THE COMMITTEE ON ENERGY AND COMMERCE

Memorandum

May 7, 2013

TO: Members, Subcommittee on Energy and Power

FROM: Committee Staff

RE: Hearing on "American Energy Security and Innovation: Grid Reliability Challenges in a Shifting Energy Resource Landscape"

On May 9, 2013, at 9:30 a.m. in 2123 Rayburn House Office Building, the Subcommittee on Energy and Power will hold a hearing entitled "American Energy Security and Innovation: Grid Reliability Challenges in a Shifting Energy Resource Landscape." This hearing will examine the reliability challenges and consumer impacts resulting from the increased use of natural gas and renewables in the nation's electricity generation portfolio.

I. WITNESSES

Mr. Gary Sypolt
CEO
Dominion Energy
On behalf of
Interstate Natural Gas Association of America

Mr. John Shelk
President and CEO
Electric Power Supply Association

Mr. Paul Cicio
President
Industrial Energy Consumers of America

Mr. Daniel Weiss
Senior Fellow and Director of Climate Strategy
Center for American Progress

Mr. Robert Gramlich
Interim CEO
American Wind Energy Association

Dr. Jonathan Lesser
President
Continental Economics, Inc.

II. BACKGROUND

This hearing builds upon the Subcommittee's previous work examining the shifting landscape of the Nation's electric generation portfolio, including hearings on the importance of fuel diversity in the generation mix and gas-electric coordination challenges. Continuing this evaluation, this hearing will explore additional grid reliability challenges and consumer impacts resulting from the shift in the Nation's generation portfolio, spurred by low natural gas prices,

new environmental regulations affecting the power sector, and the integration of renewable energy resources.

A. Gas-Electric Convergence Challenges

According to the Energy Information Administration (EIA), the share of natural gas in the electric generation mix has increased from 25 percent in 2011 to 30 percent in 2012 (*see* Appendix). The increased use of natural gas is likely to continue as more coal-fired generating units are retired,[1] new intermittent renewable resources require more backup support from natural gas-fired power plants, and anticipated low prices for natural gas encourage its greater use to generate electricity.

Natural gas is used for many different purposes, ranging from residential, industrial, and commercial uses to power generation. The increased use of natural gas to generate electricity has numerous benefits, but also raises potential integration issues as the electric and natural gas industries become increasingly interdependent. Challenges such as pipeline infrastructure and storage, and inconsistent scheduling practices between the industries, could impact electric reliability and put upward pressure on electricity rates in some regions. Recent events and reports have highlighted this interdependency and the importance of greater coordination between the sectors.[2]

Recognizing the critical implications of this electric-gas convergence, the Federal Energy Regulatory Commission (FERC) has initiated a series of technical conferences to further explore the issue. In August 2012, FERC held five regional conferences in the Northeast, Mid-Atlantic, Central, West, and Southeast.[3] Subsequently, FERC held a technical conference on February 13, 2013, focused specifically on information sharing and communications, and hosted an April 25, 2013, conference on scheduling differences between the sectors.

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[1] North American Electric Reliability Corporation, "2012 Long-Term Reliability Assessment," (Nov. 2012) (finding that over 70,000 megawatts of fossil-fuel fired generating capacity will retire over the next 10 years, 90% of which will retire over the next 5 years).

[2] *See, e.g.*, FERC and NERC, "Report on Outages and Curtailments During the Southwest Cold Weather Event of February 1-5, 2011," at p. 189 (Aug. 2011) ("The February 2011 cold weather event highlights the interdependency of electricity and natural gas, an interdependency that has grown in recent years."); Midwest ISO, "EPA Compliance: MISO's Concerns," (Mar. 11, 2013) ("MISO's Phase I and Phase II analyses of gas infrastructure indicated that significant investments in infrastructure expansion may be required to keep pace with growing demand – and identified potential pipeline capacity shortfalls under peak demand days in the MISO system."); PJM, "2012 Regional Transmission Expansion Plan Report, Book 1: PJM 2012 RTEP in Review," at p. 93 (Feb. 28, 2013) ("PJM is in the early stages of an interregional study with other regional grid operators to gauge the interdependence of the electric and natural gas systems, and the challenges these present for planning."); *see also* NY Times, "In New England, a Natural Gas Trap," (Feb. 15, 2013).

