BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation	:	
for Approval of its Second Distributed Energy	:	P-2024-3049223
Resources Management Plan	:	

RECOMMENDED DECISION

Before
John M. Coogan
Administrative Law Judge

TABLE OF CONTENTS

I. INTRODUCTION

This Recommended Decision recommends that the Pennsylvania Public Utility Commission deny PPL Electric Utilities Corporation's Petition for Approval of its Second Distributed Energy Resources Management Plan for failure to meet its burden of proof.

II. HISTORY OF THE PROCEEDING

On May 20, 2024, PPL Electric Utilities Corporation (PPL or Company) filed a Petition requesting that the Pennsylvania Public Utility Commission (Commission) approve tariff modifications and other authorizations that are needed to implement PPL's Second Distributed Energy Resources (DER) Management Plan (Petition or Second DER Management Plan), pursuant to Paragraph 62 of the Joint Petition for Settlement of All Issues approved by the Commission at Docket No. P-2019-3010128.

On June 7, 2024, the Office of Small Business Advocate (OSBA) filed a Notice of Intervention and Public Statement in this proceeding.

On July 1, 2024, the Office of Consumer Advocate (OCA) filed an Answer to PPL's Petition.

On July 8, 2024, American Home Contractors, Inc.; Enphase Energy, Inc.; the Solar Energy Industries Association; SolarEdge Technologies, Inc.; Sun Directed; Sunnova, Inc.; Tesla, Inc.; and Trinity Solar, LLC (collectively, the Joint Solar Parties or JSPs) filed an Answer, Petition to Intervene, and Protest in this proceeding.[1]

[1] On September 13, 2024, the JSPs filed a letter stating that Sunnova, Inc. is no longer a member of the JSPs.

On July 10, 2024, the PP&L Industrial Customer Alliance (PPLICA) filed a Petition to Intervene.

On July 12, 2024, the Sustainable Energy Fund of Central Eastern Pennsylvania (SEF) filed a Petition to Intervene.

On July 24, 2024, a hearing notice was issued, establishing a telephonic prehearing conference for this proceeding for August 6, 2024, at 10:00 a.m. and assigning me as the Presiding Officer. A Prehearing Conference Order was issued on July 25, 2024 setting forth rules that would govern the prehearing conference.

The prehearing conference convened on August 6, 2024, as scheduled. PPL, OSBA, OCA, the JSPs, PPLICA, and SEF were present and represented by counsel. During the Prehearing Conference various procedural matters were discussed and resolved, including: the Petitions to Intervene filed by the JSPs, PPLICA, and SEF were granted; litigation schedules were set; and modifications to the Commission's discovery rules were established. A Scheduling Order was issued on August 7, 2024.

On September 13, 2024, PPL filed a Motion to Dismiss Objections and Compel Responses to Interrogatories and Requests for Production of Documents Propounded on the Joint Solar Parties – Set I (Motion to Compel). On September 16, 2024, the JSPs filed their Answer to PPL's Motion to Compel. Also on September 16, 2024, a hearing notice was issued, establishing telephonic evidentiary hearings for this proceeding for December 4, 2024, and December 5, 2024.

On September 24, 2024, I granted PPL's Motion to Compel (Motion to Compel Order).

On September 26, 2024, the JSPs filed a Petition for Certification of Petition for Interlocutory Review and Stay of Order (Petition for Interlocutory Review), seeking a stay and Commission review of the Motion to Compel Order.

On September 26, 2024, PPL filed a Motion for Protective Order.

On September 27, 2024, I issued a Protective Order.

On September 27, 2024, the JSPs filed a Petition for Leave to Withdraw its Petition for Interlocutory Review (Petition to Withdraw).

On October 9, 2024, I issued an order granting the JSPs' Petition to Withdraw.

On October 21, 2024, I issued a Modified Scheduling Order.

On October 22, 2024, I issued a Corrected Modified Scheduling Order.

On January 8, 2025, a corrected hearing notice was issued, establishing telephonic evidentiary hearings for this proceeding for February 11, 2025, February 12, 2025 and February 13, 2025.

On January 24, 2025, PPL filed a Motion in Limine and/or to Strike Certain of the JSPs' Testimony and Exhibits and Motion for Sanctions.

On January 27, 2025, the JSPs filed an answer to PPL's Motion in Limine and/or to Strike Certain of the JSPs' Testimony and Exhibits and Motion for Sanctions.

On January 30, 2025, I issued an Order Denying PPL's Motion in Limine and/or to Strike Certain of the JSPs' Testimony and Exhibits and Motion for Sanctions.

On January 30, 2025, the JSPs filed a Motion for Leave to Amend Surrebuttal Testimony.

On January 30, 2025, PPL filed a Motion to Dismiss Objections and Compel Responses to Interrogatories and Requests for Production of Documents Propounded on the Joint Solar Parties – Set XIX, Nos. 2 through 4 (Second Motion to Compel).

