ECKERT SEAMANS
ATTORNEYS AT LAW

Eckert Seamans Cherin & Mellott, LLC
213 Market Street
8th Floor
Harrisburg, PA 17101

TEL: 717 237 6000
FAX: 717 237 6019

Deanne M. O'Dell, Esq.
717.255.3744
dodell@eckertseamans.com

June 6, 2025

Via Electronic Filing
Matthew Homsher, Secretary
Pennsylvania Public Utility Commission
400 North Street
Harrisburg, PA 17120

RE: *En Banc* Hearing Concerning Interconnection and Tariffs for Large Load Customers
Docket No. M-2025-3054271

Dear Secretary Homsher:

Enclosed for electronic filing please find NRG Energy, Inc.'s ("NRG") Comments with regard to the above-referenced matter. Copies to be served in accordance with the attached Certificate of Service.

Sincerely,

Deanne M. O'Dell

Deanne M. O'Dell

DMO/lww
Enclosure

cc: James A. Mullins, Law Bureau at jamullins@pa.gov
Scott J. Thomas, Law Bureau at sjthomas@pa.gov

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

En Banc Hearing Concerning Interconnection and Tariffs For Large Load Customers	: : : : :	Docket No. M-2025-3054271

Comments of NRG Energy, Inc.

Date: June 6, 2025

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SUMMARY

NRG Energy, Inc. ("NRG") respectfully submits these Comments in response to the Public Utility Commission ("PUC" or "Commission") Secretarial Letter issued on April 12, 2025, as well as the Motion of Chairman DeFrank adopted at the March 27, 2025, Public Meeting, which established a timeline for written comments regarding interconnection and tariffs for large load customers in Pennsylvania to be submitted. NRG appreciates the opportunity to share its perspective with the Commission as it evaluates how best to balance the increasing number of large load customers that place significant new demand on the electric grid in Pennsylvania and the broader PJM region with the need to protect consumers from undue burdens and costs.

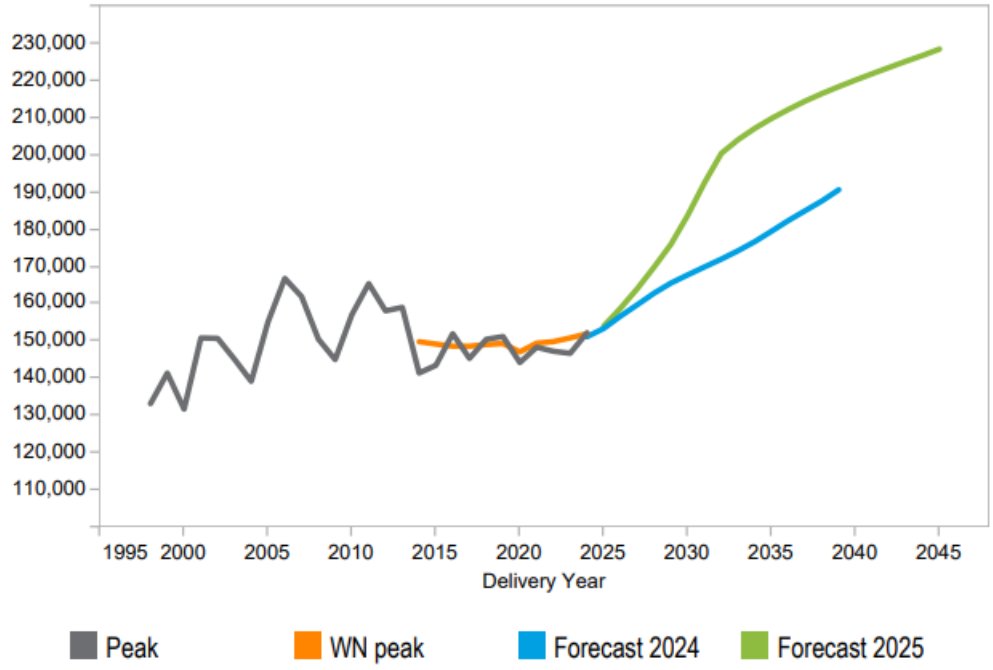
As the Pennsylvania Electric Distribution Companies ("EDCs") noted in their testimony at the April 24, 2025, Technical Conference, Pennsylvania is proving to be an attractive location for hyperscale data centers.[1] These data centers are critical to driving the development and use of Artificial Intelligence ("AI") applications, in addition to more typical uses for the streaming and storage of cloud-based digital information. Data centers use an enormous amount of electrical energy, and the regional market operator is forecasting significant increase in electric demand as a result of data center penetration in the region, as seen in Figure 1 (below). The massive change in two forecasts conducted within a year of one another underscores both the scale and uncertainty of what lies ahead, even as data-center customers, policymakers, utilities, and others are clamoring for investments to be made to serve these prospective large loads.

