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ADDITIONAL PIPELINE CAPACITY AND BASELOAD POWER GENERATION NEEDED TO SECURE ELECTRIC GRID

February 20, 2020

A new NETL report and case study released today shows that additional natural gas pipeline capacity and baseload generation units—such as coal and nuclear generation—are critical to providing reliable and affordable electricity during extreme weather events. Both are vitally important to meeting U.S. energy needs as more intermittent electricity sources, such as wind and solar, come onto the U.S. electricity grid.

The study, which is Volume II of NETL’s “Reliability, Resilience and the Oncoming Wave of Retiring Baseload Units,” follows two previously published NETL reports that examined the performance of electricity generation units during the “bomb cyclone” of 2018—a winter storm and cold weather event that primarily affected the Eastern Interconnection, one of the three major AC electricity grids responsible for the reliability of the U.S. power system.

As the electric power system relies more heavily on natural gas power generation, the reliability and resiliency of the Nation’s electrical system will become increasingly linked to the performance and capabilities of the natural gas delivery system. The report and case study reviewed the performance of coal-fired power plants that were slated for or at risk of retirement during the “bomb cyclone” event. It projects near-term economic and reliability costs associated with expanding the natural gas generation network.

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NETL Director Brian Anderson, Ph.D., highlighted the importance of increasing U.S. natural gas pipeline infrastructure capacity to handle the additional need for natural gas power generation.

“As the power sector relies more and more on natural gas and renewable sources for power generation, infrastructure must keep pace with this growth,” Director Anderson said. “The Department continues to advance grid storage technologies for future deployment, but we’ve seen how periodic winter weather events exert more pressure on the electricity system and associated natural gas infrastructure today – highlighting the important attributes that coal and nuclear power generation bring to the electricity mix. These reports are important to understanding how to ensure our grid reliability moving forward.”

Director Anderson explained that the NETL team’s analysis of the “bomb cyclone” event showed that natural gas demand, coupled with natural gas infrastructure constraints, led to significant spikes in natural gas prices. Coal and nuclear power sources lessened the impact of gas constraints and elevated gas prices and ensured reliable operation of the bulk power system. Further retirements would reduce the flexibility of generation in the face of extreme events.

The newly released report and case study includes three chapters:

- ▶ [Volume II-A: Case Study on Organized Markets of the Eastern Interconnection](https://www.netl.doe.gov/energy-analysis/details?id=2997) (<https://www.netl.doe.gov/energy-analysis/details?id=2997>).
- ▶ [Volume II-B: Electricity Generation Supply Chain in the Northeast](https://www.netl.doe.gov/energy-analysis/details?id=2998) (<https://www.netl.doe.gov/energy-analysis/details?id=2998>).
- ▶ [Volume II-C: Fuel-Electricity Interaction in the Northeast and Midcontinent](https://www.netl.doe.gov/energy-analysis/details?id=2999) (<https://www.netl.doe.gov/energy-analysis/details?id=2999>).

As noted in the report, dual-fueled plants can partially relieve peak demand for natural gas, but it will be difficult to maintain adequate fuel availability to meet that demand when more coal and nuclear resources are lost. The need exists for additional pipeline capacity, at a conservative investment of between \$470 million and \$1.1 billion. The study also notes an increased need to examine the interaction between natural gas and electricity markets.

NETL conducts a variety of energy analyses to identify and evaluate promising research and development (R&D) opportunities to provide balanced solutions in support of economic sustainability and energy supply security, mitigation of carbon emissions, and improved environmental performance. NETL-conducted studies require a multi-disciplinary approach to the assessment of large, complex energy systems encompassing energy production, distribution, and use. Strategic assessments and planning efforts also incorporate the evaluation of current status, near-term trends, and futuristic scenarios.

NETL is a U.S. Department of Energy (DOE) National Laboratory that produces technological solutions for America’s energy challenges. From developing creative innovations and efficient energy systems that make coal more competitive, to advancing technologies that enhance oil and natural gas extraction and transmission processes, NETL research is providing breakthroughs and discoveries that support domestic energy initiatives, stimulate a growing economy, and improve the health, safety, and security of all Americans. Highly skilled men and women at NETL’s sites in Albany, Oregon; Anchorage, Alaska; Houston, Texas;

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