January 9, 2025

Secretary Rosemary Chiavetta
Pennsylvania Public Utility Commission
400 North Street
Harrisburg, PA 17120

Re: Docket No. M-2024-3051988 – Technical Conference on Resource Adequacy

Dear Secretary Chiavetta:

Advanced Energy United ("United") submits for filing the attached comments in response to the Technical Conference on Resource Adequacy held on November 25, 2024.

Respectfully submitted,

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BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

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Technical Conference on Resource Adequacy	)	Docket No. M-2024-3051988
	)	

January 09, 2025

Comments in Response to the Technical Conference on Resource Adequacy

Advanced Energy United ("United") appreciates the opportunity to provide comments in response to the November 25, 2024 technical conference on resource adequacy ("RA") convened by the Pennsylvania Public Utility Commission ("Commission" or "PUC"). United is a national association of businesses that works to accelerate the move to 100% clean energy and electrified transportation in the U.S. The term advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting our energy needs today and tomorrow. These include electric vehicles ("EVs"), energy efficiency, demand response ("DR"), energy storage, solar, wind, hydro, nuclear, heat pumps (air- and ground-sourced), and smart grid technologies. United represents more than 100 companies in the $374 billion U.S. advanced energy industry, which employs 4.1 million U.S. workers and 141,700 in Pennsylvania.

It is vital to the Commonwealth of Pennsylvania that PJM efficiently fulfill its critical responsibility of providing reliable and affordable wholesale electric power. A reliable and well-functioning regional electric grid is critical to the health and safety of all Pennsylvania residents, and it is the lifeblood of all economic activity and growth in the Commonwealth. PJM's recent pronouncements regarding a potential RA shortfall in this decade are extremely concerning. Regional, independently operated competitive markets are the most efficient way to ensure electric reliability, but it will take swift and decisive action by PJM and state policymakers to ensure we have an adequate, affordable supply of electricity for this decade and beyond. United's comments below offer perspectives on the challenges and opportunities facing Pennsylvania and PJM, and recommended actions for the Commission to take.

Introduction

United is encouraged by the Commission's interest in exploring methods for ensuring RA, and is pleased to offer recommendations of several actions the state can take itself to help ensure RA for its residents. Key areas for state engagement include:

- Remaining vigilant to ensure PJM is fully compliant with existing FERC orders on interconnection (FERC Order No. 2023) and transmission planning (FERC Order No. 1920 and 1920-A), and apply pressure to ensure further progress beyond FERC's minimal requirements

- Engaging in key PJM stakeholder processes and FERC proceedings impacting RA

- Streamlining PA siting and permitting processes for critical transmission and generation infrastructure

- Developing appropriate Pennsylvania-specific demand side management polices to better forecast and manage demand, including large single site load interconnections, while aligning with PJM's load forecast and Regional Transmission Expansion Planning (RTEP) process.

- Developing appropriate PSC jurisdictional polices to better forecast and manage demand and large single site load interconnections, while aligning with PJM's load forecast and Regional Transmission Expansion Planning (RTEP) process.

- Supporting demand side resources, reducing barriers to VPP deployment in the PJM market, and creating state-level VPP programs to deploy and scale distributed energy resources ("DER")

The Commission can engage at PJM and the Federal Energy Regulatory Commission ("FERC") both as an independent entity and as a member of the Organization of PJM States, Inc. ("OPSI"). Pennsylvania's participation in the multi-state, independently-operated, competitive wholesale market administered by PJM is an asset at a time when RA challenges are emerging across the country. This is particularly true when considering the ability of competitive energy markets to enhance participation of multiple technologies and their ability to keep consumer pricing low, which can alleviate upward price pressures on retail customers.[1] Being part of an RTO like PJM that has a significant geographic scope also enables Pennsylvania to access more geographically and fuel-source diverse resources, levying fewer costs onto consumers and promoting RA.[2]

To realize and maximize these benefits, the Commission can advocate for several policy and planning improvements at PJM that will enhance RA and competition and lower consumer costs. These include improvements to the generator interconnection process to bring new resources online to meet RA needs faster; enhancements to regional transmission planning to ensure the highest-value regional lines get built; and reforms to the market mechanisms relied upon to procure resources to ensure RA.

In addition to these opportunities to shape market policies and planning at PJM, the Commission can take further independent action within Pennsylvania. Specifically, the state can take steps to improve transparency regarding delays impacting projects after the interconnection process is complete; take action to ensure consideration of Alternative Transmission Technologies ("ATTs"); work to reduce siting and permitting bottlenecks; plan

[1] Researchers concluded that generation costs decreased by 1.5% after the ERCOT market redesign. *See* Brehm and Zhang, "The Efficiency and Environmental Impacts of Market Organization: Evidence from the Texas Electricity Market" (Nov. 2019), *available at* https://www2.oberlin.edu/faculty/pbrehm/BrehmZhang_Electricity_Mkt_Structure_Submitted.pdf, at 29.

