Richard G. Webster, Jr.
Vice President
Regulatory Policy & Strategy

PECO
2301 Market Street
S15
Philadelphia, PA 19103

Telephone 215.841.5777
Fax 215.841.6208
www.peco.com
dick.webster@peco-energy.com

May 2, 2022

VIA E-FILING ONLY
Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, Pennsylvania 17120

Re: PECO 2021 Annual Electric Reliability Report - PUC Docket No. M-2016-2522508

Dear Secretary Chiavetta:

Enclosed is PECO's 2021 Annual Reliability Report for the period ending December 31, 2021, submitted pursuant to the Electric Service Reliability Regulations at 52 Pa. Code Chapter 57.

Due to the continuing COVID-19 pandemic, PECO's employees are working remotely in the office on a part-time basis. Accordingly, PECO employees will have limited access to photocopying and U.S. mail, among other services. PECO requests that all communications with PECO employees continue to be transmitted by email.

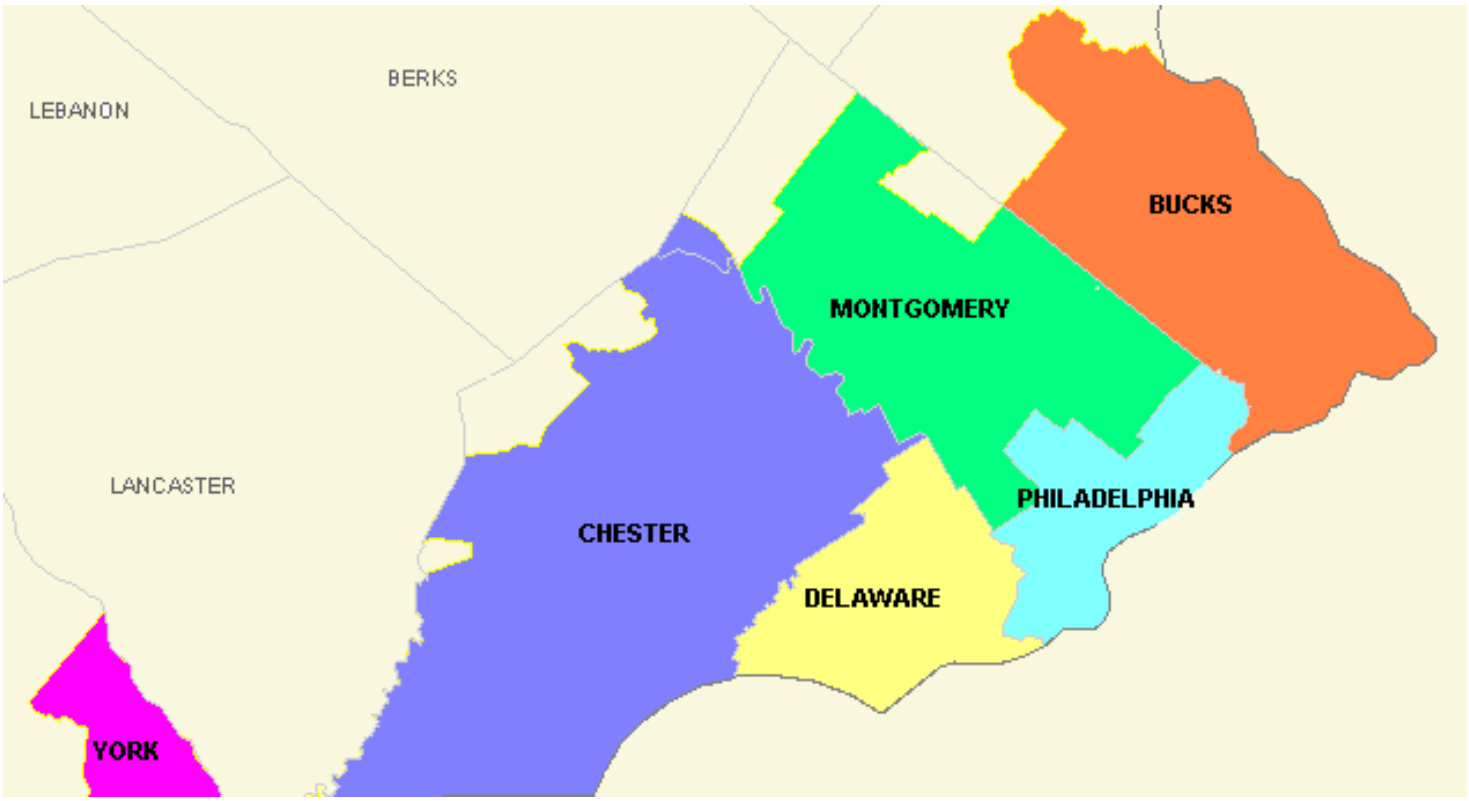
Thank you for your assistance in this matter and please direct any questions regarding the above to Megan McDevitt, Manager, Retail Rates at (215) 841 6361 or via email: megan.mcdevitt@exeloncorp.com.
.

