BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Technical Conference on Resource Adequacy in Pennsylvania	* * * *	Docket No. M-2024-3051988

COMMENTS OF
CONSTELLATION ENERGY GENERATION, LLC

On November 25, 2024, the Pennsylvania Public Utility Commission (the "Commission") held a Technical Conference regarding electric resource adequacy. Commissioners posed questions during the conference to selected panelists, facilitating a robust discussion about the state of resource adequacy in Pennsylvania and related topics. The Commission invited feedback from stakeholders on issues discussed at the Technical Conference. Constellation Energy Generation, LLC ("Constellation") welcomes this opportunity and offers the following comments on this important topic.

Introduction

Electricity is fundamental to nearly every aspect of modern life; its reliability and affordability are critical. The Commission is wise to open this proceeding to better understand resource adequacy concerns, separate fact from fiction, and, if necessary, take prudent steps to protect customers. Pennsylvania is in an enviable position compared to other PJM Interconnection, L.L.C. ("PJM") member states given its large generation fleet, with additional, large, new units planned within state borders. Resource adequacy is healthy in Pennsylvania.

At Constellation, we believe that the wholesale markets operated by PJM can and do incent the development of new supply and demand-side resources—as well as the retention of existing generation—through competitive price signals, thereby ensuring electric reliability at least cost. In Section I, we review the current state of PJM's wholesale markets and the reforms underway to address the needs of an evolving system. In Section II, we provide examples of additional actions for the Commission to consider to support PJM's efforts to enhance resource adequacy across the region and mitigate price volatility for Pennsylvania consumers.

As the Commission considers these and other potential actions, it must understand that Pennsylvania is only one player in the 14-jurisdiction PJM footprint. Any actions taken by Pennsylvania must align with the PJM market structure to be effective. The key to effective reforms is to craft policies that will achieve Pennsylvania's goals while preserving the integrity of the markets that stakeholders have long depended upon and that have proven effective.

Comments

Pennsylvania is the third-largest producer of electricity in the nation; only Texas and Florida generate more power.[1] Electricity generation in the Commonwealth regularly exceeds Pennsylvania's power consumption, and the state is a net exporter of electricity.[2] As load grows within the Commonwealth as a result of Pennsylvania's business-friendly policies, more energy produced in Pennsylvania will be consumed within Pennsylvania, as a matter of general physics. Until then, PJM provides ready markets for the excess energy generated by Pennsylvania resources, and those markets, in turn, reinforce the signal to invest in Pennsylvania.

Notably, investment in new generation resources is currently being proposed in Pennsylvania. Constellation has announced the relaunch of the renamed Crane Clean Energy Center ("CCEC") in Dauphin County, which will add approximately 835 MWs of carbon-free baseload generation to the grid. Likewise, just last month, Homer City Generation Station, the largest coal-burning facility in Pennsylvania before it was closed in 2023, announced plans to restart and increase its generating capacity through burning natural gas.[3] In addition, 31,608 MW of new generation is proposed to be built in Pennsylvania, according to the PJM generation interconnection queue.[4] In short, the PJM markets are working to ensure resource adequacy in Pennsylvania.

Since its inception, the PJM market has delivered reliable service despite severe weather, extensive resource retirements, load growth, and other challenges.[5] And as one of PJM's original member states, Pennsylvania has been a large part of the grid operator's success. The Keystone State's large and diverse generation fleet includes a mix of baseload thermal generation, peaking facilities, and intermittent resources such as hydro, wind, and solar.

For this success to continue, the wholesale markets must be allowed to function as designed. The markets can and should evolve, as discussed below, but their fundamental structure is sound. If permitted to operate as intended, these markets will naturally drive investment in additional resources where they are needed most, bolstering the overall system. And as new supply is added to the system, robust investment in transmission infrastructure will remain critically important, as it enables power flows across the PJM footprint to support the reliable supply of power.

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[1] U.S. EIA, *Electric Power Annual*, Table 3.7 (Utility Scale Facility Net Generation), https://www.eia.gov/electricity/annual/table.php?t=epa_03_07.html.

[2] U.S. EIA, *State Electricity Profiles 2023*, https://www.eia.gov/electricity/state/; PJM, *2023 Pennsylvania State Infrastructure Report*, at 24 (June 2024), https://www.pjm.com/-/media/DotCom/library/reports-notices/state-specific-reports/2023/pennsylvania.pdf (depicting net energy import/export trend).

[3] Darrell Proctor, *Largest Pennsylvania Coal-Fired Plant Will Convert to Natural Gas*, Power Magazine (Dec. 6, 2024), https://www.powermag.com/largest-pennsylvania-coal-fired-plant-will-convert-to-natural-gas/.

[4] *See* PJM, *Serial Service Request Status Page*, https://www.pjm.com/planning/service-requests/serial-service-request-status (accessed Jan. 8, 2025) (data filtered by "active" and "suspended" generation interconnection requests located in Pennsylvania that (i) have an engineering and procurement agreement, (ii) are partially in service, or (iii) are under construction)).