[2] "The fuel diversity of energy generation in the first nine months of 2024, measured by the fuel diversity index for energy (FDI_e), increased 0.8 percent compared to the first nine months of 2023." Monitoring Analytics, LLC, "State of the Market Report for PJM" (Nov. 14, 2024), *available at* https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024/2024q3-som-pjm.pdf, at 24.

and prepare to accommodate and efficiently manage new large loads coming online; and design and expand programs to facilitate deployment of demand side resources and VPPs.

The Coming Resource Adequacy Landscape

Many regions are facing a future energy landscape where RA is at risk, generally driven by similar factors: accelerating load growth due to new manufacturing, data centers, and electrification; a shifting resource mix with older resources retiring; and a grid that has been underinvested for decades.

The PJM region is no exception: PJM has released load growth projections that identify a severe RA situation when the projected load growth is compared with expected retirements and new generation additions. PJM projects net energy load growth on its system will average 2.3% per year over the next 10-year period, and 2.2% over the next 15 years. In its preliminary 2025 load forecasts, PJM expects 2030 summer demand to be roughly 16,000 MW higher than it was in the 2024 load forecast.[3]

Developers of new generation resources are seeking to meet this surging demand by submitting requests to interconnect to the PJM grid, but the process is slow. The next PJM study cluster to be approved for interconnection, Transition Cluster 1 ("TC1"), just entered the application review phase in December 2024.[4] This cluster contains roughly 72,000 MW of generation resources, but it is not slated for full approval until the third quarter of 2025.[5] While this new generation would meet a large proportion of PJM's predicted 15-year increase, the upgrades needed to connect the projects in TC1 will take several years to construct, and the

[3] PJM Interconnection, L.L.C., "2025 Preliminary PJM Load Forecast" (Dec. 9, 2024), *available at* https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/las/2024/20241209/20241209-item-03---2025-preliminary-pjm-load-forecast.pdf, at 40.

[4] PJM Interconnection, L.L.C., "Fast Lane & TC1 Progress Update" (Nov. 2024), *available at* https://www.pjm.com/-/media/DotCom/committees-groups/subcommittees/ips/2024/20241122/20241122-item-03---fast-lane-progress.ashx, at 2.

[5] PJM Interconnection, L.L.C., "PJM Reaches Next Interconnection Milestone" (Aug. 6, 2024), *available at* https://insidelines.pjm.com/pjm-reaches-next-milestone/.

projects themselves have other processes to complete before they can start injecting energy into the system. This approval to operation lag is itself a contributor to PJM's generation gap and highlights why it is imperative that proposed generation projects be studied and approved for interconnection as quickly as possible.

Part of the challenge facing new resources seeking to come online is that the region has not engaged in efficient regional transmission planning, and now has a grid that is congested and in need of significant investment. Despite this lack of investment in regional transmission, consumers in the PJM region have faced a 117% increase in transmission costs[6] resulting from increased reliance on less efficient locally planned transmission projects.[7] The region has an opportunity to improve regional planning and get more value from money spent on transmission by ensuring strong compliance and implementation of FERC Order No. 1920. States have a central role in the success of this effort.

In addition to a functional interconnection process and adequate grid infrastructure, another key component of RA is fair and predictable markets to signal system needs and reward resources for their contributions to RA. The PJM capacity market ensures that the required generation resources are in place, operational and available to meet system power demands at the times of greatest system need. Getting capacity market design right is critically important to incentivize capacity resources to enter the market, and to ensure the right kind of resources are available at the lowest possible cost. An improperly designed capacity market can result in consumers overpaying for capacity resources, or worse, capacity shortfalls and power outages at times of peak system need. Poor market design can result in early resource retirements or certain classes of power generation not entering the market, which will drive up capacity auction prices and/or result in capacity shortfalls.

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[6] Complaint to FERC in Docket No. EL25-44, *available at* https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20241219-5368&optimized=false, at 70.

[7] According to analysis by Rocky Mountain Institute, low-voltage lines (below 230 kV) made up 26% of total transmission investment in PJM prior to 2014, whereas since that time they have made up 71% of transmission spending in the region. *See* Claire Wayner, *Increased Spending on Transmission in PJM – Is It the Right Type of Line?* (Rocky Mountain Institute, March 20, 2023), *available at* https://rmi.org/increased-spending-on-transmission-in-pjm-is-it-the-right-type-of-line/.

Effectively addressing RA challenges necessitates a focus on the demand side of the equation as well. Demand-side management strategies—such as energy efficiency, DR, time-of-use ("TOU") rates, and managed charging for electric vehicles—will play a crucial role in managing demand growth. These solutions not only help reduce the need for large-scale increases in supply-side resources, but also highlight the importance of personalized rate education. By leveraging Advanced Metering Infrastructure (AMI) data, utilities can offer tailored rate structures that empower consumers to make informed decisions, optimizing their energy use and contributing to overall system efficiency.

