



NEW JERSEY SENATE ENVIRONMENT AND ENERGY COMMITTEE

Statement of Asim Haque on behalf of PJM Interconnection, L.L.C.

June 8, 2023

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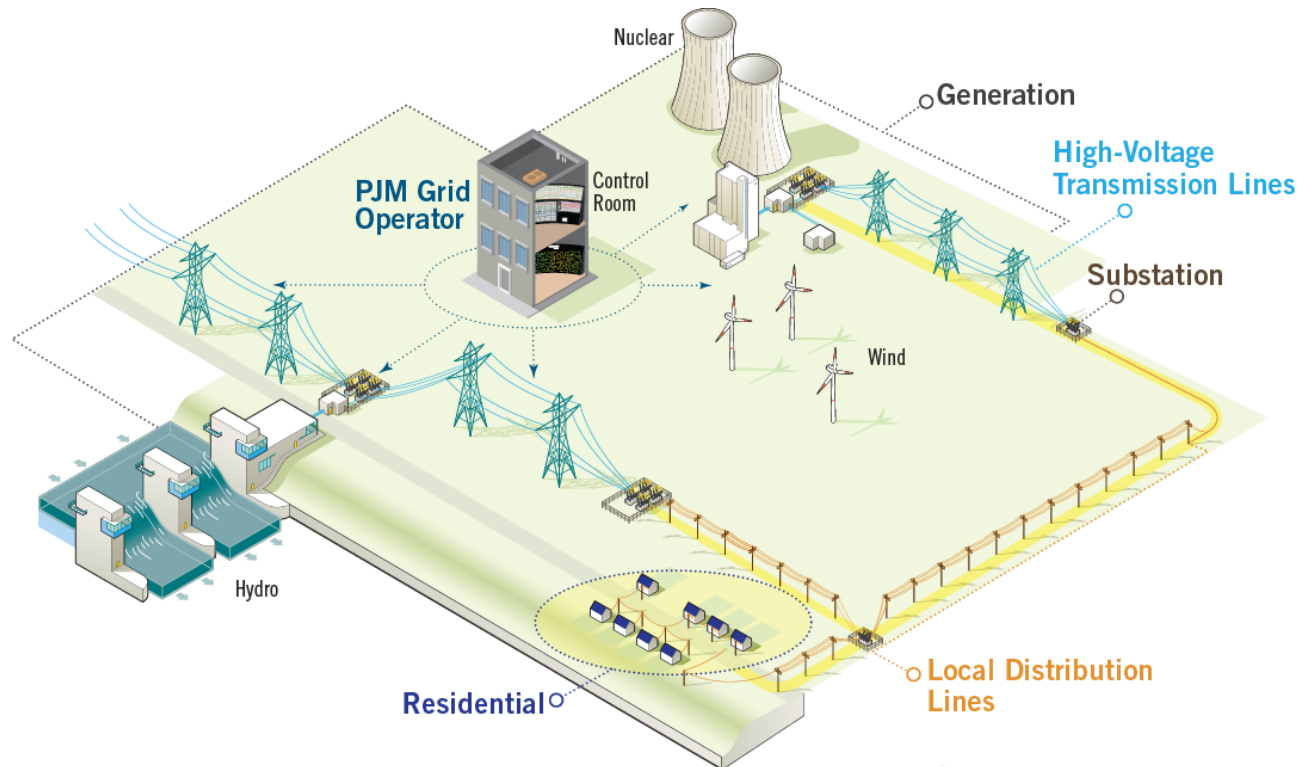
I. Introduction

Good morning, Committee Chair Senator Smith, Vice-Chair Senator Greenstein, and Committee Members Governor Codey, Senator Durr, and Senator Stanfield. Thank you for the opportunity to appear before you today. My name is Asim Haque, and I am the Vice President of State and Member Services for PJM.

