

**Pennsylvania Senate  
Consumer Protection & Professional Licensure Committee  
Joint Public Hearing with the  
Environmental Resources & Energy Committee  
on  
Grid Reliability and Winter Storm Elliot**

**February 27, 2023**

**Testimony of:  
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Chairmen Stefano and Yaw, Chairwomen Boscola and Comitta, and honorable members of the Senate Consumer Protection and Professional Licensure Committee and the Environmental Resources and Energy Committee, I am Rachel Gleason, Executive Director of the Pennsylvania Coal Alliance (PCA). I appreciate the opportunity to provide testimony on grid reliability and Winter Storm Elliott.

The PCA is the principal trade organization representing underground and surface bituminous coal operators in Pennsylvania, as well as other associated companies whose businesses rely on coal mining and a strong coal economy. Nationally, Pennsylvania is the third largest coal producing state, and PCA member companies produce over 98 percent of the bituminous coal mined annually in Pennsylvania, which totaled over 40 million tons in 2022.

PCA does not directly represent any generation, however, high Btu thermal coal that is mined in our state is sent to power plants in Pennsylvania and throughout PJM. Fuel receipts to generators have not been finalized for 2022, but preliminary estimates from the U.S. Energy Information Administration indicate over 25 million tons of Pennsylvania-mined thermal coal was sent to U.S. power plants, 80% of which was sent to plants operating in PJM states.<sup>1</sup>

As an advocate for Pennsylvania's coal industry, of which a considerable amount of our production is thermal fuel used to generate electricity in Pennsylvania, PJM and the United States, I would like to preface my testimony today by underscoring the importance of an all-of-the-above energy strategy, which includes coal. Every resource that can contribute to a reliable, resilient, and secure electric grid should play a role in providing power.

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<sup>1</sup> <https://www.eia.gov/electricity/data/eia923/>

## Importance of Coal-Fired Generation and a Diversified Grid

PJM's coal fleet is essential to the grid because of its reliability, resiliency, and security attributes. Coal-fired electric generation is the only source of baseload power with on-site fuel that can ramp to meet electricity demand when it peaks, such as during extreme hot and cold weather. Coal-fired generation does not rely on just-in-time fuel delivery, which is the case with most natural gas generation that relies on pipeline delivery, and the sun and the wind, which rely solely on weather conditions. Coal-fired generation in PJM is supplied with fuel that is mined domestically by operations in the U.S., providing fuel assurance and planning, and significant security attributes. The only other baseload power that is both reliable and resilient with on-site fuel, nuclear, is dependent on 95% imported uranium from countries like Kazakhstan (35%) and Russia (14%).<sup>2</sup>

Considering this, coal is no longer the predominate source of generation on PJM's grid. Since 2010, 38 GW of coal capacity in PJM has retired and 53 GW of generation capacity was added to the grid, of which 36 GW was natural gas-fired generation. As of September 2022, 49% of PJM's installed capacity was natural gas, 24% was coal, and 18% was nuclear.<sup>3</sup> However, between now and 2027, over 23.5 GW of solar capacity and about 12.8 GW of wind projects – both highly intermittent and weather dependent - are planned for PJM. Meanwhile, approximately 23 GW of coal-fired capacity, roughly half of the PJM coal fleet, is expected to retire between now and 2030 due to PJM market design and regulatory pressures, many of which have not been incorporated into reliability planning.<sup>4</sup> We are making our grid less reliable by adding taxpayer subsidized resources based on ideological preferences instead of rationale considerations. We are making the grid increasingly dependent on the weather, overly dependent on just-in-time fuel delivery, and we are retiring baseload that comes to the rescue during the weather events when unreliable sources are not available to meet demand.

During Winter Storm Elliot PJM saw 23% of its generating fleet shutdown on Dec. 24.<sup>5</sup> Since the storm, PJM has acknowledged that they underestimated demand by about 10%. While no fuel source came through the bitter cold unscathed – natural gas plants accounted for 70%, or 32 GW – of the nearly 46 GW of outages, the majority due to fuel availability and equipment failures. And, while intermittent solar and wind performed largely as expected during this period, they produced almost nothing when needed most; solar was supplying less than 1% to the grid during Winter Storm Elliott, and wind was providing between 5% and 7%.

PJM has faced gas supply problems from cold weather before, during a cold weather event in 2014 and the polar vortex in 2018, but it's a growing problem becoming more pronounced as the gas generation sources account for a larger share of the grid's dispatchable baseload generation. In February of 2014, during a cold snap, PJM found that 23% of total generator outages were due to interruptions of natural gas supply, and in January of 2018, during the polar vortex, half