While this potential dramatic increase in power demand could have real reliability impacts for the PJM system, there is opportunity for Pennsylvania in addressing these challenges, including the economic development opportunity from data center construction, increased electrification, and EV deployment. The construction of data centers and building electrification presents opportunities for local contractors, and EV deployment has the benefit of lowering operations costs for the EV users. Data centers also support economic activity throughout their lifetimes by providing necessary computing power relevant across the entire economy. The recommended actions below will ensure that Pennsylvania can realize these benefits while maintaining reliability and affordability for all customers.

Changing Policy Structures and the Future of the PJM Market

As the discussion of the looming RA challenge above makes clear, there are multiple actions that PJM, states, and stakeholders can take to reform the PJM markets and planning processes to resolve critical bottlenecks. United will address three below: (1) generator interconnection, (2) transmission planning, and (3) capacity accreditation and market reform. For each, we will identify actions the Commission can take to ensure progress.

Generator Interconnection

The inefficiency of the current PJM interconnection process is a significant barrier to Pennsylvania's efforts to connect more clean generation projects that could otherwise contribute to meeting RA. A 2024 scorecard from Grid Strategies and The Brattle Group graded PJM a "D-" for interconnection outcomes and processes,[8] and there are currently 287 GW[9] of resources sitting in PJM's interconnection queue, including 27 GW in Pennsylvania.[10] If PJM were to improve interconnection speeds, Pennsylvania would realize significant RA and economic benefits. Consulting firm Power Advisory found that these benefits would include:[11]

- 11 TWh of additional land-based clean energy generation by 2030 (for 22 TWh total, a 100% improvement over the business-as-usual ("BAU") scenario)
- 8 TWh of additional land-based clean energy generation by 2040 (for 38 TWh total, a 27% improvement over the BAU scenario)
- $3.614 billion in net economic output for Pennsylvania while adding 40,000 job-years in the state.

PJM has repeatedly stated that they are committed to improving their interconnection process and providing proposed generation resources the best opportunities to interconnect quickly. PJM has made improvements to its interconnection process over the last few years, with queue reforms submitted to and approved by FERC in 2022, but more could still be done to fix the outdated interconnection study process. PJM itself has recognized this, and has recently put forward a suite of reforms intended to bring additional projects online quickly to meet imminent RA concerns; United offers our brief perspective on these proposals below. Beyond

[8] Grid Strategies, LLC and The Brattle Group, *Generator Interconnection Scorecard: Ranking Interconnection Outcomes and Processes of the Seven U.S. Regional Transmission System Operators* (February 2024), *available at* https://gridstrategiesllc.com/wp-content/uploads/2024/03/AEI-2024-Generation-InterconnectionScorecard.pdf, at 22.

[9] Lawrence Berkeley National Laboratory, *Queued Up: 2024 Edition Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023* (April 2024), *available at* https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_R2.pdf, at 9.

[10] Lawrence Berkeley National Laboratory, Maps of Projects by Region, State, and County, *available at* https://emp.lbl.gov/maps-projectsregion-state-and-county.

[11] Power Advisory for Advanced Energy United, *How Interconnection Reform Can Accelerate Clean Energy Deployment* (November 2024), Table 2, Table 3, Table 4, Table 5, and Table 6, *available at* http://www.advancedenergyunited.org/interconnectionreform.

these changes, PJM must continue to identify additional comprehensive reforms and improvements that will help in both the near-term and the long-term. The Commission should remain engaged at PJM and at FERC to ensure progress on generator interconnection given its critical role in ensuring RA.

PJM's Near-Term Interconnection Proposals

PJM has advanced three generator interconnection reform proposals intended to address its medium-term RA concerns: the Reliability Resource Initiative ("RRI"), Capacity Interconnection Rights ("CIR") transfer, and surplus interconnection service ("SIS"). These proposed changes (specifically, CIR transfer and SIS) will bring incremental improvements; however, RRI is a step in the wrong direction.

RRI is PJM's proposal to introduce new projects into Transition Cluster 2 ("TC2") for what it claims is a "limited injection" of 50 projects into the cluster.[12] PJM describes the RRI as "a one-time event."[13] As outlined in our Protest before FERC, the RRI is legally flawed, a threat to open access, a breach of settled expectations among already-queued projects, and an ineffective solution to the problem it seeks to solve because it offers no guarantee that projects allowed to join the queue will come online in time to meet RA needs.[14] RRI also does nothing to fix structural issues with PJM's interconnection process, and the potential queue delays of RRI will only exacerbate the structural deficiencies of the study process. If RRI is nonetheless approved by FERC, stakeholders and states must be vigilant to ensure that it remains a "one-time" event, and that it does not become precedent setting in a way that undermines the predictability and fairness of the PJM market. Indeed, PJM's Independent Market Monitor ("IMM") has already suggested that the RRI process should also be utilized to

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[12] PJM Interconnection, L.L.C., "Tariff Revisions for Reliability Resource Initiative" (Dec. 13, 2024), *available at* https://www.pjm.com/pjmfiles/directory/etariff/FercDockets/8547/20241213-er25-712-000.pdf, at 3.

[13] *Id.* at 23.