On January 31, 2025, PPL filed a letter withdrawing its Second Motion to Compel.

On February 8, 2025, the JSPs filed a Motion for Leave to File Surrejoinder Testimony.

On February 11 and 12, 2025, the evidentiary hearings were held as scheduled. During the hearings, I granted the JSPs' Motion for Leave to Amend Surrebuttal Testimony and the JSPs' Motion for Leave to File Surrejoinder Testimony. Hearing Transcript (Tr.) at 89-91. Additionally, the evidence listed in Appendix A to this Recommended Decision was admitted into the record during the hearings.

On February 13, 2025, I issued a Briefing Order.

On March 25, 2025, PPL, the JSPs, OCA, OSBA, and SEF filed Main Briefs.

On April 15, 2025, PPL, the JSPs, OCA, OSBA, and SEF filed Reply Briefs.

On April 16, 2025, the JSPs filed a Motion for Leave to File a Surreply Brief.

On May 6, 2025, PPL and the OCA filed answers to the Motion for Leave to File a Surreply Brief.

On May 13, 2025, I issued an Order Denying Motion for Leave to File Surreply Brief and On Close of Record. The record in this proceeding closed when Reply Briefs were filed on April 15, 2025.

III. FINDINGS OF FACT

Parties

1. The Petitioner is PPL Electric Utilities Corporation, a Pennsylvania electric distribution company.

2. The Intervenors include the Joint Solar Parties which is an ad hoc group of entities consisting of American Home Contractors, Inc.; Enphase Energy, Inc.; the Solar Energy Industries Association; SolarEdge Technologies, Inc.; Sun Directed; Sunnova, Inc.; Tesla, Inc.; and Trinity Solar, LLC; all of whom are in the business of installing solar energy and battery storage equipment, manufacturing said equipment, or providing grid services via aggregation of said equipment, or are a trade association representing the same.

3. Solar Energy Industries Association (SEIA) is the national trade association for the solar and storage industries, with more than 1,200 member companies, including many of the JSPs. JSP St. 1, p. 1.

4. American Home Contractors, Inc. (AHC) is a $30 million a year company that presently does business in nine states, including Pennsylvania, and is finalizing its involvement in a tenth state. JSP St. 2, p. 2.

5. Sun Directed is a family-owned business that has installed 400 plus solar and solar plus storage projects in Central Pennsylvania. JSP St. 3, p. 1-2.

6. Tesla, Inc. (Tesla) is a corporation that manufactures and deploys electric vehicles, electric vehicle charging stations, and sustainable energy products, such as rooftop solar, battery energy storage systems, and auxiliary inverters and products. As of July 18, 2023, Tesla had installed 537 Powerwall battery energy storage units in PPL territory, and an additional 254 Powerwalls have been installed in PPL territory by third-party installers as of December 2023. JSP St. 4, pp. 1-2.

7. Trinity Solar, LLC (Trinity) is one of the largest, independently owned solar installation companies in the United States that over the last 30 years has provided solar power and roofing solutions to more than 100,000 homeowners in the mid-Atlantic and Northeast, including 12,000 solar or solar plus storage systems in Pennsylvania, over 1,700 of which in 2023 alone were in PPL territory. JSP St. 5, p. 2.

8. Enphase Energy, Inc. (Enphase) is a global energy technology company and manufacturer of solar microinverters, battery energy storage, electric vehicle supply equipment and home energy management systems that optimize the use of locally produced solar energy to power homes and provide grid services. JSP St. 6, p. 2.

9. SolarEdge Technologies, Inc. (SolarEdge) is an aggregator, providing grid services in exchange for compensation, such as generation, demand response, ancillary services, balancing services, voltage or frequency regulation, or other services, in response to utility-level signals or in response to wholesale electricity market opportunities. JSP St. 7, p. 16.

10. The OCA is an agency of the Commonwealth of Pennsylvania authorized to represent the interests of consumers before the Commission. 71 P.S. §§ 309-1-309-7.

11. The OSBA is an agency of the Commonwealth of Pennsylvania authorized to represent the interests of small business consumers before the Commission. 73 P.S. §§ 399.41-399.50b.

12. Intervenor SEF is a Pennsylvania corporation established upon the conclusion of PPL's Restructuring Proceeding and pursuant to the terms of the Joint Settlement of that proceeding approved by the Commission's August 27, 1998 Order at Docket No. R-00973954. SEF's mission is to promote and invest in energy efficiency, renewable energy and energy education that provide opportunities and benefits for PPL ratepayers. Inclusive in SEF's mission is to lower barriers to enter the renewable energy space for its clients which include contractors, businesses, and consumers. PPLICA Petition to Intervene at 2.

