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DATE OF DEPOSIT

FEB 29 2024

PA PUBLIC UTILITY COMMISSION
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February 29, 2024

VIA OVERNIGHT DELIVERY

Rosemary Chiavetta
Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: PPL Electric Utilities Corporation 2024 Annual Asset Optimization Plan

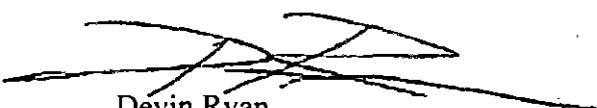
Dear Secretary Chiavetta:

Please find enclosed the original and one (1) copy of the Annual 2024 Asset Optimization Plan for the above-reference proceeding.

I would ask that you please timestamp and return to me in the envelope provided at least one of the copies, evidencing the receipt and filing of same.

Thank you for your assistance. In the meantime, should you have any questions, please contact me.

Very truly yours,


Devin Ryan

DR/dmc
Enclosures

DATE OF DEPOSIT

FEB 29 2024

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VIA FEDEX

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February 29, 2024

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 February 29, 2024, which is the date it was deposited with an overnight delivery service.

If you have any questions or need additional information, please contact me or Colleen Lauver, Manager - Distribution Planning & Asset Management, at (610) 774-4411.

Respectfully submitted,

Kimberly A. Klock

Enclosures

cc: Certificate of Service

DATE OF DEPOSIT

FEB 29 2024

PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

PPL Electric Utilities Corporation
Annual Asset Optimization Plan
Year Ended December 31, 2023

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.

In addition, in this AAOP, the projected installation and spending figures for 2024 do not assume Pennsylvania Public Utility Commission (“Commission”) approval of the Company’s Petition for Major Modifications to the LTIP, which is pending at Docket No. P-2022-3034972 (“Revised Third LTIP”). However, the projected installation and spending figures for 2024 match the projections set forth in the proposed Revised Third LTIP except for Predictive Failure Technology, which is a new program proposed in the Revised Third LTIP.

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 a LTIP that is consistent PPL Electric Utilities Corp.

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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.

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 LTIP 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 LTIP, including information on modification of a utility's LTIP, 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 LTIP must contain and outlined the procedure and process for filing and review of LTIPs 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 LTIP 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 PPL Electric Utilities Corp.

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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 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.

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.

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.

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.

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

Executive Summary

The upcoming 12-month period (2024) is covered by PPL Electric's third LTIP, which contains a consolidated set of asset groups. As the table on page 9 shows, in 2023, PPL Electric spent \$105.11 million and plans to spend \$188.91 million on DSIC-eligible projects in 2024.

The 2024 planned expenditures appear in the chart labeled "2024 Projection of Work and Spend by Asset Group" on page 10.

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. For 2023, PPL Electric was below the Commission's benchmark for SAIFI. Meanwhile, SAIDI and CAIDI were heavily impacted by the record number of storms (45) recorded in 2023.

Overall, PPL Electric has been nationally ranked as a 1st quartile SAIFI performer over the past 9 consecutive years by IEEE and over the past 10 consecutive years by EEL 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.

		2019	2020	2021	2022	2023
Average Number of Customers Served		1,429,085	1,438,204	1,445,611	1,445,611	1,445,611
PUC METRICS	SAIFI (Benchmark = 0.98; rolling 12-month Std. = 1.18)	0.85	0.84	0.91	0.87	0.78
	CAIDI (Benchmark = 145; Rolling 12-month Std. = 174)	176	137	187	164	189
	SAIDI (Benchmark = 142; Rolling 12-month Std. = 205)	150	116	170	142	147
	MAIFI	5.7	5.3	2.6	1.4	0.3
	Number of Sustained Customer Interruptions (Trouble Cases)	21,497	20,877	24,241	23,882	23,082
	Number of Customers Affected	1,213,340	1,212,136	1,308,569	1,256,631	1,134,905
	Customer Minutes of Interruptions	231,915,481	166,414,603	245,413,282	206,385,043	214,249,565
	Number of Customer Momentary Interruptions	8,083,974	7,639,856	3,817,912	2,020,520	470,353
IEEE METRICS	SAIFI	0.66	0.69	0.68	0.74	0.64
	CAIDI	112	99	124	120	142
	SAIDI	74	69	85	89	91
	MAIFI	4.3	4.2	2.1	0.8	0.3
	Number of Sustained Customer Interruptions (Trouble Cases)	22,728	23,495	24,032	25,211	24,522
	Number of Customers Affected	943,894	990,900	988,372	1,071,806	935,297
	Customer Minutes of Interruptions	106,186,418	98,721,644	122,230,348	129,679,197	133,236,331
	Number of Customer Momentary Interruptions	6,095,576	6,066,279	3,100,572	1,232,315	404,981

