



June 5, 2025

**Via Electronic Filing**

Secretary  
Pennsylvania Public Utility Commission  
400 North Street Commonwealth  
Keystone Building, 2nd Floor  
Harrisburg, Pennsylvania 17120

**RE: Docket No. M-2025-3054271: Comments of Calibrant Energy in the Matter of Pennsylvania Public Utility Commission's En Banc Hearing Concerning Interconnection and Tariffs for Large Load Customers**

Dear Secretary,

Please find attached Calibrant Energy's ("Calibrant") comments in response to the Pennsylvania Public Utility Commission's ("PUC" or "Commission") April 24, 2025 en banc hearing on interconnection and tariffs for large load customers.

We appreciate the PUC's proactive approach to investigating ways to manage the impending load growth in Pennsylvania. It is in the interest of all parties to develop Interconnection and Tariff structures that enable economic growth, while maintaining the reliability of the grid and fairly allocating costs. Calibrant looks forward to continuing to work with the PUC and other interested parties to achieve these goals.

Sincerely,

Joe Macklin  
Senior Manager, Market Development & Commercialization  
Calibrant Energy

## Comments of Calibrant Energy in the Matter of the En Banc Hearing Concerning Interconnection and Tariffs for Large Load Customers in Pennsylvania

### Responses to Select Questions Posed by Vice Chair Barrow’s May 1, 2025 Statement

For Build-to-Own Data Center Developers:

#### **Q1. What contract structures (e.g., minimum demand charges, exit fees) do you find most acceptable to balance the need for cost predictability with the need to prevent uncompensated stranded assets?**

A1. It is understandable and appropriate that utilities and regulators would seek to implement protective contract structures—minimum demand charges, minimum contract terms, exit fees, collateral requirements—to ensure that ratepayers are not left responsible for paying for massive infrastructure costs associated with large interconnection upgrades in the event large-load requests fail to come to fruition or disconnect from the system early. However, from the data center’s perspective, it is challenging to accept this risk as it is next to impossible to forecast what utilization rates may be within the rapidly evolving landscape of AI. Therefore, data centers will make efforts to find the best terms (costs, commitments, and speed to interconnection) available in the market, which could include seeking out other utility providers with slightly better contractual terms for firm capacity, bringing a 24/7 fuel-based resource to the equation, or circumventing the grid altogether with an off-grid solution.

Calibrant believes, however, that there is an altogether different solution to address this problem: **the PUC (1) should implement policies which defer the largest infrastructure upgrade costs by developing, and potentially mandating, load flexibility options within large load tariffs and contracts, and (2) ensure that this load flexibility is incorporated into utility interconnection and system planning procedures.** This would provide both the large load customer and the utility more time to assess whether they need to make an infrastructure upgrade, while still allowing the large load customer to interconnect in the near term without the risk of passing premature infrastructure upgrade costs to others.

This alternative hybrid solution strikes the most appropriate balance between all parties. The non-firm, flexible capacity enabled by a “Path to Power” solution provides a fast and affordable outcome for all parties, enabling improved utilization of the already-built system and maintaining equivalent levels of reliability. This option requires data centers to operate within existing constraints of the as-built system as identified by the utilities. Flexibility could be accomplished via load flexibility inherent to the operations of the data center, via customer-sited dispatchable resource like a battery energy storage system (BESS) or similar, or via combination of the two.

For the sake of example, let’s imagine a data center submits an interconnection application for 300MW. Under the current interconnection process, a study determines that only 50MW can be provided by 2028 due to transmission constraints. An additional \$100M in upgrades over five years would be required to deliver the remaining 250MW. This outcome is unattractive for the

data center customer, who cannot access their desired power needs until 2033, and it poses a risk for the state, as the economic investment could be lost to another more accommodating location. We propose that, alongside the traditional interconnection study, utilities offer applicants the option to submit a “flexible interconnection” application. This study would assess how adaptable the customer would need to be to receive a non-firm interconnection approval for the full 300MW. For example, this refined study may yield a clause such as: the customer is approved for 300MW of load, contingent on the ability to reduce demand to 50MW during four-hour constraint windows on occasional summer afternoons. The utility in turn can assess whether it can defer or avoid the interconnection upgrade. Actual terms would depend on the specific flexibility characteristics that are needed, but we view this concept as a win-win-win for all parties: data centers get their power, the state gets the economic investment of the new customer, and the utility increases the utilization of their existing grid and doesn’t have to immediately socialize the cost of upgrades.

