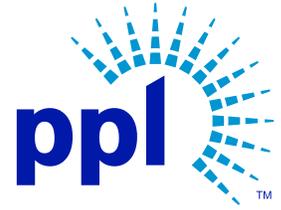


Kimberly A. Klock
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VIA E-FILING

March 3, 2025

Rosemary Chiavetta, Esquire
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

**Re: PPL Electric Utilities Corporation
2024 Annual Asset Optimization Plan
Docket No.**

Dear Ms. Chiavetta:

Enclosed for filing on behalf of PPL Electric Utilities Corporation is its 2024 Annual Asset Optimization Plan.

Copies have been provided as indicated on the Certificate of Service.

Pursuant to 52 Pa. Code § 1.11, the enclosed document is to be deemed filed on March 3, 2025, which is the date it was filed electronically using the Commission's E-filing system.

If you have any questions or need additional information, please contact me or Mark Safi, Senior Manager Engineering, at (610) 774-6916.

Respectfully submitted,

A handwritten signature in blue ink that reads "Kimberly A. Klock". The signature is written in a cursive, flowing style.

Kimberly A. Klock

Enclosures

cc: Certificate of Service

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

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Date: March 3, 2025



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PPL Electric Utilities Corporation
Annual Asset Optimization Plan
Year Ended December 31, 2024

PPL Electric Utilities Corporation

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Introduction

PPL Electric Utilities Corporation (“PPL Electric” or the “Company”) files this Annual Asset Optimization Plan (“AAO Plan”) in compliance with 66 Pa.C.S. § 1356. Section 1356 requires a utility with an approved distribution system improvement charge (“DSIC”) and long-term infrastructure improvement plan (“LTIP”) to file an AAO Plan. Consistent with the requirements of Section 1356, PPL Electric’s AAO Plan will provide:

- (1) A description that specifies all eligible property repaired, improved and replaced in the immediately preceding 12-month period pursuant to the utility's long-term infrastructure improvement plan and prior year's asset optimization plan; and
- (2) A detailed description of all the facilities to be improved in the upcoming 12-month period.

The AAO Plan is part of PPL Electric’s overall strategy to repair, improve, and replace its aging distribution infrastructure to ensure that its system continues to be safe, reliable, and able to meet the needs and expectations of its customers. PPL Electric’s plans reflect the Company’s ongoing commitment to accelerate its investment, while managing finite resources and ensuring that its portfolio of activities is effective. As a result, PPL Electric’s plans for the upcoming 12-month period have been developed incorporating the lessons learned from the Company’s experience with an effective LTIP and DSIC.

Procedural History

On February 14, 2012, Governor Corbett signed into law Act 11 of 2012 (“Act 11”), which amends Chapters 3, 13 and 33 of the Public Utility Code. Act 11 authorizes electric distribution companies (“EDCs”), natural gas distribution companies (“NGDCs”), water utilities, wastewater utilities and city natural gas distribution operations to establish a DSIC. The DSIC allows utilities to recover reasonable and prudent costs incurred to repair, improve, or replace certain eligible property that is part of the utility’s distribution system. Eligible property for EDCs is defined in Section 1351 of the Public Utility Code. *See* 66 Pa.C.S. § 1351. As a precondition to the initial implementation of a DSIC, each utility must file and obtain approval of an LTIP that is consistent with the provisions of Section 1352 of the Public Utility Code. *See* 66 Pa.C.S. § 1352(a). Act 11 also requires a yearly compliance filing known as an AAO Plan. *See* 66 Pa.C.S. § 1356.

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On August 2, 2012, the Commission issued its Final Implementation Order establishing procedures and guidelines necessary to implement Act 11. The Final Implementation Order adopted the requirements established in Act 11, provided additional standards that each utility must meet in developing an LTIIP and DSIC, and gave guidance to utilities for meeting the Commission's standards.

On March 14, 2013, the Commission entered a Proposed Rulemaking Order at Docket No. L-2012-2317274 in *Review of Long-Term Infrastructure Improvement Plan*. In its Order, the Commission provided proposed regulations regarding the LTIIP, including information on modification of a utility's LTIIP, and the annual review process for the AAO Plan. On May 23, 2014, after review of comments from interested stakeholders, the Commission entered a Final Rulemaking Order, which set forth the elements an LTIIP must contain and outlined the procedure and process for filing and review of LTIIPs and AAO Plans. The Final Rulemaking Order was published in the *Pennsylvania Bulletin* on December 20, 2014 (44 Pa.B. 7856), and the final regulations at 52 Pa. Code §§ 121.1-121.8 became effective upon that publication.

On September 21, 2016, the Commission entered a Supplemental Implementation Order at Docket No. M-2012-2293611 in *Implementation of Act 11 of 2012*. In that Order, the Commission addressed issues regarding the implementation, operation and computation of the DSIC. Specifically, the Commission addressed the requirement of quarterly financial reports for all utilities that use the DSIC mechanism; filing and computation issues for when the DSIC is reset to zero; treatment of over/under collections, or E-factor, after the DSIC is reset to zero; computation issues for determining the DSIC rate cap; and the requirement to file an LTIIP by water utilities that use the DSIC.

