UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Large Loads Co-Located at Generating Facilities	**Docket No. EL25-49-000 et al.**

AFFIDAVIT OF ANDREW LEVITT AND ANIRUDDH MOHAN

ON BEHALF OF
EOLIAN, L.P.

March 25, 2026

I. QUALIFICATIONS

Our names are Andrew Levitt and Aniruddh Mohan. Mr. Levitt is a Senior Consultant and Dr. Mohan is an Energy Associate at The Brattle Group (Brattle).

Mr. Levitt is an expert on wholesale market design and reliability implications of changes in the power system. He has consulted to Independent System Operators and Regional Transmission Organizations (ISO/RTOs) such as the Midcontinent Independent System Operator (MISO), the New York Independent System Operator (NYISO), the Alberta Electric System Operator (AESO), and the Independent Electricity System Operator (IESO) of Ontario, and helped other clients navigate ISO/RTO changes nationwide. Prior to joining Brattle in 2022, Mr. Levitt was on staff at PJM for seven years (most recently as Lead Market Designer), where he developed reforms to reliably integrate new resource types. Mr. Levitt holds an MMP from the University of Delaware and a BSc in physics from the University of Toronto.

Dr. Mohan specializes in the evaluation of energy technologies at a systems level, with expertise in electricity markets, techno-economic analysis, and energy policy. He has expertise in optimization models that support both resource and transmission planning and has published peer-reviewed research in leading academic journals on energy systems. He holds a PhD in Engineering & Public Policy from Carnegie Mellon University.

We have worked extensively on the benefits of co-located ("hybrid") loads and generation and how that option should be facilitated to reduce costs, achieve faster connection of new loads and generation, and ensure reliability. This includes co-authored affidavits and reports in prior filings before the Federal Energy Regulatory Commission ("FERC" or "Commission") on co-location including an affidavit on behalf of Eolian in FERC Docket No. RM26-4-000 on *Interconnection of Large Loads to the Interstate Transmission System* and a report on behalf of Bloom Energy in this Docket EL25-49-000 on *Accelerating the Integration of New Co-located Generation and Loads*.[1]

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[1] Affidavit of Andrew Levitt, Aniruddh Mohan, Ryan Quint, and Sirisha Tanneeru on Behalf of Eolian Energy, Inc., before the Federal Energy Regulatory Commission in the matter of Interconnection of Large Loads to the Interstate Transmission System, Docket No. RM26-4-000, November 21, 2025; A. Levitt, J. Pfeifenberger, and A. Mohan, *Accelerating the Integration of New Co-located Generation and Loads*, prepared for Bloom Energy as part of Docket No. EL25-49-000, April 23, 2025.

II. ASSIGNMENT

We were asked by Eolian, L.P. to assess the efficiency and reliability effects of PJM's compliance filing in Dockets EL25-49-000 et al. on new transmission services for loads co-locating with generation resources, and to identify potential enhancements. We assessed: the proposed eligibility for Non-Firm Contract Demand Transmission Service ("Non-Firm CDS" or "NFCDS"); operational requirements for NFCDS and Interim Network Integration Transmission Service ("Interim NITS"); PJM interconnection study procedures for co-located load and supply resources; and PJM's proposed timeline for implementation of the proposed reforms.

III. BACKGROUND

In February 2025, the Federal Energy Regulatory Commission (FERC) initiated a show cause proceeding into whether sections of PJM's tariff on co-location of generation with loads are just, reasonable, and not unduly discriminatory or preferential. FERC's subsequent Order in Docket EL25-49-000 on December 18, 2025 found that PJM's Tariff did not address with sufficient clarity and consistency the rates, terms, and conditions applicable to generators serving co-located load and to eligible customers taking transmission service on behalf of such load.[2] FERC therefore directed PJM to revise its Tariff, required PJM to establish three new transmission service options for co-located load arrangements, and set the matter for further paper-hearing proceedings on the appropriate rates, terms, and conditions.

PJM's filings are its response to those directives. In its compliance filing, PJM proposes revisions to its Open Access Transmission Tariff addressing, among other things, behind-the-meter generation, necessary study procedures, and the framework for new transmission services applicable to co-located load. In its accompanying Initial Brief, which is the subject of this affidavit, PJM sets out illustrative tariff language and supporting positions for three new service categories: Interim NITS, Firm CDS, and Non-Firm CDS. PJM also submitted supporting affidavits addressing planning, operations, market design, and implementation timing. We submit this affidavit in response to this Initial Brief and its accompanying affidavits, and the issues they place before the Commission.

[2] *PJM Interconnection, LLC*, 193 FERC ¶ 61,217 (2025) (Co-Location Order).

IV. SUMMARY

We appreciate the steps PJM has taken in its Initial Brief and compliance filing to create new transmission services for co-located loads that can reduce their withdrawals from the grid when needed. PJM has undertaken considerable work to outline a number of pathways that we believe will help facilitate faster entry of new large loads, new generation resources, and more flexible contractual arrangements. These reforms are well positioned to be fully realized, and the benefits fully unlocked, with relatively minor enhancements.

In this affidavit, we assess the proposal PJM has made in its Initial Brief in Docket EL25-49-000 and identify enhancements that will enable it to achieve the full scope and ambition indicated in the Co-Location Order. To summarize, we identify these enhancements as:

Provide NFCDS when needed and available (i.e., not limited only to periods when the co-located generator is on outage), improving efficiency and speed to power;

For loads that take Interim NITS, obligate curtailment to the level of net zero withdrawals from the transmission system to avoid additional unnecessary curtailment of load supplied by local generation (with narrow exceptions discussed below) while ensuring no or minimal impact on the transmission system;

Use penalties that are proportional to the system impact and commensurate with similar penalties faced by generators today; apply penalties that distinguish between failing to curtail during resource adequacy events versus transmission security events;

Provide more detail on the interconnection studies required for co-located load and supply resources, including how each component will be modeled in the studies of the other component(s); study non-firm load as dispatchable in order to achieve maximum speed to power benefits; and clarify treatment of the co-location of load with storage resources, including allowing co-located load and energy storage resources to nominate joint withdrawal limits in order to enable flexible and technology-neutral co-location arrangements;

Accelerate the target implementation of significant portions of the new transmission services to enable energization of new large loads; and

Deploy remedial action schemes (RAS) more extensively to increase the utilization of the existing transmission grid.