[3] FERC, "Staff Report on Gas-Electric Coordination Technical Conferences," Docket No. AD12-12-000 (Nov. 15, 2012). The regional conferences focused on three sets of issues: scheduling and market structures/rules; communications, coordination, and information sharing; and reliability concerns. *Id.*

B. Challenges to Integrating Variable Energy Resources[4]

According to EIA, the share of non-hydropower renewable energy resources – or variable energy resources – has increased over the last decade, increasing to approximately 5 percent of total U.S. electricity generation in 2012 (*see* Appendix). This increase is largely the result of technological advancements, environmental policies, and numerous State and Federal incentives intended to make renewables more cost-competitive with traditional generation sources.[5] Such State and Federal policies include the adoption of State renewable energy mandates and goals[6] and Federal tax subsidies such as the renewable electricity production tax credit.[7]

Integrating increasing amounts of variable energy resources into the electric grid presents operational challenges due to their intermittency. The electric system is designed to meet customer demand in real time, meaning that supply and demand must be kept in constant balance. Integrating large amounts of variable resources complicates this balance and can impact the reliability of the electric grid if not properly addressed. As explained by the North American Electric Reliability Corporation (NERC):

> Variable resources differ from conventional and fossil-fired resources in a fundamental way: their fuel source (wind, sunlight, and moving water) cannot presently be controlled or stored. Unlike coal or natural gas, which can be extracted from the earth, delivered to plants thousands of miles away, and stockpiled for use when needed, variable fuels must be used when and where they are available. Fuel availability for variable resources often does not positively correlate with electricity demand, either in terms of time of use/availability or geographic location . . . . Additionally, peak availability of wind power, the most abundant variable resource in terms of megawatt value today, can often occur during periods of relatively low customer demand for electricity.[8]

These output intermittency and time of use problems have led NERC to conclude that "as the electric industry seeks to reliably integrate large amounts of variable generation into the bulk power system, considerable effort will be needed to accommodate and effectively manage these unique operating and planning characteristics."[9]

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[4] FERC describes a "variable energy resource" as a "device for the production of electricity that is characterized by an energy source that: (1) is renewable; (2) cannot be stored by the facility owner or operator; and (3) has variability that is beyond the control of the facility owner or operator. This includes, for example, wind, solar thermal and photovoltaic, and hydrokinetic generating facilities." *See Integration of Variable Energy Resources Notice of Proposed Rulemaking*, FERC Stats. & Regs. ¶ 32,664, at P 64 (2010).

[5] EIA, "How much of our electricity is generated from renewable energy?" (last updated June 27, 2012).

[6] Database of State Incentives for Renewables and Efficiency, "Renewable Portfolio Standard Policies" (March 2013) (29 states and Washington, DC have renewable portfolio standards).

[7] 26 U.S.C. § 45.

[8] NERC, "Special Report: Accommodating High Levels of Variable Generation," at pp. i-ii (April 2009). *See also* NERC, "2012 Special Assessment: Interconnection Requirements for Variable Generation," at p. 12 (Sept. 2012) (stating that "unlike traditional, non-renewable resources, the output of wind, solar, ocean, and some hydro generation resources varies according to the availability of the primary fuel (wind, sunlight, and moving water) that cannot be reasonably stored.").

[9] NERC, "Special Report: Accommodating High Levels of Variable Generation," at p. ii (April 2009).

III. ISSUES

The following issues will be examined at the hearing:

- Challenges arising from increased interdependence of the natural gas and electricity sectors.

- Potential impacts on reliability resulting from the operational differences between the natural gas and electricity sectors.

- Challenges of integrating increasing amounts of variable energy resources, such as wind and solar, into the electric system.

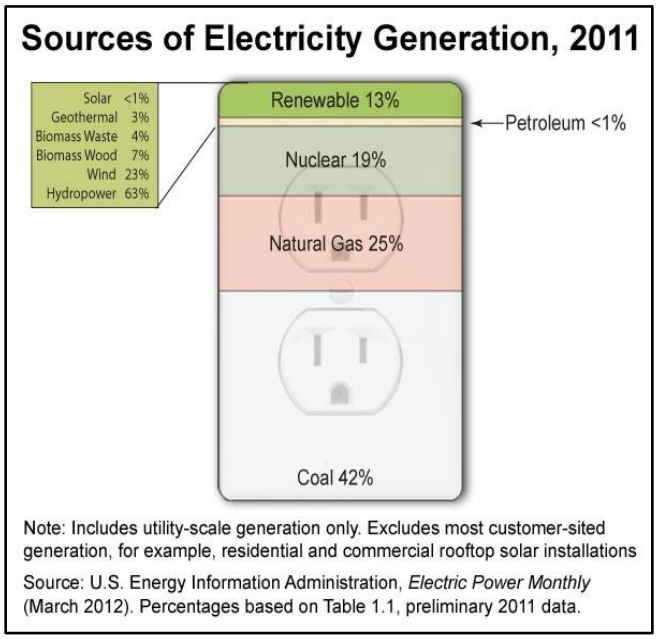
- Potential impacts on consumers and manufacturers resulting from the increased use of natural gas and renewables.