We endorse an approach like this because even a small amount of load flexibility has the ability to unlock GWs of new load capacity. A [Feb-25 report](#) published by Duke University's Nicholas Institute for Energy, Environment, and Sustainability reveals that the average load factor (the ratio between the actual load and the theoretical max load) for the 22 largest balancing authorities in the United States is 53%. This means that most of the time the system is operating well below its theoretical max capability. It is only in a small subset of hours that the system approaches its maximum capacity, but this small set of hours is what drives system investment. If a new resource was able to take advantage of the existing headroom available most of the time, and provide flexibility during peak times, we could avoid a significant portion of the most expensive system upgrades. The Duke Study found that there was an average headroom between 76 to 215 GW with only small amounts of load curtailment (0.25% - 5% of the year). Assuming a 2024 peak load of the United States at [~750 GW](#), the addition of 100 GW of flexibility-enabled, non-peak-contributing capacity to the grid would amount to a 13% effective load factor improvement. This approach immediately expands available grid capacity without triggering the need for traditional network service or generation capacity investment, shielding other energy users from undue cost burden, and may even reduce per unit rates for the entire system.

**Q2. How flexible are your operations in terms of geographic load-shifting or demand response, and how should that flexibility be reflected via rate discount in tariff design or expedited interconnection processes?**

A2. For more than 15 years, Calibrant has been developing, owning, and operating customer-sited BESS in the U.S. and Canada. We have a large portfolio of over 1,100 MWh of BESS in operation or under development, including with data center customers, and have successfully navigated a wide array of utility interconnection requirements, tariff structures, bilateral utility agreements, and wholesale market mechanisms. Furthermore, we have three times claimed the title of largest customer-sited behind-the-meter (BTM) project in North America. We expect BTM BESS systems to routinely be in the 100MW+ range in the near future, enabling BTM systems to address grid-wide challenges. Our technology and software are entirely compatible

with data center operations and can provide flexibility to this customer class, even if typical loads are expected to be relatively inflexible.

Depending on the regional footprint of a demand response program, our portfolio of BESS assets can be, and have been, deployed in aggregate (as a Virtual Power Plant) to maximize the benefit to the greater system. In place of a more traditional DR program, like Emergency Capacity, Reserves, or Regulation, this BESS VPP could be leveraged as a generation or transmission capacity resource on behalf of a constrained data center facility within the same transmission zone, helping to facilitate an expedited interconnection process. Whether the BESS VPP is optimized against pre-defined dispatch parameters or if it responds to real-time utility-directed dispatches depends on the flexible interconnection arrangement between the utility, data center, and flexibility provider. In either circumstance (Calibrant-optimized or utility-directed), the flexibility offered should be in exchange for an expedited interconnection process rather than a rate discount in tariff design.

**Q3. To what extent are energy storage and other technologies integrated into the design of your facilities to address oversizing of compute beyond existing needs—driving increased design load—and enable participation in demand response programs?**

A3. The majority of Calibrant’s data-center-sited BESS applications comply with non-export configuration and serve the purpose of unlocking capacity 1:1 with existing compute needs – there is minimal oversizing involved in our approach. However, interconnection obligations are not present at all times, leaving room for participation in demand response programs and other revenue generating behaviors on behalf of either the data center or the utility.

Furthermore, oversizing a system that could export power and provide value in demand response programs or flexible capacity on behalf of other near- or remote-sited data center facilities is an option not currently available to BTM BESS due to interconnection and net metering design in Pennsylvania but is well worth exploring.

**Q4. To what extent do you intend to collaborate with grid operators on the timing of discretionary high-load tasks like model training in order to avoid increasing coincident peaks?**

A4. We intend to use the flexible power capacity provided by a BTM BESS to collaborate with grid operators to ensure that data center demand as measured at their utility meter does not contribute to demand during coincident peaks. Instead of adjusting data center operations to meet the needs of grid operator, an approach that is logistically challenging for data centers, we intend to use a BESS to reduce their load per utility direction. This will increase certainty that coincident peaks won’t be increased by data centers, while not disrupting their normal operations.

Calibrant’s battery systems are typically connected behind-the-meter, on the customer side of the meter, and as such, it is critical that our systems operate in a configuration that fully complies with the terms of both the customer’s Energy Service Agreement (“ESA”) with the utility and the BESS Interconnection Agreement. This includes both charge and discharge behaviors.