On October 27, 2022, the Commission entered a Supplemental Implementation Order ("October 2022 Order") at Docket No. M-2012-2293611 when it was determined that changes must be made to the DSIC calculation and the DSIC model tariff in order to implement changes required by the Pennsylvania Supreme Court's decision in *McCloskey v. Pa. PUC*, 255 A.3d 416 (Pa. 2021). In *McCloskey*, the Pennsylvania Supreme Court affirmed the Commonwealth Court of Pennsylvania's holding that new statutory language added by Act 40 applied to the DSIC and modified its calculation. In the October 2022 Order, the Commission directed utilities to file a proforma tariff supplement reflecting the updated formula for the calculation of the DSIC. Subsequently, on November 10, 2022, the Office of Consumer Advocate ("OCA") filed a Petition for Clarification and Reconsideration ("Petition") of the October 2022 Order. PPL Electric filed an Answer to OCA's Petition on November 21, 2022. In compliance PPL Electric Utilities Corp.

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with the October 2022 Order, PPL Electric filed its DSIC proforma tariff supplement on December 1, 2022, with an amended version filed December 20, 2022.

On April 26, 2024, PPL Electric filed a Petition for a Waiver of the Distribution System Improvement Charge Cap of 5% of Billed Revenues, in which the Company proposed an increase of the DSIC cap to 9%. On November 21, 2024, Administrative Law Judge Arlene Ashton (“ALJ Ashton”) issued her Recommended Decision denying PPL Electric’s Petition. On February 20, 2025, the Commission adopted a Motion by Commissioner Yanora to grant in part and deny in part PPL Electric’s Exceptions to the Recommended Decision, under which the Company would be granted a temporary increase in the DSIC cap from 5% to 7.5% until the effective date of rates established in PPL Electric’s next base rate case or the end of the Company’s 2023-2027 LTIP, whichever occurs first. As of the date of this AAOP, the Commission’s Final Order consistent with that Motion has yet to be issued.

PPL Electric has been a long-time supporter of implementing a DSIC for EDCs and has actively participated in the Commission’s process to develop the procedures and policies surrounding the Commission’s implementation of Act 11. PPL Electric was a participant in the Commission’s working groups and filed comments to both of the Commission’s Tentative Implementation Orders.

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Background

PPL Electric is a public utility and an EDC as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 102, 2803. PPL Electric furnishes electric distribution, transmission, and default service electric supply services to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of 29 counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania.

On January 10, 2013, PPL Electric's first LTIP ("First LTIP") was approved by the Commission at Docket No. P-2012-2325034. PPL Electric's First LTIP covered the years 2013 through 2017. PPL Electric filed a petition seeking approval of a DSIC on January 15, 2013, which was approved in an Order entered on May 23, 2013, at Docket No. P-2012-2325034. PPL Electric's second LTIP ("Second LTIP") was filed with the Commission on August 31, 2017, and was approved in an Order entered on December 21, 2017, at Docket No. P-2017-2622393. The Company's Second LTIP covers the years 2018-2022. PPL Electric's third LTIP ("Third LTIP") was filed with the Commission on September 2, 2022, and was approved in an Order entered on December 22, 2022, at Docket No. P-2022-3034972. The Third LTIP covers the years 2023-2027. In preparing its LTIPs, PPL Electric followed the guidelines established in the Commission's August 2, 2012 Final Implementation Order at Docket No. M-2012-2293611.

On January 17, 2024, PPL Electric filed a Petition for Approval of Major Modifications to its Third LTIP. In the Petition, PPL Electric requested Commission approval of certain "major" modifications to its Third LTIP, namely: (1) adding a new program, i.e., Predictive Failure Technology ("PFT"); and (2) updating its total capital expenditure projection for the LTIP, which exceeded by more than 20% the total capital expenditure projection set forth in the current LTIP. On July 11, 2024, the Commission entered an Order granting in part and denying in part PPL Electric's Petition. Specifically, the Commission approved all other proposed modifications to the Third LTIP, except for the addition of the PFT program ("Modified Third LTIP"). PPL Electric filed a corrected compliance version of its Modified Third LTIP on August 28, 2024, and the Commission issued a Secretarial Letter on September 9, 2024, approving the corrected compliance version of the Modified Third LTIP.

Within the LTIPs, PPL Electric categorized its distribution system infrastructure planned for replacements into asset groups and provided descriptions of the DSIC-eligible projects. Details on each of the asset groups included factors used to identify the need for the project, average age of the asset, scope of the project including the number of units to be replaced or improved over the PPL Electric Utilities Corp.

PPL Electric Utilities Corporation

next five years, the approximate location by geographic region for the projects, and the yearly expenditures for the five-year period covered by the LTIIPs for each asset class.

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Executive Summary

The upcoming 12-month period (2025) is covered by PPL Electric's Modified Third LTIIP, which contains a consolidated set of asset groups. As the table on page 10 shows, in 2024, PPL Electric spent \$150.10 million and plans to spend \$154.44 million on DSIC-eligible projects in 2025.

Reliability Performance

Since the 1994-1998 benchmark period, which defines PPL Electric's reliability performance targets, PPL Electric's service reliability has significantly improved; however, year over year reliability performance is impacted by varying weather conditions. In 2024, PPL Electric was below the Commission's benchmark for SAIFI, largely attributable to storm volume and severity. PPL Electric experienced 37 storms in total, with nine of them being Tier 4 or higher, meaning each event resulted in over 800 outage cases. For context, the number of Tier 4 or higher storms in 2024 equaled the total count of similarly severe storms over the previous 11 years combined.

