

PENNSYLVANIA HOUSE OF REPRESENTATIVES

CONSUMER AFFAIRS COMMITTEE

Statement of F. Stuart Bresler, III on Behalf of PJM Interconnection

March 11, 2019

I. Introduction

Good afternoon, Committee Chairs - Representative Roae and Representative Matzie - and members of the Consumer Affairs Committee. Thank you for the opportunity to appear before you today. My name is Stu Bresler, and I am Senior Vice President of Operations and Markets for PJM. PJM has its headquarters in Valley Forge, Pennsylvania and I invite the members of this Committee and your staff to visit our control center operations and see first-hand what we do.

Pennsylvania stands today, as it has for much of its history, as a leader and an innovator in energy production. The Commonwealth is blessed with vast energy resources that have placed it, at various times, among the very top producers of coal, oil, and natural gas. In addition, Pennsylvania was home to the first commercial nuclear reactor at Shippingport. These resources together with the vision of Pennsylvania's policymakers to embrace competitive energy markets have resulted over the last couple of decades in extensive, private at-risk capital investment in power generation that supplies cost effective electricity to Pennsylvania, its neighbors, and the larger PJM region. PJM is proud that its Pennsylvania roots are woven into the fabric of the Commonwealth's energy leadership in the U.S. and abroad.

While Pennsylvania has a rich energy production history, we cannot ignore that the industry and the power sector are evolving rapidly. We have seen and continue to see significant changes in the way electricity is produced and consumed across Pennsylvania and the PJM region. On the consumption side, customers are taking a more active role in their electricity purchase decisions, leading to increases in demand response, energy efficiency, and distributed generation technologies. On the production side, Pennsylvania continues to be one of the epicenters of the shale gas revolution. The combination of

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abundant, low-priced gas from the Marcellus and Utica shales and policies supportive of competitive markets are fueling Pennsylvania's growth in the future energy economy.

Pennsylvania's policy of electric competition has benefitted the Commonwealth in at least two meaningful ways. First, through its commitment to competitive markets, Pennsylvania electric consumers saw the immediate benefits of the industry's game-changing innovation that is shale extraction. Over the last decade of shale gas development, Pennsylvania consumers have seen significant declines in wholesale energy costs. Without competitive electricity markets, consumers could have been locked into outmoded, high-cost power generation technologies. Instead, Pennsylvania's 13-million residents saw the market react with agility to reflect the new pricing dynamics of low cost fuel and highly efficient new technologies. This is a major success for Pennsylvania and its consumers.

Second, through its commitment to competitive markets, Pennsylvania has developed the most robust generation development market among the PJM states. In 2018 alone, 19 new or upgraded natural gas plants – totaling over 5,000 megawatts of capacity – came online in Pennsylvania. An additional 7,500 megawatts of new natural gas projects in Pennsylvania are presently being studied by PJM. This is also a major success for Pennsylvania and its consumers. Importantly, given the open, transparent, non-discriminatory markets in place in our region and supported by Pennsylvania's policies, these resources have been financed and constructed mostly by merchant developers. As such, investment risk is assumed by the developers, not by end-use customers as was the case under the vertically integrated monopolies that existed before restructuring.

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In the remainder of my testimony today, I would like to provide an overview of PJM and tell you about our mission to ensure reliable wholesale electricity at lowest cost to customers. In addition, I would like to discuss three important points about the state of wholesale electricity in Pennsylvania. First, production and transmission of wholesale electricity in Pennsylvania is reliable today and will continue to be so into the future. Second, while the fuel mix for both the PJM region and Pennsylvania is more diverse today than it has been historically, PJM is also working on market incentives that will help ensure that the fuel mix remains secure. Third, and finally, PJM's markets are evolving to meet the challenges and opportunities facing the electricity industry today and tomorrow.

II. The Role of PJM

PJM is an independent and neutral party established to maintain the reliability of the high voltage transmission system for both Pennsylvania and the broader region we serve. We conduct the operation of the high voltage grid 24 hours a day, 365 days a year, continuously matching generation and load, and doing so while ensuring that power flows on transmission facilities remain within their established limits. Our mission therefore is to keep the lights on and just as importantly, to do so at the lowest reasonable cost to the customer. We accomplish this mission through long-range transmission grid planning and by leveraging the power of competitive markets for energy and resource adequacy. The markets exist for one reason: to reinforce grid reliability, and the discipline provided by the competitive market helps to ensure that the power generation needs of Pennsylvania and the PJM region are met by the most efficient and cost-effective resources available.

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The next part of my testimony will refer to the slide deck attachment provided in support of my comments here today.

As shown on page 2 of the attachment, PJM is responsible for the reliable operation of the power grid for all or parts of 13 states and the District of Columbia. We serve the entirety of the Commonwealth of Pennsylvania. Our member utility companies serve 65 million people.