[14] Protest of Advanced Energy United, American Clean Power, MAREC Action, and Solar Energy Industries Institute in FERC Docket No. ER25-712 (Jan. 8, 2025), *available at* https://elibrary.ferc.gov/eLibrary/docinfo?accession_num=20250108-5114.

determine which facilities are awarded SIS, which would inherently limit the types of resources that could interconnect under SIS.[15]

The CIR transfer mechanism is a beneficial pathway to allow retiring facilities to pass their interconnection rights to new generation, enabling relatively quick replacement.[16] This mitigates the reliability gaps that could otherwise appear on the system due to generation facility retirements. PJM is also making adjustments to its SIS, another important positive interconnection process modification. SIS allows for additional generation to be sited at existing interconnection points alongside pre-existing generation, and utilize that interconnection capacity when the original resource is not injecting into the system. PJM's existing SIS process is inflexible and has been underutilized compared to that of neighboring regions like MISO, where SIS has been an effective tool to quickly add storage to existing renewable or thermal facilities, among other configurations. A recent study by Gabel and Associates indicated that, based on the existing queue, PJM could unlock over 26 GW of Accredited Capacity for just the 2026/2027 Delivery Year.[17] As that report indicated, PJM's Surplus Interconnection Service provisions were a barrier to the ability to deploy those 26 GW. PJM's proposed reforms to SIS are an important step to allow additional resources to come online quickly by making the best use of the existing transmission system.

[15] Monitoring Analytics, "Reliability Resource Initiative (RRI) and Surplus Interconnection Process" (Nov. 21, 2024), available at https://www.monitoringanalytics.com/reports/Presentations/2024/IMM_MC_RRI_and_Surplus_Interconnection_Process_20241121.pdf, at 2.

[16] "Stakeholder Coalition Proposal for PJM CIR Transfer Efficiency Process Planning Committee Vote" (Oct. 8, 2024), *available at* https://www.pjm.com/-/media/DotCom/committees-groups/committees/pc/2024/20241008/20241008-item-04b---enhancing-cir-transfer-efficiency---stakeholder-coalition-proposal.ashx, at 3.

[17] Gabel Associates, Inc., *ReSISting a Resource Shortfall: Fixing PJM's Surplus Interconnection Service (SIS) to Enable Battery Storage* (Sept. 17, 2024), *available at* https://acore.org/wp-content/uploads/2024/09/Report-ReSISting-a-Resource-Shortfall-Fixing-PJMs-Surplus-Interconnection-Service-SIS-to-Enable-Battery-Storage.pdf, at 6.

Further Opportunities for Interconnection Reform to Support Resource Adequacy

In addition to near-term changes, PJM and grid operators across the country must be working toward additional structural reforms to ensure an interconnection process that is fit for purpose. These reforms would build off the progress made in FERC Order No. 2023 (for which PJM's compliance is still pending). The priority reforms summarized below are excerpted from *Unlocking America's Energy: How to Efficiently Connect New Generation to the Grid*.[18] Reforms include:

1. **Increasing interconnection certainty** – Transmission providers would proactively build interconnection capacity based on long-term, multi-driver, and scenario-based planning processes and generators would subscribe to available capacity based on commercial readiness and willingness to pay an "entry fee."

2. **Fast-track utilization of available interconnection capacity** – Interconnection requests would be processed on an expedited basis in locations where available interconnection capacity exists. This would be particularly useful for utilizing "headroom" created by retiring generation sources.

3. **Improve efficiency of interconnection studies** – Study processes could be improved by tailoring analysis to the desired interconnection service level (i.e., capacity vs. energy-only), standardizing study assumptions, evaluating alternatives to traditional transmission upgrades, utilizing automation, and establishing independent monitors to evaluate transmission providers' processes and enhance transparency.

4. **Expedite construction of necessary upgrades** – Timelines required to implement necessary upgrades could be shortened by adopting industry best practices and proactively addressing supply chain constraints.

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[18] Grid Strategies and The Brattle Group, *Unlocking America's Energy: How to Efficiently Connect New Generation to the Grid* (August 2024), *available at* https://blog.advancedenergyunited.org/reports/unlocking-americas-energy.

FERC created Docket No. AD24-9 to consider additional interconnection innovations and efficiencies like the ones above.

PUC Actions to Improve the PJM Interconnection Process

While the PUC does not have jurisdiction over the PJM interconnection process, it can take important steps to improve the interconnection process at PJM by:

- Supporting PJM's proposals for CIR transfer (to be filed with FERC in January) and SIS reform (FERC Docket No. ER25-778);
- Opposing PJM's RRI proposal (FERC Docket No. ER25-712), and working with PJM, other states, and stakeholders to minimize damage and ensure RRI remains a "one-time" solution if approved by FERC; and
- Advocating for further interconnection process reforms (as outlined above) at the regional level through individual and collective engagement at PJM and FERC.

These steps will lead to improvements in the PJM interconnection process, allowing PJM to more efficiently and quickly move projects through its queue.

