

Prepared Testimony of

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Good morning, Chairman Benninghoff, Representative Rader and members of the Committee. I am Andrew Place, Vice Chairman of the Public Utility Commission (Commission or PUC), and it is a pleasure to be back in front of you this morning.

Joining me today is Dan Searfoorce, the Manager of Water, Reliability and Emergency Preparedness in the Commission's Bureau of Technical Utility Services.

I appreciate the opportunity to highlight the PUC's approach to electric reliability in the Commonwealth and specifically reliability and resiliency in Northeast Pennsylvania. Firstly, the Commission recently released its annual Electric Service Reliability report, detailing benchmarks and standards as well as the performance of the state's eleven (11) PUC-regulated electric distribution companies (EDCs).¹

Secondly, following a string of strong storms this past spring and summer, today's session provides a forum for continued discussion of electric reliability, resilience and restoration – including concerns raised by customers and communities here in Northeast Pennsylvania.

Lastly, today's hearing affords me the opportunity to update the committee on the PUC's ongoing grid modernization work to address and implement key components helping to shape the "Grid of the Future" – work and preparation that is critical to ensure the continued economic competitiveness of our Commonwealth; the viability of our communities; and the safety and comfort of homes and businesses.

Reliability is at the core of the PUC's statutory mission and its every day work to ensure adequate maintenance, safety and reliability of utility services. The Public Utility Code at Title 66 specifies that reliability is comprised of "adequacy" and "security" – adequacy to provide sufficient volumes and deliverability of power, and security to design, maintain, and operate a system that can handle extreme conditions, emergencies, and cyber threats.

Statutorily, the Commission is mandated to ensure reliability at levels which were instituted two decades ago - prior to the restructuring of Pennsylvania's competitive market. The Commission has established reliability benchmarks and standards based on those levels of reliability. EDCs that are not in compliance

¹ The Report is available for download here:
http://www.puc.pa.gov/General/publications_reports/pdf/Electric_Service_Reliability2017.pdf.

with these metrics undergo additional scrutiny by the Commission staff and continuous noncompliance may trigger enforcement actions by the Commission's prosecutorial staff.

Hand-in-hand with reliability is resilience – the ability of a power system to avoid or minimize the impacts of service interruptions and to adeptly recover. The Federal Energy Regulatory Commission (FERC) has proposed to define resilience of the bulk power grid as “[t]he ability to withstand and reduce the magnitude and/or duration of disruptive events, which includes the capability to anticipate, absorb, adapt to, and/or rapidly recover”²

Pennsylvania's EDCs, transmission organizations, and power generators are all integral parts of the PJM regional transmission footprint. As such, the PUC routinely monitors and engages with PJM in its ongoing examination of the interplay of reliability and resilience – including:

- The ability to prepare for a low probability but high impact event;
- The ability to mitigate risk and effectively operate through the event; and
- The ability to recover from the event.

The Commission measures EDC system performance to these attributes to ensure learning and adaptation from each response incident.

The Commission also has reporting requirements designed to ensure continued safety, adequacy and reliability of the transmission and distribution of electricity in the Commonwealth. These reporting requirements include data related to the reliability benchmarks and standards mentioned above. A summary and evaluation of this data is published annually in the PUC's Electric Service Reliability Report. Data presented in this report focuses on the frequency and duration of electric service interruptions, as well as their underlying causes.

As noted in our Reliability Report, weather appeared to be a key factor impacting reliability in 2017. One of the key causes of service outages in 2017 was the severity of the weather and the number of storms that we experienced. There were 50 reportable outage events reported by EDCs during 2017 – the highest number

² See the FERC Order *Terminating Rulemaking Proceeding, Initiating New Proceeding, and Establishing Additional Procedures*, at Docket No. AD18-7, issued January 8, 2018.

since the PUC began collecting data in 1993, and a substantial increase from the previous year when only 20 outage events were reported.

I would note that preliminary data for the first half of 2018 shows a continuing trend of severe storms disrupting electric service – with 22 outage events reported between January and June of this year. By comparison, the annual average for storm events, since the PUC began keeping records, is 25.76.

The size and scope of the storms are also noteworthy, with 2017 storms disrupting power to 1.3 million customers – which is nearly twice the figure for 2016 and more than double the 2015 total. Nearly all the 2017 outage events were triggered by severe spring and summer thunderstorms, which brought extremely high winds and heavy rain. That was the case here in Northeast PA this March and May, when primarily Met-Ed, Penelec, and PPL customers dealt with power restoration issues in the aftermath of the storms.