[5] *See, e.g., PJM Interconnection, L.L.C.*, 115 FERC ¶ 61,079, at PP 29-32 (2006) (describing resource adequacy issues in 2006 in PJM).

I. The Commission Should Resist Calls for Reform That Would Undermine the Competitive Wholesale Markets

It has been over a quarter century since Pennsylvania restructured its electric generation market. Like many other states in the region, utilities in Pennsylvania functionally separated or divested their generation resources, and their integrated resource plans were replaced with a reliance on wholesale competitive markets and bulk power transmission planning. Private developers of generation resources in PJM rely on the wholesale markets as an investment signal, and private capital—not the ratepayer—assumes the investment risk.

Some utilities in the PJM footprint have begun to suggest that the most recent capacity auction is an indicator that competitive markets are not working and that they should be permitted to develop generation to manage anticipated load growth. There have also been discussions about pursuing a statewide "Integrated Resource Assessment," which resembles a move back in the direction of integrated resource planning in Pennsylvania. We urge caution as Pennsylvania considers these proposals. Returning to utility-owned generation (or similar arrangements) would have significant customer cost and risk implications. Guaranteed cost recovery for new generation creates a very different risk profile for customers and would undermine competition from merchant developers, imperiling the cost reductions competitive markets motivate.

A. PJM's Markets Have Provided Adequate, Affordable Supply

Any resource adequacy investigation must start with understanding the current PJM market-based approach to ensuring resource adequacy. Competitive markets remain the most cost-effective means for satisfying resource adequacy objectives and maintaining reliable operations under changing system conditions. As reflected in PJM's chart below, PJM's capacity market has consistently delivered robust resource reserve margins in the region, including providing an 18.5% reserve margin for the 2025/2026 delivery year, which is 0.7% **above** PJM's recently increased target reserve margin of 17.8%.[6]

[6] PJM, *2025/2026 Base Residual Auction Report* at 4 (July 30, 2024), https://www.pjm.com/-/media/DotCom/markets-ops/rpm/rpm-auction-info/2025-2026/2025-2026-base-residual-auction-report.ashx.

Table 2. RPM Base Residual Auction Resource Clearing Price Results in the RTO

Delivery Year	Auction Results				
	Resource Clearing Price	Cleared UCAP (MW)	RPM Reserve Margin	Total Reserve Margin[1]	Total Cost to Load ($ billion)
2015/16[2]	$136.00	164,561.2	19.7%	19.3%	$9.7
2016/17[3]	$59.37	169,159.7	20.7%	20.3%	$5.5
2017/18	$120.00	167,003.7	20.1%	19.7%	$7.5
2018/19	$164.77	166,836.9	20.2%	19.8%	$10.9
2019/20	$100.00	167,305.9	22.9%	22.4%	$7.0
2020/21[4]	$76.53	165,109.2	23.9%	23.3%	$7.0
2021/22	$140.00	163,627.3	22.0%	21.5%	$9.3
2022/23	$50.00	144,477.3	21.1%	19.9%	$3.9
2023/24	$34.13	144,870.6	21.6%	20.3%	$2.2
2024/25	$28.92	147,478.9	21.7%	20.4%	$2.2
2025/26[5]	$269.92	135,684.0	18.6%	18.5%	$14.7

[1] Reserve Margin includes FRR+RPM (Total ICAP/Total Peak-1; [2] 2015/2016 BRA includes a significant portion of AEP and DEOK zone load previously under the FRR Alternative; [3] 2016/2017 BRA includes EKPC zone; [4] Beginning 2020/2021 Cleared UCAP (MW) includes Annual and matched Seasonal Capacity Performance sell offers; [5] DOM zone included in RPM

Since the 2007/2008 capacity auction, PJM has successfully facilitated significant new generation investment to meet load growth, with nearly 45,000 MW of new generation capacity added in the region.[7]

