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The Honorable Ed Whitfield
Chairman
Subcommittee on Energy and Power
Energy and Commerce Committee
2125 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Whitfield:

The American Public Power Association (APPA) welcomes the opportunity to submit this statement for the record in relation to the House Energy & Power Subcommittee hearing on "American Energy Security and Innovation: Grid Reliability Challenges in a Shifting Energy Resource Landscape."

APPA is the national service organization representing the interests of over 2,000 municipal and other state- and locally-owned, not-for-profit electric utilities throughout the United States (all but Hawaii). Collectively, public power utilities deliver electricity to one of every seven electricity consumers (approximately 47 million people), serving some of the nation's largest cities. However, the vast majority of APPA's members serve communities with populations of 10,000 people or less.

Overall, public power utilities' primary purpose is to provide reliable, efficient service to local customers at the lowest possible cost, consistent with good environmental stewardship. Public power utilities are locally created governmental institutions that address a basic community need: they operate on a not-for-profit basis to provide an essential public service, reliably and efficiently, at a reasonable price.

Greater Use of Natural Gas and Renewables for Electric Generation Will Impact Utility Operations and Potentially Impact Grid Reliability

APPA commends you for holding a hearing on the issues surrounding the greater use of natural gas and intermittent renewables as fuel sources for electric generation. APPA members are impacted by the greater use of these fuel sources and will likely experience a variety of operational issues as they bring more of these resources online. The shift from coal to natural gas for electric generation creates several challenges that must be addressed, including potential price volatility for utilities and their customers, inadequate pipeline capacity and storage, lack of flexibility in pipeline rate schedules to accommodate the needs of electric generation, and misalignment of, and lack of intra-day flexibility within, the gas and electric days.

Greater use of intermittent renewables, such as wind, creates additional challenges from an operational standpoint. Because electricity must be generated and used simultaneously, the type of fuel used to generate must be accessible at all times. Therefore, when the wind does not blow or the sun does not shine, back-up power must be available to make up for the loss of the power being generated by those variable or intermittent sources. In the absence of substantial electricity storage facilities, the only such reliable back-up power is coal, natural gas, oil (which is only used sparingly in power generation), and, in some cases, hydropower. Nuclear power is extremely reliable in terms of being able to be used almost continuously for months at a time at close to 100 percent, but it is not able to be ramped up and down

quickly for extended periods of time, so is not well-suited to follow the fluctuations in wind and solar generation. Therefore, as coal is pushed out of the resource mix because of environmental constraints, the most heavily used resources to back up wind and solar are and will be natural gas and hydropower. Since hydropower is not available everywhere, the principal fuel source for this type of back-up power nationwide is natural gas.

Given these trends, it is important that Congress continues to examine the short- and long-term implications of federal policies that promote more use of natural gas and intermittent renewables as fuels for electric generation on electricity prices and grid reliability.

Natural Gas Is Becoming the Dominant Fuel Source for Electric Generation

As the subcommittee is well aware, there are a variety of factors driving electric utilities away from the use of coal-fired generation. The Environmental Protection Agency (EPA) has issued several regulations, such as utility Maximum Achievable Control Technology (MACT), that are driving utilities to retire coal-fired power plants and replace them with natural gas-fired ones. At the same time, the low cost of natural gas in the U.S., due to increased production, is making the use of coal for generation less economic, particularly when factoring in the regulatory landscape. Just a few years ago, coal was the predominant fuel type used for electric generation. Today, its share has declined as electric generation from natural gas and renewables, such as wind and solar, increase. The use of coal for electric generation in the U.S. will further decline when EPA finalizes its New Source Performance Standards (NSPS) for greenhouse gas (GHG) emissions from new power plants.