The larger number of severe storms in recent years is notably different from previous spikes in outage figures, which were driven by a small number of high-impact storms like Hurricanes Irene (2011) and Sandy (2012), or Winter Storm Nika (2014).

Additionally, the continuing reliability challenge posed by trees - including trees located outside the utility right-of-way - is noted in the reliability report, as is the impact of increased storm activity. Overall, approximately 50 percent of the total minutes of service interruptions during 2017 were attributed to fallen trees or tree limbs (400 million customer-minutes of service interruptions, impacting over 2 million customers). Even with the increased severe weather and threats from trees, we expect our EDCs to maintain performance at or below the benchmark.

With regard to Northeast Pennsylvania electric utilities, both Penelec and Met-Ed continue to struggle to achieve both benchmark and standard reliability performance metrics. The PUC currently uses three metrics to measure reliability performance:

- 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.

In order to analyze and set measurable and reasonable goals for electric service reliability performance, outage data is separated into either normal or abnormal periods. Only outages during normal event periods are used in calculating the reliability metrics. The term “major event” is used to identify an abnormal event, such as a major storm, and is defined as either of the following: (1) An interruption of electric service resulting from conditions beyond the control of the EDC which affects at least 10 percent of the customers in the EDC’s service territory during the course of the event for a duration of 5 minutes or greater; or (2) An unscheduled interruption of electric service resulting from an action taken by an EDC to maintain the adequacy and security of the electrical system. The PUC must approve all requests for the major storm exclusion events.

The performance benchmark represents the statistical average of the EDC’s annual, system-wide, reliability performance index values for the 5 years from 1994-98. The performance standard is a numerical value representing an EDC’s performance upper control limit established for each reliability index. Both long-term (rolling 3-year) and short-term (rolling 12-month) performance standards have been established for each utility based on individual EDC historical performance benchmarks. The performance rolling 12-month average is equal to 120 percent of the benchmark, and the performance rolling 3-year average is 110 percent of the benchmark.

Penelec and Met-Ed have failed to achieve benchmark performance for all three reliability metrics in each of the four rolling 12-month quarters in 2017, and failed to achieve rolling 12-month reliability standards for two-thirds of the four quarters in 2017.

As a result of these performance issues, the PUC has been performing extra monitoring of the Penelec and Met-Ed work management systems and Reliability

Improvement Plans (RIPs). The RIPs were a requirement of FirstEnergy's Implementation Plan to the findings of the Commission's Focused Management and Operations Audit of the FirstEnergy Companies. The Penelec and Met-Ed RIPs are expected by the companies to drive their performance to the applicable benchmark by the end of 2018.

Additionally, Met-Ed's and Penelec's Long-Term Infrastructure Improvement Plans (LTIIPs) were approved on February 11, 2016. Met-Ed and Penelec modified their LTIIPs in 2017 and increased spending on their LTIIPs for the remaining years as a result of additional funds made available through the termination of the consolidated tax adjustment via Act 40 of 2016. The LTIIPs were designed to improve storm hardening, system resiliency, and reliability. As of the release date of this report, TUS is currently reviewing the efficacy of all the FirstEnergy Company LTIIPs as part of the required mid-term review of LTIIPs. Their reliability performance will be an important part of this review process. We expect to issue an Order on our determination in late August or by mid-September 2018.

PPL, however, continues to consistently meet both benchmark and standard reliability metrics. In 2015 and 2017, PPL missed its benchmark performance metric in one quarter for one metric – CAIDI. In 2016, PPL met all its benchmark performance and standard reliability metrics for all quarters. PPL has had an LTIIP in place since 2013 and its reliability performance has improved each year, including the stormy year of 2017.

Specific to the recent large nor'easter storms in early March, the PUC's reliability and emergency preparedness staff worked closely with the Pennsylvania Emergency Management Agency (PEMA) and other state agencies to assist county and local emergency management through the Commonwealth Response and Coordination Center (CRCC). One of our roles during such events is to provide information on jurisdictional service outages to key stakeholders – information such as the location, expected duration, and restoration estimates of service outages. We also help bridge any gaps in communication between county emergency management and jurisdictional utilities.