Taken together, we believe these modifications to PJM's proposal will significantly expand the commercial opportunities for co-located load and generation resources in PJM, consistent with the outlined priorities of the US Department of Energy and FERC to accelerate energization of new large loads, while improving and expanding the efficiency benefits of the PJM energy market, making it more attractive for new loads to bring new generation, and reducing the transmission upgrades and interconnection timelines necessary to integrate new loads.

We note that the scope of our affidavit is restricted to the items described above. We do not address the proposed prices for the new non-firm transmission services, while acknowledging that such pricing should be consistent with other non-firm transmission services already provided by PJM to ensure that customers pay for a fair share of the transmission system they are using.

V. Assessment of the PJM Proposal and Potential Enhancements

V.A. Making Non-Firm CDS Available as Needed Improves Efficiency and Speed to Power

V.A.1. The benefit of Non-Firm Contract Demand Service is unnecessarily limited as it only contemplates load withdrawals when co-located generation is on outage

PJM has proposed to limit the availability of Non-Firm CDS to "the event the Co-Located Generating Facility is on outage and unable to provide any of the dedicated level of energy."[3]

[3] PJM Illustrative Tariff § 709.2(b).

PJM's implementation therefore seems to envisage a load that is 100% self-supplied by its co-located generation unit for almost the entire year, except for periods of generator outages.[4]

PJM's proposed implementation is unreasonable and inefficient as it is far narrower than necessary. If implemented as proposed, it would introduce potentially significant economic inefficiencies by precluding the load from accessing the PJM energy market when doing so would be lower cost than dispatching the co-located generation, assuming of course that such withdrawals would be limited to when the transmission network could reliably deliver that energy. For example, consider the case of a load taking NFCDS that is co-located with a natural gas peaker plant. Under PJM's proposed implementation, the load would have to rely on its peaker plant for all the hours of the year in which the plant is physically available (i.e., not on outage). This would be necessary (and reasonable) only if the transmission network were unable to deliver market energy for the entire year. As proposed, loads would not be able to request non-firm CDS and PJM would not even check for the availability of non-firm transmission unless the co-located generator is on outage. Assuming non-firm transmission capability would indeed be available in many hours of the year, PJM's proposal would result in unnecessarily high costs (and unnecessarily high fuel consumption and emissions) for supplying the load compared to allowing access to PJM's market resources whenever non-firm transmission is available. This is because a co-located peaking unit would only be cost competitive during a portion of all hours when the unit is available (i.e., not on outage).

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[4] We note that even if PJM's proposed restriction of NFCDS to periods where co-located Generation is on outage were necessary and beneficial, which it is not, PJM has not provided sufficient clarity on how outages are defined and whether this covers both planned and unexpected outages or both. Given the need for reserving NFCDS ahead of time, it is likely in practice that this would only be used for planned outages or extended forced outages. By definition, unexpected outages cannot be anticipated and fully reserved for in advance

PJM's implementation also does not specify how multiple units are to be treated for outages. For example, in the Illustrative Tariff § 709.2(b) it says NFCDS would be allowed in *"the event the Co-Located Generating Facility is on outage and unable to provide any of the dedicated level of energy."* Take the case of a 500 MW load co-located with 2 × 250 MW generators that takes NFCDS. The use of the word "any" suggests that PJM would not allow the 500 MW load to take NFCDS unless all 500 MW of the generation, i.e. both units, were fully on outage. Load must request reservation of 500 MW or nothing. However, in its Initial Brief, p. 32, PJM says *"The Eligible Customer may then, on any given day, reserve Non-Firm Contract Demand Transmission Service up to the amount specified in the Service Agreement (but only up to the MW level that the Co-Located Generating Facility is on outage)."* The phrase "only up to the MW level" would suggest that in the example, load may take NFCDS up to 250 MW if one of its generation units were offline. This is clearly inconsistent. In Attachment B (Affidavit of Dr. Sami Abdulsalam), p.6 it also says that *"An Eligible Customer would only need to take non-firm transmission service under limited circumstances—e.g., if the co-located generator is unavailable or operating at a reduced capacity."* The phrase "reduced capacity" contradicts the use of the word "any" in PJM's Illustrative Tariff provision.

As a second example, consider a co-located battery storage facility. Battery storage provides particular value for co-locating with artificial intelligence data centers, given the batteries' ability to ramp instantaneously to match rapid changes in computing load. PJM's proposal to only allow loads to reserve NFCDS during outages appears to be incompatible with co-located storage use cases, since storage is physically incapable of producing power at all times. Given that storage is capable of working in concert with load curtailment to accelerate grid connection of a co-located facility via non-firm transmission service, PJM's proposal would unnecessarily shut out this use case.[5] This precludes taking advantage of the benefits of battery storage for addressing the infrastructure challenge that is the subject of FERC and PJM's policy effort in this docket. Those benefits include the fast-ramping loads mentioned above, as well as rapid deployment, a robust supply chain, lower permitting requirements, and lower emissions.

In addition, generation facilities typically feature multiple units for economies of scale, local redundancy, or other purposes. PJM would benefit if new co-located facilities are designed with redundancy offered by multiple units, which in some cases could be dozens or more units at a single site able to offer extremely high availability and commensurate reliability benefits.[6] In such cases, physical generation outages would not typically cover all generation at the site, thus potentially precluding utilization of NFCDS entirely, despite the efficiency benefits that broad availability of Non-Firm CDS would offer. As long as non-firm capacity is available on the PJM grid, customers should be able to reserve the service.