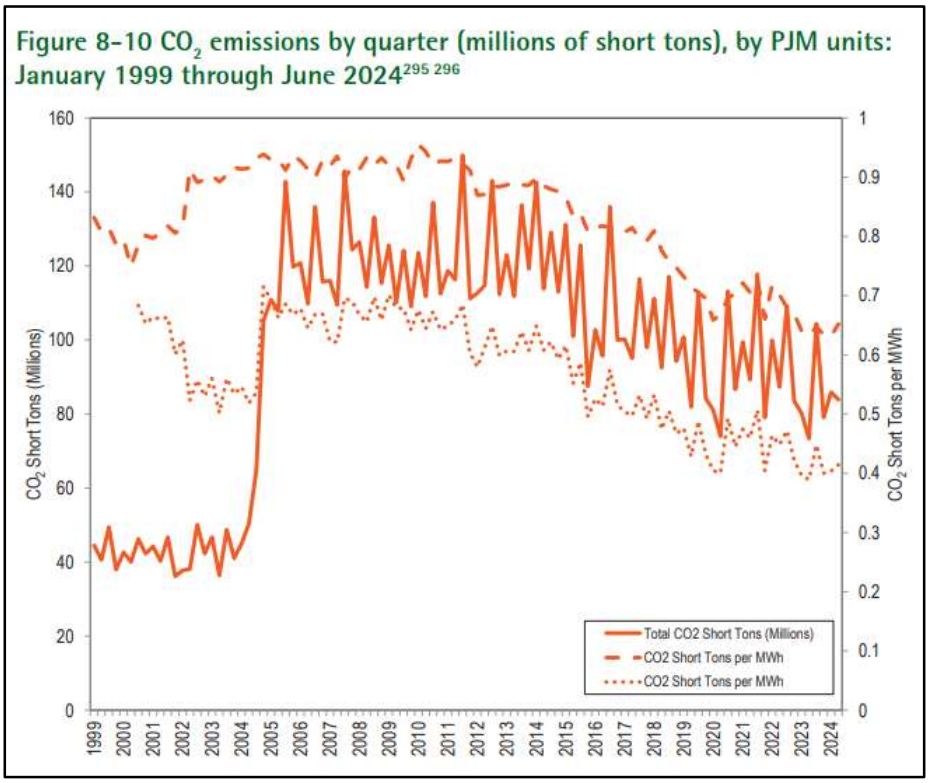
Table 5-6 Generation capacity changes: 2007/2008 through 2023/2024[82]

	ICAP (MW)								
	New	Reactivations	Uprates	Integration	Net Change in Capacity Imports	Net Change in Capacity Exports	Deactivations	Derates	Net Change
2007/2008	45.0	0.0	691.5	0.0	70.0	15.3	380.0	417.0	(5.8)
2008/2009	815.4	238.3	987.0	0.0	473.0	(9.9)	609.5	421.0	1,493.1
2009/2010	406.5	0.0	789.0	0.0	229.0	(1,402.2)	108.4	464.3	2,254.0
2010/2011	153.4	13.0	339.6	0.0	137.0	367.7	840.6	223.5	(788.8)
2011/2012	3,096.4	354.5	507.9	16,889.5	(1,183.3)	(1,690.3)	2,542.0	176.2	18,637.1
2012/2013	1,784.6	34.0	528.1	47.0	342.4	84.0	5,536.0	317.8	(3,201.7)
2013/2014	198.4	58.0	372.8	2,746.0	934.3	28.9	2,786.9	288.3	1,205.4
2014/2015	2,276.8	20.7	530.2	0.0	2,335.7	177.3	4,915.6	360.3	(289.8)
2015/2016	4,291.8	90.0	449.0	0.0	511.4	(117.8)	8,338.2	215.8	(3,094.0)
2016/2017	3,679.3	532.0	419.2	0.0	575.6	722.9	659.4	206.7	3,617.1
2017/2018	4,127.3	5.0	562.1	0.0	(1,025.1)	(695.1)	2,657.4	148.5	1,558.5
2018/2019	8,127.5	4.0	330.9	2,120.0	(3,217.0)	212.7	6,730.0	89.2	333.5
2019/2020	4,612.0	13.3	494.9	165.0	(1,196.6)	401.3	3,296.0	116.8	274.5
2020/2021	403.1	11.6	575.4	0.0	(37.9)	(111.6)	3,572.0	206.4	(2,714.6)
2021/2022	3,309.3	6.0	412.2	0.0	38.5	1,066.1	2,197.6	125.5	376.8
2022/2023	4,743.2	0.0	417.0	0.0	(469.3)	(868.0)	7,460.5	294.7	(2,196.3)
2023/2024	2,696.8	0.0	510.5	0.0	(47.9)	1,067.8	5,149.2	1,441.1	(4,498.7)
Total	44,766.8	1,380.4	8,917.3	21,967.5	(1,530.2)	(750.9)	57,779.3	5,513.1	12,960.3

[7] Monitoring Analytics, LLC, *2024 Quarterly State of the Market Report for PJM: January through June*, Table 5-6 (Aug. 8, 2024), https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2024/2024q2-som-pjm.pdf ("PJM IMM 2024 Quarterly State of the Market Report").