Overall, PPL Electric has been nationally ranked as a 1st quartile SAIFI performer over the past 10 consecutive years by IIEEE and over the past 11 consecutive years by EEI as a result of a decade of reducing permanent customer outages.

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The table below illustrates PPL Electric's past 5-year reliability performance as compared to the Commission benchmark and the IEEE 1366-2012 standard.

		2020	2021	2022	2023	2024
Average Number of Customers Served		1,438,204	1,445,611	1,445,611	1,445,611	1,470,254
PUC METRICS	SAIFI (Benchmark = 0.98; rolling 12-month Std. = 1.18)	0.84	0.91	0.87	0.78	1.22
	CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	137	187	164	189	371
	SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	116	170	142	147	451
	MAIFI	5.3	2.6	1.4	0.3	9.7
	Number of Sustained Customer Interruptions (Trouble Cases)	20,877	24,241	23,882	23,082	32,294
	Number of Customers Affected	1,212,136	1,308,569	1,256,631	1,134,905	1,791,362
	Customer Minutes of Interruptions	166,414,603	245,413,282	206,385,043	214,249,565	663,783,475
	Number of Customer Momentary Interruptions	7,639,856	3,817,912	2,020,520	470,353	14,308,908
IEEE METRICS	SAIFI	0.69	0.68	0.74	0.64	0.66
	CAIDI	99	124	120	142	137
	SAIDI	69	85	89	91	90
	MAIFI	4.2	2.1	0.8	0.3	6.6
	Number of Sustained Customer Interruptions (Trouble Cases)	23,495	24,032	25,211	24,522	26,326
	Number of Customers Affected	990,900	988,372	1,071,806	935,297	971,887
	Customer Minutes of Interruptions	98,721,644	122,230,348	129,679,197	133,236,331	132,702,811
	Number of Customer Momentary Interruptions	6,066,279	3,100,572	1,232,315	404,981	9,631,692

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Approximately 35% of the capital dollars for distribution operations is allocated to Act 11 projects; therefore, the assumption was made that 35% of the Full Time Equivalent (“FTE”) positions would be used for Act 11 purposes as well. The only breakdown available is between PPL Electric (PPL) and contract (COC) employees; there is no further drill down available at a field/supervisory level. The data shown below are for FTE only.

Year	PPL	COC	Total
2024	172	184	356

LTTIP Category	2024 Modified Third LTIIP	2024 Actuals	2025 Modified Third LTIIP	2025 Forecast
Poles	\$19.70	\$12.58	\$17.11	\$13.51
New Electronic Reclosers*	\$10.10	\$3.62	\$7.55	\$18.40
Distribution Animal Guarding	\$0.34	\$0.63	\$0.32	\$0.31
Failed Equipment	\$42.44	\$55.59	\$34.12	\$37.13
Underground Cable Replacement	\$4.36	\$0.39	\$1.98	\$7.91
Low Tension Network Equipment and Structures	\$3.76	\$1.58	\$4.56	\$5.36
LTN Upgrades*	\$10.55	\$4.90	\$11.56	\$10.49
Reliability	\$32.97	\$15.62	\$7.13	\$7.13
System Reliability Improvements Projects	\$11.52	\$21.11	\$12.66	\$12.66
Unreimbursed Highway Relocation	\$4.50	\$10.12	\$4.92	\$7.45
Substations	\$26.94	\$16.38	\$28.12	\$17.33
Protection and Control	\$21.73	\$7.58	\$13.47	\$16.76
Total	\$188.91	\$150.10	\$143.50	\$154.44

Dollars in Millions

**Categories eligible to receive IIJA funding from the DOE with a 43% cost share with the DOE. As of this filing, no funding has been received by PPL Electric.*

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Distribution Assets

The following pages set forth actual results for calendar year 2024. These assets include, but are not limited to, the following:

- Structures
 - Poles
 - Crossarms
 - Vaults
 - Manholes
- Overhead Conductors and Hardware
- Underground Cables and Hardware
- Switching Devices
 - Air Break Switches
 - Disconnect Switches
 - Switching Cabinets
- Protective Devices
 - Fuses
 - Reclosers
 - Network Protectors
 - Lightning Arresters
- Transformers
 - Overhead
 - Pad-Mounted
 - Submersible
 - Low Tension Network

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Poles

This category includes the replacement and reinforcement of wood poles to maintain reliability, ensure public safety, and further storm harden the system.

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$19.70
2024 AAOP Forecast	\$19.70
2024 Actual	\$12.58
2025 Forecast	\$13.51

Distribution Pole Replacements

Program Description and Purpose

Replacement of distribution wood poles identified as non-restorable (cannot be reinforced) during the annual inspect and treat program or during a spot inspection to improve public and employee safety, as well as service reliability. This program contributes to storm hardening efforts and aims to improve public and employee safety, as well as service reliability, by reducing potential pole failures.

Identification/Justification Process

PPL Electric inspects approximately 75,000 poles per year. Historical data suggests an approximate 6% rejection rate from the population of yearly inspections. Of those poles rejected, 25% are candidates for reinforcement and 75% are candidates for replacement. Replacing rejected poles avoids property damage and risk of accidental injury, and it mitigates the costs associated with extended service outages. Replacement rates are expected to fall as a result of PPL Electric's pole treatment program. The average age of an in-service wooden distribution pole is 42 years.