13. Intervenor PPLICA is an ad hoc group of energy-intensive large commercial and industrial customers receiving electric service from PPL primarily under Rate Schedules LP-4 and LP-5, as well as available riders. PPLICA members annually consume approximately 1.03 billion kWh of electricity in their manufacturing and operational processes, and electricity costs comprise a significant element of their respective costs of operation. PPLICA Petition to Intervene at 2.

Background

14. In 2019, the Company requested Commission approval to implement its First DER Management Plan and Pilot Program, which was designed to produce cost-effective benefits for customers with and without DERs, the DER market, and the Commonwealth as a whole. PPL Ex. 1, p. 2.

15. Under that proposal, customers applying to interconnect new DERs to PPL Electric's distribution system would be required to: (1) use Company-approved smart inverters that are compliant with IEEE 1547-2018 and then-forthcoming revisions to UL Standard 1741; and (2) install DER Management devices that enable PPL Electric to monitor and actively manage DERs. PPL Ex. 1, p. 2.

16. The First DER Management Plan and Pilot Program was approved by the Commission at *Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan*, Docket No. P-2019-3010128 (Order entered Dec. 17, 2020).

17. Effective January 1, 2021, new DERs interconnecting with the Company's distribution system were required to have smart inverters installed that meet: (1) UL 1741 SA; and (2) the Company's testing for the communications requirements under IEEE 1547-2018. PPL St. 1, p. 12.

18. These interim requirements were used by PPL Electric until January 1, 2023, at which point, the Company transitioned to requiring new DERs to have smart inverters installed that meet IEEE 1547-2018 and have been certified with IEEE 1547.1 / UL 1741 SB. PPL St. 1, pp. 12-13.

19. The Pilot Program was designed to test and evaluate: (1) the costs and benefits to distribution system operation and design of monitoring DERs through devices connected to inverters as compared to maintaining distribution system status visibility through other means (e.g., automated meter reading equipment, ADMS systems, modeling); and (2) the costs and benefits to distribution system operation of active management of DERs as compared to the benefits available through the use of inverter autonomous grid support functions. PPL St. 1, p. 13.

20. During the Pilot Program, the Company is authorized to purchase and install DER Management devices on all new DERs with inverters up to an annual limit of 3,000 DER Management devices. PPL St. 1, p. 13.

21. DERs installed above the annual limit are not part of the Pilot Program. PPL St. 1, p. 13.

22. All DER Management devices are owned, operated, and maintained by the Company at no direct cost to interconnecting customers. PPL St. 1, p. 13.

23. The annual cap on the number of DER Management devices is not an annual cap on the number of new DERs that can be interconnected with the Company's distribution system. PPL St. 1, p. 13.

24. The Pilot Program began on January 1, 2021, and was set to end on March 21, 2025. PPL St. 1, p. 13.

25. On September 12, 2024, the Commission entered an Opinion and Order, approving PPL's Joint Petition for Extension of PPL Electric Utilities Corporation's Distributed Energy Resources Management Pilot Program Period until

thirty days after the Commission's Final Order entered in the Company's ongoing Second DER Management Plan proceeding at this docket. *Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan*, Docket No. P-2019-3010128 (Opinion and Order entered Sep. 12, 2024).

26. PPL Electric's Second DER Management Plan would enable the Company to continue to integrate, monitor, and manage DER resources throughout PPL Electric's service territory. PPL St. 1, p. 22.

27. As proposed, PPL Electric's Second DER Management Plan would require that all customer-owned and third party-owned, inverter-based DER system installations be equipped with DER Management devices so that the Company can monitor and manage the DERs. PPL St. 1, p. 22.

28. The Second DER Management Plan would expand on the Pilot Program by authorizing PPL Electric to: (1) actively monitor and manage the smart inverter settings on all DERs that are in the Pilot Program's control groups; (2) utilize the Volt/Watt functionality, with customer consent, when the interconnecting DER could create a localized high voltage issue on the distribution system at the time of interconnection, which would not be resolved by the Volt/VAR or Constant Power Factor grid support functions; and (3) make the Pilot Program permanent. PPL St. 1, p. 22-23.

29. The Company proposes to install DER Management devices on: (1) solar photovoltaic systems interconnected before the Pilot Program started on January 1, 2021; and (2) inverter-based DERs interconnected after the Pilot Program started without DER Management devices installed on them. PPL St. 1, p. 23.

30. Previously excluded customer-generators would be required to submit a new interconnection application when they upgrade their system, install a new inverter on their system, or by March 22, 2040, whichever is earlier. PPL St. 1, p. 23, n.3.

Scope of Second DER Management Plan

31. Since January 1, 2023, PPL's Pilot Program has required that new DERs interconnecting with PPL's distribution system use smart inverters approved by PPL as meeting IEEE 1547-2018, and certified to UL 1741 SB using IEEE 1547.1-2020, and meet PPL's DER Lab's testing requirements "to ensure that [the inverters] are compatible with PPL Electric's DER Management Devices …" PPL St. 2, pp. 9-10.

