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April 26, 2024

VIA ELECTRONIC FILING

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

Re: Petition of PPL Electric Utilities Corporation for a Waiver of the Distribution System Improvement Charge Cap of 5% of Billed Revenues
Docket No. P-2024-

Dear Secretary Chiavetta:

Attached for filing please find the Petition of PPL Electric Utilities Corporation ("PPL Electric" or the "Company") for a Waiver of the Distribution System Improvement Charge Cap of 5% of Billed Revenues.

Copies are being provided as indicated on the attached Certificate of Service.

Respectfully submitted,

Devin Ryan

DR/kls
Attachment

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).

VIA E-MAIL

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Date: April 26, 2024

Devin T. Ryan

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities	:	
Corporation for a Waiver of the	:	Docket No. P-2024-_____
Distribution System Improvement	:	
Charge Cap of 5% of Billed Revenues	:	

PETITION OF PPL ELECTRIC UTILITIES CORPORATION FOR A WAIVER OF THE DISTRIBUTION SYSTEM IMPROVEMENT CHARGE CAP OF 5% OF BILLED REVENUES

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

Pursuant to Section 1358(a) of the Public Utility Code, 66 Pa. C.S. § 1358(a), PPL Electric Utilities Corporation ("PPL Electric" or the "Company") hereby files this Petition requesting that the Pennsylvania Public Utility Commission ("Commission") waive the Company's Distribution System Improvement Charge ("DSIC") cap of 5% of billed revenues and increase the maximum allowable DSIC to 9% for bills rendered on or after January 1, 2025, because a higher DSIC cap is necessary to ensure and maintain adequate, efficient, safe, reliable, and reasonable service for the benefit of PPL Electric's customers and as required by Section 1501 of the Public Utility Code, 66 Pa. C.S. § 1501.

The DSIC accelerates the repair and replacement of aging infrastructure by providing timely recovery of investments in eligible property, which help improve or maintain the adequacy, efficiency, safety, reliability, or reasonableness of utility service. However, in certain situations, the DSIC's existing cap limits full utilization of the DSIC to address the issues on its distribution system. Accordingly, the General Assembly empowered the Commission to waive the DSIC cap when necessary to "ensure and maintain adequate, efficient, safe, reliable and reasonable service." 66 Pa. C.S. § 1358(a). PPL Electric currently faces issues that warrant such a waiver.

Right now, PPL Electric must confront ever-increasing challenges to maintain and improve reliability of service for a number of reasons, including severe weather events, aging infrastructure and rising supply costs. Specifically, the Company has missed the System Average Interruption Duration Index ("SAIDI") benchmark in nine quarters since 2021 and has failed to meet the Customer Average Interruption Duration Index ("CAIDI"), benchmark in every quarter since 2020. While the Company's System Average Interruption Frequency Index ("SAIFI") performance historically met the Commission's benchmark, PPL Electric missed the Commission's SAIFI benchmark in the first quarter of 2024 (with a performance of 0.361 versus a target of 0.25) and is projected to miss the Commission's SAIFI benchmark for 2024 (with an estimated performance of 0.982 versus a target of 0.98). Critically, the recent downward trend in the Company's SAIFI performance is driven by the distribution system's SAIFI performance. The Company's distribution SAIFI performance was 0.722 versus a target of 0.882 in 2023 but is projected to be 0.934 versus a target of 0.882 in 2024.[1] Additionally, PPL Electric's Customers Experiencing Multiple Interruptions ("CEMI") performance shows that through the end of the first quarter of 2024, 5.8% of PPL Electric's customers were at CEMI 4 or higher for the 12 rolling months ending March 31, 2024.

PPL Electric's reliability performance is affected by a variety of factors. For example, over the past several years, PPL Electric has experienced more frequent and severe weather events in its service territory. Moreover, the cost of materials has increased due to inflation and supply chain constraints, which, in turn, forces PPL Electric to absorb these increased costs within its existing budgets for projects that are designed to improve service reliability. Due to these cost pressures

[1] To achieve the Commission's reliability performance metrics, PPL Electric uses a 90/10 split of the target for distribution SAIFI and transmission/substation SAIFI. Hence, the Company targets achieving a distribution SAIFI performance of at least 0.882 (*i.e.*, 90% of the overall SAIFI performance target of 0.98).

and the Company's ongoing investment in reliability-focused projects, PPL Electric's estimates that its DSIC would remain at the cap of 5% until rates established in the Company's next base rate case become effective.

The proposed DSIC cap increase will help the Company address those issues in an effective and efficient manner by: (1) timely recovering its investments in projects that will support and improve reliability of service that are outlined in PPL Electric's current LTIIP and its Petition for Approval of Major Modifications to its Existing LTIIP at Docket No. P-2022-3034972 ("Modified LTIIP")[2]; and (2) freeing up funding for additional projects that can improve service reliability but are not set forth in the LTIIP or Modified LTIIP. In fact, if the proposed DSIC cap waiver were approved, PPL Electric can increase and accelerate infrastructure investments that consistently improve SAIFI, SAIDI, CAIDI and CEMI performance, such as targeted vegetation removal of trees outside of the right-of-way ("ROW"), additional non-wires alternatives similar to dynamic line rating ("DLR") technology and battery energy storage systems ("BESS"), vehicle-mounted camera systems, drones, ground rovers, and, as set forth in the Modified LTIIP, Predictive Failure Technology ("PFT").[3]

Further, the Company's proposal aligns with the increased capital expenditure projections set forth in the Modified LTIIP. PPL Electric also proposed to add a new program to the Company's existing LTIIP (*i.e.*, PFT) and update the Company's total capital expenditure projections set forth in the current LTIIP. The increased investments in the New Electronic

[2] See note 3, *infra*, for a list of the categories with the largest budget increases under the modified LTIIP. PPL Electric notes that this is the first time the Company has proposed any "major" modifications to its LTIIPs since the first LTIIP was approved over a decade ago on January 10, 2013.

[3] In particular, the total increase in spending is being driven largely by additional and necessary investments in: (1) New Electronic Reclosers; (2) Low Tension Network Primary Cable, Equipment and Structures; (3) Substations; (4) Reliability; and (5) Protection and Control. Additionally, the projected increase in spending is partly due to the potential available funding for projects under the Infrastructure Investment and Jobs Act ("IIJA"), which is providing a customer benefit by offsetting more than $45 million in investments and enabling the Company to accelerate these investments.

Reclosers and Reliability programs in the modified LTIIP are estimated to improve SAIFI performance by 0.056 and reduce the Company's rolling 12 months CEMI 4 or higher performance to 5.7%. Additionally, through the new PFT program, the Company estimates a possible savings between 10-15% for SAIFI once fully deployed. The Company also is deploying weather stations strategically across the system. Benefits of these weather stations include, but are not limited to, improved modeling of end-of-life assets and improved weather and outage prediction modeling. Collectively, these modifications are designed to improve SAIFI reliability performance going forward by 0.0835, Momentary Average Interruption Frequency Index ("MAIFI") performance by 0.0628, and CEMI 4 or higher performance by 0.2%. Thus, by increasing the Company's DSIC cap to 9%, the Commission would better facilitate these projects.[4]

Also, the Commission previously approved increases in the DSIC cap when necessary to better address service reliability. For instance, the Commission approved a settlement that increased Pennsylvania Power Company's ("Penn Power") DSIC cap when Penn Power was having difficulty meeting the Commission's reliability benchmarks.[5] Likewise, the Commission has approved other utilities' DSIC cap waiver petitions after finding that such waivers would enhance their accelerated infrastructure replacement programs and address the utilities' safety and reliability issues.[6] As explained previously, the Company must accelerate its investments in aging

[4] Even if the January 27, 2024 Petition is not approved, the requested DSIC cap waiver would still assist with the Company undertaking the projects set forth in its current LTIIP and free up additional capital to be used on other projects that are designed to improve safety and reliability.

[5] *See Petition of Pa. Power Co. for a Waiver of the Distribution System Improvement Charge Cap of 5% of Billed Distribution Rate Revenue and Approval to Increase the Maximum Allowable Distribution System Improvement Charge Cap to 11.81%*, Docket No. P-2019-3012628, at 21-22 (Recommended Decision dated Feb. 5, 2020) ("*Penn Power RD*"), *adopted without modification*, Docket No. P-2019-3012628 (Order entered Mar. 12, 2020) ("*Penn Power Order*") (collectively referred to herein as "*Penn Power*").

[6] *See Petition of UGI Central Penn Gas, Inc. for a Waiver of the Distribution System Improvement Charge (DSIC) Cap of 5% of Billed Distribution Revenues and Approval to Increase the Maximum Allowable DSIC to 10% of Billed Distribution Revenues*, Docket No. P-2016-2537609, at 65 (Order entered May 10, 2017) (finding that "increase of the DSIC cap to 7.5% will enhance UGI-CPG's accelerated main replacement program as well as address the Company's safety and reliability issues to ensure 'adequate, efficient, safe, reliable and reasonable service.'") (Continued on following page…)

infrastructure to improve its reliability performance. Thus, the Commission should follow suit here and approve PPL Electric's Petition.

Notwithstanding, PPL Electric is mindful that an increase in the DSIC cap will impact customers' bills. Therefore, the Company carefully analyzed and selected a cap percentage that would facilitate the necessary investments on its distribution system and have a minimal impact on customers' bills. As part of that process, the Company analyzed how much the DSIC rate would be if no cap were in place for the remainder of the 2023-2027 LTIIP. The Company found that the Company's DSIC would exceed 5% in every quarter for the remainder of the 2023-2027 LTIIP, potentially reaching as high as 11.84% under the current LTIIP and 14.53% under the Modified LTIIP. Although a DSIC cap higher than 9% could be justified based on those figures, PPL Electric decided to propose a DSIC cap of 9% because it would increase the DSIC for a residential customer using 1,000 kWh per month by $2.37. Thus, PPL Electric's proposal appropriately balances the need for timely cost recovery of investments with the impact on customers' bills.

For these reasons, and as set forth herein, the Commission should approve this Petition because the proposed increase in the DSIC cap from 5% to 9% of billed revenues is reasonable and in the public interest and will ensure that the Company can provide and maintain adequate,

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("*UGI-CPG*"), *reconsideration denied*, Docket No. P-2016-2537609 (Order entered Sept. 21, 2017); *Petition of UGI Penn Natural Gas, Inc. for a Waiver of the Distribution System Improvement Charge (DSIC) Cap of 5% of Billed Distribution Revenues and Approval to Increase the Maximum Allowable DSIC to 10% of Billed Distribution Revenues*, Docket No. P-2016-2537594, at 60 (Order entered May 10, 2017) ("*UGI-PNG*") (concluding that "a 7.5% increase will enhance UGI-PNG's accelerated main replacement program as well as address the Company's safety and reliability issues to ensure 'adequate, efficient, safe, reliable and reasonable service.'"); *Petition of Phila. Gas Works for Waiver of Provisions of Act 11 to Increase the Distribution System Improvement Charge CAP and to Permit Levelization of DSIC Charges*, Docket Nos. P-2015-2501500, *et al.*, at 55 (Order entered Jan. 28, 2016) ("*PGW*") (determining that "allowing PGW to increase its DSIC cap to 7.5% will permit the Company to significantly accelerate its main replacement efforts to address the problems resulting from its aging infrastructure, as discussed above, and PGW has met its burden of proof to demonstrate that an increase to 7.5% is necessary to ensure 'adequate, efficient, safe, reliable and reasonable service.'), *reconsideration granted*, Docket Nos. P-2015-2501500, *et al.*, at 30 (Order entered July 6, 2016) (granting PGW's petition for reconsideration and temporarily increasing the DSIC cap to 8.84% to a period not to exceed 2 years, after which it would decrease to 7.5%).

efficient, safe, reliable and reasonable service. PPL Electric also respectfully requests Commission approval of this Petition no later than the Commission's public meeting on December 5, 2024, so that the Company can implement the increase to its DSIC cap for the bills rendered on or after January 1, 2025.

I. BACKGROUND

1. This Petition is filed by PPL Electric, a public utility that provides electric distribution, transmission, and provider of last resort services in Pennsylvania subject to the regulatory jurisdiction of the Commission.

2. PPL Electric's address is as follows:

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Two North Ninth Street
Allentown, Pennsylvania 18101

3. PPL Electric's attorneys are:

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4. PPL Electric's attorneys are authorized to receive all notices and communications regarding this filing.

5. PPL Electric provides electric distribution, transmission and provider of last resort services to approximately 1.5 million customers in a certificated service territory that spans approximately 10,000 square miles in all or portions of 29 counties in eastern and central Pennsylvania.

6. PPL Electric is a "public utility" and an "electric distribution company" ("EDC") as those terms are defined under the Public Utility Code, 66 Pa. C.S. §§ 102 and 2803.

7. PPL Electric's distribution system serves both urban and rural areas. Currently, PPL Electric owns and operates approximately 28,144 miles of overhead distribution lines, 8,017 miles of underground distribution lines, 368 substations.

8. On December 22, 2022, the Company's third LTIIP was approved by the Commission at Docket No. P-2022-3034972.[7] The Company's third LTIIP is set to expire on December 31, 2027.

9. On January 17, 2024, PPL Electric filed a Petition for Approval of Major Modifications to its third LTIIP.[8]

10. PPL Electric's current Commission-approved DSIC tariff is attached hereto as **Appendix A**.

[7] *Petition of PPL Electric Utilities Corp. for Approval of its Third Long-Term Infrastructure Improvement Plan*, Docket No. P-2022-3034972 (Order entered Dec. 22, 2022).

[8] The Petition remains pending before the Commission, as of the date of this filing.

11. Pertinent to this Petition, PPL Electric's current Commission-approved DSIC tariff includes, among other things, a 5% cap on the total amount of revenue that can be collected through the DSIC as determined on an annualized basis.[9]

II. LEGAL STANDARDS

12. On February 14, 2012, Governor Corbett signed into law Act 11 of 2012 ("Act 11"), which, among other things, amends Chapter 13 of Title 66 of the Public Utility Code to allow the Commission to approve a DSIC for EDCs. The DSIC is designed to facilitate the recovery of reasonable and prudent capital costs incurred to repair, improve or replace certain eligible distribution property that is part of the EDC's distribution system in order to encourage investment into the distribution system while including important customer protections.

13. Eligible property for DSIC recovery is defined in Section 1351 of the Public Utility Code. *See* 66 Pa. C.S. § 1351.

14. Under Section 1352 of the Public Utility Code, a utility must file an LTIIP, which identifies the types and age of eligible property owned or operated by the utility for which the utility would seek recovery through the DSIC. *See id.* § 1352.

15. Section 1358 of the Public Utility Code sets forth several customer protections related to the DSIC. *See id.* § 1358.

16. For example, Section 1358(e) sets out specific audit and reconciliation procedures, including refunds with interest to customers of any over-collections. *See id.* § 1358(e).

[9] Consistent with 66 Pa. C.S. § 1358 and the Commission's Model Tariff, PPL Electric's Commission-approved DSIC also includes: annual reconciliations performed by PPL Electric; audits conducted by the Commission; customer notice of any changes in the DSIC; a reset of the DSIC to zero as of the effective date of new base rates that include the DSIC-eligible plant; and provisions for the charge to be set at zero if, in any quarter, PPL Electric's most recent earnings report shows that PPL Electric is earning a rate of return that exceeds the allowable rate of return used to calculate its DSIC revenue requirement. *See* Appendix A.

17. Furthermore, under Section 1358(a)(1), the DSIC for an EDC "may not exceed 5% of the amount billed to customers under the applicable rates of the" EDC. *Id.* § 1358(a)(1).

18. However, the Commission "may upon petition grant a waiver of the 5% limit under this paragraph for a utility in order to ensure and maintain adequate, efficient, safe, reliable and reasonable service." *Id.* § 1358(a)(1).

III. THE COMMISSION SHOULD INCREASE PPL ELECTRIC'S DSIC CAP FROM 5% TO 9%

19. Through this Petition, PPL Electric respectfully requests that the Commission exercise its authority under Section 1358(a)(1) of the Public Utility Code to increase the Company's DSIC cap from 5% to 9%, as set forth in the *pro forma* tariff supplement attached hereto as **Appendix B**.

20. As explained previously and in the following sections, the Company's Petition should be approved because an increase in the DSIC cap will allow PPL Electric to address the reliability of its distribution system in an efficient and effective manner, while having a minimal impact on customers' bills.

A. BACKGROUND ON THE DSIC

21. The Commission has long been an innovative regulator, and the DSIC is but one example.

22. Pennsylvania was the first state in the country to implement a DSIC for any type of utility, when the Commission approved Petitions by Philadelphia Suburban Water Company and

Pennsylvania-American Water Company to establish DSICs in their tariffs pursuant to Section 1307(a) of the Public Utility Code.[10]

23. In those Orders, the Commission also adopted "sample tariff language to be implemented for tariff supplements to establish a DSIC."[11]

24. Act 156 of 1996 was subsequently enacted on December 18, 1996, which amended Section 1307 of the Public Utility Code and enabled water utilities to establish DSICs in their tariffs subject to Commission approval. *See* 1996 Pa. Laws 156.

25. "Due to DSIC and other innovative regulatory mechanisms, the PUC was recognized for effectively encouraging water company investment by Standard & Poor's."[12]

26. Act 11 built upon the successes of the water utilities' DSIC and expanded DSICs to electric distribution companies, natural gas distribution companies, city natural gas distribution operations, and wastewater utilities. *See* 66 Pa. C.S. § 1351, *et seq.*

27. The Commission has recognized that DSICs can produce several benefits, such as (a) accelerating the replacement of aging infrastructure; (b) recovering fixed costs of certain non-revenue producing, non-expense reducing infrastructure improvement costs placed into service between rate cases; (c) reducing the number of base rate cases and the associated expenses; (d)

[10] *Petition of Phila. Suburban Water Co. for Approval to Implement a Tariff Supplement Establishing a Distribution System Improvement Charge*, 1996 Pa. PUC LEXIS 211, at *21 (Order entered Aug. 22, 1996) ("*Philadelphia Suburban 1996*"); *Petition of Pennsylvania-American Water Co. for Approval to Implement a Tariff Supplement Establishing a Distribution System Improvement Charge*, 1996 Pa. PUC LEXIS 182, at *22 (Order entered Aug. 26, 1996) ("*PAWC 1996*").

[11] *Philadelphia Suburban 1996* at *22-28; *PAWC 1996* at *23-30.

[12] *System Improvement Charges Distribution and Collection*, Pennsylvania Public Utility Commission, *available at* https://www.puc.pa.gov/general/consumer_ed/pdf/dsic_fs.pdf ("*DSIC Summary*").

better absorbing increases in other categories of costs for a longer period of time; (e) implementing solutions to regional supply problems; and (f) promoting economic development.[13]

28. For more than a decade, PPL Electric has utilized the DSIC to accelerate its repair and replacement of aging infrastructure with a focus on safety and reliability of service.

29. Since the Company's DSIC was implemented in March 2013, approximately 39% of PPL Electric's DSIC eligible investments have been in automation and reliability improvement programs, approximately 46% of the DSIC-eligible investments have been in improving the underground and overhead infrastructures, and approximately 15% of DSIC-eligible investments have been in upgrading the substation infrastructure and restoring and improving pole plant system wide.

30. Additionally, the DSIC has helped reduce the frequency of PPL Electric's base rate case filings and, by extension, the time and expenses parties and the Commission must dedicate to those proceedings. Indeed, the Company's last base rate case was filed in 2015 at Docket Nos. R-2015-2469275, *et al.*

31. Nevertheless, PPL Electric's current ability to optimize the potential of the DSIC is limited by the 5% cap.

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[13] *See DSIC Summary*. On economic development, Governor Shapiro recognized the critical importance of electric infrastructure in driving economic development over the 2024-2033 period in his Economic Development Strategy, stating, in pertinent part:

> - Critically, energy production, transmission, and distribution are a key enablers of our entire economy. Each are especially important for energy-intensive industries, like additive and advanced manufacturing.
>
> - Our diverse energy resources position us well to innovate across the energy space. We can leverage our formidable electric grid to deploy next generation power technologies and deliver businesses the energy needed to manufacture the products that will help the world decarbonize.

A Ten-Year Strategic Plan for Economic Development in Pennsylvania, Governor Shapiro, *available at* https://pagetsitdone.com/wp-content/uploads/EconomicDevelopmentStrategy-DCED_2024_FINAL.pdf.

32. As explained below, the Commission should increase the Company's DSIC cap to 9% because the proposed increase in the DSIC cap: (a) is needed to improve and maintain service reliability; (b) will facilitate the implementation of projects that are beneficial to customers; and (c) will have a minimal impact on customers' bills.

B. THE PROPOSED INCREASE IN THE DSIC CAP IS NEEDED BECAUSE IT WILL FACILITATE ADDITIONAL INVESTMENT IN RELIABILITY

1. Summary of PPL Electric's Reliability Performance

33. PPL Electric is critically focused on the safety and reliability of its electric service.

34. However, PPL Electric has proposed an increase in the DSIC cap to best address the Company's recent reliability performance and trends.

35. In particular, PPL Electric has missed the Commission's SAIDI benchmark in nine quarters since 2021 and has failed to meet the Commission's CAIDI benchmark in every quarter since 2020.

36. Moreover, although the Commission has touted PPL Electric as "an excellent SAIFI benchmark performer,"[14] more recent data and trends have shown declines in the Company's SAIFI performance. In fact, PPL Electric missed the Commission's SAIFI benchmark in the first quarter of 2024 (with a performance of 0.361 versus a target of 0.25) and is projected to miss the Commission's SAIFI benchmark for 2024 (with an estimated performance of 0.982 versus a target of 0.98).

37. Notably, the distribution system's SAIFI performance is the reason for the Company's overall SAIFI performance declining.

[14] *2022 Pennsylvania Electric Reliability Report*, Pennsylvania Public Utility Commission, at 77 (Apr. 2024), *available at* https://www.puc.pa.gov/media/2898/electric-reliability-report_final.pdf ("*2022 Pennsylvania Electric Reliability Report*").

38. The Company's distribution SAIFI performance was 0.722 versus a target of 0.882 in 2023.

39. However, through the end of the first quarter of 2024, PPL Electric's distribution SAIFI was 0.356 versus a target of 0.245.[15]

40. Even if the Company's distribution SAIFI performance for the remainder of 2024 were to equal its performance in the second through fourth quarters of 2023, PPL Electric's distribution SAIFI is projected to be 0.934 versus a target of 0.882 in 2024.

41. Additionally, PPL Electric's Customers Experiencing Multiple Interruptions ("CEMI") performance shows that through the end of the first quarter of 2024, 5.8% of PPL Electric's customers were at CEMI 4 or higher for the 12 rolling months ending March 31, 2024.

42. Also, in the Commission's recently issued *2022 Pennsylvania Electric Reliability Report*, the "Commission recognize[d], overall, that that PPL's reliability is beginning to decline" and that "the number of PPL customers interrupted annually is on a sharp trend upward."[16]

43. In conclusion, the Company's actual and projected overall reliability performance can be summarized as follows[17]:

	PUC 2023 YE	PUC 2024 Q1	PUC 2024 EOY Projected
SAIFI (Benchmark = 0.98, Standard = 1.18)	0.78	0.36	0.982
CAIDI (Benchmark = 145, Standard = 172)	189	137	265
SAIDI (Benchmark=142, Standard = 205)	147	380	260
CEMI 4	3.4%	5.8%	4.0%
	IEEE 2023 YE	IEEE 2024 Q1	IEEE EOY Projected
IEEE SAIFI (1st Quartile = 0.82)	0.64	0.14	0.650
IEEE CAIDI (1st Quartile = 101)	142	131	115
IEEE SAIDI (1st Quartile = 85)	91	18.3	74.6

[15] *See* note 1, *supra*, for an explanation about the distribution SAIFI target.

[16] *2022 Pennsylvania Electric Reliability Report* at 77.

[17] The Company notes that CAIDI equals SAIDI divided by SAIFI. *See* 52 Pa. Code § 57.192. Therefore, if SAIDI remains equal, improvements in SAIFI actually increase CAIDI. Thus, CAIDI performance is not always a true reflection of a utility's reliability performance and improvements thereto.

2. The Company Faces Challenges to Maintaining and Improving Service Reliability

44. Meanwhile, PPL Electric confronts several factors that make it challenging to maintain and improve reliability of service.

45. A leading factor is more frequent and severe weather events.

46. Although these more frequent and severe weather events are affecting many electric utilities, PPL Electric's service territory is being particularly impacted.

47. As the Commission recently observed in its *2022 Pennsylvania Electric Reliability Report*, PPL Electric saw 36 total storms in 2022, "which is the second most on record in terms of PUC storm cases and third most for PUC Storm customers interrupted."[18] Furthermore, PPL Electric observed a total of 45 storms in 2023, surpassing the previous high of 42 storms in 2021. So far in 2024, PPL Electric has seen a total of 11 storms, 8 of which were "reportable" storms.[19]

48. The Commission further stated:

> As noted in Section 3 of this report, EDCs experienced 42 reportable outage events (ROEs) in 2022. EDCs had 63 ROEs in 2021, which was the highest number reported to the Commission since 1994 (the first year of the five-year benchmarking period). All of the ROEs were caused by weather impacts on the EDC distribution systems. Noting this fact is not to excuse a slip in reliability performance of the EDCs, but rather to reiterate the importance of EDCs continuing to invest in reliability improvement and resiliency to weather events.[20]

49. In addition, the cost of materials has increased due to inflation and supply chain constraints, which are being driven by commodity shortages, transportation costs, and increased industry demand. For example, the procurement costs for transformers between 2016 and 2020

[18] *2022 Pennsylvania Electric Reliability Report* at 76.

[19] Reportable storms are those that cause unscheduled service interruptions in a single event to 2,500 or more customers for six or more consecutive hours; non-reportable storms are all other storms. *See* 52 Pa. Code § 67.1(b).

[20] *2022 Pennsylvania Electric Reliability Report* at 103-04 (emphasis added).

averaged approximately $590,000. Since 2021, however, those costs have averaged over $1 million. Industry demand also remains at the highest levels seen in the last five years and continues to drive higher costs and extend lead times for distribution units from vendors.

50. PPL Electric must absorb these increased costs within its existing budgets for projects that are designed to improve service reliability.

51. Because PPL Electric continues to invest in DSIC-eligible projects focused on reliability despite these cost increases, the Company currently exceeds the 5% cap on a regular basis and projects that the DSIC will, absent the requested waiver and increase to 9%, remain at the cap of 5% until rates established in the Company's next base rate case become effective.

52. As such, the current DSIC cap of 5% is inhibiting the accelerated repair and replacement of aging infrastructure that PPL Electric could undertake to improve and maintain service reliability.

53. In fact, the Commission recommended in its *2022 Pennsylvania Electric Reliability Report* that PPL Electric pursue "continued and increased efforts in vegetation management, equipment replacement and improvement under LTIIP, and a continuing emphasis on improving response times."[21]

3. Increasing the DSIC Cap Will Help Improve and Maintain Service Reliability

54. PPL Electric's proposal to increase the DSIC cap from 5% to 9% will help the Company address those issues in an effective and efficient manner by: (1) timely recovering its investments in projects that will support and improve reliability of service that are outlined in PPL Electric's current LTIIP and its Modified LTIIP; and (2) freeing up funding for additional projects that can improve service reliability but are not set forth in the LTIIP or Modified LTIIP.

[21] *Id.* at 77.

55. First, if the proposed DSIC cap waiver were approved, PPL Electric can increase and accelerate infrastructure investments that that are proven to improve SAIFI, SAIDI, CAIDI and CEMI performance.[22]

56. Under the Company's current LTIIP, approximately $13 million is dedicated to the New Electronic Reclosers and Reliability programs in 2024 and 2025 and is projected to reduce customer interruptions by approximately 20,100, improve SAIFI performance by 0.014, reduce to 1.4% of current customer interruptions, and reduce the percentage of CEMI 4 or higher customers from 3.4% to 3.35%.

57. Moreover, the Company's Petition for Approval of Major Modifications to its Existing LTIIP at Docket No. P-2022-3034972 sets forth increased capital expenditure projections.[23]

58. Under the Modified LTIIP, PPL Electric would spend approximately $58 million on the New Electronic Reclosers and Reliability programs.

59. The increased investments in the New Electronic Reclosers and Reliability programs in the modified LTIIP are estimated to improve SAIFI performance by 0.056, reduce the Company's rolling 12 months CEMI 4 or higher performance to 5.7%, and reduce the percentage of CEMI 4 or higher customers from 3.4% to 3.2%.

[22] In particular, the total increase in spending is being driven largely by additional and necessary investments in: (1) New Electronic Reclosers; (2) Low Tension Network Primary Cable, Equipment and Structures; (3) Substations; (4) Reliability; and (5) Protection and Control. Additionally, the projected increase in spending is partly due to the potential available funding for projects under the Infrastructure Investment and Jobs Act ("IIJA"), which is providing a customer benefit by offsetting more than $45 million in investments and enabling the Company to accelerate these investments.

[23] See note 3, *supra*, for a list of the categories with the largest budget increases under the modified LTIIP. PPL Electric notes that this is the first time the Company has proposed any "major" modifications to its LTIIPs since the first LTIIP was approved over a decade ago on January 10, 2013.

60. Also, PPL Electric proposed to add a new program to the Company's existing LTIIP (*i.e.*, PFT) and update the Company's total capital expenditure projections set forth in the current LTIIP.

61. Based on a reliability analysis looking back at the 2023 PFT installations alone, reliability benefits are projected to produce SAIFI savings of 0.0275 and MAIFI savings of 0.0628.

62. In addition to the predictive failure sensors being deployed with this new PFT program, the Company is deploying weather stations strategically across the system. Benefits of these weather stations include, but are not limited to, improved modeling of end-of-life asset modeling and improved weather modeling and outage prediction modeling.

63. In total, the modifications to the LTIIP and these weather stations are designed to improve SAIFI reliability performance going forward by 0.0835, MAIFI performance by 0.0628, and CEMI 4 or higher performance from 3.4% to 3.2%.

64. In addition, if the proposed DSIC cap waiver were approved, PPL Electric can increase and accelerate infrastructure investments that consistently improve SAIFI, SAIDI, CAIDI and CEMI performance, such as targeted vegetation removal of trees outside of the ROW, additional non-wires alternatives similar to DLR technology and BESS, vehicle-mounted camera systems, drones, ground rovers, and PFT (as set forth in the Modified LTIIP).

65. Specifically, Pacific Gas & Electric Company's ("PG&E") successful deployment of early fault detection technology, similar to PPL Electric's PFT, yielded consistent and similar results, such as detecting asset defects and vegetation encroachment, which were remediated eliminating outage exposure for their customers.[24]

[24] *See* "EPIC Final Report," PG&E (dated Nov. 12, 2020), *available at* https://www.pge.com/assets/pge/docs/about/corporate-responsibility-and-sustainability/PGE-EPIC-Project-2.34.pdf.

66. DLR technology also has shown to provide increased situational awareness and condition-based monitoring of transmission lines, which is something the Company has started to deploy on the distribution system.[25]

67. Further, through the use of data modeling and analytics, the Company is strategically identifying and prioritizing high risk areas that are prone to vegetation overgrowth and trees falling outside of the ROW that would otherwise impact reliability.

68. As for non-wires alternatives, the Company projects, based on its existing non-wires alternatives investments to date, that outage exposure will be reduced by approximately 90% for 72 customers and that capital-intensive grid investments driven by line capacity limitations can be further deferred.

69. Moreover, by deploying vehicle-mounted camera systems, several operational efficiencies can be gained, such as minimizing truck rolls and optimizing labor spent on visual patrol of assets, increasing public safety via timely replacements of degraded assets, and mitigating personnel exposure necessitated by traditional patrols.

70. By increasing the Company's DSIC cap to 9%, the Commission would better facilitate these projects.

71. Thus, the Commission should grant PPL Electric's requested waiver of the existing DSIC cap of 5% and increase the cap to 9%.

4. The Commission Has Previously Recognized that Increases in the DSIC Cap Can Help Improve and Maintain Service Reliability

72. PPL Electric's proposal also comports with the Commission's prior approval of DSIC cap increases when necessary to better address service reliability.

[25] *See* "Dynamic Line Rating," U.S. Dep't of Energy (dated June 2019), *available at* https://www.energy.gov/oe/articles/dynamic-line-rating-report-congress-june-2019.

73. In *Penn Power*, the Commission approved a settlement that allowed Penn Power to increase its DSIC cap for the remainder of its LTIIP or until new base rates take effect, whichever would be earlier.[26]

74. This followed the Commission's review of Penn Power's LTIIP, where the Commission noted Penn Power's failure to achieve its benchmark reliability goals in one year and its standard reliability goals over a two-year period.[27]

75. In the *Penn Power LTIIP Review Order*, the Commission directed Penn Power to modify its LTIIP and consider not only its spending but also utilizing "the full capacity of the DSIC mechanism, as capped at 5% by statute or otherwise capped by the Commission via waiver."[28]

76. Similarly, the Commission has approved other utilities' DSIC cap waiver petitions after finding that such waivers would enhance their accelerated infrastructure replacement programs and address the utilities' safety and reliability issues.[29]

77. Here, as explained previously, PPL Electric has been under-performing in SAIDI and CAIDI and is projected to under-perform in SAIFI in 2024, and the Company must accelerate its investments in aging infrastructure to improve its reliability performance.