Scope

The scope of the program is a direct correlation to the number of wood pole inspections.

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Replacements in Units	
2024 Modified Third LTIP	2,000 - 2,500
2024 AAOP Forecast	2,000 - 2,500
2024 Actual	1,171
2025 Forecast	2,000 – 2,500

Locations

Specific locations are a direct correlation to the wood pole inspection plan. Inspection locations are identified yearly primarily as a function of previous inspection dates, as well as ensuring cost-effectiveness of the program and minimizing inspection crew movements.

Comments:

In 2024, completed pole replacements came in below the forecast due to the number of storms experienced and the associated resource availability. All remaining work initially scheduled for 2024 is expected to be completed in 2025.

Pole Reinforcements

Program Description and Purpose

Reinforcement of deteriorated distribution wood poles in order to restore the pole’s original strength, ensure public safety, and maintain reliable electric service through the reduction of potential pole failures. This program contributes to storm hardening efforts by reducing potential pole failures.

Identification/Justification Process

PPL Electric inspects approximately 75,000 poles per year. Historical data suggests an approximate 6% rejection rate from the population of yearly inspections. Of those poles rejected, 25% are candidates for reinforcement. When applicable, this method achieves significant savings over pole replacement.

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Scope

Reinforcements in Units	
2024 Modified Third LTIP	4,000 – 5,000
2024 AAOP Forecast	4,000 - 5,000
2024 Actual	1,174
2025 Forecast	400 - 800

Locations

Locations identified for reinforcement are a direct correlation to the number of wood pole inspections.

Comments:

Poles that fail inspection are tested to see if they qualify for reinforcement rather than fully replacing the pole. The poles are reinforced using C-Truss or fiber wrap. In 2023, an effort to continue strategic storm hardening initiatives drove a process change to no longer reinforce poles that were over a certain age. Due to contractor resourcing and performance, some of the 2024 reinforcements were carried over into 2025. These reasons led to fewer poles being reinforced than originally forecasted in 2024.

New Electronic Reclosers

Program Description and Purpose

Proactive installation of new electronic reclosers on both single-phase and three-phase lines, to improve reliability performance by increasing circuit sectionalizing ability. Reclosers minimize the number of customers affected by a sustained outage.

Identification/Justification Process

Locations are requested by regional reliability engineers and prioritized annually based on anticipated reliability savings. A gradual scope reduction is assumed in the outer years as a result of saturation of reclosers and other distribution automation equipment.

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Scope

Installations in Units	
2024 Modified Third LTIP	120-250
2024 AAOP Forecast	120-250
2024 Actual	72
2025 Forecast	200 - 230

Locations (2024 Actual)

Region	Units
Lehigh	18
Northeast	17
Central	9
Susquehanna	8
Harrisburg	11
Lancaster	9

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$10.10
2024 AAOP Forecast	\$10.10
2024 Actual	\$3.62
2025 Forecast	\$18.40

Comments:

The number of three phase device installs were lower than anticipated due to three manufacturing defects that delayed the delivery of reclosers and temporarily halted installations of equipment at hand. Additionally, there were resource constraints with single phase installations due to the volume of storms in 2024; they are on track to be completed in early 2025.

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Distribution Animal Guarding

Program Description and Purpose

Proactive installation of animal guards on existing distribution overhead transformers and air break switches to improve circuit reliability. Animal guards help prevent animal-related contacts which cause service interruptions.

Identification/Justification Process

Transformers are identified both by opportunistic installation of guarding during other non-related work, and by on-the-spot or follow-up orders after responding to animal-caused outages.

Scope

Areas To Address	
2024 Modified Third LTIP	240 - 360
2024 AAOP Forecast	240 - 360
2024 Actual	362
2025 Forecast	240 - 360

Locations (2024 Actual)

Region	Units
Lehigh	13
Northeast	90
Central	53
Susquehanna	23
Harrisburg	107
Lancaster	76

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$0.34
2024 AAOP Forecast	\$0.34
2024 Actual	\$0.63
2025 Forecast	\$0.31

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Comments:

Animal guarding work was in line with the forecast. Actual expenditures were higher than anticipated due to higher unit rates established with backshift crews.

Failed Equipment

Program Description and Purpose

This category includes the replacement of failed or deteriorated distribution equipment, Low Tension Network (“LTN”) equipment, underground cable, and underground getaways.

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$42.44
2024 AAOP Forecast	\$42.44
2024 Actual	\$55.59
2025 Forecast	\$37.13

Comments:

Planned expenditures were above the forecast due to increased units of overhead failed equipment.

Distribution Failed Equipment

Program Description and Purpose

Replacement or repair of failed or deteriorated capital units of distribution equipment, excluding underground cable, in order to maintain adequate service reliability.

Identification/Justification Process

Candidates are identified via inspections, both planned and ad-hoc, as well as actual outages and power service problems. Budget allocations are based on historical trends of hours charged to corrective work, in addition to projected trends of future equipment failures. Examples include, but are not limited to, failed reclosers, poles, capacitor banks, and air breaks.

Scope & Locations

Scope and locations are determined as equipment fails.

