The increasing role of natural gas as a fuel for electricity generation has raised concerns about the reliability implications for the electric grid if the fuel is not available for generating plants. PJM Interconnection and other grid operators, along with the gas industry and regulatory agencies, are carefully examining the gas/electric interface to identify issues and develop solutions.

Natural gas is quickly becoming a dominant fuel in PJM as a result of several factors. They include the increased availability of gas from nearby shale gas resources and the retirement of coal-fired generation as a result of changing economics and new environmental requirements. Retiring coal generation is being replaced, in part, by new gas-fired capacity.

From 2007 to 2011, shale gas production in the U.S. increased by more than 400 percent, according to the U.S. Energy Information Administration. Two of the largest shale reserves, Marcellus and Utica, are located in the PJM region. This increased gas availability has driven down prices and made gas competitive with coal for power generation.

In addition, there is a well-developed gas infrastructure in the PJM footprint, including 32 interstate gas pipelines, enhancing its ability to handle new gas-fired generation.

One way in which gas is different than coal as a power plant fuel is that coal can be easily stored on site for later use, while gas cannot. As a result, gas generally must be delivered as it is needed. Improving delivery flexibility somewhat is the ability to store gas in the pipeline or in storage facilities. A significant portion of the U.S. gas storage capacity is located in the PJM region.

Gas/electric coordination is important. One issue involves the daily timing differences in the way the two industries operate. The natural gas operating day runs from 10 a.m. EST of the current day to 10 a.m. EST the next day. Gas scheduled today is delivered during the next operating day beginning at 10 a.m.

In effect, gas delivery to generators begins 10 hours after PJM’s operating day begins at midnight. Generators must straddle two gas operating days to cover one electric operating day, complicating gas procurement for generation.

PJM is participating in coordination efforts between the electric and natural gas industries, along with the Federal Energy Regulatory Commission, to help ensure grid reliability as the transition to a much larger role for natural gas in the generation mix proceeds. Increasing communication between the industries is a large part of that effort.

Communication between the natural gas and electric industries about fuel supply and operational issues can be improved. Currently, this communication generally is limited to publicly available information under FERC rules. Improved communication and data exchanges would benefit day-to-day operations in both industries.

During this winter’s extreme cold, the FERC gave PJM temporary authority to communicate with gas pipeline companies to assess fuel-supply issues for scheduled gas-fired generators. PJM has filed to have that authority made permanent under FERC rules.

An assessment by the North American Electric Reliability Corp. emphasized the importance of natural gas to electric system reliability, noting that in the past decade, natural-gas-fired generation has grown to 25 percent of U.S. power generation.
The NERC has called for more operating coordination between the industries, including seasonal preparations, operational planning and real-time operating procedures that include emergency measures in extreme events.

As part of PJM’s stakeholder process, a Gas Electric Senior Task Force was formed to focus on the gas/electric interface. The task force identified issues for PJM to examine.

Topics discussed include the differences in timing commitments in PJM markets versus natural gas markets; federal and state rules governing gas delivery to generating plants; generator availability; and gas/electric information-sharing efforts.

In a major initiative, six grid operators are partnering to analyze the natural gas infrastructure serving a large portion of the Eastern Interconnection. They are PJM, the Midcontinent Independent System Operator, ISO-New England, the New York ISO, the Tennessee Valley Authority and the Ontario Independent Electricity System Operator.

The study is being coordinated by the Eastern Interconnection Planning Collaborative, the umbrella organization for electric grid planning activities in the Eastern Interconnection, with funding under an existing Department of Energy grant.

The study, which is to be completed by mid-2015, will develop a baseline of the electric and natural gas systems, including their planning, operation and interactions. In addition to analyzing all the elements of the natural gas system serving the interconnection, it will look at the adequacy of the gas system to satisfy generation needs over five- and 10-year horizons; identify contingencies on both systems that could negatively affect the other; and examine the pros and cons of dual-fuel capability for generation versus expanding gas system infrastructure.

The study results will be valuable in helping to improve gas/electric coordination in support of the goal of ensuring electric system reliability.

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