Beyond engaging at PJM and FERC, Pennsylvania can also take an active role in providing needed transparency to project developers that can reduce projects having to drop out *after* completing the interconnection process (whether they go through the PJM interconnection queue or through the state-jurisdictional process). Currently, project developers face lengthy and unpredictable timelines to physically interconnect to the system due to a lack of transparency regarding the cost, procurement, and construction timelines for grid upgrades needed to interconnect their projects. While these upgrades are vital to ensuring the reliability and efficiency of the transmission system, this lack of transparency leads to delays, increases financing costs, and ultimately raises energy costs for consumers. Until necessary grid upgrades are completed, approved projects cannot deliver on their promise to reduce costs and improve grid reliability.

Pennsylvania has an opportunity to lead by increasing transparency around these upgrades. The Commission can require reporting of electricity construction delays and cost increases for projects recently energized or pending completion within the state, enabling prospective projects that may enter the queue or existing projects nearing construction to have more transparency around expected project construction costs and timelines, and identifying any common bottlenecks that may benefit from reform or action. By compiling regular updates on project progress, delays, and costs, the Commission can identify inefficiencies and push for solutions. This proactive approach is an important first step to address delays that can occur even after the lengthy and uncertain interconnection process is completed, ensuring that new generation projects come online faster.

Regional Transmission Planning

Adequate transmission capacity is critical to a reliable grid that can support RA: it is needed to move electricity within and between regions, and to bring new resources online to serve growing demand. The PJM region has not been building the kind of transmission lines it needs to reliably and cost-effectively power our grid, and a major part of the problem has been our short-term, just-in-time planning process. This means customers in the PJM region have been spending a lot on transmission, but they are not receiving as much benefit as they could if the transmission getting built were higher-value regional projects selected through long-term regional plans.

This problem is not unique to PJM—it is what led FERC to issue Order No. 1920 in May 2024. FERC gave states a central role in that planning process, and then clarified and expanded that role when it issued Order No. 1920-A in November 2024.[19] Pennsylvania can play an important role in successful implementation of Order No. 1920 by working with PJM, with transmission owners in the PJM region, and with OPSI.

In addition to planning and building new transmission infrastructure, it is critically important to ensure optimal use of our existing transmission system by taking full advantage of Alternative

[19] *Building for the Future Through Electric Regional Transmission Planning and Cost Allocation*, Order No. 1920, 187 FERC ¶ 61,068.

Transmission Technologies ("ATTs"). While FERC Order No. 1920 requires consideration of certain ATTs, there are more steps that PJM and states themselves can take to ensure optimal consideration and adoption of ATTs. Indeed, the National Association of Regulatory Utility Commissioners ("NARUC") recently adopted a resolution recognizing how ATTs can contribute to reliability and affordability.[20]

Additionally, dynamic load management can further enhance optimal use of transmission by incentivizing customers to use energy at off-peak times, thus reducing the need for new infrastructure investments during high-demand periods. The Commission should ensure that this capability is considered in transmission planning not only to mitigate peak demand, but also reduce overall cost of grid maintenance and expansion.

Commission Actions to Improve Transmission Outcomes

In addition to remaining engaged in ongoing Regional Transmission Expansion Plan discussions in PJM, there are two primary actions that the Commission can take to improve transmission planning and outcomes for Pennsylvania: (1) engage meaningfully on compliance and implementation of Order No. 1920, and (2) take action to expand the use of ATTs.

With respect to Order No. 1920, states are granted a role throughout the compliance and implementation process. Specifically, FERC directs transmission providers such as PJM to give states a role in:

- Designing the planning process itself;
- Providing input into the three long-term scenarios that will be studied;

[20] Resolutions Passed by the NARUC Board of Directors at the November 10-13, 2024 NARUC Annual Meeting and Education Conference, *available at* https://pubs.naruc.org/pub/812873F4-E348-B77F-4D75-E513FF13A86D?_gl=1*jo3umk*_ga*MTE2NjIwODQ3NS4xNzE2MjEwNzQ4*_ga_QLH1N3Q1NF*MTczMTU5Njc0Mi42Mi4xLjE3MzE1OTY3NzkuMC4wLjA, at 2.

    - Order No. 1920-A added the requirement for transmission providers to study additional state-requested scenarios that need not comply with the directives set by FERC for the other three scenarios;

- Providing information to transmission providers to inform the factors included in the scenarios, especially any laws, regulations and goals impacting the resource mix;
- Providing input into the benefits that are evaluated and how they are measured;
- Providing input into the process by which proposed transmission facilities are evaluated and selected;
- Engaging with other states to align on cost allocation through a six-month engagement period;
    - Order No. 1920-A added the requirement that the states' preferred cost allocation approach must be filed at FERC even if differs from the cost-allocation selected by the Transmission Provider;
- Providing feedback and participating in stakeholder meetings to discuss local transmission planning.

The Commission can also consider how AMI data could be integrated into transmission planning. By leveraging real-time data from AMI, the Commission can better understand load profiles and identify potential shifting opportunities where consumers could be incentivized to reduce their demand or shift usage to times when the grid is less constrained. This could inform development of more targeted transmission projects that optimize system efficiency.