78. Moreover, electric service reliability is important to the Company's existing customers and potential new electric service applicants.

79. With projected increases in electric service load due to electrification efforts, the adoption of electric vehicles ("EVs") and related build-out of EV charging infrastructure, and new

[26] *Penn Power Order* at 2.

[27] *Periodic Review of Pa. Power Company's Long-Term Infrastructure Improvement Plan*, Docket Nos. M-2018-3000948, *et al.*, at 16 (Order entered Sept. 20, 2018) ("*Penn Power LTIIP Review Order*").

[28] *Id.* at 19.

[29] See note 6, *supra*.

large users of electricity, such as data centers, EDCs must be well-positioned to: (a) continue providing reliable service to their existing customers; and (b) provide reliable service to any new customers.

80. Otherwise, EDCs may be unable to help attract and facilitate the economic development occurring in their service territories.

81. Thus, consistent with the Commission's encouragement for Penn Power to "utilize the full capacity of the DSIC mechanism, as capped at 5% by statute or otherwise capped by the Commission via waiver," the Company has submitted this Petition seeking to increase the DSIC cap from 5% to 9% so that PPL Electric can, among other things, pursue reliability-focused investments in the most efficient and effective manner.

C. THE PROPOSED INCREASE IN THE DSIC CAP WILL HAVE A MINIMAL IMPACT ON CUSTOMERS' BILLS

82. When evaluating DSIC cap waiver proposals, the Commission has "emphasize[d] that [its] approval of an increased DSIC recovery level must be balanced by the need to consider the impact on the Company's ratepayers."[30]

83. In this case, PPL Electric is mindful that an increase in the DSIC cap will impact customers' bills.

84. As such, the Company carefully analyzed and selected a cap percentage that would facilitate the necessary investments on its distribution system and have a minimal impact on customers' bills.

85. As part of that process, the Company analyzed how much the DSIC rate would be if no cap were in place for the remainder of the 2023-2027 LTIIP.

[30] *PGW* at 55.

86. The Company found that the Company's DSIC would exceed 5% in every quarter for the remainder of the 2023-2027 LTIIP, potentially reaching as high as 11.84% under the current LTIIP and 14.53% under the modified LTIIP.

87. Although a DSIC cap higher than 9% could be justified based on those figures, PPL Electric decided to propose a DSIC cap of 9% because it would increase the DSIC for a residential customer using 1,000 kWh per month by only $2.37.[31]

88. Therefore, PPL Electric's proposal appropriately balances the need for timely cost recovery of investments with the impact on customers' bills and is a reasonable way to accelerate infrastructure repairs and replacements to improve reliability while balancing reliability and affordability for customers.

89. Based on the foregoing, and as explained further in the Company's direct testimony and exhibits attached hereto, the Commission should approve PPL Electric's Petition and increase the Company's DSIC cap from 5% to 9%.

IV. CUSTOMER NOTICE

90. PPL Electric has served copies of the filing on the Office of Consumer Advocate, Office of Small Business Advocate, and the Commission's Bureau of Investigation and Enforcement. This filing will be posted on PPL Electric's website at www.pplelectric.com.

91. The Company also requests that the Commission publish notice of this filing in the *Pennsylvania Bulletin* and that a reasonable deadline for intervention be set as part of that notice.

[31] Essentially, for every 1% increase in the DSIC cap, residential customers would see a $0.59 increase in their monthly bill. However, because the DSIC rate fluctuates based on plant-in-service and revenue projected, changes to the price are likely to be more gradual than an immediate increase to 9%.

92. PPL Electric believes that these various communications initiatives will provide all interested parties with full notice of the Company's proposal to increase its maximum DSIC to 9% and an opportunity to participate in any Commission proceeding about this Petition.

93. However, if the Commission concludes that additional notice would be appropriate, the Company will provide such additional notice as the Commission may direct.

V. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission issue an Order no later than its December 5, 2024 public meeting, which: (1) grants a waiver of the current Distribution System Improvement Charge cap of 5% of billed revenues, and (2) approves an increase the maximum allowable Distribution System Improvement Charge from 5% to 9% of billed revenue for bills rendered on or after January 1, 2025, as set forth in the *pro forma* a tariff supplement provided in Appendix B.

Respectfully submitted,

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Of Counsel:

Post & Schell, P.C.

Date: April 26, 2024

Attorneys for PPL Electric Utilities Corporation

Appendix A

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC)

In addition to the net charges provided for in this Tariff, a charge of 5.00% will apply consistent with the Commission Order dated May 23, 2013, at Docket No. P-2012-2325034, approving the DSIC. This charge will be effective during the period April 1, 2024 through June 30, 2024. **(C)**

GENERAL DESCRIPTION

A. Purpose: To recover the reasonable and prudent costs incurred to repair, improve, or replace eligible property which is completed and placed in service and recorded in the individual accounts, as noted below, between base rate cases and to provide PPL Electric with the resources to accelerate the replacement of aging infrastructure, to comply with evolving regulatory requirements and to develop and implement solutions to regional supply problems.

The costs of extending facilities to serve new customers are not recoverable through the DSIC.

B. Eligible Property: The DSIC-eligible property will consist of the following:

- Poles and towers (Account 364);
- Overhead conductors (Account 365) and underground conduit and conductors (Accounts 366 and 367);
- Line transformers (account 368) and substation equipment (Account 362);
- Any fixture or device related to eligible property listed above, including insulators, circuit breakers, fuses, reclosers, grounding wires, crossarms and brackets, relays, capacitors, converters and condensers;
- Unreimbursed costs related to highway relocation projects where an electric distribution company must relocate its facilities; and
- Other related capitalized costs.

C. Effective Date: The DSIC will become effective for bills rendered on and after July 1, 2013.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC

A. Calculation: The initial DSIC, effective July 1, 2013, shall be calculated to recover the fixed costs of eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base and will have been placed in service between March 1 through May 31, 2013. Thereafter, the DSIC will be updated on a quarterly basis to reflect eligible plant additions placed in service during the three-month periods ending one month prior to the effective date of each DSIC update. Thus, changes in the DSIC rate will occur as follows: **(C)**

Effective Date of Change	Date to which DSIC-Eligible Plant Additions Reflected
April 1st	December 1st – February 28th
July 1st	March 1st – May 31st
October 1st	June 1st – August 31st
January 1st	September 1st – November 30th

B. Determination of Fixed Costs: The fixed costs of eligible distribution system improvements projects will consist of depreciation and pre-tax return, calculated as follows:

1. Depreciation: The depreciation expense shall be calculated by applying the annual accrual rates employed in PPL Electric's most recent base rate case for the plant accounts in which each retirement unit of DSIC-eligible property is recorded to the original cost of DSIC-eligible property.

2. Pre-tax return: The pre-tax return shall be calculated using the statutory state and federal income tax rates, PPL Electric's actual capital structure and actual cost rates for long-term debt and preferred stock as of the last day for the three-month period ending one month prior to the effective date of the DSIC and subsequent updates. The cost of equity will be the equity return rate approved in PPL Electric's last fully litigated base rate proceeding for which a final order was entered not more than two years prior to the effective date of the DSIC. If more than two years shall have elapsed between the entry of such a final order and the effective date of the DSIC, then the equity return rate used in the calculation will be the equity return rate calculated by the Commission in the most recent Quarterly Report on the Earnings of Jurisdictional Utilities released by the Commission.

C. Application of DSIC: The DSIC will be expressed as a percentage carried to two decimal places and will be applied to the total amount billed to each customer for distribution service under PPL Electric's otherwise applicable rates and charges, excluding amounts billed for the State Tax Adjustment Surcharge (STAS). To calculate the DSIC, one-fourth of the annual fixed costs associated with all property eligible for cost recovery under the DSIC will be divided by PPL Electric's projected revenue for distribution service (including all applicable clauses and riders) for the quarterly period during which the charge will be collected, exclusive of the STAS.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC (Continued)

D. Formula: The formula for calculation of the DSIC is as follows: **(C)**

$$DSIC = \frac{((DSI \times PTRR) + STFT + Dep + e) \times \frac{1}{(1-T)}}{PQR}$$

Where:

DSI = Original cost of eligible distribution system improvement projects net of accrued depreciation and associated accumulated deferred income taxes pertaining to property-related book/tax depreciation timing differences resulting from the use of accelerated depreciation per Internal Revenue Code, 26 U.S. Code § 168.

PTRR = Pre-tax return rate applicable to DSIC-eligible property.

STFT = (State Tax Flow Through) Pre-tax flow through calculated on book-tax timing differences between accelerated tax depreciation and book depreciation net of federal tax.

Dep = Depreciation expense related to DSIC-eligible property.

e = Amount calculated (+/-) under the annual reconciliation feature or Commission audit, as described below.

PQR = Projected quarterly revenues for distribution service (including all applicable clauses and riders) from appliable customers. The quarterly revenues will be determined on the basis of the summation of projected revenues for the applicable three-month period.

T = Pennsylvania gross receipts tax rate in effect during the billing month, expressed in decimal form.

Minimum bills shall not be reduced by reason of the DSIC, nor shall charges hereunder be a part of the monthly rate schedule minimum. The DSIC shall not be subject to any credits or discounts. The State Tax Adjustment Surcharge (STAS) included in this Tariff is applied to charges under the DSIC.

QUARTERLY UPDATES

Supporting data for each quarterly update will be filed with the Commission and served upon the Commission's Bureau of Investigation and Enforcement, the Bureau of Audits, the Office of Consumer Advocate, and the Office of Small Business Advocate at least ten (10) days prior to the effective date of the update.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS

A. Cap: The DSIC is capped at 5.0% of the amount billed to customers for distribution service (including all applicable clauses and riders) as determined on an annualized basis.

B. Audit/Reconciliation: The DSIC is subject to audit at intervals determined by the Commission. Any cost determined by the Commission not to comply with any provision of 66 Pa C.S. §§ 1350, *et seq.*, shall be credited to customer accounts. The DSIC is subject to annual reconciliation based on a reconciliation period consisting of the twelve months ending December 31 of each year or PPL Electric may elect to subject the DSIC to quarterly reconciliation but only upon request and approval by the Commission. The revenue received under the DSIC for the reconciliation period will be compared to PPL Electric's eligible costs for that period. The difference between revenue and costs will be recouped or refunded, as appropriate, in accordance with Section 1307(e), over a one-year period commencing on April 1 of each year, or in the next quarter if permitted by the Commission. If DSIC revenues exceed DSIC-eligible costs, such over-collections will be refunded with interest. Interest on over-collections and credits will be calculated at the residential mortgage lending specified by the Secretary of Banking in accordance with the Loan Interest and Protection Law (41 P.S. §§ 101, *et seq*.) and will be refunded in the same manner as an over-collection. PPL Electric is not permitted to accrue interest on under collections. **(C)**

C. New Base Rates: The DSIC will be reset at zero upon application of new base rates to customer billings that provide for prospective recovery of the annual costs that had previously been recovered under the DSIC. Thereafter, only the fixed costs of new eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base will be reflected in the quarterly updates of the DSIC.

D. Customer Notice: Customers shall be notified of changes in the DSIC by including appropriate information on the first bill they receive following any change. An explanatory bill insert also shall be included with the first billing.

E. Customer classes: Effective July 1, 2013, the DSIC shall be applied equally to all customer classes except Rate Schedule LP-5, consistent with the Commission Order entered April 9, 2015 at Docket No. P-2012-2325034. Effective January 1, 2016, the DSIC shall be applied equally to all customer classes except Rate Schedules LP-5 and LPEP.

F. Earning Reports: The DSIC also will be reset at zero if, in any quarter, data filed with the Commission in PPL Electric's then most recent Annual or Quarterly Earnings reports (Schedule D-2) show that PPL Electric would earn a rate of return that would exceed the allowable rate of return used to calculate its fixed costs under the DSIC as described in the pre-tax return section. PPL Electric shall file a tariff supplement implementing the reset to zero due to overearning on one-days' notice and such supplement shall be filed simultaneously with the filing of the most recent Annual or Quarterly Earnings reports indicating that PPL Electric has earned a rate of return that would exceed the allowable rate of return used to calculate its fixed costs. **(C)**

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS (Continued)

G. Residual E-Factor Recovery Upon Reset to Zero: PPL Electric shall file with the Commission interim rate revisions to resolve the residual over/under collection or E-factor amount after the DSIC rate has been reset to zero. PPL Electric can recoup or refund the residual over/under collection balance when the DSIC rate is reset to zero. PPL Electric shall refund any overcollection to customers and is entitled to recover any undercollections as set forth in Customer Safeguard Section B. The tariff supplement shall be submitted in accordance with the Quarterly Updates section of this tariff. **(C)**

Appendix B

Supplement No. ###
Electric Pa. P.U.C. No. 201

PPL Electric Utilities Corporation

GENERAL TARIFF

RULES AND RATE SCHEDULES
FOR ELECTRIC SERVICE

In the territory listed on pages 4, 4A, and 4B
and in the adjacent territory served.

ISSUED: TBD

EFFECTIVE: January 1, 2025

CHRISTINE M. MARTIN, PRESIDENT
Two North Ninth Street
Allentown, PA 18101-1179

NOTICE

THIS TARIFF MAKES CHANGES **(C)** IN EXISTING RATES. SEE PAGE TWO.

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC)

In addition to the net charges provided for in this Tariff, a charge of X.XX%~~5.00%~~ will apply **(C)** consistent with the Commission Order dated May 23, 2013, at Docket No. P-2012-2325034, approving the DSIC. This charge will be effective during the period January 1, 2025~~April 1, 2024~~ through March 31, 2025~~June 30, 2024~~.

GENERAL DESCRIPTION

A. Purpose: To recover the reasonable and prudent costs incurred to repair, improve, or replace eligible property which is completed and placed in service and recorded in the individual accounts, as noted below, between base rate cases and to provide PPL Electric with the resources to accelerate the replacement of aging infrastructure, to comply with evolving regulatory requirements and to develop and implement solutions to regional supply problems.

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B. Eligible Property: The DSIC-eligible property will consist of the following:

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- Line transformers (account 368) and substation equipment (Account 362);
- Any fixture or device related to eligible property listed above, including insulators, circuit breakers, fuses, reclosers, grounding wires, crossarms and brackets, relays, capacitors, converters and condensers;
- Unreimbursed costs related to highway relocation projects where an electric distribution company must relocate its facilities; and
- Other related capitalized costs.

C. Effective Date: The DSIC will become effective for bills rendered on and after July 1, 2013.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC

A. Calculation: The initial DSIC, effective July 1, 2013, shall be calculated to recover the fixed costs of eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base and will have been placed in service between March 1 through May 31, 2013. Thereafter, the DSIC will be updated on a quarterly basis to reflect eligible plant additions placed in service during the three-month periods ending one month prior to the effective date of each DSIC update. Thus, changes in the DSIC rate will occur as follows:

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2. Pre-tax return: The pre-tax return shall be calculated using the statutory state and federal income tax rates, PPL Electric's actual capital structure and actual cost rates for long-term debt and preferred stock as of the last day for the three-month period ending one month prior to the effective date of the DSIC and subsequent updates. The cost of equity will be the equity return rate approved in PPL Electric's last fully litigated base rate proceeding for which a final order was entered not more than two years prior to the effective date of the DSIC. If more than two years shall have elapsed between the entry of such a final order and the effective date of the DSIC, then the equity return rate used in the calculation will be the equity return rate calculated by the Commission in the most recent Quarterly Report on the Earnings of Jurisdictional Utilities released by the Commission.

C. Application of DSIC: The DSIC will be expressed as a percentage carried to two decimal places and will be applied to the total amount billed to each customer for distribution service under PPL Electric's otherwise applicable rates and charges, excluding amounts billed for the State Tax Adjustment Surcharge (STAS). To calculate the DSIC, one-fourth of the annual fixed costs associated with all property eligible for cost recovery under the DSIC will be divided by PPL Electric's projected revenue for distribution service (including all applicable clauses and riders) for the quarterly period during which the charge will be collected, exclusive of the STAS.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC (Continued)

D. Formula: The formula for calculation of the DSIC is as follows: **(C)**

$$DSIC = \frac{((DSI \times PTRR) + STFT + Dep + e) \times \frac{1}{(1-T)}}{PQR}$$

Where:

DSI = Original cost of eligible distribution system improvement projects net of accrued depreciation and associated accumulated deferred income taxes pertaining to property-related book/tax depreciation timing differences resulting from the use of accelerated depreciation per Internal Revenue Code, 26 U.S. Code § 168.

PTRR = Pre-tax return rate applicable to DSIC-eligible property.

STFT = (State Tax Flow Through) Pre-tax flow through calculated on book-tax timing differences between accelerated tax depreciation and book depreciation net of federal tax.

Dep = Depreciation expense related to DSIC-eligible property.

e = Amount calculated (+/-) under the annual reconciliation feature or Commission audit, as described below.

PQR = Projected quarterly revenues for distribution service (including all applicable clauses and riders) from applicable customers. The quarterly revenues will be determined on the basis of the summation of projected revenues for the applicable three-month period.

T = Pennsylvania gross receipts tax rate in effect during the billing month, expressed in decimal form.

Minimum bills shall not be reduced by reason of the DSIC, nor shall charges hereunder be a part of the monthly rate schedule minimum. The DSIC shall not be subject to any credits or discounts. The State Tax Adjustment Surcharge (STAS) included in this Tariff is applied to charges under the DSIC.

QUARTERLY UPDATES

Supporting data for each quarterly update will be filed with the Commission and served upon the Commission's Bureau of Investigation and Enforcement, the Bureau of Audits, the Office of Consumer Advocate, and the Office of Small Business Advocate at least ten (10) days prior to the effective date of the update.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS

A. Cap: The DSIC is capped at 9.0%~~5.0%~~ of the amount billed to customers for distribution service (including all applicable clauses and riders) as determined on an annualized basis.

B. Audit/Reconciliation: The DSIC is subject to audit at intervals determined by the Commission. Any cost determined by the Commission not to comply with any provision of 66 Pa C.S. §§ 1350, *et seq.*, shall be credited to customer accounts. The DSIC is subject to annual reconciliation based on a reconciliation period consisting of the twelve months ending December 31 of each year or PPL Electric may elect to subject the DSIC to quarterly reconciliation but only upon request and approval by the Commission. The revenue received under the DSIC for the reconciliation period will be compared to PPL Electric's eligible costs for that period. The difference between revenue and costs will be recouped or refunded, as appropriate, in accordance with Section 1307(e), over a one-year period commencing on April 1 of each year, or in the next quarter if permitted by the Commission. If DSIC revenues exceed DSIC-eligible costs, such over-collections will be refunded with interest. Interest on over-collections and credits will be calculated at the residential mortgage lending specified by the Secretary of Banking in accordance with the Loan Interest and Protection Law (41 P.S. §§ 101, *et seq*.) and will be refunded in the same manner as an over-collection. PPL Electric is not permitted to accrue interest on under collections.

C. New Base Rates: The DSIC will be reset at zero upon application of new base rates to customer billings that provide for prospective recovery of the annual costs that had previously been recovered under the DSIC. Thereafter, only the fixed costs of new eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base will be reflected in the quarterly updates of the DSIC.

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F. Earning Reports: The DSIC also will be reset at zero if, in any quarter, data filed with the Commission in PPL Electric's then most recent Annual or Quarterly Earnings reports (Schedule D-2) show that PPL Electric would earn a rate of return that would exceed the allowable rate of return used to calculate its fixed costs under the DSIC as described in the pre-tax return section. PPL Electric shall file a tariff supplement implementing the reset to zero due to overearning on one-days' notice and such supplement shall be filed simultaneously with the filing of the most recent Annual or Quarterly Earnings reports indicating that PPL Electric has earned a rate of return that would exceed the allowable rate of return used to calculate its fixed costs.

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS (Continued)

G. Residual E-Factor Recovery Upon Reset to Zero: PPL Electric shall file with the Commission interim rate revisions to resolve the residual over/under collection or E-factor amount after the DSIC rate has been reset to zero. PPL Electric can recoup or refund the residual over/under collection balance when the DSIC rate is reset to zero. PPL Electric shall refund any overcollection to customers and is entitled to recover any undercollections as set forth in Customer Safeguard Section B. The tariff supplement shall be submitted in accordance with the Quarterly Updates section of this tariff.

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Docket No. P-2024-_____

PPL Electric Utilities Corporation

Statement No. 1

Direct Testimony of Steven D. Selkregg

Dated: April 26, 2024

Direct Testimony of Steven D. Selkregg

I. INTRODUCTION

Q. Please state your full name and business address.

A. My name is Steven David Selkregg. My business address is 7231 Windsor Drive, Allentown, PA 18106.

Q. By whom are you employed and in what capacity?

A. I am employed by PPL Electric Utilities Corporation ("PPL Electric" or the "Company") as Director of T&D Operations.

Q. What are your duties as Director of T&D Operations?

A. I currently oversee the following departments:

- Distribution Control Center
  - 24/7 operations center consisting of distribution system operators and system dispatchers. These personnel oversee all system operations as well as dispatch crews to trouble locations.
- Transmission Control Center
  - 24/7 operations center consisting of transmission system operators and system dispatchers. These personnel oversee all system operations.
- Respond to Customer Field Team - Troubleman Journeyman Lineman
  - Qualified Journey Linemen who respond to outages or other issues on the distribution system during second, third and weekend shifts.
- Metering department - Metering field crews and engineering responsible for PPL Electrics metering installs, change outs, and overall maintenance.

Q. What is your educational background?

A. I have a Bachelor's of Science in Civil Engineering from Temple University. I also have completed 12 of 16 classes from DeSales University for a Masters in Business of Administration.

Q. Please describe your professional experience.

A. I have held several positions with PPL Electric from 2013 to present, as outlined below:

- Transmission Line Engineer 2013 to 2015
- T&S Design Supervisor- Transmission Engineering 2015 to 2016
- Project Engineering Manager 2016 to 2018
- Manager of Distribution Design 2018 to 2021
- Manager of Distribution Planning and Asset Management 2021 to 2022
- Director of Asset Management and Engineering 2022 to 2023
- Director of Distribution Operations 2023 to 2024

In addition, before joining PPL Electric in 2013, I worked as a Structural Engineer for Fabcon Precast, LLC from 2008 to 2012 and as a Structural Engineer for WorleyParsons Constructors, Inc. (now Worley Constructors, Inc.) from 2012 to 2013.

Q. Have you previously testified as a witness in other Commission proceedings or any other jurisdiction's proceedings?

A. No.

Q. Please briefly describe the subject matter of your direct testimony in this

proceeding.

A. My testimony will provide an overview of the Company's Long-Term Infrastructure Improvement Plan ("LTIIP") and support the Company's request that the Commission waive the 5% Distribution System Improvement Charge ("DSIC") cap provided in 66 Pa. C.S. § 1358(a) and increase the cap to 9%.

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. I am sponsoring PPL Electric Exhibits SDS-1 through SDS-3.

II. Overview of the Company's LTIIP

Q. Briefly describe the Company's LTIIP.

A. PPL Electric's current LTIIP sets forth the DSIC-eligible property that the Company plans to repair and replace over the 2023-2027 term of the LTIIP. This is the Company's third LTIIP since Act 11 of 2012 ("Act 11"), which amended Chapters 3, 13, and 33 of Title 66 of the Code to allow, among other things, EDCs, natural gas distribution companies, water utilities, wastewater utilities and city natural gas distribution operations to establish a DSIC, became effective. A copy of the third LTIIP is attached as PPL Electric Exhibit SDS-1.

As required by the Commission's regulations, the third LTIIP includes the following eight major elements: (a) identification of types and age of eligible property owned and operated by the utility for which it is seeking DSIC recovery; (b) an initial schedule for planned repair and replacement of eligible property; (c) a general description of location of the eligible property; (d) a reasonable estimate of quantity of eligible property to be improved or repaired; (e) projected

annual expenditures and means to finance the expenditures; (f) a description of the manner in which infrastructure replacement will be accelerated and how repair, improvement or replacement will ensure and maintain adequate, efficient, safe, reliable and reasonable service; (g) a workforce management and training program designed to ensure that the utility will have access to a qualified workforce to perform work in a cost-effective, safe and reliable manner; and (h) a description of a utility's outreach and coordination activities with other utilities, Department of Transportation and local governments regarding the planned maintenance/construction projects and roadways that may be impacted by the LTIIP. *See* 52 Pa. Code § 121.3.

Q. When was the third LTIIP approved by the Commission?

A. On December 22, 2022, the Company's third LTIIP was approved by the Commission at Docket No. P-2022-3034972. The Company's third LTIIP is set to expire on December 31, 2027.

Q. Have there been any modifications to the third LTIIP?

A. Yes. Under the Commission's Annual Asset Optimization Plan ("AAOP") review process, PPL Electric has made "minor" modifications to its third LTIIP. A copy of the Company's 2023 AAOP filing, which amended the proposed budgets in the third LTIIP, is attached as PPL Electric Exhibit SDS-2. Moreover, PPL Electric filed a Petition for Approval of Major Modifications to its Third LTIIP on January 17, 2024. That Petition remains pending before the Commission. A copy of the Company's January 17, 2024 Petition, which sets forth the proposed

"major" modifications to the third LTIIP, is attached as PPL Electric Exhibit SDS-3.

Q. How does the LTIIP affect the costs that can be recovered through the DSIC?

A. Under Act 11, the LTIIP must set forth the "eligible property" that a utility can seek to recover through its Commission-approved DSIC. *See* 66 Pa. C.S. §§ 1351 (defining "eligible property"), 1352(a)(1)-(4) (requiring LTIIPs to provide details about the "eligible property").

III. Support for Increasing the DSIC Cap from 5% to 9%

Q. Could you please provide some background on the Company's DSIC and how it has been utilized by PPL Electric?

A. PPL Electric's DSIC was implemented in March 2013 and has been utilized to accelerate the Company's repair and replacement of aging infrastructure with a focus on safety and reliability of service. In particular, since the Company's DSIC was originally implemented, approximately 39% of PPL Electric's DSIC eligible investments have been in automation and reliability improvement programs, approximately 46% of the DSIC-eligible investments have been in improving the underground and overhead infrastructures, and approximately 15% of DSIC-eligible investments have been in upgrading the substation infrastructure and restoring and improving pole plant system wide.

Q. Has the Commission recognized that DSICs can produce several

benefits?

A. Yes, the Commission has noted that DSICs produce several benefits, such as (a) accelerating the replacement of aging infrastructure; (b) recovering fixed costs of certain non-revenue producing, non-expense reducing infrastructure improvement costs placed into service between rate cases; (c) reducing the number of base rate cases and the associated expenses; (d) better absorbing increases in other categories of costs for a longer period of time; (e) implementing solutions to regional supply problems; and (f) promoting economic development.

Q. Can you please explain why the Company is proposing to increase the DSIC cap from 5% to 9%?

A. Right now, the Company is facing challenges to maintain and improve service reliability on its distribution system. PPL Electric's proposal to increase the DSIC cap from 5% to 9% will help the Company address those challenges in an effective and efficient manner by: (1) timely recovering its investments in projects that will support and improve reliability of service that are outlined in PPL Electric's current LTIIP and its Petition for Approval of Major Modifications to its Existing LTIIP at Docket No. P-2022-3034972 ("Modified LTIIP"); and (2) freeing up funding for additional projects that can improve service reliability but are not set forth in the LTIIP or Modified LTIIP. Also, as explained by Ms. Bethany L. Johnson (PPL Electric Statement No. 2), the proposed increases in the DSIC cap will have a minimal impact on customers' bills. Furthermore, I have been advised by counsel that PPL Electric's proposal is permitted by law

and consistent with prior findings and approvals by the Commission.

Q. Please summarize the Company's recent reliability performance.

A. PPL Electric is critically focused on the safety and reliability of its electric service. However, PPL Electric has missed the Commission's SAIDI benchmark in nine quarters since 2021 and has failed to meet the Commission's CAIDI benchmark in every quarter since 2020. Moreover, although the Commission has touted PPL Electric as "an excellent SAIFI benchmark performer,"[1] more recent data and trends have shown declines in the Company's SAIFI performance. In fact, PPL Electric missed the Commission's SAIFI benchmark in the first quarter of 2024 (with a performance of 0.361 versus a target of 0.25) and is projected to miss the Commission's SAIFI benchmark for 2024 (with an estimated performance of 0.982 versus a target of 0.98).

Notably, the distribution system's SAIFI performance is the reason for the Company's overall SAIFI performance declining. The Company's distribution SAIFI performance was 0.722 versus a target of 0.882 in 2023 but is projected to be 0.934 versus a target of 0.882 in 2024. Additionally, PPL Electric's Customers Experiencing Multiple Interruptions ("CEMI") performance shows that through the end of the first quarter of 2024, 5.8% of PPL Electric's customers were at CEMI 4 or higher for the 12 rolling months ending March 31, 2024.

[1] *2022 Pennsylvania Electric Reliability Report*, Pennsylvania Public Utility Commission, at 77 (Apr. 2024), *available at* https://www.puc.pa.gov/media/2898/electric-reliability-report_final.pdf ("*2022 Pennsylvania Electric Reliability Report*").

Also, in the Commission's recently issued *2022 Pennsylvania Electric Reliability Report*, the "Commission recognize[d], overall, that PPL's reliability is beginning to decline" and that "the number of PPL customers interrupted annually is on a sharp trend upward."[2]

In conclusion, the Company's actual and projected overall reliability performance can be summarized as follows[3]:

	PUC 2023 YE	PUC 2024 Q1	PUC 2024 EOY Projected
SAIFI (Benchmark = 0.98, Standard = 1.18)	0.78	0.36	0.982
CAIDI (Benchmark = 145, Standard = 172)	189	137	265
SAIDI (Benchmark=142, Standard = 205)	147	380	260
CEMI 4	3.4%	5.8%	4.0%
	IEEE 2023 YE	IEEE 2024 Q1	IEEE EOY Projected
IEEE SAIFI (1st Quartile = 0.82)	0.64	0.14	0.650
IEEE CAIDI (1st Quartile = 101)	142	131	115
IEEE SAIDI (1st Quartile = 85)	91	18.3	74.6

Q. What challenges is the Company facing to maintain and improve its reliability of service?

A. PPL Electric is facing several factors that make it difficult to maintain and improve reliability of service. A leading factor is more frequent and severe weather events. Although these more frequent and severe weather events are affecting many electric utilities, PPL Electric's service territory is being particularly impacted. As the Commission recently observed in its *2022 Pennsylvania Electric Reliability Report*, PPL Electric saw 36 total storms in 2022, "which is the second most on record in terms of PUC storm cases and

[2] *Id.*

[3] The Company notes that CAIDI equals SAIDI divided by SAIFI. *See* 52 Pa. Code § 57.192. Therefore, if SAIDI remains equal, improvements in SAIFI actually increase CAIDI. Thus, CAIDI performance is not always a true reflection of a utility's reliability performance and improvements thereto.

third most for PUC Storm customers interrupted."[4] Furthermore, PPL Electric observed a total of 45 storms in 2023, surpassing the previous high of 42 storms in 2021. So far in 2024, PPL Electric has seen a total of 11 storms, 8 of which were "reportable" storms.[5] The Commission further stated:

> As noted in Section 3 of this report, EDCs experienced 42 reportable outage events (ROEs) in 2022. EDCs had 63 ROEs in 2021, which was the highest number reported to the Commission since 1994 (the first year of the five-year benchmarking period). All of the ROEs were caused by weather impacts on the EDC distribution systems. Noting this fact is not to excuse a slip in reliability performance of the EDCs, but rather to reiterate the importance of EDCs continuing to invest in reliability improvement and resiliency to weather events.[6]

In addition, the cost of materials has increased due to inflation and supply chain constraints, which are being driven by commodity shortages, transportation costs, and increased industry demand. For example, the procurement costs for transformers between 2016 and 2020 averaged approximately $590,000. Since 2021, however, those costs have averaged over $1 million. Industry demand also remains at the highest levels seen in the last five years and continues to drive higher costs and extend lead times for distribution units from vendors. Those cost increases force PPL Electric to absorb these increased costs within its existing budgets for projects that are designed to improve service reliability. Because PPL Electric continues to invest in DSIC-eligible projects focused on reliability despite these cost increases, the Company currently exceeds the 5% cap on a regular basis. As

[4] *2022 Pennsylvania Electric Reliability Report* at 76.

[5] Reportable storms are those that cause unscheduled service interruptions in a single event to 2,500 or more customers for six or more consecutive hours; non-reportable storms are all other storms. *See* 52 Pa. Code § 67.1(b).

