Cycle (IGCC) Technology:

IGCC uses a chemical process that converts coal into a synthetic gas. This synthetic gas is burned in a combustion gas turbine to produce electricity. The flue gas from the combustion turbine is further used to produce steam in a heat recovery steam generator to drive a steam turbine generator. Though it is an evolving technology, IGCC does not currently meet the need for reliable and economical power production. There are only four operating coal-fired IGCC plants in the world, two in the United States both which use petroleum coke and not coal as the fuel source. Other IGCC projects in the U.S. were built as small scale (less than 300 megawatts) demonstration projects with substantial government funding and some faced such severe operating problems that they never reached commercial operation.

Even the facilities that did achieve commercial operation have not met projections for cost, efficiency, reliability, and environmental performance. The "next generation" of IGCC plants, currently in development, with commercial operation dates planned in the 2011-2015 period, are in the 300-600 megawatt range. It remains to be seen if the next generation of IGCC plants will meet the cost and reliability targets needed to provide reliable, low cost power. There are also many engineering issues that remain to be solved in using low BTU high ash coals such as those found in New Mexico to fuel IGCC plants.

Reliability – The IGCC units currently in operation have a poor reliability records. It remains to be seen if the next generation of IGCC plants will face similar reliability issues. The "integrated" part of IGCC refers to the integration of a gasifier and a combined cycle power plant to transform the coal into syngas and combust that syngas to produce electricity. This integration introduces numerous additional potential engineering points of failure and, as a result, there is a record of poor performance. Several of the IGCC units in operation have been able to reach the 80% reliability level but only after five to ten years of operation. In contrast, supercritical technology proposed for Desert Rock has a proven performance record of 90% or better, beginning in its first year of operation.

Cost – Projections of life cycle capital and operating costs for IGCC plants in the 600 to 2,000 megawatt range are substantially higher than supercritical technology. These have demonstrated that the cost of a 1,500 megawatt IGCC plant is approximately 30-40% higher than a similarly-sized supercritical pulverized coal plant. Desert Rock would cost \$1 billion more to build using IGCC technology.

Efficiency – The technology proposed for Desert Rock is highly efficient, meaning substantially less coal is used to produce the same amount of electricity with fewer emissions than older, conventional coal fired power plants. Desert Rock's proposed technology is also more efficient than current IGCC plants. For example, the Desert Rock's technology is approximately 15% more efficient than the present IGCC facilities in Florida and Indiana, meaning it will use 15% less coal to produce a similar amount of electricity on an average annual basis. In comparison to recently filed air permit applications for the “next generation” IGCC plants, Desert Rock will have comparable efficiencies when the IGCC efficiency losses of operating at above 5,000 ft above sea level are taken in account.

Emissions – Due to the high efficiency of Desert Rock's generating technology and the extensive array of pollution control equipment incorporated into its design, the plant's emission rates compare very favorably to existing IGCC units and are expected to be similar to the “next generation” IGCC plants. IGCC plants do not produce any less greenhouse gases than a supercritical plant with similar efficiency.

Sithe Global is also designing Desert Rock to have “future proofing” characteristics, which allow for augmentation of the initial extensive array of emissions control equipment and with more advanced control equipment when the new equipment is demonstrated to be commercially viable. This would be in addition to the industry-leading emissions controls that Desert Rock employs at initial commercial operation. For example, Desert Rock will be able to be fitted for future deployment of carbon capture and storage technology when the conditions exist to support its implementation.

Summary

Sithe Global carefully considered all options available before concluding that supercritical pulverized coal technology is the best choice for Desert Rock. The Desert Rock's supercritical design helps to ensure a reliable power supply and lower fuel cost for customers, while being highly protective of public health and the environment. While IGCC is expected to become a viable large scale electric generation technology in the future, it currently lacks the reliability, efficiency, economics, and scale that supercritical technology provides with no material difference in emissions including greenhouse gases. Furthermore, as environmental technologies advance, Desert Rock's selected design can be readily modified to accommodate future carbon capture, carbon conversion, and new combustion (e.g., oxycombustion) equipment, affording more environmental advancement possibilities.