32. An inverter that has been certified by a Nationally Recognized Testing Laboratory as meeting IEEE 1547-2018 and UL 1741 SB standards but that does not meet PPL's "interoperability" requirements may be denied permission to interconnect. PPL St. 2-R, p. 6.

33. PPL's DER growth historically is not exceptionally high compared to other utilities in the United States. Overall, Pennsylvania ranks 14th nationally in Distributed Solar Capacity as of June 2024 with 875MW installed and 28th in per capita distributed solar capacity. OCA St. 1, p. 33.

34. Despite projected growth, states like Arizona, California, Hawaii, Massachusetts, and Rhode Island have five to ten times more DER per capita today than Pennsylvania, and are likely to remain far ahead of PPL into the future. OCA St. 1, p. 33.

35. San Diego is ahead of Pennsylvania in DER adoption but has not utilized the measures proposed by PPL. OCA St. 1, p. 33.

36. Hawaii has implemented autonomous control for all DER including volt-watt for curtailment of active power, demonstrating that this type of functionality can deliver the type of hosting capacity and reliability benefits touted by PPL's Second DER Management Plan. OCA St. 1, p. 33.

37. Both San Diego and Hawaii have DER that are a decade or more ahead of PPL's projected growth and they both continue to operate their grids safely and reliably without utilizing the measures proposed by PPL. OCA St. 1SR, p. 5.

38. While PPL has approximately 150 MW of solar on its system, PG&E has over 8,000 MWs, Southern California Edison has over 5,700 MWs, Eversource has approximately 2,600 MWs with over 1,000 MWs more in development in Massachusetts, Commonwealth Edison has over 1,000 MWs, Xcel Energy's upper Midwest territory has over 1,000 MWs, Hawaiian Electric has over 1,000 MWs, and Nevada Power has approximately 950 MWs. None of these utilities require mandatory active control of small DERs, and they do not have DER related reliability issues. OCA St. 1SR, pp. 5-6.

39. No other U.S. utility has implemented anything on par with the Company's First DER Management Plan or Second DER Management Plan. Although utilities have implemented many components and requirements for inverter requirements, such as IEEE and other industry driven initiatives (like communication protocol requirements), other utilities have not yet taken the next step of leveraging them to monitor and manage DERs across the distribution system. PPL St. 6, p. 16.

40. No other U.S. utility requires that DERs be tested for compatibility with a utility-owned DER Management Device in order to receive approval to interconnect. JSP St. 9, p. 6.

41. No other utility mandates full monitoring and control of DERs by the utility, as proposed by PPL. OCA St. 1, p. 24.

42. As a condition of approval of its Pilot program, the Commission required that PPL compare the costs and benefits of active management of DERs by PPL's Devices, to the benefits available through the use of inverter autonomous grid support functions. PPL St. 1, p. 13.

Second DER Management Plan Standards

43. AHC provided evidence showing it denied sales to at least 52 customers, because the customers requested products that were not on PPL's Approved List. JSP St. 2-SR, p. 11.

44. Pennsylvania is AHC's second largest market, and would be its largest if AHC were still able to sell, install, and service Tesla products in PPL territory. JSP St. 2, pp. 2-3.

45. AHC based its information on the location of the sites where sales were lost on, *inter alia*, copies of the customers' utility bills. JSP St. 2-SR, pp. 9-10.

46. In AHC's experience, mixing and matching approved and non-approved products is not feasible. JSP St. 2-SR, p. 6.

47. Sun Directed has denied service to larger-size single phase commercial projects because it could not use the inverters that in its professional judgment were the best value for its customers, as they were not on PPL's Approved List. JSP St. 3, p. 4.

48. As there are three main utilities in Central Pennsylvania, the area Sun Directed serves, PPL's program has limited 1/3rd of Sun Directed's business. JSP St. 3, p. 5.

49. Sun Directed based its calculation that PPL comprises 1/3rd of Sun Directed's, *inter alia*, on the larger number of high population cities in PPL. JSP St. 3-SR, p. 9.

50. In Sun Directed's experience, PPL-approved products are higher-priced. JSP St. 3, p. 4.

51. Delays in servicing customers because of PPL's Pilot Program increased Trinity's costs due to additional days of field techs' time and the costs associated with its hiring an additional staffer to coordinate service visits. JSP St. 5, pp. 5, 7; JSP St. 5-SR, pp. 5-6.

52. Trinity testified that this coordination between PPL, Trinity, and the customer is unique to PPL's territory because of PPL's program and is not required in other areas. JSP St. 5-SR, p. 7.