By engaging meaningfully within the PJM stakeholder process (to ensure full compliance with Order No. 1920), with OPSI (to ensure that states agree to a fair cost allocation methodology), and at FERC (to address any deficiencies), Pennsylvania can secure a more efficient long-term regional transmission planning process that will yield more affordable, more reliable outcomes for the Commonwealth.

With respect to ATTs, United recommends that the Commission open a proceeding to independently study their deployment, which would include:

- An evaluation of the technical feasibility and cost-effectiveness of ATTs to address congestion and constraints, to facilitate the interconnection of new generation and loads, and to meet other state energy, environmental justice, and climate goals in both distribution and transmission system planning
- Identification of jurisdictional issues associated with implementation for ATTs and potential solutions
- A survey of utility performance incentive mechanisms ("PIMs") which could be designed to provide incentives for the cost-effective deployment of ATTs and consider implementation pathways of PIMs where applicable

In addition, the Commission should require distribution utilities and, where applicable, transmission owners to report on their evaluation of and plans for deploying ATTs as part of existing grid planning processes (e.g., integrated resource plans, rate cases, distribution/state transmission planning, siting, and certificate of public convenience and necessity proceedings); where ATTs are not used in a grid planning process, require utilities to explain why; and require regulators and siting agencies to determine whether ATTs have been adequately considered before granting approval and the authority to deny requests where ATTs have not been adequately considered.

Finally, the Commission should require utilities and, where applicable, transmission owners to conduct periodic market efficiency analyses on their systems to identify the highest congested system elements and, for elements over a certain threshold (e.g., highly congested for more than 25% of hours per year), conduct a cost-benefit analysis to determine if deploying ATTs would reduce overall system costs, in conjunction with or instead of transmission expansion.

Capacity Market and Capacity Resource Accreditation Reforms

PJM, through a number of ongoing, complex stakeholder processes, develops myriad assumptions that ultimately determine capacity market prices and generation resource mix.

One of the most important assumptions PJM makes is around “capacity accreditation,” which is a measure of each specific power generation resource’s ability to mitigate PJM system peak demands based on each resource’s unique operational characteristics. If crafted poorly, accreditation calculations can undervalue, and effectively punish, renewables, storage, hybrid resources, DR, and DERs. Similarly, thermal fossil resources can be overvalued for their reliability. Beyond accreditation, there are other key capacity market rules such as the “must offer” requirement, which can unfairly penalize intermittent renewable resources and discourage investment in clean energy. PJM will be examining many of these key assumptions in stakeholder processes in the first quarter of 2025. An accurate, consistent framework for valuing resources is essential to incentivizing ongoing investment in power generation and keeping consumer rates as low as possible.

Commission actions to improve PJM capacity market outcomes

The outcomes of these stakeholder processes at PJM are critical to the health, safety and economy of the Commonwealth, and will also impact achievement of Pennsylvania energy policy goals. As such, the need for engagement in these stakeholder processes cannot be overstated. Pennsylvania should advocate for a well-designed capacity market which incentivizes a diverse and reliable generation mix at the lowest possible cost, that will allow the Commonwealth to meet all its economic and public policy goals.

As these processes are resolved, the Commission should work to align state programs and procurements accordingly. New resources rely on sufficient revenue potential and market certainty to get financed and built, and, to the extent the PJM markets are not providing opportunities for investment, states will need to take that into account in their own planning and incentive programs.

State and Local Siting and Permitting

In addition to completing the lengthy and arduous PJM process of receiving permission to interconnect to the PJM transmission system, generating resources must also navigate the state and local siting and permitting processes, which can also result in further delays getting critically needed power generation resources online quickly. It is important for Pennsylvania to ensure that all state and local siting and permitting processes functionally enable the development of projects and are as efficient and streamlined as possible to allow for rapid deployment of critically needed resources.

Planning for and Addressing Growth of Large New Loads

Load growth, and especially the acceleration of new large loads such as advanced manufacturing and data centers, is both a challenge and an opportunity. Good planning and flexible, proactive approaches to meeting and managing these loads will be critical to facilitating economically-beneficial load growth in a way that is reliable, affordable, and fair for all customers.

First, planning and transparency is critical. Regulators can support transparency by directing utilities to provide additional transparency around large load interconnection. Specifically, this could include:

a) Reporting to regulators the methodology used to develop load forecasts for large load interconnections; requiring coordination with other states to understand and avoid where the same loads may be counted twice; and requiring coordination with PJM to ensure load interconnections are reflected in PJM's load forecast and Regional Transmission Expansion Planning ("(RTEP")) process;

b) Reporting to regulators a summary of constraints (i.e., system conditions, times of the day, system elements) which are preventing large loads from interconnecting to their systems; and

c) Creating hosting capacity maps which show where there is available capacity to interconnect large loads.