In response to the March 2nd, 2018 storm, the Commission had representatives at the PEMA's CRCC as part of the state coordination activity through PEMA. The PUC staffed the CRCC providing outage updates as well as coordinating the information flow. The PUC also initiated the Chairman and Utility Operational Conference Call procedure providing utility management updates on restoration progress and identifying any unmet needs. This communication allowed the Commission to act quickly in coordinating between Met-Ed, PEMA and Pike County when extra efforts were needed to clear roads and allow utility and other emergency personnel access. The PUC also participated in the elected official and municipal/county official calls that were held by PECO, Met-Ed, and PPL. These calls were instituted as a best practice following reviews from previous storms. Communication and coordination continues, in assessing utility response, identifying areas for improvement, and augmenting reliability. Additionally, following large events, the Commission's Bureau of Technical Utility Services (TUS) issues data requests to the affected utilities and reviews information provided by EDCs in their required outage reports. TUS also communicates with PEMA and county emergency management staff to develop lessons learned.

The PUC participated in an after-action meeting with Pike County Emergency Management (EMA), local and state elected officials, and utilities (PPL, Met-Ed, and Verizon) on July 13, 2018. Pike County's Emergency Management Agency has continued coordination with the utilities on lessons learned and action items going forward. The PUC and Met-Ed also participated in the Stroudsburg Borough Council meeting on July 17, 2018 which focused on customer experience and general reliability concerns with Met-Ed. The PUC continues to be actively engaged with Met-Ed, state, and local government partners in this region to identify potential reliability issues related both to storm recovery as well as normal operations.

In addition, TUS staff is preparing a post-storm report for the March storms based on information gathered from the EDCs and discussions with stakeholders. The report will include key findings and recommendations for improvement. The report will be made public and posted on the Commission's website, in keeping with our past practice for previous storm events such as Sandy and Irene. TUS expects to have this report completed and posted by late August to mid-September.

The EDCs also have a storm response best practices group that meets routinely. This group will be meeting to discuss the March nor'easter and develop a list of lessons learned and action items for improvement. TUS Reliability staff is apprised of the work of this group at least twice a year. Certain best practices from previous PUC storm reports and developed by the EDC best practices group have been incorporated in to the Commission's policy statement at 52 Pa. Code § 69.1903.

More broadly, the Commission is examining policies that will shape a future grid that will be more resilient, mitigate system vulnerabilities, incorporate innovation, and continue to provide affordable, safe and reliable power.

Aging infrastructure is a shared problem among all utilities. The Distribution System Improvement Charge (DSIC) mechanism enables utilities, through a surcharge on customers' bills, to accelerate the replacement of aging facilities and infrastructure. To utilize a DSIC, a regulated entity must submit an LTIP, including the utility's eligible property and its repair and replacement schedule. LTIPs provide a comprehensive strategy for capital replacement and improvement to address aging infrastructure, system integrity, reduce reliability risks, and maintain safe, adequate and reasonable service. The PUC encourages EDCs to review its reliability metrics when developing plans to address future reliability concerns. All of the large EDCs have approved LTIPs, which also undergo periodic reviews for sufficiency.

As mentioned previously, Commission staff is performing mid-term reviews of the four FirstEnergy Companies' LTIPs, including Met-Ed and Penelec. The Commission has the ability to direct a utility to revise, update or resubmit its LTIP if the Commission finds changes to the LTIP are necessary to maintain and improve the efficiency, safety, adequacy and reliability of the utility's existing distribution infrastructure.

Met-Ed's initial LTIP, filed on October 19, 2015, increased capital spending from \$76.65 million to \$116.24 million for the 5-year period 2016-2020, relative to the previous historic period 2010-2014. Met-Ed updated this LTIP in March 2017, expanding spending by an additional \$32 million over the same 5-year plan period. The revised plan increased spending on new circuit ties and loops, SCADA devices, network equipment, underground cable replacement, and, most significantly, pole replacement.

Penelec's initial LTIP increased capital spending from \$106.33 million to \$178.32 million over the same 5-year periods. Penelec updated this LTIP to expand spending by an additional \$13.7 million. The revised plan increased spending on new circuit ties and loops, new SCADA devices, distribution line rehabilitation, network rehabilitation (including vaults), and substation breaker replacement.

