

Prepared Testimony of

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Pennsylvania Senate Environmental Resources & Energy Committee

and the

Pennsylvania Senate Consumer Protection & Professional Licensure
Committee

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Good morning, Chairman Stefano, Chairman Yaw, Chairwoman Boscola, Chairwoman Comitta, and members of both Senate committees here today for a joint hearing on Winter Storm Elliott and overall electric grid reliability.

I am Gladys Brown Dutrieuille, Chairman of the Pennsylvania Public Utility Commission (PUC or Commission). My testimony provides remarks regarding the Commission's efforts to maintain service reliability along with a summary of key events and observations surrounding Winter Storm Elliott of 2022.

In a world that is becoming ever more dependent on electrification, the Commission is aware of the impacts of electrical outages and works with its regulated electric distribution companies (EDCs) as well as county and state emergency management officials to manage emergency response. Further, Winter Storm Elliott presented a number of challenges for the generation and distribution of electricity. My remarks will highlight a number of these challenges, with a particular focus on distribution operations, understanding that you also have invited testifiers from the electric generation, reliability standards, and natural gas supply communities to cover those subject areas.

Winter Storm Elliott and Emergency Response

The PUC consistently monitors weather for impending events which may cause electrical outages. We communicate with the EDCs before and during these events to ensure EDC preparation. The Commission is also a direct liaison with the Pennsylvania Emergency Management Agency (PEMA) and participates with PEMA, among other state agencies, in preparing for and responding to severe weather events.

If an impending weather event appears to be of a significant threat to the Commonwealth, the Commission works with PEMA and other state and federal agencies on preparation. Commission emergency preparedness staff also work with the EDCs and other jurisdictional lifeline utilities (water, wastewater, telephone, and natural gas) to understand their preparations and to capture any unmet needs.

The Commission also has a standard operating procedure to initiate a conference call with the Chairman's Office and the lifeline utilities' senior management before and during high-impact events, if necessary. Commission staff facilitates the call, which includes invited representatives from the Governor's Office, PEMA, and any other Commonwealth agency relevant to the event issues, such as the Department of Environmental Protection (DEP) and Pennsylvania Department of Transportation (PennDOT).

EDCs also hold regional conference calls with county emergency management and local and state elected officials in areas impacted by severe storm events. These are a best practice developed and memorialized in Commission policy. Another best practice includes the EDCs offering of in-

person or virtual liaisons to county emergency operations centers during impactful events. These liaisons help to address road closure priorities and communicate on priority restoration needs.

In preparation for Winter Storm Elliott (Elliott), the PUC reached out to EDCs on December 21, 2022, to assess the EDCs' storm preparation activities and any predicted impacts for the impending storm. The Commission received the reports from all EDCs and conveyed that information to its regulatory partners (PEMA and DEP) for their situational awareness. The primary distribution system impacts of Elliott on EDCs occurred on December 23, 2022, with the peak number of customer service outages at 108,534 at 4:54 p.m. on that date. For context, Elliott would be considered a moderately impactful storm due to the low temperatures. A high impact winter storm would be on the scale of Winter Storms Riley and Quinn of 2018, where the peak number of outages was approximately 680,000 customers.

The Commission communicated service outages and restoration estimates to its regulatory partners throughout the remainder of Elliott. In response to PJM Interconnection L.L.C.'s (PJM) call for conservation during Elliott, the Commission also issued a press release amplifying the need for customers to conserve. No major unmet needs were reported to the Commission by PEMA or counties during Elliott, and the last customers affected by Elliott were restored on December 27, 2022.

In addition to restoring electrical service during the event, Duquesne Light Company, Metropolitan Edison Company (Met-Ed), Pennsylvania Electric Company (Penelec) Pennsylvania Power Company, West Penn Power Company (West Penn), and PPL Electric Utilities Inc. provided warming stations for impacted customers. The Commission notes that external mutual aid resources for EDCs were very limited due to the widespread and regional nature of the storm. Met-Ed, Penelec, and West Penn reported using on-system line contractors for restoration efforts and reported securing a small number of off-system contractors, that is, those that are currently not under a contract with the EDC. The storm-related winds did hamper aerial work in bucket trucks and prolong the response and restoration efforts of all the EDCs. Safety requirements limit aerial work when wind speeds reach a certain level.