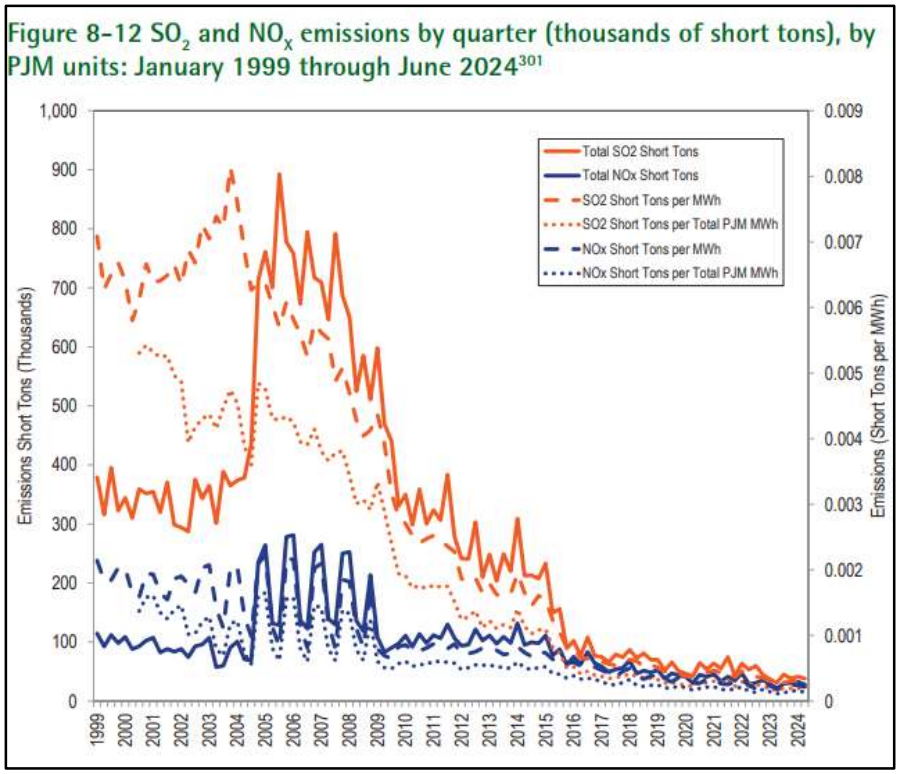
These successes did not happen by accident. PJM and its stakeholders have carefully pursued reforms over the years to ensure that PJM's capacity market remains effective in procuring the least-cost fleet of resources needed to reliably serve the evolving system. For example, last year PJM implemented several improvements to its capacity market modelling, including improving how it determines resources' actual capacity contributions (i.e., the effective load carrying capability, or ELCC).[8] These reforms were critical to reliability as the generation mix continues to change in response to state and federal policy goals, and they were particularly helpful for the Commonwealth. The ELCC reforms appropriately value the resource adequacy contribution provided by thermal generation resources that predominate in Pennsylvania and will send the right reliability signals to guide investment going forward.

Competitive markets have also facilitated a significant reduction in emissions of carbon and other forms of air pollution from electricity generation. As reflected in the charts below, sulfur, nitrogen, and carbon emissions in PJM have decreased dramatically over the last 15 years.[9] While PJM's capacity market has continued to procure the least-cost resources needed to maintain reliability, it has done so under changing system conditions and in a manner that supports lower emissions goals across the PJM footprint.



[8] *See PJM Interconnection, L.L.C.*, 189 FERC ¶ 61,043 (2024) (FERC order on rehearing accepting PJM's modelling changes).

[9] PJM IMM 2024 Quarterly State of the Market Report, Figures 8-11 and 8-12.



B. With Appropriate Reforms, PJM's Markets Are Poised for Continued Success

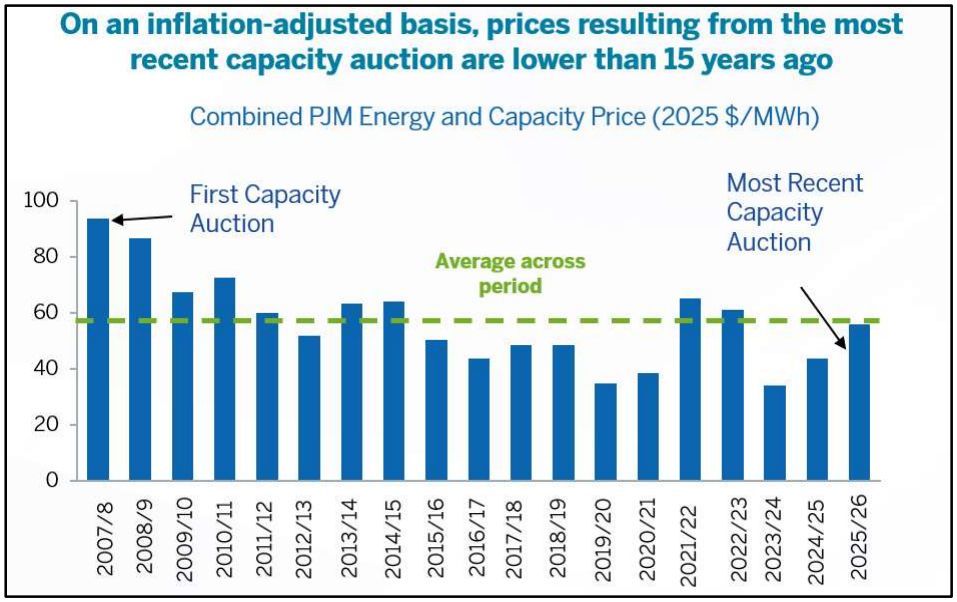
There is no reason to believe that PJM's markets cannot continue to function as intended.[10] One of the primary benefits of competitive markets is that they send price signals to guide efficient private investment decisions. While prices in PJM's recent capacity auction cleared higher than they have in the recent past, that result sends an important signal: it reflects tightening supply/demand fundamentals in the region and encourages investment where it is needed most. In any well-functioning competitive market, higher demand and/or reduced supply results in upward pressure on prices that will incentivize new entry. PJM is experiencing increasing load growth coupled with an evolving resource mix, and retention of existing resources and entry of new ones will be necessary for longer-term price stability.[11]