[6] *2022 Pennsylvania Electric Reliability Report* at 103-04 (emphasis added).

noted in Ms. Johnson's direct testimony (PPL Electric Statement No. 2), the Company projects that the DSIC will, absent the requested waiver and increase to 9%, remain at the cap of 5% until rates established in the Company's next base rate case become effective.

Therefore, the current DSIC cap of 5% is inhibiting the accelerated repair and replacement of aging infrastructure that PPL Electric could undertake to improve and maintain service reliability. In fact, the Commission recommended in its *2022 Pennsylvania Electric Reliability Report* that PPL Electric pursue "continued and increased efforts in vegetation management, equipment replacement and improvement under LTIIP, and a continuing emphasis on improving response times."[7]

Q. How will the Company's proposal to increase the DSIC cap help improve and maintain reliability of service?

A. PPL Electric's proposal to increase the DSIC cap from 5% to 9% will help the Company address those issues in an effective and efficient manner by: (1) timely recovering its investments in projects that will support and improve reliability of service that are outlined in PPL Electric's current LTIIP and its Modified LTIIP; and (2) freeing up funding for additional projects that can improve service reliability but are not set forth in the LTIIP or Modified LTIIP.

First, if the proposed DSIC cap waiver were approved, PPL Electric can increase and accelerate infrastructure investments that that consistently

[7] *Id.* at 77.

improve SAIFI, SAIDI, CAIDI and CEMI performance.[8] Under the Company's current LTIIP, approximately $13 million is dedicated to New Electronic Reclosers and Reliability in 2024 and 2025 and is projected to reduce customer interruptions by approximately 20,100, improve SAIFI performance by 0.014, reduce to 1.4% of current customer interruptions, and reduce the percentage of CEMI 4 or higher customers from 3.4% to 3.35%.

Moreover, the Company's Modified LTIIP sets forth increased capital expenditure projections.[9] Under the Modified LTIIP, PPL Electric would spend approximately $58 million on the New Electronic Reclosers and Reliability programs. The increased investments in the New Electronic Reclosers and Reliability programs in the Modified LTIIP are estimated to improve SAIFI performance by 0.056, reduce the Company's rolling 12 months CEMI 4 or higher performance to 5.7%, and reduce the percentage of CEMI 4 or higher customers from 3.4% to 3.2%.

Also, PPL Electric proposed to add a new program to the Company's existing LTIIP (*i.e.*, PFT) and update the Company's total capital expenditure projections set forth in the current LTIIP. Based on a reliability analysis looking back at the 2023 PFT installations alone, reliability benefits are projected to produce SAIFI savings of 0.0275 and MAIFI savings of 0.0628.

[8] In particular, the total increase in spending is being driven largely by additional and necessary investments in: (1) New Electronic Reclosers; (2) Low Tension Network Primary Cable, Equipment and Structures; (3) Substations; (4) Reliability; and (5) Protection and Control. Additionally, the projected increase in spending is partly due to the potential available funding for projects under the Infrastructure Investment and Jobs Act ("IIJA"), which is providing a customer benefit by offsetting more than $45 million in investments and enabling the Company to accelerate these investments.

[9] See note 8, *supra*, for a list of the categories with the largest budget increases under the modified LTIIP. I note that this is the first time the Company has proposed any "major" modifications to its LTIIPs since the first LTIIP was approved over a decade ago on January 10, 2013.

In addition to the predictive failure sensors being deployed with this new PFT program, the Company is deploying weather stations strategically across the system. Benefits of these weather stations include, but are not limited to, improved modeling of end-of-life asset modeling and improved weather modeling and outage prediction modeling.

In total, the modifications to the LTIIP and these weather stations are designed to improve SAIFI reliability performance going forward by 0.0835, MAIFI performance by 0.0628, and CEMI 4 or higher performance from 3.4% to 3.2%.

In addition, if the proposed DSIC cap waiver were approved, PPL Electric can increase and accelerate infrastructure investments that consistently improve SAIFI, SAIDI, CAIDI and CEMI performance, such as targeted vegetation removal of trees outside of the ROW, additional non-wires alternatives similar to DLR technology and BESS, vehicle-mounted camera systems, drones, ground rovers, and PFT (as set forth in the Modified LTIIP).

Specifically, Pacific Gas & Electric Company's ("PG&E") successful deployment of early fault detection technology, similar to PPL Electric's PFT, yielded consistent and similar results, such as detecting asset defects and vegetation encroachment, which were remediated eliminating outage exposure for their customers.[10] DLR technology also has shown to provide increased situational awareness and condition-based monitoring of transmission lines,

[10] *See* "EPIC Final Report," PG&E (dated Nov. 12, 2020), *available at* https://www.pge.com/assets/pge/docs/about/corporate-responsibility-and-sustainability/PGE-EPIC-Project-2.34.pdf.

which is something the Company has started to deploy on the distribution system.[11]

Further, through the use of data modeling and analytics, the Company is strategically identifying and prioritizing high risk areas that are prone to vegetation overgrowth and trees falling outside of the ROW that would otherwise impact reliability.

As for non-wires alternatives, the Company projects, based on its existing non-wires alternatives investments to date, that outage exposure will be reduced by approximately 90% for 72 customers and that capital-intensive grid investments driven by line capacity limitations can be further deferred.

Moreover, by deploying vehicle-mounted camera systems, several operational efficiencies can be gained, such as minimizing truck rolls and optimizing labor spent on visual patrol of assets, increasing public safety via timely replacements of degraded assets, and mitigating personnel exposure necessitated by traditional patrols.

Thus, by increasing the Company's DSIC cap to 9%, the Commission would better facilitate these projects.[12]

[11] *See* "Dynamic Line Rating," U.S. Dep't of Energy (dated June 2019), *available at* https://www.energy.gov/oe/articles/dynamic-line-rating-report-congress-june-2019.

[12] Even if the Modified LTIIP is not approved, the requested DSIC cap waiver would still assist with the Company undertaking the DSIC-eligible projects set forth in its current LTIIP and free up additional capital to be used on other projects that are designed to improve safety and reliability.

Q. Do you believe that the proposed increase in the DSIC cap is reasonable and in public interest?

A. Yes. As I explained previously, the Company's proposal to increase the DSIC cap from 5% to 9% is necessary to ensure and maintain adequate, efficient, safe, reliable, and reasonable service. Given that a DSIC cap of 9% has a small impact on customers' bills, as explained in Ms. Johnson's direct testimony (see PPL Electric Statement No. 2), and the reliability benefits tied to the accelerated and additional investments facilitated by the increased DSIC cap, I believe the Company's proposal to increase the DSIC cap to 9% is reasonable and in the public interest.

Q. Does this conclude your direct testimony?

A. Yes, it does.

PPL Electric Exhibit SDS-1

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September 2, 2022

VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
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P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Petition of PPL Electric Utilities Corporation for Approval of its Long-Term Infrastructure Improvement Plan for the Period January 1, 2023 through December 31, 2027
Docket No. P-2022-

Dear Secretary Chiavetta:

Enclosed for filing is the Petition of PPL Electric Utilities Corporation for Approval of a Long-Term Infrastructure Improvement Plan. Copies are being served on the statutory advocates and all parties of record to the Company's most recent base rate proceeding at Docket No. R-2015-2469275 as indicated on the Certificate of Service.

Respectfully submitted,

Devin Ryan

DR/dmc
Enclosures

cc: Certificate of Service

CERTIFICATE OF SERVICE

Docket No. P-2022-_____

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 E-MAIL and FIRST-CLASS MAIL

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Date: September 2, 2022

Devin T. Ryan

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for Approval of its Long-Term Infrastructure Improvement Plan for the Period January 1, 2023, through December 31, 2027	: : : :	Docket No. P-2022-_____

PETITION OF PPL ELECTRIC UTILITIES CORPORATION FOR APPROVAL OF A LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

Pursuant to 66 Pa. C.S. § 1352(a) and 52 Pa. Code §§ 121.1 *et seq,* PPL Electric Utilities Corporation ("PPL Electric" or the "Company") hereby requests approval of its third Long-Term Infrastructure Improvement Plan ("LTIIP") for the period January 1, 2023, through December 31, 2027. A copy of the Company's proposed third LTIIP is provided as "**Attachment 1**" to this Petition. This third LTIIP replaces the Company's current second LTIIP that was approved on December 21, 2017, at Docket No. P-2017-2622393, which is set to expire on December 31, 2022. Under the third LTIIP, the Company proposes to continue its accelerated repair, improvement, and replacement of aging infrastructure as described below and in further detail in the proposed LTIIP.

PPL Electric respectfully requests that the Pennsylvania Public Utility Commission ("Commission") approve the third LTIIP, as further described in this Petition for the period January 1, 2023, through December 31, 2027.

I. INTRODUCTION

1. This Petition is filed by PPL Electric, a public utility subject to the regulatory jurisdiction of the Commission.

2. PPL Electric's address is PPL Electric Utilities Corporation, Two North Ninth Street, Allentown, Pennsylvania 18101.

3. PPL Electric's attorneys are:

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PPL Electric's attorneys are authorized to receive all notices and communications regarding this filing.

4. PPL Electric furnishes electric distribution, transmission and default supply services to approximately 1.4 million customers throughout its certificated service territory, which includes all or portions of twenty-nine counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania.

5. PPL Electric is a "public utility," an "electric distribution company" ("EDC"), and a "default service provider" as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 102, 2803.

6. On February 14, 2012, Governor Corbett signed into law Act 11 of 2012 ("Act 11"), which amended Chapters 3, 13, and 33 of Title 66 of the Code to allow, among other things, EDCs, natural gas distribution companies, water utilities, wastewater utilities and city natural gas distribution operations to establish a distribution system improvement charge ("DSIC").

7. Act 11 provides utilities with the ability to implement a DSIC to recover reasonable and prudent costs incurred to repair, improve, or replace certain eligible distribution property that is part of the utility's distribution system. Eligible property for EDCs is defined in Section 1351 of the statute. *See* 66 Pa. C.S. § 1351(1). As a precondition to the implementation of a DSIC, a utility must file an LTIIP with the Commission that is consistent with the provisions of Section 1352 of the statute. *See* 66 Pa. C.S. § 1352(a).

8. On August 2, 2012, the Commission issued an Implementation Order establishing procedures and guidelines necessary to implement Act 11. *Implementation of Act 11 of 2012*, Docket No. M-2012-2293611 (Order entered August 2, 2012) ("*Implementation Order*"). The *Implementation Order* adopted the requirements established in Section 1352, provided additional standards that each LTIIP must meet, and gave guidance to utilities for meeting the Commission's standards.

9. On January 10, 2013, the Company's first LTIIP was approved by the Commission at Docket No. P-2012-2325034. The Company's first LTIIP expired on December 31, 2017.

10. On January 15, 2013, PPL Electric filed a petition seeking approval of a DSIC. By Orders entered May 23, 2013 and April 9, 2015, the Commission approved PPL Electric's DSIC.

11. On December 21, 2017, the Company's second LTIIP was approved by the Commission at Docket No. P-2017-2622393. The Company's second LTIIP is set to expire on December 31, 2022.

12. The Commission's LTIIP regulations became effective on December 20, 2014. *See* 52 Pa. Code §§ 121.1 *et seq*. The LTIIP regulations provide the elements that an LTIIP must include to be approved. Specifically, an LTIIP must include the following eight major elements:

> (a) Identification of types and age of eligible property owned and operated by the utility for which it is seeking DSIC recovery;
>
> (b) An initial schedule for planned repair and replacement of eligible property;
>
> (c) A general description of location of the eligible property;
>
> (d) A reasonable estimate of quantity of eligible property to be improved or repaired;
>
> (e) Projected annual expenditures and means to finance the expenditures;
>
> (f) A description of the manner in which infrastructure replacement will be accelerated and how repair, improvement or replacement will ensure and maintain adequate, efficient, safe, reliable and reasonable service;
>
> (g) A workforce management and training program designed to ensure that the utility will have access to a qualified workforce to perform work in a cost-effective, safe and reliable manner; and
>
> (h) A description of a utility's outreach and coordination activities with other utilities, Department of Transportation and local governments regarding the planned maintenance/construction projects and roadways that may be impacted by the LTIIP.

52 Pa. Code § 121.3.

13. The Commission's LTIIP regulations further provide that a utility seeking to continue its DSIC mechanism after the expiration of its LTIIP must file a new LTIIP with the

Commission at least 120 days prior to the expiration of the currently-effective LTIIP. 52 Pa. Code § 121.5.

14. PPL Electric's proposed LTIIP addresses each of the eight elements listed in the LTIIP regulations, as summarized in this Petition, and is being filed at least 120 days prior to the second LTIIP's expiration on December 31, 2022.

II. PROPOSED LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

A. PROPERTY TO BE IMPROVED, REPAIRED AND REPLACED

15. In accordance with the Commission's *Implementation Order*, the LTIIP regulations and statute, PPL Electric has focused its LTIIP on distribution plant that is DSIC eligible. *Implementation Order*, p. 18; 52 Pa. Code § 121.3(b).

16. All of the property PPL Electric has included in its LTIIP meets the definition of eligible property found in Section 1351(1), which includes the following items: poles; overhead conductors; distribution substation equipment; fixtures and devices related to the eligible property such as circuit breakers, fuses, reclosers, and crossarms; unreimbursed costs related to highway relocation projects; and other related capitalized costs.

17. Nearly half of PPL Electric's distribution system was constructed 50 or more years ago as a result of the economic expansion and building boom of the 1960's and 1970's. As this equipment deteriorates due to age, environmental exposure, and added load, it has become increasingly critical to plan for the repair, upgrade, and/or replacement of these assets through the initiatives outlined in the LTIIP.

18. The LTIIP covers a broad spectrum of distribution related equipment and facilities, which have been separated into various asset categories. (*See* Attachment 1, pp. 11-34.) Within each of these categories, PPL Electric has identified specific programs to address the various elements, equipment, and facilities that make up the asset classes. Each program is

described individually, with an estimated replacement schedule and estimated costs as applicable or appropriate.

19. For each individual program included in the LTIIP, PPL Electric has provided the following information: a description of the program and its purpose; a description of how PPL Electric identifies equipment for replacement within each program and the appropriate course of action to improve identified equipment; the scope of the program, including a reasonable estimate of the quantity of property to be improved where applicable; and the location of planned replacements where applicable. These detailed profiles of the individual programs are provided in the LTIIP. (*See* Attachment 1, pp. 13-34.)

20. Appendix A to the LTIIP provides a summary of the types and average age of eligible property to be replaced. (*See* Attachment 1, Appx. A.)

21. The LTIIP also provides the total amount projected to be spent by the Company annually and over the life of the five-year plan. (*See* Attachment 1, p. 9.)

B. SCHEDULE FOR REPAIR AND REPLACEMENT

22. The proposed LTIIP covers the five-year period January 1, 2023, through December 31, 2027.

23. The estimated schedule for each individual LTIIP program has been included in the program descriptions. (*See* Attachment 1, pp. 13-34.)

24. PPL Electric has estimated the number of replacements in a variety of distribution asset categories over the five-year LTIIP period. In estimating its replacement schedule, a number of factors were considered. Some of the initiatives, such as animal guarding, clearly have implied end-points, where no further opportunities for improvement remain. Others, such as distribution automation, eventually experience diminishing returns over time. Also, some programs, such as pole reinforcement and replacement, will be ongoing. Finally, some programs

may become obsolete, while new programs may become desirable as a result of the evolution of new technologies.

25. Because of these and other variables, the effectiveness of these programs is reviewed annually, and programs are added, deleted, and/or modified, as necessary, to ensure that the expenditures are providing the desired benefits to customers at a reasonable cost.

26. Therefore, while PPL Electric has provided an estimated schedule for when certain replacements will take place, that schedule is subject to change as a result of PPL Electric's ongoing review process and emergent resource requirements.

C. LOCATION OF ELIGIBLE PROPERTY

27. The individual program descriptions in the LTIIP provide a description of the location of eligible property to be repaired and replaced. (*See* Attachment 1, pp. 13-34.)

D. REASONABLE ESTIMATE OF THE QUANTITY OF PROPERTY TO BE IMPROVED

28. The individual program descriptions in the LTIIP provide an estimate of the quantity of eligible property to be improved or repaired, as well as the Company's basis for these estimates. (*See* Attachment 1, pp. 13-34.)

E. PROJECTED ANNUAL EXPENDITURES AND MEANS TO FINANCE THE EXPENDITURES

29. The LTIIP provides the Company's projected expenditures on a yearly basis for each of the individual programs for the five-year period, the total projected expenditures for each program at the conclusion of the five-year period, and the overall projected annual and total expenditures for all DSIC eligible distribution property. (*See* Attachment 1, p. 11.)

30. The Company intends to finance the costs of its DSIC-eligible work through its usual financing mechanisms: debt and equity. In each DSIC rate filing, the Company will identify its capital structure and cost of debt, in addition using the Return on Equity as

determined in its base rate case proceeding or as defined in the most recent applicable Commission Quarterly Financial Report.

31. To ensure that its individual programs are cost-effective investments, PPL Electric will routinely review the effectiveness of its programs. Program/project impact on System Average Interruption Duration Index ("SAIDI") and System Average Interruption Frequency Index ("SAIFI"), in addition to potential reductions in outage response costs, is compared to the overall program/project costs. PPL Electric utilizes a project prioritization process that defines the cost-effectiveness of programs/projects to ensure effective optimization of reliability investments.

32. PPL Electric utilizes the information from its ongoing reviews of the effectiveness of its programs to determine the most cost-effective strategy for replacing its distribution infrastructure on a going forward basis. Reliability metric performance can result in the redirection of spending to help ensure the Company's ability to meet targets.

F. ACCELERATION OF INFRASTRUCTURE IMPROVEMENT

33. In its *Implementation Order*, the Commission noted that some utilities had already taken substantial steps toward increasing capital investment to address the issue of aging infrastructure. For those utilities, the Commission requested that the LTIIP "reflect how the DSIC will maintain or augment acceleration of infrastructure replacement and prudent capital investment." *Implementation Order*, p. 19.

34. As described in the LTIIP, PPL Electric has already significantly increased its capital expenditures on distribution related infrastructure over historical spend. (*See* Attachment 1, p. 7, Figure 4.) Specifically, as shown in Figure 4 of the LTIIP, PPL Electric's average annual capital investments increased from approximately $88 million during the 2008-2012 period to approximately $180 million during the 2018-2022 period.

35. As a result of these investments, PPL Electric arrested the increase in failed equipment and the current trend is flat to mildly decreasing. Even with these investments, the average age of equipment increased slightly since the second LTIIP was approved.

36. In addition, while projected spending under this proposed LTIIP is lower than the 2018-2022 period, continued capital investment is necessary to maintain or improve the recently flattened trend in equipment failure.

37. PPL Electric is aware of the direct impact the equipment included in the LTIIP has on its reliability metrics. (*See* Attachment 1, Appx. B.) PPL Electric will use these metrics to monitor the success of its LTIIP programs. Those programs are expected to prevent the growth in failures caused by aging equipment and will eventually reduce the number of equipment failures experienced on PPL Electric's distribution system.

G. WORKFORCE MANAGEMENT AND TRAINING PLAN

38. The Company's workforce management and training program is described in the LTIIP. (*See* Attachment 1, pp. 8-10.)

39. PPL Electric utilizes a wide variety of programs and tools to ensure that it has a qualified workforce.

40. As a measure to ensure the use of a qualified workforce, PPL Electric has adopted the definition of a Qualified Electrical Worker from the Occupational Safety and Health Administration ("OSHA") Regulation 29 CFR § 1910.269 Electrical Power Generation, Transmission and Distribution, which is defined in the PPL Electric Safety Rule Book and is provided to each employee. It is also incorporated into the training and qualification process for all electrical workers.

41. PPL Electric administers a rigorous, formal training and evaluation process for all qualified electrical workers. Training is required before an employee may perform work

independently on exposed, energized electrical equipment greater than 50 volts. Training requirements and programs are unique to the job classification and work being performed. Curriculum documents, outlining subject areas and training durations by job classification have been developed. Training may require up to five years to complete and incremental qualifications, following assessment, are identified throughout the duration of the training program. Retraining is conducted on a periodic basis as required by OSHA or more frequently when determined necessary.

42. For its contractors, PPL Electric's Sourcing department administers a standard process for soliciting contractors to perform work identified to be completed by independent contractors. The process includes issuance of a Request for Proposal ("RFP") to various contractors. Responses to the RFP are evaluated based on detailed financial and technical schedules that compare respondents' capabilities. Part of the RFP evaluation process includes evaluating the qualification of contractors to perform work (both technical and financial capabilities to meet the contractual commitments, and level of qualification of employees) and may include reference checks if appropriate.

43. Most independent contractors employ personnel through the building trades, which includes Union apprenticeship programs to help ensure that employees are qualified to perform assigned work. Employee qualification programs for non-Union independent contractors are stringently reviewed to assess the contractor's training program, such as on-the-job training and certification programs.

44. PPL Electric monitors contractor performance through several activities that may include direct job oversight through on-site supervision, monthly scorecards that evaluate such

areas as job quality, safety performance, cost, and validating billing activities that meet contractual expectations.

H. OUTREACH AND COORDINATION ACTIVITIES

45. PPL Electric's outreach and coordination activities with other utilities, the Pennsylvania Department of Transportation, and local governments are described in the LTIIP. (*See* Attachment 1, p. 8.) PPL Electric has established procedures for communicating with such entities regarding projects.

III. NOTICE AND EVIDENTIARY HEARINGS

46. Pursuant to the Commission's regulations, PPL Electric is serving this Petition and the attached LTIIP on the statutory advocates and all parties of record in the Company's most recent base rate proceeding at Docket No. R-2015-2469275.

47. Neither Act 11 nor the Commission's regulations require hearings on a proposed LTIIP.

48. The Commission's regulations provide a 30-day comment period for proposed LTIIPs and state that those comments raising material factual issues will be referred to the Office of Administrative Law Judge. *See* 52 Pa. Code § 121.4(c).

49. Accordingly, it is unknown at this time whether PPL Electric's proposed third LTIIP will be subject to evidentiary hearings.

IV. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the third Long-Term Infrastructure Improvement Plan for the period January 1, 2023, through December 31, 2027, as set forth in this Petition and the attachment hereto.

Respectfully submitted,

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Dated: September 2, 2022

Attorneys for PPL Electric Utilities Corporation

Attachment 1

2023-2027 LTIIP

PPL Electric Utilities Corporation

Long-Term Infrastructure Improvement Plan

PPL Electric Utilities Corporation

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PPL Electric Utilities Corporation

Introduction

PPL Electric Utilities Corporation ("PPL Electric" or "Company") is submitting this Long Term Infrastructure Improvement Plan ("LTIIP") pursuant to the requirements of Subchapter B, Distribution Systems, of the Public Utility Code, 66 Pa.C.S. §§ 1350-1360, the Public Utility Commission's ("PUC") Implementation Order for Establishment of a Distribution System Improvement Charge, entered on August 2, 2012 at Docket No. M-2012-2293611 and the Commission's regulations at 52 Pa. Code §§ 121.1 et seq. This LTIIP addresses a broad spectrum of Distribution Asset Management initiatives that the Company will use to continue its repair, improvement and replacement of aging infrastructure under this process, and is for the five-year period beginning January 1, 2023, and ending December 31, 2027.

PPL Electric strives to operate as efficiently as possible by performing the work required to maintain system integrity and reliability. Performance indicators such as System Average Interruption Frequency Index ("SAIFI"), Customer Average Interruption Duration Index ("CAIDI") and System Average Interruption Duration Index ("SAIDI") show that PPL Electric has been successful in its efforts. However, a generally flat to mildly decreasing trend in equipment failures, combined with an aging infrastructure, indicate that PPL Electric needs to continue to invest in its distribution system. As equipment failures remain flat to mildly decreasing, PPL Electric has been experiencing a significant increase in maintenance spending beyond normal inflationary pressures. The driver is a combination of both increased corrective and planned maintenance. PPL Electric has initiated and enhanced maintenance practices and programs to repair, improve, or replace certain distribution facilities in order to ensure adequate, efficient, safe and reliable service.

Addressing aging infrastructure will require ongoing investment. Such investment includes not only replacing aging equipment, but also investment in advanced equipment and communication technologies that can facilitate further system reliability improvements. If continued proactive re-investment does not occur, it is expected that system reliability will degrade, while the overall cost to maintain the distribution system will continue to rise. By investing in its distribution system, PPL Electric will ensure that its system continues to be safe, reliable, and able to meet the growing needs and expectations of its customers.

PPL Electric believes that managing finite resources to produce optimal results is essential for maintaining customer satisfaction. Criteria for program inclusion into the Long-Term Infrastructure Improvement Plan is not whether any single activity produces a positive reliability result, but rather, which portfolio of activities produces the best result for a given expenditure. PPL Electric's goal is focused on results (i.e., the reliability experienced by customers and associated rate impacts), not the rote execution of particular tasks.

Reliability Experience

The Distribution Asset Planning process employed by PPL Electric has been focused on maintaining reliability at the level that existed prior to passage of the Electricity Generation Customer Choice and Competition Act ("Customer Choice Act"). Since the 1994-1998 benchmark period, which defines PPL Electric's reliability performance targets, PPL Electric's service reliability has experienced annual swings, positive and negative, resulting largely from varying weather conditions. Historical benchmark performance is illustrated in Figures 1 and 2.

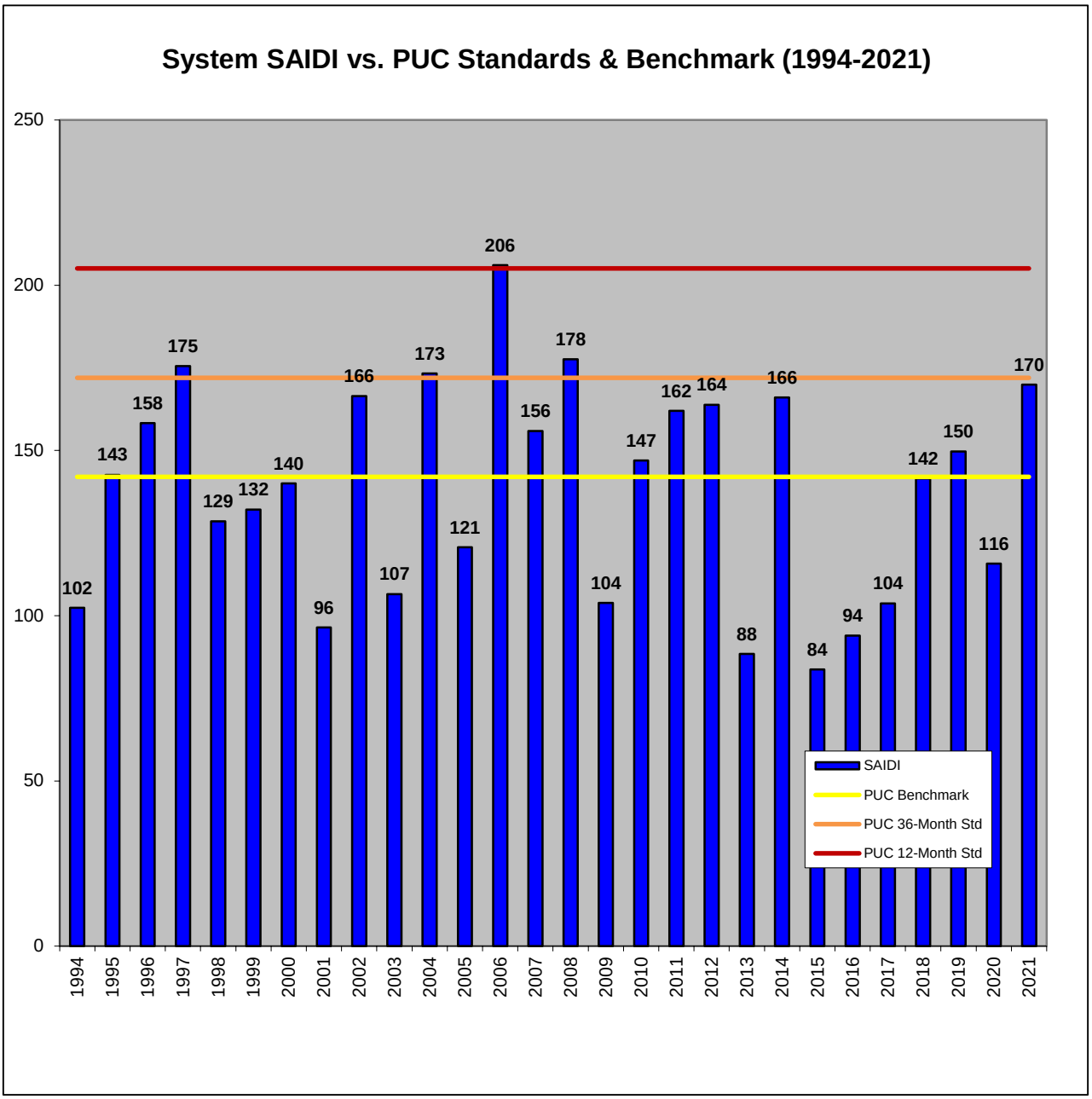

Figure 1: PPL Electric's SAIDI Performance

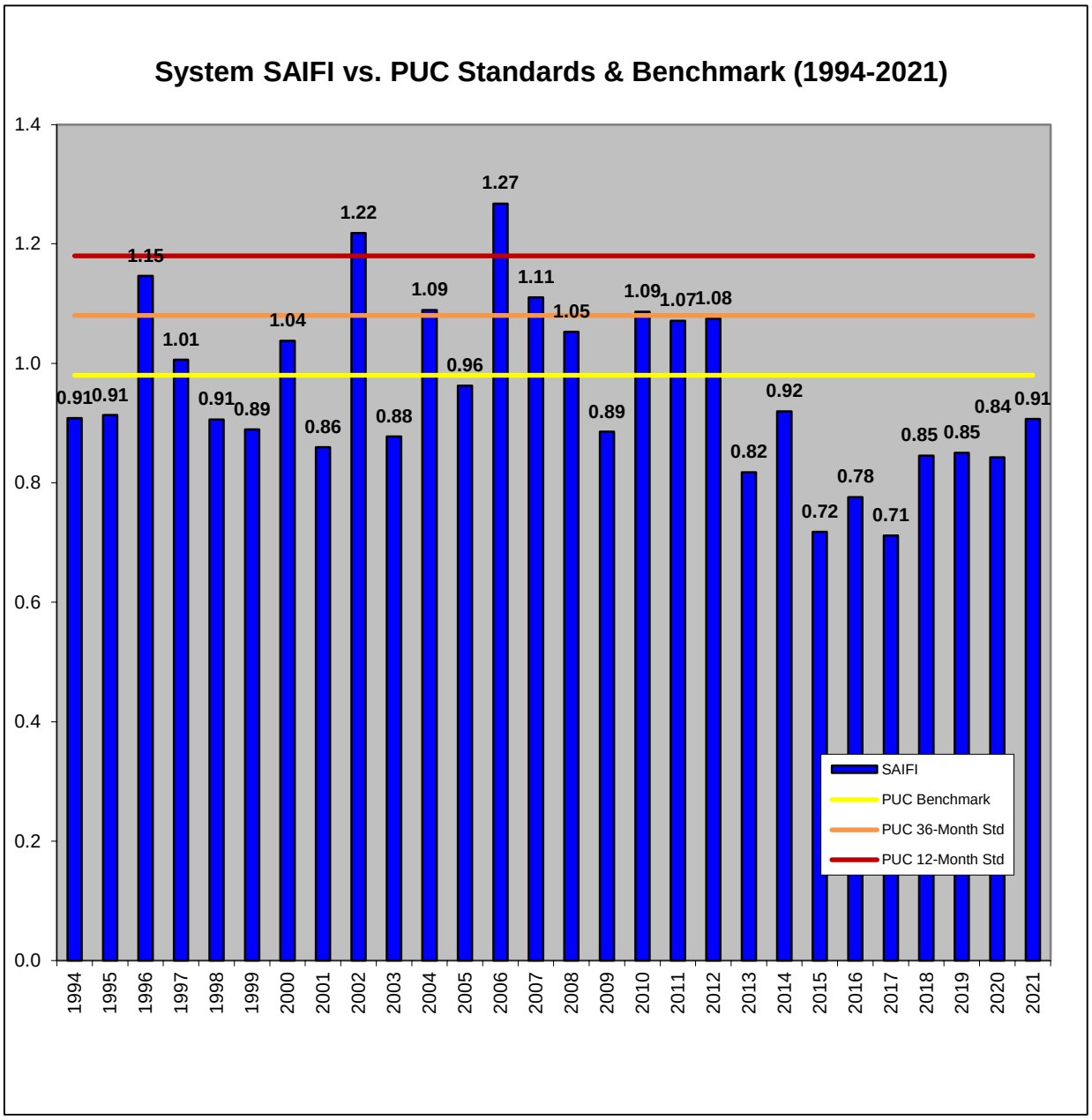

Figure 2: PPL Electric's SAIFI Performance

A significant risk to PPL Electric's ability to meet reliability benchmarks is the large portion of distribution facilities, many of which were installed in the 1960's and 1970's, that are now beyond or nearing the end of their design lifetime. See Appendix A for average age of major units of property. The resultant effect on non-storm-related equipment failures is illustrated by the chart in Figure 3 below.