Elliott had a much more profound impact on the wholesale generation market. With the understanding that other parties will be testifying more directly on this portion of the storm, I wish to highlight a few key observations from the Commission's perspective. First, the precipitous drop in temperature during the holiday weekend Elliott event resulted in two significantly impactful circumstances. Second, the PJM forecast for electricity demand was significantly under-projected. Information provided by PJM shows the forecast on December 23rd was almost 10% below realized load. Third, a significant number of electric generation resources which were expected to be able to generate were in fact unable to do so. This was the result of a number of factors including plant equipment failure and fuel supply issues. Of the units unable to perform about 70% were natural gas, 16% were coal, with the remainder made up of a mix of solar, wind, and nuclear. The Commission is continuing to work with PJM to

evaluate the results of the storm. These evaluations will be key to determining market or operational modifications to reduce the likelihood of recurrence of these types of events.

Distribution System Electric Reliability

Reliability is at the core of the Commission's statutory mission to ensure utilities provide and maintain adequate, efficient, safe, and reasonable service and facilities. The Electricity Generation Customer Choice and Competition Act (Competition Act) mandates that the PUC ensure levels of reliability that existed prior to the restructuring of the electric utility industry.

The Commission uses three main metrics to measure electric utility reliability performance.¹ These performance metrics are based on those adopted by the Institute of Electrical and Electronics Engineers (IEEE):

- CAIDI (Customer Average Interruption Duration Index): Measures average power restoration time (by minutes) for every customer who lost power during the reporting period.
- SAIDI (System Average Interruption Duration Index): Measures average outage duration time (by minutes) for every customer served during the reporting period.
- SAIFI (System Average Interruption Frequency Index): Measures average frequency of power interruptions for every customer served during the reporting period.

Other electric reliability data reported includes the following:

- Average number of customers served.
- Number of sustained customer interruption minutes.
- Number of customers affected by service interruptions.
- Analysis of outage causes such as equipment failure, animal contact, and contact with trees.
- Reliability performance on the worst performing circuits and a corrective action plan to increase the reliability of these circuits.

EDCs that are not compliant with these metrics undergo additional scrutiny by Commission staff and continuous noncompliance may trigger enforcement action.²

The Commission issues annual *Electric Service Reliability in Pennsylvania* Reports that detail the performance of the 11 jurisdictional EDCs, based on the data reported by the EDCs and data

¹ The Commission's current benchmarks and standards were established by Commission Order entered May 11, 2004, at Docket No. M-00991220.

² The PUC is currently reviewing how reliability benchmarks and standards are calculated through a collaborative with the EDCs and Statutory Advocates (the Office of Consumer Advocate, the Office of Small Business Advocate, and the Commission's Bureau of Investigation and Enforcement). See related Docket No. M-2021-3024513.

collected by Commission Staff on severe storms and outage events.³ The data from our most recent report, issued in 2022, shows that, in general, overall reliability performance of most EDCs in meeting benchmark performance metrics declined in some important areas.

Key findings include the following:

- In 2021, only three of the 11 EDCs achieved CAIDI benchmark performance levels.
- Only five of the 11 EDCs achieved benchmark for SAIFI in 2021, as compared to eight in 2020.
- Approximately 5.8 million customer outages were experienced in 2021 as compared to 5.4 million in 2020.⁴
- Only one EDC, PECO, saw a slight decrease in customer outages from 1.51 million in 2020 to 1.48 million in 2021.
- For customer minutes interrupted, all EDCs except Penn Power saw an increase.
- The EDCs experienced 63 reportable service outage events in 2021⁵, which is the highest number reported since the Commission began tracking the data in 1993. The reportable outage events were almost exclusively caused by severe weather events.
- The number of impactful storms does not appear to be lessening and if the weather pattern of increasing severe storms continues, EDCs may struggle to achieve sustained benchmark performance without sufficient investment in reliability improvements and resiliency.
- The majority of customer outages within Pennsylvania are caused by trees/vegetation impacts, with the second-highest cause being equipment failures.
- Off-right-of-way (OROW) trees are a significant contributor to electric outages year over year for all EDCs.
- The three EDCs that have expended the most capital through their Long-Term Infrastructure Investment Plans (LTIIPs) have been the most consistent in achieving benchmark SAIFI performance the past three years (Duquesne Light, PECO, and PPL). Nine of the 11 EDCs have LTIIPs in effect.
- The Commission expects to see improvements in reliability performance as EDCs execute their LTIIPs.

It is important to note that approximately 58% of Pennsylvania is tree covered and because of this, the tree related outages continue to hamper the EDCs efforts to improve reliability. The

³ All *Electric Service Reliability in Pennsylvania* reports may be found on the Commission's website here:

<https://www.puc.pa.gov/filing-resources/reports/electric-service-reliability-report/>.