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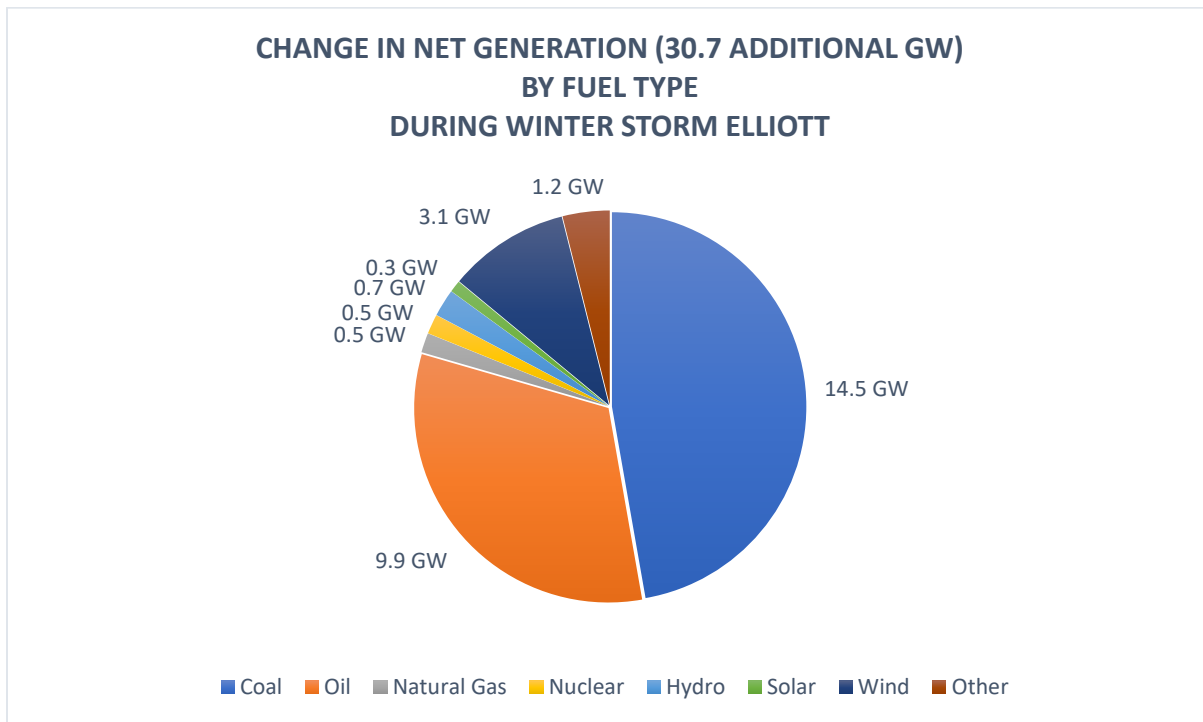
<sup>2</sup> <https://www.eia.gov/energyexplained/nuclear/where-our-uranium-comes-from.php>

<sup>3</sup> [https://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2022/2022q2-som-pjm.pdf](https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2022/2022q2-som-pjm.pdf)

<sup>4</sup> <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/solar-additions-set-to-displace-new-gas-plants-in-pjm-72605357>

<sup>5</sup> <https://pjm.com/-/media/committees-groups/committees/mic/2023/20230111/item-0x---winter-storm-elliott-overview.ashx>

of the total PJM natural gas capacity was not available to supply peak demand. In 2014, 2018 and two months ago, it was coal generation that came to the rescue, ramping up power supply when gas couldn't, when nuclear stayed the same because it cannot ramp, and renewables did what renewables do, worked some of the time and didn't work some of the time. Based on preliminary data, of the 30 GW of additional generation needed during Winter Storm Elliott, coal provided 47%.<sup>6</sup> PJM's coal fleet was the principal source of increased power generation to meet demand during Winter Storm Elliott. Without adequate and comparable replacement capacity with the same reliable and resilient attributes, grid failures are increasingly likely during future extreme weather events.



Source: EIA Hourly Grid Monitor

To be fair, natural gas generation isn't at fault. Grid operators are well aware that most natural gas generation relies on just-in-time fuel delivery. Compressor stations freeze or fail, pipeline pressure drops, doohickeys break, natural gas is diverted to home heating, and sometimes the fuel just isn't available. The only way natural gas can truly be relied upon during peak demand is if they are required to keep fuel supplies on site, and at the end of 2021 only one-third of natural gas generation in PJM had the ability to rely on oil as a back-up fuel source.<sup>7</sup> Illustrating this, during Winter Storm Elliot one natural gas generator was prepared for an emergency scenario, and at two of its dual fuel natural gas/oil plants in Pennsylvania had on-site oil ready to go, which prompted PJM, pursuant to the Federal Power Act, to request all generating units in PJM to operate up to their maximum generation "notwithstanding air quality or other permit limitations."<sup>8</sup>

<sup>6</sup> [https://www.eia.gov/electricity/gridmonitor/dashboard/electric\\_overview/US48/US48](https://www.eia.gov/electricity/gridmonitor/dashboard/electric_overview/US48/US48)

<sup>7</sup> <https://www.eia.gov/electricity/data/eia860/>

<sup>8</sup> <https://www.pjm.com/-/media/documents/other-fed-state/20221224-doe-202c-filing.ashx>

Winter Storm Elliott was a teachable event. Yes, rolling blackouts were narrowly avoided in PJM, however they were not avoided on other grids in the Eastern Interconnection. The lessons to be learned are the grid is becoming too reliant on one source of baseload power; unreliable, subsidized renewable additions on the grid do not perform when needed and must be backed up by reliable baseload; and coal and nuclear retirements have made the grid increasingly volatile and are not being replaced by reliable and resilient generation sources.

