Testimony of Paul Bailey

President and Chief Executive Officer

American Coalition for Clean Coal Electricity

Before the House Committee on Energy and Commerce

Subcommittee on Energy

At the hearing entitled:

"Part II: Powering America: Defining Reliability

in a Transforming Electricity Industry"

October 3, 2017

Highlights of ACCCE Testimony

- The electric sector is undergoing changes that could affect the reliability and resilience of the electric grid. These changes include the retirement of a large amount of traditional baseload generating capacity, in particular coal-fueled generating capacity.

- Currently, the nation's coal fleet is comprised of 1,004 individual generating units located at 377 power plants that represent a total of 262,000 megawatts (MW) of electric generating capacity. Some 60,000 MW of coal-fueled generating capacity (20 percent of the coal fleet) had retired by the end of last year. An additional 41,000 MW have announced plans to retire. Altogether, these retirements represent one-third of the nation's coal fleet.

- The coal fleet provides many attributes that help ensure the reliability and resilience of the electric grid. These attributes include on-site fuel supplies that have averaged 73 to 82 days. Without fuel security, the electric grid is less reliable and less resilient.

- Almost two-thirds of the coal fleet (174,000 MW) serves wholesale electricity markets. However, the contributions of the coal fleet to grid reliability and resilience are not being properly valued in these wholesale markets. This is contributing to coal retirements.

- Recently, DOE has proposed a rule aimed at preventing further premature retirements of baseload electric generating capacity. The proposed rule directs FERC to require grid operators to adopt market reforms to value the onsite fuel and other reliability attributes provided by the coal fleet. This action by DOE is a major step toward achieving long overdue wholesale electricity market reforms.

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Chairman Upton, Ranking Member Rush, and Members of the Subcommittee, my name is Paul Bailey. I am President and Chief Executive Officer of the American Coalition for Clean Coal Electricity (ACCCE). We commend the subcommittee for holding this hearing and appreciate the opportunity to testify today regarding changes to the nation's electric grid and the contribution of the coal fleet to grid reliability and resilience.

The mission of ACCCE is to advocate on behalf of the nation's fleet of coal-fueled power plants. Our members include electricity generators, coal producers, railroads, barge lines, and equipment manufacturers. Their operations, in one way or another, involve the production of electricity from coal.

Here are a few facts about the coal fleet:

- Currently, the coal fleet is comprised of 1,004 individual generating units located at 377 power plants and representing a total of 262,000 megawatts (MW) of electric generating capacity.[i]
- Some 60,000 MW of coal-fueled generating capacity had retired by the end of last year. An additional 41,000 MW have announced plans to retire. In

total, 43 states have coal-fueled generating units that have either retired or have announced plans to retire.[ii]

- The coal fleet helps to provide affordable and reliable electricity to consumers in 48 states. Moreover, the fleet provides at least half the electricity in 13 states and at least one quarter of the electricity in 26 states.[iii]
- According to EIA, the coal fleet was responsible for slightly more than 30 percent of electricity generated in the U.S. last year and is projected to supply 31 percent of U.S. electricity this year and next year.[iv] Through 2030, EIA projects that coal will provide 31 percent of U.S. electricity needs.[v]

A reliable and resilient electric grid is essential for public health, public safety, a sound economy, and national security. It is obvious the nation's electric grid is undergoing profound changes that could challenge grid reliability and resilience. Your invitation asked each member of the panel to address two questions that are relevant to these changes. The first, in my case, is how does the coal fleet contribute to reliability and what are its unique attributes? The second is what challenges does the coal fleet face? Our responses follow.

"How does the coal fleet contribute to reliability and what are its unique attributes?" The North American Electric Reliability Corporation (NERC) is charged with ensuring the reliability of the nation's bulk power supply system (power plants and the high voltage transmission system). NERC defines reliability as ensuring resource adequacy — that is, maintaining generation reserves such that load shedding due to inadequate supply would occur only once in ten years, or "loss of load expectation" — plus ensuring the bulk power system can withstand sudden disturbances and avoid uncontrolled cascading outages.[vi] In other words, reliability means having

sufficient supplies of electricity along with a transmission system that will keep the lights on, even in the face of short-term disturbances.