A January 2013 APPA report examining new generation capacity in the U.S. highlights these trends in the industry. It finds that "the share of coal-fired capacity continues to diminish, as solar and nuclear, in addition to wind and natural gas, have surpassed it in the under construction category."[1] Over 40 percent of new plant construction is natural gas, with 19.1 percent wind, 12.7 percent solar, and 11.4 percent nuclear.[2] In addition, since 2007, the share of coal plants under construction has dropped dramatically. The report also notes that natural gas has the largest share of operating capacity (43.4 percent), with coal at 30 percent.[3] The operating capacity of coal will continue to drop as more coal-fired plants are retired due to age, EPA regulations, and the generally lower price of natural gas. In 2012 alone, over 12,200 MW of capacity was retired. Two-thirds of those retirements were coal-fired.[4]

There will be long-term implications from the greater use of natural gas for electric generation. Utilities are spending hundreds of millions of dollars to convert existing coal facilities, where possible, to natural gas or to construct new natural gas plants. They are also using natural gas generation to back up wind and solar power, which are, as mentioned above, variable energy sources that cannot be relied on to generate power at all times. These are long-term investments being made to generate cleaner power, but they increase the risk of greater volatility in electricity prices for consumers, and potentially reduce electric reliability. As a commodity, natural gas is subject to price volatility. Prices may be low today, but can easily rise in the years to come due to a variety of factors including potential new or existing regulations on hydraulic fracturing, increased utility and industrial demand, exports, and increasing use in the transportation sector.

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[1] *See* APPA Report on New Generating Capacity: 2013 Update, January 2013, available at http://publicpower.org/files/PDFs/New_plants_analysis_2013.pdf
[2] *Id.* at 2.
[3] *Id.* at 15.
[4] *Id*. at 17.

In addition, it is not clear yet whether there will be sufficient infrastructure or storage to accommodate the greater use of natural gas by electric utilities.[5] While the Federal Energy Regulatory Commission (FERC) is examining how to promote greater coordination between the electricity and natural gas industries, no one knows whether all the changes needed for fuel switching on this scale can be accomplished in the time needed to comply with EPA regulations. As is evidenced in New England, a region of the country heavily dependent on natural gas for electric generation, there are issues with pipeline capacity and competing demand for gas for home heating. Electricity prices in the region were four to eight times higher than normal in February 2013 because of the lack of fuel diversity.[6]

New England is not the only region of the country with potential reliability concerns. A January 2013 EPA Compliance Update by the Midwest Independent System Operator (MISO) states the ISO has concerns about whether there is sufficient resource adequacy in the Midwest beginning in 2016. With the significant number of coal-fired generation units retiring due to EPA regulations and low natural gas prices, MISO projects there will be a potential 11.7 GW shortfall of resource adequacy in the winter of 2016 and a 3.5 GW one in the summer of 2016.[7] MISO anticipates increased utilization of natural gas fuel generation that will result in "changes to the system's generation configuration and concerns about the ability of the current pipeline infrastructure's ability to deliver enough gas."[8] On March 19, 2013, the Committee heard directly from representatives of ISO-New England and MISO about these and other challenges regional grid operators face and potential electric reliability impacts.

There are also market-related challenges arising from greater use of natural gas for electric generation. Electric utilities are concerned about the misalignment of, and intra-day flexibility within, the gas and electric days and the range of pipeline service offerings available to accommodate generator needs (e.g., flexibility of pipeline rate schedules). They are also concerned about the lack of sufficient communications between the two industries and how efforts to improve communications going forward could potentially violate FERC's Standards of Conduct (SoC). It is unclear to both industries what type of information they can share with one another without running afoul of the SoC. Many of these issues are solvable, but will require time to do so. Congressional oversight of these challenges is needed to ensure they are addressed.

Electric Generation from Renewables Is Increasing and Creates Unique Operational Challenges

The amount of electric generation from renewable or variable energy resources (VERs) is increasing throughout the U.S. The primary driver of increased use of VERs is state renewable portfolio standards (RPS) that mandate that utilities generate electricity from a certain percentage of designated renewable resources. These resources vary by state, but generally include wind, solar, geothermal, biomass, and certain types of hydropower. According to the U.S. Energy Information Agency, 30 states and the District of Columbia have mandatory RPSs and another seven have voluntary goals for renewable

[5] A July 2010 APPA Study by the Aspen Environmental Group, Implications of Greater Reliance on Natural Gas for Electricity Generation, examines the impacts on natural gas and deliveries to electric utilities from fuel switching.
[6] *See* In New England, a Natural Gas Trap, New York Times, February 15, 2013, available at http://www.nytimes.com/2013/02/16/business/electricity-costs-up-in-gas-dependent-new-england.html?_r=0
[7] See MISO EPA Compliance Update, January 11, 2013, available at https://www.misoenergy.org/Library/Repository/Communication%20Material/Power%20Up/EPA%20Compliance%20Update.pdf.
[8] https://www.misoenergy.org/WhatWeDo/StrategicInitiatives/Pages/EPACompliance.aspx

generation (as of January 2012).[9] Other policies driving increased use of renewables include market conditions and federal incentives, namely federal tax incentives.