PJM's proposed implementation would create economic and technical barriers to loads that wish to take NFCDS to contract with any resources other than low-energy-cost baseload resources. PJM's proposed implementation of NFCDS would thus not be technology neutral, and PJM offers no explanation for why such a restrictive operational envelope for Non-Firm CDS is necessary. Finally, by creating conditions in which co-location is limited to baseload resources (that may require many years to develop), PJM's proposal would create the unintended outcome of providing a strong incentive to existing baseload resources (such as nuclear plants and gas-

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[5] Affidavit of Andrew Levitt, Aniruddh Mohan, Ryan Quint, and Sirisha Tanneeru on Behalf of Eolian Energy, Inc., before the Federal Energy Regulatory Commission in the matter of Interconnection of Large Loads to the Interstate Transmission System, Docket No. RM26-4-000, November 21, 2025.

[6] A. Levitt, J. Pfeifenberger, and A. Mohan, *Accelerating the Integration of New Co-located Generation and Loads*, prepared for Bloom Energy as part of Docket No. EL25-49-000, April 23, 2025.

fired combined cycles) to exit the PJM market so they can enter into co-location arrangements with loads taking NFCDS. These are also the resources with the highest capacity market accreditation, whose exit would have the highest adverse impact on the PJM capacity market. Creating such incentives is undesirable at a time in which the PJM capacity market is falling short of its reliability requirement and capacity prices are at the cap.

V.A.2. PJM can leverage the same tools for Interim NITS and for Non-Firm CDS to ensure reliability

Consistent with FERC's Order, PJM has structured NFCDS such that it has the authority and capability to evaluate and deny requested reservations based on expected operational considerations ahead of time.[7] Further, in real time operations, even after granting reservation of NFCDS, PJM has the ability to curtail withdrawals consistent with the nature of non-firm service. We find merit with PJM's proposed structure for reservations and operational evaluations. Given that PJM proposes to evaluate operations when it receives a reservation request, it stands to reason that PJM could also evaluate conditions for NFCDS requests when the co-located generation is not on outage. PJM has not provided a justification for why the NFCDS reservation process should be limited to when the co-located generator is on outage.

Further, PJM has already proposed to offer interruptible non-firm access to withdrawals at all hours to load taking Interim NITS, even without the need to request reservation. PJM should therefore be able to offer non-firm, as-available service to Non-Firm CDS customers whenever the request can be served reliably (understanding that the service can be curtailed in real time). We conclude that NFCDS should be offered upon request whenever non-firm transmission capability is available. Since PJM can deny a service request based on PJM's operational evaluation and curtail the service in real time if needed, doing so would be at least as reliable and

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[7] For example, PJM in its Initial Brief, pp. 32–33 notes that "*requests for Non-Firm service shall only be granted when PJM has determined there is available transmission capacity.*" PJM also notes that studies for NFCDS "*relate only to the maximum amount of Non-Firm Contract Demand Transmission Service that would be allowed under a specific Service Agreement. PJM expects to perform different evaluations to actually use such service on the Transmission System on any given day.*" Further, in PJM Initial Brief, Attachment B (Affidavit of Dr. Sami Abdulsalam, p. 6) Dr. Abdulsalam notes that "*The order also requires Non-Firm Contract Demand Transmission Service to be requested ahead of time and on a relatively short duration basis (one hour to one month). This forward request for service implies foreseeable conditions where the Co-Located Load is expected to withdraw power from the PJM network.*"

practical to operationalize as Interim NITS.[8] Limiting Non-Firm CDS to periods during which the co-located generator is on outage would be unnecessary, unreasonable, inefficient, and create a significant or unworkable barrier for co-locating loads with many types of the generation resources, including batteries and gas-fired peaking units.

V.A.3. PJM's implementation would be more efficient and accelerate speed to power if NFCDS were broadly available when requested

Expanding availability of Non-Firm CDS reservations to whenever it is requested and non-firm grid capacity is available removes barriers to use of the NFCDS construct for generators that are not baseload. This would significantly improve the economic efficiency offered by the service and accelerate speed to power. Allowing customers with NFCDS to apply for reservations for non-firm service in all hours of the year at their nominated levels would maximize economic efficiency and allow loads to co-locate with a wide variety of technologies depending on their needs and technology availability. In this expanded implementation, PJM would still have the ability to deny reservations for non-firm service if expected grid conditions do not permit reliably serving the load on a non-firm basis. And, if unforeseen conditions occur in real time, a curtailment order could be issued, and the load would follow instructions to curtail its net withdrawals from the grid to the level ordered by PJM.

Expanding NFCDS would enable large loads to make commercial investments with this service, avoiding major transmission upgrades (and reducing the associated cost) and achieving the speed

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8 PJM Initial Brief, Attachment B (Affidavit of Dr. Sami Abdulsalam) distinguishes between the reliability implications of Interim NITS and NFCDS by noting that Interim NITS is temporary (see p. 4). However, PJM has not provided any time frame to limit the expected period of Interim service. Transmission upgrades required to enable full NITS for load may take many years to be completed. Further, the transmission system is changing continuously due to new generation, load, and transmission upgrades, making it unclear why temporary Interim NITS is reliable for its entire duration while NFCDS, which allows for continuous operational evaluations, is not.

Further, the Affidavit, p. 5 also acknowledges that operational screening by PJM for NFCDS will reduce the number of protection schemes necessary: "*For Non-Firm Contract Demand Transmission Service, PJM will be offering and managing these pre-scheduled services "operationally" and ensure that permanent monitoring and aggressive, fast-acting protections are in place if conditions arise that may compromise reliable system operations. This approach allows for more reliable system operation, reduces the number of permanent protection systems on the system, thereby reducing the likelihood of unintended protection system misoperation that could lead to cascading events.*"

to power priorities of FERC and the US administration. It would also increase the attractiveness of co-located arrangements under which large new loads voluntarily bring their own new generation, reducing PJM's reliance on other efforts (i.e., the Reliability Backstop Auction) to assure generation adequacy through administrative mandates or cost allocations. Finally, by incentivizing transmission customers to develop load curtailment as a backstop to generator availability, it increases the operational reliability tools available to PJM.

