



Statement of Asim Z. Haque
on behalf of PJM Interconnection, LLC

**THE OHIO SENATE ENERGY AND PUBLIC
UTILITIES COMMITTEE**

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For Public Use

Introduction

Chairman Wilson, Vice Chairman McColley, Ranking Minority Member Williams and respected members of the Senate Energy and Public Utilities Committee, thank you for the invitation to appear before you this morning. My name is Asim Haque, and I am the executive director of State and Member Services at PJM. In that capacity, I lead PJM's state policy team as well as all of its member-related divisions. I am here today to discuss the work that PJM undertakes to ensure that power reliably flows across the bulk electric system and is eventually delivered to consumers and businesses in the great state of Ohio. I want to focus my testimony on two items. The first is how PJM works in real time to maintain system reliability. The second is how PJM partners with our member utilities to maintain cyber and physical grid protection – an important component of PJM maintaining grid reliability.

Background

PJM is a Regional Transmission Organization (RTO) serving all or parts of 13 states and the District of Columbia, including the entirety of the state of Ohio. One way to view PJM is as an “air traffic controller” for the electric grid. PJM is not the local utility. PJM does not own or operate generation assets. PJM does not own or operate transmission assets. Like an air traffic controller, PJM operates, in a coordinated fashion, high-voltage transmission lines that are committed to PJM's footprint by their owners. In Ohio, those owners include AEP, the American Transmission Systems (which is owned by FirstEnergy), Dayton Power & Light, Duke Energy Ohio, and the Ohio Valley Electric Corporation. The Committee should also be aware that PJM is not publicly traded, has no shareholders, and is a revenue-neutral organization, collecting from its membership only the costs required to run the organization from tariffs approved by the Federal Energy Regulatory Commission.

PJM performs three core business functions. First, we **operate** the grid on a second-to-second basis, managing changing demand on the system and reacting to equipment malfunctions or other anomalies. Second, we **plan** the grid looking out 15 years into the future to see how the system must be reconfigured to meet changing needs, such as population migration, new or retiring power plants, and customer-located power plants. Third, and finally, we execute **markets** to produce least-cost outcomes that reinforce the reliable operation and planning of the grid – marrying the physics of moving electricity with the economics of producing it. Put together, these functions, occurring at the *wholesale level*, form the basis for the reliable and economic delivery of retail electricity used to power millions of homes and businesses in Ohio. These collective services result in cost savings and improved decision-making that deliver up to an estimated \$4 billion annually to the region.¹

¹ PJM Value Proposition, 2019, <https://www.pjm.com/about-pjm/~media/about-pjm/pjm-value-proposition.ashx>

Reliability Operations Is Job One

What is today known as PJM dates back to 1927. Over 90 years later, the services offered by PJM, our footprint, and even our name² have evolved. The core tenet of our mission, however, remains the same: reliable operations, a technical term for “keeping the lights on,” will always be job one for the organization.

A construct of the federal government, PJM, like all RTOs, has a responsibility to ensure reliable grid operations across what is called the bulk electric system. The bulk electric system, generally, consists of large generators and the high-voltage transmission system that connect them. The electric power system in the eastern part of the country, which we call the eastern interconnect, operates as a single interstate machine with electricity moving at the speed of light. When a generating plant malfunctions in Newark, New Jersey, that can have effects on the system in Newark, Ohio. When a transmission line is lost in Ashland, Pennsylvania, that may require adjustments to keep the flow of power to places like Ashland, Ohio. Due to the physics of how electrons are transmitted, and due to the physical interconnectivity of the grid across state lines, some form of regional collaboration is necessary.

Needless to say, “keeping the lights on” for over 65 million people requires a high degree of scientific and engineering knowledge. To give you just a glimpse of this, please allow for me to walk through how PJM maintains a reliable system for a typical operating day.