This is a moment of great risk, and potential reward, for anyone making investments to serve the data-center industry. Like previous revolutions in novel, high-fixed-cost industries, much is uncertain about the foretold revolution in data processing and AI. The degree to which forecasted load growth will actually occur as a result of efficiency improvements in data-processing; the particular commercial actors who will dominate the space and where in the world they will do business; whether the first phase of AI development will flare and flame out like the 1990s dot-

[1] As reported at the PUC's Large Load Technical Conference, both PPL and PECO are actively fielding large load interconnection requests. PPL reported it has requests in excess of 9 GW of new load, while PECO reported it is currently working to add 3.8 GW of new load but is also studying another 24 projects that would add an additional 8 GW of demand to the system. See the Pre-Filed Testimony of Joseph Lookup, VP, Transmission & Distribution Planning and Asset Management at PPL Electric Utilities, and Richard Webster, VP, Regulatory Policy and Strategy for PECO Energy Company, filed on April 24, 2025, and April 23, 2025, respectively.

com bubble before being supplanted by a more sustainable growth: All of these are questions that have been asked about this revolution.

Figure 1: PJM Historical System Load and 2024 / 2025 Forecasts[2]



Each of these considerations weighs heavily on the amount of electricity demand that will emerge from the sector, which poses a corresponding risk to the energy businesses hoping to serve the prospective demand. The costs and risks inherent in this business must be placed on the parties in a best position to manage them. It is incumbent upon this Commission, both for the fulfillment of its own responsibilities to the people of Pennsylvania and also as a national example, to properly mitigate these risks while not standing in the way of advancements in computing technology.

The Commission can best accomplish this dual mission by relying upon Pennsylvania's competitive market for electricity supply to power data-center loads. This allows electric distribution companies not to be distracted in their mission and to focus on what they do best: provide secure and sufficient transmission capacity. In this regard, Pennsylvania is in an enviable

[2] *PJM Long-Term Load Forecast Report,* PJM Resource Adequacy Planning Department, January 24, 2025, *https://www.pjm.com/-/media/DotCom/library/reports-notices/load-forecast/2025-load-report.pdf*.

position. Pennsylvania's restructured electricity market benefits from robust competition, particularly in the large customer segment. As of April 2025, 73% of the Commonwealth's commercial customer load and 96% of its industrial customer load was being served by competitive retail suppliers.[3] Moreover, the remaining load served by utility provided default service benefits from market based hourly priced service supplied by competitive wholesale suppliers. All new large load choosing to locate in Pennsylvania will be greeted by robust competitive supply market eager to serve them. This situation can be compared to jurisdictions that rely upon utility monopolies to procure supply to all customers. These states are in the position of shifting costs and imposing risk on other customers as they seek to accommodate data-center loads. By contrast, in Pennsylvania, the cost and risk of supplying data-center loads is contained within the bilateral agreement between two, well-resourced and fully informed counterparties (the data center and the competitive supplier), neither of which has recourse to a captive customer base. There may be second-order effects on grid reliability and costs as a result of demand scaling up if the supply base does not have a corresponding expansion, and for that reason NRG offers targeted recommendations that the Commission may choose to adopt in its regulation of the retail sale of energy to very large loads.

For now, and as NRG noted in its comments filed in the Commission's Resource Adequacy docket earlier this year, Pennsylvania is fortunate to have robust resources throughout the Commonwealth to serve its customers. PJM has observed that, even in scenarios with no new resource additions, the Commonwealth is likely to be resource adequate through 2032. This outlook does not reflect the anticipated return of the retired Three Mile Island nuclear facility or other potential resources that may return to service in Pennsylvania, nor the addition of any of the 10,500 MWs of new resources in the PJM interconnection queue. There may be benefits to encouraging loads to hedge themselves through the bilateral procurement of capacity and energy over a longer term, and in that vein, NRG urges the Commission to consider two policies.