Sincerely,

Enclosure

Cc: John Van Zant (via email only)
Dan Searfoorce (via email only)
Harry R. Bidelspach (via email only)
Office of Consumer Advocate (via email only)
Office of Small Business Advocate (via email only)

2021
Electric Distribution Company
Annual Reliability Report



May 2, 2022

Table of Contents

Introduction

PECO Energy (“PECO”) is submitting this report to the Pennsylvania Public Utility Commission (the “Commission”) in accordance with 52 Pa Code 5.423.

PECO is committed to providing safe and reliable electric service to its customers. PECO serves approximately 1.6 million electric customers covering nearly 2,000 square miles in Bucks, Montgomery, Delaware, Chester, York and Philadelphia Counties, including the City of Philadelphia.

Following years of strong reliability indicators for frequency and duration of interruptions, PECO experienced several significant storms in 2019-21 that led to increased time to restore power, pushing outage duration to elevated levels, while outage frequency remained favorable to historical levels.

B1: Section 57.195(b)(1)

"The annual reliability report shall include … an overall current assessment of the state of the system reliability in the electric distribution company's service territory including a discussion of the electric distribution company's current programs and procedures for providing reliable electric service."

Current Assessment:

PECO's electric transmission and distribution system is reliable, and its restoration of service when outages occur is safe, rapid, and attentive to customers' needs. Each year, investments and operational improvements bring more resilience to PECO's system, and better preparedness for storms and other emergencies. As shown in the Commission's annual reports on electric service reliability in Pennsylvania, PECO's reliability has been strong for the last decade. In 2019 through 2021, PECO experienced several significant storms, most of which did not meet the threshold defined by the Commission for exclusion from reported reliability. The totals of 2019-21 storm interruptions included in PUC indices were elevated, affecting reported duration indices unfavorably.

Annual Reliability Indices for 2021:
For 2021, SAIFI was below its Benchmark, while CAIDI and SAIDI were above their respective Benchmarks. Extended service restoration times caused by several significant storms in 2021 led the duration index of CAIDI and SAIDI to be high.

3-Year Average Reliability Indices for 2019 - 2021:
For 2019 - 2021, average SAIFI was below its Benchmark and Standard, average SAIDI was between its Benchmark and Standard, and average CAIDI was above its Benchmark and Standard. The 2019 through 2021 storms that drove annual CAIDI above its Benchmark also drove 3-year average CAIDI above its 3-Year Average Standard.

Benchmarks and Standards were established on May 7, 2004. No Benchmark or Standard was established for MAIFI.

Programs and Procedures:

PECO Energy continues to stress excellence in fundamentals:

- Safety of our employees and the public
- Emergency response and daily operation
- Thorough preventive and corrective maintenance including the use of drones
- Appropriate capacity and design
- Adequate bulk supply
- Appropriate investment
- Enhanced use of automation and new technologies
- Integration of advanced meter infrastructure (AMI, smart meters) into reliability processes

PECO Energy's program for providing reliable electric service is multifaceted. It starts with a transmission and distribution system that is designed and built to reliable standards. Under a formal, comprehensive, predictive, and preventive maintenance program, equipment receives maintenance to ensure its safe, reliable operation. Vegetation in the proximity of the system is pruned and controlled via a funded, well-managed program that

protects the electric facilities while respecting the beauty and environmental importance of the vegetation. PECO has also implemented a program to upgrade construction in areas of high vegetation interruptions and continues to install reclosers and other protective equipment to limit impacts when interruptions do occur. In response to invasive insects that cause ash tree deaths, PECO has increased its focus on the removal of EAB trees through dedicated mitigation plans and vegetation management programs. In 2021, PECO executed the first year of the Company's filed Reliability & Resiliency Plan Long-term Infrastructure Improvement Plan (LTIIP), with additional capital investments to construct reliability-related improvements over the period 2021 to 2025 focused on storm hardening and resiliency, cable replacements, and substation retirements with related distribution system upgrades.