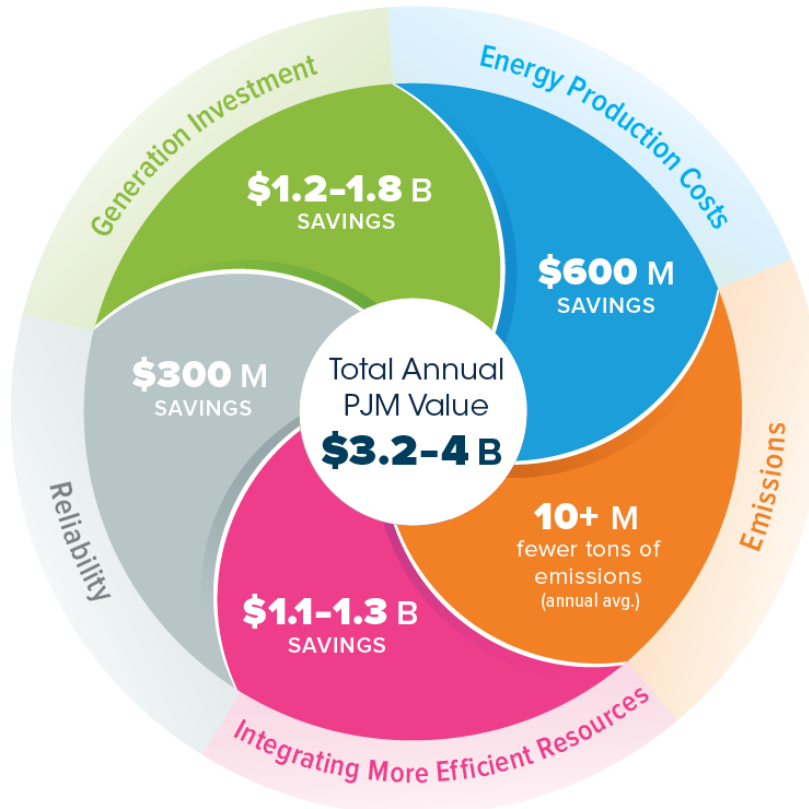
PJM Interconnection (PJM) is a regional transmission organization (RTO) responsible for the reliable operation of the electric grid serving 65 million customers in 13 states and the District of Columbia, including all of New Jersey. Ensuring a safe and reliable bulk power system – keeping the lights on – is PJM’s most important priority. This requires constant system monitoring by skilled operators and real-time coordination with other operating entities and industry sectors. PJM also strives to utilize its scale and competitive processes to keep costs low for consumers.

Reliability and affordability are cornerstones for what PJM does on a day-to-day basis.

Below is a very basic diagram of how the power grid functions. Watts are generated, are then transmitted across high voltage transmission lines, and eventually find their way to distribution substations where New Jersey’s local utilities distribute them to consumers. PJM oversees the generation and transmission of power, which is generally referred to as the “bulk” electric system.



The scale of the PJM system provides tremendous value for grid reliability. Electrons do not know state boundaries and travel across a vast network of interstate transmission. PJM plans for and operates this system in a manner that is both reliable and cost-effective. PJM has a diverse portfolio of resources and a footprint that spans multiple states and time zones. Operating our region as one cohesive system affords us the flexibility to rely on these resources across different locations and allows us to better absorb abrupt disturbances to the system. Further, using competitive processes for the construction of transmission and competitive markets for the procurement of power, PJM is able to derive significant cost savings for consumers. **All in all, through the use of our regional scale and competition, PJM is able to save consumers approximately \$3.2–\$4.0 billion annually.**



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PJM is a “public utility” under the Federal Power Act and is regulated by the Federal Energy Regulatory Commission (FERC). It is also effectively a non-profit in that we are mission driven with predetermined rates that do not allow for PJM to retain earnings. **PJM has no-profit motive, and its mission is clear: to ensure reliable power delivery on the bulk system and keep costs affordable for the 65 million consumers in our footprint.**

¹ All numbers are estimates.