First, and as NRG noted in the Commission's Resource Adequacy docket, "bring your own generation" ("BYOG") can be a useful tool to ensuring sufficient capacity to serve new load choosing to locate here, and that demand will be met by competitors eager to build it. Unlike

[3] See *PA PowerSwitch Monthly Update – April* 2025, Pennsylvania Public Utility Commission, https://www.papowerswitch.com/media/jfybgb1t/paps_numbers043025.pdf.

certain other generators, NRG has generally regarded it as valuable for the electricity industry to remain networked in such a way that power resources are pooled in a common and dispatched by a market operator, rather than reserved to individuated and private uses. History tells us that networks produce economic and social benefits that increase as more people are connected to those networks, and the power grid is no exception. Consequently, while there may be a role for "behind-the-meter," private arrangements to supply data-center loads, NRG views there as being a more robust and durable market for "front-of-the-meter" supply to data centers, who take service as do nearly all other customers by relying upon grid-delivered electricity, even while they have a specific financial contract with a dedicated Load-Serving Entity that arranges to buy the customer's upstream supply of power with some certainty around the cost of that supply, including the possibility that it has features of unit contingency for one or more power-generating resources. It may be reasonable for the Commission to require very large loads as part of a tariff requirement to enter into a contract that transparently designates a source and supplier of generation as part of a BYOG requirement.

Second, as it concerns investment in grid infrastructure, NRG has contemplated how to square the data-center moment with the utility's role in the provision of interconnection, distribution, and transmission services. Here, we believe the Commission should draw upon the experience of other regulated industries and contemplate a Network Open Season to right-size and directly allocate grid costs to new very large loads. For the incremental cost necessary to serve very large loads, NRG proposes the Commission consider a Network Open Season ("NOS") model that directly allocates the incremental costs of interconnection, distribution, and transmission expansion to customers requesting access to the grid. This direct allocation of cost could be refundable to the customer over a period of 7-10 years if the customer continues to pay the tariffed transmission rate applicable to its class of service.

NOSes have a long history of use in the development of natural-gas pipelines, and while more limited, it also has certain precursors in the power sector as well. The right to interconnection that a successful bidder into a NOS obtains can be used, if regulation allows for it, as a property right in a tradeable secondary market. The workings of such a market can help to eliminate duplicative interconnection requests and thus potential over-forecasts of load. In adopting this reform, the Commission would ensure that the potential exit of large-load

customers does not negatively shift stranded transmission costs to customers who did not cause these costs in the first instance, while at the same time creating a market-based check on demand projections that currently are left to a significant degree to administrative guesswork by the utility and the regional transmission organization.

ABOUT NRG ENERGY, INC.

NRG is the leading essential home services company offering a unique whole-home experience to millions of North American customers. As a Fortune 500 company, NRG has provided leadership in competitive energy markets by creating a platform that offers consumers more control over their energy use and home automation and protection, especially with its newly acquired tech-forward smart home solutions. NRG serves 8 million customers across North America, including a significant share of retail energy customers in Pennsylvania. NRG has three offices in the Commonwealth to support its substantial investment in serving our customers, in Philadelphia, Pittsburgh and Wyomissing, staffed with hundreds of employees that support our businesses. NRG's retail energy subsidiaries include Electric Generation Suppliers ("EGSs") and Natural Gas Suppliers ("NGSs"), which serve customers of all sizes across the Commonwealth.[4]

Recently, NRG entered into a purchase and sale agreement to acquire a portfolio of generation assets from LS Power, six of which are in Pennsylvania and total more than 2,400 MW of capacity.[5] In addition, NRG will acquire CPower, a leading C&I VPP platform operating in all U.S. restructured energy markets with 6 GW of capacity representing more than 2,000 commercial and industrial customers. This deal remains pending subject to regulatory approvals. In a separate announcement, NRG, along with GE Vernova, Inc. and TIC – The Industrial Company (TIC), a subsidiary of Kiewit Corporation, announced a new venture aimed at rapidly

[4] NRG's licensed retail companies include: Direct Energy Business, LLC (Docket No. A-11025 and A-125072); Direct Energy Business Marketing, LLC (Docket No. A-2013-2368464 and A-2013-2365792); Direct Energy Services, LLC (Docket No. A-110164 and A-125135); Energy Plus Holdings LLC (Docket No. A-20092139745); Gateway Energy Services Corporation (Docket No. A-2009-2137275 and A-2009-2138725); Green Mountain Energy Company (Docket No. A-2009-2139745 and A-2017-2583732); Independence Energy Group LLC d/b/a Cirro Energy (Docket No. A-2011-2262337 and A-2013-2396449); Reliant Energy Northeast LLC d/b/a NRG Home/NRG Business/NRG Retail Solutions (Docket No. A-2010-2192350 and A-2015-2478293); Stream Energy Pennsylvania, LLC (Docket No. A-20102181867 and A-2012-2308991); and XOOM Energy Pennsylvania, LLC (Docket No. A-2012-2283821 and A-2012-2283967).