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Replace Failed Underground Cable

Program Description and Purpose

Replacement of failed underground residential primary cables in order to maintain adequate service reliability.

Identification/Justification Process

Candidates are identified via actual failures. Budget recommendations are based on historical trends of hours charged to corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as cable fails.

Replace Failed 12 kV Underground Getaway Cables

Program Description and Purpose

Replacement of failed 12 kV underground getaway cables in order to maintain adequate service reliability. Getaway failures can result in long duration outages. Getaway cables connect substations to outgoing feeders beyond the substation perimeter.

Identification/Justification Process

Candidates are identified via actual failures and cables with severely poor testing results. Budget recommendations are based on historical trends of hours charged to corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as cables fail in-service or fail testing.

Replace Deteriorated/Failed Low Tension Network Equipment and Structures

Program Description and Purpose

Replacement or repair of deteriorated and failed equipment related to low-tension networks, including submersible transformers, network protectors, manholes, and vault tops in order to maintain adequate service reliability. Low-tension networks are low voltage underground distribution facilities found in urban areas.

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Identification/Justification Process

Candidates are identified via actual failures, inspections, testing, or work on the system. Budget recommendations are based on historical trends of hours charged to corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as cable fails.

Replace Deteriorated/Failed Area Supply Substations

Program Description and Purpose

Replacement of failed or deteriorated station facilities at area supply substations with in-kind equipment to maintain safe and reliable service. Identified facilities include, but are not limited to, circuit breakers, power transformers, tie/transfer cables, disconnect switches, DC equipment, and instrument transformers.

Identification/Justification Process

Candidates are identified via actual failures, inspections, and test results. Budget recommendations are based on historical trends in equipment failure quantities and costs, in addition to projected trends of future equipment failures based on asset health metrics.

Scope & Locations

Scope and locations are determined as station equipment fail while in service or fail conditionally under testing.

Underground Cable Replacement

Program Description and Purpose

Programmatic replacement of deteriorated underground cable to maintain reliable electric service.

Identification/Justification Process

Candidates are selected based on history of cable failures and failure risk scores generated by a data analytics model that uses criteria such as segment length, cable age, customer count, and number of tap fuse outages.

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Scope

Scope In Cable Segments	
2024 Modified Third LTIP	220 - 320
2024 AAOP Forecast	220 - 320
2024 Actual	66
2025 Forecast	570 - 670

Locations (2024 Actual)

Region	Units
Lehigh	20
Northeast	7
Central	12
Susquehanna	0
Harrisburg	7
Lancaster	20

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$4.36
2024 AAOP Forecast	\$4.36
2024 Actual	\$0.39
2025 Forecast	\$7.91

Comments:

While segments placed in service in 2024 came in below the forecast, all planned projects from 2024 are on track to be completed in 2025. Although various factors led to projects being delayed, contractor availability due to an above-average number of storms and failed cable sections was a primary factor. Furthermore, approximately 93 segments were delayed due to resource constraints associated with an increased volume of storms in 2024.

Low Tension Network Primary Cable, Equipment and Structures

Program Description and Purpose

Programmatic replacement of deteriorated equipment related to Low Tension Networks, including primary underground cable, network transformers, network protectors, manholes, and vault tops. The purpose of this program is to ensure public safety and service reliability through the replacement of underground facilities

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that have reached the end of their expected life or that show signs of premature age from prolonged exposure to corrosive environments.

Identification/Justification Process

Primary underground cables for Low Tension Network feeders are reaching their end of useful life and proactive replacements mitigate feeder outages. Replacement and repairs of manhole and vault tops are determined by regular inspections. Network transformer and network protector replacements are determined through inspection and age, where assets exceeding 40 years in service are considered highest priority.

Scope

	Planned Expenditure	Units
Primary Cable	2024 Modified Third LTIP	0 - 2
Primary Cable	2024 AAOP Forecast	0 - 2
Primary Cable	2024 Actual	2
Primary Cable	2025 Forecast	0 - 2
LTN Equipment	2024 Modified Third LTIP	6 - 18
LTN Equipment	2024 AAOP Forecast	6 - 18
LTN Equipment	2024 Actual	1
LTN Equipment	2025 Forecast	30 - 75

Locations (2024 Actual)

Region	LTN Equipment	Cable
Lehigh	0	2
Northeast	1	0
Central	0	0
Susquehanna	0	0
Harrisburg	0	0
Lancaster	0	0

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$3.76
2024 AAOP Forecast	\$3.76
2024 Actual	\$1.58
2025 Forecast	\$5.36

Comments:

While units placed in service in this category are shown as below the forecast, a large portion of the work eligible to be completed in this category was completed under the Deteriorated/Failed LTN equipment & structures category (see above section). Specific numbers are not forecasted or reported for that category. Both categories have been used interchangeably in the past. However, there will be an increased focus on accurate categorization going forward.

LTN Upgrades

Program Description and Purpose

The purpose of this program is to install remote monitoring and control equipment in all LTN vaults, upgrade network devices up to the latest standard, replace vault equipment near its end of useful life, and install telemetry on secondary network cable. These improvements will allow for safer operation of LTNs, reduce maintenance costs, reduce failed equipment requiring replacement, and provide better data for asset planning and investments.