⁴ This information excludes Duquesne, which calculates customer outages as kVA disrupted, rather than individual customers. Nonetheless, Duquesne also saw an increase to 7.3 million kVA disrupted in 2021 from 6.4 million kVA disrupted in 2020.

⁵ Service outages reports are required under 52 Pa. Code § 67.1. The reporting threshold for a 67.1 reportable outage event is 5% of total customers or 2,500 customers, whichever is less, for six or more consecutive hours. The reporting requirements are an initial phone call to the Commission when it is believed the threshold will be reached, followed by a written report 10 working days after the last customer is restored.

Emerald Ash Borer and other woodland pests have done significant damage to the trees. As a result of this, EDCs are faced with the challenge of dead and damaged trees, which decay and fall into lines. Some of the dead and damaged trees are OROW, which requires additional actions of the EDCs to address. Vegetation management expenditures are not part of the LTIP and therefore not eligible for recovery through the Distribution System Improvement Charge (DSIC).⁶

Regional and National Issues Impacting Grid Systems

Following deregulation and the passage of the Competition Act, Pennsylvania utilities spun off or divested their power generation assets and signed agreements with the regional transmission operator, PJM, to coordinate the operation of their higher voltage transmission facilities.

The PUC monitors the wholesale electric markets, the PJM stakeholder processes, and dockets before the Federal Energy Regulatory Commission (FERC) so that we can intervene as needed in any proceedings regarding wholesale generation and interstate transmission that will affect the reliable and affordable delivery of electric service to Pennsylvania's retail electric customers.

Our country continues to experience an increase in significant weather events – the 2014 Polar Vortex, successive hurricanes, Winter Storm Uri which brought down Texas' grid, and the more recent Winter Storm Elliott which brought another severe and sudden cold snap during Christmas weekend are but a few examples. The Commission thus finds that it must even more closely monitor the rules and mechanisms put in place in the competitive generation market, as well as the resiliency of the interstate transmission grid, to ensure that these markets are optimizing and prioritizing resiliency as well as affordability.

Of note, on February 16, 2023, FERC approved new extreme cold-weather reliability standards stemming from a series of recommendations FERC and the North American Electric Reliability Corporation (NERC) proposed in the wake of the February 2021 Winter Storm Uri event. The reliability standards contain new and revised requirements to advance reliability of the grid during extreme cold weather temperatures. They include implementation of generator freeze protection measures, enhanced cold weather preparedness plans, identification of freeze-sensitive equipment in generators, corrective actions for when equipment freeze issues occur, annual training for generator maintenance and operations personnel, and procedures to improve the coordination of load reduction measures during a grid emergency.⁷

⁶ EDCs were allowed to file for the DSIC beginning in 2013. 66 Pa.C.S. § 1353. LTIPs and the DSIC are unique regulatory tools that allow EDCs to accelerate capital investment on programs designed to improve reliability or maintain benchmark performance. All of the largest EDCs have LTIPs in place.

⁷ A summary of the order is available here: <https://www.ferc.gov/news-events/news/ferc-approves-extreme-cold-weather-reliability-standards-directs-improvements>.

The Commission will monitor the FERC cold-weather reliability standards carefully and will continue tracking these issues through our membership in the Organization of PJM States, Inc., or OPSI. Through this organization, the 13 states within PJM along with the District of Columbia coordinate efforts and advocate on numerous issues related to PJM markets and operations.

Pennsylvania Energy Outlook

Looking at the broader “Energy” picture, the PUC’s role is that of an economic regulator tasked with ensuring just and reasonable rates. As a restructured state, we do not choose the energy sources. Instead, we work to ensure that EDCs and Natural Gas Distribution Companies (NGDCs) competitively procure the commodities they sell to non-shopping customers.

When it comes to electric generation in Pennsylvania, it is a mixed and complex picture involving nuclear, coal, natural gas, renewable energy sources, and now storage – further complicated by competing economic factors and actions in other states.

The electric generation breakdown for Pennsylvania is as follows:

- Natural gas provided 53% of PA’s electricity generation in 2021, this figure has almost doubled in the last five years.
- In 2021, nuclear power supplied 33% of our state’s net generation.
- Coal remains a factor in electric generation in PA, but it comprised just 12% of net generation in 2021, an almost 50% reduction over the past five years.