The transmission and distribution system is operated around-the-clock, every day, from control centers where trained personnel use modern monitoring and control equipment to ensure that equipment is run within its load rating and other technical constraints.

When interruptions to electric service do occur, calls and instant reports from smart AMI meters are noted in a computer-aided outage management system, which associates calls and meter reports with information about the distribution system configuration to construct probable trouble groupings. These outage reports quickly appear on the screens for the operations center personnel. First response personnel are on the system at all times to make trouble locations safe and quickly restore service. The current outage management system has kept pace with technology through upgrades made available by the manufacturer and has been enhanced with information from the Advanced Meter Operating System.

PECO continues to install and upgrade the latest proven and cost-effective technology in support of reliability and safe, efficient operations. Examples include computers in the vehicles of field workers, smart electronic meters with communications and diagnostic capabilities, electronically-controlled switching and communication equipment to automatically reroute power around problem areas, a geographic information system (GIS), and a central distribution system management computer system.

Should a storm or other emergency arise, an appropriate emergency response team is assembled via group pager and cell-phone notification. The trained team performs per the specifications of a thorough, documented, tested emergency response procedure, quickly escalating the magnitude of the response when required, and communicating with the public and government agencies. If necessary, pre-established agreements with local contractors and neighboring utilities are exercised to augment PECO Energy's workforce. Access to further supplemental resources has been maintained since 2012, when PECO augmented its existing mutual assistance agreement with the Mid-Atlantic Mutual Assistance Group by joining the Southeastern Electric Exchange, increasing its ability to respond to major storms. After each significant emergency event, the groups involved evaluate the response. Strengths and weaknesses are identified, action plans are constructed, and individuals are tasked with bringing about the necessary changes to facilities, the organization, the procedures, and the understanding of the procedures by the work force. Management tracks each action item and demands timely completion to ensure continuous improvement.

Seasonal emergency response drills are carefully planned and carried out, followed by critiques and improvements to ensure that the entire organization can function properly when called upon for actual emergencies.

Management sets clearly-defined, challenging reliability goals, communicates them to the work force, demands meaningful action plans, monitors progress, holds the organization accountable for results, and attaches incentive compensation for employees to the achievement of the goals. Full-time engineering professionals monitor and

analyze reliability trends and changes, and institute capital upgrades and improvements to maintenance, design, construction, and/or operations to ensure that customers continue to enjoy reliable electric service.

B2: Section 57.195(b)(2)

"The annual reliability report shall include… a description of each major event that occurred during the year being reported on, including the time and duration of the event, the number of customers affected the cause of the event and any modified procedures adopted in order to avoid or minimize the impact of similar events in the future."

PECO experienced no events in 2021 that qualified as major events under Pa. Code § 57.192, defined below. However, PECO's service territory was substantially affected by remnants of Hurricane Ida, which caused downed tree limbs on power lines, tornados, and flooding which interrupted electric service to 164,989 customers (9.85% of PECO customers). There were five tornados confirmed that touched down in the service area, two of which were confirmed EF-2 and three confirmed EF-1. Significant flood levels breaking historical records caused damage, specifically along the Schuylkill River which had a 100-year flood level. Total damage to PECO's system required 183 transformers, 290 poles, and 681 crossarms to support restoration, which is more material in each of these categories than was required for Tropical Storm Isaias (10% storm) restoration in August 2020. Exclusion of this event was not requested. PECO has installed thousands of reclosers over the last twenty years, which has significantly reduced the customers affected per outage event in storms (i.e., it is highly probable this event would have caused outages exceeding 10% of PECO customers had fewer reclosers been installed).