While the immediate benefits of speed to power and avoided transmission upgrades for Non-Firm CDS match those benefits for Interim NITS, Non-Firm CDS has the added benefit of: (1) being a permanent service (as opposed to Interim NITS); (2) indicating to PJM exactly how much load the customer is willing to curtail as a backstop for its co-located generator, and (3) explicitly indicating to PJM and the transmission owner that the customer intends to primarily rely on its own generator for a specified portion of its firm supply, setting a clear benchmark for PJM to plan towards.

V.B. PJM's Proposal to Curtail Interim NITS Loads to Zero Gross Consumption Results in Unnecessary Curtailment

V.B.1. PJM's proposal to fully curtail all load of Interim NITS customers results in unnecessary curtailment and renders Interim NITS commercially unworkable for many applications

PJM has stated in its stakeholder meetings that load customers taking Interim NITS service (which is appropriately interruptible and non-firm until the customer transitions to firm NITS) would be required to curtail their entire load to zero MW when ordered to do so by PJM.[9] During system conditions demanding curtailment, PJM would not allow load to net its consumption against its co-located generation resource. Instead, PJM would curtail the entire load even when its co-located generator is producing. Curtailing customer load to levels beyond what is needed

[9] While not explicit in its tariff filing, PJM in stakeholder materials has said that load would not be allowed to net its load with its co-located generation resource during system conditions that require curtailment. "*If curtailed, EC cannot take energy from co-located generator (no netting under system conditions that required curtailment).*"

to achieve zero withdrawals from the grid (i.e., to less than the generation output of the co-located generation) is unreasonable and inefficient in most use cases.

PJM does not explain why the load would need to curtail beyond the level at which zero MW are withdrawn from the transmission system to the co-located facility (i.e., when some or all of the load is consuming but is physically taking power entirely from the co-located generation). In other words, PJM does not explain why the load could not take power from its co-located generator without physically flowing power over the transmission network.

Since PJM proposes that co-located loads taking Interim NITS curtail not only when needed for transmission security, but also for resource adequacy reasons (prior to deployment of Pre-Emergency Demand Response), PJM's proposal denies the load the benefit of any resource adequacy value from its co-located generation.[10] This would result in unnecessary curtailments and render the Interim NITS proposal commercially unworkable for loads that develop their own new generation, since the purpose of the co-location arrangement is to increase the firmness of power availability to the load by way of the co-located generator.

For example, consider a 300 MW generator with full injection rights and a 300 MW load with interim NITS, with the generator running at maximum output. If system conditions require curtailment from the grid, PJM proposes to curtail the load to 0 MW while the 300 MW generation resource would still be injecting into the grid. This would mean the co-located facility would now be injecting 300 MW into the grid, instead of simply obligating co-located generation and load to limit their net withdrawals to 0 MW. Doing so would be reasonable only if the co-location involves (1) existing generators with PJM capacity market obligations prior to taking advantage of the co-location opportunity and (2) the generator had no intention to retire the facility absent the co-location opportunity. In any other cases, such as when new load is co-located with owned or contracted new generation, curtailments should be limited to zero net withdrawals from the grid.

10 We refer to the proposed provision to curtail prior to pre-emergency Demand Response as a resource-adequacy related curtailment.

Consider another case in which a 300 MW generator has minimal net injection rights (i.e., it is limited in its interconnection agreement to almost exclusively provide power for the co-located load, consistent with the Co-Location Order, with only e.g. 20 MW of allowed injections) and is sited with a 300 MW load. With the load at 280 MW and the generation at 300 MW, PJM's proposal would be to curtail the load to 0 MW prior to a Pre-Emergency Demand Response event. This would result in the generator also curtailing such that it injected at its maximum of 20 MW. The result would be to incur great opportunity cost through the curtailment yet yielding no net gain in power balance during the scarcity condition. This is inefficient and unnecessary and may also reduce reliability as the reactive power and stability benefits of the generator would no longer be available due to its curtailment.

V.B.2. PJM can offer Interim NITS without unnecessary curtailments by obligating curtailment to net zero withdrawals and clarifying resource adequacy curtailment obligations

PJM proposes curtailment of load taking Interim NITS not only for transmission security reasons but also for resource adequacy purposes (as evidenced by the requirement of Interim NITS customers to curtail before Demand Response customers are curtailed). Curtailment for transmission security is natural given the interruptible, non-firm nature of the Interim NITS transmission service. However, the extent of obligatory curtailment is greater than necessary, and the application to resource adequacy is insufficiently specified with respect to capacity arrangements for the load and generation, leading to inefficient, unnecessary curtailments of loads. Reliability would be maintained while minimizing unnecessary curtailment and offering a workable Interim NITS construct if PJM limited the curtailment of net grid withdrawals only to (a) the level necessary for transmission security, and (b) the level appropriate to the resource adequacy circumstance the customer is in (as explained below).

Putting aside transmission security considerations related to existing generators (where addition of new load without new generation can adversely impact transmission security for existing customers), it is evident that load co-located with new generation does not generally impact transmission security for existing customers once net withdrawals have been reduced to zero and the customer is no longer taking any power from the transmission system. In some cases, even curtailing to net zero withdrawals is more than necessary, especially when multiple customers taking non-firm transmission service can respond to mitigate the same issue.