II. Facilitating Decarbonization Policies Reliably and Cost-Effectively

As with the entire U.S. electric grid, PJM is experiencing an accelerating transition toward intermittent renewable generation. Policies, economics and consumer choices are shifting the grid away from dispatchable, emitting generation resources toward intermittent generation with little-to-no carbon emissions. Driven by industry trends and their associated challenges, **PJM developed the following strategic pillars to ensure an efficient and reliable energy transition: facilitating decarbonization policies reliably and cost-effectively; planning/operating the grid of the future; and fostering innovation.**

PJM is committed to these strategic pillars, and has undertaken multiple initiatives in coordination with our stakeholders and state and federal governments to further this strategy. These include:

- Deployment of the first-ever use of the State Agreement Approach² to facilitate 7,500 MW of offshore wind in New Jersey, with an additional 3,500 MW of capacity being investigated
- Coordination with state and federal governments on maintaining system reliability while developing and implementing specific energy policies
- Reform of the interconnection process to help accelerate the entry of new generation
- Reform of the Minimum Offer Price Rule to support competitive procurement of resources
- Transmission studies to determine system upgrades needed to enable state policy objectives
- Reforms of our energy market rules to accurately value the reserves needed to operate a system more reliant on intermittent resources
- Exploring market enhancements to enable states and other willing buyers to procure clean resource attributes, on a voluntary basis, through a regional and centralized procurement or market

At the same time, PJM has embarked on research to evaluate the anticipated changes to the system and any challenges they may present. Building on a foundation of this research, analysis and stakeholder exchange over the past several years, and further informed by lessons learned from Winter Storm Elliott in December 2022, PJM recently outlined a set of emerging risks to reliable electrical supply.

² The State Agreement Approach (SAA) was incorporated into the PJM Operating Agreement in 2013, with the implementation of the Federal Energy Regulatory Commission's Order 1000. With that order, FERC required regional grid operators to "provide for the consideration of transmission needs driven by public policy requirements in the regional transmission planning processes." The SAA may be used by any state, or combination of states, to advance state public policy goals, as long as the state (or states) agrees to pay all costs of the project's build-out included in the PJM Regional Transmission Expansion Plan.



The Immediate Concern:
Support Resource Performance



The Near-Term Concern:
Ensure Resource Adequacy



The Upcoming Concern:
Maintain & Attract Essential Reliability Services

From purely a reliability perspective, PJM is well-positioned today. We have enough resources and enough essential reliability services. However, Winter Storm Elliott presented challenges for our generator fleet, and we need to support better performance of our generators going forward. This is the **immediate concern: support generator performance**.

Our near-term concern relates to a paper we released this year entitled “Energy Transition in PJM: Resource Retirements, Replacements & Risks.” That paper concludes, based upon specific and quantifiable trends,³ that we may not have adequate supply to power homes and businesses toward the end of this decade. This is the **near-term concern: ensure resource adequacy**.

Finally, all generating resources do not have the same physical properties. We need our thermal resources (nuclear, gas, coal) to provide what the North American Electric Reliability Corporation (NERC) calls essential reliability services. This includes properties like inertia, flexibility and a host of other physics and grid engineering properties that we need to deliver electrons. Currently, these essential reliability services can only be provided by our thermal resources. We will continue to need these thermal resources until a replacement technology is deployable at scale. Currently, solely renewable resources cannot provide these attributes. This is the **upcoming concern: maintain & attract essential reliability services**.

PJM has launched a multiyear reliable energy transition initiative to address the identified challenges and potential solutions. The initiative proposes an initial set of actions to support reliability that PJM can take with its stakeholders, government and industry over the immediate, near-term and upcoming time frames to keep pace with these trends. **Ensuring a Reliable Energy Transition** is the name of this multi-year effort, and we encourage you to visit PJM’s website where you can see PJM’s initial proposed set of actions to try and help alleviate the immediate, near-term and upcoming reliability concerns identified.