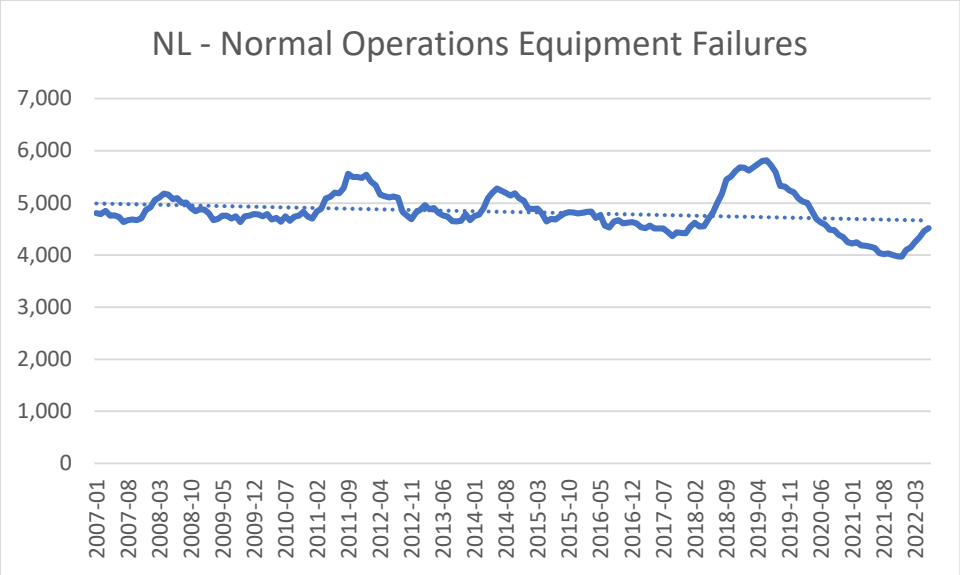

Figure 3: Equipment Failure Service Interruption Cases

The number of no-light cases due to equipment failures is trending slightly downward due to investments over the past five to ten years. The need to remediate that equipment which is at or near end-of-life remains to maintain or improve this favorable trajectory. Components contributing the most significantly to distribution equipment failures include poles/arms/attachments, overhead and underground conductors, switches, and substation equipment. See Appendix B for further details on asset contribution to reliability metrics.

Response to Aging Equipment

PPL Electric's reliability investment process is forward-looking and proactive. It consists of the following:

- Analyze and identify the drivers of historical trends of causes of service outages and other power service problems.
- Forecast future reliability metrics (SAIDI, SAIFI, and CAIDI) given existing mitigation programs' effect on the identified drivers.
- Identify new programs, policies, and activities to enhance or accelerate existing mitigation programs to avoid forecasted gaps between future reliability and benchmark targets.
- Identify, evaluate, and implement new technologies that enhance the Company's condition monitoring strategy.
- Evaluate and adjust existing programs, policies, and activities to produce the desired future results.
- Perform targeted data analytics against the Company's aging infrastructure utilizing real-time, or near real-time, operational data to further improve reliability performance.

- Incorporate the resulting portfolio of existing and new programs, policies, and activities in PPL Electric's five-year business plan.

In February 2018, PPL Electric's Reliability Principles and Practices ("P&P") were revised to help reduce the overall impact to the Company's customers from outages due to various causes, including but not limited to, equipment failures. The P&P sets forth a set of Principles that PPL Electric follows to plan, protect, and operate the Electrical Distribution System ("EDS"). These Principles are implemented through a set of standard Practices that are used as guidelines in designing the EDS. These Practices are reasonable, acceptable, and consistent with leading utility practices. More specifically, to reduce the number of customers experiencing permanent outages and outage duration over the long term, the following circuit design guidelines are used wherever practical, starting with those identified as Worst Performing Circuits ("WPCs"):

- Provide three-phase line ties that will support the transfer of all but approximately 500-750 customers for 100% of the year.

- Provide sectionalizing devices to limit customer count to no more than approximately 500-750 customers between devices.

- Limit customer count to less than approximately 1,500 customers per circuit.

- Limit line length to approximately 70 circuit miles

Prioritization utilizing these design criteria is based on the greatest expected improvement in reliability for the entire system.

Several other mitigation initiatives have been undertaken to reduce the forecasted short-term equipment failure growth rate.

- **Enhanced Pole Inspection/Treatment Program:** Beginning in 2021, the Company's wood pole inspection and treatment program was enhanced from a subjective inspection process to an objective, resistance drill-based methodology. The resistance drill inspection allows a complete pole health assessment, with both interior and exterior decay accurately measured. This holistic strength assessment of the pole is the most accurate and thorough pole inspection possible. As an integral part of the twelve-year pole inspection process, PPL Electric observes, notes, and reports at-risk conditions of all pole attachments, specifically crossarms, braces, conductors, transformers, fuse cutouts, lightning arresters, reclosers, regulators, capacitors, switches, wildlife protection, vegetation encroachment, guys, anchors, ground wires, and ground rods.

- **Increased Utilization of Infrared Inspections:** PPL Electric conducted a trial of infrared inspections of multi-phase lines in 2006. The trial inspections cost $122,500 and identified repairs costing $100,000, saving an estimated 1,460,000-2,600,000 Customer Minutes Interrupted ("CMI"). Funding of infrared inspections and repairs was increased significantly during 2010 and has remained at a higher funding level. Infrared inspections occur on all 3-phase and 2-phase overhead lines adjacent to roadways every two years.

- **Proactive Circuit Analysis ("PCA"):** PCAs are performed on each circuit on a four-year cycle. The review analyzes and addresses both operational and reliability characteristics of each circuit. Voltage support, phase balancing, protection coordination, power factor maintenance and loading issues are

addressed from an operational perspective. Service outage analysis, exposure analysis, and field checks address reliability and power quality.

- **Distribution Automation Strategy:** In 2010, PPL Electric launched a "smart grid" pilot project that enables the Company to react rapidly to changes on the delivery system, and to automatically re-route power around problems that occur. The project initially focused on the Harrisburg, Pa. area, but has since been expanded to cover all of the Company's service territory. The project included the implementation of an advanced Distribution Management Systems ("DMS"), which was a breakthrough technology that enables the Company's operators to see the status of PPL Electric's distribution network in real-time. In 2016, PPL Electric completed a system wide rollout of Fault Isolation and Service Restoration ("FISR") technology. FISR identifies faulted sections and quickly develops an optimized restoration plan, then automatically executes that plan. Customers typically can be restored within five minutes from the start of the outage. This milestone is an industry first and has saved over one million customer interruptions to date. Over 8,600 automated smart devices have been installed, which has allowed for remote operation and monitoring of circuit sectionalizing equipment.

Although these programs have successfully slowed failure growth rates in the short-term, PPL Electric faces a long-term issue regarding aging infrastructure. The surge in electrical construction in the 1960's and 1970's has resulted in a large number of assets that have reached or are nearing the end of their useful lifetime. Consequently, in 2008-2009, PPL Electric conducted a major condition assessment and maintenance study of its distribution system. The result was the implementation of the Asset Optimization Strategy ("AOS"). The study found that programmatic and accelerated replacement of infrastructure would be the most cost-effective strategy to address aging infrastructure and ensure system reliability and integrity.

Asset Optimization Strategy

The purpose of the AOS study was to develop a strategy for accelerated capital replacement improvements that would combat the anticipated effects of aging infrastructure and bolster PPL Electric's ability to effectively maintain reliable electric service. With the Company entering a period where a significant number of assets are expected to reach the end of life, a plan was developed to intelligently replace assets prior to an unplanned failure that impacts customers. The plan includes replacements in kind, as well as upgrades to current standards.

Examples of AOS Projects include proactive replacement of substation equipment, Low Tension Network ("LTN") equipment, and vintage underground cable based on condition-based health analysis.

Accelerated Investment

As a result of the AOS study, PPL Electric approximately doubled its level of investment in DSIC-eligible property from 2009-2012. During this period, non-storm equipment failures fluctuated but continued to show a slight upward trend. PPL Electric continued to accelerate capital investments during the periods 2013-2017 and 2018-2022 to address an upward trend in equipment failures that peaked in 2018-2019 (see figure 3 above).

Period	Avg Annual Capital investment (in millions)
2008-2012	$88
2013-2017	$137
2018-2022	$180

Figure 4: Approximate average annual capital investment in millions. Not adjusted for inflation.

As a result of these investments, PPL Electric arrested the increase in failed equipment and the current trend is flat to mildly decreasing. Even with these investments, the average age of equipment increased slightly since the 2018-2022 plan. While projected spending under this proposed LTIIP is lower than the 2018-2022 period, continued capital investment is necessary to maintain or improve the recently flattened trend in equipment failure.

Implementation of Long-Term Infrastructure Improvement Plan

The Long-Term Infrastructure Improvement Plan, in addition to various other prudent capital investments, helps to ensure the safety and reliability of the distribution system. The investments since the LTIIP was initially put into place have arrested and reversed the growth trend in equipment failures. Equipment failure trends and asset-specific contributions to system-level reliability metrics are analyzed on an ongoing basis to ensure funding is invested appropriately.

PPL Electric routinely reviews the effectiveness of programs to ensure cost-effective investment. Program/project impact on SAIDI and SAIFI, in addition to potential reductions in outage response costs, is compared to the overall program/project costs. PPL Electric utilizes a project prioritization process that defines the cost-effectiveness of programs/projects to ensure effective optimization of reliability investments. PPL Electric currently is improving the use of ongoing asset health indices to further refine asset replacement criteria.

Ongoing review of the effectiveness of investments to address equipment failure trends will likely result in adjustments to the strategy over time. Future Long Term Infrastructure Improvement Plans will reflect such adjustments. Additionally, work plans may fluctuate throughout a given year due to the need to reallocate resources in response to changing business needs. Some examples include shifting resources for storm response activities, project construction delays caused by a backlog of material deliveries, and the redirection of investment to cure costly equipment failures. In addition, during the project engineering phase, issues such as right-of-way requirements and environmental considerations can result in scope changes that also can delay actual construction. During construction of larger projects, additional scope needs can be identified, creating the need to defer other projects. Finally, reliability metric performance can result in redirection of spending to help ensure the ability to meet targets.

Projected expenditures for the replacement of failed equipment are based on a review of historical trends while considering current failure rates and proactive mitigating measures. For such programs, it is difficult to project the specific scope and location. Therefore, PPL Electric has provided only planned expenditures based on historical trending information.

Utility Outreach

PPL Electric continues to remain engaged, seeking out opportunities with other utilities and government officials on the planning and execution of future construction projects. A forum exists with the Utility Highway Liaison Committee ("UHLC"), with whom PennDOT, the Turnpike Commission, other utilities, and the Energy Association of Pennsylvania meet quarterly to discuss policy issues, present and future projects, and relocation projects. The Company is a regular participant. Initiatives at these forums are focused primarily on improving state and utility interactions.

PPL Electric also participates in various Pennsylvania Coordinating Committees, including the Northeast PA ("NEPA") Regional partnership, the Lancaster County Regional Partnership, the Lehigh Valley Regional Partnership, and the Lycoming County Area Coordinating Committee. These meetings are held monthly, bi-monthly, or quarterly to discuss and share project plans with stakeholders including utility companies, PennDOT, public works officials and planning commission members. PPL Electric currently hosts two of these meetings each calendar year.

Utilization of a Qualified Work Force

PPL Electric Workforce

As a measure to ensure the use of a qualified workforce, PPL Electric has adopted the definition of a Qualified Electrical Worker from the Occupational Safety and Health Administration ("OSHA") Regulation 29 CFR § 1910.269 Electrical Power Generation, Transmission and Distribution, which is defined in the PPL Electric Safety Rule Book and is provided to each employee. It is also incorporated into the training and qualification process for all electrical workers.

PPL Electric administers a rigorous, formal training and evaluation process for all qualified electrical workers. Training is required before an employee may perform work independently on exposed, energized electrical equipment greater than 50 volts. Training requirements and programs are unique to the job classification and work being performed. Curriculum documents, outlining subject areas and training durations by job classification have been developed. Training may require up to 5 years to complete and incremental qualifications, following

assessment, are identified throughout the duration of the training program. Retraining is conducted on a periodic basis as required by OSHA or more frequently when determined necessary.

PPL Electric's formal training programs are administered by the Technical Development & Improvement ("TD&I") group. The training section of the TD&I group is comprised of approximately 37 full time employees, both training professionals and craft employees. Experienced training professionals lead the design and development of the training programs with input from subject matter expertise provided by craft employees from the field. Training program (curriculum) content is approved by a curriculum committee which is comprised of business line managers. The basic job requirement for an instructor includes 5-years of experience performing the work and attainment of Journeyman level (or equivalent) qualifications. Craft instructors are then trained and mentored. Training delivery is governed by PPL Electric policies and procedures to ensure quality and consistency.

Training is delivered in phases. A phase typically consists of a grouping of training modules into one training period of several days to several weeks. Training consists of both classroom and field work to gain hands-on practical learning experience. Trainees are evaluated throughout the program. Evaluation includes written examination and/or a performance examination. Employees must successfully complete each training module before progressing to the next phase of training.

In addition, trainees in key programs must complete an additional skills assessment prior to advancement to the next step. These assessments are coordinated by the TD&I group. The employees are evaluated (graded) by a panel comprised of knowledgeable field supervisors and experienced bargaining unit craft members. This independent evaluation serves as a quality control check on the TD&I training section.

Over the next 5 years, PPL Electric will be executing a resource strategy which includes formal training classes to hire and train new employees in preparation for upcoming attrition.

Contractor Workforce

PPL Electric's Sourcing department administers a standard process for soliciting contractors to perform work identified to be completed by independent contractors. The process includes issuance of a Request for Proposal ("RFP") to various contractors. That process includes a meeting to review the technical and administrative components of the work and normally a walk-down of the project area. Responses to the RFP are evaluated based on detailed financial and technical schedules that compare respondents' capabilities. Part of the RFP evaluation process includes evaluating the qualification of contractors to perform work (both technical and financial capabilities to meet the contractual commitments, and level of qualification of employees) and may include reference checks if appropriate. Any specific required qualifications of contractors would typically be outlined in the RFP and/or contract (for example: pole installation, permit and tag authorities, line construction by specific voltage, live line work, foundations, directional bore/trenching, underground networks).

Most independent contractors employ personnel through the building trades, which includes Union apprenticeship programs to help ensure that employees are qualified to perform assigned work. (This approach is comparable to PPL Electric's Union labor qualification training program.) Employee qualification programs for non-Union independent contractors are stringently reviewed to assess the contractor's training program, such as on-the-job training and certification programs.

Prior to award, contractors are screened for their safety performance and, if applicable, environmental record. Contractors that do not have an acceptable record receive no further consideration. In the event that a contractor

working for PPL Electric incurs safety incidents and/or does not take appropriate safety measures, the contractor is terminated and prohibited from performing work for PPL Electric in the future.

PPL Electric has instituted a contractor orientation program that provides new contractors an opportunity to understand company expectations for performing work safely, mindful of public and private landowner considerations and administrative concerns (such as billing). PPL Electric also performs weekly safety and workmanship review meetings with the Company's contractor work force to review safety issues and other relevant topics

PPL Electric sponsors a training program that allows the contractors' employees to become qualified in PPL Electric's permit-and-tag system. Contractor employees who successfully complete the training program can be permit holders on PPL Electric's system.

PPL Electric monitors the contractors' performance through several activities that may include direct job oversight through on-site supervision, monthly scorecards that evaluate such areas as job quality, safety performance, cost, and validating billing activities that meet contractual expectations. If safety concerns are identified at a job site, any person has the ability and express duty to cease work until the concerns have been appropriately addressed, and a safety review team could be assembled to formally request a contractor to respond to safety concern. Safety violations could result in immediate contractor termination.

PPL Electric's Project Construction Supervisors continuously monitor the quality of all contractor work and adherence to PPL Electric's Construction Standards. Where the contractor installs specialized equipment on critical facilities, special Quality Assurance review are performed which may include inspection of grounding, trench, foundations, final grade, structural components, poles/towers, conduits, electrical equipment, primary conductor, wiring, designations, and final completion of the Acceptance of Facilities form). Any failures are described along with description and dates of corrections to resolve the areas of concern before final acceptance of the contractor's quality of work.

Summary

As a result of the economic expansion and building boom of the 1960's and 1970's, much of PPL Electric's distribution system was constructed 50 or more years ago. As this equipment deteriorates due to age, environmental exposure, and added load, it becomes increasingly critical to plan for the repair, upgrade, and/or replacement of these assets through the initiatives described above. In the absence of these initiatives, the efficiency, safety, and reliability of the electric distribution system is expected to be increasingly compromised. PPL Electric believes that the expenditures for these initiatives constitute a prudent and reasonable investment for managing its distribution assets and that each of the listed programs will successfully achieve one or more of the following benefits:

- Maintaining public and employee safety
- Reducing service outage durations and number of customers affected
- Reducing service outage restoration times
- Reducing service outage locating and repair times
- Controlling service outage repair costs
- Limiting failure-related damages and related costs, and
- Improving/maintaining power quality (voltage, flicker, etc.)

To achieve these results, PPL Electric anticipates the need for the following total capital expenditures over the 2023-2027 period. Note that planned expenditures for certain initiatives can fluctuate yearly due to the various factors identified previously.

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 17.33	$ 18.96	$ 17.33	$ 17.33	$ 17.33	$ 88.28
New Electronic Reclosers	$ 5.07	$ 4.69	$ 4.13	$ 3.63	$ -	$ 17.52
Distribution Animal Guarding	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 2.50
Failed Equipment	$ 34.77	$ 34.03	$ 35.18	$ 36.64	$ 36.03	$ 176.64
Underground Cable Replacement	$ 0.42	$ 1.11	$ 1.67	$ 1.59	$ 1.59	$ 6.37
Low Tension Network Primary Cable, Equipment and Structures	$ 0.60	$ 1.54	$ 0.38	$ 2.40	$ 2.40	$ 7.32
Substation	$ 3.04	$ 7.71	$ 14.05	$ 13.31	$ 13.08	$ 51.19
LTN Upgrades	$ 3.12	$ 12.60	$ 7.63	$ 8.19	$ -	$ 31.54
Reliability	$ 4.08	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 12.08
System Reliability Improvement Projects	$ 12.77	$ 8.11	$ 13.79	$ 17.80	$ 13.29	$ 65.76
Unreimbursed Highway Relocations	$ 6.16	$ 4.90	$ 3.92	$ 2.83	$ 2.83	$ 20.64
Protection and Control	$ 4.70	$ 6.06	$ 7.35	$ 6.83	$ 6.83	$ 31.77
Total	$ 92.56	$ 102.21	$ 107.92	$ 113.05	$ 95.88	$ 511.62

Almost all of the aforementioned initiatives take advantage of new technologies that did not exist when the associated assets were originally placed into service, and many of these technologies are very recent innovations. These technologies are expected not only to restore the assets to their original level of performance, but, in many cases, provide performance well beyond what previously was achievable in order to ensure and maintain adequate, efficient, safe, and reliable service.

Some of the initiatives, such as animal guarding, clearly have implied endpoints, where no further opportunities for improvement remain. Others, such as distribution automation, eventually experience diminishing returns over time. Other initiatives, such as pole reinforcement and replacement, will be ongoing. Finally, some programs may

become obsolete, while new programs may become desirable as a result of the evolution of new technologies. Because of these and other variables, the effectiveness of these programs is reviewed annually, and programs are added, deleted, and/or modified, as necessary, to ensure that the expenditures are providing the desired benefits to customers at a reasonable cost.

Distribution Assets

The following pages detail 5-years projections for Long-Term Infrastructure Improvements initiatives that apply to distribution line assets. 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

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$17.33	$18.96	$17.33	$17.33	$17.33	$88.28

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.

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2000-2500	2000-2500	2000-2500	2000-2500	2000-2500	10000-12500

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.

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

Planned Reinforcements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
4000-5000	4000-5000	4000-5000	4000-5000	4000-5000	20000-25000

Locations

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

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

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
210-250	170-200	110-140	50-70	0	540-660

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	90-110
Northeast	90-110
Central	90-110
Susquehanna	90-110
Harrisburg	90-110
Lancaster	90-110

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$5.07	$4.69	$4.13	$3.63	$0	$17.52

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

Planned Animal Guards					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
240-360	240-360	240-360	240-360	240-360	1200-1800

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	200-300
Northeast	200-300
Central	200-300
Susquehanna	200-300
Harrisburg	200-300
Lancaster	200-300

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.50	$0.50	$0.50	$0.50	$0.50	$2.50

Failed Equipment

This category includes the replacement of failed or deteriorated distribution equipment, LTN equipment, underground cable, and underground getaways.

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$34.77	$34.03	$35.18	$36.64	$36.03	$176.64

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.

Replace Failed Underground Cable

Program Description and Purpose

Replacement of failed underground residential primary and secondary 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 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 poor test results. Budget recommendations are based on historical trends in getaway failure quantities and costs, in addition to projected trends of future getaway failures based on asset health metrics.

Scope & Locations

Scope and locations are determined as getaway cables fail while in service or fail conditionally under 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 network 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 corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as assets fail.

Replace Deteriorated/Failed Area Supply Substation Equipment

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.

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

Scope

Planned Scope in Cable Segments					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
25-100	75-150	135-225	100-200	100-200	435-875

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	100-200
Northeast	45-125
Central	45-100
Susquehanna	45-100
Harrisburg	100-175
Lancaster	100-175

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.42	$1.11	$1.67	$1.59	$1.59	$6.37

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 Replacements in Units (in Work Orders)						
	2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
Primary Cable Replacements	0-2	0-2	0-2	0-3	0-3	0-12
LTN Equipment	6-18	6-18	6-18	6-18	6-18	30-90

Locations (Approximate total over 5-year plan)

Region	LTN Equipment	Cable
Lehigh	5-15	0-2
Northeast	5-15	0-2
Central	5-15	0-2
Susquehanna	5-15	0-2
Harrisburg	5-15	0-2
Lancaster	5-15	0-2

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.60	$1.54	$0.38	$2.40	$2.40	$7.32

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

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$3.04	$7.71	$14.05	$13.31	$13.08	$51.19

Underground Getaway Cable Replacements and Life Extension

Program Description and Purpose

Proactive replacement of aging and deteriorating 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

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-4	5-12	8-15	8-15	8-15	29-61

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	0-7
Northeast	12-17
Central	4-5
Susquehanna	2-7
Harrisburg	10-22
Lancaster	1-3

Miscellaneous Substation Equipment

Program Description and Purpose

Programmatic replacement of older substation equipment, including air break switches, potential transformers ("PTs"), capacitance-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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-2	4-8	5-9	5-9	5-9	19-37

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	3-6
Northeast	4-7
Central	3-6
Susquehanna	3-6
Harrisburg	3-6
Lancaster	3-6

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, obsoletion, 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

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
7-12	22-32	42-62	39-58	39-58	149-222

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	40-50
Northeast	11-21
Central	17-26
Susquehanna	29-34
Harrisburg	29-57
Lancaster	23-34

69/12 kV & 138/12 kV 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, obsoletion, 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

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
1-2	2-4	4-6	3-5	3-5	13-22

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	8-9
Northeast	2-3
Central	1-3
Susquehanna	0-1
Harrisburg	0-2
Lancaster	2-4

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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-1	4-6	6-8	6-8	6-8	22-31

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	3-5
Northeast	3-5
Central	3-5
Susquehanna	4-5
Harrisburg	6-7
Lancaster	3-4

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

Scope

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-1	1-3	1-3	1-3	0-1	3-11

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	2-3
Northeast	0-1
Central	1-2
Susquehanna	0-3
Harrisburg	0-1
Lancaster	0-1

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

Scope

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2-4	3-5	4-6	4-6	4-6	17-27

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	1-2
Northeast	3-6
Central	7-8
Susquehanna	2-3
Harrisburg	1-3
Lancaster	3-5

LTN Upgrades

Program Description and Purpose

The purpose of this program is to install remote monitoring and control equipment in all Low Tension Network ("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

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
21	159	102	195	0	477

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	62
Northeast	111
Central	80
Susquehanna	33
Harrisburg	97
Lancaster	94

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$3.12	$12.60	$7.63	$8.19	0	$31.54

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$4.08	$2.00	$2.00	$2.00	$2.00	$12.08

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 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. These projects are 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
10-25	10-25	10-25	10-25	10-25	50-125

Locations

Locations are identified based upon emergent reliability needs.

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.

Scope

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
6-12	6-12	6-12	6-12	6-12	30-60

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	5-10
Northeast	5-10
Central	5-10
Susquehanna	5-10
Harrisburg	5-10
Lancaster	5-10

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$12.77	$8.11	$13.79	$17.80	$13.29	$65.76

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.

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$6.16	$4.90	$3.92	$2.83	$2.83	$20.64

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, age, and automation enhancement potential. 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2-6	59-89	72-108	67-100	67-100	267-403

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	54-81
Northeast	42-64
Central	32-49
Susquehanna	34-51
Harrisburg	51-77
Lancaster	54-81

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$4.70	$6.06	$7.35	$6.83	$6.83	$31.77

Appendix A: Average Age of Major Units of Property

The below chart is a summary of key distribution assets, targeted for planned replacement and proactive installation.

Average Age of Major Units of Distribution Property		
Utility Account	**Description**	**Avg Asset Age**
362.0 - Station Equipment	DC Sytem Equipment	18
362.0 - Station Equipment	Substation Animal Guards	10
362.0 - Station Equipment	Power Circuit Breakers	33
362.0 - Station Equipment	Power Transformers	42
362.0 - Station Equipment	Protection and Control Equipment	51
364.4 - Poles and Fixtures	Distribution Wood Poles	43
365.0 - Overhead Conductors, Device	Distribution Animal Guards	7
365.0 - Overhead Conductors, Device	OH Primary Conductor	50
365.0 - Overhead Conductors, Device	Air Break Switches	13
365.0 - Overhead Conductors, Device	Automatic Switches (Primarily OCRs/VCRs)	10
365.0 - Overhead Conductors, Device	Disconnect Switches	35
367 - Underground Conductors	UG Primary Conductor (includes Getaways and Cross Yard Ties)	27
366.0 - Underground Conduit	Equipment Foundation, Man Holes, Transformer Vaults (excl Conduit)	27
368.4 - Submersible or Padmt Type	UG Transformers (include LTN Transformers and Network Protectors)	25

PPL Electric Utilities Corporation

Appendix B: Asset Contribution to Reliability Metrics

The below table provides a summary of customers interrupted ("CI") and Customer Minutes Interrupted ("CMI") by failed component. Note that both transmission and distribution substation outages are included in the Substation component asset type.

Outage Contribution By Component - Equipment Failure Causes - Non Major Events											
Component Asset Type	Component Desc	2017		2018		2019		2020		2021	
		CI	CMI	CI	CMI	CI	CMI	CI	CMI	CI	CMI
Distribution	OH-Capacitor Bank	3,424	108,863	473	94,627	1,216	104,022	490	12,697	1,020	50,662
Distribution	OH-Lightning Arrester	6,301	566,653	8,154	731,871	6,200	712,771	2,702	290,321	2,151	293,442
Distribution	OH-Other Equipment(explain)	3,030	289,973	4,840	465,772	5,175	804,502	6,109	451,306	3,456	313,318
Distribution	OH-Pole/Arms Attachments	52,713	6,524,470	48,513	4,700,495	41,599	4,070,548	35,347	3,959,531	43,737	5,505,965
Distribution	OH-PRI Splices and Connectors	7,454	989,200	13,398	1,040,441	24,195	1,685,455	15,181	980,526	15,620	1,443,678
Distribution	OH-Primary/Neutral	85,443	9,923,218	122,999	15,577,602	110,511	12,776,083	116,882	14,222,141	103,375	13,167,440
Distribution	OH-SEC Splices and Connectors	1,813	134,821	1,497	145,830	1,392	102,066	1,710	151,429	1,690	208,053
Distribution	OH-Secondaries/Services	2,610	274,850	3,592	371,244	3,735	486,804	3,283	370,513	3,369	379,299
Distribution	OH-Switch/Automatic	20,631	1,619,275	24,333	2,167,680	20,436	1,663,225	15,214	1,330,628	25,270	2,014,136
Distribution	OH-Switch/Manual/AB/Disc/OS/LBD	13,402	1,170,281	12,348	1,128,002	5,081	505,950	6,291	401,764	5,692	297,479
Distribution	OH-Tap Fuse/Cutout	6,951	749,227	11,402	1,229,204	8,284	1,133,814	7,764	841,505	7,116	925,719
Distribution	OH-Transformer	5,671	968,793	8,079	1,220,182	9,353	1,197,199	7,292	1,225,848	8,189	1,171,421
Distribution	OH-Transformer Fuse/Cutout	16,744	1,778,312	25,048	2,830,029	19,132	2,096,787	20,863	2,208,699	18,545	2,025,416
Distribution	UG-Elbows	84	31,649	313	58,893	199	49,054	480	274,811	937	212,896
Distribution	UG-Lightning Arrester	61	14,383	97	14,711	98	23,831	120	21,331	76	12,064
Distribution	UG-Load Break Junctions	183	36,227	9	1,069	31	9,845	73	16,468	164	58,516
Distribution	UG-Low Tension Network							5	315		
Distribution	UG-Other Equipment(explain)	17	2,086	819	95,603	154	32,535	1,444	155,257	7	795
Distribution	UG-Pads/Vaults/MHs & Splice Boxes	83	18,854	44	7,021	91	19,727	102	18,971	801	150,036
Distribution	UG-PRI Splices and Connectors	151	28,502	82	16,355	1,666	136,146	343	38,591	791	53,784
Distribution	UG-Primary Cable/Neutral	13,539	2,118,561	21,525	2,962,012	18,980	2,779,215	15,006	2,304,340	12,565	2,377,282
Distribution	UG-Riser Pole Equip & Devices	749	88,313	551	70,197	1,404	115,247	306	41,973	948	131,556
Distribution	UG-SEC Splices and Connectors	40	1,200	22	2,575	40	2,814	2	324	33	1,193
Distribution	UG-Secondaries/Services	292	47,087	393	85,353	260	44,414	310	50,241	377	80,910
Distribution	UG-Switchgear	1,021	146,580	1,589	334,778	2,651	309,998	441	87,554	712	142,733
Distribution	UG-Transformer/Transformer Fuse	1,455	254,990	2,735	578,648	1,326	358,322	1,041	232,250	2,915	336,981
Substation	SUB-Circuit Breaker	10,859	1,162,641	6,129	217,364	5,658	605,760	28,289	1,766,321	9,349	202,774
Substation	SUB-Control/Relay	1,950	143,054			26,241	464,478			730	9,127
Substation	SUB-Insulator	84	4,990			5	3,312			3,539	31,055
Substation	SUB-Lightning Arrester					583	99,422				
Substation	SUB-Other Equipment(Explain)							35,104	366,321	499	14,436
Substation	SUB-Power Fuse							2,823	26,593	67	355
Substation	SUB-Switch/Automatic			1,340	14,843						
Substation	SUB-Switch/Manual/AB/Disc/LBD	654	54,045	3,353	82,506	1	1,014	22,157	486,661	4	1,982
Substation	SUB-Transformer	13	2,320	1,449	11,606	5,980	72,007	7,719	118,942		
Total		257,422	29,253,418	325,126	36,256,511	321,677	32,466,367	354,893	32,454,169	273,744	31,614,503

VERIFICATION

I, STEVEN D. SELKREGG, being the Director - Distribution Asset Management & Engineering at PPL Services Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 09/01/2022

Steven Selkregg
Steven Selkregg (Sep 1, 2022 15:14 EDT)

Steven D. Selkregg

PPL Electric Exhibit SDS-2

Kimberly A. Klock
Assistant General Counsel

PPL
Two North Ninth Street
Allentown, PA 18101-1179
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VIA FEDEX

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

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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PPL Electric Utilities Corporation

Annual Asset Optimization Plan

Year Ended December 31, 2023

PPL Electric Utilities Corporation

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PPL Electric Utilities Corporation

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 ("LTIIP") 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 LTIIP 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 LTIIP, which is pending at Docket No. P-2022-3034972 ("Revised Third LTIIP"). However, the projected installation and spending figures for 2024 match the projections set forth in the proposed Revised Third LTIIP except for Predictive Failure Technology, which is a new program proposed in the Revised Third LTIIP.

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 LTIIP 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.

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 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 LTIIP ("First LTIIP") was approved by the Commission at Docket No. P-2012-2325034. PPL Electric's First LTIIP 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 LTIIP ("Second LTIIP") 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 LTIIP covers the years 2018-2022. PPL Electric's third LTIIP ("Third LTIIP") 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 LTIIP covers the years 2023-2027. In preparing its LTIIPs, PPL Electric followed the guidelines established in the Commission's August 2, 2012 Final Implementation Order at Docket No. M-2012-2293611.