The U.S. bulk power system is considered to be extremely reliable.[vii] However, as the subcommittee noted, changes in the electricity generation mix make this a critical time to carefully examine reliability, as well as resilience. Several groups have identified attributes that various electricity resources — coal, gas, nuclear, renewables, demand response, and storage — contribute to reliability. These reliability attributes are listed below in no particular order. (Note that there may be attributes that others might include in the list.)

- Dispatchability,
- Frequency response / inertia,
- Voltage control / reactive power,
- Contingency reserves / spinning reserves,
- Ramp capability,
- Regulation,
- Load following,
- Minimum load,
- Black start capability,
- Fuel security / on-site fuel,
- Resource availability (non-intermittency),
- Equivalent availability factor,
- Flexibility (cycling and short startup times),
- Vulnerability to single points of disruption,
- Storage capability, and
- Price stability.[viii]

The coal fleet provides most of these attributes, especially fuel security (or assurance). Without fuel security, the electric grid is less reliable and less

resilient. At the same time, it is important to recognize that no single resource provides each and every reliability attribute. This is why fuel diversity is critical to reliability and why the retirement of a large number of coal-fueled generating units is concerning.

While reliability is critical, NERC, DOE, and others (including Congress) have begun to focus more attention on grid resilience. For example, Congress called for an independent assessment of the reliability and resilience of the electric grid in 2014. This assessment, "Enhancing the Resilience of the Nation's Electricity System," was released by the National Academies of Science, Engineering, and Medicine (NAS) two months ago. The NAS report notes that grid resilience is "not just about being able to lessen the likelihood that outages will occur, but also managing and coping with outage events as they occur to lessen their impacts, regrouping quickly and efficiently once an event ends, and learning to better deal with other events in the future."[ix] Similarly, PJM explains that resilience "relates to preparing for, operating through, and recovering from a high-impact, low frequency event. Resilience is remaining reliable even during these events."[x]

The importance of resilience is highlighted elsewhere. For example, in June, NERC testified that "[S]ystem resiliency is becoming an enhanced yardstick of reliability."[xi] PJM's "Evolving Resource Mix" released earlier this year includes analysis in which the PJM electric resource portfolio is subjected to an assumed Polar Vortex event (see below).[xii] Also, the DOE report reviews extreme weather events that have tested the grid's resilience and notes that "more work is needed to define, quantify, and value resilience."[xiii]

Both the DOE and NAS reports refer to the coal fleet's onsite fuel attribute that contributes to grid resilience. According to DOE, "Fuel assurance is a growing

consideration for the electricity system. Maintaining onsite fuel resources is one way to improve fuel assurance … Coal facilities typically store enough fuel onsite to last 30 days or more."[xiv] The NAS report recommends that "fuel diversity, dual fuel capability, and local storage should explicitly be addressed as a part of these resilience strategies."[xv]

PJM's "Evolving Resource Mix" analyzes an assumed Polar Vortex scenario to test the resilience of its electricity resource mix. The analysis evaluates 98 "desirable" resource portfolios (different amounts of coal, gas, nuclear, and demand response) and finds that only one-third of the portfolios were resilient against Polar Vortex conditions. PJM observed that "the majority of the resilient portfolios in this polar vortex sensitivity preserve a high share of coal."[xvi] Most of the resilient portfolios included the same amount of coal-fueled capacity that PJM has in its current resource mix.

Similar findings are also highlighted in a recent study for ACCCE by PA Consulting Group.[xvii] PA concludes that coal-fueled generation provides attributes that are critical for maintaining grid reliability and resilience. In particular, PA notes that "two components that contribute to electric system resilience are (i) diversification of the fuels used, and (ii) ensuring adequate and consistent fuel supply to electric generators." PA goes on to note that "coal-fueled plants … have unique attributes that contribute to grid resilience, including a secure fuel supply."