While most APPA members are not directly subject to state RPSs, many have as a policy matter added renewables to their generation mix in states where RPSs are mandated for investor-owned utilities. Reasons for doing so include the promotion of fuel diversity, community desire to promote clean energy, and state policies or incentives. Wind and solar are the dominant renewables used by public power utilities for generation, and their use continues to grow. APPA members using these renewable resources face a variety of operational challenges, particularly with the use of wind power, due to their intermittency.

The electric grid is designed to provide real-time power to meet demand. Electricity generated from renewable resources can vary widely based on the time of day and season of year. Solar power is generated during the day, when electricity demand is higher. However, the opposite tends to be true with wind power. The wind tends to blow more at night and during the spring and fall when electricity demand is lower. As more wind power is integrated into the grid, this variability can cause operational challenges that impact grid stability. When the wind generates more power than is needed, utilities undertake a variety of measures to manage that power and ensure system stability.

When the wind does not blow, its production has to be replaced with another fuel source, which is typically natural gas, as mentioned above. Most wind generation is backed up with natural gas turbines (either simple cycle or combined cycle) that can ramp up or down based on the production output of the wind power. Utilities have to carefully monitor weather forecasts to determine when the wind might blow and be able to dispatch backup generation in a short time frame to provide power when the wind is not blowing. They also have to work closely with balancing authorities to ensure that transmission is available to move power to meet customer demands for power.

While technological improvements to natural gas turbines that back up wind generation will address some of the problems associated with ramping, such as reduced turbine efficiency and increased emissions of certain pollutants, utilities will still face many challenges from the integration of wind power into the grid. Transmission of power from remote areas to population centers to serve customer demand is another problem with no simple solution. There are strong disagreements about who should pay for the construction of transmission lines that bring renewable power into the grid and issues surrounding the siting of such lines.

In addition to these challenges, there is the issue of the federal renewable electricity production tax credit (PTC). Created by Congress in the Energy Policy Act of 1992 to promote the use of renewables, it provides tax credits of varying amounts for each kilowatt hour (kWh/h) of electricity generated from eligible technologies. For wind, the credit is currently 2.3 cents per kWh. The PTC is widely credited with the development of the wind industry in the U.S. There is, however, ongoing debate today about whether the PTC is still necessary to support the wind industry's continued development.

It is important for the subcommittee to evaluate all federal policies designed to promote renewable energy. Many of these policies have served the important goal of fostering research and development of clean energy technologies. With some of these technologies having become more commercially viable and competitive with other generation sources, now is a good time to evaluate whether these policies still make sense or should be modified.

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[9] See "Most States Have Renewable Portfolio Standards," U.S. EIA, Today in Energy available at http://www.eia.gov/todayinenergy/detail.cfm?id=4850.

For example, wind developers in the Northwest sued the Bonneville Power Administration (BPA) when it curtailed wind power on its transmission lines in 2011 because of significant amounts of water in the Columbia River power system. With so much water to generate hydropower and a lot of wind, there was far more power than needed to meet load. Hydropower generation in the Columbia River basin is governed by a strict set of environmental laws to protect fish, so BPA had to maintain the hydropower flows in order to ensure protection of those resources.

APPA members, in incorporating renewable generation into their resource portfolios, need the ability to evaluate specific renewable projects against one another and against distributed generation and energy efficiency/demand response measures. Subsidies given to certain types of renewable generation can skew individual utility integrated resource planning processes and, on a macro level, our nation's overall resource choices, leading to sub-optimally efficient resource outcomes. Therefore, it is important that Congress evaluate federal energy policies in order to ensure that we are able to maximize our domestic generation resources.

Thank you again for this opportunity to submit a statement for the record and we welcome any questions you might have.

Sincerely,

Mark Crisson
President & CEO

cc: The Honorable Bobby Rush
The Honorable Fred Upton
The Honorable Henry Waxman