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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 break down 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
2023	159	98	257

LTIP Category	2023 LTIP	2023 In-service
Poles	\$17.33	\$9.59
New Electric Reclosers	\$5.07	\$2.10
Distribution Animal Guarding	\$0.50	\$0.28
Failed Equipment	\$34.77	\$39.01
Underground Cable Replacement	\$0.42	\$0.48
Low Tension Network Equipment and Structures	\$0.60	\$1.70
LTN Upgrades	\$3.12	\$9.39
Reliability	\$4.08	\$8.06
System Reliability Improvement Projects	\$12.77	\$4.82
Unreimbursed Highway Relocations	\$6.16	\$4.81
Substation	\$3.04	\$19.32
Protection and Control	\$4.70	\$5.55
Total	\$92.56	\$105.11

Dollars in Millions

PPL Electric Utilities Corporation

2024 Projection of Work and Spend by Asset Group

LTIIP Category	2024 Forecast	2024 Units
Poles	\$19.70	Replacements 2000-2500 Reinforcements 4000-5000
New Electric Reclosers	\$10.10	120-250
Distribution Animal Guarding	\$0.34	240-360
Failed Equipment	\$42.44	As needed
Underground Cable Replacement	\$4.36	220-320
Low Tension Network Equipment and Structures	\$3.76	Primary Cable Replacements 0-2, LTN Equipment 6-18
LTN Upgrades	\$10.55	62
Reliability	\$32.97	100-135
System Reliability Improvement Projects	\$11.52	6-12
Unreimbursed Highway Relocations	\$4.50	As needed
		Getaway Replacements 11-16, Misc. Equipment 4-8, CBs 30-50, Transformers 4-8, DC Equip. 2-5, Animal Guard 2- 10, Bus Tie and Transfer Cable 5-
Substation	\$26.94	10
Protection and Control	\$21.73	79-101
Total	\$188.91	

Dollars in Millions

Distribution Assets

The following pages set forth actual results for calendar year 2023. These assets include, but are not limited to, the following:

- Structures
 - Poles
 - Crossarms
 - Vaults
 - Manholes
- Overhead Conductors and Hardware

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- **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
2023 (Third LTIP)	\$17.33
2023 (AAOP Forecast)	\$17.33
2023 (Actual)	\$9.59
2024 (Forecast)	\$19.70

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 in an effort 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 8% rejection rate from the population of yearly inspections. Of those poles rejected, 70% are candidates for reinforcement while 30% 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 43 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	
2023 (Third LTIP)	2000-2500
2023 (AAOP Forecast)	2000-2500
2023 (Actual)	1418
2024 (Forecast)	2000-2500

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:

Most pole replacements are identified by the previous year's pole inspections. In 2020, PPL Electric started the second 12-year pole inspection cycle, resulting in fewer poles being inspected annually (compared to the previous 10-year pole inspection cycle). In the 2023 AAOP, PPL Electric explained that the shift in the pole inspection cycle led to fewer pole replacements and that the downward trend was expected to continue in 2023.

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 8% rejection rate from the population of yearly inspections. Of those poles rejected, 70% are candidates for reinforcement. When applicable, this method achieves a significant savings over pole replacement.

Scope

Reinforcements in Units	
2023 (Third LTIP)	4000-5000
2023 (AAOP Forecast)	4000-5000
2023 (Actual)	711
2024 (Forecast)	4000-5000

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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 fiberwrap. 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. This led to fewer poles being reinforced than originally forecasted in 2023.

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.

Scope

Installations in Units	
2023 (Third LTIP)	210-250
2023 (AAOP Forecast)	210-250
2023 (Actual)	182
2024 (Forecast)	120-250

Locations (2023 Actual)

Region	Units
Lehigh	26
Northeast	19
Central	35
Susquehanna	43
Harrisburg	29
Lancaster	30

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$5.07
2023 (AAOP Forecast)	\$5.07
2023 (Actual)	\$2.10
2024 (Forecast)	\$10.10

Comments:

The number of installs for the new recloser program were lower than forecasted due to transitioning to a new style of three-phase recloser. Single-phase recloser installations were in line with forecast; however, they have a lower unit cost and account for a smaller portion of the overall budget.