53. Regarding the number of times service visits required coordination, Trinity testified it coordinates in all instances, because it does not know in which inverters PPL has installed its Device. JSP St. 5-SR, p. 5.

54. Green Way Solar (Green Way) is not a JSP member but filed Direct and Surrebuttal testimony on the JSPs' behalf, due to its dissatisfaction with PPLs' Pilot Program. Green Way has been installing solar systems on residences and businesses in central and eastern Pennsylvania since 2018. Roughly 60 percent of its projects are in PPL territory. JSP St. 10, p. 2.

55. Green Way showed that its customers have experienced lengthy delays in receiving permission to operate (PTO), as a result of their having to await PPL's installation of its Device, sometimes up to 47 days following the date of the electrical inspection. JSP St. 10, pp. 3-4; Ex. JSP-WS-1.

56. A 38-day delay in obtaining PTO cost one Green Way customer $116,000.00, because his ability to obtain financing was pegged to his showing that his system was successfully operating for 30 days. JSP St. 10, pp. 5-6.

57. The delay Green Way and its customers are experiencing is unique to PPL territory, as no other utility has a requirement to install utility-owned equipment on inverters. JSP St. 10, p. 4.

58. Green Way's evidence on days lapsing between an electrician completing his or her inspection and PPL's issuance of PTO showed all required signatures. JSP St. 10- SR, p. 5.

59. Enphase expended resources seeking to obtain PPL approval of and support for its inverters, which were certified as meeting an IEEE 2030.5 interface, per California Rule 21 requirements. PPL initially sought to require all inverter products to be capable of communicating through DNP3 or SunSpec Modbus, due to PPL's having not yet completed an integration of IEEE 2030.5 into its AMI network. JSP St. 6, p. 5.

60. Upon PPL's agreement to use Enphase's product, Enphase sent free equipment to PPL's lab and provided remote support as PPL worked to integrate Enphase into its servers. JSP St. 6, p. 5.

61. Enphase estimates it took three months of lab work for PPL to successfully "get the client to communicate with their servers," followed by ongoing troubleshooting and debugging tasks to ensure that commands were working as intended, and the expenditure of significant resources by both (approximately 250 hours of PPL staff time, and 150 hours of Enphase staff time). JSP St. 6, pp. 5-6.

62. In addition to losing sales during this four-month period, Enphase observed several installers and/or pending projects switch to competitor products. JSP St. 6, p. 5

63. Enphase has not been required to dedicate this level of attention to operations in other similarly sized utilities' territory. JSP St. 6, p. 6.

64. When the Pilot commenced on January 1, 2021, SolarEdge inverters purchased by customers who were awaiting PTO did not yet meet the not-yet effective UL 1741 SB Standard. JSP St. 7, p. 4.

65. To obtain PTO for its customers, SolarEdge delivered Modbus register maps to PPL, and helped train the PPL team on how to use the maps. JSP St. 7, p. 4.

66. SolarEdge estimates its development of this custom solution required that an employee dedicate a full two weeks of work (worth approximately

$6,460) over the period from January 1, 2021 to January 28, 2021, diverting his time from securing new business. JSP St. 7, pp. 4-5.

67. SolarEdge testified it lost or experienced delays in sales during the 28 days it awaited approval of its inverters' inclusion on PPL's Approved List. JSP St. 7, pp. 3-4.

68. At least 27 Tesla multi-inverter solar systems installs involving PPL-approved Delta or SolarEdge inverters, all involving ZigBee communications modules, and all containing PPL's Device, experienced communications disruptions. JSP St. 4-SR, pp. 3-5.

69. The disruptions commenced when PPL installed its Device and changed the inverter ID numbering in multi-inverter solar installations resulting in neither Tesla nor its customers being able to see communications data from any inverter other than the inverter numbered "1," blocking them from seeing how the entire solar system was producing and functioning. JSP St. 4, p. 7.

70. Due to the restriction on multi-inverter installs, Tesla redesigned four solar systems, reducing the size of the systems from what Tesla's customers originally ordered, totaling a cumulative reduction of 37.6 kW-AC. JSP St. 4-SR, p. 15.

71. A fix of communications disruptions came only after three years of troubleshooting. JSP St. 4-SR, p. 10.

72. Pending PPL's discovery of this fix, Tesla spent significant resources attempting to resolve the harm caused by PPL's Pilot, and customers lost value. JSP St. 4, pp. 5, 9-12, 18.

73. Tesla has installed roughly 453,000 residential solar systems across the country with one or more Zigbee communications modules installed. In no other territory have Zigbee communications modules posed the communications problems Tesla experienced in PPL's territory. JSP St. 4, p. 9.

74. In no other territory has a utility limited installations of inverters with ZigBee modules to a single inverter. JSP St. 4, p. 9.

