Gas Stakeholder Steering Committee Comments
on EIPC Gas-Electric System Interface Study
Gas Demand Scenarios and Potential Sensitivities

The Gas Stakeholder Steering Committee offers the following comments on the Eastern Interconnection Planning Collaborative (EIPC) Gas Demand Scenarios and Proposed Sensitivities for Analysis, as outlined in "Proposed Scenario Definition Parameters and Sensitivities."[1] The increased use of renewable electric power generation, particularly wind, will require electric power systems to provide back-up power to firm the generation from these intermittent sources of electricity when the intermittent generation does not run (i.e., the wind does not blow or the sun does not shine). Combined cycle natural gas-fired generations and the gas pipeline system have considerable operational flexibility for managing variable demands for natural gas and for supplying natural gas reliably to firming generators at their required pressures. Still, when assuming a large market penetration of intermittent resources, such as wind and/or solar, the appropriate amount of firming capacity must be added to ensure both grid reliability as well as energy deliverability. The EIPC should recognize in its gas demand scenarios the amount of natural gas demand and pipeline capacity additions needed to firm renewable generation.

The firming pipeline capacity will need to able to ramp up and ramp down quickly to accommodate both the forecasted and unexpected variability of the intermittent resources. This could necessitate a pipeline to increase its hourly variability, requiring changes to how a pipeline operates its line pack and potentially requiring new supra-firm or no-notice and gas storage services. In some regions at some locations, accommodating this ramping variability may require the addition of both compression on existing pipeline infrastructure and new pipeline expansions, to guarantee the reliable on-demand service needed to support firming power generators.

In 2011, The INGAA Foundation, Inc. analyzed the amount of incremental natural gas pipeline capacity needed to support gas-fired generators for firming intermittent renewables. The report found that over the next 15 years, almost 5 Bcf/d of incremental delivery capability could be required to provide the new gas-fired firming generation with firm natural gas supply.[2] In addition, for every 1,000 MW of wind capacity, an estimated 259 MW of capacity will be needed to firm the intermittent resource. The total annual gas use associated with firming intermittent generation could grow to 440 Bcf by 2025, which is only 2 percent of 2011's total gas demand. The total capital cost of the natural gas infrastructure to support firming requirements could range from about $2 billion to $15 billion.

Further, given that gas-fired firming generation resources may be called upon to ensure the reliability of the bulk power system, one could argue that such resources cannot rely on interruptible pipeline transportation or secondary market services to meet this reliability need. Additional natural gas pipeline capacity may be required, perhaps held by a third party such as an asset manager or an ISO/RTO, to firm such resources in order to ensure electric reliability.

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[1] Levitan & Associates, Inc. "Proposed Scenario Definition Parameters and Sensitivities: Draft for SSC Discussion," prepared for the Eastern Interconnection Planning Collaborative Gas-Electric System Interface Study, December, 2013.

[2] The INGAA Foundation, Inc. "Firming Renewable Electric Power Generators: Opportunities and Challenges for Natural Gas Pipelines," March, 2011. http://www.ingaa.org/Foundation/Foundation-Reports/Studies/13417.aspx

When considering the penetration of renewable resources in its Gas-Electric System Interface Study, the EIPC should consider the natural gas capacity demand and infrastructure requirements necessary to firm intermittent generation resources.

The Gas Stakeholders Steering Committee also offers the following comments on certain gas demand scenarios and sensitivities proposed for analysis, identified below.

Gas Demand Scenarios

i) *Reference Gas Demand Scenario* reflects a significant substitution of renewable energy technology for conventional gas-fired UCAP additions.

Comment: Include enough flexible, dispatchable generation, pipeline and storage infrastructure to support the high levels of renewable intermittency.

ii) *Reference Gas Demand Scenario* reflects a significant substitution of renewable energy technology and DR/EE for conventional gas-fired UCAP additions.

Comment: Include enough flexible, dispatchable generation, pipeline and storage infrastructure to support the high levels of renewable intermittency.

iii) *Reference Gas Demand Scenario* reflects a significant substitution of different renewable energy technology types and locations for conventional gas-fired UCAP additions, including energy storage technologies.

Comment: Include enough flexible, dispatchable generation, pipeline and storage infrastructure to support the high levels of renewable intermittency.

vi) *High Gas Demand Scenario* reflects the 25 percent or percent substitution of wind / other renewables for new gas-fired combined cycle or gas turbine plants, thereby lowering the gas demand for electric generation, but reflecting a portfolio approach for resource planning purposes.

Comment: Include enough flexible, dispatchable generation, pipeline and storage infrastructure to support the high levels of renewable intermittency.

xiv) *Low Gas Demand Scenario* reflects increased renewable penetration rate and, perhaps, a coupling of increased renewables with increased EE/DR penetration.

Comment: Include enough flexible, dispatchable generation, pipeline and storage infrastructure to support the high levels of renewable intermittency.

Sensitivities Proposed for Analysis

The Gas Stakeholders Steering Committee suggests that the EIPC consider the following additional sensitivities in its analysis.

1. *Low Gas Demand Scenario* assumptions with no change in gas price from the reference case.

   The sensitivity reflects the notion that low gas demand very well could be driven by dynamics outside of gas price.

2. *High Gas Demand Scenario* assumptions with no change in gas price from the reference case.

   The sensitivity reflects the notion that high gas demand very well could be driven by dynamics outside of gas price.

3. *Reference Gas Demand Scenario* with high LNG export assumptions.

   The EIPC should assume LNG export levels as noted in the Energy Information Administration (EIA) Annual Energy Outlook (AEO) 2014 Early Release as opposed to the EIA AEO 2013.

4. *Reference Gas Demand Scenario* with high industrial demand assumptions.

   The sensitivity reflects the notion that high industrial demand could impact the amount of currently unsubscribed pipeline capacity should industrials contract for firm transportation. Further, the sensitivity should reflect the potential for industrials to support pipeline expansions, both mainline and lateral only, to support increased demand. The sensitivity further should consider the impact of additional demand competing with generators for interruptible pipeline transportation and capacity release.

Respectfully submitted,

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