[5] See Press Release *NRG Energy Inc. to Acquire Premier Power Portfolio from LS Power; Transforming Generation Fleet for Growing Demand*, May 12, 2025, https://www.nrg.com/about/newsroom/2025/44431.html.

brining new electricity generation capacity to market in response to growing demand for computing power and generative AI. Initially, the new venture will work to advance four projects totaling over 5 gigawatts of efficient, new natural gas combined cycle power plants for the ERCOT and PJM markets.[6]

REQUIRE DATA CENTERS TO "BRING THEIR OWN" GENERATION

The concern raised by the PJM Independent Market Monitor and by FERC Commissioner Mark Christie in recent proceedings involving a Pennsylvania data center is that new large loads may sap the system of the existing resources that hitherto been expected to supply other customers in a relatively low-load-growth environment.[7]

Before the Commission does anything based on this largely speculative fear, the Commission should ask itself, based on the evidence it gathers and not mere speculation, if it is so profoundly concerned that data center load growth will disrupt the system's resource adequacy in a way that the ordinary workings of the retail and wholesale markets are incapable of solving it. If the answer is "yes," and that the Commission feels that it is forced to do something, then there is a fairly obvious answer: requiring data centers to contract for capacity, potentially including incremental capacity, as a precondition of interconnecting to the system.

Certain utilities have argued that the era of data centers requires them to get back into the power-generation game through Commission-approved power plants that would be charged to all customers. It would be a profound irony, and a huge mistake, for the Commission—in trying to avoid a perceived cost shift associated with the growth of data centers—to end up perpetuating one by requiring utilities to sign long-term power purchase agreements (or utility-owned generation) that all residential or other commercial and industrial customers, not just data

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[6] See Press Release *NRG Energy, GE Vernova and Kiewit Accelerating New Generation Capacity to Support Demand Growth*, Businesswire, February 26, 2025, https://www.businesswire.com/news/home/20250225753165/en/NRG-Energy-GE-Vernova-and-Kiewit-Accelerating-New-Generation-Capacity-to-Support-Demand-Growth.

[7] *See* Concurrence of Commissioner Christie. PJM Interconnection, L.L.C.. 189 FERC ¶ 61,078, November 1, 2024 at P 2: "Co-location arrangements of the type presented here present an array of complicated, nuanced and multifaceted issues, which collectively could have huge ramifications for both grid reliability and consumer costs." *See also* FERC Docket No. ER24-2172. Answer and Motion For Leave to Answer of the Independent Market Monitor for PJM. July 10, 2024 at 6-7: "While the proposed amendment to the ISA is creative, its benefits to the co-located load come at the expense of other customers in the PJM markets. If this approach were extended to all the nuclear plants in PJM, the impact on the PJM grid and markets would be extreme."

centers, were obliged to pay for. This "solution" would actually *ensure* the outcome that regulators are ostensibly trying to avoid by entertaining the concept. It should be discarded by the Commission out of hand.

NRG believes that recent announcements around PJM's Reliability Resource Initiative and public announcements like NRG's own efforts to develop new gas generation are indicative of a market where additional supply can nimbly meet new demand needs. Requiring new large loads to be incrementally matched to supply raises certain policy challenges; for example, should the matching be 1:1, should the load be treated as truly firm, and what are the particulars of the tenor and generator attributes of the contracting requirement? If Pennsylvania chose to be overly restrictive, it could cause large loads to locate elsewhere on the PJM grid. However, to the extent that the Commonwealth wants to ensure that new large loads are supplied through incremental investments in generation capacity, it has the legal right to do so, and other states have required long-term contractual commitments on the part of retailers seeking to serve load in a state—although typically in a manner that imposes that requirement across all loads, and not for a particular customer class or vintage of load.