75. All the inverters Tesla installed under PPL's Pilot were on PPL's Approved Inverter List, and Tesla has produced evidence showing that the ZigBee communications modules Tesla used in the PPL-approved inverters were either already installed, or approved for use, by SolarEdge and Delta. JSP St. 4, p. 2; Ex. JSP-JG-2.

76. Enphase recorded 18 incidents between April 30, 2024 and July 22, 2024 in which PPL's DER Management Device disrupted communications and power production from customers' inverters. JSP St. 6, p. 7.

77. In 8 of the 18 instances, customer communications were disrupted because PPL was sending commands to the Enphase IQ Gateway (which manages local and cloud communications at the customer's premises) in the wrong units. JSP St. 6, p. 8.

78. The 8 systems experienced at least 419 cumulative days of solar power production downtime, resulting in an estimated 12,570 kWh of lost energy, assuming each system produced an average of 30 kWh of energy per day. JSP St. 6-SR, p. 4.

79. Evidence PPL offered in support contains no indication that Enphase erroneously "directed" PPL as to the units to use. JSP St. 6-SR, p. 2.

80. In 10 of the 18 instances, communication traffic emanating from PPL's modem clashed with communication traffic over the customer's Wi-Fi related to local system operations, disrupting the customers' systems' communications. JSP St. 6, p. 8.

81. In five of these 10 instances, the disruption also halted power production from the customers' solar systems. JSP St. 6 p. 8; Ex. JSP-MM-3.

82. PPL has since changed all DER Management devices to a different LAN IP, which resolved the issue of halting power production. PPL St. 2-R, p. 33.

83. As a result of these disruptions, Enphase's customers experienced at least 617 cumulative days of solar power production downtime, and at least 609 cumulative days of communications downtime. JSP St. 6, p. 8; Ex. JSP-MM-3.

84. At least 18,410 kWh of solar power generation from these customers' inverters was lost because of the disruptions caused by PPL's installation of its Device. JSP St. No. 6, p. 9.

85. Cumulatively, because of the disruptions caused by PPL's installation of its Device, Enphase customers lost at least $1,851 worth of net energy metering credits, as well as lost SREC values. JSP St. 6, p. 9.

86. Cumulatively, Enphase expended approximately $2,400 worth of labor to develop software fixes to resolve the two issues at the 18 sites. JSP St. 6, p. 9.

87. Enphase's costs do not include costs incurred by installers, who had to travel to each of the 18 sites at least once to perform troubleshooting and system reset activities on the physical systems. JSP St. 6, p. 9.

88. SolarEdge estimates it has spent 210 hours over the past two years supporting PPL's implementation of its program determining how to configure multi-inverter systems. JSP St. 7, p. 6.

89. Historically, PPL's Device required a Modbus RTU port, while SolarEdge inverters have only a Modbus TCP (or ethernet) port available. JSP St. 7, p. 5.

90. SolarEdge has not been required to meet utility-specific testing requirements that go beyond the requirements for IEEE and UL certification, or to provide ongoing technical support, in any other jurisdiction. JSP St. 7, p. 6.

91. While resolved, Sun Directed also provided evidence of instances in which customers were inconvenienced, and deprived of the value of their solar equipment, and Sun Directed lost money servicing their systems, which experienced interference as a result of PPL's DER Device installation. JSP St. p. 3, pp. 5–6.

92. PPL's ability to assert primary control of a customer's inverter will be a significant blocker for third-party aggregators of battery energy storage in PPL's territory and will block the provision of wholesale market grid services from aggregated DERs by creating unique and excessive risk and complexities for aggregators, which ultimately will dissuade them from aggregating Pennsylvania-based DERs. JSP St. 8, pp. 6-12.

93. Accommodating the utility control required by PPL's Pilot and Plan alongside a VPP program would require third-party aggregators, such as Tesla, to create novel technical solutions that would be unique to the PPL territory, and would need to be capable of managing multiple points of communication and control. JSP St. 8-SR, p. 3.

94. The need to create such a novel technical solution would be costly and would act as a significant barrier for aggregators to enter PPL's territory, particularly for aggregators looking to participate in PJM. JSP St. 8, pp. 9-10.

95. The complexities of managing multiple points of communications and control created by PPL's Pilot and Plan, and of incorporating PPL management into VPP forecasting and dispatch strategies, would itself create an entirely new risk and complexity that is difficult for aggregators to assess and quantify, causing a significant deterrent to market entry. JSP St. 8-SR, pp. 3-5.

96. PPL's ability to update reactive power setpoints has the effect of reducing the active power potential of resources such as solar and batteries, which can otherwise be controlled by manufacturers' cloud Application Programming Interfaces for participation in grid services programs. JSP St. 6, p. 21.

97. PPL's hegemony over DER control presents a high degree of uncertainty for prospective third-party aggregators, interfering with their ability to be able to confidently deliver grid services, particularly wholesale electricity market reliability services. JSP St. 6, p. 20.