Second, developing flexible solutions to effectively facilitate and manage new large loads will minimize their impact on the grid. Many new large loads are increasingly operating as responsive load, meaning that they have the capability to either lower their activity or rely on on-site generation or storage at times of high energy prices. This means that while new loads such as data centers and EV charging add significantly to the overall electricity usage of a given grid system, their peak load contribution may be significantly lower by comparison. With reasonable notice from PJM and load serving entities, flexible loads could be responsive to emergency grid conditions, allowing these loads to provide capacity services. Flexible loads can also provide important peak load reduction at the utility level, independent of PJM frameworks. For new large loads that cannot change their load profile, there are other potential solutions that can mitigate their impact on the grid. One potential solution is a bring-your-own generation option, in which large loads could choose to secure their own generation needs on the system, either through colocation arrangements with advanced energy resources or through bilateral contracts. Another way to mitigate RA issues at large load facilities which cannot easily change their load profile is to encourage development of on-site energy storage or fuel cell technologies, which can enable large load flexibility during system peaks.

The Commission should pursue tariffs and programs, such as flexible interconnections, that expedite the ability of new loads to connect if they act to mitigate a portion of their system impact, for example, by maximizing deployment of cost-effective VPPs, on-site or grid-connected generation and storage, ATTs, and energy efficiency programs. These programs would be aimed at allowing the large interconnecting load to reduce its impact and/or create headroom elsewhere on the system, thereby mitigating the reliability impacts of its interconnection. The Commission can also support large loads already sited in Pennsylvania which are not looking to participate in the PJM market, but still want to shift their load profile with behind-the-meter resources to alleviate grid stress and their own costs. The Commission should endeavor to support these load customers by facilitating large load customer investments in behind-the-meter resources, which should also attract third party capital for retrofit projects of this kind.

The Commission should also be exploring its own interconnection rules for distributed energy, as the current rules only apply to energy systems which plan to export to their electric distribution company ("EDC"), known as customer-generators, for the purpose of net metering.[21] There are large loads on the distribution system who may wish to construct standalone storage systems behind-the-meter at their facility, but which never plan to inject energy onto the distribution system or participate in net metering. The code should be updated to include a class of distribution customers that are interconnection behind-the-meter energy assets strictly for the purpose of reducing their own load, with a separate interconnection process which is more streamlined to reflect the reduced need for study, since these systems require no additional headroom on their local distribution lines.

Optimizing Use of Demand Side Resources, Distributed Energy Resources, and Virtual Power Plants

Addressing RA concerns will require an approach that allows a wide range of demand side resources to participate, and the Commission should not overlook the significant RA benefits that these resources can provide. Demand side resources can include energy efficiency, DR, TOU rates, and aggregations of DERs, known as VPPs. These resources play an essential role in securing resource adequacy by allowing customers to shift their energy usage, reduce consumption during peak times, and provide flexibility to the grid.

The Value of Time-of-Use Rates, Personalized Rate Education, and Load Flexibility

TOU rates are a powerful tool to encourage consumers to shift their energy consumption away from peak periods, when the grid is most stressed, and toward off-peak times. This load shifting can reduce the need for expensive peaking generation and help balance overall demand. By offering TOU rates that are dynamic and transparent, consumers can be incentivized to make more cost-effective decisions about when to use electricity.

[21] Pennsylvania Code, § 75.21. Scope., *available at* https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/052/chapter75/s75.21.html&d=.

Moreover, personalized rate education is essential in ensuring that consumers understand how TOU rates and demand response programs can benefit them financially while also contributing to grid reliability. By integrating AMI data, utilities can provide real-time feedback on individual energy consumption, helping customers make informed decisions about how to reduce demand during peak hours. Personalized rate education could include tools or notifications that alert consumers about high-cost periods, encouraging them to shift their energy consumption to times when rates are lower. This type of education can increase participation in load-shifting programs and ensure that consumers are more actively engaged in demand flexibility solutions.

Promoting DER Deployment and VPP Programs

VPPs also have significant capability to use demand side resources to address resource adequacy. Nationally, there are 30-60 GW of VPP capacity online today, most of which participate in DR programs. The U.S. Department of Energy found that deploying 80-160 GW of VPPs by 2030 could save $10 billion in annual grid costs and contribute approximately 10-20% of peak demand.[22] This 160 GW goal may not be aspirational: according to Wood Mackenzie, the country is projected to add 217 GW of DER capacity through 2028.[23] The firm also found that enrolling that 217 GW in VPP programs would enable the resource to be "at the scale to meaningfully offset peak load growth without relying on new transmission or RTO interconnection."[24]

VPPs have two key advantages in contributing to RA that set them apart from traditional large-scale resources. First, the nature of a VPP being composed of numerous DERs means that growth of VPPs is not limited by the interconnection delays that are now synonymous with the

[22] U.S. Department of Energy, *Pathways to Commercial Liftoff: Virtual Power Plants* (September 2023), *available at* https://liftoff.energy.gov/wp-content/uploads/2023/09/20230911-Pathways-to-Commercial-Liftoff-Virtual-Power-Plants_update.pdf, *at* 3.