As illustrated on page 3 of the attachment, PJM executes three core functions to ensure safe and reliable regional grid operations – *keeping the lights on* – for those we serve. PJM does so through: (1) Coordinated long-term, regional transmission expansion planning; (2) Operation in real-time of the high voltage transmission system; and, (3) Administration of competitive, transparent, non-discriminatory wholesale electricity markets to maintain operational reliability at the lowest, reasonable cost. Each function is analogous to those performed in other industries, such as urban planning, air traffic control, and the stock market, respectively.

On page 4 of the attachment you can see the independence of PJM's governance structure. PJM's governance model comprises two tiers: an independent Board of Managers and a Members Committee. The Members Committee, balanced structurally to prevent undue influence by any one stakeholder or group of stakeholders, provides deliberative advice to the PJM Board through a robust, transparent stakeholder process by proposing and voting on changes and new rules regarding PJM's operations, wholesale markets, or transmission planning functions.

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Put together, as illustrated on page 5 of the attachment, PJM's operations provide an annualized value of nearly \$3 billion in cost savings to its members. The value PJM imparts is created through its three core functional services – planning, operations, and markets – being executed on a regionalized and coordinated basis. Executing these services across the 14-jurisdiction PJM footprint, allows PJM members access to more diverse supply options, and enables economies of scale.

Lastly, page 6 of the attachment outlines the various wholesale markets PJM operates. At its core is reliable operation of the power grid. The PJM markets exist to reinforce grid reliability by providing physical asset owners with the financial incentive to act in a manner that supports reliable operations.

III. The State of Reliability: PJM and Pennsylvania

As I indicated earlier, the supply and transmission of electricity in both the PJM region and Pennsylvania are reliable today and will continue to be so into the future. Reliable wholesale electricity service is multifaceted and depends upon, among other things, prudent transmission engineering and planning, effective power grid and market operations, and adequate supply resources with sufficient reserves. While all of these components are important, resource adequacy – *having enough steel in the ground to meet peak demand* – is where I will focus my comments on reliability today.

To ensure Resource Adequacy, PJM holds an annual auction to procure capacity from various types of power supply resources for a one-year term three years into the future. For instance, in May 2018, PJM held an auction to procure capacity commitments for the period extending from June 1, 2021 through May 31, 2022. The target amount of capacity PJM procures ensures that a sufficient quantity of

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resources is in place to meet future demand *plus* a reserve margin to further protect grid reliability against unforeseen events. Capacity resources that clear the auction receive a daily payment during the delivery period in exchange for being available to serve load when needed.

Turning your attention to page 7 of the attachment, you will see PJM has procured robust reserve margins to meet future demand through May 31, 2022 – the furthest date for which PJM has committed future capacity. Over the last four auctions, PJM sought enough capacity to meet estimated future demand *plus* a reserve margin in the range of 15.7 to 16.6 percent of that estimated future demand. In actuality, PJM was able to commit enough resources on an economic basis to result in reserve margins as high as 21.5 percent through May 31, 2022, or 5.7 percent *above* PJM's own conservative target reserve margin. To underscore the robustness of PJM's current Resource Adequacy, this only reflects those resources that are physically and financially committed to be available. These margins do not reflect power supply resources that continue to operate without a commitment for one or more Delivery Years.

What's more, these robust reserve margins were achieved at highly competitive pricing outcomes. For instance, the most recent auction procured a conservative reserve margin at a price that is just 44 percent to 82 percent of the net cost to build a new facility, depending upon the location in PJM.

IV. The Diversity and Security of Fuel Mix: PJM and Pennsylvania

Both PJM and Pennsylvania hold a more diverse fuel mix portfolio today than has been the case historically. Coal, natural gas, and nuclear power generation now comprise a more balanced share of the overall portfolio for both installed capacity and energy production.

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On page 8 of the attachment, you can see that PJM capacity resources started a transition from coal to natural gas starting in PJM's capacity auction conducted in May 2010 for the 2013/14 Delivery Year. This outcome reflects two significant market fundamentals. First, this was the first auction that reflected the increased cost of compliance placed on coal-fired generation to comply with new federal environmental standards. Second, the increased compliance costs on coal assets coincided with a wave of investment capital in new natural gas-fired power generation brought on by the development of shale gas. These shale gas discoveries have allowed developers to locate new, highly efficient facilities relatively close to both fuel supply and population centers. Conversely, coal-fired power plants that averaged 45-years of age were displaced by the confluence of increased compliance costs and lower cost natural gas alternatives.

As pages 9 and 10 of the attachment illustrate, this development has resulted in natural gas taking a more balanced position among actual energy production in both PJM and Pennsylvania. Page 10 also shows that Pennsylvania produced more than 202.5 million megawatt hours of energy in 2018 from all fuel sources and that 24.0 percent of that energy was exported out of the state.