Within the LTIIPs, 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

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.

Executive Summary

The upcoming 12-month period (2024) is covered by PPL Electric's third LTIIP, 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 EEI as a result of a decade of reducing permanent customer outages.

PPL Electric Utilities Corporation

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	1,429,035	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

LTIIP Category	2023 LTIIP	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
Substation	$26.94	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 5-10
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

- 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

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 LTIIP)	$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.

Replacements in Units	
2023 (Third LTIIP)	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 LTIIP)	4000-5000
2023 (AAOP Forecast)	4000-5000
2023 (Actual)	711
2024 (Forecast)	4000-5000

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 LTIIP)	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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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 LTIIP)	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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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 LTIIP)	$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

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

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.

PPL Electric Utilities Corporation

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 LTIIP)	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 LTIIP)	$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.

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 LTIIP)	0-2
Primary Cable	2023 (AAOP Forecast)	0-2
Primary Cable	2023 (Actual)	1
Primary Cable	2024 (Forecast)	0-2
LTN Equipment	2023 (Third LTIIP)	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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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 LTIIP)	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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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 LTIIP)	$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

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 LTIIP)	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.

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 LTIIP)	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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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.

Planned Expenditures	$Million
2023 (Third LTIIP)	$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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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 LTIIP)	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

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 LTIIP)	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 LTIIP and forecast provided last year.

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, obsoletion, 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 LTIIP)	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.

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, obsoletion, 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 LTIIP)	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.

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 LTIIP)	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,

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 LTIIP)	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

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 LTIIP)	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.

PPL Electric Utilities Corporation

Scope

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

Planned Expenditures (in millions)

Planned Expenditures	$Million
2023 (Third LTIIP)	$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.

PPL Electric Exhibit SDS-3

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January 17, 2024

VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
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Harrisburg, PA 17105-3265

P-2022-3034972-jbs

Re: Petition of PPL Electric Utilities Corporation for Approval of Major Modifications to its Existing Long-Term Infrastructure Improvement Plan
Docket No. P-2024-

Dear Secretary Chiavetta:

Enclosed for filing is the Petition of PPL Electric Utilities Corporation for Approval of Major Modifications to its Existing Long-Term Infrastructure Improvement Plan. Copies are being served on the statutory advocates and all parties of record to the Company's most recent base rate proceeding at Docket No. R-2015-2469275 as indicated on the Certificate of Service.

Respectfully submitted,

Devin Ryan

DR/dmc
Enclosures

cc: Certificate of Service

CERTIFICATE OF SERVICE

Docket No. P-2024-_____

I hereby certify that a true and correct copy of the filing 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 E-MAIL and FIRST CLASS MAIL

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Date: January 17, 2024

Devin T. Ryan

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation for Approval of Major Modifications to its Existing Long-Term Infrastructure Improvement Plan	: : : :	Docket No. P-2024-_____

PETITION OF PPL ELECTRIC UTILITIES CORPORATION FOR APPROVAL OF MAJOR MODIFICATIONS TO ITS EXISTING LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

TO THE PENNSYLVANIA PUBLIC UTILITY COMMISSION:

Pursuant to 52 Pa. Code §§ 5.41 and 121.5(a), PPL Electric Utilities Corporation ("PPL Electric" or the "Company") hereby files this Petition requesting approval of major modifications to its existing third Long-Term Infrastructure Improvement Plan ("LTIIP"), which covers the period January 1, 2023, through December 31, 2027. Under the third LTIIP, the Company has continued its accelerated repair, improvement, and replacement of aging infrastructure. Since the time that the Pennsylvania Public Utility Commission ("Commission") originally approved the third LTIIP on December 22, 2022,[1] there have been developments affecting the design and funding of the LTIIP, including the Distribution System Improvement Charge ("DSIC") eligible property that the Company would like to incorporate in its LTIIP.

Specifically, PPL Electric proposes to add a new program, *i.e.*, Predictive Failure Technology, to its LTIIP. Moreover, PPL Electric's updated total capital expenditure projection for the LTIIP exceeds by more than 20% the total capital expenditure projection set forth in the current LTIIP. These major modifications to the LTIIP, as set forth in the redline and clean

[1] *See Petition of PPL Electric Utilities Corp. for Approval of its Third Long-Term Infrastructure Improvement Plan*, Docket No. P-2022-3034972 (Order entered Dec. 22, 2022).

versions of the revised LTIIP attached hereto as **Appendix A** and **Appendix B**, respectively, are justified for the reasons set forth in the instant Petition.

As such, PPL Electric respectfully requests that the Commission approve the proposed major modifications to the Company's LTIIP, as further described in this Petition.

I. INTRODUCTION

1. This Petition is filed by PPL Electric, a public utility subject to the regulatory jurisdiction of the Commission.

2. PPL Electric's address is PPL Electric Utilities Corporation, Two North Ninth Street, Allentown, Pennsylvania 18101.

3. PPL Electric's attorneys are:

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PPL Electric's attorneys are authorized to receive all notices and communications regarding this filing.

4. PPL Electric furnishes electric distribution, transmission and default supply services to approximately 1.5 million customers throughout its certificated service territory, which

includes all or portions of twenty-nine counties and encompasses approximately 10,000 square miles in eastern and central Pennsylvania.

5. PPL Electric is a "public utility," an "electric distribution company" ("EDC"), and a "default service provider" as defined in Sections 102 and 2803 of the Pennsylvania Public Utility Code, 66 Pa. C.S. §§ 102, 2803.

6. On February 14, 2012, Governor Corbett signed into law Act 11 of 2012 ("Act 11"), which amended Chapters 3, 13, and 33 of Title 66 of the Code to allow, among other things, EDCs, natural gas distribution companies, water utilities, wastewater utilities and city natural gas distribution operations to establish a DSIC.

7. Act 11 provides utilities with the ability to implement a DSIC to recover reasonable and prudent costs incurred to repair, improve, or replace certain eligible distribution property that is part of the utility's distribution system. Eligible property for EDCs is defined in Section 1351 of the statute. *See* 66 Pa. C.S. § 1351. As a precondition to the implementation of a DSIC, a utility must file an LTIIP with the Commission that is consistent with the provisions of Section 1352 of the statute. *See* 66 Pa. C.S. § 1352(a).

8. On August 2, 2012, the Commission issued an Implementation Order establishing procedures and guidelines necessary to implement Act 11. *Implementation of Act 11 of 2012*, Docket No. M-2012-2293611 (Order entered August 2, 2012) ("*Implementation Order*"). The *Implementation Order* adopted the requirements established in Section 1352, provided additional standards that each LTIIP must meet, and gave guidance to utilities for meeting the Commission's standards.

9. On January 10, 2013, the Company's first LTIIP was approved by the Commission at Docket No. P-2012-2325034. The Company's first LTIIP expired on December 31, 2017.

10. On January 15, 2013, PPL Electric filed a petition seeking approval of a DSIC. By Orders entered May 23, 2013, and April 9, 2015, the Commission approved PPL Electric's DSIC.

11. On December 21, 2017, the Company's second LTIIP was approved by the Commission at Docket No. P-2017-2622393. The Company's second LTIIP expired on December 31, 2022.

12. On December 22, 2022, the Company's third LTIIP was approved by the Commission at Docket No. P-2022-3034972. The Company's third LTIIP is set to expire on December 31, 2027.

13. Through this Petition, PPL Electric proposes certain "major" modifications to its third LTIIP, as set forth in the following section.[2]

II. PROPOSED MAJOR MODIFICATIONS TO THE LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

A. ADDITION OF PREDICTIVE FAILURE TECHNOLOGY AS A NEW PROGRAM IN THE LTIIP

14. PPL Electric proposes to include Predictive Failure Technology as a new program in the Company's LTIIP.

15. In accordance with the Commission's *Implementation Order*, the LTIIP regulations and statute, PPL Electric's LTIIP is focused on distribution plant that is DSIC-eligible. *Implementation Order*, at 18; 52 Pa. Code § 121.3(b).

16. Since the time that the Commission approved the third LTIIP, PPL Electric continued to investigate the viability and benefits of deploying Predictive Failure Technology on its electric distribution system.

17. As explained in the revised LTIIP:

[2] PPL Electric notes that this is the first time the Company has proposed any "major" modifications to its LTIIPs since the first LTIIP was approved over 10 years ago on January 10, 2013.

> The purpose of the predictive failure technology is to anticipate and proactively address potential equipment failures before they occur. This is achieved by installing new line monitoring sensors on the distribution voltage levels while leveraging new company processes/procedures, advanced analytics, machine learning, and real-time data capturing. The new line monitoring sensors can detect fault disturbances along the feeder, thereby identifying aging or damaged equipment before they fail, reducing reactive replacements of failed equipment, improving reliability for customers, reducing maintenance costs associated with necessary repairs, reducing hazards to the public and employees, and providing data insights into failure trends that can support more strategic and prudent investments across the distribution system.

(Appendix A, p. 40.)

18. To evaluate this new technology, PPL Electric began rolling out Predictive Failure Technology "on select circuits across the system" in 2023. (*Id.*)

19. PPL Electric's initial testing of this technology consisted of 33 sensors deployed on three distribution circuits. Through that testing, PPL Electric identified 36 deteriorated assets consisting of insulator damage, transformer issues, vegetation encroachment, conductor damage, and conductor tie wires. Initial results also yielded cost savings of approximately $33,000, assuming all 36 of the identified issues resulted in a permanent failure.

20. Based on the success of the technology on those circuits, PPL Electric plans to deploy Predictive Failure Technology across its service territory. (*Id.*)

21. In fact, at scale with this technology, PPL Electric estimates that its System Average Interruption Frequency Index ("SAIFI") would improve by 10-15% and, over the life of the technology, reduce operations and maintenance expense by approximately $9 million.

22. When deployment of the technology is completed in 2025, every distribution circuit will have, on average, between three to seven radial taps installed with these sensors. (*Id.*)

23. Predictive Failure Technology meets the definition of "eligible property" under Section 1351 of the Public Utility Code and, therefore, can be included in the Company's LTIIP.

See 66 Pa. C.S. § 1351 (stating that "eligible property" includes "[a]ny fixture or device related to eligible property under subparagraphs (i), (ii) and (iii)" and "other related capitalized costs").

24. Furthermore, the Company's revised LTIIP contains a description of the Predictive Failure Technology program and its purpose; a description of how PPL Electric identifies installation locations within the program and the appropriate course of action to deploy the technology; the scope of the program, including a reasonable estimate of the quantity of the planned installations; and the location of planned installations. (*See id.*)

25. The LTIIP also provides the total amount projected to be spent by the Company annually and over the life of the five-year plan on Predictive Failure Technology. (*See id.*)

26. Based on the foregoing, PPL Electric respectfully requests that the Commission approve this proposed major modification to the Company's LTIIP.

B. UPDATES TO PROJECTED CAPITAL EXPENDITURES

27. The Company further proposes to update its projected capital expenditures for various programs set forth in the LTIIP, all of which amount to an increase in total LTIIP spending by more than 20%.

28. The current LTIIP provides the Company's projected expenditures on a yearly basis for each of the individual programs for the five-year period, the total projected expenditures for each program at the conclusion of the five-year period, and the overall projected annual and total expenditures for all DSIC-eligible distribution property.

29. As explained in the Company's Petition for approval of the third LTIIP, PPL Electric routinely reviews the effectiveness of its programs to ensure that its individual programs are cost-effective investments. PPL Electric also utilizes a project prioritization process that defines the cost-effectiveness of programs/projects to ensure effective optimization of reliability investments.

30. PPL Electric utilizes the information from its ongoing reviews of the effectiveness of its programs to determine the most cost-effective strategy for replacing its distribution infrastructure on a going forward basis. Reliability metric performance can result in the redirection of spending to help ensure the Company's ability to meet targets.

31. After the Commission approved the Company's current LTIIP, PPL Electric identified the need to increase the projected spending for several programs within the LTIIP.

32. Below is the table summarizing the Company's originally-projected capital expenditures for the 2023-2027 LTIIP period:

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 17.33	$ 18.96	$ 17.33	$ 17.33	$ 17.33	$ 88.28
New Electronic Reclosers	$ 5.07	$ 4.69	$ 4.13	$ 3.63	$ -	$ 17.52
Distribution Animal Guarding	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 2.50
Failed Equipment	$ 34.77	$ 34.03	$ 35.18	$ 36.64	$ 36.03	$ 176.64
Underground Cable Replacement	$ 0.42	$ 1.11	$ 1.67	$ 1.59	$ 1.59	$ 6.37
Low Tension Network Primary Cable, Equipment and Structures	$ 0.60	$ 1.54	$ 0.38	$ 2.40	$ 2.40	$ 7.32
Substation	$ 3.04	$ 7.71	$ 14.05	$ 13.31	$ 13.08	$ 51.19
LTN Upgrades	$ 3.12	$ 12.60	$ 7.63	$ 8.19	$ -	$ 31.54
Reliability	$ 4.08	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 12.08
System Reliability Improvement Projects	$ 12.77	$ 8.11	$ 13.79	$ 17.80	$ 13.29	$ 65.76
Unreimbursed Highway Relocations	$ 6.16	$ 4.90	$ 3.92	$ 2.83	$ 2.83	$ 20.64
Protection and Control	$ 4.70	$ 6.06	$ 7.35	$ 6.83	$ 6.83	$ 31.77
Total	$ 92.56	$ 102.21	$ 107.92	$ 113.05	$ 95.88	$ 511.62

33. Below is the table summarizing PPL Electric's updated projection of capital expenditures for the 2023-2027 LTIIP period, as set forth on page 12 of Appendix A:

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 11.40	$ 19.70	$ 17.11	$ 19.32	$ 17.74	$ 85.27
New Electronic Reclosers	$ 1.03	$ 10.10	$ 7.55	$ 7.28	$ 7.00	$ 32.96
Distribution Animal Guarding	$ 0.20	$ 0.34	$ 0.32	$ 0.31	$ 0.32	$ 1.49
Failed Equipment	$ 42.85	$ 42.44	$ 34.12	$ 34.68	$ 35.69	$ 189.78
Underground Cable Replacement	$ 0.52	$ 4.36	$ 1.98	$ 1.50	$ 2.03	$ 10.39
Low Tension Network Primary Cable, Equipment and Structures	$ 0.54	$ 3.76	$ 4.56	$ 4.25	$ 4.45	$ 17.56
Substation	$ 11.25	$ 26.94	$ 28.12	$ 30.24	$ 27.80	$ 124.35
LTN Upgrades	$ 6.87	$ 10.55	$ 11.56	$ 13.94	$ -	$ 42.93
Reliability	$ 9.19	$ 32.97	$ 7.13	$ 5.84	$ 6.91	$ 62.04
System Reliability Improvement Projects	$ 19.23	$ 11.52	$ 12.66	$ 4.13	$ 3.67	$ 51.21
Unreimbursed Highway Relocations	$ 8.87	$ 4.50	$ 4.92	$ 4.07	$ 3.71	$ 26.08
Protection and Control	$ 3.34	$ 21.73	$ 13.47	$ 14.82	$ 17.63	$ 70.99
Predictive Failure Technology	$ -	$ 46.13	$ 38.32	$ -	$ -	$ 84.44
Total	$ 115.29	$ 235.04	$ 181.82	$ 140.39	$ 126.94	$ 799.48

34. As shown above, PPL Electric's revised total projected capital spending for the five-year period has increased from $511.62 million to $799.48 million.

35. There are several reasons for the projected increase in capital spending under the LTIIP.

36. For starters, after the third LTIIP was filed, there were changes in personnel, including those that oversee the LTIIP, which spurred a comprehensive review of the Company's capital investments, including the $511.62 million in DSIC-eligible expenditures under the third LTIIP. When reviewing and evaluating its planned capital investments, the Company considered the Commission's feedback on previous LTIIPs (particularly around LTIIP spend), as well as the impact of such investments on the Company's current and future reliability performance, and determined that the level of spending in the current LTIIP was insufficient to maintain reliability when considering changes in operating conditions.

37. Specifically, through this process, PPL Electric's personnel concluded that the Company must do more to address aging infrastructure and trends regarding more frequent and severe weather events,[3] increased interconnections of distributed energy resources ("DERs"),[4] and increased supply chain costs and constraints in order to continue providing safe, reliable, adequate, and reasonable service.

38. In particular, the total increase in spending is being driven largely by additional and necessary investments in: (1) New Electronic Reclosers; (2) Low Tension Network Primary Cable,

[3] In 2023 PPL Electric experienced 45 storm events, which was the highest in the Company's recent history. The previous high was 42 storms in 2021, followed by 36 in 2022.

[4] The rate of DER installations continues to grow exponentially. In fact, when compared to 2020, PPL Electric has seen nearly 114% more DER installations in 2023, which equates to almost 25,000 additional interconnections.

Equipment and Structures; (3) Substations; (4) Reliability; (5) Protection and Control; and (6) Predictive Failure Technology.[5]

39. Additionally, the projected increase in spending is partly due to the potential available funding for projects under the Infrastructure Investment and Jobs Act ("IIJA").

40. On October 19, 2023, PPL Electric announced that its Grid of the Future infrastructure project application was selected by the U.S. Department of Energy ("DOE") to potentially receive up to $49.5 million in federal funding through the IIJA.[6]

41. The Company did not anticipate receiving this funding when the third LTIIP was originally prepared, but now, PPL Electric proposes to update its LTIIP to reflect the additional projects that could be completed with that potential funding.

42. For these reasons, PPL Electric respectfully requests that the Commission approve this proposed major modification to the Company's LTIIP.

III. NOTICE AND COMMENT PERIOD

43. PPL Electric is serving this Petition on the statutory advocates and all parties of record in the Company's most recent base rate proceeding at Docket No. R-2015-2469275.

44. Under Section 121.5(a) of the Commission's regulations, "[p]arties shall have 30 days to file comments to the petition." 52 Pa. Code § 121.5(a).

[5] PPL Electric notes that even without the addition of Predictive Failure Technology, the total projected capital expenditures are estimated to increase by more than 20% of the current total LTIIP expenditures.

[6] PPL ELECTRIC UTILITIES CORP., "U.S. Department of Energy selects PPL Electric Utilities for grid modernization projects in Central and Eastern Pennsylvania" (Oct. 19, 2023), *available at* https://news.pplweb.com/U-S-Department-of-Energy-selects-PPL-Electric-Utilities-for-grid-modernization-projects-in-Central-and-Eastern-Pennsylvania

IV. CONCLUSION

WHEREFORE, PPL Electric Utilities Corporation respectfully requests that the Pennsylvania Public Utility Commission approve the proposed major modifications to the third Long-Term Infrastructure Improvement Plan for the period January 1, 2023, through December 31, 2027, as set forth in this Petition and the attachments hereto.

Respectfully submitted,

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Dated: January 17, 2024

Attorneys for PPL Electric Utilities Corporation

Appendix A

Redline Version of the Revised LTIIP

Style Definition: Comment Text

PPL Electric Utilities Corporation

Long-Term Infrastructure Improvement Plan

PPL Electric Utilities Corporation

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PPL Electric Utilities Corporation

Introduction

PPL Electric Utilities Corporation ("PPL Electric" or "Company") is submitting this Long Term Infrastructure Improvement Plan ("LTIIP") pursuant to the requirements of Subchapter B, Distribution Systems, of the Public Utility Code, 66 Pa.C.S. §§ 1350-1360, the Public Utility Commission's ("PUC") Implementation Order for Establishment of a Distribution System Improvement Charge, entered on August 2, 2012 at Docket No. M-2012-2293611 and the Commission's regulations at 52 Pa. Code §§ 121.1 et seq. This LTIIP addresses a broad spectrum of Distribution Asset Management initiatives that the Company will use to continue its repair, improvement and replacement of aging infrastructure under this process, and is for the five-year period beginning January 1, 2023, and ending December 31, 2027.

PPL Electric strives to operate as efficiently as possible by performing the work required to maintain system integrity and reliability. Performance indicators such as System Average Interruption Frequency Index ("SAIFI"), Customer Average Interruption Duration Index ("CAIDI") and System Average Interruption Duration Index ("SAIDI") show that PPL Electric has been successful in its efforts. However, a generally flat to mildly decreasing trend in equipment failures, combined with an aging infrastructure, indicate that PPL Electric needs to continue to invest in its distribution system. As equipment failures remain flat to mildly decreasing, PPL Electric has been experiencing a significant increase in maintenance spending beyond normal inflationary pressures. The driver is a combination of both increased corrective and planned maintenance. PPL Electric has initiated and enhanced maintenance practices and programs to repair, improve, or replace certain distribution facilities in order to ensure adequate, efficient, safe and reliable service.

Addressing aging infrastructure will require ongoing investment. Such investment includes not only replacing aging equipment, but also investment in advanced equipment and communication technologies that can facilitate further system reliability improvements. If continued proactive re-investment does not occur, it is expected that system reliability will degrade, while the overall cost to maintain the distribution system will continue to rise. By investing in its distribution system, PPL Electric will ensure that its system continues to be safe, reliable, and able to meet the growing needs and expectations of its customers.

PPL Electric believes that managing finite resources to produce optimal results is essential for maintaining customer satisfaction. Criteria for program inclusion into the Long-Term Infrastructure Improvement Plan is not whether any single activity produces a positive reliability result, but rather, which portfolio of activities produces the best result for a given expenditure. PPL Electric's goal is focused on results (i.e., the reliability experienced by customers and associated rate impacts), not the rote execution of particular tasks.

Reliability Experience

The Distribution Asset Planning process employed by PPL Electric has been focused on maintaining reliability at the level that existed prior to passage of the Electricity Generation Customer Choice and Competition Act ("Customer Choice Act"). Since the 1994-1998 benchmark period, which defines PPL Electric's reliability performance targets, PPL Electric's service reliability has experienced annual swings, positive and negative, resulting largely from varying weather conditions. Historical benchmark performance is illustrated in Figures 1 and 2.

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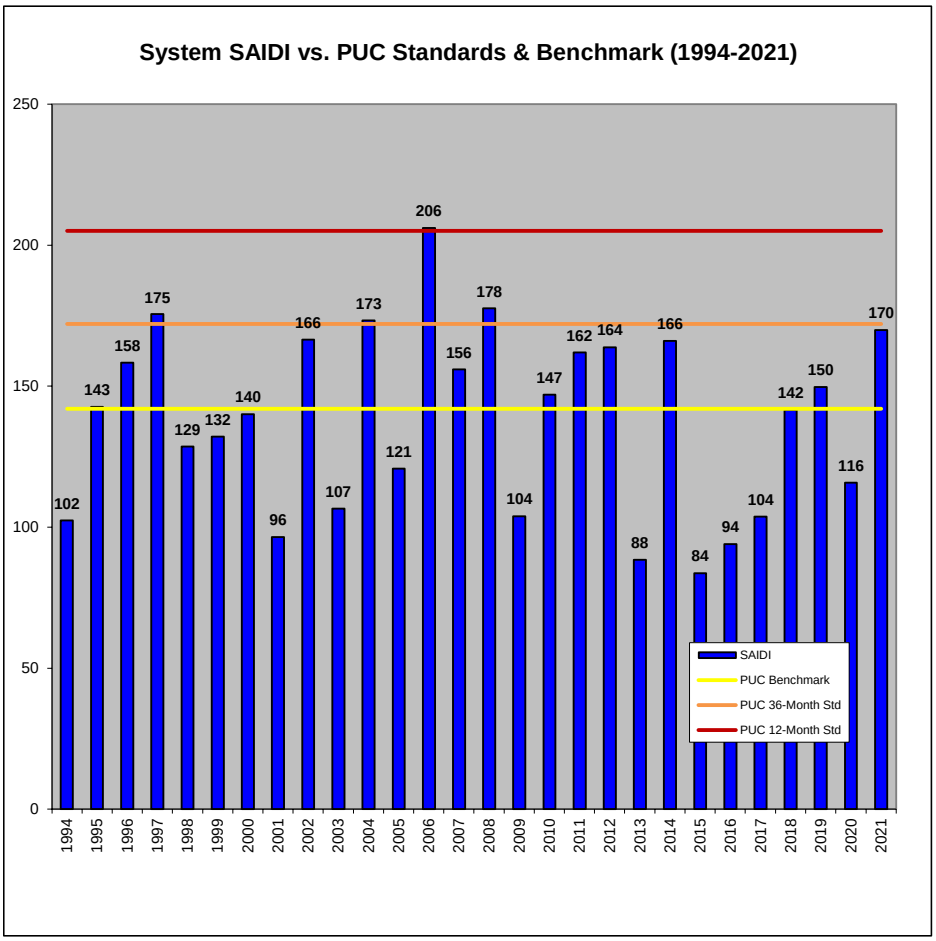

Figure 1: PPL Electric's SAIDI Performance

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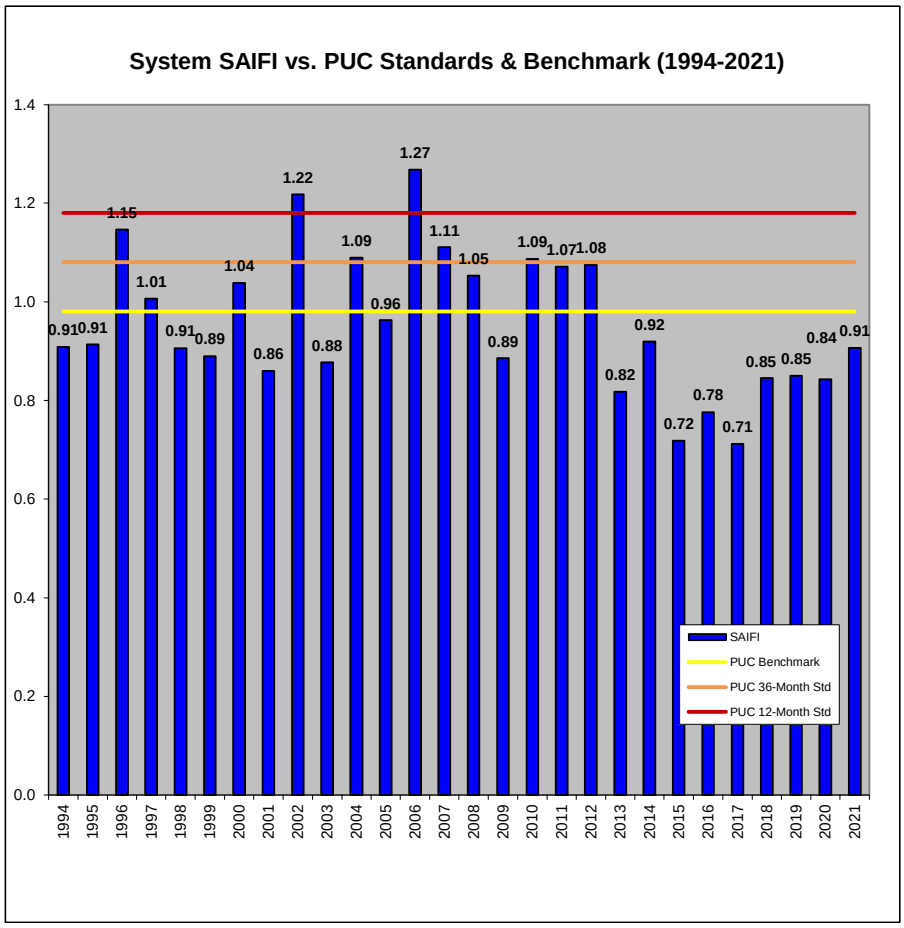

Figure 2: PPL Electric's SAIFI Performance

A significant risk to PPL Electric's ability to meet reliability benchmarks is the large portion of distribution facilities, many of which were installed in the 1960's and 1970's, that are now beyond or nearing the end of their design lifetime. See Appendix A for average age of major units of property. The resultant effect on non-storm-related equipment failures is illustrated by the chart in Figure 3 below.

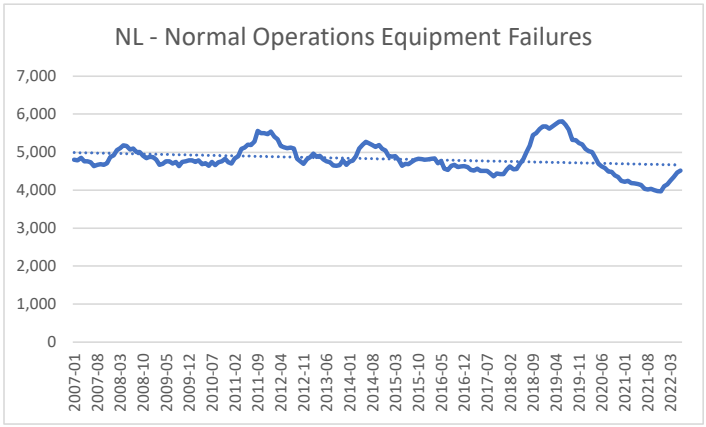

Figure 3: Equipment Failure Service Interruption Cases

The number of no-light cases due to equipment failures is trending slightly downward due to investments over the past five to ten years. The need to remediate that equipment which is at or near end-of-life remains to maintain or improve this favorable trajectory. Components contributing the most significantly to distribution equipment failures include poles/arms/attachments, overhead and underground conductors, switches, and substation equipment. See Appendix B for further details on asset contribution to reliability metrics.

Response to Aging Equipment

PPL Electric's reliability investment process is forward-looking and proactive. It consists of the following:

- Analyze and identify the drivers of historical trends of causes of service outages and other power service problems.
- Forecast future reliability metrics (SAIDI, SAIFI, and CAIDI) given existing mitigation programs' effect on the identified drivers.
- Identify new programs, policies, and activities to enhance or accelerate existing mitigation programs to avoid forecasted gaps between future reliability and benchmark targets.
- Identify, evaluate, and implement new technologies that enhance the Company's condition monitoring strategy.
- Evaluate and adjust existing programs, policies, and activities to produce the desired future results.
- Perform targeted data analytics against the Company's aging infrastructure utilizing real-time, or near real-time, operational data to further improve reliability performance.

- Incorporate the resulting portfolio of existing and new programs, policies, and activities in PPL Electric's five-year business plan.

In February 2018, PPL Electric's Reliability Principles and Practices ("P&P") were revised to help reduce the overall impact to the Company's customers from outages due to various causes, including but not limited to, equipment failures. The P&P sets forth a set of Principles that PPL Electric follows to plan, protect, and operate the Electrical Distribution System ("EDS"). These Principles are implemented through a set of standard Practices that are used as guidelines in designing the EDS. These Practices are reasonable, acceptable, and consistent with leading utility practices. More specifically, to reduce the number of customers experiencing permanent outages and outage duration over the long term, the following circuit design guidelines are used wherever practical, starting with those identified as Worst Performing Circuits ("WPCs"):

- Provide three-phase line ties that will support the transfer of all but approximately 500-750 customers for 100% of the year.
- Provide sectionalizing devices to limit customer count to no more than approximately 500-750 customers between devices.
- Limit customer count to less than approximately 1,500 customers per circuit.
- Limit line length to approximately 70 circuit miles

Prioritization utilizing these design criteria is based on the greatest expected improvement in reliability for the entire system.

Several other mitigation initiatives have been undertaken to reduce the forecasted short-term equipment failure growth rate.

- **Enhanced Pole Inspection/Treatment Program:** Beginning in 2021, the Company's wood pole inspection and treatment program was enhanced from a subjective inspection process to an objective, resistance drill-based methodology. The resistance drill inspection allows a complete pole health assessment, with both interior and exterior decay accurately measured. This holistic strength assessment of the pole is the most accurate and thorough pole inspection possible. As an integral part of the twelve-year pole inspection process, PPL Electric observes, notes, and reports at-risk conditions of all pole attachments, specifically crossarms, braces, conductors, transformers, fuse cutouts, lightning arresters, reclosers, regulators, capacitors, switches, wildlife protection, vegetation encroachment, guys, anchors, ground wires, and ground rods.
- **Increased Utilization of Infrared Inspections:** PPL Electric conducted a trial of infrared inspections of multi-phase lines in 2006. The trial inspections cost $122,500 and identified repairs costing $100,000, saving an estimated 1,460,000-2,600,000 Customer Minutes Interrupted ("CMI"). Funding of infrared inspections and repairs was increased significantly during 2010 and has remained at a higher funding level. Infrared inspections occur on all 3-phase and 2-phase overhead lines adjacent to roadways every two years.
- **Proactive Circuit Analysis ("PCA"):** PCAs are performed on each circuit on a four-year cycle. The review analyzes and addresses both operational and reliability characteristics of each circuit. Voltage support, phase balancing, protection coordination, power factor maintenance and loading issues are

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addressed from an operational perspective. Service outage analysis, exposure analysis, and field checks address reliability and power quality.