98. PPL's program blocks SolarEdge's ability to confidently develop an aggregation program. JSP St. No. 7-SR, p. 20.

99. There are uncertainties that are common to all distribution systems, such as weather, circuit outages, and equipment failures. However, the new uncertainties introduced by PPL's program are unique to PPL's territory, and pose unique risks and complexities that would be costly to design around. JSP St. 8-SR, p. 3.

100. PPL's DER Lab testing to ensure that the inverters are compatible with PPL Electric's DER Management Devices involves PPL's "... DER Lab verif[ying that, *inter alia*] the inverter has … an open and available [communications] port." PPL St. 2-R, p. 19.

101. A third-party aggregator likely would be unable to access an inverter's communication port because PPL's Tariff requires that "the Company shall be permitted to actively monitor and manage the grid support functions of DER inverters using the DER Management Device and the Company's Distributed Energy Resources Management System (DERMS)." JSP St. 9-SR, p. 14.

102. SolarEdge equipment cannot communicate with multiple entities at the same time. JSP St. No. 7-SR, p. 21.

103. SolarEdge equipment adheres to the proper communications protocols required by the applicable standards, but IEEE 1547-2018 is silent about communicating with multiple entities at the same time for the purposes of providing grid support. JSP St. No. 7-SR, pp. 21-22.

104. SCADA systems are expensive ($100,000.00) and more typically used in large, industrial settings, not the residential systems at issue in this litigation. JSP St. No. 7-SR, p. 22.

105. PPL has installed its Device in nearly 8,000 SolarEdge inverters. PPL St. No. 2-RJ, pp. 34-5.

106. The guide for SolarEdge's inverter contains no instructions on installing a third-party device, such as PPL's DER Management Device, to the inverter to power the third party's Device. Tr., pp. 381-382.

107. Although PPL's connections of its wires voided the customers' warranties, SolarEdge voluntarily replaced damaged customers' inverters. JSP St. 7, p. 11.

108. On August 22, 2024, SolarEdge was called by an installer who observed smoke coming from a customer's inverter. JSP St. 12-R, p. 8.

109. The smoke is visible on Ex. JSP-JB-2, Slide 5. JSP St. 12-R, p. 8.

110. As a smoking inverter is quite unusual, and as the customer had lost generation, the field team escalated the case to SolarEdge personnel, including SolarEdge's Failure Analysis Engineer, Jacob Geller. JSP St. 12-R, p. 8.

111. Based upon his review of the photographs, Mr. Geller immediately saw PPL's connection to the inverter and concluded that the unauthorized modification caused the thermal damage. JSP St. 12-R, p. 8.

112. Because the photographs showed PPL's wires, SolarEdge's Code Compliance Officer commenced an inquiry into whether other like instances had occurred in PPL territory, yielding the package referred to as the September 19, 2024 PPL Case Review, showing evidence of eight instances of thermal damage to inverters that have or had PPL's Device installed. JSP St. 12-R, pp. 8-9.

113. All eight cases had clear evidence of thermal damage to the inverters arising from PPL's installations reducing spacing; over-torquing, cross-threading, or not sufficiently tightening screws; leaving behind contamination; or leaving bare wire exposed and in contact or in proximity with the circuit board, all of which could cause thermal arcing. Alternatively, the thermal damage arose as a result of the installer causing mechanical damage to components during installation, which can also cause thermal damage. JSP St. No. 13-SR, p. 5.

114. A loose screw would cause the type of thermal damage seen in the PPL case review. JSP St. 13-SR, p. 7; Ex. JSP-JIG-7SR.

Cost-Benefit Analyses

115. In its 2024 DER Management Report, PPL claimed that avoided truck rolls produced the majority of program benefits, amounting to roughly 62% of PPL's claimed benefits of its program. PPL Electric Exhibit CD-4.

116. The approach employed by PPL Rebuttal Expert Witness, Steven Wishart "... to estimating avoided truck rolls ... result[ed] in a much lower estimate" than the one set forth in PPL's 2024 DER Management Report. PPL St. No. 10-R, p. 18.

117. Mr. Wishart estimated 172 avoided truck rolls associated with 10,000 DER Management Devices in 2025, reducing the benefits from avoided truck rolls to only 5 percent of the total program benefits and only 11.4% of program costs. PPL St. 10-R, pp. 9, 29.

118. On Rebuttal, Mr. Wishart identified that 85.9% of the Program's benefits would come from "incremental hosting capacity" created by the program. JSP St. 4-SR, p. 26.