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	
2023 (Third LTIP)	240-360
2023 (AAOP Forecast)	240-360
2023 (Actual)	56
2024 (Forecast)	240-360

Locations (2023 Actual)

Region	Units
Lehigh	4
Northeast	13
Central	19
Susquehanna	9
Harrisburg	9
Lancaster	2

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$0.50
2023 (AAOP Forecast)	\$0.50
2023 (Actual)	\$0.28
2024 (Forecast)	\$0.34

Comments:

The number of installs for animal guarding were down versus the forecast driven predominantly by an increase in higher priority work being executed by second shift 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
2023 (Third LTIP)	\$34.77
2023 (AAOP Forecast)	\$34.77
2023 (Actual)	\$39.01
2024 (Forecast)	\$42.44

Comments:

Planned expenditures were above the forecast.

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

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Scope and locations are determined as equipment fails.

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

PPL Electric Utilities Corporation

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.

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 and/or treatment of deteriorated underground cable to maintain reliable electric service.

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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.

Regional allocation of cable remediation is based on historical regional percent contribution to system-wide cable failures.

Scope

Scope In Cable Segments	
2023 (Third LTIP)	25-100
2023 (AAOP Forecast)	15-50
2023 (Actual)	0
2024 (Forecast)	220-320

Locations (2023 Actual)

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

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$0.42
2023 (AAOP Forecast)	\$0.42
2023 (Actual)	\$0.48
2024 (Forecast)	\$4.36

Comments:

While no underground cable replacement jobs were placed in-service in 2023, a large percentage of the planned construction was completed in 2023. As such, these projects were placed in service in early 2024. The 2023 spend accounts for the construction labor costs from 2023 planned scope and the carryover jobs from 2022.

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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 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	2023 (Third LTIP)	0-2
Primary Cable	2023 (AAOP Forecast)	0-2
Primary Cable	2023 (Actual)	1
Primary Cable	2024 (Forecast)	0-2
LTN Equipment	2023 (Third LTIP)	6-18
LTN Equipment	2023 (AAOP Forecast)	75-100
LTN Equipment	2023 (Actual)	1
LTN Equipment	2024 (Forecast)	6-18

Locations (2023 Actual)

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

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$0.60
2023 (AAOP Forecast)	\$1.05
2023 (Actual)	\$1.70
2024 (Forecast)	\$3.76

Comments:

Units placed in service in 2023 for LTN equipment were under the forecast due to a safety concern with equipment causing work to be stopped until a new material was chosen. The 2023 expenditures are driven by an accelerated primary cable job due to a partial failure with a high unit cost.

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	
2023 (Third LTIP)	21
2023 (AAOP Forecast)	5-10
2023 (Actual)	29
2024 (Forecast)	62

Locations (2023 Actual)

Region	Units
Lehigh	1
Northeast	0
Central	0
Susquehanna	0
Harrisburg	6
Lancaster	22

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$3.12
2023 (AAOP Forecast)	\$6.30
2023 (Actual)	\$9.39
2024 (Forecast)	\$10.55

Comments:

The number of LTN automation jobs constructed in 2023 is in line with the forecast provided last year but the units placed in service and spend was higher because work from previous years was placed in service.

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
2023 (Third LTIP)	\$4.08
2023 (AAOP Forecast)	\$4.08
2023 (Actual)	\$8.06
2024 (Forecast)	\$32.97

Comments:

2023 spend was higher than the forecast due to 2022 jobs carrying over into early 2023.

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

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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	
2023 (Third LTIP)	10-25
2023 (AAOP Forecast)	10-25
2023 (Actual)	14
2024 (Forecast)	100-135

Locations

Locations are identified based upon reliability needs.

Comments:

The number of reliability preservation jobs placed in service were in line with forecast.

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.

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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.

Scope

Planned Projects	
2023 (Third LTIP)	6-12
2023 (AAOP Forecast)	6-12
2023 (Actual)	5
2024 (Forecast)	6-12

Locations (2023 Actual)

Region	Projects
Lehigh	4
Northeast	0
Central	1
Susquehanna	0
Harrisburg	0
Lancaster	0

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$12.77
2023 (AAOP Forecast)	\$12.77
2023 (Actual)	\$4.82
2024 (Forecast)	\$11.52

Comments:

The 2023 actual spend and planned units were lower than the forecasts, due to some projects carrying over into 2024. Also, a substation rebuild completion was delayed, which significantly contributed to the variance between the forecast and actuals.

Unreimbursed Highway Relocations

Program Description and Purpose

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

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 35%.

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.

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Planned Expenditures	\$Million
2023 (Third LTIP)	\$6.16
2023 (AAOP Forecast)	\$6.16
2023 (Actual)	\$4.81
2024 (Forecast)	\$4.50

Comments:

Timelines for several projects were shifted by PennDOT, resulting in less work being complete in 2023.