The exception to limiting load curtailments to net zero grid withdrawals is for facilities with large generation unit or load module components for which a trip of the large component could cause inadvertent inflows or outflows, which would need to be addressed by reducing the output or consumption of the component.[11] This can be remedied with a relay or simple RAS monitoring flows at the point of connection to the grid. Indeed, PJM recognizes the value of RAS for the Interim NITS case in preventing accidental load withdrawals from the grid.[12] In case no RAS is available and post-contingency flows are insecure, curtailment obligations for Interim NITS customer loads can be made by exception, rather than setting a standing obligation to curtail the entire load to zero even if co-located generation supplies all or some of the load. This would clarify that unnecessary curtailments are not expected.

Curtailments of load to ensure resource adequacy for co-location arrangements with <u>new</u> generators should also be limited to net zero grid withdrawals (putting aside the use case involving <u>existing</u> generator arrangements with capacity market obligations). When the co-located new generator is not selling capacity to PJM and, instead, provides capacity to the co-located load customer, it would be unreasonable and unnecessary to curtail load below net zero grid withdrawals from the co-located facilities. In other words, even under Interim NITS, loads co-located with dedicated new generation should not be curtailed for resource adequacy events if there are no net withdrawals from the grid.

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[11] We note that the simplest solution to this issue is to avoid large units/modules in the design of such facilities, which is not uncommon for new large load co-location arrangements.

[12] PJM Initial Brief, Attachment C (Affidavit of Matthew Wharton), at p. 9. *"There is one scenario where a RAS would be overwhelmingly beneficial and would have a minimal impact on the overall grid. A RAS will be required for the loss of the Co-Located Generating Facility. In this instance, PJM would expect the RAS to actuate on the loss of the Co-Located Generating Facility and the load served by Non-Firm Contract Demand Transmission Service or Interim NITS will automatically be removed from the system by the RAS scheme. In other words, after the co-located generator is offline, only the NITS or Firm Contract Demand Transmission Service will remain connected and served by PJM. At that point, PJM could evaluate if additional non-firm load could be supported after the loss of generation occurs."*

Only if the co-located load is not buying capacity from PJM but the co-located generator is selling capacity to PJM (and is therefore not available to serve the co-located load) is it logical and necessary to curtail the load for resource adequacy events (e.g., prior to Demand Response deployment, or otherwise as appropriate).

V.B.3. The benefits of limiting curtailments only to net zero withdrawals under Interim NITS are significant

For all cases in which generation does not have a PJM capacity market obligation, significant benefits would accrue by allowing the co-located generation to provide capacity to Interim NITS load and power that load during resource adequacy and transmission security events. PJM has indicated that the highest level of reliability for loads seeking transmission service is to take NITS, a service which will be provided to all Interim NITS customers once the necessary grid upgrades have been completed. Enabling energization of new loads on an expedited basis through co-location supports national economic competitiveness and national security priorities for artificial intelligence. The Interim NITS framework established by FERC was directed at addressing both the need for reliability (via eventual NITS) as well as energization of load on an accelerated basis while upgrades required to provide full NITS were built out. Allowing the co-located generation to provide resource adequacy benefits to its co-located load while avoiding unnecessary curtailments for transmission security events increases reliability for loads that elect to come online faster under Interim NITS. This speed to market advantage is particularly important if the load served by Interim NITS is co-located with new generation that is able to serve the load with lower (or no) net grid injections. In that case, the generation could be developed more quickly with fewer delays in PJM's generator interconnection process. Enabling that use case would make the Interim NITS framework significantly more attractive for major capital investments and help achieve FERC's and DOE's policy objectives.

V.C. The Proposed Penalty for Failure to Curtail Is Disproportionate to the Impact and Should Distinguish Types of Events

PJM has proposed a strict liability rule for a customer taking NFCDS or Interim NITS that "fails to respond to established Load Shedding and Curtailment procedures."[13] Such a customer would be disqualified from taking the service after a single failure to respond. For customers that have an equipment malfunction, i.e. a protection scheme not operating as intended, PJM proposes a suspension of service for up to 120 days on the first failure, to analyze the operation of the protection scheme.[14] On the second failure, PJM proposes a disqualification of service.[15]

Loads taking Non-Firm CDS or Interim NITS do not have firm transmission service nor benefit from a resource adequacy obligation from PJM. These two attributes (transmission security and resource adequacy) have distinct functions and values, and PJM's curtailment of loads has different implications for resource inadequacy or transmission related events. Penalties for failure to comply with these two types of curtailments are most effectively applied when they are commensurate with the reliability and cost implications of that failure. Importantly, these penalties should be equivalent to the penalties paid by generators that cannot meet their capacity obligations, or that cause transmission reliability impacts due to their failure to comply with PJM dispatch orders.

Generators and demand response resources with a capacity market obligation that fail to perform during a resource adequacy event are assessed as a Non-Performance Charge during every Performance Assessment Interval (PAI) in which they cannot perform as committed. This charge reflects the cost of the failure to perform during resource adequacy events. A similar or equivalent financial penalty would appropriately be applied for load under NFCDS or Interim NITS that fails to curtail for resource adequacy events. In contrast, the penalty proposed by PJM (permanently discontinuing non-firm transmission service and effectively shutting down the customer facility not for hours, but for many months or years) is many thousands of times more

[13] PJM Initial Brief pp. 41–42
[14] PJM Initial Brief, pp. 43–45
[15] PJM Initial Brief, pp. 45–46

costly than the system cost for resource adequacy failures implied by the PAI performance penalties imposed on generators. For example, the PAI penalty for a 1,000 MW failure to curtail for one hour might be roughly $2-3 million based on PJM's formula.[16] PJM's Interim NITS and NFCDS penalty proposal to shut down a load customer until transmission upgrades are completed would have a far higher cost. A 1,000 MW data center might provide a gross revenue of several billion dollars per year, much or most of it profit, in addition to contributing to national priorities for deployment of artificial intelligence.[17] Shutting it down for several years until firm NITS can be provided due to a failure to curtail its grid withdrawals to net zero during a resource adequacy event likely represents a lost opportunity cost on the order of many billion dollars, or three orders of magnitude higher than the equivalent PAI penalty. PJM's proposed penalty is therefore unnecessarily high, not commensurate with the system impact of the failure to curtail during resource adequacy events, and discriminatory relative to the treatment of PJM generators for non-performance during resource adequacy events.