Some argue that the higher capacity price in the last auction is evidence that the capacity market is broken and structural changes to resource adequacy are needed. Constellation respectfully encourages all parties to zoom out from a single auction held last summer to consider the bigger picture. Capacity makes up only a small portion of customer bills for electric generation, and focusing narrowly on capacity market costs fails to consider the full picture of what consumers pay over time. When factoring in energy and ancillary service costs, the overall cost for generation

[10] We also note that, in the unlikely event that PJM's capacity market fails to incent the right resources and that PJM is unable to timely adjust its market rules to ensure that it does, PJM retains authority to procure additional capacity through its backstop authority. *See* PJM Open Access Transmission Tariff, Att. DD, section 16 (Reliability Backstop).

[11] *See, e.g.,* PJM Interconnection, L.L.C., Statement of Aftab Khan on Behalf of PJM, Docket No. AD24-10-000 at 1-2 (Oct. 16, 2024), 20241016-statement-of-aftab-khan-for-the-ferc-2024-reliability-technical-conference.ashx.

in PJM has remained stable and has even seen a decrease in recent years. When adjusted for inflation, the all-in prices for energy and capacity for the 2025/2026 delivery year are expected to be lower than they were 15 years ago and align with the generation costs observed over the past 15 years:[12]



Second, as they have done in the past, competitive markets are attracting investment in needed new capacity. The relaunch of CCEC, which was facilitated by a twenty-year power purchase agreement with Microsoft,[13] is the latest sign of this fact. Significant transactions like this one cannot be supported by off-take customers unless their long-term view of the market justifies the investment. Constellation also has announced plans to uprate two of its nuclear facilities in Illinois, Byron and Braidwood, which would add approximately 135 MW of new carbon-free generation to the grid.[14] In fact, Constellation has identified up to 1,000 MW of uprate potential across its entire nuclear fleet and is prioritizing investment at sites that have stable long-term financial viability. While a number of factors, including federal tax incentives, play into uprate investment decisions, Constellation would not be pursuing any of these investments unless market fundamentals and forward price signals were sufficiently robust to support them.

Other suppliers are responding as well. In early September, Elgin decided to continue operating its combined cycle generators (approximately 480 MWs), reversing a decision to

[12] Energy prices based on day-ahead annual average prices reported by PJM with 2024/25 and 2025/26 based on forward energy prices. Capacity prices based on average price resulting from Reliability Pricing Model auctions. Inflation adjustment using GPD deflator, with 2.5% inflation assumed for 2024-26.

[13] *See* Press Release, Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to The Grid (Sept. 20, 2024), https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html.

[14] *See id.*

deactivate.[15] In a recent Federal Energy Regulatory Commission ("FERC") filing, Calpine's Vice President of Strategic Origination and Development stated that "buoyed by the 2025/2026 auction results . . . [w]e are considering opportunities to bring to market a range of technologies that would add reliable capacity to the region, including natural gas peaker plants, natural gas combined cycle plants (potentially with carbon capture), solar and storage."[16] The President of Generation Development at LS Power Development, LLC also told FERC they are "considering development of an investment portfolio of over 2,000 MW of new Battery Storage capacity across 11 sites in the PJM footprint with an aggregate potential investment of over $5 billion."[17] And, as mentioned above, Homer City Redevelopment LLC recently announced that its retired coal facility in Indiana County would be converted to natural gas and restarted.[18] These data points suggest that the PJM markets are functioning as expected to induce investment in resource adequacy.

Higher prices in the most recent capacity auction are a direct response to load growth and the retirement of aging fossil generation. With expected load growth and changes in the resource mix, it is more important than ever to support accurate price formation to send an appropriate forward signal that investments in generation and transmission are needed. Prices that fail to reflect supply and demand fundamentals, along with regulatory uncertainty about future market design, undermine the private investment needed to support new resources. Further, price formation is key for resources to make informed retirement decisions. Prices that lead to the premature economic retirement of resources needed for reliability will only create additional challenges to meeting expected load growth at affordable prices.

