

*Via E-mail*

September 14, 2021

PJM Board of Managers, c/o Mr. Mark Takahashi, Chairman  
Mr. Manu Asthana, President and CEO  
2750 Monroe Boulevard  
Audubon, PA 19403

RE: Valuation of Thermal Resources and Phase II Capacity Market Reforms

Dear Mr. Takahashi, Mr. Asthana and Board of Managers,

Our undersigned organizations and companies urge PJM to take up a review of thermal generation capacity valuation as the first order of business in Phase II of its capacity market reform initiative. Thermal valuation is an input to most other PJM models and therefore even more important to prioritize now as other reforms are also under consideration.

This letter underscores our serious concern that since the metrics for thermal resources were developed in the 1970s and earlier, the grid has changed significantly. Experience in PJM, Texas and other regions has shown that the most costly outages are indeed not independent from one another. However, PJM currently plans its system primarily on the assumption that thermal generation outages are independent of one another.

Now is the time to focus on proper valuation of thermal resources. Academic research has questioned PJM's current model and found that thermal outage rates are actually 50-300% greater at peak times than the annual averages used today.<sup>1</sup> Analysis confirms that the PJM region experiences simultaneous generator outages that are 2.5 times larger than would be expected if thermal generator outages were truly random, uncorrelated events, as the current thermal valuation method assumes.<sup>2</sup> Moreover, this study found PJM and other regions "show clear evidence of violating the independent failures assumption, even when Hurricane Sandy and January 2014 are removed,"<sup>3</sup> indicating that the capacity market reforms that PJM implemented after the Polar Vortex have not eliminated the risk of correlated outages.

This compelling evidence indicates that thermal resources may not be providing the reliability that PJM's current models assume, and PJM may not have the reliability it believes it has now.

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<sup>1</sup> Murphy, et al., "A Time-Dependent Model of Generator Failures and Recoveries Captures Correlated Events and Quantifies Temperature Dependencies", *Applied Energy* (2019) at 113513. Available: <https://www.sciencedirect.com/science/article/pii/S0306261919311870>

<sup>2</sup>Murphy, et al, "Resource Adequacy Risks to the Bulk Power System in North America", *Applied Energy* (2018), at 1366. Available: <https://www.sciencedirect.com/science/article/pii/S0306261917318202>

<sup>3</sup> *Ibid.*, at 1365

PJM's increasing reliance on just in time fuel from natural gas pipelines and experience with weather-related outages suggests closer examination of this issue is warranted.

On one hand, PJM stakeholders have spent the better part of two years developing metrics (the Effective Load Carrying Capability, or "ELCC", methodology) to modernize the valuation of solar, wind, storage, hydropower, and other resources. While growing rapidly in response to consumer demands and state policy imperatives, these resources together constitute less than 7%<sup>4</sup> of PJM's installed capacity. On the other hand, the metrics that determine the capacity valuation of thermal resources (based on estimated forced outages, or "EFORD"), which make up the remaining 93% of PJM's installed capacity, have not been evaluated in decades.

Indeed, all generation resources must be treated on a level playing field. Using ELCC tools to determine how correlated output profiles for solar, wind, storage, or hydropower resources reduce their capacity value, while correlations in the output of thermal generators due to common mode failures across the fleet are ignored, results in a tremendous bias in capacity accreditation in favor of thermal generators and causes PJM to miss the reliability risk posed by thermal plant correlated outages.

PJM has the tools now to update its valuation of thermal resources. PJM's ELCC tools could be readily applied to thermal generators using historical data and models showing patterns of correlated outages and their correlation with extreme temperatures, which would more appropriately determine thermal generators' accredited capacity value.

Ultimately, it is critical to take up an immediate review of thermal capacity valuation because this topic is pivotal to determine how much capacity PJM procures to meet evolving system needs, and at what cost. PJM capacity market revenues may influence market entry and the retirement of inefficient resources, and must be done correctly to ensure PJM's system continues to be a leader globally. More importantly, failing to account for thermal generators' correlated outages puts electric reliability for PJM's 65 million customers at risk.

Finally, our undersigned organizations and companies appreciate the tremendous efforts by PJM's team to maintain a robust stakeholder process during the COVID-19 pandemic. Thank you for your dedication to ensure reliability and just and reasonable rates.