### **Markets and Accountability**

PJM's Energy Markets are comprised of the Day-Ahead and Real-Time Markets. The Location Marginal Pricing is settled twice, once in each market, determined by generators offering supply and utilities bidding demand from low to high until the projected demand is met, plus some reserves. There are a number of factors that contribute to offers from generators, including fuel cost, maintenance, labor, and taxpayer subsidies. The Day-Ahead Market is exactly how it's title sounds; LMP prices are set for energy that will be delivered the next day. Any deviations from what cleared the Day-Ahead Market is address in the Real-Time Market, which operates every five minutes and addresses immediate electricity needs in real time.

PJM's Capacity Market, the RMP (Reliability Pricing Model), is an auction for the commitment to provide electricity three years in advance to ensure sufficient supply and deliver in an emergency. In exchange for the commitment, generation sources are provided a daily guaranteed payment, which is often a generator's principal source of revenue for operations and maintenance. However, in recent years capacity payments have been plummeting – from \$8.3 billion in 2021/22 to \$2.2 billion for 2023/24 - largely due to FERC's approval of PJM's revised Minimum Offer Price Rule ("MOPR") that had the effect of allowing taxpayer subsidized resources, like wind and solar, suppress energy prices by submitting artificially low bids.<sup>9</sup>

Allowing subsidized, unreliable sources to bid into the Markets, sometimes at \$0 due to their subsidies, distorts the Markets, especially when it comes to capacity payments, resulting in baseload generation experiencing and facing declining capacity revenues. In a filing last month to the Federal Energy Regulatory Commission, the Independent Market Monitor agreed that PJM has permitted offers from capacity resources that were incorrectly defined as capacity and agreed that those offers should not have been permitted.<sup>10</sup>

For years the North American Electric Reliability Corporation (NERC) and the Independent Market Monitor have been warning about the early phase out of coal and nuclear, but there hasn't been a sense of urgency. A report released a week and a half prior to Winter Storm Elliott from the NERC concluded fossil-fuel plants are being removed from the grid

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<sup>9</sup> [https://www.puc.pa.gov/media/2013/epo\\_report\\_2022.pdf](https://www.puc.pa.gov/media/2013/epo_report_2022.pdf)

<sup>10</sup> [https://www.monitoringanalytics.com/filings/2023/IMM\\_Comments\\_Docket\\_No\\_EL23-13\\_20230113.pdf](https://www.monitoringanalytics.com/filings/2023/IMM_Comments_Docket_No_EL23-13_20230113.pdf)

too quickly to continue to meet demand.<sup>11</sup> Speaking on the Report to reporters, John Moura, Director of Reliability Assessment and Performance Analysis for NERC said “There are extraordinary reliability challenges and opportunities in front of us...Just to say it for the fourth or fifth time: Managing the pace of our generation retirements and our resource changes to ensure we have enough energy and essential services is an absolute necessity. He continued by stating “It’s vitally important that we’re planning and operating power systems that can be resilient to extreme weather. That includes maintaining our baseload generation fleet.”<sup>12</sup> The report also identified several “emerging electrification challenges,” including new load from electric vehicles. As we electrify everything from cars to homes, we are dismantling the grid and adding weather dependent taxpayer subsidized unreliable sources.

PJM does significant planning, and perhaps rolling blackouts were avoided in Winter Storm Elliott because they are really good grid operators. However, PJM is simply that, a grid operator – they run the Capacity and Energy Markets but they are not regulators and they do not authorize power plants - that isn’t their job. A power plant could be authorized by regulatory agencies to be built in Pennsylvania or PJM, and constructed, but the power plant isn’t guaranteed any payments or revenues due to the design of PJM’s Capacity and Energy Markets where cost recovery is not relevant, and reliability and resiliency attributes are not adequately considered. The Independent Market Monitor and NERC will point out the problems with the Markets and the grid, and they issue warnings, but there isn’t any overall accountability or guarantee the lights will come on. In other words, in terms of reliability, the buck does not appear to stop anywhere. Just last week during PJM’s Markets & Reliability Committee Meeting, PJM acknowledged it could face resource adequacy shortfalls if current trends persist.

We must ensure the grid is comprised of diverse, secure, reliable and resilient generation sources, including coal. Subsidizing inadequate generation sources distorts the Markets and lowers payments, leading to baseload not being compensated for performing when needed, threatening reliability, and directly impacting capital investments.

Thank you to the Committee for the opportunity to testify, and I welcome any questions.

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<sup>11</sup> [https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC\\_LTRA\\_2022.pdf](https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf)

<sup>12</sup> <https://www.utilitydive.com/news/nerc-grid-resource-adequacy-shortfall-reliability-assessment/638949/>