Identification/Justification Process

Rollout of this program began in the Lehigh and Harrisburg regions. By the completion of this program in 2026, all LTN vaults will receive automation.

Scope

Replacements in Units	
2024 Modified Third LTIP	62
2024 AAOP Forecast	62
2024 Actual	37
2025 Forecast	212

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Locations (2024 Actual)

Region	Units
Lehigh	19
Northeast	1
Central	0
Susquehanna	0
Harrisburg	17
Lancaster	0

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$10.55
2024 AAOP Forecast	\$10.55
2024 Actual	\$4.90
2025 Forecast	\$10.49

Comments:

The number of LTN automation jobs constructed in 2024 was below the forecast due to construction delays. Additionally, crew availability, and switching capability, was impacted by high levels of storm activity. All jobs initially planned for 2024 are expected to be completed in 2025, which will put the Company on track to finish LTN upgrades by the end of 2026 as planned.

Reliability

This category includes deployment of Smart Grid devices and distribution circuit upgrades to address reliability issues identified through inspections or various circuit or customer level performance metrics.

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$32.97
2024 AAOP Forecast	\$32.97
2024 Actual	\$15.62
2025 Forecast	\$7.13

Comments:

Actual 2024 expenditures were below the forecasted value due to: (1) the size of projects that were completed in 2024; and (2) a strategy change that shifted projects from the “Distribution Reliability Preservation Category” to

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the “System Reliability Improvements” category. The resulting budget impact on the System Reliability Improvements category will be seen in forecasted years.

Distribution Reliability Preservation

Program Description and Purpose

Upgrades to the distribution system as justified by regional reliability supervisors to improve reliability. Improvements are targeted towards Worst Performing Circuits (“WPCs”), circuits with a history of customer complaints, or recommendations as a result of Proactive Circuit Analysis (PCAs). PCAs are detailed reliability and operational analysis performed on 25% of a region’s distribution circuits per year. Additional work is scoped on the basis of Customers Experiencing Multiple Interruptions (“CEMI”), and Customers Experiencing Multiple Momentary Interruptions (“CEMMI”).

Identification/Justification Process

Projects are identified and submitted for both small and large-scale circuit improvement projects. These projects ranked utilizing PPL Electric’s investment prioritization tool to ensure funds are directed towards the most cost-effective projects. The number of projects and locations may vary depending on areas with reliability concerns. Examples include, but are not limited to, installation of fuses, fault indicators, reconductoring of vintage conductor, upgrading conductor to reduce impact of vegetation related service outages, and relocating sections of lines that may be inaccessible or prone to vegetation related service outages.

It should be noted projects vary significantly in size, which can result in material swings in the number of planned projects.

Scope

Planned Projects	
2024 Modified Third LTIP	100 - 135
2024 AAOP Forecast	100 - 135
2024 Actual	226
2025 Forecast	20 - 35

Locations

Locations are identified based upon reliability needs.

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Comments:

The number of reliability preservation jobs placed in service exceeded the 2024 forecast due to a significant impact of storm activity that accelerated reliability preservation work.

Reliability Preservation Emergent

Program Description and Purpose

Remediation of issues primarily associated with secondary voltage and emergent small-scale customer reliability needs in order to improve reliability.

Identification/Justification Process

Work is identified by line crews, as well as through customer calls, and is completed to avoid potential service outages, power quality concerns, and safety issues. Examples include, but are not limited to, modifying capacitance to address voltage concerns, installing fusing to aid in sectionalizing, and replacing transformers to resolve transformer overload. Budget recommendations are based on historical trends of hours charged.

Scope & Locations

Scope and locations are determined as emergent needs arise.

System Reliability Improvement Projects

Program Description and Purpose

Large-scale improvements to distribution circuits with a history of poor reliability. This program addresses long-term projects, primarily aimed at WPCs. However, other proactive long-term projects with proven reliability benefit are included.

Identification/Justification Process

Each quarter, distribution planners and regional reliability supervisors meet to propose projects to improve WPCs. Projects are approved by distribution planning supervisors and vetted against other projects for scheduling based on historical reliability, potential benefit, and cost. Projects may span multiple years and are listed in the years they are planned to go in service. Scope is expected to increase in outer years as circuits and projects are identified. Examples include, but are not limited to, circuit reconfigurations with new tie lines, new lines and terminals, or the installation of substations for increased reliability.

Additionally, PPL Electric monitors large customer impact outages on a daily basis. A circuit that begins to show reliability deterioration and notable impact on reliability metrics requires a root cause analysis. Such analysis can result in the identification of a long-term project.

Note that the projects vary significantly in size, which can result in material swings in the number of planned projects.

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Scope

Planned Projects	
2024 Modified Third LTIP	6 - 12
2024 AAOP Forecast	6 - 12
2024 Actual	7
2025 Forecast	6 - 12

Locations (2024 Actual)

Region	Projects
Lehigh	0
Northeast	0
Central	2
Susquehanna	0
Harrisburg	5
Lancaster	0

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$11.52
2024 AAOP Forecast	\$11.52
2024 Actual	\$21.11
2025 Forecast	\$12.66

Comments:

The increased spend in 2024 for system reliability projects was a result of project delays from 2023 carrying over into 2024, along with higher than estimated project costs.