The secure fuel supplies at coal-fueled power plants serve as an insurance policy against fuel disruptions that can occur with other fuels. In contrast to coal-fueled power plants, natural gas-fueled plants rely on deliveries via pipeline, leaving them vulnerable to supply disruptions, especially when high-impact, low-probability events occur. For example, at least 30 percent of the natural gas delivered to power plants in the Northeast and Mid-Atlantic

states is subject to curtailment, under which pipelines and local distribution companies can cut off gas supplies in the event of needs by residential and commercial heating customers.[xviii] The coal fleet can continue generating electricity for weeks even if coal deliveries are interrupted because the average coal-fueled power plant maintains more than a two-month supply (73 to 82 days) of coal onsite.[xix]

"What challenges does the coal fleet face?" Despite its contribution to fuel diversity, reliability, resilience, and affordable electricity prices, the coal fleet has faced and still faces a number of challenges. These include massive environmental compliance expenditures over the past six years; uncertainty over future environmental policies; low natural gas prices; mandates and tax incentives for renewables; out-of-market subsidies for other resources; and wholesale electricity market rules that do not properly value the reliability and resilience attributes of the coal fleet.

The latter challenge is especially important because almost two-thirds of the coal fleet (174,000 MW) serves wholesale electricity markets whose price formation policies are badly in need of reform. We believe the competitive markets do not adequately value all essential reliability and resilience attributes of the coal fleet. However, the markets can be structured to price these attributes, and FERC has a vital role in helping to accomplish this.

While three-fourths of coal retirements have been attributed, at least in part, to EPA regulations, many recent retirements have been directly linked to wholesale market conditions.[xx] For example, Dynegy attributed the retirement of its Wood River plant and the shutdown of units at its Baldwin and Newton plants in Illinois in 2016 and 2017 to the "poorly designed wholesale capacity market."[xxi] Similarly, the retirement of plants in Ohio has been blamed on market conditions, including the planned retirement of four units at First

Energy's Sammis plant in 2020, as well as Dayton Power and Light's announcement that it is retiring the Killen and Stuart plants in 2018.[xxii] Some 8,000 MW of coal-fueled generating capacity in PJM, MISO, and NYISO that have retired or are expected to retire between 2016 and 2020 have been attributed to wholesale market conditions.[xxiii]

In addition to market conditions, federal tax incentives for renewable energy have encouraged renewable energy development and deployment. According to DOE, "the … ITC and PTC, as well as state-level RPS, have driven expansion of VRE, particularly wind and solar … These policies reduce revenues for traditional baseload power plants by lowering the wholesale electric prices they receive and by displacing a portion of their output."[xxiv]

With the retirement of coal and nuclear units, EIA projects that natural gas and renewables will comprise almost 75 percent of the nation's electric generating capacity by 2040.[xxv]

Path Forward DOE notes in its report that evolving market conditions show that "markets need … reform to address future services essential to grid reliability and resilience."[xxvi] DOE recommends that FERC "create … regulatory mechanisms that compensate grid participants for services that are necessary to support reliable grid operations." With respect to resilience, DOE recommends that "RTOs and ISOs should further define criteria for resilience, identify how to include resilience in business practices, and examine resilience-related impacts of their resource mix."[xxvii] ACCCE supports these recommendations.

Just recently, DOE proposed a rule directing FERC to adopt electricity market reforms to prevent the premature retirement of baseload power plants. This rule would require RTOs and ISOs to adopt market rules to ensure that fuel

security, reliability, and resilience attributes are fully valued. DOE's proposal is a major step toward achieving long overdue reforms in wholesale electricity markets. However, to achieve DOE's goal, these reforms must be adopted as quickly as possible. FERC must provide strong leadership and act expeditiously, and grid operators must adopt reforms as quickly as possible.

Thank you for the opportunity to testify today. I look forward to answering your questions.

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[i] SNL Energy data; EIA Electric Power Monthly, August 2017.

[ii] ACCCE, *Retirement of Coal-Fired Electric Generating Units as of June 17, 2017*.

[iii] EIA, Electric Power Monthly, February 2017.

[iv] EIA, Short Term Energy Outlook, August 2017.