PJM has taken price formation concerns seriously and worked with its stakeholders to pursue additional changes to capacity market rules before the next auction planned for July 2025 (covering delivery year 2026/27). On December 9, 2024, PJM filed at FERC a suite of reforms intended to (1) recognize the resource adequacy contributions of Reliability Must-Run units, (2) ensure non-performance penalties appropriately incentivize performance from capacity resources, and (3) reduce volatility by adjusting the Reference Resource used to develop the market's demand curve.[19] These changes are intended to ensure that prices reflect supply and demand fundamentals while also increasing predictability and reducing volatility. No one benefits from a market that swings wildly from year-to-year between the price floor and the price cap.

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[15] For a list of future, current, and withdrawn deactivations, *see PJM Generation Deactivations*, https://www.pjm.com/planning/service-requests/gen-deactivations.

[16] Calpine Corporation and LS Power Development, LLC, Protest, Docket No. EL24-148-000, Exh. 2, Testimony of Suriyun Sukduang at 6 (filed Oct. 25, 2024).

[17] *Id.*, Exh. 3, Testimony of Nathan Hanson at 7.

[18] Darrell Proctor, *Largest Pennsylvania Coal-Fired Plant Will Convert to Natural Gas*, Power Magazine (Dec. 6, 2024), https://www.powermag.com/largest-pennsylvania-coal-fired-plant-will-convert-to-natural-gas/.

[19] PJM, Reliability Pricing Model Revisions, Docket No. ER25-682-000 (filed Dec. 9, 2024).

PJM has actively pursued other improvements to its market as well. Recognizing that the backlog in its interconnection queue is constraining new supply from balancing out the surging demand for power, PJM recently filed a proposal at FERC that would allow qualifying proposed generation projects to get online faster.[20] These are the types of fixes—facilitating proper functioning of competitive markets rather than undermining them—that are needed to meet the resource adequacy challenges of the years ahead.

C. Supporting New Transmission Supports Functioning Markets

To the extent overall consumer costs are a concern, the Commission should consider other elements of consumer bills that are on the rise. While the "all-in" price for generation in PJM has remained stable, and even decreased over the past 15 years, transmission and distribution rates have risen during the same period. As noted above, a robust transmission grid is essential to optimizing power flows across the region. Lack of adequate transmission infrastructure leads to higher congestion costs, which directly impact resource adequacy issues and energy prices. Promptly building the already-identified transmission infrastructure needs identified by PJM to address reliability issues will enhance resource deliverability to and from the Commonwealth as necessary.

There are, however, other actions that the Commission can take to ensure that PJM and its member utilities are planning, constructing, and operating transmission lines efficiently and effectively. Pennsylvania utilities could be encouraged to expand deliverability by reconductoring lines and leveraging existing rights of way and to deploy grid enhancing technologies ("GETs") to maximize throughput on existing lines. GETs include dynamic line rates, which can be employed relative quickly such as what PPL did in 2022 to expand capacity on historically congested lines in northeastern Pennsylvania, saving customers $23 million annually.[21] The Commission should continue to focus on ways to improve transmission efficiency, individually through its own authorities and in collaboration with PJM and FERC.

II. Policy Solutions for Consideration

As we discussed above, PJM's capacity market has been an effective tool for signaling where and when additional capacity investment is needed. Many have expressed concern, however, about the price signal to retain existing and invest in new generation coming out of the most recent PJM auction. In the near term, Pennsylvania can use existing authority to mitigate the exposure to price swings while not undermining the price signal that the PJM market is sending to bring more effective load carrying generating capacity online. In the longer-term, we encourage Pennsylvania to be a partner in the burgeoning "new nuclear" industry.

[20] PJM, Filing, Docket No. ER25-712-000 (filed Dec. 13, 2024).

[21] *See Dynamic Line Rating Activated by PPL Electric Utilities* (Oct. 24, 2022), https://insidelines.pjm.com/dynamic-line-rating-activated-by-ppl-electric-utilities/.

A. Capacity Hedge for Default Service Customers

For years, capacity market prices have been lower, signaling that some existing generation facilities should retire and new entry should slow. This trend has now reversed as new demand from data centers and manufacturing is triggering the need for more generation across the region. In response, new generation facilities are being developed in Pennsylvania and elsewhere. PJM also is taking multiple actions, including changes to market and interconnection rules currently pending before federal regulators. Taken together, these changes in PJM rules and underlying market conditions will impact capacity prices, but it is unclear whether those prices will be lower or higher than the most recent auction for the 2025/2026 delivery year and, if higher, by how much and for how long.

A fruitful area for inquiry by the Commission may be whether it should encourage Pennsylvania utilities to manage this price uncertainty by entering into long-term capacity hedging contracts that provide default service customers a financial hedge against volatility in the PJM market. For example, in addition to procurement of one to three-year full requirements supply contracts to serve default service customers, utilities could conduct a competitive auction to procure a financial hedge for capacity costs as part of the default service procurement ("DSP"). The hedge would provide long-term protection (e.g., five to 10 years) against market volatility and insulate customers from the highest-priced auction results. Such hedges are commonly used by suppliers and large buyers in the wholesale market. The Commission could provide guidance indicating the maximum price at which it would consider a financial hedging arrangement prudent and consistent with the "least cost over time" statutory standard for default service.