Unreimbursed Highway Relocations

Program Description and Purpose

Unreimbursed customer requested relocations of PPL Electric distribution facilities in support of highway and bridge projects throughout the service territory.

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Identification/Justification Process

The customers (“project sponsors”) include PennDOT, the PA Turnpike Commission, and various counties and municipalities. PPL Electric and the project sponsor execute a reimbursement agreement, and PPL Electric is reimbursed for its work based on the “pole count method”, as defined in PennDOT’s DM-5 manual. Historically, reimbursement for distribution projects is approximately 26%.

To accommodate highway relocations and other municipal projects, approximately 70-120 projects per year are placed in service. PPL Electric typically is notified of distribution relocation work 12 months or less before the start of requested utility relocation activities.

Scope & Locations

Scope and locations are determined as requests are received.

Planned Expenditures (in millions)

PPL Electric’s expenditures to complete highway relocation projects are the net of total expenditures minus the project sponsor’s reimbursements.

Planned Expenditures	
2024 Modified Third LTIP	\$4.50
2024 AAOP Forecast	\$4.50
2024 Actual	\$10.12
2025 Forecast	\$7.45

Comments:

Timelines for several projects were shifted due to storm restoration efforts and PennDOT schedule changes in 2023 that were then completed in 2024, resulting in more work being completed in 2024 than originally forecasted.

Substation

This category includes replacement of various substation assets and substation animal guarding.

Substation assets include, but are not limited to, the following:

- Structures
 - Enclosures
 - Fences
- Overhead Conductors and Hardware
- Underground Cables and Hardware

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- Switching Devices
 - Air Break Switches
 - Disconnect Switches
- Protective Devices
 - Circuit Breakers
 - Fuses
 - Reclosers
 - Lightning Arresters
- Transformers
 - Power
 - Station Service
 - Instrument

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$26.94
2024 AAOP Forecast	\$26.94
2024 Actual	\$16.38
2025 Forecast	\$17.33

Comments:

The 2024 actual spend was below the forecast due to overall units being below the forecast. The specific reasons for that are outlined in the sections below.

Underground Getaway Cable Replacements and Life Extension

Program Description and Purpose

Programmatic replacement of aging 12 kV underground getaway cables to prevent failures that can result in long duration outages.

Identification/Justification Process

Getaways are selected for proactive replacement based on data analytics risk models that quantify cable health and risk and provide a priority ranking based on risk factors such as age, repair history, installation

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type, length, load transferability, etc. Scope is additionally identified through inspection feedback and other work.

Scope

Replacements in Units	
2024 Modified Third LTIP	11 - 16
2024 AAOP Forecast	11 - 16
2024 Actual	3
2025 Forecast	9 - 13

Locations (2024 Actual)

Region	Units
Lehigh	0
Northeast	0
Central	0
Susquehanna	0
Harrisburg	2
Lancaster	1

Comments:

Actual work completed was below the forecast primarily due to , material and labor delays, and scheduling and outage constraints.

Miscellaneous Substation Equipment

Program Description and Purpose

Programmatic replacement of older substation equipment, including air breaks, potential transformers (“PTs”), capacitive-coupled voltage transformers (“CCVTs”), circuit switchers, lightning arresters, voltage regulators, and DC panels in order to prevent future maintenance concerns and to maintain reliable service.

Identification/Justification Process

Candidates for replacement are identified based on age and/or operating condition, both indicators of potential failure. Once identified, replacement of these facilities is coordinated and aligned with the replacement of other assets at the same substation within the five-year planning window.

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Scope

Planned Projects	
2024 Modified Third LTIP	4 - 8
2024 AAOP Forecast	4 - 8
2024 Actual	1
2025 Forecast	8 - 12

Locations (2024 Actual)

Region	Projects
Lehigh	0
Northeast	0
Central	0
Susquehanna	1
Harrisburg	0
Lancaster	0

Comments:

Projects in this category were delayed due to long material lead times and resource constraints due to increased storm response in 2024.

Distribution Substation Circuit Breakers

Program Description and Purpose

Proactive replacement of substation circuit breakers (“CBs”) based on asset health and risk factors produced by data analytics models to maintain reliable service. This program includes the replacement of 12 kV circuit breakers.

Identification/Justification Process

Candidates for replacement are identified based on data analytics risk models that consider age, mis-operation history, repair history, obsolescence, and load transferability. Once identified, replacement of these facilities is coordinated and aligned with the replacement of other assets at the same substation within the five-year planning window. Furthermore, assets with chronic issues and high operation and maintenance (“O&M”) trails are also factored into the proactive replacement scope.

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Scope

Projects	
2024 Modified Third LTIP	30 - 50
2024 AAOP Forecast	30 - 50
2024 Actual	37
2025 Forecast	60 - 70

Locations (2024 Actual)

Region	Projects
Lehigh	5
Northeast	11
Central	7
Susquehanna	6
Harrisburg	2
Lancaster	6

Comments:

The number of circuit breakers replaced in 2024 was in the forecasted range.

69/12 kV & 138/12kV Transformer Replacement

Program Description and Purpose

Proactive replacement of distribution substation transformers based on asset health and risk factors produced by data analytics models to maintain reliable service. This program includes the replacement of 69/12 kV and 138/12 kV transformers.