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

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Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$3.04
2023 (AAOP Forecast)	\$9.80
2023 (Actual)	\$19.32
2024 (Forecast)	\$26.94

Comments:

The 2023 actual expenditures exceeded the 2023 forecast largely due to the increased procurement costs.

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

Scope

Replacements in Units	
2023 (Third LTIP)	0-4
2023 (AAOP Forecast)	5-7
2023 (Actual)	5
2024 (Forecast)	11-16

Locations (2023 Actual)

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

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Comments:

The number of substation getaways replaced in 2023 was in line with the forecast provided last year.

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.

Scope

Planned Projects	
2023 (Third LTIP)	0-2
2023 (AAOP Forecast)	0-2
2023 (Actual)	2
2024 (Forecast)	4-8

Locations (2023 Actual)

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

Comments:

The number of miscellaneous substation equipment replaced in 2023 was in line with the third LTIP and forecast provided last year.

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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.

Scope

Projects	
2023 (Third LTIP)	7-12
2023 (AAOP Forecast)	38-42
2023 (Actual)	43
2024 (Forecast)	30-50

Locations (2023 Actual)

Region	Projects
Lehigh	11
Northeast	2
Central	15
Susquehanna	2
Harrisburg	0
Lancaster	13

Comments:

The number of circuit breakers replaced in 2023 was slightly higher than the forecasted amount because a job was accelerated due to the condition of the equipment.

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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.

Scope

Projects	
2023 (Third LTIP)	1-2
2023 (AAOP Forecast)	3-5
2023 (Actual)	4
2024 (Forecast)	4-8

Locations (2023 Actual)

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

Comments:

The number of transformers replaced in 2023 was in line with the forecast provided last year.

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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.

Scope

Planned Projects	
2023 (Third LTIP)	0-1
2023 (AAOP Forecast)	0-1
2023 (Actual)	3
2024 (Forecast)	2-5

Locations (2023 Actual)

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

Comments:

The amount of DC equipment replaced in 2023 was slightly higher than the forecasted amount since work from the previous year extended into 2023.

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,

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

Scope

Planned Installations	
2023 (Third LTIP)	0-1
2023 (AAOP Forecast)	1-3
2023 (Actual)	3
2024 (Forecast)	2-10

Locations (2023 Actual)

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

Comments:

The number of animal guarding jobs performed in 2023 was in line with the forecast provided last year.

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

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

Scope

Planned Projects	
2023 (Third LTIP)	2-4
2023 (AAOP Forecast)	2-4
2023 (Actual)	4
2024 (Forecast)	5-10

Locations (2023 Actual)

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

Comments:

The number of crossyard bus tie and transfer cable replacement jobs performed in 2023 was in line with the forecast provided last year.

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.

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.

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Scope

Planned Projects	
2023 (Third LTIP)	2-6
2023 (AAOP Forecast)	30-40
2023 (Actual)	19
2024 (Forecast)	79-101

Planned Expenditures (in millions)

Planned Expenditures	\$Million
2023 (Third LTIP)	\$4.70
2023 (AAOP Forecast)	\$5.70
2023 (Actual)	\$5.55
2024 (Forecast)	\$21.73

Comments:

The number of installations placed in service in 2023 were lower than the forecast due to some jobs being bundled with outer year scope for workforce efficiency. The 2023 actual spending was substantially in line with the forecast.

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).

VIA ELECTRONIC MAIL

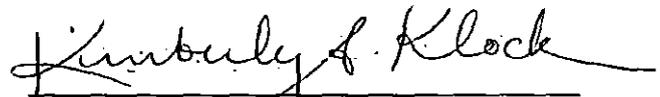
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Date: February 29, 2024



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DATE OF DEPOSIT

FEB 29 2024

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SECRETARY'S BUREAU

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12TH FLOOR
HARRISBURG, PA 17101
UNITED STATES US

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PA PUBLIC UTILITY COMMISSION
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2ND FLOOR NORTH
HARRISBURG PA 17120

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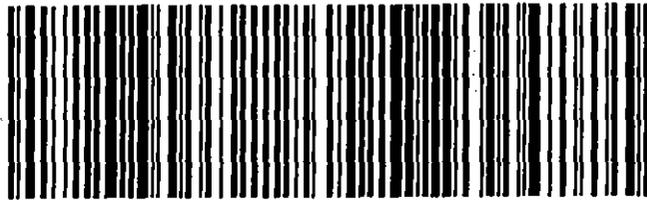


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