Sincerely,

<p>Sean Baur Director, Power Markets &amp; Transmission GlidePath Power Operations LLC 132 N York Street, Suite 3L Elmhurst, IL 60126 <a href="mailto:sbaur@glidepath.net">sbaur@glidepath.net</a></p>	<p>Jason Burwen Interim Chief Executive Officer U.S. Energy Storage Association <a href="mailto:j.burwen@energystorage.org">j.burwen@energystorage.org</a></p>
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<sup>4</sup> Monitoring Analytics, LLC, *State of the Market Report 2020* (2021) at Table 5-3. Available:  
[https://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2020/2020-som-pjm-sec5.pdf](https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2020/2020-som-pjm-sec5.pdf)

<p>Liz Delaney          Senior Director, Wholesale Market Development          Borrego          55 Technology Drive, Suite 102          Lowell, MA 01851  <a href="mailto:edelaney@borregosolar.com">edelaney@borregosolar.com</a></p>	<p>Jeff Dennis          General Counsel and Managing Director          Advanced Energy Economy          1010 Vermont Avenue NW, Suite 1050          Washington, DC 20005  <a href="mailto:jdennis@aee.net">jdennis@aee.net</a></p>
<p>Alyssa Edwards          VP Environmental Affairs and Government Relations          Lightsource bp  <a href="mailto:alyssa.edwards@lightsourcebp.com">alyssa.edwards@lightsourcebp.com</a></p>	<p>Juergen Fehr          Managing Director          Geenex Solar LLC          1930 Abbott Street          Suite 402          Charlotte, NC 28203  <a href="mailto:juergen.fehr@geenexsolar.com">juergen.fehr@geenexsolar.com</a></p>
<p>Sari Fink  <i>Sr. Director, Electricity &amp; Transmission Policy</i>          Gabe Tabak  <i>Counsel</i>          American Clean Power Association          1501 M Street NW, Suite 900          Washington, DC 20005  <a href="mailto:sfink@cleanpower.org">sfink@cleanpower.org</a>  <a href="mailto:gtabak@cleanpower.org">gtabak@cleanpower.org</a></p>	<p>Michelle C. Gardner          Senior Director, Regulatory Affairs          NextEra Energy Resources          76 Paul Road          Hanover, MA 02339  <a href="mailto:Michelle.Gardner@nexteraeenergy.com">Michelle.Gardner@nexteraeenergy.com</a></p>
<p>John Horstmann          Senior Director of RTO Affairs          AES  <a href="mailto:john.horstmann@aes.com">john.horstmann@aes.com</a></p>	<p>Brian Kauffman          Senior Manager, Regulatory Affairs          Enel North America, Inc.          One Marina Park Drive          Boston, MA 02210  <a href="mailto:Brian.Kauffman@enel.com">Brian.Kauffman@enel.com</a></p>
<p>Chris Lazinski          Origination Associate          BayWa r.e. Solar Projects LLC          18575 Jamboree Road, Suite 850          Irvine, CA 92612  <a href="mailto:chris.lazinski@baywa-re.com">chris.lazinski@baywa-re.com</a></p>	<p>John Moore          Director          Sustainable FERC Project          20 North Wacker Drive, Suite 1600          Chicago, IL 60606  <a href="mailto:jmoore@nrdc.org">jmoore@nrdc.org</a></p>
<p>Tom Rutigliano          Senior Advocate          Natural Resource Defense Council          1125 15<sup>th</sup> Street NW, Suite 300          Washington, DC 20005</p>	<p>Mark Walter          Savion, LLC          Director of Legislative and Regulatory Affairs          422 Admiral Boulevard</p>

<a href="mailto:trutigliano@nrdc.org">trutigliano@nrdc.org</a>	Kansas City, MO 64106 <a href="mailto:mwalter@savionenergy.com">mwalter@savionenergy.com</a>
Betty Watson Senior Director, Policy and Market Design Modern Energy 703 Foster Street Durham, NC 27701 <a href="mailto:betty@modern.energy">betty@modern.energy</a>	Brett White Director, Regulatory Affairs Pine Gate Renewables, LLC 130 Roberts Street Asheville, NC 28801 <a href="mailto:bwhite@pgrenewables.com">bwhite@pgrenewables.com</a>