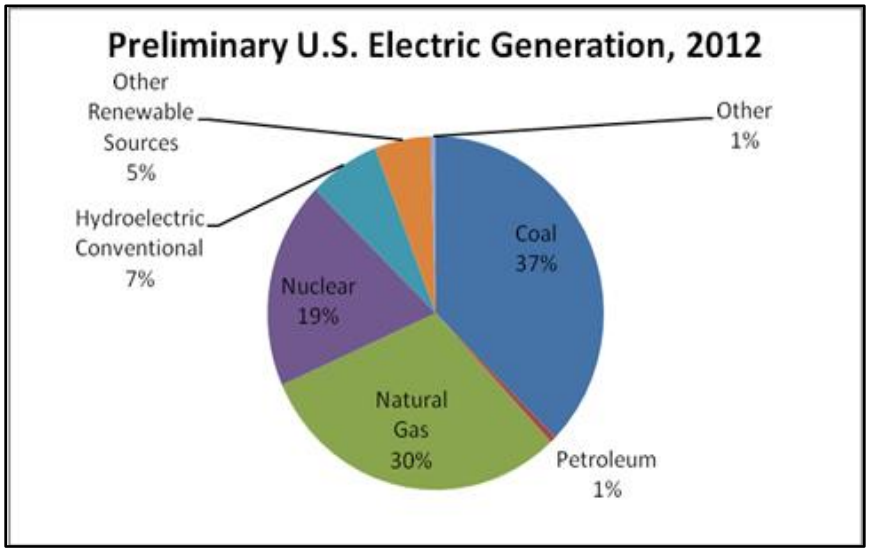
IV. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Patrick Currier or Jason Knox at (202) 225-2927.

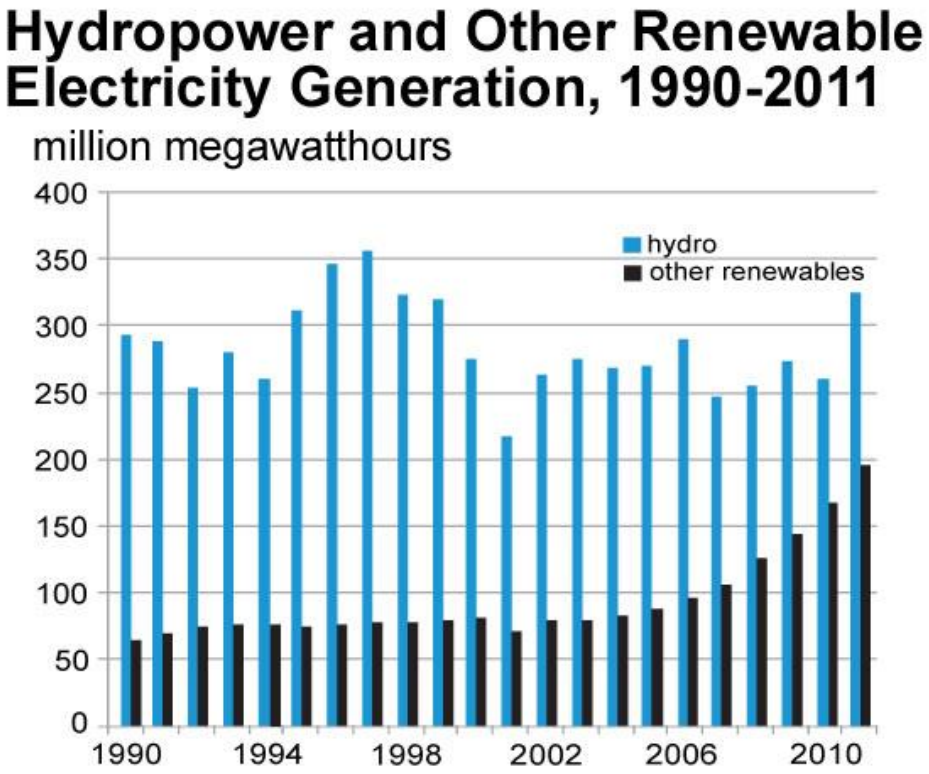
APPENDIX

Comparison of 2011 and 2012 Electric Generation Portfolios





*** Note: EIA data for 2012 is preliminary and subject to change*



Source: U.S. Energy Information Administration, *Electric Power Annual and Electric Power Monthly* (March 2012) based on preliminary 2011 data.