A major benefit of a financial hedge rather than long-term, full requirements bilateral contracts with specific resources is that financial hedging arrangements of this nature would not replace or seek to change outcomes in the PJM market. They would not alter the underlying economics of a specific PJM generation resource, for example, which in turn may impact the price signal provided to the entire market. Instead, the default service hedging arrangement would appropriately focus directly on protecting retail customers through price stability and avoiding rate shocks, while allowing the wholesale markets to continue doing their job—directing the efficient deployment of private capital.

While our view is that a financial hedge for capacity is preferable to utility ownership of or contracting for physical capacity as part of utility DSPs, we understand some parties may advocate for the latter approach. To the extent utilities and the Commission do intend to explore that option, the Commission must ensure that any such contracts result in a procurement that is consistent with the least-cost standard.[22] To that end, any such contracts should be entered into through a competitive process that is open to all available generation resources, both existing and new. As discussed at the technical conference, an overly narrow procurement confined to bringing

[22] *See* 66 Pa.C.S. § 2807.

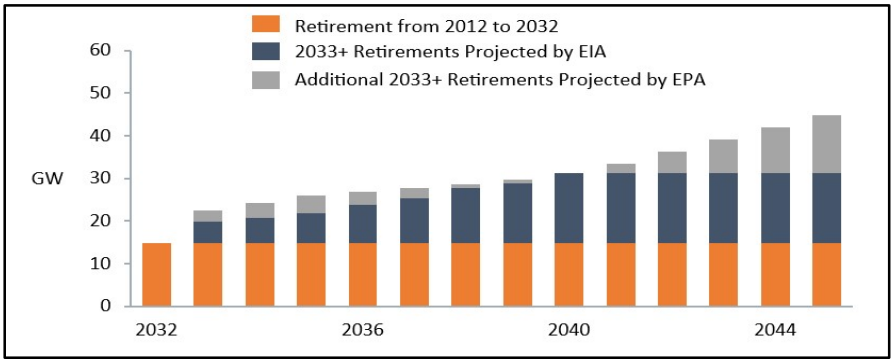
a new resource (or resources) online is likely to burden ratepayers with excessively expensive and non-competitive capacity.[23]

B. Continued Operation, and Potential Expansion, of Nuclear Power Is Essential to Maintaining and Expanding Pennsylvania's Resource Adequacy

Nuclear power provides around-the-clock carbon-free electricity and, as other states have affirmed, "has demonstrated the lowest lifecycle emissions of any generation technology."[24] Nuclear power provides roughly 45% percent of Pennsylvania's carbon-free energy and roughly 32% percent of the state's overall electricity.[25] Nuclear power is also significantly more efficient in terms of land use: it requires 31 times less land than solar facilities and 173 times less than wind farms for the same amount of energy output.[26] Maintaining current nuclear operations while introducing new nuclear technologies is one of the most effective actions Pennsylvania could take to maintain resource adequacy in a decarbonizing power system.

1. Long Term Contracts are a Key Component to Preserving and Expanding Existing Nuclear Output at Pennsylvania Nuclear Power Plants

First and foremost, it is critical to maintain the existing nuclear fleet in the Commonwealth, and the best way to do that is to minimize interference with the competitive market. Competitive long-term contracts, whether from a data center or any other customer, will provide the long-term financial stability needed to justify the investments to keep these carbon-free and reliable plants operating. Although the federal nuclear production tax credit ("PTC") has ensured the financial stability of nuclear resources until 2032, both the EIA and EPA project a resurgence of nuclear plant retirements when that program expires.



[23] For example, as discussed at the Technical Conference, the experience in New Jersey and Maryland from the last decade should caution against state overreaction to resource adequacy concerns.

[24] N.Y. State Energy Research and Dev. Auth., *Draft Blueprint for Consideration of Advanced Nuclear Technologies* at 3 (2024), https://www.nyserda.ny.gov/-/media/Project/Nyserda/Files/ny/Draft-Blueprint-for-Consideration-of-Advanced-Nuclear-Technologies.pdf ("NYSERDA Blueprint").

[25] Nuclear Energy Institute, *Pennsylvania Fact Sheet 2024*, https://www.nei.org/CorporateSite/media/filefolder/resources/fact-sheets/state-fact-sheets/Pennsylvania-State-Fact-Sheet.pdf.

[26] Nuclear Energy Institute, *Nuclear Needs Small Amounts of Land to Deliver Big Amounts of Electricity* (Apr. 29, 2022), https://www.nei.org/news/2022/nuclear-brings-more-electricity-with-less-land#:~:text=A%20nuclear%20energy%20facility%20has,sites%20in%20the%20United%20States.

Long-term contracts, whether from a data center or any other customer, would provide an alternative source of financial stability supporting continued operation of these carbon-free, reliable plants operating over the long-term. A retired nuclear plant provides no reliability or environmental benefits to anyone.