The Commission defines a major event as either of the following:

An interruption of electric service resulting from conditions beyond the control of the EDC which affects at least 10 % of the customers in the EDC's service territory during the course of the event for a duration of 5 minutes or greater; or

An unscheduled interruption of electric service resulting from an action taken by an EDC to maintain the adequacy and security of the electrical system.

B3: Section 57.195(b)(3)

"The report shall include… a table showing the actual values of each of the reliability indices (SAIFI, CAIDI, SAIDI, and if available, MAIFI) for the electric distribution company's service territory for each of the preceding 3 calendar years. The report shall include the data used in calculating the indices, namely the average number of customers served, the number of sustained customer minutes interruptions, the number of customers affected, and the minutes of interruption. If MAIFI values are provided, the number of customer momentary interruptions shall also be reported"

	SAIFI	CAIDI	SAIDI	MAIFI
2021	0.88	187	164	0.91
2020	0.90	135	122	0.86
2019	1.08	189	205	0.91
2018	0.95	110	106	0.71

	SAIFI	CAIDI	SAIDI	MAIFI
2019 – 2021 Average	0.98	170	164	0.89
Benchmark	1.23	112	138	N/A
3-Year Average Standard	1.35	123	167	N/A

	2021	2020	2019	2018
Number of customers served *	1,678,055	1,673,328	1,662,121	1,649,295
Sustained customer minutes	275,743,622	203,448,803	341,040,677	174,581,540
Number of customers affected	1,478,394	1,506,978	1,802,311	1,592,149
Number of customer momentary interruptions	1,532,454	1,440,715	1,509,449	1,167,283

B4: Section 57.195(b)(4)

"The report shall include… a breakdown and analysis of outage causes during the year being reported on, including the number and percentage of service outages, the number of customers interrupted and customer interruption minutes categorized by outage cause such as equipment failure, animal contact, tree related, and so forth. Proposed solutions to identified service problems shall be reported."

Cause	Service Outages	% of Service Outages	Customer Interruptions	% of Customer Interruptions	Customer Minutes
Animal	1,146	9.0%	35,568	2.4%	2,147,895
Contact/Dig-In	177	1.4%	23,475	1.6%	2,049,450
Equipment Failure	5,035	39.6%	509,444	34.5%	55,048,738
Lightning	465	3.7%	48,038	3.2%	8,169,203
Other	546	4.3%	86,978	5.9%	14,244,382
T&S	21	0.2%	83,715	5.7%	43,916,344
Unknown	469	3.7%	68,715	4.6%	5,450,984
Vegetation-Broken/Uprooted	3,888	30.6%	506,687	34.3%	128,111,878
Vegetation-Ingrowth	538	4.2%	44,830	3.0%	10,843,922
Vehicles	424	3.3%	70,944	4.8%	5,760,825

The largest contributors to customer interruptions were tree-related interruptions and equipment failure. The leading groups within the equipment failure category were aerial equipment and underground equipment. Equipment is replaced based on observed trends under reliability programs and PECO's Long-term Infrastructure Improvement Plans. Most customer interruptions caused by trees came from broken branches and tree trunks or uprooted trees (34.3% of all customer interruptions), as opposed to ingrowth (3.0% of all outage customer interruptions). PECO has continued to supplement its regularly scheduled vegetation management cycle with a hazard tree removal program and off-cycle trim program to target trees that overhang the distribution system.

PECO has observed an increase in dead and declining ash trees near its electrical facilities. Emerald ash borers (invasive insects that cause ash tree deaths) are known to be concentrated in the eastern United States and have infested areas across the PECO territory. Limb and tree failures caused by emerald ash borers are expected to continue through much of this decade. PECO's execution of enhanced vegetation maintenance on circuit segments identified through annual reliability performance assessments mitigates risks to facilities and customer reliability.

B5: Section 57.195(b)(5)

"The reports shall include… a list of the major remedial efforts taken to date and planned for circuits that have been on the worst performing 5% of circuits list for a year or more."

See Appendix A

B6: Section 57.195(b)(6)

"The report shall include… a comparison of established transmission and distribution inspection and maintenance goals/objectives versus actual results achieved during the year being reported on. Explanations of any variances shall be included."