- **Distribution Automation Strategy:** In 2010, PPL Electric launched a "smart grid" pilot project that enables the Company to react rapidly to changes on the delivery system, and to automatically re-route power around problems that occur. The project initially focused on the Harrisburg, Pa. area, but has since been expanded to cover all of the Company's service territory. The project included the implementation of an advanced Distribution Management Systems ("DMS"), which was a breakthrough technology that enables the Company's operators to see the status of PPL Electric's distribution network in real-time. In 2016, PPL Electric completed a system wide rollout of Fault Isolation and Service Restoration ("FISR") technology. FISR identifies faulted sections and quickly develops an optimized restoration plan, then automatically executes that plan. Customers typically can be restored within five minutes from the start of the outage. This milestone is an industry first and has saved over one million customer interruptions to date. Over 8,600 automated smart devices have been installed, which has allowed for remote operation and monitoring of circuit sectionalizing equipment.

Although these programs have successfully slowed failure growth rates in the short-term, PPL Electric faces a long-term issue regarding aging infrastructure. The surge in electrical construction in the 1960's and 1970's has resulted in a large number of assets that have reached or are nearing the end of their useful lifetime. Consequently, in 2008-2009, PPL Electric conducted a major condition assessment and maintenance study of its distribution system. The result was the implementation of the Asset Optimization Strategy ("AOS"). The study found that programmatic and accelerated replacement of infrastructure would be the most cost-effective strategy to address aging infrastructure and ensure system reliability and integrity.

Asset Optimization Strategy

The purpose of the AOS study was to develop a strategy for accelerated capital replacement improvements that would combat the anticipated effects of aging infrastructure and bolster PPL Electric's ability to effectively maintain reliable electric service. With the Company entering a period where a significant number of assets are expected to reach the end of life, a plan was developed to intelligently replace assets prior to an unplanned failure that impacts customers. The plan includes replacements in kind, as well as upgrades to current standards.

Examples of AOS Projects include proactive replacement of substation equipment, Low Tension Network ("LTN") equipment, and vintage underground cable based on condition-based health analysis.

Accelerated Investment

As a result of the AOS study, PPL Electric approximately doubled its level of investment in DSIC-eligible property from 2009-2012. During this period, non-storm equipment failures fluctuated but continued to show a slight upward trend. PPL Electric continued to accelerate capital investments during the periods 2013-2017 and 2018-2022 to address an upward trend in equipment failures that peaked in 2018-2019 (see figure 3 above).

Period	Avg Annual Capital investment (in millions)
2008-2012	$88
2013-2017	$137
2018-2022	$180

Figure 4: Approximate average annual capital investment in millions. Not adjusted for inflation.

As a result of these investments, PPL Electric arrested the increase in failed equipment and the current trend is flat to mildly decreasing. Even with these investments, the average age of equipment increased slightly since the 2018-2022 plan. While projected spending under this proposed LTIIP is lower than the 2018-2022 period, continued capital investment is necessary to maintain or improve the recently flattened trend in equipment failure.

Implementation of Long-Term Infrastructure Improvement Plan

The Long-Term Infrastructure Improvement Plan, in addition to various other prudent capital investments, helps to ensure the safety and reliability of the distribution system. The investments since the LTIIP was initially put into place have arrested and reversed the growth trend in equipment failures. Equipment failure trends and asset-specific contributions to system-level reliability metrics are analyzed on an ongoing basis to ensure funding is invested appropriately.

PPL Electric routinely reviews the effectiveness of programs to ensure cost-effective investment. Program/project impact on SAIDI and SAIFI, in addition to potential reductions in outage response costs, is compared to the overall program/project costs. PPL Electric utilizes a project prioritization process that defines the cost-effectiveness of programs/projects to ensure effective optimization of reliability investments. PPL Electric currently is improving the use of ongoing asset health indices to further refine asset replacement criteria.

Ongoing review of the effectiveness of investments to address equipment failure trends will likely result in adjustments to the strategy over time. Future Long Term Infrastructure Improvement Plans will reflect such adjustments. Additionally, work plans may fluctuate throughout a given year due to the need to reallocate resources in response to changing business needs. Some examples include shifting resources for storm response activities, project construction delays caused by a backlog of material deliveries, and the redirection of investment to cure costly equipment failures. In addition, during the project engineering phase, issues such as right-of-way requirements and environmental considerations can result in scope changes that also can delay actual construction. During construction of larger projects, additional scope needs can be identified, creating the need to defer other projects. Finally, reliability metric performance can result in redirection of spending to help ensure the ability to meet targets.

Projected expenditures for the replacement of failed equipment are based on a review of historical trends while considering current failure rates and proactive mitigating measures. For such programs, it is difficult to project the specific scope and location. Therefore, PPL Electric has provided only planned expenditures based on historical trending information.

Utility Outreach

PPL Electric continues to remain engaged, seeking out opportunities with other utilities and government officials on the planning and execution of future construction projects. A forum exists with the Utility Highway Liaison Committee ("UHLC"), with whom PennDOT, the Turnpike Commission, other utilities, and the Energy Association of Pennsylvania meet quarterly to discuss policy issues, present and future projects, and relocation projects. The Company is a regular participant. Initiatives at these forums are focused primarily on improving state and utility interactions.

PPL Electric also participates in various Pennsylvania Coordinating Committees, including the Northeast PA ("NEPA") Regional partnership, the Lancaster County Regional Partnership, the Lehigh Valley Regional Partnership, and the Lycoming County Area Coordinating Committee. These meetings are held monthly, bi-monthly, or quarterly to discuss and share project plans with stakeholders including utility companies, PennDOT, public works officials and planning commission members. PPL Electric currently hosts two of these meetings each calendar year.

Utilization of a Qualified Work Force

PPL Electric Workforce

As a measure to ensure the use of a qualified workforce, PPL Electric has adopted the definition of a Qualified Electrical Worker from the Occupational Safety and Health Administration ("OSHA") Regulation 29 CFR § 1910.269 Electrical Power Generation, Transmission and Distribution, which is defined in the PPL Electric Safety Rule Book and is provided to each employee. It is also incorporated into the training and qualification process for all electrical workers.

PPL Electric administers a rigorous, formal training and evaluation process for all qualified electrical workers. Training is required before an employee may perform work independently on exposed, energized electrical equipment greater than 50 volts. Training requirements and programs are unique to the job classification and work being performed. Curriculum documents, outlining subject areas and training durations by job classification have been developed. Training may require up to 5 years to complete and incremental qualifications, following

assessment, are identified throughout the duration of the training program. Retraining is conducted on a periodic basis as required by OSHA or more frequently when determined necessary.

PPL Electric's formal training programs are administered by the Technical Development & Improvement ("TD&I") group. The training section of the TD&I group is comprised of approximately 37 full time employees, both training professionals and craft employees. Experienced training professionals lead the design and development of the training programs with input from subject matter expertise provided by craft employees from the field. Training program (curriculum) content is approved by a curriculum committee which is comprised of business line managers. The basic job requirement for an instructor includes 5-years of experience performing the work and attainment of Journeyman level (or equivalent) qualifications. Craft instructors are then trained and mentored. Training delivery is governed by PPL Electric policies and procedures to ensure quality and consistency.

Training is delivered in phases. A phase typically consists of a grouping of training modules into one training period of several days to several weeks. Training consists of both classroom and field work to gain hands-on practical learning experience. Trainees are evaluated throughout the program. Evaluation includes written examination and/or a performance examination. Employees must successfully complete each training module before progressing to the next phase of training.

In addition, trainees in key programs must complete an additional skills assessment prior to advancement to the next step. These assessments are coordinated by the TD&I group. The employees are evaluated (graded) by a panel comprised of knowledgeable field supervisors and experienced bargaining unit craft members. This independent evaluation serves as a quality control check on the TD&I training section.

Over the next 5 years, PPL Electric will be executing a resource strategy which includes formal training classes to hire and train new employees in preparation for upcoming attrition.

Contractor Workforce

PPL Electric's Sourcing department administers a standard process for soliciting contractors to perform work identified to be completed by independent contractors. The process includes issuance of a Request for Proposal ("RFP") to various contractors. That process includes a meeting to review the technical and administrative components of the work and normally a walk-down of the project area. Responses to the RFP are evaluated based on detailed financial and technical schedules that compare respondents' capabilities. Part of the RFP evaluation process includes evaluating the qualification of contractors to perform work (both technical and financial capabilities to meet the contractual commitments, and level of qualification of employees) and may include reference checks if appropriate. Any specific required qualifications of contractors would typically be outlined in the RFP and/or contract (for example: pole installation, permit and tag authorities, line construction by specific voltage, live line work, foundations, directional bore/trenching, underground networks).

Most independent contractors employ personnel through the building trades, which includes Union apprenticeship programs to help ensure that employees are qualified to perform assigned work. (This approach is comparable to PPL Electric's Union labor qualification training program.) Employee qualification programs for non-Union independent contractors are stringently reviewed to assess the contractor's training program, such as on-the-job training and certification programs.

Prior to award, contractors are screened for their safety performance and, if applicable, environmental record. Contractors that do not have an acceptable record receive no further consideration. In the event that a contractor

working for PPL Electric incurs safety incidents and/or does not take appropriate safety measures, the contractor is terminated and prohibited from performing work for PPL Electric in the future.

PPL Electric has instituted a contractor orientation program that provides new contractors an opportunity to understand company expectations for performing work safely, mindful of public and private landowner considerations and administrative concerns (such as billing). PPL Electric also performs weekly safety and workmanship review meetings with the Company's contractor work force to review safety issues and other relevant topics.

PPL Electric sponsors a training program that allows the contractors' employees to become qualified in PPL Electric's permit-and-tag system. Contractor employees who successfully complete the training program can be permit holders on PPL Electric's system.

PPL Electric monitors the contractors' performance through several activities that may include direct job oversight through on-site supervision, monthly scorecards that evaluate such areas as job quality, safety performance, cost, and validating billing activities that meet contractual expectations. If safety concerns are identified at a job site, any person has the ability and express duty to cease work until the concerns have been appropriately addressed, and a safety review team could be assembled to formally request a contractor to respond to safety concern. Safety violations could result in immediate contractor termination.

PPL Electric's Project Construction Supervisors continuously monitor the quality of all contractor work and adherence to PPL Electric's Construction Standards. Where the contractor installs specialized equipment on critical facilities, special Quality Assurance review are performed which may include inspection of grounding, trench, foundations, final grade, structural components, poles/towers, conduits, electrical equipment, primary conductor, wiring, designations, and final completion of the Acceptance of Facilities form). Any failures are described along with description and dates of corrections to resolve the areas of concern before final acceptance of the contractor's quality of work.

PPL Electric Utilities Corporation

Summary

As a result of the economic expansion and building boom of the 1960's and 1970's, much of PPL Electric's distribution system was constructed 50 or more years ago. As this equipment deteriorates due to age, environmental exposure, and added load, it becomes increasingly critical to plan for the repair, upgrade, and/or replacement of these assets through the initiatives described above. In the absence of these initiatives, the efficiency, safety, and reliability of the electric distribution system is expected to be increasingly compromised. PPL Electric believes that the expenditures for these initiatives constitute a prudent and reasonable investment for managing its distribution assets and that each of the listed programs will successfully achieve one or more of the following benefits:

- Maintaining public and employee safety
- Reducing service outage durations and number of customers affected
- Reducing service outage restoration times
- Reducing service outage locating and repair times
- Controlling service outage repair costs
- Limiting failure-related damages and related costs, and
- Improving/maintaining power quality (voltage, flicker, etc.)

To achieve these results, PPL Electric anticipates the need for the following total capital expenditures over the 2023-2027 period. Note that planned expenditures for certain initiatives can fluctuate yearly due to the various factors identified previously.

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 17.33	$ 18.96	$ 17.33	$ 17.33	$ 17.33	$ 88.28
New Electronic Reclosers	$ 5.07	$ 4.69	$ 4.13	$ 3.63	$ -	$ 17.52
Distribution Animal Guarding	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 0.50	$ 2.50
Failed Equipment	$ 34.77	$ 34.03	$ 35.18	$ 36.64	$ 36.03	$ 176.64
Underground Cable Replacement	$ 0.42	$ 1.11	$ 1.67	$ 1.59	$ 1.59	$ 6.37
~~Low Tension Network Primary Cable, Equipment and Structures~~	~~$ 0.60~~	~~$ 1.54~~	~~$ 0.38~~	~~$ 2.40~~	~~$ 2.40~~	~~$ 7.32~~
Substation	$ 3.04	$ 7.71	$ 14.05	$ 13.31	$ 13.08	$ 51.19
LTN Upgrades	$ 3.12	$ 12.60	$ 7.63	$ 8.19	$ -	$ 31.54
Reliability	$ 4.08	$ 2.00	$ 2.00	$ 2.00	$ 2.00	$ 12.08
System Reliability Improvement Projects	$ 12.77	$ 8.11	$ 13.79	$ 17.80	$ 13.29	$ 65.76
Unreimbursed Highway Relocations	$ 6.16	$ 4.90	$ 3.92	$ 2.83	$ 2.83	$ 20.64
Protection and Control	$ 4.70	$ 6.06	$ 7.35	$ 6.83	$ 6.83	$ 31.77
Total	$ 92.56	$ 102.21	$ 107.92	$ 113.05	$ 95.88	$ 511.62

PPL Electric Utilities Corporation

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 11.40	$ 19.70	$ 17.11	$ 19.32	$ 17.74	$ 85.27
New Electronic Reclosers	$ 1.03	$ 10.10	$ 7.55	$ 7.28	$ 7.00	$ 32.96
Distribution Animal Guarding	$ 0.20	$ 0.34	$ 0.32	$ 0.31	$ 0.32	$ 1.49
Failed Equipment	$ 42.85	$ 42.44	$ 34.12	$ 34.68	$ 35.69	$ 189.78
Underground Cable Replacement	$ 0.52	$ 4.36	$ 1.98	$ 1.50	$ 2.03	$ 10.39
Low Tension Network Primary Cable, Equipment and Structures	$ 0.54	$ 3.76	$ 4.56	$ 4.25	$ 4.45	$ 17.56
Substation	$ 11.25	$ 26.94	$ 28.12	$ 30.24	$ 27.80	$ 124.35
LTN Upgrades	$ 6.87	$ 10.55	$ 11.56	$ 13.94	$ -	$ 42.93
Reliability	$ 9.19	$ 32.97	$ 7.13	$ 5.84	$ 6.91	$ 62.04
System Reliability Improvement Projects	$ 19.23	$ 11.52	$ 12.66	$ 4.13	$ 3.67	$ 51.21
Unreimbursed Highway Relocations	$ 8.87	$ 4.50	$ 4.92	$ 4.07	$ 3.71	$ 26.08
Protection and Control	$ 3.34	$ 21.73	$ 13.47	$ 14.82	$ 17.63	$ 70.99
Predictive Failure Technology	$ -	$ 46.13	$ 38.32	$ -	$ -	$ 84.44
Total	$ 115.29	$ 235.04	$ 181.82	$ 140.39	$ 126.94	$ 799.48

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Almost all of the aforementioned initiatives take advantage of new technologies that did not exist when the associated assets were originally placed into service, and many of these technologies are very recent innovations. These technologies are expected not only to restore the assets to their original level of performance, but, in many cases, provide performance well beyond what previously was achievable in order to ensure and maintain adequate, efficient, safe, and reliable service.

Some of the initiatives, such as animal guarding, clearly have implied endpoints, where no further opportunities for improvement remain. Others, such as distribution automation, eventually experience diminishing returns over time. Other initiatives, such as pole reinforcement and replacement, will be ongoing. Finally, some programs may become obsolete, while new programs may become desirable as a result of the evolution of new technologies. Because of these and other variables, the effectiveness of these programs is reviewed annually, and programs are added, deleted, and/or modified, as necessary, to ensure that the expenditures are providing the desired benefits to customers at a reasonable cost.

Distribution Assets

The following pages detail 5-years projections for Long-Term Infrastructure Improvements initiatives that apply to distribution line assets. 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

PPL Electric Utilities Corporation

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~17.33~~11.40	~~$18.96~~ $19.70	$17.~~33~~11	~~$17.33~~ $19.32	$17.~~33~~74	~~$88.28~~ $85.27

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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.

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2000-2500	2000-2500	2000-2500	2000-2500	2000-2500	10000-12500

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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.

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

Planned Reinforcements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
4000-5000	4000-5000	4000-5000	4000-5000	4000-5000	20000-25000

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Locations

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

PPL Electric Utilities Corporation

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

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
~~210-250~~ 130-160	~~170-200~~ 120-250	~~110-140~~ 120-200	~~50-70~~ 120-200	~~0~~120-200	~~540-660~~610-1010

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Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	~~90-110~~ 100-164
Northeast	~~90-110~~ 100-164
Central	~~90-110~~ 100-168
Susquehanna	~~90-110~~ 100-168
Harrisburg	~~90-~~ 110-180
Lancaster	~~90-110~~100-166

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~5.07~~1.03	$~~4.69~~10.10	$~~4.13~~7.55	$~~3.63~~7.28	$~~0~~7.00	$~~17.52~~32.96

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PPL Electric Utilities Corporation

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

Planned Animal Guards					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
240-360	240-360	240-360	240-360	240-360	1200-1800

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Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	200-300
Northeast	200-300
Central	200-300
Susquehanna	200-300
Harrisburg	200-300
Lancaster	200-300

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.~~50~~20	$0.~~50~~34	$0.~~50~~32	$0.~~50~~31	$0.~~50~~32	$~~2.50~~1.49

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Failed Equipment

This category includes the replacement of failed or deteriorated distribution equipment, LTN equipment, underground cable, and underground getaways.

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~34.77~~42.85	$~~34.03~~42.44	$~~35.18~~34.12	$~~36.64~~34.68	$~~36.03~~35.69	$~~176.64~~189.78

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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.

Replace Failed Underground Cable

Program Description and Purpose

Replacement of failed underground residential primary and secondary 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 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 poor test results. Budget recommendations are based on historical trends in getaway failure quantities and costs, in addition to projected trends of future getaway failures based on asset health metrics.

Scope & Locations

Scope and locations are determined as getaway cables fail while in service or fail conditionally under 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 network 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 corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as assets fail.

Replace Deteriorated/Failed Area Supply Substation Equipment

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.

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

Scope

Planned Scope in Cable Segments					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
25-100	~~75-150~~220-320	135-225	100-200	100-200	~~435-875~~ 580-1045

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	100-200
Northeast	45-125
Central	~~45-100~~ 90-150
Susquehanna	45-100
Harrisburg	~~100-175~~ 120-200
Lancaster	~~100-175~~ 180-270

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.~~42~~52	$~~1.11~~ 4.36	$1.~~67~~ 98	$1.~~59~~ 50	$~~1.59~~ 2.03	$~~6.37~~ 10.39

PPL Electric Utilities Corporation

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 Replacements in Units (in Work Orders)						
	2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
Primary Cable Replacements	0-2	0-2	0-2	0-3	0-3	0-12
LTN Equipment	6-18	6-18	~~6-18~~ 30-75	~~6-18~~ 75-125	6-18	~~30-90~~ 123-254

Locations (Approximate total over 5-year plan)

Region	LTN Equipment	Cable
Lehigh	~~5-15~~ 20-42	0-2
Northeast	~~5-15~~ 20-42	0-2
Central	~~5-15~~20-42	0-2
Susquehanna	~~5-15~~ 21-42	0-2
Harrisburg	~~5-15~~ 21-42	0-2
Lancaster	~~5-15~~ 21-44	0-2

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Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.~~60~~ 54	$~~1.54~~ 3.76	$~~0.38~~ 4.56	$~~2.40~~ 4.25	$~~2.40~~ 4.45	$~~7.32~~ 17.56

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

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~3.04~~11.25	$~~7.71~~26.94	$~~14.05~~28.12	$~~13.31~~30.24	$~~13.08~~27.80	$~~51.19~~124.35

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Underground Getaway Cable Replacements and Life Extension

Program Description and Purpose

Proactive replacement of aging and deteriorating 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

Planned Replacements in Units					
2023	2024	2025	2026	2027	Total Scope
~~0~~ ~~4~~ 2-8	~~5~~ ~~12~~ 11-16	~~8~~ ~~15~~9-13	~~8~~ ~~15~~20-30	~~8~~ ~~15~~20-30	~~29~~ ~~61~~62-97

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Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	~~0~~ ~~7~~10-15
Northeast	~~12~~ ~~17~~20-25
Central	~~4~~ ~~5~~6-12
Susquehanna	~~2~~ ~~7~~6-13
Harrisburg	~~10~~ ~~22~~17-24
Lancaster	~~1~~ 3-8

Miscellaneous Substation Equipment

Program Description and Purpose

Programmatic replacement of older substation equipment, including air break switches, potential transformers ("PTs"), capacitance-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	2024	2025	2026	2027	Total Scope
0-~~24~~	4-8	~~5-9~~8-12	~~5-9~~18-22	~~5-9~~18-22	~~19-37~~48-68

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	~~3-6~~5-8
Northeast	~~4-7~~9-12
Central	~~3-6~~5-8
Susquehanna	~~3-6~~4-7
Harrisburg	~~3-6~~17-20
Lancaster	~~3-6~~8-13

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, obsoletion, 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

Planned Projects					
2023	2024	2025	2026	2027	Total Scope
~~7-12~~35-45	~~22-32~~30-50	~~42-62~~70-100	~~39-58~~50-70	~~39-58~~50-70	~~149-222~~235-335

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	~~40 50~~74-85
Northeast	~~11 21~~24-45
Central	~~17 26~~35-45
Susquehanna	~~29 34~~25-36
Harrisburg	~~29 57~~42-65
Lancaster	~~23 34~~35-59

69/12 kV & 138/12 kV 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, obsoletion, 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

Planned Projects					
2023	2024	2025	2026	2027	Total Scope
~~1-2~~3-5	~~2-4~~-8	~~4-~~6-10	~~3-5~~6-10	~~3-5~~6-10	~~13-22~~25-43

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	~~8-9~~4-7
Northeast	~~2-3~~6-9

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Central	~~1~~ ~~3~~5-~~8~~
Susquehanna	~~0~~-~~1~~4-~~7~~
Harrisburg	~~0~~-2-~~4~~
Lancaster	~~2~~-4-~~8~~

PPL Electric Utilities Corporation

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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-14	4-62-5	6-825-30	6-825-30	6-825-30	22-3177-99

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	3-512-15
Northeast	3-512-15
Central	3-512-15
Susquehanna	4-513-19
Harrisburg	6-716-20
Lancaster	3-412-15

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

Scope

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-~~1~~4	~~1~~-32-10	~~1~~-32-6	~~1~~-32-6	~~0~~-12-6	~~3~~-11~~8~~-32

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Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	2-~~3~~7
Northeast	~~0~~-1-5
Central	~~1~~-2-5
Susquehanna	~~0~~-31-5
Harrisburg	~~0~~-1-5
Lancaster	~~0~~-1-5

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

Scope

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
~~2~~1-4	~~3~~ 5-10	~~4 6~~5-10	~~4 6~~5-10	~~4 6~~5-10	~~17 27~~21-44

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	~~1~~ 2-5
Northeast	~~3 6~~5-10
Central	~~7 8~~6-10
Susquehanna	2-~~3~~4
Harrisburg	~~1 3~~2-5
Lancaster	~~3 5~~4-10

PPL Electric Utilities Corporation

LTN Upgrades

Program Description and Purpose

The purpose of this program is to install remote monitoring and control equipment in all Low Tension Network ("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

Planned Replacements in Units					
2023	2024	2025	2026	2027	Total Scope
~~21~~9	~~159~~62	~~102~~155	~~195~~262	0	~~477~~488

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Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	~~62~~63
Northeast	~~111~~112
Central	~~80~~81
Susquehanna	~~33~~34
Harrisburg	~~97~~102
Lancaster	~~94~~96

Planned Expenditures (in millions)

Planned Expenditures					
2023	2024	2025	2026	2027	Total
$~~3.12~~6.87	$~~12.60~~10.55	$~~7.63~~11.56	$~~8.19~~13.94	$0	$~~31.54~~42.93

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PPL Electric Utilities Corporation

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
~~$4.08~~9.19	~~$2.00~~32.97	~~$2.00~~7.13	~~$2.00~~5.84	~~$2.00~~6.91	~~$12.08~~62.04

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 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. These projects are 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
10-25	~~10-25~~100-135	~~10-25~~20-35	~~10-25~~20-35	~~10-25~~20-35	~~50-125~~170-265

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Locations

Locations are identified based upon emergent reliability needs.

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.

PPL Electric Utilities Corporation

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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
6-12	6-12	6-12	6-12	6-12	30-60

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Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	5-10
Northeast	5-10
Central	5-10
Susquehanna	5-10
Harrisburg	5-10
Lancaster	5-10

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~12.77~~ 19.23	$~~8.~~11~~.~~.52	$~~13.79~~ 12.66	$~~17.80~~ 4.13	$~~13.29~~ 3.67	$~~65.76~~ 51.21

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.

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$~~6.16~~8.87	$4.~~90~~50	$~~3~~4.92	$~~2.83~~4.07	$~~2.83~~3.71	$~~20.64~~26.08

PPL Electric Utilities Corporation

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, age, and automation enhancement potential. 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2-6	~~59-~~ 89-101	~~72-~~ 108-114	~~67-~~ 100-139	~~67-~~ 100-118	~~267-~~ 403-478

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Locations (Approximate total over 5-year plan)

Region	**Projects**
Lehigh	~~54-~~ 81-61
Northeast	~~42-~~ 64-87
Central	~~32-~~ 49-73
Susquehanna	~~34-~~ 51-49
Harrisburg	~~51-~~ 77-100
Lancaster	~~54-~~ 81-108

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**

$~~4.70~~3.34	$~~6.06~~21.73	$~~7.35~~13.47	$~~6.83~~14.82	$~~6.83~~17.63	$~~31.77~~70.99

PPL Electric Utilities Corporation

Predictive Failure Technology

Program Description and Purpose

The purpose of the predictive failure technology is to anticipate and proactively address potential equipment failures before they occur. This is achieved by installing new line monitoring sensors on the distribution voltage levels while leveraging new company processes/procedures, advanced analytics, machine learning, and real-time data capturing. The new line monitoring sensors can detect fault disturbances along the feeder, thereby identifying aging or damaged equipment before they fail, reducing reactive replacements of failed equipment, improving reliability for customers, reducing maintenance costs associated with necessary repairs, reducing hazards to the public and employees, and providing data insights into failure trends that can support more strategic and prudent investments across the distribution system.

Identification/Justification Process

Rollout of this program began on select circuits across the system to validate the effectiveness of the technology in 2023. Following the successes of the initial rollout, PPL plans to deploy this technology across its service territory. By the end of 2025, all distribution feeders on the three-phase system will have these sensors, with a goal of coverage in excess of 90%. Additionally, PPL has scoped coverage for select radial taps based on customer count, accessibility, and length or tap. On average, every distribution circuit will have between 3-7 radial taps installed with the sensors.

Scope

Planned Installations in Units					
2023	2024	2025	2026	2027	Total Scope
0	3800-4400	4100-4500	0	0	7900-8900

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	1090-1240
Northeast	1420-1620
Central	1440-1640
Susquehanna	1410-1610
Harrisburg	1260-1460
Lancaster	1280-1330

Planned Expenditures (in millions)

Planned Expenditures					
2023	2024	2025	2026	2027	Total
$0	$46.13	$38.32	$0	$0	$84.44

Appendix A: Average Age of Major Units of Property

The below chart is a summary of key distribution assets, targeted for planned replacement and proactive installation.

Average Age of Major Units of Distribution Property		
Utility Account	Description	Avg Asset Age
362.0 - Station Equipment	DC Sytem Equipment	18
362.0 - Station Equipment	Substation Animal Guards	10
362.0 - Station Equipment	Power Circuit Breakers	33
362.0 - Station Equipment	Power Transformers	42
362.0 - Station Equipment	Protection and Control Equipment	51
364.4 - Poles and Fixtures	Distribution Wood Poles	43
365.0 - Overhead Conductors, Device	Distribution Animal Guards	7
365.0 - Overhead Conductors, Device	OH Primary Conductor	50
365.0 - Overhead Conductors, Device	Air Break Switches	13
365.0 - Overhead Conductors, Device	Automatic Switches (Primarily OCRs/VCRs)	10
365.0 - Overhead Conductors, Device	Disconnect Switches	35
367 - Underground Conductors	UG Primary Conductor (includes Getaways and Cross Yard Ties)	27
366.0 - Underground Conduit	Equipment Foundation, Man Holes, Transformer Vaults (excl Conduit)	27
368.4 - Submersible or Padmt Type	UG Transformers (include LTN Transformers and Network Protectors)	25

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Appendix B: Asset Contribution to Reliability Metrics

The below table provides a summary of customers interrupted ("CI") and Customer Minutes Interrupted ("CMI") by failed component. Note that both transmission and distribution substation outages are included in the Substation component asset type.

Outage Contribution By Component - Equipment Failure Causes - Non Major Events

Component Asset Type	Component Desc	2017		2018		2019		2020		2021	
		CI	CMI	CI	CMI	CI	CMI	CI	CMI	CI	CMI
Distribution	OH-Capacitor Bank	3,424	108,863	473	94,627	1,216	104,022	490	12,697	1,020	50,662
Distribution	OH-Lightning Arrester	6,301	566,653	8,154	731,871	6,200	712,771	2,702	290,321	2,151	293,442
Distribution	OH-Other Equipment(explain)	3,030	289,973	4,840	465,772	5,175	804,502	6,109	451,306	3,456	313,318
Distribution	OH-Pole/Arms Attachments	52,713	6,524,470	48,513	4,700,495	41,599	4,070,548	35,347	3,959,531	43,737	5,505,965
Distribution	OH-PRI Splices and Connectors	7,454	989,200	13,398	1,040,441	24,195	1,685,455	15,181	980,526	15,620	1,443,678
Distribution	OH-Primary/Neutral	85,443	9,923,218	122,999	15,577,602	110,511	12,776,083	116,882	14,222,141	103,375	13,167,440
Distribution	OH-SEC Splices and Connectors	1,813	134,821	1,497	145,830	1,392	102,066	1,710	151,429	1,690	208,053
Distribution	OH-Secondaries/Services	2,610	274,850	3,592	371,244	3,735	486,804	3,283	370,513	3,369	379,299
Distribution	OH-Switch/Automatic	20,631	1,619,275	24,333	2,167,680	20,436	1,663,225	15,214	1,330,628	25,270	2,014,136
Distribution	OH-Switch/Manual/AB/Disc/OS/LBD	13,402	1,170,281	12,348	1,128,002	5,081	505,950	6,291	401,764	5,692	297,479
Distribution	OH-Tap Fuse/Cutout	6,951	749,227	11,402	1,229,204	8,284	1,133,814	7,764	841,505	7,116	925,719
Distribution	OH-Transformer	5,671	968,793	8,079	1,220,182	9,353	1,197,199	7,292	1,225,848	8,189	1,171,421
Distribution	OH-Transformer Fuse/Cutout	16,744	1,778,312	25,048	2,830,029	19,132	2,096,787	20,863	2,208,699	18,545	2,025,416
Distribution	UG-Elbows	84	31,649	313	58,893	199	49,054	480	274,811	937	212,896
Distribution	UG-Lightning Arrester	61	14,383	97	14,711	98	23,831	120	21,331	76	12,064
Distribution	UG-Load Break Junctions	183	36,227	9	1,069	31	9,845	73	16,468	164	58,516
Distribution	UG-Low Tension Network							5	315		
Distribution	UG-Other Equipment(explain)	17	2,086	819	95,603	154	32,535	1,444	155,257	7	795
Distribution	UG-Pads/Vaults/MHs & Splice Boxes	83	18,854	44	7,021	91	19,727	102	18,971	801	150,036
Distribution	UG-PRI Splices and Connectors	151	28,502	82	16,355	1,666	136,146	343	38,591	791	53,784
Distribution	UG-Primary Cable/Neutral	13,539	2,118,561	21,525	2,962,012	18,980	2,779,215	15,006	2,304,340	12,565	2,377,282
Distribution	UG-Riser Pole Equip & Devices	749	88,313	551	70,197	1,404	115,247	306	41,973	948	131,556
Distribution	UG-SEC Splices and Connectors	40	1,200	22	2,575	40	2,814	2	324	33	1,193
Distribution	UG-Secondaries/Services	292	47,087	393	85,353	260	44,414	310	50,241	377	80,910
Distribution	UG-Switchgear	1,021	146,580	1,589	334,778	2,651	309,998	441	87,554	712	142,733
Distribution	UG-Transformer/Transformer Fuse	1,455	254,990	2,735	578,648	1,326	358,322	1,041	232,250	2,915	336,981
Substation	SUB-Circuit Breaker	10,859	1,162,641	6,129	217,364	5,658	605,760	28,289	1,766,321	9,349	202,774
Substation	SUB-Control/Relay	1,950	143,054			26,241	464,478			730	9,127
Substation	SUB-Insulator	84	4,990			5	3,312			3,539	31,055
Substation	SUB-Lightning Arrester					583	99,422				
Substation	SUB-Other Equipment(Explain)							35,104	366,321	499	14,436
Substation	SUB-Power Fuse							2,823	26,593	67	355
Substation	SUB-Switch/Automatic			1,340	14,843						
Substation	SUB-Switch/Manual/AB/Disc/LBD	654	54,045	3,353	82,506	1	1,014	22,157	486,661	4	1,982
Substation	SUB-Transformer	13	2,320	1,449	11,606	5,980	72,007	7,719	118,942		
Total		257,422	29,253,418	325,126	36,256,511	321,677	32,466,367	354,893	32,454,169	273,744	31,614,503

Appendix B

Clean Version of the Revised LTIIP

PPL Electric Utilities Corporation

Long-Term Infrastructure Improvement Plan

PPL Electric Utilities Corporation

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PPL Electric Utilities Corporation

Introduction

PPL Electric Utilities Corporation ("PPL Electric" or "Company") is submitting this Long Term Infrastructure Improvement Plan ("LTIIP") pursuant to the requirements of Subchapter B, Distribution Systems, of the Public Utility Code, 66 Pa.C.S. §§ 1350-1360, the Public Utility Commission's ("PUC") Implementation Order for Establishment of a Distribution System Improvement Charge, entered on August 2, 2012 at Docket No. M-2012-2293611 and the Commission's regulations at 52 Pa. Code §§ 121.1 et seq. This LTIIP addresses a broad spectrum of Distribution Asset Management initiatives that the Company will use to continue its repair, improvement and replacement of aging infrastructure under this process, and is for the five-year period beginning January 1, 2023, and ending December 31, 2027.