Traditional interconnection agreements indicate a maximum capacity that can ever be drawn into the facility, which establishes an upper BESS charging limit during all times of the year, net of the customer's real-time load. Calibrant has several non-standard interconnection agreements that offer flexible operating envelopes in which charging windows are confined to a smaller subset of hours each day but in exchange for unobstructed charging allowances. This structure closely mirrors our recommended approach for non-firm data center interconnection agreements.

From a discharge perspective, our BESS systems are typically not eligible for net metering, so they must comply with non-export configuration, which also requires a precise forecasting of the customer's real-time load so not to ever dispatch a greater amount of power than is being consumed on-site. However, as demonstrated in the answer to Q3, there could be significant value in oversizing a system if interconnection and net metering design appropriately quantified the benefit.

At the simplest level, Calibrant's proprietary operating software, DER.OS, determines the optimal times for a BESS to charge or discharge, based on the specifics of a customer's tariff, actual and forecasted site electrical load (net of any other on-site generation resources), grid market programs the site is registered in, and specific site-level constraints, such as power import and export limits. For a highly volatile data center facility, such as an AI application, it is especially important for the BESS to be in lockstep with the fluctuations in load so not to trip any physical or financial obligations of the flexible capacity arrangement, which would likely include performance obligations during coincident peak intervals.

## Conclusion

Calibrant appreciates the PA PUC's consideration of these comments and stands ready to continue to engage in the stakeholder process. While we appreciate and recognize the scale of the effort that interconnection and tariff reforms represent, we believe that the eventual actions resulting from this Docket have the potential to help the state accommodate the load growth associated with data center investments in a manner that is beneficial to all stakeholders.

## About Calibrant Energy:

Calibrant Energy is a distributed energy company dedicated to providing "energy-as-a-service" solutions to commercial, industrial, and institutional customers in North America. Our solutions include the origination, development, ownership, and operation of an array of distributed energy technologies, including battery storage ("BESS"), solar photovoltaics ("PV"), microgrids, and electric transport infrastructure. Calibrant is owned by Macquarie Asset Management, the world's largest infrastructure asset manager, through the Macquarie Green Energy Transition Solutions (MGETS) fund. With the strategic acquisition of Enel DES in October 2024, Calibrant has significantly expanded its development pipeline and portfolio of operating assets, bolstering the company's ability to deliver cutting-edge clean energy solutions for the market, particularly as it relates to customer-sited battery storage.

- **Extensive Experience:** With over 15 years of experience operating behind-the-meter ("BTM") storage assets, we have honed our expertise and built a robust portfolio of

successful projects across investor-owned utilities in ISO-NE, NYISO, CAISO, and IESO. Our installed base has grown to more than 330 MWh of BESS projects in operation or construction, including some of the largest behind-the-meter BESS projects in North America. Beyond our operating portfolio, Calibrant has over 800 MWh of distributed projects in late-stage development, including large BTM opportunities in Pennsylvania, as well as over 2 GWh of optimization service contracts.

- **Proven Expertise in Innovative C&I Storage:** Calibrant is consistently at the forefront of developing innovative, large-scale, customer-sited energy storage projects that set industry benchmarks. This includes the construction of the first BESS system in New York City in 2011, the toughest permitting jurisdiction in the country. In Ontario, Calibrant has three times claimed the title of largest customer-sited BTM project in North America with two 10MW / 20MWh systems that connect above 34kV as well as a 20MW / 40MWh system which connects at transmission-voltage that was commissioned in 2022. This trend of steadily increasing project sizes has continued into Calibrant’s development of the Pennsylvania market as well as across the rest of PJM.
- **Market-Leading Optimization Software:** Our DER.OS optimization software has been refined over time to meet the specific needs of various markets, ensuring an extensive tariff library, advanced machine learning forecasting, and market-leading co-optimization capabilities. Each of our projects layer complex value stacks that would be applicable to any large load management dispatches that will be necessary for successful compliance with any future flexible interconnection structure, and while would be applicable for any on-bill and market revenue streams already available in Pennsylvania and PJM. Our unparalleled record of accomplishment of delivering these large, complex, and “first-of-their-kind” customer-sited projects uniquely and directly positions us to both contribute to the ideation and development of effective large load tariffs in Pennsylvania.