[v] EIA, Annual Energy Outlook 2017, January 5, 2017.

[vi] North American Electric Reliability Corporation, "Frequently Asked Questions," August 2013.

[vii] See, for example, North American Electric Reliability Council (NERC), *State of Reliability 2017* (June 2017).

[viii] PJM Interconnection, *PJM's Evolving Resource Mix and System Reliability*, March 30, 2017; Hubbard, P., S. Tierney, and K. Franklin, *Electricity Markets, Reliability and the Evolving U.S. Power System*, Analysis Group, June 2017; Lannoye, E., E. Ela, and D. Brooks, "Grid Impacts and Challenges Arising from the Integration of Inverter-Based Variable Resources," EPRI, ISO New England Stakeholder Meeting, October 19, 2016; Shavel, I, M. Kline, R. Lueken, and P. Ruiz, *Diversity of Reliability Attributes: A Key Component of the Modern Grid*, Prepared for the American Petroleum Institute, May 17, 2017; PA Consulting Group, Inc., *The Contribution of the Coal Fleet to America's Electricity Grid*, Prepared for the American Coalition for Clean Coal Electricity, August 2017.

[ix] National Academies of Sciences, Engineering, and Medicine. 2017. *Enhancing the Resilience of the Nation's Electricity Systems.* Washington, DC: The National Academies Press. https://doi.org/10.17226/24836. ("NAS Report")

[x] PJM Interconnection, *PJM's Evolving Resource Mix and System Reliability*, March 30, 2017, footnote 16.

[xi] Remarks of Mark Lauby, Senior Vice President and Chief Reliability Officer, North American Electric Reliability Corporation, FERC Reliability Technical Conference, Panel III: The Potential for Long-term and Large-Scale Disruptions to the Bulk-Power System, June 22, 2017.

[xii] PJM Interconnection, Appendix to PJM's *Evolving Resource Mix and System Reliability*, March 30, 2017, at 40-41.

[xiii] DOE, *Staff Report to the Secretary on Electricity Markets and Reliability*, August 2017 ("DOE Report") at 100.

[xiv] DOE Report at 11. The DOE report does mention frozen coal piles as occurring during extreme cold, but while this did occur during the 2014 Polar Vortex, NERC's review of that incident shows that natural gas represented over 55% of outages during the event, to coal's 26%. (NERC, *Polar Vortex Review*, September 2014)

[xv] NAS Report at 4-22.

[xvi] PJM Interconnection, Appendix to PJM's *Evolving Resource Mix and System Reliability*, March 30, 2017.

[xvii] PA Consulting Group, Inc., *The Contribution of the Coal Fleet to America's Electricity Grid*, Prepared for the American Coalition for Clean Coal Electricity, August 2017.

[xviii] *Ibid*.

[xix] EIA, *Electricity Monthly Update*, accessed July 27, 2017. This is the average amount of coal stockpiled over the past five years. Plants that use bituminous coal have an average stockpile equivalent to 82 days; plants burning subbituminous coal average 73 days.

[xx] ACCCE, *Retirement of Coal-Fired Electric Generating Units as of June 17, 2017*.

[xxi] Bandyk, Matthew, "Dynegy to shut more Illinois coal plants, calls for fixes in MISO market, *SNL Energy*, May 3, 2016; Bandyk, Matthew, "Dynegy to retire Illinois coal plant due to 'flawed' MISO auction," *SNL Energy*, November 4, 2015.

[xxii] Qureshi, Nazia, "First Energy to abandon 856 MW of Ohio coal units, record $647M Q2 impairment," *SNL Energy*, July 22, 2016; Sweeney, Darren, "DP&L commits to retiring nearly 3,000 MW of Ohio coal capacity in 2018," SNL Energy, March 20, 2017.

[xxiii] ACCCE, *Retirement of Coal-Fired Electric Generating Units as of June 17, 2017* and backup data.

[xxiv] DOE Report at 49-50.

[xxv] EIA, Annual Energy Outlook 2017.

[xxvi] DOE Report at 10.

[xxvii] *Ibid* at 126.