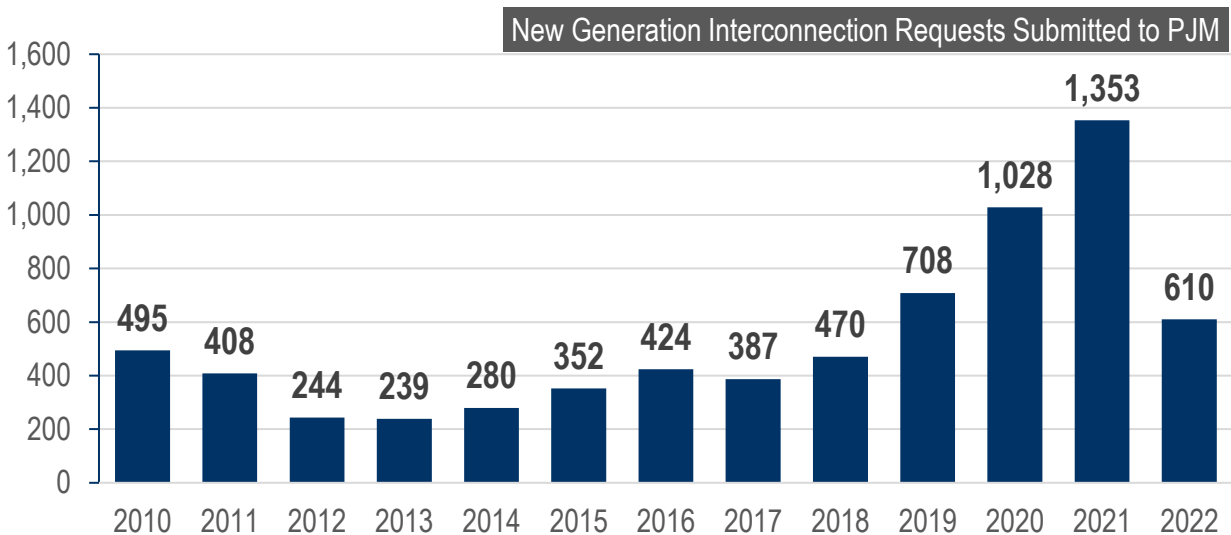
³ These trends include: (i) increased demand due to data centers and electrification; (ii) significant generation plant retirements due primarily to policy drivers; and (iii) new entry of mostly renewable resources not matching the pace of these retirements. See *Energy Transition in PJM: Resource Retirements, Replacements & Risks* <https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx>



The need to maintain reliability into the future does not mean that PJM is opposed to or wary of decarbonizing the grid. PJM is very encouraged by the amount of renewable resources seeking operation in our footprint and have worked with our stakeholders to implement new planning processes that can better accommodate the volume of renewables seeking interconnection. However, maintaining an adequate level of generation resources, with the right operational and physical characteristics, is essential for PJM’s ability to serve electrical demand through the energy transition.