PPL Electric strives to operate as efficiently as possible by performing the work required to maintain system integrity and reliability. Performance indicators such as System Average Interruption Frequency Index ("SAIFI"), Customer Average Interruption Duration Index ("CAIDI") and System Average Interruption Duration Index ("SAIDI") show that PPL Electric has been successful in its efforts. However, a generally flat to mildly decreasing trend in equipment failures, combined with an aging infrastructure, indicate that PPL Electric needs to continue to invest in its distribution system. As equipment failures remain flat to mildly decreasing, PPL Electric has been experiencing a significant increase in maintenance spending beyond normal inflationary pressures. The driver is a combination of both increased corrective and planned maintenance. PPL Electric has initiated and enhanced maintenance practices and programs to repair, improve, or replace certain distribution facilities in order to ensure adequate, efficient, safe and reliable service.

Addressing aging infrastructure will require ongoing investment. Such investment includes not only replacing aging equipment, but also investment in advanced equipment and communication technologies that can facilitate further system reliability improvements. If continued proactive re-investment does not occur, it is expected that system reliability will degrade, while the overall cost to maintain the distribution system will continue to rise. By investing in its distribution system, PPL Electric will ensure that its system continues to be safe, reliable, and able to meet the growing needs and expectations of its customers.

PPL Electric believes that managing finite resources to produce optimal results is essential for maintaining customer satisfaction. Criteria for program inclusion into the Long-Term Infrastructure Improvement Plan is not whether any single activity produces a positive reliability result, but rather, which portfolio of activities produces the best result for a given expenditure. PPL Electric's goal is focused on results (i.e., the reliability experienced by customers and associated rate impacts), not the rote execution of particular tasks.

Reliability Experience

The Distribution Asset Planning process employed by PPL Electric has been focused on maintaining reliability at the level that existed prior to passage of the Electricity Generation Customer Choice and Competition Act ("Customer Choice Act"). Since the 1994-1998 benchmark period, which defines PPL Electric's reliability performance targets, PPL Electric's service reliability has experienced annual swings, positive and negative, resulting largely from varying weather conditions. Historical benchmark performance is illustrated in Figures 1 and 2.

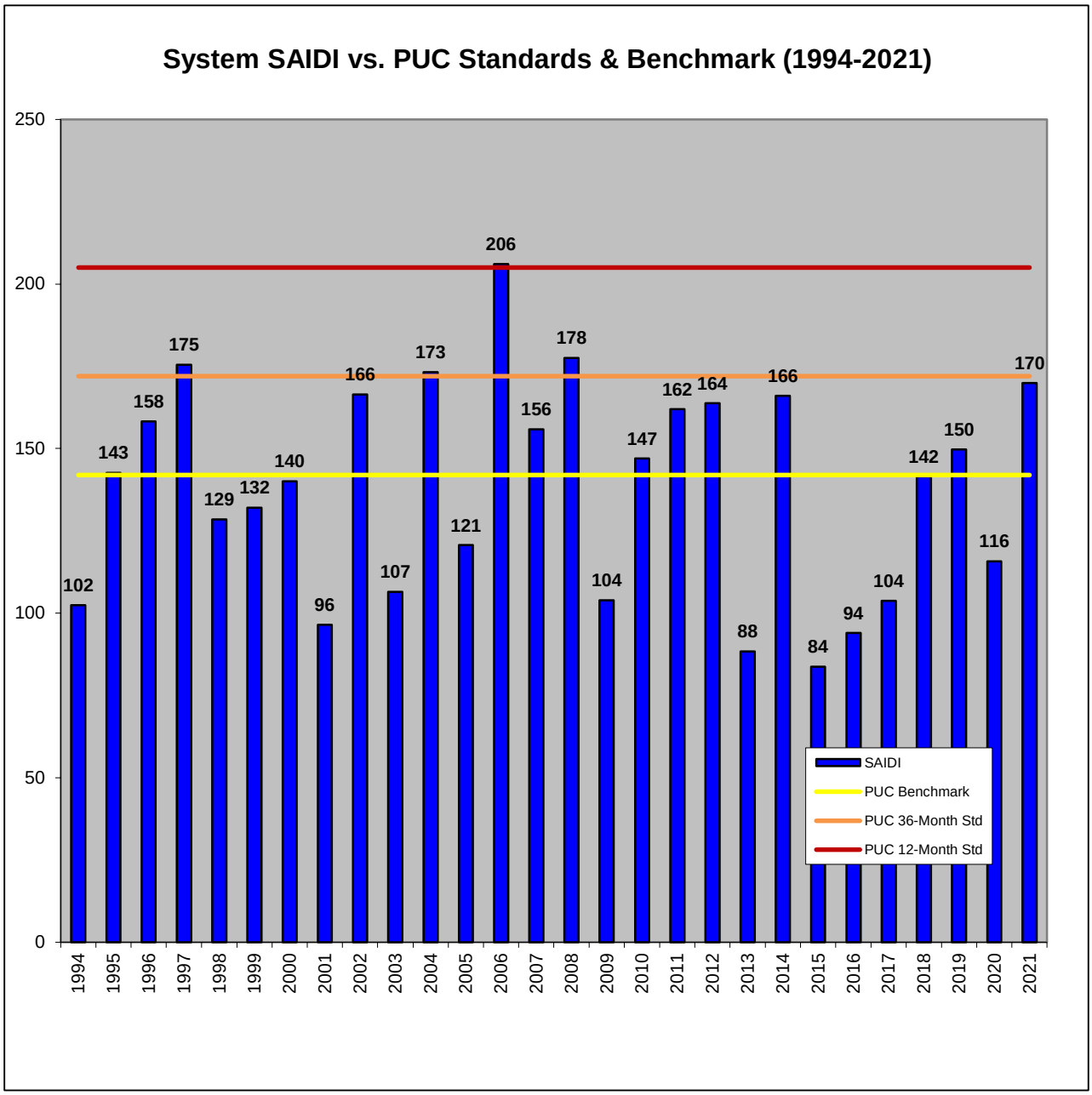

Figure 1: PPL Electric's SAIDI Performance

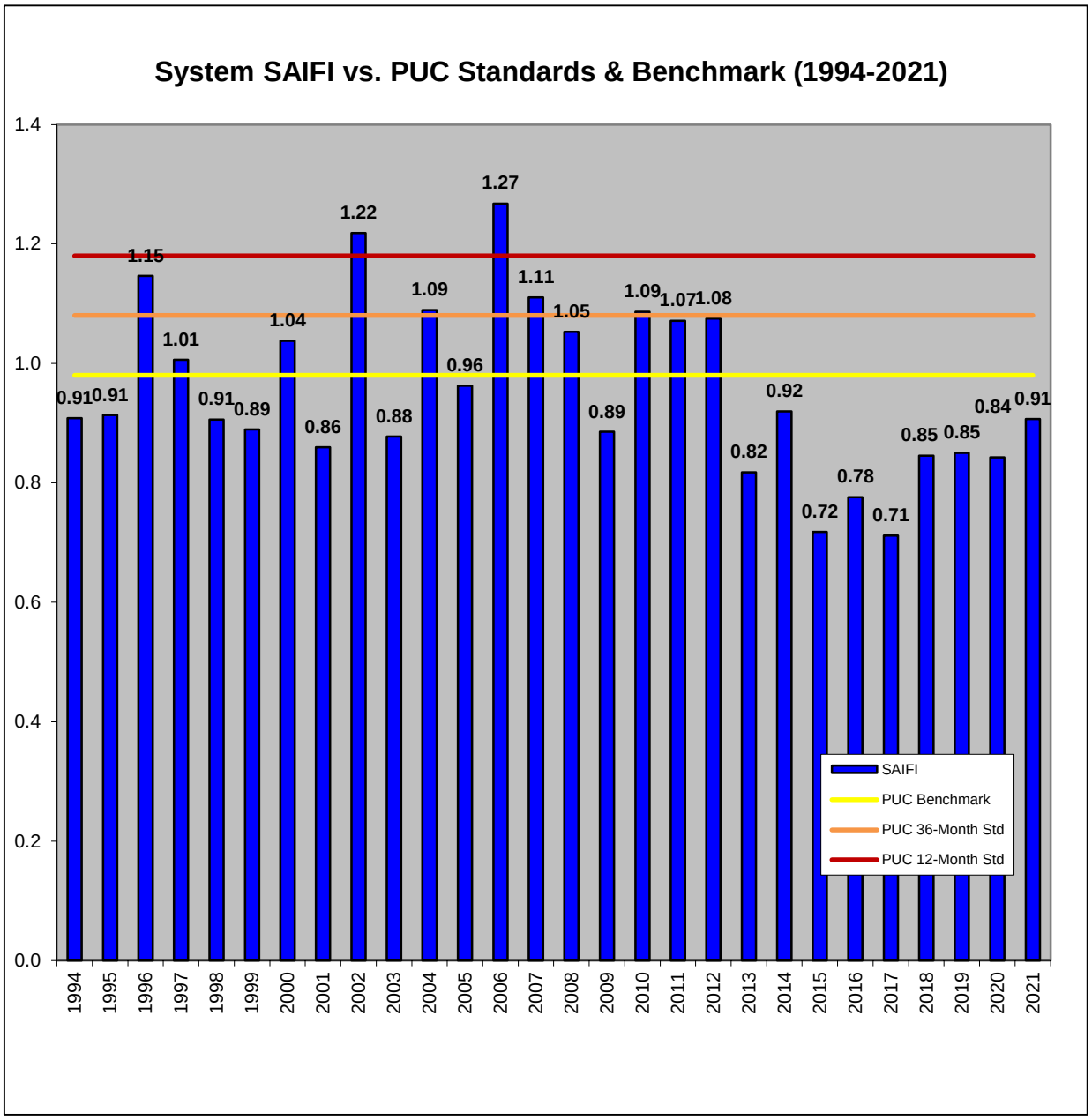

Figure 2: PPL Electric's SAIFI Performance

A significant risk to PPL Electric's ability to meet reliability benchmarks is the large portion of distribution facilities, many of which were installed in the 1960's and 1970's, that are now beyond or nearing the end of their design lifetime. See Appendix A for average age of major units of property. The resultant effect on non-storm-related equipment failures is illustrated by the chart in Figure 3 below.

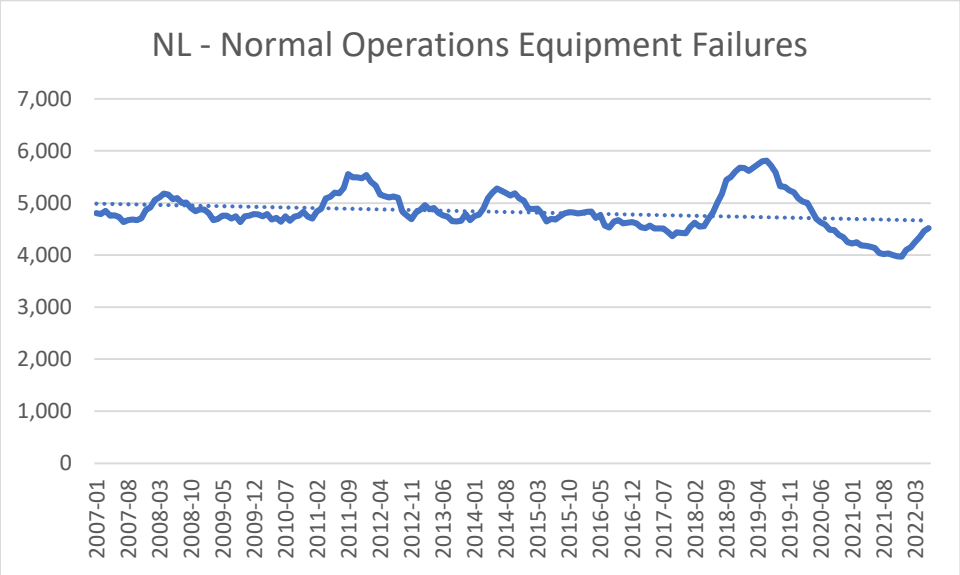

Figure 3: Equipment Failure Service Interruption Cases

The number of no-light cases due to equipment failures is trending slightly downward due to investments over the past five to ten years. The need to remediate that equipment which is at or near end-of-life remains to maintain or improve this favorable trajectory. Components contributing the most significantly to distribution equipment failures include poles/arms/attachments, overhead and underground conductors, switches, and substation equipment. See Appendix B for further details on asset contribution to reliability metrics.

Response to Aging Equipment

PPL Electric's reliability investment process is forward-looking and proactive. It consists of the following:

- Analyze and identify the drivers of historical trends of causes of service outages and other power service problems.
- Forecast future reliability metrics (SAIDI, SAIFI, and CAIDI) given existing mitigation programs' effect on the identified drivers.
- Identify new programs, policies, and activities to enhance or accelerate existing mitigation programs to avoid forecasted gaps between future reliability and benchmark targets.
- Identify, evaluate, and implement new technologies that enhance the Company's condition monitoring strategy.
- Evaluate and adjust existing programs, policies, and activities to produce the desired future results.
- Perform targeted data analytics against the Company's aging infrastructure utilizing real-time, or near real-time, operational data to further improve reliability performance.

- Incorporate the resulting portfolio of existing and new programs, policies, and activities in PPL Electric's five-year business plan.

In February 2018, PPL Electric's Reliability Principles and Practices ("P&P") were revised to help reduce the overall impact to the Company's customers from outages due to various causes, including but not limited to, equipment failures. The P&P sets forth a set of Principles that PPL Electric follows to plan, protect, and operate the Electrical Distribution System ("EDS"). These Principles are implemented through a set of standard Practices that are used as guidelines in designing the EDS. These Practices are reasonable, acceptable, and consistent with leading utility practices. More specifically, to reduce the number of customers experiencing permanent outages and outage duration over the long term, the following circuit design guidelines are used wherever practical, starting with those identified as Worst Performing Circuits ("WPCs"):

- Provide three-phase line ties that will support the transfer of all but approximately 500-750 customers for 100% of the year.

- Provide sectionalizing devices to limit customer count to no more than approximately 500-750 customers between devices.

- Limit customer count to less than approximately 1,500 customers per circuit.

- Limit line length to approximately 70 circuit miles

Prioritization utilizing these design criteria is based on the greatest expected improvement in reliability for the entire system.

Several other mitigation initiatives have been undertaken to reduce the forecasted short-term equipment failure growth rate.

- **Enhanced Pole Inspection/Treatment Program:** Beginning in 2021, the Company's wood pole inspection and treatment program was enhanced from a subjective inspection process to an objective, resistance drill-based methodology. The resistance drill inspection allows a complete pole health assessment, with both interior and exterior decay accurately measured. This holistic strength assessment of the pole is the most accurate and thorough pole inspection possible. As an integral part of the twelve-year pole inspection process, PPL Electric observes, notes, and reports at-risk conditions of all pole attachments, specifically crossarms, braces, conductors, transformers, fuse cutouts, lightning arresters, reclosers, regulators, capacitors, switches, wildlife protection, vegetation encroachment, guys, anchors, ground wires, and ground rods.

- **Increased Utilization of Infrared Inspections:** PPL Electric conducted a trial of infrared inspections of multi-phase lines in 2006. The trial inspections cost $122,500 and identified repairs costing $100,000, saving an estimated 1,460,000-2,600,000 Customer Minutes Interrupted ("CMI"). Funding of infrared inspections and repairs was increased significantly during 2010 and has remained at a higher funding level. Infrared inspections occur on all 3-phase and 2-phase overhead lines adjacent to roadways every two years.

- **Proactive Circuit Analysis ("PCA"):** PCAs are performed on each circuit on a four-year cycle. The review analyzes and addresses both operational and reliability characteristics of each circuit. Voltage support, phase balancing, protection coordination, power factor maintenance and loading issues are

addressed from an operational perspective. Service outage analysis, exposure analysis, and field checks address reliability and power quality.

- **Distribution Automation Strategy:** In 2010, PPL Electric launched a "smart grid" pilot project that enables the Company to react rapidly to changes on the delivery system, and to automatically re-route power around problems that occur. The project initially focused on the Harrisburg, Pa. area, but has since been expanded to cover all of the Company's service territory. The project included the implementation of an advanced Distribution Management Systems ("DMS"), which was a breakthrough technology that enables the Company's operators to see the status of PPL Electric's distribution network in real-time. In 2016, PPL Electric completed a system wide rollout of Fault Isolation and Service Restoration ("FISR") technology. FISR identifies faulted sections and quickly develops an optimized restoration plan, then automatically executes that plan. Customers typically can be restored within five minutes from the start of the outage. This milestone is an industry first and has saved over one million customer interruptions to date. Over 8,600 automated smart devices have been installed, which has allowed for remote operation and monitoring of circuit sectionalizing equipment.

Although these programs have successfully slowed failure growth rates in the short-term, PPL Electric faces a long-term issue regarding aging infrastructure. The surge in electrical construction in the 1960's and 1970's has resulted in a large number of assets that have reached or are nearing the end of their useful lifetime. Consequently, in 2008-2009, PPL Electric conducted a major condition assessment and maintenance study of its distribution system. The result was the implementation of the Asset Optimization Strategy ("AOS"). The study found that programmatic and accelerated replacement of infrastructure would be the most cost-effective strategy to address aging infrastructure and ensure system reliability and integrity.

Asset Optimization Strategy

The purpose of the AOS study was to develop a strategy for accelerated capital replacement improvements that would combat the anticipated effects of aging infrastructure and bolster PPL Electric's ability to effectively maintain reliable electric service. With the Company entering a period where a significant number of assets are expected to reach the end of life, a plan was developed to intelligently replace assets prior to an unplanned failure that impacts customers. The plan includes replacements in kind, as well as upgrades to current standards.

Examples of AOS Projects include proactive replacement of substation equipment, Low Tension Network ("LTN") equipment, and vintage underground cable based on condition-based health analysis.

Accelerated Investment

As a result of the AOS study, PPL Electric approximately doubled its level of investment in DSIC-eligible property from 2009-2012. During this period, non-storm equipment failures fluctuated but continued to show a slight upward trend. PPL Electric continued to accelerate capital investments during the periods 2013-2017 and 2018-2022 to address an upward trend in equipment failures that peaked in 2018-2019 (see figure 3 above).

Period	Avg Annual Capital investment (in millions)
2008-2012	$88
2013-2017	$137
2018-2022	$180

Figure 4: Approximate average annual capital investment in millions. Not adjusted for inflation.

As a result of these investments, PPL Electric arrested the increase in failed equipment and the current trend is flat to mildly decreasing. Even with these investments, the average age of equipment increased slightly since the 2018-2022 plan. While projected spending under this proposed LTIIP is lower than the 2018-2022 period, continued capital investment is necessary to maintain or improve the recently flattened trend in equipment failure.

Implementation of Long-Term Infrastructure Improvement Plan

The Long-Term Infrastructure Improvement Plan, in addition to various other prudent capital investments, helps to ensure the safety and reliability of the distribution system. The investments since the LTIIP was initially put into place have arrested and reversed the growth trend in equipment failures. Equipment failure trends and asset-specific contributions to system-level reliability metrics are analyzed on an ongoing basis to ensure funding is invested appropriately.

PPL Electric routinely reviews the effectiveness of programs to ensure cost-effective investment. Program/project impact on SAIDI and SAIFI, in addition to potential reductions in outage response costs, is compared to the overall program/project costs. PPL Electric utilizes a project prioritization process that defines the cost-effectiveness of programs/projects to ensure effective optimization of reliability investments. PPL Electric currently is improving the use of ongoing asset health indices to further refine asset replacement criteria.

Ongoing review of the effectiveness of investments to address equipment failure trends will likely result in adjustments to the strategy over time. Future Long Term Infrastructure Improvement Plans will reflect such adjustments. Additionally, work plans may fluctuate throughout a given year due to the need to reallocate resources in response to changing business needs. Some examples include shifting resources for storm response activities, project construction delays caused by a backlog of material deliveries, and the redirection of investment to cure costly equipment failures. In addition, during the project engineering phase, issues such as right-of-way requirements and environmental considerations can result in scope changes that also can delay actual construction. During construction of larger projects, additional scope needs can be identified, creating the need to defer other projects. Finally, reliability metric performance can result in redirection of spending to help ensure the ability to meet targets.

Projected expenditures for the replacement of failed equipment are based on a review of historical trends while considering current failure rates and proactive mitigating measures. For such programs, it is difficult to project the specific scope and location. Therefore, PPL Electric has provided only planned expenditures based on historical trending information.

Utility Outreach

PPL Electric continues to remain engaged, seeking out opportunities with other utilities and government officials on the planning and execution of future construction projects. A forum exists with the Utility Highway Liaison Committee ("UHLC"), with whom PennDOT, the Turnpike Commission, other utilities, and the Energy Association of Pennsylvania meet quarterly to discuss policy issues, present and future projects, and relocation projects. The Company is a regular participant. Initiatives at these forums are focused primarily on improving state and utility interactions.

PPL Electric also participates in various Pennsylvania Coordinating Committees, including the Northeast PA ("NEPA") Regional partnership, the Lancaster County Regional Partnership, the Lehigh Valley Regional Partnership, and the Lycoming County Area Coordinating Committee. These meetings are held monthly, bi-monthly, or quarterly to discuss and share project plans with stakeholders including utility companies, PennDOT, public works officials and planning commission members. PPL Electric currently hosts two of these meetings each calendar year.

Utilization of a Qualified Work Force

PPL Electric Workforce

As a measure to ensure the use of a qualified workforce, PPL Electric has adopted the definition of a Qualified Electrical Worker from the Occupational Safety and Health Administration ("OSHA") Regulation 29 CFR § 1910.269 Electrical Power Generation, Transmission and Distribution, which is defined in the PPL Electric Safety Rule Book and is provided to each employee. It is also incorporated into the training and qualification process for all electrical workers.

PPL Electric administers a rigorous, formal training and evaluation process for all qualified electrical workers. Training is required before an employee may perform work independently on exposed, energized electrical equipment greater than 50 volts. Training requirements and programs are unique to the job classification and work being performed. Curriculum documents, outlining subject areas and training durations by job classification have been developed. Training may require up to 5 years to complete and incremental qualifications, following

assessment, are identified throughout the duration of the training program. Retraining is conducted on a periodic basis as required by OSHA or more frequently when determined necessary.

PPL Electric's formal training programs are administered by the Technical Development & Improvement ("TD&I") group. The training section of the TD&I group is comprised of approximately 37 full time employees, both training professionals and craft employees. Experienced training professionals lead the design and development of the training programs with input from subject matter expertise provided by craft employees from the field. Training program (curriculum) content is approved by a curriculum committee which is comprised of business line managers. The basic job requirement for an instructor includes 5-years of experience performing the work and attainment of Journeyman level (or equivalent) qualifications. Craft instructors are then trained and mentored. Training delivery is governed by PPL Electric policies and procedures to ensure quality and consistency.

Training is delivered in phases. A phase typically consists of a grouping of training modules into one training period of several days to several weeks. Training consists of both classroom and field work to gain hands-on practical learning experience. Trainees are evaluated throughout the program. Evaluation includes written examination and/or a performance examination. Employees must successfully complete each training module before progressing to the next phase of training.

In addition, trainees in key programs must complete an additional skills assessment prior to advancement to the next step. These assessments are coordinated by the TD&I group. The employees are evaluated (graded) by a panel comprised of knowledgeable field supervisors and experienced bargaining unit craft members. This independent evaluation serves as a quality control check on the TD&I training section.

Over the next 5 years, PPL Electric will be executing a resource strategy which includes formal training classes to hire and train new employees in preparation for upcoming attrition.

Contractor Workforce

PPL Electric's Sourcing department administers a standard process for soliciting contractors to perform work identified to be completed by independent contractors. The process includes issuance of a Request for Proposal ("RFP") to various contractors. That process includes a meeting to review the technical and administrative components of the work and normally a walk-down of the project area. Responses to the RFP are evaluated based on detailed financial and technical schedules that compare respondents' capabilities. Part of the RFP evaluation process includes evaluating the qualification of contractors to perform work (both technical and financial capabilities to meet the contractual commitments, and level of qualification of employees) and may include reference checks if appropriate. Any specific required qualifications of contractors would typically be outlined in the RFP and/or contract (for example: pole installation, permit and tag authorities, line construction by specific voltage, live line work, foundations, directional bore/trenching, underground networks).

Most independent contractors employ personnel through the building trades, which includes Union apprenticeship programs to help ensure that employees are qualified to perform assigned work. (This approach is comparable to PPL Electric's Union labor qualification training program.) Employee qualification programs for non-Union independent contractors are stringently reviewed to assess the contractor's training program, such as on-the-job training and certification programs.

Prior to award, contractors are screened for their safety performance and, if applicable, environmental record. Contractors that do not have an acceptable record receive no further consideration. In the event that a contractor

working for PPL Electric incurs safety incidents and/or does not take appropriate safety measures, the contractor is terminated and prohibited from performing work for PPL Electric in the future.

PPL Electric has instituted a contractor orientation program that provides new contractors an opportunity to understand company expectations for performing work safely, mindful of public and private landowner considerations and administrative concerns (such as billing). PPL Electric also performs weekly safety and workmanship review meetings with the Company's contractor work force to review safety issues and other relevant topics

PPL Electric sponsors a training program that allows the contractors' employees to become qualified in PPL Electric's permit-and-tag system. Contractor employees who successfully complete the training program can be permit holders on PPL Electric's system.

PPL Electric monitors the contractors' performance through several activities that may include direct job oversight through on-site supervision, monthly scorecards that evaluate such areas as job quality, safety performance, cost, and validating billing activities that meet contractual expectations. If safety concerns are identified at a job site, any person has the ability and express duty to cease work until the concerns have been appropriately addressed, and a safety review team could be assembled to formally request a contractor to respond to safety concern. Safety violations could result in immediate contractor termination.

PPL Electric's Project Construction Supervisors continuously monitor the quality of all contractor work and adherence to PPL Electric's Construction Standards. Where the contractor installs specialized equipment on critical facilities, special Quality Assurance review are performed which may include inspection of grounding, trench, foundations, final grade, structural components, poles/towers, conduits, electrical equipment, primary conductor, wiring, designations, and final completion of the Acceptance of Facilities form). Any failures are described along with description and dates of corrections to resolve the areas of concern before final acceptance of the contractor's quality of work.

Summary

As a result of the economic expansion and building boom of the 1960's and 1970's, much of PPL Electric's distribution system was constructed 50 or more years ago. As this equipment deteriorates due to age, environmental exposure, and added load, it becomes increasingly critical to plan for the repair, upgrade, and/or replacement of these assets through the initiatives described above. In the absence of these initiatives, the efficiency, safety, and reliability of the electric distribution system is expected to be increasingly compromised. PPL Electric believes that the expenditures for these initiatives constitute a prudent and reasonable investment for managing its distribution assets and that each of the listed programs will successfully achieve one or more of the following benefits:

- Maintaining public and employee safety
- Reducing service outage durations and number of customers affected
- Reducing service outage restoration times
- Reducing service outage locating and repair times
- Controlling service outage repair costs
- Limiting failure-related damages and related costs, and
- Improving/maintaining power quality (voltage, flicker, etc.)

To achieve these results, PPL Electric anticipates the need for the following total capital expenditures over the 2023-2027 period. Note that planned expenditures for certain initiatives can fluctuate yearly due to the various factors identified previously.

	Millions of dollars invested					
	2023	2024	2025	2026	2027	Total
Poles	$ 11.40	$ 19.70	$ 17.11	$ 19.32	$ 17.74	$ 85.27
New Electronic Reclosers	$ 1.03	$ 10.10	$ 7.55	$ 7.28	$ 7.00	$ 32.96
Distribution Animal Guarding	$ 0.20	$ 0.34	$ 0.32	$ 0.31	$ 0.32	$ 1.49
Failed Equipment	$ 42.85	$ 42.44	$ 34.12	$ 34.68	$ 35.69	$ 189.78
Underground Cable Replacement	$ 0.52	$ 4.36	$ 1.98	$ 1.50	$ 2.03	$ 10.39
Low Tension Network Primary Cable, Equipment and Structures	$ 0.54	$ 3.76	$ 4.56	$ 4.25	$ 4.45	$ 17.56
Substation	$ 11.25	$ 26.94	$ 28.12	$ 30.24	$ 27.80	$ 124.35
LTN Upgrades	$ 6.87	$ 10.55	$ 11.56	$ 13.94	$ -	$ 42.93
Reliability	$ 9.19	$ 32.97	$ 7.13	$ 5.84	$ 6.91	$ 62.04
System Reliability Improvement Projects	$ 19.23	$ 11.52	$ 12.66	$ 4.13	$ 3.67	$ 51.21
Unreimbursed Highway Relocations	$ 8.87	$ 4.50	$ 4.92	$ 4.07	$ 3.71	$ 26.08
Protection and Control	$ 3.34	$ 21.73	$ 13.47	$ 14.82	$ 17.63	$ 70.99
Predictive Failure Technology	$ -	$ 46.13	$ 38.32	$ -	$ -	$ 84.44
Total	$ 115.29	$ 235.04	$ 181.82	$ 140.39	$ 126.94	$ 799.48

Almost all of the aforementioned initiatives take advantage of new technologies that did not exist when the associated assets were originally placed into service, and many of these technologies are very recent innovations. These technologies are expected not only to restore the assets to their original level of performance, but, in many cases, provide performance well beyond what previously was achievable in order to ensure and maintain adequate, efficient, safe, and reliable service.

Some of the initiatives, such as animal guarding, clearly have implied endpoints, where no further opportunities for improvement remain. Others, such as distribution automation, eventually experience diminishing returns over time. Other initiatives, such as pole reinforcement and replacement, will be ongoing. Finally, some programs may become obsolete, while new programs may become desirable as a result of the evolution of new technologies. Because of these and other variables, the effectiveness of these programs is reviewed annually, and programs are added, deleted, and/or modified, as necessary, to ensure that the expenditures are providing the desired benefits to customers at a reasonable cost.

Distribution Assets

The following pages detail 5-years projections for Long-Term Infrastructure Improvements initiatives that apply to distribution line assets. 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

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$11.40	$19.70	$17.11	$19.32	$17.74	$85.27

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.

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2000-2500	2000-2500	2000-2500	2000-2500	2000-2500	10000-12500

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.

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

Planned Reinforcements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
4000-5000	4000-5000	4000-5000	4000-5000	4000-5000	20000-25000

Locations

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

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.

Scope

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
130-160	120-250	120-200	120-200	120-200	610-1010

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	100-164
Northeast	100-164
Central	100-168
Susquehanna	100-168
Harrisburg	110-180
Lancaster	100-166

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$1.03	$10.10	$7.55	$7.28	$7.00	$32.96

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

Planned Animal Guards					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
240-360	240-360	240-360	240-360	240-360	1200-1800

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	200-300
Northeast	200-300
Central	200-300
Susquehanna	200-300
Harrisburg	200-300
Lancaster	200-300

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.20	$0.34	$0.32	$0.31	$0.32	$1.49

Failed Equipment

This category includes the replacement of failed or deteriorated distribution equipment, LTN equipment, underground cable, and underground getaways.

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$42.85	$42.44	$34.12	$34.68	$35.69	$189.78

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.

Replace Failed Underground Cable

Program Description and Purpose

Replacement of failed underground residential primary and secondary 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 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 poor test results. Budget recommendations are based on historical trends in getaway failure quantities and costs, in addition to projected trends of future getaway failures based on asset health metrics.

Scope & Locations

Scope and locations are determined as getaway cables fail while in service or fail conditionally under 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 network 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 corrective work, in addition to projected trends of future equipment failures.

Scope & Locations

Scope and locations are determined as assets fail.

Replace Deteriorated/Failed Area Supply Substation Equipment

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.