General Statement on Maintenance Programs Work Prioritization and Scheduling

PECO Energy develops its annual T&D maintenance plan to conform to company established maintenance cycles and based on current program priority determined by safety, risk and reliability evaluations. Resources may be reallocated during the maintenance period depending on impact of key performance areas. There is an adherence to schedule grace period equivalent to 25% of the maintenance cycle length to allow for scheduling and bundling of work.

PECO Energy's Distribution Inspection and Maintenance Plan vs. Actual Work for 2021

Maintenance Program	Planned Tasks	Completed Tasks
Recloser Inspections (Number of reclosers inspected)	246	698
Circuit Patrol & Thermography (Number of circuits inspected)	976	1,959
Pole Inspections (Number of poles inspected)	34,695	37,480
Padmount Transformer Inspections (Number of maintenance tasks performed (e.g. visual inspection, functional testing)	6,718	7,636
Below Ground Transformers (Number of maintenance tasks performed (e.g. visual inspection, functional testing)	1,563	1,608
Substation Inspections (Number of maintenance tasks performed (e.g. visual inspection, predictive/diagnostic maintenance, preventive maintenance) for a variety of substation components)	1,360	1,415
Unit Substations (Number of maintenance tasks performed (e.g. calibration, trip testing)	2,960	3,112

Vegetation Management Preventive Maintenance Program

Maintenance Program	Miles Planned	Miles Completed
Distribution Lift & Manual Trimming	2,304	2,926
Transmission Trim & Removal	202	202

B7: Section 57.195(b)(7)

"The report shall include…a comparison of budgeted versus actual Transmission and Distribution operation and maintenance expenses for the year being reported on in total and detailed by the electric distribution company's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included."

Operation and Maintenance Expenses

Functional Account Code	Budget	Actual	Variance
New Business Connections	$3.4	$3.6	($0.2)
Capacity Expansion	$0.6	$0.6	($0.0)
System Performance	$76.2	$76.9	($0.7)
Facility Relocation	$1.7	$0.5	$1.2
Maintenance	$204.1	$212.2	($8.1)
Category Totals	$286.0	$293.8	($7.8)
Budgeted T&D O&M Expenses		$286.0	
Actual T&D O&M Expenses		$293.8	
Variance		($7.8)	
Percent Variance		(2.7%)	

"Explanations of any variances 10% or greater shall be included"

- **Facility Relocation –** Under budget due to revised scope of work on various relocation projects.

B8: Section 57.195(b)(8)

"The report shall include… a comparison of budgeted versus actual Transmission and Distribution capital expenditures for the year being reported on in total and detailed by the electric distribution company's own functional account code or FERC account code as available. Explanations of any variances 10% or greater shall be included."

Capital Expenses

Functional Account Code	Budget	Actual	Variance
New Business Connections	$73.4	$86.8	($13.4)
Capacity Expansion	$49.3	$41.9	$7.4
System Performance	$481.0	$493.9	($12.9)
Facility Relocation	$23.6	$11.8	$11.8
Maintenance	$148.9	$149.1	($0.2)
Category Totals	$776.2	$783.5	($7.3)
Budgeted Capital Expenses		$776.2	
Actual Capital Expenses		$783.5	
Variance		($7.3)	
Percent Variance		(0.9%)	

"***Explanations of any variances 10% or greater shall be included"***

- **New Business Connections –** Over budget due to increased residential development and commercial projects.
- **Capacity Expansion** – Under budget due to reallocation of funds to support increased scope of various system performance programs.
- **Facility Relocation –** Under budget due to decreased scope of work on various relocation projects.

B9: Section 57.195(b)(9)

"The report shall include… quantified Transmission and Distribution inspection and maintenance goals/objectives for the current calendar year detailed by system area (i.e., transmission, substation, and distribution)."

PECO Energy's 2022 Transmission and Distribution Inspection and Maintenance Plan
Per 52 Pa Code Chapter 57.198, PECO's Biennial Inspection, Maintenance, Repair and Replacement plan filed September 27, 2018.