III. Interconnection Queue Reform

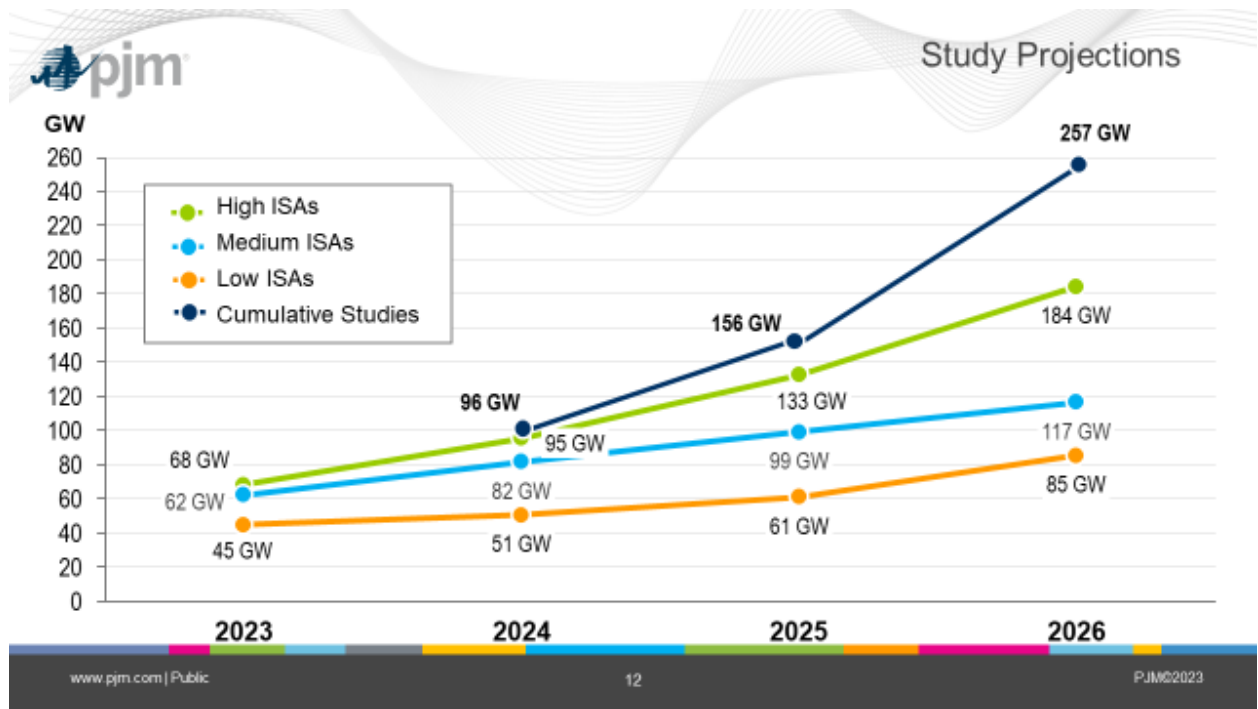
As renewable generation development has soared, the type of new projects has shifted from a limited number of large resources to hundreds of smaller, more dispersed, renewable energy projects. As a result, the number of projects entering PJM’s New Services Queue has significantly increased over the past four years.



Recognizing the recent tripling of projects entering its queue, in October 2020, PJM and stakeholders began working together to create a plan that streamlines generation interconnection requests, improves project cost certainty, and significantly improves the process by which new and upgraded generation resources are introduced onto the electrical grid. The PJM Planning Committee held four workshops, and the Interconnection Process Reform Task Force held 21 meetings during which PJM and stakeholders worked through solutions for these problems.

This work culminated in a vote on a proposal for reform with overwhelming stakeholder support. That proposal was approved by FERC on November 29, 2022, and the transition to the new rules will begin in July as PJM continues to clear the backlog of projects. Moreover, to tackle this work, PJM has invested significantly in tools and automation, as well as in the staffing of both employees and outside contractors.

The transition that starts in the third quarter is expected to process interconnection applications that cumulatively represent about 260,000 MW worth of resources over the next three years. PJM anticipates having about 100,000 MW of projects complete the PJM study process by the end of 2025. Further, there are about 44,000 MW of projects that have come through the study process with either signed or pending Interconnection Service Agreements (ISAs) and should be moving to construction; that should grow to about 62,000 MW by year's end.



However, PJM continues to be concerned about the rate of new build actually coming online. In 2022, there were only 2,000 MW of projects built, of which only 700 MW were renewables, when there were over 30,000 GW of generation with signed ISAs. In 2023 thus far, only 250 MW (all renewables) have been built. PJM continues to work with developers to understand what is holding these projects back. External variables potentially affecting build-out include local opposition, cost of capital, developer financing challenges, supply chain issues, siting and permitting, and market signals. We need to solve that problem together as an industry if we want to preserve reliability amid this transition.

PJM and stakeholders continue to look at measures to improve queue throughput and efficiencies in the Interconnection Process Subcommittee. On June 6, 2023, stakeholders approved an issue charge to examine how to enhance the transfer of Capacity Interconnection Rights, the rights to input generation as a capacity resource, from resources that are deactivating to new projects.