Identification/Justification Process

Candidates for replacement are identified based on data analytics risk models that consider age, dissolved gas analysis trends/analytics, repair history, obsolescence, and load transferability. Once identified, replacement of these facilities is coordinated and aligned with the replacement of other assets at the same substation within the five-year planning window. Furthermore, assets with chronic issues and high O&M trails are also factored into the proactive replacement scope.

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Scope

Projects	
2024 Modified Third LTIP	4 - 8
2024 AAOP Forecast	4 - 8
2024 Actual	5
2025 Forecast	6 - 10

Locations (2024 Actual)

Region	Projects
Lehigh	0
Northeast	3
Central	1
Susquehanna	0
Harrisburg	0
Lancaster	1

Comments:

The number of transformers replaced in 2024 was in line with the forecast provided last year.

Distribution Substation DC Equipment

Program Description and Purpose

Programmatic replacement of distribution substation DC equipment based on asset health and risk factors produced by data analytics models to maintain reliable service. This program includes the replacement of 24 V, 48 V, and 125 V batteries, chargers, and related equipment.

Identification/Justification Process

Candidates for replacement are identified based on age, operating issues, availability of spare parts, and failure trends. Once identified, replacement of these facilities is coordinated and aligned with the replacement of other assets at the same substation within the five-year planning window. Furthermore, DC assets with chronic issues and high O&M trails are also factored into the proactive replacement scope.

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Scope

Planned Projects	
2024 Modified Third LTIP	2 - 5
2024 AAOP Forecast	2 - 5
2024 Actual	2
2025 Forecast	20 - 25

Locations (2024 Actual)

Region	Projects
Lehigh	2
Northeast	0
Central	0
Susquehanna	0
Harrisburg	0
Lancaster	0

Comments:

The amount of DC equipment replaced in 2024 was in line with the forecast provided last year.

Substation Animal Guarding

Program Description and Purpose

Improvements to existing distribution substation equipment via the proactive installation of animal guards to prevent animal contacts and maintain reliable service. Guarded equipment includes transformer bushings, circuit breakers, fuse/disconnect switches, bus supporting insulators, surge arresters, station service transformers, PTs, and cable terminations. Future investments could be made in pilot products like internal perimeter electric fences for comprehensive rodent deterrents at high animal contact risk locations.

Identification/Justification Process

Distribution substations are regionally prioritized based on historical animal-related service outages (both at the substation and within a 1-mile perimeter), number of customers served, substation load, and

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transferability. High priority substations are animal guarded first with the lower priority substations guarded in outer years.

Scope

Planned Installations	
2024 Modified Third LTIP	2 - 10
2024 AAOP Forecast	2 - 10
2024 Actual	1
2025 Forecast	6 - 15

Locations (2024 Actual)

Region	Units
Lehigh	0
Northeast	0
Central	0
Susquehanna	0
Harrisburg	1
Lancaster	0

Comments:

Due to an increased number of animal contacts at substations in 2024, PPL Electric altered the strategy for which substations to prioritize for animal guarding. The number of animal guarding jobs performed in 2024 was slightly below forecast as a result. The 2025 forecast is above Modified Third LTIP projection to make up for jobs carried over from 2024.

12 kV Underground Bus Tie & Transfer Cable Replacement

Program Description and Purpose

Proactive replacement of distribution substation underground bus tie and transfer cables based on asset health and risk factors produced by data analytics models to maintain reliable service. This program includes the replacement all 12 kV underground cables within the perimeter of the substation yard.

Identification/Justification Process

Underground bus tie and transfer cables are selected for proactive replacement based on data analytics risk models that quantify cable health and risk, and provide a priority ranking based on factors such as age, repair

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history, installation type, length, loading, etc. Scope is additionally identified through inspection feedback and other work.

Scope

Planned Projects	
2024 Modified Third LTIP	5 - 10
2024 AAOP Forecast	5 - 10
2024 Actual	1
2025 Forecast	5 - 10

Locations (2024 Actual)

Region	Projects
Lehigh	0
Northeast	0
Central	0
Susquehanna	0
Harrisburg	0
Lancaster	1

Comments:

The number of projects completed was lower than anticipated largely due to resource constraints associated with an increase in storm volume in 2024.

Protection and Control

Program Description and Purpose

Proactive replacement of protection and control equipment to maintain reliable distribution service to customers. Replacement of legacy relays with modern microprocessor relays will also improve fault monitoring and diagnosis processes and will provide added insight into circuit breaker health and risk. Replacement of obsolete Supervisory Control and Data Acquisition (“SCADA”) protocols and equipment will also enable relays to perform properly.

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Identification/Justification Process

Candidates for replacement are identified based on obsolescence, availability of vendor support, and age. Once identified, replacement of these facilities is coordinated and aligned with the replacement of other assets at the same substation within the five-year planning window.

Scope

Planned Projects	
2024 Modified Third LTIP	79 - 101
2024 AAOP Forecast	79 - 101
2024 Actual	130
2025 Forecast	150 - 200

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2024 Modified Third LTIP	\$21.73
2024 AAOP Forecast	\$21.73
2024 Actual	\$7.58
2025 Forecast	\$16.76

Comments:

The number of installations placed in service in 2024 was increased for reliability improvements, leading to actual installations being higher than the forecast. The increase in units triggered a lower unit rate with the vendor, which resulted in lower actual expenditures compared to the forecast.