Using a portion of a nuclear plant to serve a large load under a long-term contract also provides the financial stability needed to invest in the plant to increase output. As noted above, Constellation has identified up to 1,000 MW of uprate potential across its entire nuclear fleet and is prioritizing investment at sites that have stable long-term financial viability. An uprate to a nuclear unit in Pennsylvania would be one of the fastest paths to bringing new, clean energy online, given that these projects can be executed faster than greenfield development. The cost of a significant uprate project can approach a billion dollars. This level of investment requires the type of financial stability provided by a long-term contract, resulting in a win-win for everyone: ensuring both the continued operation and expansion of a highly valuable clean generator so that it can provide service to both the new load (and support economic growth in the state) and the broader grid.

2. A New Nuclear Strategy Should Leverage Private Sector Demand, Multistate Interest and Existing Sites at Limerick, Peach Bottom and the Crane Clean Energy Center

For the medium to long-term, Constellation encourages Pennsylvania to follow the lead of states like New York[27] and Texas[28] in the pursuit of advanced nuclear technologies. Cooperation among states, including Pennsylvania, the federal government, and private sector partners, will be needed to resolve some of the challenges facing these new nuclear projects.

Given the growing recognition of the necessity for new clean and reliable megawatts amid a rapidly rising demand for electricity, there is an unprecedented opportunity to advance new nuclear initiatives. The International Energy Agency has found repeatedly that more firm, dispatchable clean electricity technologies and advanced energy storage systems are needed to cost-effectively decarbonize grids and help the world meet its growing electricity demand with carbon-free energy sources.[29] This reality is recognized not only by states like Pennsylvania and its policymakers, but also by some of the largest, most financially robust companies globally. These companies have an interest in expanding firm clean energy resources and increasingly appear willing to invest. One needs to look no further than the recently announced agreement between Constellation and Microsoft to re-start the Crane Clean Energy Center, described above,

[27] *See* NYSERDA Blueprint, *supra* n.25.

[28] *See, e.g.*, Public Utility Commission of Texas, Case 55421-5 (establishing the Texas Advanced Nuclear Reactor Working Group, as directed by Texas Governor Abbott).

[29] Int'l Energy Agency, *Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach* at 16 (2023), https://iea.blob.core.windows.net/assets/8ad619b9-17aa-473d-8a2f-4b90846f5c19/NetZeroRoadmap_AGlobalPathwaytoKeepthe1.5CGoalinReach-2023Update.pdf.

and recent announcements by Amazon[30] and Google[31] to partner with new nuclear developers on first-of-a-kind technologies, for confirmation. There is new interest from an enthusiastic set of private sector off-takers in a tried-and-true approach, long term agreements, to support the addition and continued operation of clean, reliable resources like nuclear.

To support the development of new nuclear, however, it is unlikely that such investments, particularly first-of-a-kind nuclear, can be funded solely by the private sector. States and the federal government will need to be involved in supporting such investments. Pennsylvania should explore avenues where it can work with private sector investors and nuclear operators to accelerate these investments, as states such as New York and Texas already are doing. Pennsylvania also should consider a multi-state procurement with these and other states to reduce the cost of the technology and reactor production and improve learnings in deployment and timing. A multi-state procurement of new nuclear for 5-10 units to be built in different parts of the country would be particularly helpful in managing the concern of cost overruns associated with first-of-a-kind advanced nuclear projects.

For Pennsylvania, there is an opportunity to locate the next generation of advanced nuclear reactors at existing nuclear sites. Developing new nuclear power plants on existing sites is a strategic approach that Pennsylvania should consider to accelerate the deployment of advanced nuclear technologies. Constellation is uniquely positioned to partner in such deployment given its existing fleet of nuclear generation and its expertise as the largest nuclear operator in the country. Constellation stands ready to work with Pennsylvania and other states to explore these opportunities.

Conclusion

Resource adequacy and reliability are of critical importance and warrant regular monitoring and evaluation. While the Commission should be always vigilant, it will rarely need to actively intervene. Indeed, doing so prematurely or unnecessarily will do more harm than good.

Instead of taking drastic measures that could undermine functioning markets, the Commission should review and understand the data over time (protecting against reactions to volatile, limited data sets), and consider steps that have the primary purpose of achieving complementary state goals, e.g., clean, reliable energy, and a secondary benefit of contributing to the supply mix and sufficiency. These measures include clean attribute procurements and actions that will support investment in nuclear uprates, and even new nuclear resources. These steps would also serve to backstop the market while not undermining it.

[30] *Amazon signs agreements for innovative nuclear energy projects to address growing energy demands* (Oct. 16, 2024), https://www.aboutamazon.com/news/sustainability/amazon-nuclear-small-modular-reactor-net-carbon-zero.

[31] *New nuclear clean energy agreement with Kairos Power* (Oct. 14, 2024), https://blog.google/outreach-initiatives/sustainability/google-kairos-power-nuclear-energy-agreement/.

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