IV. Grid of the Future

PJM is planning for the grid of the future and embraces innovation in-house and fosters collaboration with our members and other key players in the power industry to explore new and advanced technologies. A few examples include:

- PJM is enhancing long-term regional transmission planning. Large-scale changes in the resource mix and load growth are observed and expected to continue over the coming decades. By adding an enhanced layer to its transmission planning processes, PJM can maintain reliability by potentially identifying and implementing more efficient and cost-effective transmission facilities.
- In the past, PJM has partnered with companies including BMW North America and General Motors OnStar to demonstrate the potential of aggregated fleets of electric vehicles to respond to certain types of grid signals, such as demand response events, locational marginal prices or the real-time generation profile of renewable energy resources. Given that electric vehicles will be a significant part of our future transportation systems, PJM looks forward to playing a role in powering these vehicles and enabling their ability to interact with the grid in innovative ways to maintain reliable and cost-efficient electricity.
- Dynamic Line Rating (DLR) technology uses advanced sensors and software to monitor real-time conductor temperature along a transmission line. It then uses this data to calculate an actual rating for the line based on environmental conditions, as opposed to modeled scenarios. In this way, DLR technology can identify additional capacity on transmission lines that could potentially relieve congestion and create economic efficiencies. Such technology also can contribute to system resilience by providing better monitoring of the real-time capabilities of transmission assets. To better understand the overall impact of DLR technology, PJM undertook a one-year study of a hypothetical installation on one of its most congested lines. The analysis found that use of the technology could reduce system congestion payments by more than \$4 million.
- With the aid of a \$14 million U.S. Department of Energy stimulus grant, PJM and its member transmission owners have installed more than 750 phasor measurement units (PMUs), or Synchrophasors, in more than 245 substations. Synchrophasors provide time-synchronized data at a higher resolution and much higher reporting frequency than traditional SCADA (supervisory control and data acquisition) systems, painting a more detailed picture of the status of the grid at any given moment. Advanced monitoring will be key during the energy transition. PJM is developing advanced applications of this technology to improve the efficiency, reliability and resilience of the power system.

V. Conclusion

PJM is a mission-driven organization whose primary focus is to keep the lights on. PJM and the entire U.S. electric grid are experiencing an accelerating transition toward intermittent renewable generation. PJM has embraced this transition through its five-year strategy, producing intensive research and analysis on the opportunities and challenges presented by such a seismic shift.

PJM and its stakeholders from throughout the energy industry have been hard at work smoothing the way for the transition by evolving our market rules, streamlining the planning process for new generators and engaging with states to put their clean-energy policies into action. This includes the interconnection queue reform initiatives to accommodate the shift from a limited number of large resources entering the queue to hundreds of smaller, more dispersed, renewable energy projects. It also includes the first-ever use of the State Agreement Approach to facilitate 7,500 MW of offshore wind in New Jersey, with an additional 3,500 MW of capacity being investigated. This work will continue.

PJM's role as an independent regional transmission organization necessitates identifying reliability challenges and crafting solutions to those challenges amid the ongoing shift to solar, wind and other generators that increasingly rely on renewable energy sources. PJM has clearly articulated its concerns and has proposed an initial set of actions to be taken to keep the power flowing through this energy transition. Development and implementation of these solutions can only be accomplished in concert with all stakeholders and government partners.

Moreover, PJM will continue to plan for the grid of the future. This includes initiatives like enhancing the long-term transmission planning process for a changing landscape and collaborating with key industry players to study technology that is on the horizon. Initiatives vary by topic and scope, but they have a common theme of contributing to the reliable and cost-efficient operation of the electric grid into the future.

As we continue on this transition, it is important to recall that the grid has successfully endured energy transitions in the past. PJM has reliably and effectively weathered these transitions due in large part to the value that comes with being a regional transmission organization with a robust planning process, efficient capacity market design, access to fuel and geographically diverse generating resources, and a highly resilient network of transmission facilities.

PJM embraces the challenge ahead. Working together with our governmental partners such as the BPU and utility transmission and generation owners, PJM is committed to facilitating the energy transition reliably and cost-effectively for the 65 million consumers in our footprint.

I thank you for the opportunity to present my testimony today. I look forward to any questions you may have.