Failure to curtail for a transmission-security-related event could in principle result in severe, potentially catastrophic reliability problems. A more substantial penalty may therefore be appropriate to the scale of the risk. A similar circumstance holds for generators that fail to curtail when transmission system overloads are at risk. Because the consequence of continued withdrawals (or, for generators, injections) can be so high, in the case of both load and generator failures to curtail as instructed, transmission owners often retain the ability to manually disconnect a facility if needed to avoid potential severe reliability risk. It therefore stands to reason that such overriding "forced curtailment" action would be available as a backstop in case of failed load curtailment to limit the extent of actual reliability impact. Therefore, the severe penalty proposed by PJM (discontinuing non-firm transmission service) is unnecessarily high for transmission-related curtailment failure. It is also not commensurate with the penalty levied on

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16 PJM, Manual 18, Section 3A.6.2, Revision 65, effective December 17, 2025 specifies the PAI charge for an interval = Performance Shortfall (MW)×Non-Performance Charge Rate. The Non-Performance Charge Rate is estimated based on Net CONE.

17 CoreWeave, CoreWeave Reports Strong Fourth Quarter and Fiscal Year 2025 Results, February 26, 2026 (stating that the company "*became the fastest cloud in history to reach $5 billion in annual revenue*"); CoreWeave, Annual Report on Form 10-K for the year ended December 31, 2025 (filed February 26, 2026) (stating that, as of December 31, 2025, CoreWeave operated "*43 data centers with over 850 MW of active power*"). Scaling those figures proportionally implies approximately $5.9 billion of annual revenue per 1 GW of active power.

generators that fail to curtail when ordered under similar circumstances (there appears to be no such systematic penalty on generators, although arguably there should be).

V.D. PJM should study co-located resources independently but in the presence of one another and consider load as dispatchable to maximize speed to power benefits

V.D.1. PJM has not provided sufficient detail on study design for co-located resources

PJM has provided limited details in its filing on how studies for transmission service for loads co-located with supply resources will proceed. For example, in its section on Study Procedures for load taking NFCDS, PJM says only that it will coordinate with the Transmission Owners to identify appropriate studies.[18] Similarly, for Interim NITS, PJM says that it will determine whether additional studies beyond what is required to evaluate the Customer's request for NITS are needed.

The design of studies for large load interconnection is the critical factor in determining the scale of upgrades required for energization of new large loads under all scenarios including co-located NITS, Interim NITS, NFCDS, and firm CDS. As explained in detail in a prior filing in the same docket, it is important for study processes to capture both the co-located load and generation (rather than netting them against one another prior to implementing the components in the study model), but the study process for load must account for the presence of the generation resource(s) and vice versa.[19] This ensures that co-located load and generation are *both* present in

[18] On p.33 of its Initial Brief PJM says *"As discussed, PJM will not study transmission service requests alone, but rather will coordinate and consult with any affected Transmission Owners to determine whether and how the requested transmission service may be provided. Thus, upon receipt of a request for Non-Firm Contract Demand Transmission Service, PJM will notify the affected Transmission Owner(s) of such request.108 PJM and the affected Transmission Owner(s) will determine whether additional studies are required 'to assess whether the Transmission System has sufficient available capacity to provide Non-Firm Contract Demand Transmission Service, and if so, which studies are appropriate.'"*

[19] A. Levitt, J. Pfeifenberger, and A. Mohan, *Accelerating the Integration of New Co-located Generation and Loads*, prepared for Bloom Energy as part of Docket No. EL25-49-000, April 23, 2025.

the study model, therefore offering the option to effectively self-supply and impose zero or de minimis impacts on the transmission system.

V.D.2. Studying co-located load and generation in the presence of each other achieves speed to power

For example, take the case of a 500 MW load and a 500 MW co-located generator. If in the study model, the presence of the co-located generator is ignored (e.g., because it does not yet have an Interconnection Service Agreement), the 500 MW load is withdrawing from the system in the steady state case, and the transmission service must be firm enough to support it, including after removing any two components in the N-1-1 study cases. However, if both generation and load are present, the 500 MW generator can support the load, ensuring that net withdrawals from the transmission system are effectively zero in the base case. We recognize that contingency analysis would still require stress testing one component to be tripped offline while the other is online, as is the case with all elements on the transmission system. However, the addition of the new generation still reduces the need for system upgrades identified in the transmission network planning studies, because only so many network facilities are removed from service in contingency planning cases. Further, for cases that utilize a RAS, it would ensure that the co-located load never shows up on the transmission system if the generation unit were to trip offline due to an unexpected outage, therefore further mitigating any impact of contingency events.[20] Such a study model would generally identify significantly lower upgrades relative to studies that do not consider both generation and load in the presence of each other.