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

Scope

Planned Scope in Cable Segments					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
25-100	220-320	135-225	100-200	100-200	580-1045

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	100-200
Northeast	45-125
Central	90-150
Susquehanna	45-100
Harrisburg	120-200
Lancaster	180-270

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.52	$4.36	$1.98	$1.50	$2.03	$10.39

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 Replacements in Units (in Work Orders)						
	2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
Primary Cable Replacements	0-2	0-2	0-2	0-3	0-3	0-12
LTN Equipment	6-18	6-18	30-75	75-125	6-18	123-254

Locations (Approximate total over 5-year plan)

Region	**LTN Equipment**	**Cable**
Lehigh	20-42	0-2
Northeast	20-42	0-2
Central	20-42	0-2
Susquehanna	21-42	0-2
Harrisburg	21-42	0-2
Lancaster	21-44	0-2

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0.54	$3.76	$4.56	$4.25	$4.45	$17.56

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

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$11.25	$26.94	$28.12	$30.24	$27.80	$124.35

Underground Getaway Cable Replacements and Life Extension

Program Description and Purpose

Proactive replacement of aging and deteriorating 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

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2-8	11-16	9-13	20-30	20-30	62-97

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	10-15
Northeast	20-25
Central	6-12
Susquehanna	6-13
Harrisburg	17-24
Lancaster	3-8

Miscellaneous Substation Equipment

Program Description and Purpose

Programmatic replacement of older substation equipment, including air break switches, potential transformers (“PTs”), capacitance-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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-4	4-8	8-12	18-22	18-22	48-68

Locations (Approximate total over 5-year plan)

Region	**Projects**
Lehigh	5-8
Northeast	9-12
Central	5-8
Susquehanna	4-7
Harrisburg	17-20
Lancaster	8-13

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, obsoletion, 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

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
35-45	30-50	70-100	50-70	50-70	235-335

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	74-85
Northeast	24-45
Central	35-45
Susquehanna	25-36
Harrisburg	42-65
Lancaster	35-59

69/12 kV & 138/12 kV 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, obsoletion, 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

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
3-5	4-8	6-10	6-10	6-10	25-43

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	4-7
Northeast	6-9
Central	5-8
Susquehanna	4-7
Harrisburg	2-4
Lancaster	4-8

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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-4	2-5	25-30	25-30	25-30	77-99

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	12-15
Northeast	12-15
Central	12-15
Susquehanna	13-19
Harrisburg	16-20
Lancaster	12-15

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

Scope

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0-4	2-10	2-6	2-6	2-6	8-32

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	2-7
Northeast	1-5
Central	2-5
Susquehanna	1-5
Harrisburg	1-5
Lancaster	1-5

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

Scope

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
1-4	5-10	5-10	5-10	5-10	21-44

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	2-5
Northeast	5-10
Central	6-10
Susquehanna	2-4
Harrisburg	2-5
Lancaster	4-10

LTN Upgrades

Program Description and Purpose

The purpose of this program is to install remote monitoring and control equipment in all Low Tension Network ("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

Planned Replacements in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
9	62	155	262	0	488

Locations (Approximate total over 5-year plan)

Region	**Units**
Lehigh	63
Northeast	112
Central	81
Susquehanna	34
Harrisburg	102
Lancaster	96

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$6.87	$10.55	$11.56	$13.94	$0	$42.93

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					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$9.19	$32.97	$7.13	$5.84	$6.91	$62.04

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 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. These projects are 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
10-25	100-135	20-35	20-35	20-35	170-265

Locations

Locations are identified based upon emergent reliability needs.

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.

Scope

Planned Projects					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
6-12	6-12	6-12	6-12	6-12	30-60

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	5-10
Northeast	5-10
Central	5-10
Susquehanna	5-10
Harrisburg	5-10
Lancaster	5-10

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$19.23	$11.52	$12.66	$4.13	$3.67	$51.21

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.

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$8.87	$4.50	$4.92	$4.07	$3.71	$26.08

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, age, and automation enhancement potential. 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	**2024**	**2025**	**2026**	**2027**	**Total Scope**
2-6	79-101	104-114	121-139	94-118	400-478

Locations (Approximate total over 5-year plan)

Region	Projects
Lehigh	50-61
Northeast	75-87
Central	56-73
Susquehanna	41-49
Harrisburg	84-100
Lancaster	94-108

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$3.34	$21.73	$13.47	$14.82	$17.63	$70.99

Predictive Failure Technology

Program Description and Purpose

The purpose of the predictive failure technology is to anticipate and proactively address potential equipment failures before they occur. This is achieved by installing new line monitoring sensors on the distribution voltage levels while leveraging new company processes/procedures, advanced analytics, machine learning, and real-time data capturing. The new line monitoring sensors can detect fault disturbances along the feeder, thereby identifying aging or damaged equipment before they fail, reducing reactive replacements of failed equipment, improving reliability for customers, reducing maintenance costs associated with necessary repairs, reducing hazards to the public and employees, and providing data insights into failure trends that can support more strategic and prudent investments across the distribution system.

Identification/Justification Process

Rollout of this program began on select circuits across the system to validate the effectiveness of the technology in 2023. Following the successes of the initial rollout, PPL plans to deploy this technology across its service territory. By the end of 2025, all distribution feeders on the three-phase system will have these sensors, with a goal of coverage in excess of 90%. Additionally, PPL has scoped coverage for select radial taps based on customer count, accessibility, and length or tap. On average, every distribution circuit will have between 3-7 radial taps installed with the sensors.

Scope

Planned Installations in Units					
2023	**2024**	**2025**	**2026**	**2027**	**Total Scope**
0	3800-4400	4100-4500	0	0	7900-8900

Locations (Approximate total over 5-year plan)

Region	Units
Lehigh	1090-1240
Northeast	1420-1620
Central	1440-1640
Susquehanna	1410-1610
Harrisburg	1260-1460
Lancaster	1280-1330

PPL Electric Utilities Corporation

Planned Expenditures (in millions)

Planned Expenditures					
2023	**2024**	**2025**	**2026**	**2027**	**Total**
$0	$46.13	$38.32	$0	$0	$84.44

Appendix A: Average Age of Major Units of Property

The below chart is a summary of key distribution assets, targeted for planned replacement and proactive installation.

Average Age of Major Units of Distribution Property		
Utility Account	**Description**	**Avg Asset Age**
362.0 - Station Equipment	DC Sytem Equipment	18
362.0 - Station Equipment	Substation Animal Guards	10
362.0 - Station Equipment	Power Circuit Breakers	33
362.0 - Station Equipment	Power Transformers	42
362.0 - Station Equipment	Protection and Control Equipment	51
364.4 - Poles and Fixtures	Distribution Wood Poles	43
365.0 - Overhead Conductors, Device	Distribution Animal Guards	7
365.0 - Overhead Conductors, Device	OH Primary Conductor	50
365.0 - Overhead Conductors, Device	Air Break Switches	13
365.0 - Overhead Conductors, Device	Automatic Switches (Primarily OCRs/VCRs)	10
365.0 - Overhead Conductors, Device	Disconnect Switches	35
367 - Underground Conductors	UG Primary Conductor (includes Getaways and Cross Yard Ties)	27
366.0 - Underground Conduit	Equipment Foundation, Man Holes, Transformer Vaults (excl Conduit)	27
368.4 - Submersible or Padmt Type	UG Transformers (include LTN Transformers and Network Protectors)	25

PPL Electric Utilities Corporation

Appendix B: Asset Contribution to Reliability Metrics

The below table provides a summary of customers interrupted ("CI") and Customer Minutes Interrupted ("CMI") by failed component. Note that both transmission and distribution substation outages are included in the Substation component asset type.

Outage Contribution By Component - Equipment Failure Causes - Non Major Events											
Component Asset Type	Component Desc	2017		2018		2019		2020		2021	
		CI	CMI	CI	CMI	CI	CMI	CI	CMI	CI	CMI
Distribution	OH-Capacitor Bank	3,424	108,863	473	94,627	1,216	104,022	490	12,697	1,020	50,662
Distribution	OH-Lightning Arrester	6,301	566,653	8,154	731,871	6,200	712,771	2,702	290,321	2,151	293,442
Distribution	OH-Other Equipment(explain)	3,030	289,973	4,840	465,772	5,175	804,502	6,109	451,306	3,456	313,318
Distribution	OH-Pole/Arms Attachments	52,713	6,524,470	48,513	4,700,495	41,599	4,070,548	35,347	3,959,531	43,737	5,505,965
Distribution	OH-PRI Splices and Connectors	7,454	989,200	13,398	1,040,441	24,195	1,685,455	15,181	980,526	15,620	1,443,678
Distribution	OH-Primary/Neutral	85,443	9,923,218	122,999	15,577,602	110,511	12,776,083	116,882	14,222,141	103,375	13,167,440
Distribution	OH-SEC Splices and Connectors	1,813	134,821	1,497	145,830	1,392	102,066	1,710	151,429	1,690	208,053
Distribution	OH-Secondaries/Services	2,610	274,850	3,592	371,244	3,735	486,804	3,283	370,513	3,369	379,299
Distribution	OH-Switch/Automatic	20,631	1,619,275	24,333	2,167,680	20,436	1,663,225	15,214	1,330,628	25,270	2,014,136
Distribution	OH-Switch/Manual/AB/Disc/OS/LBD	13,402	1,170,281	12,348	1,128,002	5,081	505,950	6,291	401,764	5,692	297,479
Distribution	OH-Tap Fuse/Cutout	6,951	749,227	11,402	1,229,204	8,284	1,133,814	7,764	841,505	7,116	925,719
Distribution	OH-Transformer	5,671	968,793	8,079	1,220,182	9,353	1,197,199	7,292	1,225,848	8,189	1,171,421
Distribution	OH-Transformer Fuse/Cutout	16,744	1,778,312	25,048	2,830,029	19,132	2,096,787	20,863	2,208,699	18,545	2,025,416
Distribution	UG-Elbows	84	31,649	313	58,893	199	49,054	480	274,811	937	212,896
Distribution	UG-Lightning Arrester	61	14,383	97	14,711	98	23,831	120	21,331	76	12,064
Distribution	UG-Load Break Junctions	183	36,227	9	1,069	31	9,845	73	16,468	164	58,516
Distribution	UG-Low Tension Network							5	315		
Distribution	UG-Other Equipment(explain)	17	2,086	819	95,603	154	32,535	1,444	155,257	7	795
Distribution	UG-Pads/Vaults/MHs & Splice Boxes	83	18,854	44	7,021	91	19,727	102	18,971	801	150,036
Distribution	UG-PRI Splices and Connectors	151	28,502	82	16,355	1,666	136,146	343	38,591	791	53,784
Distribution	UG-Primary Cable/Neutral	13,539	2,118,561	21,525	2,962,012	18,980	2,779,215	15,006	2,304,340	12,565	2,377,282
Distribution	UG-Riser Pole Equip & Devices	749	88,313	551	70,197	1,404	115,247	306	41,973	948	131,556
Distribution	UG-SEC Splices and Connectors	40	1,200	22	2,575	40	2,814	2	324	33	1,193
Distribution	UG-Secondaries/Services	292	47,087	393	85,353	260	44,414	310	50,241	377	80,910
Distribution	UG-Switchgear	1,021	146,580	1,589	334,778	2,651	309,998	441	87,554	712	142,733
Distribution	UG-Transformer/Transformer Fuse	1,455	254,990	2,735	578,648	1,326	358,322	1,041	232,250	2,915	336,981
Substation	SUB-Circuit Breaker	10,859	1,162,641	6,129	217,364	5,658	605,760	28,289	1,766,321	9,349	202,774
Substation	SUB-Control/Relay	1,950	143,054			26,241	464,478			730	9,127
Substation	SUB-Insulator	84	4,990			5	3,312			3,539	31,055
Substation	SUB-Lightning Arrester					583	99,422				
Substation	SUB-Other Equipment(Explain)							35,104	366,321	499	14,436
Substation	SUB-Power Fuse							2,823	26,593	67	355
Substation	SUB-Switch/Automatic			1,340	14,843						
Substation	SUB-Switch/Manual/AB/Disc/LBD	654	54,045	3,353	82,506	1	1,014	22,157	486,661	4	1,982
Substation	SUB-Transformer	13	2,320	1,449	11,606	5,980	72,007	7,719	118,942		
Total		257,422	29,253,418	325,126	36,256,511	321,677	32,466,367	354,893	32,454,169	273,744	31,614,503

VERIFICATION

I, STEVEN D. SELKREGG, being the Director - Operations at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 01/16/2024

Steven Selkregg (Jan 16, 2024 15:53 EST)

Steven D. Selkregg

BEFORE THE

PENNSYLVANIA PUBLIC UTILITY COMMISSION

Docket No. P-2024-_____

PPL Electric Utilities Corporation

Statement No. 2

Direct Testimony of Bethany L. Johnson

Dated: April 26, 2024

Direct Testimony of Bethany L. Johnson

I. INTRODUCTION

Q. Please state your full name and business address.

A. Bethany L. Johnson, 827 Hausman Road, Allentown, Pennsylvania, 18104.

Q. By whom are you employed and in what capacity?

A. I am employed by PPL Services Corporation as the Senior Director of Regulatory.

Q. What are your duties as Senior Director of Regulatory?

A. I am responsible for PPL Electric Utilities Corporation's ("PPL Electric") and Rhode Island Energy's development of load and revenue forecasting and analysis, procurement of wholesale generation supply, distribution rate design and administration, cost of service implementation, as well as transmission Federal Energy Regulatory Commission ("FERC") Formula Rates, development of rate case strategies and processes, and compliance with the regulatory requirements of the Pennsylvania Public Utility Commission ("Commission"), the FERC and other regulatory agencies, as necessary. Additionally, I oversee energy and utility policy and company strategy for PPL Electric. As part of this function, I am responsible for the preparation, review, and technical oversight and guidance of the development, content, and structure of cost allocation and revenue requirement studies. In addition, I am responsible for all aspects of Rhode Island Energy's and PPL Electric's rates and riders/factors and scheduling and settlement activities with PJM Interconnection, LLC ("PJM") and

ISO New England, Inc. I also prepare and present expert testimony regarding these and other cost-of-service and ratemaking-related issues.

Q. What is your educational background?

A. I graduated from King's College in 1999 with a Bachelor of Science Degree in Finance, and from Moravian College in 2003 with a Master of Business Administration.

Q. Please describe your professional experience.

A. In 2000, I was employed by PPL Global Operations, Inc. ("PPL Global Operations"), where I supported the accounting and financial reporting activities for PPL Global Operations' domestic operations. In 2001, as a result of corporate realignment, I joined PPL Generation, LLC. In this position, my responsibilities included cost control, budgeting, reporting, and management of the forecasting process for large construction projects, as well as the administration of construction and financing contracts. In 2004, I rejoined PPL Global Operations as a Senior Business Analyst with responsibility for maintaining, analyzing, consolidating, and presenting business plans and operational performance results for PPL Global Operations' international affiliates. In 2007, I joined PPL Energy Services Group, LLC as a Business Analyst providing financial modeling and analytical support for evaluations of acquisition, development, and divestiture opportunities. In 2009, I joined PPL Electric as a Project Controls Specialist providing advanced cost analysis for distribution and transmission projects. Later in 2009, I became the Financial

Business Planning Specialist in the Regulatory Compliance Department. In August 2012, I was named Manager - Regulatory Compliance for PPL Electric, and in October 2015, I was named Manager - Regulatory Operations, which included overseeing scheduling and settlement functions with PJM. During my time in this role, I also took responsibility for load and revenue forecasting and reporting as well as energy and utility policy, and company strategy. In September 2020, I was named Director - Regulatory Affairs. In December 2021, my role was transferred to PPL Services Corporation. In June 2023, I was promoted to Senior Director -– Regulatory for PPL Services Corporation.

Q. Have you previously testified as a witness in other Commission proceedings or any other jurisdiction's proceedings?

A. Yes, I have testified before this Commission in several proceedings. A list of the matters in which I have testified is attached as Attachment A.

Q. Please briefly describe the subject matter of your direct testimony in this proceeding.

A. My testimony will provide an overview of the Company's Distribution System Improvement Charge ("DSIC"), explain the Company's proposal to increase the DSIC from 5% to 9%, and provide details about the rate and bill impacts associated with the Company's proposal.

Q. Are you sponsoring any exhibits in this proceeding?

A. Yes. I am sponsoring PPL Electric Exhibits BLJ-1 through BLJ-2.

II. Overview of the Company's DSIC

Q. Briefly describe the Company's DSIC.

A. The purpose of the DSIC is to recover the reasonable and prudent capital costs incurred to repair, improve, or replace eligible property which is completed and placed in service between base rate cases. The DSIC provides public utilities, such as PPL Electric, with the resources to accelerate the replacement of aging infrastructure, to comply with evolving regulatory requirements, and to develop and implement solutions to regional supply problems.

Q. Is there a statutory limitation on the amount that may be recovered through the DSIC?

A. Yes. Pursuant to 66 Pa. C.S. § 1358(a)(1), the DSIC may not exceed 5% of billed distribution revenues and is reset to zero upon the effective date of new base rates that reflect the investment in DSIC-eligible property or if the Company over-earns in any quarter. However, the Commission may grant a waiver of the 5% DSIC cap in order to "ensure and maintain adequate, efficient, safe, reliable and reasonable service." 66 Pa. C.S. § 1358(a)(1).

Q. When was the Company's DSIC approved by the Commission?

A. On January 15, 2013, PPL Electric filed a Petition seeking approval of a DSIC. By its Orders entered May 23, 2013, and April 9, 2015, the Commission

approved PPL Electric's DSIC.[1]

Q. Is the 5% DSIC cap reflected in the Company's current tariff?

A. Yes. PPL Electric's Commission-approved DSIC tariff includes, among other things, a 5% cap on the total amount of revenue that can be collected through PPL Electric's DSIC as determined on an annualized basis. The current DSIC tariff is attached to the Petition as Appendix A and is attached to my testimony as PPL Electric Exhibit BLJ-1.

III. Proposal to Increase the DSIC Cap from 5% to 9%

Q. Is the Company proposing any tariff changes to the DSIC?

A. Yes. Through its Petition filed in this proceeding, PPL Electric is requesting Commission approval of; (1) a waiver of the DSIC cap of 5% of billed revenues; and (ii) an increase in the maximum allowable DSIC from 5% to 9% for service rendered on or after January 1, 2025. The *pro forma* tariff supplement setting forth the tariff changes to increase the DSIC cap from 5% to 9% of billed revenues is attached to the Petition as Appendix B and is attached to my testimony as PPL Electric Exhibit BLJ-2.

Q. Is the calculation of PPL Electric's DSIC rate at the current cap of 5%?

A. Yes. PPL Electric's calculation of its DSIC has been at the cap of 5% since April

[1] *See Petition of PPL Electric Utilities Corporation for Approval of a Distribution System Improvement Charge*, Docket Nos. P-2012-2325034, *et al.* (Order entered May 23, 2023); *Petition of PPL Electric Utilities Corporation for Approval of a Distribution System Improvement Charge*, Docket Nos. P-2012-2325034, *et al.* (Order entered Apr. 9, 2015).

2021. The Company projects that the DSIC will, absent the requested waiver and increase to 9%, remain at the cap of 5% until rates established in the Company's next base rate case become effective.

Q. Can you describe the impacts that increasing the DSIC cap from 5% to 9% will have on customers?

A. Yes. When compared to the benefits of increasing the DSIC cap from 5% to 9% (see PPL Electric Statement No. 1), the incremental cost to customers is small. The current monthly cost of the DSIC at the maximum surcharge rate of 5% for a residential customer using 1,000 kWh per month is approximately $2.96 per month. Increasing the maximum DISC rate to 9% is expected to result in an estimated increased customer cost of approximately $2.37 per month at the cap, representing a 1.4% increase in the overall residential customer bill. Essentially, for every 1% increase in the DSIC cap, residential customers would see a $0.59 increase in their monthly bill. However, because the DSIC rate fluctuates based on plant-in-service and revenue projected, changes to the price are likely to be more gradual than an immediate increase to 9%.

Q. Why did the Company choose 9% as its proposed DSIC cap?

A. PPL Electric determined that a DSIC cap of 9% appropriately balances the Company's need for relief and the impact on customers' bills. To reach that determination, the Company analyzed what the rate would be if there were no cap. Under the current LTIIP, the DSIC rate would be beyond 5% for every remaining quarter of the 2023-2027 LTIIP and could reach as high as 11.84%

in 2027. Similarly, if the modified LTIIP were approved, the DSIC rate would generally be at least 6% in 2024 and range between 8.35% and 11.73% in 2025, 9.67% and 13.25% in 2026, and 10.78% and 14.53% in 2027. Thus, the Company's proposed cap of 9% is a reasonable way to accelerate infrastructure repairs and replacements to improve reliability as explained in Mr. Selkregg's direct testimony (PPL Electric Statement No. 1), while balancing affordability for customers.

Q. Does the proposed increase in the cap impact consumer protections?

A. No. The DSIC tariff continues to provide sufficient customer safeguards in its structure. In addition to still having a ceiling on recovery of capital, which must be approved as just and reasonable by the Commission as part of this Petition, the tariff also continues to include the following safeguards: (1) annual reconciliations performed by the Company and reviewed by the Commission, (2) audits conducted by the Commission, (3) customer notice of any changes in the DSIC, and (4) a reset of the DSIC to zero if Company's return in any quarter exceeds the return used to calculate the DSIC. The DSIC continues to balance consumer protections with the need to ensure that those same consumers receive safe and reliable service.

Q. Does this conclude your direct testimony?

A. Yes, it does.

PPL Electric Exhibit BLJ-1

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC)

In addition to the net charges provided for in this Tariff, a charge of 5.00% will apply consistent with the Commission Order dated May 23, 2013, at Docket No. P-2012-2325034, approving the DSIC. This charge will be effective during the period April 1, 2024 through June 30, 2024. **(C)**

GENERAL DESCRIPTION

A. Purpose: To recover the reasonable and prudent costs incurred to repair, improve, or replace eligible property which is completed and placed in service and recorded in the individual accounts, as noted below, between base rate cases and to provide PPL Electric with the resources to accelerate the replacement of aging infrastructure, to comply with evolving regulatory requirements and to develop and implement solutions to regional supply problems.

The costs of extending facilities to serve new customers are not recoverable through the DSIC.

B. Eligible Property: The DSIC-eligible property will consist of the following:

- Poles and towers (Account 364);
- Overhead conductors (Account 365) and underground conduit and conductors (Accounts 366 and 367);
- Line transformers (account 368) and substation equipment (Account 362);
- Any fixture or device related to eligible property listed above, including insulators, circuit breakers, fuses, reclosers, grounding wires, crossarms and brackets, relays, capacitors, converters and condensers;
- Unreimbursed costs related to highway relocation projects where an electric distribution company must relocate its facilities; and
- Other related capitalized costs.

C. Effective Date: The DSIC will become effective for bills rendered on and after July 1, 2013.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC

A. Calculation: The initial DSIC, effective July 1, 2013, shall be calculated to recover the fixed costs of eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base and will have been placed in service between March 1 through May 31, 2013. Thereafter, the DSIC will be updated on a quarterly basis to reflect eligible plant additions placed in service during the three-month periods ending one month prior to the effective date of each DSIC update. Thus, changes in the DSIC rate will occur as follows: **(C)**

Effective Date of Change	Date to which DSIC-Eligible Plant Additions Reflected
April 1st	December 1st – February 28th
July 1st	March 1st – May 31st
October 1st	June 1st – August 31st
January 1st	September 1st – November 30th

B. Determination of Fixed Costs: The fixed costs of eligible distribution system improvements projects will consist of depreciation and pre-tax return, calculated as follows:

1. Depreciation: The depreciation expense shall be calculated by applying the annual accrual rates employed in PPL Electric's most recent base rate case for the plant accounts in which each retirement unit of DSIC-eligible property is recorded to the original cost of DSIC-eligible property.

2. Pre-tax return: The pre-tax return shall be calculated using the statutory state and federal income tax rates, PPL Electric's actual capital structure and actual cost rates for long-term debt and preferred stock as of the last day for the three-month period ending one month prior to the effective date of the DSIC and subsequent updates. The cost of equity will be the equity return rate approved in PPL Electric's last fully litigated base rate proceeding for which a final order was entered not more than two years prior to the effective date of the DSIC. If more than two years shall have elapsed between the entry of such a final order and the effective date of the DSIC, then the equity return rate used in the calculation will be the equity return rate calculated by the Commission in the most recent Quarterly Report on the Earnings of Jurisdictional Utilities released by the Commission.

C. Application of DSIC: The DSIC will be expressed as a percentage carried to two decimal places and will be applied to the total amount billed to each customer for distribution service under PPL Electric's otherwise applicable rates and charges, excluding amounts billed for the State Tax Adjustment Surcharge (STAS). To calculate the DSIC, one-fourth of the annual fixed costs associated with all property eligible for cost recovery under the DSIC will be divided by PPL Electric's projected revenue for distribution service (including all applicable clauses and riders) for the quarterly period during which the charge will be collected, exclusive of the STAS.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC (Continued)

D. Formula: The formula for calculation of the DSIC is as follows: **(C)**

$$DSIC = \frac{((DSI \times PTRR) + STFT + Dep + e) \times \frac{1}{(1-T)}}{PQR}$$

Where:

DSI = Original cost of eligible distribution system improvement projects net of accrued depreciation and associated accumulated deferred income taxes pertaining to property-related book/tax depreciation timing differences resulting from the use of accelerated depreciation per Internal Revenue Code, 26 U.S. Code § 168.

PTRR = Pre-tax return rate applicable to DSIC-eligible property.

STFT = (State Tax Flow Through) Pre-tax flow through calculated on book-tax timing differences between accelerated tax depreciation and book depreciation net of federal tax.

Dep = Depreciation expense related to DSIC-eligible property.

e = Amount calculated (+/-) under the annual reconciliation feature or Commission audit, as described below.

PQR = Projected quarterly revenues for distribution service (including all applicable clauses and riders) from appliable customers. The quarterly revenues will be determined on the basis of the summation of projected revenues for the applicable three-month period.

T = Pennsylvania gross receipts tax rate in effect during the billing month, expressed in decimal form.

Minimum bills shall not be reduced by reason of the DSIC, nor shall charges hereunder be a part of the monthly rate schedule minimum. The DSIC shall not be subject to any credits or discounts. The State Tax Adjustment Surcharge (STAS) included in this Tariff is applied to charges under the DSIC.

QUARTERLY UPDATES

Supporting data for each quarterly update will be filed with the Commission and served upon the Commission's Bureau of Investigation and Enforcement, the Bureau of Audits, the Office of Consumer Advocate, and the Office of Small Business Advocate at least ten (10) days prior to the effective date of the update.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS

A. Cap: The DSIC is capped at 5.0% of the amount billed to customers for distribution service (including all applicable clauses and riders) as determined on an annualized basis.

B. Audit/Reconciliation: The DSIC is subject to audit at intervals determined by the Commission. Any cost determined by the Commission not to comply with any provision of 66 Pa C.S. §§ 1350, *et seq.*, shall be credited to customer accounts. The DSIC is subject to annual reconciliation based on a reconciliation period consisting of the twelve months ending December 31 of each year or PPL Electric may elect to subject the DSIC to quarterly reconciliation but only upon request and approval by the Commission. The revenue received under the DSIC for the reconciliation period will be compared to PPL Electric's eligible costs for that period. The difference between revenue and costs will be recouped or refunded, as appropriate, in accordance with Section 1307(e), over a one-year period commencing on April 1 of each year, or in the next quarter if permitted by the Commission. If DSIC revenues exceed DSIC-eligible costs, such over-collections will be refunded with interest. Interest on over-collections and credits will be calculated at the residential mortgage lending specified by the Secretary of Banking in accordance with the Loan Interest and Protection Law (41 P.S. §§ 101, *et seq*.) and will be refunded in the same manner as an over-collection. PPL Electric is not permitted to accrue interest on under collections. **(C)**

C. New Base Rates: The DSIC will be reset at zero upon application of new base rates to customer billings that provide for prospective recovery of the annual costs that had previously been recovered under the DSIC. Thereafter, only the fixed costs of new eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base will be reflected in the quarterly updates of the DSIC.

D. Customer Notice: Customers shall be notified of changes in the DSIC by including appropriate information on the first bill they receive following any change. An explanatory bill insert also shall be included with the first billing.

E. Customer classes: Effective July 1, 2013, the DSIC shall be applied equally to all customer classes except Rate Schedule LP-5, consistent with the Commission Order entered April 9, 2015 at Docket No. P-2012-2325034. Effective January 1, 2016, the DSIC shall be applied equally to all customer classes except Rate Schedules LP-5 and LPEP.

F. Earning Reports: The DSIC also will be reset at zero if, in any quarter, data filed with the Commission in PPL Electric's then most recent Annual or Quarterly Earnings reports (Schedule D-2) show that PPL Electric would earn a rate of return that would exceed the allowable rate of return used to calculate its fixed costs under the DSIC as described in the pre-tax return section. PPL Electric shall file a tariff supplement implementing the reset to zero due to overearning on one-days' notice and such supplement shall be filed simultaneously with the filing of the most recent Annual or Quarterly Earnings reports indicating that PPL Electric has earned a rate of return that would exceed the allowable rate of return used to calculate its fixed costs. **(C)**

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS (Continued)

G. Residual E-Factor Recovery Upon Reset to Zero: PPL Electric shall file with the Commission interim rate revisions to resolve the residual over/under collection or E-factor amount after the DSIC rate has been reset to zero. PPL Electric can recoup or refund the residual over/under collection balance when the DSIC rate is reset to zero. PPL Electric shall refund any overcollection to customers and is entitled to recover any undercollections as set forth in Customer Safeguard Section B. The tariff supplement shall be submitted in accordance with the Quarterly Updates section of this tariff. **(C)**

PPL Electric Exhibit BLJ-2

Supplement No. ###
Electric Pa. P.U.C. No. 201

PPL Electric Utilities Corporation

GENERAL TARIFF

RULES AND RATE SCHEDULES
FOR ELECTRIC SERVICE

In the territory listed on pages 4, 4A, and 4B
and in the adjacent territory served.

ISSUED: TBD

EFFECTIVE: January 1, 2025

CHRISTINE M. MARTIN, PRESIDENT
Two North Ninth Street
Allentown, PA 18101-1179

NOTICE

THIS TARIFF MAKES CHANGES **(C)** IN EXISTING RATES. SEE PAGE TWO.

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC)

In addition to the net charges provided for in this Tariff, a charge of X.XX%~~5.00%~~ will apply **(C)** consistent with the Commission Order dated May 23, 2013, at Docket No. P-2012-2325034, approving the DSIC. This charge will be effective during the period January 1, 2025~~April 1, 2024~~ through March 31, 2025~~June 30, 2024~~.

GENERAL DESCRIPTION

A. Purpose: To recover the reasonable and prudent costs incurred to repair, improve, or replace eligible property which is completed and placed in service and recorded in the individual accounts, as noted below, between base rate cases and to provide PPL Electric with the resources to accelerate the replacement of aging infrastructure, to comply with evolving regulatory requirements and to develop and implement solutions to regional supply problems.

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- Other related capitalized costs.

C. Effective Date: The DSIC will become effective for bills rendered on and after July 1, 2013.

(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC

A. Calculation: The initial DSIC, effective July 1, 2013, shall be calculated to recover the fixed costs of eligible plant additions that have not previously been reflected in PPL Electric's rates or rate base and will have been placed in service between March 1 through May 31, 2013. Thereafter, the DSIC will be updated on a quarterly basis to reflect eligible plant additions placed in service during the three-month periods ending one month prior to the effective date of each DSIC update. Thus, changes in the DSIC rate will occur as follows:

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(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

COMPUTATION OF THE DSIC (Continued)

D. Formula: The formula for calculation of the DSIC is as follows: **(C)**

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(Continued)

DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS

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DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC) (Continued)

CUSTOMER SAFEGUARDS (Continued)

G. Residual E-Factor Recovery Upon Reset to Zero: PPL Electric shall file with the Commission interim rate revisions to resolve the residual over/under collection or E-factor amount after the DSIC rate has been reset to zero. PPL Electric can recoup or refund the residual over/under collection balance when the DSIC rate is reset to zero. PPL Electric shall refund any overcollection to customers and is entitled to recover any undercollections as set forth in Customer Safeguard Section B. The tariff supplement shall be submitted in accordance with the Quarterly Updates section of this tariff.

VERIFICATION

I, STEVEN D. SELKREGG, being the Director - Operations at PPL Electric Utilities Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 04/26/2024

Steven Selkregg (Apr 26, 2024 13:45 EDT)

Steven D. Selkregg

VERIFICATION

I, BETHANY L. JOHNSON, being the Sr. Director - Regulatory at PPL Services Corporation, hereby state that the facts above set forth are true and correct to the best of my knowledge, information and belief and that I expect PPL Electric Utilities Corporation to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 relating to unsworn falsification to authorities.

Date: 04/26/2024

Bethany Johnson
Bethany Johnson (Apr 26, 2024 09:33 EDT)

Bethany L. Johnson