- First, starting sometimes months ahead of time, PJM schedules planned generation and transmission outages across tens of thousands of pieces of machinery, making sure that no combination of maintenance outages will impair power delivery. As *unplanned* outages occur, PJM assesses the impact and, if required, works with transmission and generation partners to develop alternative maintenance arrangements.
- Second, approaching the operating day, PJM forecasts the expected demand across the region. This includes the review of historical demand, the injection of any social criteria that may affect demand, like a Super Bowl, actions in other parts of the country, and PJM’s use of a full-time meteorologist for up-to-the-minute weather data. Put together, this demand forecast for the day allows PJM to plan for:
 1. How much generation is required by location;
 2. When during the day it is needed;
 3. How much time may be required to start up these plants; and, most importantly,
 4. How, in every five minutes, is the needed generation turned on in such a way that if any one piece of equipment would be lost – over 3,000 different scenarios in all – that no portion of the region’s customers would be without power.
- Third, PJM must react – in real-time. Outages to transmission and generation occur – these are machines, after all. Or, across 65 million customers, minor, instantaneous fluctuations like flipping a light switch can add up to

²First as “Pennsylvania–New Jersey Interconnection,” then as “Pennsylvania, New Jersey Maryland Interconnection” and finally as “PJM.”

changes that must be addressed. PJM takes actions to deploy generators and highly advanced batteries to react to these varied changes on the system.

Many in the state of Ohio have not heard of PJM or any other RTO in the country for that matter. This committee has heard of PJM in the context of the market-related debates that have occurred at the General Assembly over the past few years. However, the scientific work associated with “keeping the lights on” is the core tenet of PJM’s mission – it is a very large portion of PJM’s overall value proposition – and we work very hard to ensure that the residents and businesses in the state of Ohio don’t have to worry about rolling and major interstate blackouts as power is transmitted across the bulk electric system.

Cyber and Physical Security

Finally, I want to devote some of my testimony to how PJM helps to protect the grid from cyber and physical security threats. PJM takes very seriously its responsibility in providing a basic service that is critical to the health and safety of consumers, as well as the underlying economic fabric of our communities and the nation. Protecting the grid from cyber and physical threats is an important component of maintaining reliable system operations, and we do so with great vigor.

At the outset, it is important to offer that any security plan must think beyond prevention alone. That’s not altogether uncommon; we see that regularly in our daily lives. While the saying goes, “prevention is worth a pound of cure,” it is not always the cure alone. We make buildings as safe as practical, but we still conduct fire drills and carry insurance. To truly be *prepared*, one must be able to *react* and *recover* in case prevention alone is not enough. That is why PJM uses a security framework of: Prepare, React, and Recover. Grid operators must *prepare for*, be capable of *reacting through*, and be able to *recover from* events as quickly as possible, no matter what the cause. PJM’s initiatives range from protecting the grid against coordinated physical or cyberattacks to ensuring system restoration plans to respond after a major event.

PJM protects the grid from thousands of cyberattacks per month, and for PJM to be effective in combatting these attacks, it must forge partnerships. PJM partners with its utility members, government and industry to share experiences and gain additional expertise to help combat these attacks. PJM partners with federal agencies such as: the Department of Energy, the Department of Homeland Security, the Federal Emergency Management Agency (FEMA), as well as several criminal justice agencies. Public-private partnerships between PJM, state and federal organizations, and industry also extend to formalized joint-action councils, such as the Electric Infrastructure Security Council. These partner entities plan and conduct exercises with PJM, utilities, and relevant state and federal agencies – including several conducted here in Ohio. Exercises are intended to simulate the coordinated reaction to various hazards, including severe weather, coordinated physical attacks, and cyberattacks.

PJM just completed, along with hundreds of organizations, an exercise coordinated by the North American Electric Reliability Corporation called GridEx. GridEx is meant to test the grid in extreme attack scenarios aimed at taking down the electrical systems in all of North America. GridEx challenges participants to respond to, recover from, and successfully communicate through coordinated cyber and physical attacks. PJM runs its own version of GridEx every other year, with PJM’s next exercise slated for 2020 when we will invite our state commissions and other state agencies to participate.

While security is never an accomplished task, the vigilance by PJM and our members have put in place continuously evolving processes to adapt with the threat landscape.

Conclusion

Senators, I thank you for your time today. My hope is that through this testimony you were able to gain some understanding of how PJM supports the core tenet of its mission, which is to maintain reliable grid operations to help keep the lights on for consumers and businesses in the great state of Ohio. Better than hearing me talk about reliable grid operations would be to actually see PJM's work in action. Please do let me know if any of you are ever interested in visiting our Control Center outside of Philadelphia. We'd be very happy to host you, and I'm happy to answer any questions that you might have for me today.