In 2017, PJM released a study that analyzed the potential impacts of this fuel mix evolution. The study looked at increasing future levels of natural gas generation across PJM to see if it might pose a reliability risk to system operations. The study results found no upper bound that would constrain the levels of natural gas the system could accept to operate reliably. That said, the 2017 study only looked at the reliability attributes required to operate the system and not additional fuel security considerations such as economics or interdependency risks of a given fuel supply network.

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As defined by PJM, fuel security is the ability of the system's supply portfolio, given its fuel supply dependencies, to continue serving electricity demand through credible disturbance events. In 2018, PJM studied the fuel security of our system through numerous scenarios that included various levels of generation retirements and fuel supply disruptions. In general, PJM found that the system is currently fuel secure even under extreme but credible operating conditions. However, certain scenarios that included plant retirements well above current projections coupled with extensive, long-duration fuel supply failures would likely result in electric service disruptions. Given the results of the study, PJM opened a process with our stakeholders to discuss how best to leverage our markets to monitor fuel security and incentivize resources to maintain or build capabilities that would protect against the deterioration of fuel security in the future.

As is the case with reliability standards, PJM believes the most effective way to address fuel security is to define fuel security criteria and quantify the requirements for that criteria, and then use market forces to allow all resources to compete to meet those criteria. The PJM markets can provide fuel-neutral signals to value verified fuel security attributes such as direct access to pipelines, the benefits of resources with on-site fuel, and the value of new technologies that promote an array of fuel-secure resources.

Market-based solutions to resilience and fuel security should be especially important to Pennsylvania as it is rich in energy and generation resources. To the extent that Pennsylvania supply resources are found to provide resilience and fuel security benefits to the PJM system, your neighboring states are likely to benefit. Market-based solutions that value fuel security attributes ensure that all those

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that benefit from Pennsylvania's fuel secure resources, both inside and outside of the commonwealth, pay for those benefits while the resources providing them are compensated accordingly.

V. The Evolution of PJM's Markets

The markets PJM administers involve wholesale transactions, deemed interstate commerce, and are regulated by the Federal Energy Regulatory Commission. They do not encompass Pennsylvania retail transactions or Pennsylvania's retail market, which are under the jurisdiction of the Pennsylvania Public Utility Commission. However, PJM's establishment of a competitive, transparent, non-discriminatory wholesale electricity market created the underpinning for the Commonwealth to pursue retail electric competition twenty years ago.

PJM's markets have successfully provided cost discipline to power generation and transmission investment throughout our region for more than twenty years. Part of that success stems from PJM's partnership with its member stakeholders and the resulting collaboration that has allowed our market rules to evolve over time. That partnership and the resulting evolution continue as our industry faces new challenges and opportunities in the way electricity is used and generated.

An example of this market evolution has played out over the last several months as PJM and its members have focused on improving the efficiency of our reserve and energy pricing rules. Over the last period of years, PJM and its stakeholders have focused heavily on refining the capacity market rules. As a result, the reserve and energy markets have not evolved along with the changing industry. It is imperative that the resources called upon by PJM to maintain system reliability are appropriately valued

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for the services they provide and today's reserve and energy pricing rules fall short of that mark. By setting energy and reserve prices to levels that accurately reflect system conditions both during normal conditions and most importantly when reserve quantities become tight, resources operating to protect reliability collect revenues for the capability to respond when needed most.

Pricing during reserve shortage conditions is just one example of PJM evolving to meet the needs of a changing marketplace so it can continue to deliver on its mandate of reliable electricity at the lowest cost. Importantly, these efforts are focused on refining the existing market-based incentives so the resources that are necessary for reliability receive compensation commensurate with the services they provide. Again, the PJM system is reliable today and is projected to continue to be so into the foreseeable future. Our efforts, along with those of our stakeholders, on shortage pricing and other market improvements will help ensure that future reliability is achieved efficiently and at the lowest cost to the customers in Pennsylvania and across PJM.

VI. Conclusion

With that please allow me to end where I began: by reiterating my three main points for today. First, production and transmission of wholesale electricity in Pennsylvania is reliable today and will continue to be so into the future. Second, while the fuel mix for both the PJM region and Pennsylvania is more diverse today than it has been historically, PJM is also working on market incentives that will help ensure that the fuel mix remains secure. Third, and finally, PJM's markets are evolving to meet the challenges and opportunities facing the electricity industry today and tomorrow.

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Chairs Roae and Matzie and distinguished members of the Committee, I thank you for the opportunity to present my testimony today. I reiterate our invitation for you and your staffs to visit PJM's control center in Valley Forge, Pennsylvania to view our operations in person. I would be pleased to engage in a dialogue regarding these important topics.