EMPLOY A NETWORK OPEN SEASON TO RIGHT-SIZE AND PROPERLY ALLOCATE THE INCREMENTAL COSTS OF PROVIDING GRID SERVICES TO NEW VERY LARGE LOADS

The uncertainty in load forecasting for data centers has substantial risk implications for the amount of energy supply that a utility should plan to serve. Yet the competitive market in the supply of power allows this risk to be channeled to parties other than a captive base of ratepayers who have nothing to do with data-center development. Unfortunately, for the planning and construction of improvements to the grid that are necessary to serve incremental load, the policy approach discussed in the above section is unavailing: The role of a utility monopoly is, to a more substantial degree, inevitable given their historical and continued management of the ratepayer funded distribution network and interconnection to the grid.

Despite the presence of local monopolies on grid services, there are market-based approaches to the expansion of grid service that can simultaneously cause utility investments to be right-sized, their costs directly allocated to cost-causers and beneficiaries, the regulatory process to determine "need" for them stream-lined, and the creation of valuable property rights for

interconnection to the utility grid to be firmly established. Together, these are the four attributes of a Network Open Season ("NOS"), which may facilitate a more certain growth trajectory in the valuable data center and AI sectors of the U.S. and Virginia economies.

The natural-gas pipeline sector has long employed a network open season when a new pipeline, an expansion of a pipeline, or a gas-storage asset was proposed.[8] An investment in any of these things can clearly have beneficial effects on those upstream or downstream of a pipeline—in economics terms, it has certain "public good" attributes—but that broad view of benefits was not and is not enough to convince regulators to socialize broadly the cost of natural gas pipeline capacity or to certificate its necessity as a public-utility asset. Instead, a NOS is a conduit for both the expression of demand for these gas-infrastructure assets and an avenue to ensure that their capacity costs are paid for by anchor tenants who sign up through the NOS to the incremental capital expenditure the public utility proposes. In turn, these anchor tenants, or shippers as they are termed in the regulated-gas pipeline industry, receive a property right to the use of the new capacity. This market-based approach to gas-infrastructure regulation was the major policy breakthrough that made the expansion of the natural-gas pipeline system across the United States possible, ushering in an era of abundant energy, lower emissions (versus coal-fired power generation), and a flourishing of end-users who could make use of that gas. This momentous step of regulatory innovation has obvious parallels to the data-center moment in the power sector, as at least one commentator to the Commission's technical conference observed.[9]

Electricity systems are different than natural gas; the physics of these systems work at the speed of light and not the speed of gas, the system is more a lattice than a series of tubes, and for both of these reasons the benefits of an incremental investment in the electric grid may be more diffuse. Yet when it comes to large loads' hooking up to the grid at a particular point of interconnection, and at the scale we are now considering with respect to very large loads such as data centers, the principles that obtain in the regulation natural-gas pipelines become more relevant.

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8 *See Rockies Express Pipeline L.L.C.*, 116 F.E.R.C. ¶ 61,272 at para. 71 (2006) ("Under the Commission's policies, all new interstate pipeline construction must be preceded by a nondiscriminatory, nonpreferential, open-season process through which potential shippers may seek and obtain firm capacity rights.")

9 James Wilson, Tr. at 133.

The present practice of interconnecting these very large loads is somewhat ambiguous and devolved to the particularities of individual electric utilities. In this regard, it does not resemble FERC's regulation of the interconnection of generators which, while flawed, follows a *pro forma* process and generally has been relatively visible, even if both the interconnection of very large loads and generation follow a first-in-queue, first-in-right philosophy that tends to disregard the relative value of the interconnection to those in the queue. Both of these situations now demonstrate a scarcity of interconnection capacity. And in order to remedy either or both, but more relevant here for the load-side interconnection that this Commission clearly regulates, a market-based process would clarify the quantity, value the interconnection, and assign the costs of interconnection. The Commission should consider that retail load interconnection of very large loads be processed through a Network Open Season.