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[20] PJM Initial Brief, Attachment C (Affidavit of Matthew Wharton), at p.9. *"There is one scenario where a RAS would be overwhelmingly beneficial and would have a minimal impact on the overall grid. A RAS will be required for the loss of the Co-Located Generating Facility. In this instance, PJM would expect the RAS to actuate on the loss of the Co-Located Generating Facility and the load served by Non-Firm Contract Demand Transmission Service or Interim NITS will automatically be removed from the system by the RAS scheme. In other words, after the co-located generator is offline, only the NITS or Firm Contract Demand Transmission Service will remain connected and served by PJM. At that point, PJM could evaluate if additional non-firm load could be supported after the loss of generation occurs."*

V.D.3. Studying load under NFCDS and Interim NITS as dispatchable will improve system accuracy

While studying and evaluating the load for NFCDS and Interim NITS, PJM's models would need to consider the load to be curtailable in order to reflect its non-firm nature. This is comparable to the way in which generators are modeled as dispatchable. Dispatchable load will be incorporated into real-time operations (for example using security constrained economic dispatch or SCED to curtail when needed for reliability), and modeling details are most accurate when they reflect these operational capabilities. The studies can identify operating limits for NFCDS and Interim NITS and provide customers with guidance on expected curtailment levels. These can be updated on a periodic basis based on changes to the transmission system, consistent with provisional interconnection service to generators. Just as provisional service can provide generators with a view on operating conditions under which it may be allowed to inject into the PJM grid, studies for NFCDS and Interim NITS can provide customers with a view on the conditions in which withdrawals would be permitted.

V.D.4. PJM should clarify that storage charging is studied distinctly from load, and allow co-located load and energy storage resources to nominate joint withdrawal limits

Storage charging in PJM does not take transmission service unless it charges during the zonal peak hour without being dispatched, in which case it is a Network Load taking NITS.[21] Storage charging is therefore not studied as a new NITS customer, but rather using its own distinctive study process that is incorporated into the interconnection queue.[22] Because storage can be co-located generation, it will be helpful and possibly necessary for regulatory certainty for PJM to

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[21] PJM Manual 28, Operating Agreement Accounting, Sections 22.1 and 22.2, Revision 104, effective March 1, 2026, pp. 154-156

[22] PJM, Manual 14B, Attachment C, Section C.3.1.3, Revision 58, effective December 17, 2025, p. 95. ("*For each flowgate, group the Generation Capacity Resources based on whether the distribution factor is positive, in which case increases in the generator's output contribute to the loading on the flowgate and the generator is considered a "Harmer" or negative, in which case increases in the generator's output reduce the loading on the flowgate and the generator is considered a "Helper". Note that the light load test considers pumped storage units in the pumping mode and batteries in both the discharging and charging mode and the appropriate mode to ramp will be based on whether the distribution factor is positive for that mode*.") .

clarify that the treatment for studying storage charging at such a co-located facility is distinct from the studies for the load taking Interim NITS or Contract Demand Service. It will be similarly helpful or necessary to clarify that, even if a co-located facility has 0 MW of Firm CDS and has reserved 0 MW of Non-Firm CDS, a co-located storage component that has been granted an Interconnection Service Agreement recognizing its ability to withdraw from the grid for charging may still do so as dispatched by PJM, consistent with a standalone storage facility. Any RAS at the facility would need to be developed with such use cases in mind, including potentially interrupting storage charging withdrawals prior to a PJM dispatch to reduce storage charging under certain contingencies.

Further, the use case of co-located storage would feature enhanced efficiency and speed to power if PJM allows loads in such arrangements taking NFCDS or Interim NITS to nominate a joint withdrawal limit. This would allow for maximum flexibility and innovation for the pair of resources which can decide how to use their joint withdrawal limits for serving load or charging storage, or both, as appropriate. This joint limit would then be respected in the storage withdrawal studies as well as in the load integration studies and NFCDS reservation evaluations.

V.E. PJM can achieve implementation of all three services faster than proposed

V.E.1. Timeline for implementation of the new tariff services does not need to be fully linked to the capacity market

PJM cites capacity market timing in justifying its proposed implementation date of June 1, 2029. Under two of the three transmission services, PJM appears to contemplate loads that do not buy capacity from the market. This includes Interim NITS and NFCDS. Therefore, they cannot have an impact on the load forecast for use in the capacity market. New generators serving Interim NITS and NFCDS customers may choose to not offer capacity into the market but instead contract for capacity directly with co-located load. In that case, the new load and new generation both would result in no changes to the Base Residual Auction in the capacity market. If the new co-located generation sells capacity to the market, this would presumably be a helpful outcome in today's environment that would be desirable as soon as possible. Therefore, PJM's justifications for delaying implementation until 2029 appear not to apply to co-location cases with new generation.

Impacts on the BRA could occur in the case of existing generators leaving the capacity market to provide dedicated output to co-located loads. But these reconciliations would be necessary whether PJM implemented the proposal sooner or later, making it unclear why PJM proposes to wait until June 1, 2029 to implement the proposal. Any such impacts would need to be and can be reconciled in incremental auctions regardless of the implementation date.

If PJM's concern regarding a capacity market shock that cannot be covered through an incremental auction is focused on <u>existing</u> co-located generation withdrawing from the capacity market, it should delay only that use case, while accelerating other use cases (i.e., co-location with new generation facilities). We observe that accelerating <u>new</u> generation and co-located load options eases concerns with reliability and affordability or at least reduces burden on PJM's other efforts to address those concerns, and should be implemented as quickly as possible.

V.E.2. PJM can build on existing SCED capabilities for Price Responsive Demand to achieve a faster timeline

We are encouraged that PJM expects to modify Intermediate and Real-Time SCED tools for operationalizing the three new transmission services. This important function warrants deliberate and careful design and thorough testing, which will take time. However, PJM can build on the existing capability of its nodal Price Responsive Demand (PRD) implementation in SCED for transmission-driven curtailments when needed for local exigencies such as avoiding post-contingency transmission overloads or cascading failures. Because PRD is nodal, real-time, and uses SCED's real-time capabilities via Contingency Analysis and the other parts of the Energy Management System, it can provide the functionality needed for executing needed reliability curtailments for the non-firm transmission services in order to maintain transmission security as conditions change in real-time. Since PRD has already been developed and tested, and has been deployed in operations for several years, PJM could implement this particularly challenging aspect of the non-firm transmission services in less time. Southwest Power Pool's recent proposal to implement non-firm transmission service for load (CHILLS) by July 1, 2026 offers further evidence that such changes to dispatch can be implemented faster than envisaged by PJM.[23]

V.F. PJM Could Rely on Remedial Action Schemes (RAS) More Extensively

A Remedial Action Scheme (RAS) allows grid operators to ensure reliable system security while utilizing the capability of transmission lines more fully. A RAS monitors for certain failures and responds immediately with a remedial change to ensure the failure does not cause problems. RASs must be carefully designed to avoid introducing unmanaged complexities and are not appropriate in all circumstances.

