

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.¹ 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.² 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,"³ 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.

¹ 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>

² 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>

³ *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%⁴ 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,

Sean Baur Director, Power Markets & Transmission GlidePath Power Operations LLC 132 N York Street, Suite 3L Elmhurst, IL 60126 sbaur@glidepath.net	Jason Burwen Interim Chief Executive Officer U.S. Energy Storage Association j.burwen@energystorage.org
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⁴ 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

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

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