In the simplest terms, a NOS would have Pennsylvania utilities, individually or collectively, who face an oversubscription of very large loads relative to their existing grid capacity to develop a bid-based process to expand their grids. A NOS would operate at a high level as follows. First, in view of the load interconnection requests and potential requests that exist, an electric utility would develop several expansion plans that are sufficient to accommodate lower and higher degrees of very large load interconnection at places on its system that are economically advantageous to data-center development and for which interest has been expressed. The electric utility would then identify the projected, indicative costs by firm-MW served of these interconnections (including any upstream upgrades required). Subsequently, it would tender an offer of service through a NOS and open a period of bidding. Very large loads, as well as any party wishing to buy a transferable right for a very large load to interconnect, would express a paired bid of location and volume relative to one or more of the utility's plans. Realizing that interconnection-per-MW is not a uniform commodity with a purely linear value, some flexibility in the post-bid process could be afforded an electric utility (e.g., +/- 15%) to appropriately identify costs of the seemingly most efficient portfolio, subject to bidder consent. This NOS outcome would then be submitted to the Commission to demonstrate both need for the portfolio and as a proposal to allocate costs, so long as the portfolio met an acceptable ratio whereby bids were near or exceeded the total offer cost. On that basis the Commission could make an approval of need based on the NOS's expressed demand, and the Commission also could be satisfied that the cost of this expansion was fully funded by bidders, with any surplus

being applied to the utility's revenue requirement, or held as a contingency for cost overruns, or even kept as additional remuneration for the electric utility's extraordinary performance. Financial commitments then would be made by bidders, and the electric utility would commence construction, subject to a more limited public convenience and necessity proceeding that concerned only routing, and not necessity, since that criterion would have already been satisfied.

The revenue from NOS bidders could exist as the most significant part of the regulated rate that these customers would otherwise be subject to or, alternatively, exist parallel to the ordinary scheduled rates. In the former, the going-forward rates these customers paid would be lower than average; in the latter, these up-front payments from NOS bidders would be refunded to those customers over time (*e.g.*, between 7 and 10 years), and customers would be charged the prevailing customer-class-based rate for transmission service. The point of these up-front payments, in the pay-and-refund design, would be to ensure that the transmission is right-sized to needs and substantially avoid stranded costs. Meanwhile, in the situation where a NOS bidder pays without a future refund, the up-front cost of the upgrades is defrayed, and rate base is reduced, by what is essentially a substantial customer contribution in aid of construction. Whichever of these approaches might be selected is largely irrelevant to the benefits either approach produces, which is to resolve in one fell swoop two major regulatory problems: load forecast error, which in the regulated transmission-and-distribution-company landscape lacks any market-based check, and the allocation of capital costs that may absent an upfront defrayal be charged to consumers generally who may not have needed the investment.

This NOS approach also has another significant attribute that encourages the data-center economy: the development of a secondary market for the trade in interconnection rights. Once a bidder obtains a right to interconnect through a NOS by making a binding financial commitment, there is no reason why that bidder should not be able to transfer that property right to another party on whatever terms those two parties agree to. This would simultaneously help fund transmission expansion and allow for substitution of less economic for more economic data-center use cases in an uncertain data-center and AI landscape described at the very beginning of these comments. Moreover, it would minimize the arbitrary regulatory device of queueing that has taken a needless center stage in what should be a more streamlined process of network access to the electric grid.

The use of NOSes in the power sector is substantially more limited in the natural-gas sector, but NRG submits that the characteristics of the scale and optionality of data-center load growth make this approach well suited to the power sector at the present moment. It is a tool to both advance the data-center industry while protecting other consumers from any risk- or cost-shift in this part of the sector. There are, however, some limited antecedents for NOSes in the power sector, including the use of them for renewable generator interconnections by Bonneville Power Administration which, like the current moment, faced an overwhelming demand for interconnection (in this case, from the generation side) and decided to rationalize its queueing process by employing a market-based process.[10]

CONCLUSION

Pennsylvania's competitive energy market is perfectly positioned to meet the new large load demand that is being proposed across the Commonwealth. The Commission has the ability to exercise its authorities in a way that support the competitive paradigm that already exists. Requiring new large load to bring its own generation will ensure Pennsylvania maintains its resource adequacy. Employing a Network Open Season directly allocates the incremental costs of interconnection, distribution, and transmission expansion to customers requesting access to the grid.

Date: June 6, 2025

Respectfully submitted,

/s/ Travis Kavulla

Travis Kavulla
Vice President, Regulatory Affairs
1825 K. St. NW, Ste. 1208
Washington, D.C. 20006
Travis.Kavulla@nrg.com

[10] *See* Rob Gramlich and Zach Zimmerman, "*Use of Network Open Seasons in the Electric Industry*" (August 2024), prepared for NRG Energy. https://www.nrg.com/assets/documents/energy-policy/grid-strategies-electric-network-open-seasons080924.pdf