The U.S. Energy Information Administration projects that coal-fired generation capacity will decline through 2030 and then remain relatively flat, as coal plant retirements slow and utilization of the remaining coal fleet increases. So, it appears that coal generation is not “dying,” but rather, moving to become more efficient, with fewer competitive plants going off-line. One other reason coal has been competitive is the increase in natural gas prices.

Meanwhile, right now, over 90% of the new energy seeking to interconnect to the grid in our region is comprised of solar, wind, and storage. For resources seeking capacity accreditation, about half have yet to be built. NERC which ensures reliability of the bulk power grid and reports to FERC, has indicated in its *2022 Long-Term Reliability Assessment* that the integration of increasing amounts of inverter-based and distributed resources such as solar and wind will present reliability challenges if not managed properly.⁸

This is a massive change in electricity generation, and Pennsylvania, the PJM region, and the nation as a whole, will have to determine the role that existing fossil and nuclear plants will play

⁸ NERC’s *2022 Long-Term Reliability Assessment* is available here: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf.

in state and local economies, along with their roles in the resilience of the grid and “carbon emissions.”

Transmission

Transmission lines are literally the highways and byways that deliver the energy that keeps our homes, businesses, and economy running. For this reason, I sit on the FERC NARUC Joint Federal-State Task Force on Electric Transmission which was established by FERC in June 2021 to bring state and FERC commissioners together to discuss electric transmission in a more cooperative and cohesive manner.

When discussing current and future transmission needs, it is important to consider dual concerns – that transmission is a key variable in how successful the ongoing transition to a low-carbon generation fleet will be, and that the increase in renewables will require the utilization of balancing resources. Those balancing resources will likely be fossil or steam generators powered in large part by natural gas until such time as energy storage resources can scale up.

Historically, state commissioners focus on how transmission affects stakeholders within their states’ borders, and we leave it to FERC (and I’m oversimplifying here) to address the interstate aspects of the electric grid, as well as the long-haul gas pipelines that still supply much of our electric generation.

A key goal of the PUC’s wholesale market monitoring and policy intervention is to first retain a reliable and affordable electric network. This goal is also followed by our belief that states should be permitted to strive toward their own policy goals, as long as they don’t negatively interfere with the reliability of the grid or shift costs to non-participating states.

While regional markets were originally designed with a targeted focus on reliability and affordability among states where those goals were uniform and predominant, these markets are now challenged to assist in various state goals associated with carbon emission reductions, which is not necessarily directly recognized by regional transmission operators (RTOs) such as PJM.

In discussing the concept of modernizing and updating the RTO markets to better accommodate the new variables being presented by state policy goals, a key challenge is to design those updates or modernization in a manner that keenly focuses on reliability and affordability.

FERC, to its credit, saw the changes already occurring in the generation fleet – the gradual shift away from large fossil generators located close to load centers; the steady growth in smaller renewable generators located farther from load centers; and the Clean Energy Transition that was already underway. The task force has been tasked with addressing some of the thorny challenges that come with building out a transmission grid for a shifting generation paradigm.

Task force membership is hard work, but it is important that Pennsylvania has a seat at the table as transmission policy is crafted. One data point which really stands out is the escalating amount

of money spent on electric transmission. In the late 1990s, that cost was approximately \$2 billion per year, while in 2019, that number was \$23 billion.

With those escalating costs in mind, we face a series of complicated questions:

- How do we plan efficiently to reduce costs?
- How do we allocate costs fairly, so that the correct parties are paying?
- And what kind of oversight is needed to contain those costs?

In an attempt to answer those questions, FERC has been busy on the transmission front, issuing an omnibus transmission Advance Notice of Proposed Rulemaking and three transmission-themed Notices of Proposed Rulemaking within a year.

As the generation fleet continues to turn over, and we rely more and more on intermittent renewable resources, electric transmission will continue to become even more important than ever. To keep the levels of reliability we and utility customers expect, we will need a very nimble transmission grid that will allow flexible power flows from traditional baseload and new intermittent generation alike.

Closing

As you can see from this testimony, the issues and concerns about electric power transmission are as wide-reaching and diverse as the power lines and entities that deliver energy to our homes and businesses.

Equally important, we want to be clear that the Commission is committed to ensuring safe and reliable electric service for Pennsylvania households and businesses. This is a key responsibility of the PUC, as our state's regulator for rates and quality of service.

I hope my testimony today has detailed the PUC's perspective and role regarding this important topic. The Commission is committed to working with the legislature and other stakeholders across the Commonwealth to ensure that Pennsylvania's interests are safeguarded, and we stand ready as a resource for any further legislative discussions about this topic.