[23] Brian Martucci, "US to add 217 GW of distributed energy resource capacity through 2028, Wood Mackenzie projects" (July 3, 2024), *available at* https://www.utilitydive.com/news/wood-mackenzie-sees-217-gw-new-distributed-energy-resources-2028/720581/.

[24] *Id.*

PJM queue. As a result, these resources can begin contributing to the grid at a much faster timeline; indeed, by leveraging DERs that are already installed in homes/businesses, VPPs can be built and scaled in months, not years. Second, a VPP can provide RA at a significant cost discount compared to alternatives. After modeling the net cost of providing 400 MW of RA from a natural gas peaker plant, a transmission-connected utility-scale battery, and a VPP, the Brattle Group found that the VPP had the lowest net costs of $2 million, compared to $29 million for the battery and $43 million for the natural gas peaker plant, the most expensive option.[25] When extrapolating the findings, the authors concluded that "a 60 GW VPP deployment could meet future RA needs at a net cost that is $15 billion to $35 billion lower than the cost of the alternative options over the ensuing decade."[26]

Action by the Commission is needed to ensure that Pennsylvania consumers benefit from VPPs in the form of increased savings and stronger RA. First, the Commission should continue its work[27] in Docket No. L-2023-3044115 to align existing Commission regulations and policy statements with FERC Order 2222.[28] United encourages the Commission to adopt the recommendations identified in comments[29] submitted by the Coalition Advocating DER Regulation Efficiency ("CADRE") (of which United is a member), which offers improvements to the existing regulatory framework in Pennsylvania that are needed to support DER aggregations that seeks to participate in the PJM market.

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[25] The Brattle Group, *Real Reliability: The Value of Virtual Power* (May 2023), *available at* https://www.brattle.com/wp-content/uploads/2023/04/Real-Reliability-The-Value-of-Virtual-Power_5.3.2023.pdf, *at* 24.

[26] *Id.* at 25.

[27] Joint Motion of Chairman Stephen M. DeFrank and Vice Chair Kimberly Barrow, *Distributed Energy Resources Participation in Wholesale Markets*, Pa. PUC Docket No. L-2023-3044115, (Nov. 9, 2023), Ordering Paragraph 1, (Joint Motion).

[28] *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247 (2020), *order on reh'g*, Order No. 2222-A, 174 FERC ¶ 61,197, *order on reh'g*, Order No. 2222-B, 175 FERC ¶ 61,227 (2021).

[29] Comments of the Coalition Advocating DER Regulation Efficiency ("CADRE"), Docket No. L-2023-3044115 (May 29, 2024).

While the Commission has taken an important step in opening the above docket, the Commission should not rely exclusively on PJM's Order 2222 implementation to promote DER deployment, as significant barriers continue to exist for mass-market DERs participating in the wholesale market.[30] The Commission can use its existing Act 129 authority to implement better DR and energy efficiency programs. Additionally, the Commission could consider a VPP program that delivers peak load reduction, such as a Smart Thermostat program, as well as other grid benefits, as part of the Act 129 Phase V program cycle.

Utilities have an important role to play in reducing load, and the Commission can help ensure that utilities are appropriately directed and incentivized to engage in all appropriate measures to manage load. Under Act 129, the Commission can continue to support robust utility energy efficiency goals that are designed with Pennsylvania's resource needs and supply mix in mind. This could mean implementing performance incentive mechanisms related to capacity and reliability and directing utilities to establish load shifting, DR, TOU, and EV managed charging programs. Importantly, reducing load at the utility level does not need to be limited to direct or dispatchable load control; flexible solutions such as TOU rates and load shifting programs can also play a vital role in managing grid demand.

When considering strategies to recognize the contributions of DERs, Pennsylvania has the benefit of being able to consider the experience of its neighboring state of Maryland. As identified in the Distributed Renewable Integration and Vehicle Electrification ("DRIVE") Act[31] that passed the Maryland Legislature in April 2024, the Maryland Public Service Commission ("MD PSC") must develop a program for investor-owned utilities to establish a pilot program or temporary tariff to compensate owners and aggregators of DERs for electric distribution system support services through an incentive mechanism determined by the MD PSC. The Commission should use its existing Act 129 authority to undertake a similar action to compensate DERs for the services they provide to the grid, which would have benefits at the wholesale and retail levels. There is no need to do this on a pilot basis; VPP models such as

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[30] *See* Guidehouse Insights, *Alternative Aggregated DER Participation Methods for US Grids Are Still Needed* (2023), *available at* https://guidehouseinsights.com/reports/alternative-aggregated-der-participation-methods-for-us-grids-are-still-needed, *at* 11-15.
[31] https://mgaleg.maryland.gov/2024RS/Chapters_noln/CH_475_sb0959t.pdf.

Bring Your Own Device ("BYOD") programs are proven, ready-to-scale, and can quickly orchestrate a diverse portfolio of DERs to meet grid needs.

Conclusion

United appreciates the opportunity to provide comments in response to the technical conference on resource adequacy. We recommend the Commission pursue the reforms and policies we have identified, and we look forward to contributing to further discussions on how best to secure resource adequacy for the benefit of Pennsylvania consumers.