Mr. Wharton in his affidavit states that

> A RAS should not be installed as a substitute for good system design or operating practices. PJM Manuals reflect this caution of relying on such schemes on a permanent basis. The implementation of a RAS is generally limited to temporary conditions involving the outage of critical equipment.[24]

We were not able to identify a North American Electric Reliability Corporation (NERC) requirement or guideline that RAS be limited to temporary conditions related to outages. We observe that other grid operators utilize RAS as an alternative to new transmission, rather than as a temporary solution. For example, the California Independent System Operator (CAISO) states that:

> The primary reasons why RAS might be selected over building new transmission facilities are that RAS can normally be implemented much more quickly and at a much lower cost than constructing new infrastructure. In addition, RAS can increase the utilization of the existing transmission facilities, make better use of scarce transmission resources and maintain system reliability. Due to these advantages, use of a RAS is a commonly considered alternative to building new infrastructure in an effort to keep costs

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[23] SPP, Filing, Docket No. ER26-1323-000, at 1-2 (filed Feb. 10, 2026).

[24] PJM Initial Brief, Attachment C (Affidavit of Matthew Wharton), p.6.

> down when integrating new generation into the grid and/or addressing reliability concerns under multiple contingency conditions.[25]

CAISO acknowledges the potential complexity of RASs and reliability concerns if not properly managed and therefore has issued a RAS Planning Standard guideline to ensure their reliable utilization.[26] CAISO states that:

> These reliability concerns necessarily dictate that guidelines and standards be established to ensure that performance of all RASs are consistent across the ISO controlled grid. It is the intent of these guidelines and standards to allow the use of RASs to maximize the capability of existing transmission facilities while maintaining system reliability and optimizing operability of the ISO controlled grid. Needless to say, with the large number of generator interconnections that are occurring on the ISO controlled grid, the need for these guidelines and standards has become more critical.[27]

We observe that other grid operators also have extensive standalone RAS planning guides, but PJM does not.[28] If PJM utilized RAS more extensively, putting into place the necessary protocols to ensure reliable development and operations, it could more effectively accomplish speed to power for large loads in appropriate areas while lowering the cost of new transmission.

More extensive use of RAS would require administrative and engineering effort by PJM to ensure RAS are properly designed and only deployed where appropriate. Mr. Wharton states that, given that PJM has areas in which it is a tightly coupled network, "…having multiple RASs within a single area increases the likelihood of a misoperation."[29] Avoiding multiple RASs in a single area does not preclude use of RAS as a permanent solution across appropriate parts of the

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[25] California ISO, *California ISO Planning Standards*, effective February 2, 2023.

[26] California ISO cites the following potential reliability considerations associated with RAS: "*With the increased transmission system utilization that comes with application of RAS, there can be increased exposure to not meeting system performance criteria if the RAS fails or inadvertently operates. Transmission outages can become more difficult to schedule due to increased flows across a larger portion of the year; and/or the system can become more difficult to operate because of the independent nature of the RAS. If there are a large number of RAS, it may become difficult to assess the interdependency of these various schemes on system reliability. In addition, as RAS has become progressively increasing in complexity, it is necessary to consider the level of logic complexity through combining multiple features that were acceptable individually but that could compound to a level that cannot be integrated into market operation*." California ISO, *California ISO Planning Standards*, effective February 2, 2023, p. 11.

[27] California ISO, *California ISO Planning Standards*, effective February 2, 2023, p. 11.

[28] AEMO, Remedial Action Scheme Guidelines; Western Electricity Coordinating Council (WECC) Relay Work Group, Remedial Action Scheme Review Subcommittee, Remedial Action Scheme Design Guide, July 2022.

[29] PJM Initial Brief, Attachment C (Affidavit of Matthew Wharton), p.7.

PJM footprint (much of which is less dense than the Northern Virginia example that Mr. Wharton cites). PJM could implement this principle in a RAS guideline, similar to CAISO's guideline that "[o]verlapping RAS (i.e., two different RAS monitoring one or more of the same elements or contingencies) is not allowed."[30] Further, a given RAS can only monitor a limited number of conditions (e.g., contingencies on specified elements). As Mr. Wharton points out, "Since the PJM network is tightly coupled with multiple transmission lines, the RAS or multiple RASs will need to monitor and activate for a multitude of conditions. Typically, a RAS monitors one specific condition and is armed to respond to one condition." PJM could implement such a limit in a RAS standard, similar to CAISO's provision that "There should be no more than 6 contingencies (P1–P7) that would trigger the operation of a RAS" and "The RAS should not be monitoring more than 4 system elements or variables."[31] (We note that CAISO appears to allow broader monitoring than Mr. Wharton suggests is typical in PJM).

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[30] California ISO, *California ISO Planning Standards*, effective February 2, 2023, p. 13.

[31] California ISO, *California ISO Planning Standards*, effective February 2, 2023, p. 12.

Affidavit of Andrew Levitt

I, Andrew Levitt, do hereby swear that I have co-authored the Affidavit of Andrew Levitt and Aniruddh Mohan and the statements contained therein are true and accurate to the best of my knowledge and belief.

Andrew Levitt Date: March 25, 2026

Affidavit of Aniruddh Mohan

I, Aniruddh Mohan, do hereby swear that I have co-authored the Affidavit of Andrew Levitt and Aniruddh Mohan and the statements contained therein are true and accurate to the best of my knowledge and belief.

Aniruddh Mohan Date: March 25, 2026