Maintenance Program	Units (Planned) Annual
Recloser Inspections (Number of reclosers inspected)	407
Circuit Patrol & Thermography (Number of circuits patrolled)	970
Pole Inspections (Number of poles visually inspected)	34,000
Padmount Transformers (Number of transformers visually inspected)	6,666
Below Ground Transformers (Number of transformers visually inspected)	1,234
Substations (Number of substations inspections performed.(e.g. visual inspection, reading of currents, voltages, temperature etc.) for a variety of substation components)	1,360
Unit Substations (Number of unit substations inspections performed .(e.g. visual inspection, reading of currents, voltages, temperature etc.) for a variety of substation components)	2,830

Vegetation Management Preventive Maintenance Program

Maintenance Program	Miles Planned
Distribution Lift & Manual Trimming	2,396
Transmission Trim & Removal	193

B10: Section 57.195(b)(10)

"The report shall include… budgeted transmission and distribution operation and maintenance expenses for the current year in total and detailed by the electric distribution company's own functional account code or FERC account code as available."

Functional Account Code	2022 O&M Budget
New Business Connections	$3.8
Capacity Expansion	$0.2
System Performance	$97.2
Facility Relocation	$1.5
Maintenance	$216.5
Category Totals	$319.3

B11: Section 57.195(b)(11)

"The report shall include… budgeted transmission and distribution capital expenditures for the current year in total and detailed by the electric distribution company's own functional account code or FERC account code as available."

Functional Account Code	2022 Capital Budget
New Business Connections	$79.2
Capacity Expansion	$12.2
System Performance	$547.3
Facility Relocation	$18.5
Maintenance	$153.2
Category Totals	$810.5

B12: Section 57.195(b)(12)

"The report shall include… significant changes, if any, to the Transmission and Distribution inspection and maintenance programs previously submitted to the Commission."

- Beginning in 2020, PECO's padmount transformer inspection cycle was changed from five years to eight years. PECO requested this waiver as part of its Biennial Inspection, Maintenance, Repair Replacement Plan (2020 through 2021), and the Commission granted this waiver.

Appendix A

The following circuits were on our worst performing 5% of circuits list for a year or more:

FLINT_132
GERMANTOWN_014
KENNETT_SQUAR_005
LANDENBERG_000
LINE_708

As of the date of this report, analysis of these circuits continues. Information on remedial efforts taken and planned in addition to the details provided on the following pages will be included in future quarterly reliability reports.

Below are the efforts taken to date and planned for these circuits:

FLINT_132
Montgomery County
Completed:
Complete corrective reliability work orders
Upgrade fusing
Planned:
Complete corrective reliability work orders
Inspect circuit visually and with thermographic camera

GERMANTOWN_014
Philadelphia County
Completed:
Complete corrective reliability work orders
Inspect circuit visually and with thermographic camera
Inspect selected areas of circuit for vegetation issues and correct as needed
Upgrade insulators
Planned:
Install new fusing

KENNETT_SQUAR_005
Chester County
Planned:
Inspect circuit visually and with thermographic camera

LANDENBERG_000
Chester County
Completed:
Inspect circuit visually and with thermographic camera
Remedial efforts completed

LINE_708
Philadelphia County
Completed:
Complete corrective reliability work orders
Inspect selected areas of circuit for vegetation issues and correct as needed

Install animal protection

Planned:

Inspect circuit visually and with thermographic camera

Appendix B

New Business

This work category includes all the facility work required to add a new customer or to increase the load to an existing customer. The facility work will include the facilities required to directly connect the customer to the system and the upgrade/replacement of any existing facility to serve the requested additional load.

Capacity Expansion

This work category includes only capacity work generated by the system design engineer to prevent system failure and to assure the delivery of voltage as specified in the tariff. The addition of new substations and substation enlargements for future load growth will also be included in this project.

System Performance

This work category includes projects designed to upgrade, modify or improve the performance of the distribution system. Also included in this category are indirect costs in support of all categories and one-time accounting adjustment items.

Facility Relocation

This work category includes all requests for relocation of PECO facilities including municipal as well as customer related relocation requests.

Maintenance

This work category includes work performed to repair and restore equipment to its normal state of operation, along with planned preventive maintenance work such as visual and thermographic inspections and tree trimming around transmission and distribution lines.

Storm Funds

Incremental costs (primarily; overtime, contractors, mutual assistance, and meals) incurred while responding to major storms (storms that meet customer outage and duration criteria).