PPL's initial LTIP investment included the years 2013 through 2017 and was designed to ensure their reliability performance metrics would be consistently maintained below the Commission benchmark score. Total planned expenditures over the period were \$705.16M. Actual expenditures were \$659.52M. During that period, PPL increased expenditures on replacement of deteriorated/failed area supply substation equipment as PPL found increased failure rates of miscellaneous substation equipment attributed to aging components. PPL also expended higher than anticipated capital for an increase in the number of poles replaced and repaired. PPL's LTIP expended considerable capital during this first plan on underground cable repair and replacement, distribution automation equipment, replacement of failed equipment, and other distribution system reliability preservation and reliability improvement projects.

PPL filed its second LTIP in August 2017, for the periods 2018-2022. Capital spending was increased to \$903.13 million. Under this second plan, PPL is committing significant resources on relatively large new tie line projects, new line and terminal projects, substation conversions; and new reliability substation projects. Additionally, PPL has implemented more stringent pole reinforcement rules, which has elevated its pole repair and replacement costs, and increased spending on primary and secondary underground cable replacement. Lastly, PPL significantly increased spending on Volt-Var Optimization from \$1.4 million in the first LTIP to \$24.4 million in the second LTIP – including automation of capacitors and other assets to enhance service quality.

Further, smart grid technologies – two-way communication between devices in the field and operations in control centers allow for automatic switching of load which can substantially reduce or eliminate the impact of a fault. Smart grid devices in the field can also provide information that, once analyzed, can identify potential reliability issues before they occur.

Also, smart meters contribute to resilience and reliability. Currently, more than two-thirds of existing analog meters have been replaced by advanced meters, another key component in grid modernization, power restoration and system resilience. While driven in large measure by the need for increased operational

efficiency, utilities which have fully deployed advanced meters are also noting improvements in the identification and response to power outages – helping them respond more accurately and accelerating restoration work.

PPL, for example, has invested, and continues to invest significantly in smart grid and smart meter infrastructure, and the benefits of these investments are already being reflected in the field. During Winter Storm Riley in March 2018, PPL’s automated outage restoration application, Fault Isolation Service Restoration (FISR) (also known as “smart grid”), operated on 49 different line outages system wide. FISR is an automated system that is designed to safely, quickly and reliably isolate and restore unaffected sections of circuits to service following an outage event. PPL Operations cut outage times to five minutes or less for more than 25,000 customers through the operation of FISR. This represented about 40 percent of customer outages.

PPL also is currently deploying smart meters in the Northeast region. These new AMI meters will introduce “last gasp” and restoration messages that will enable faster detection of outages and will speed power restoration processes. For example, these messages will enable PPL to better detect embedded or nested outages. Full installation of AMI meters by PPL should be completed by early 2019. Smart meter deployment in the Met-Ed and Penelec areas should be 98.5 percent complete by mid-2019. PECO has fully implemented its smart meter program. During Winter Storms Riley and Quinn, PECO estimated that 8,807 truck rolls were avoided which equates to reducing the overall restoration duration by 2-4 days.

Potential benefits of microgrids include increased resilience during electric disruptions; peak load shaving and voltage smoothing; and increased integration of renewable and distributed energy resources (DER) – which holds potential savings for consumers. Interest in microgrids is growing among utilities, government agencies, private businesses and communities across the country. In the Commonwealth, microgrid legislation, HB 1412 (Barrar), is currently pending.

Additionally, the Commission has a combined heat and power (CHP) policy statement and has initiated a CHP working group to engage with stakeholders to encourage the deployment of, and reduce barriers to, CHP initiatives in the Commonwealth. CHP is an efficient means of generating electric power and thermal energy from a single fuel source, providing cost-effective energy services

to commercial and industrial facilities. Additionally, CHP systems enable key facilities to continue operating during outages.

Modernizing rate designs also holds the potential for greater efficiency, reliability and resiliency of the grid of the future – including but not limited to performance-based incentives; various levels of decoupling; and variations of demand-based and time-of-use pricing options, such as critical peak pricing. Act 58, recently passed by the Legislature, provides the Commission with additional regulatory authority to approve alternative ratemaking methodologies for utilities.

In closing, I hope that I have provided insight into the reliability and resiliency issues that the Commission reviews and addresses. The Commission looks forward to working with the General Assembly as well as regulated entities and local leadership to achieve the necessary standards of reliability and service for the Commonwealth's residential and business consumers.

Thank you. I would be happy to address any of your questions.