IV. LEGAL STANDARD/BURDEN OF PROOF

Section 5.41 of the Commission's regulations states, in part, that "[p]etitions for relief under the act or other statute that the Commission administers, must be in writing, state clearly and concisely the interest of the petitioner in the subject matter, the facts and law relied upon, and the relief sought." 52 Pa. Code § 5.41(a). The proponent of a rule or order bears the burden of proof pursuant to Section 332(a) of the Public Utility Code, which provides that the party seeking a rule or order from the Commission has the burden of proof in that proceeding. 66 Pa.C.S. § 332(a). It is axiomatic that "[a] litigant's burden of proof before administrative tribunals as well as before most civil proceedings is satisfied by establishing a preponderance of evidence which is substantial and legally credible." *Samuel J. Lansberry, Inc. v. Pa. Pub. Util. Comm'n,* 578 A.2d 600, 602 (Pa. Cmwlth. 1990). The preponderance of the evidence standard requires proof by a greater weight of the evidence. *Commonwealth v. Williams,* 732 A.2d 1167 (Pa. 1999).

Once the party with the burden of proof makes out a *prima facie* case, the burden of proof shifts to the opposing party. The Commission must measure the weight and credibility of all evidence, and simply because the party with the burden of proof has presented a *prima facie* case does not obligate the Commission to credit this evidence or give it any special weight. If the opposing party presents evidence found to be of co-equal (or greater) weight, then the party with the burden of proof will not have met its burden. *Milkie v. Pa. Pub. Util. Comm'n*, 768 A.2d 1217 (Pa. Cmwlth. 2001).

Additionally, any finding of fact necessary to support an adjudication of the Commission must be based on substantial evidence. *Met-Ed Indus. Users Group v. Pa. Pub. Util. Comm'n*, 960 A.2d 189 (Pa. Cmwlth. 2008) (citing 2 Pa.C.S. § 704). Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Borough of E. McKeesport v. Special/Temporary Civil Serv. Comm'n,* 942 A.2d 274 (Pa. Cmwlth. 2008). Substantial evidence must be "more than a scintilla and must do more than create a suspicion of the existence of the fact to be established." *Kyu Son Yi v. State Bd. of Vet. Med*., 960 A.2d 864, 874 (Pa. Cmwlth. 2008) (citation omitted).

The Commission is not required to consider expressly and at length each contention and authority brought forth by each party to the proceeding. *Univ. of Pa. v. Pa. Pub. Util. Comm'n*, 485 A.2d 1217 (Pa. Cmwlth. 1984). "A voluminous record does not create, by its bulk alone, a multitude of real issues demanding individual attention . . .." *Application of Midwestern Fidelity Corp.*, 363 A.2d 892, 902, n.6 (Pa. Cmwlth. 1976). Further, a Commission decision is adequate where, on each of the issues raised, the Commission was merely presented with a choice of actions, each fully developed in the record, and its choice on each issue amounted to an implicit acceptance of one party's thesis, and rejection of the other party's contention. *Popowsky v. Pa. Pub. Util. Comm'n*, 706 A.2d 1197 (Pa. 1997).

Every rate made, demanded, or received by any public utility shall be just and reasonable, and in conformity with regulations or orders of the Commission. 66 Pa.C.S. § 1301. A public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities. 66 Pa.C.S. § 1501. Electric distribution companies (EDCs) are required to "file a tariff with the Commission that provides for net metering consistent with" Chapter 75 of the Commission's regulations. 52 Pa. Code § 75.13(c). Also, an EDC and default service provider "may not require additional equipment or insurance or impose any other requirement" on a net metering customer-generator

"unless the additional equipment, insurance or other requirement is specifically authorized under this chapter or by order of the Commission." 52 Pa. Code § 75.13(k).

V. DISCUSSION

A. Parties' Positions

1. PPL's Position

PPL states that its proposed Second DER Management Plan is built upon the successes achieved through its Commission-approved First DER Management Plan and Pilot Program. PPL asserts that its Second DER Management Plan will enable the Company to continue to integrate, monitor, and manage DER resources throughout PPL's service territory. PPL Main Brief (MB) at 11.

As proposed, PPL's Second DER Management Plan will require that all customer-owned and third party-owned, inverter-based DER system installations be equipped with DER Management devices so that the Company can monitor and manage the DERs. In addition, the Second DER Management Plan would expand on the Pilot Program by authorizing PPL to: (1) actively monitor and manage the smart inverter settings on all DERs that are in the Pilot Program's control groups; (2) utilize the Volt/Watt functionality, with customer consent, when the interconnecting DER could create a localized high voltage issue on the distribution system at the time of interconnection, which would not be resolved by the Volt/VAR or Constant Power Factor grid support functions; and (3) make the Pilot Program permanent. As such, provisions in the Settlement that limit the scope of the Pilot Program's requirements, such as the annual cap of 3,000 DER Management devices, would be eliminated. Moreover, the Company proposes to install DER Management devices on: (1) solar photovoltaic systems interconnected before the Pilot Program started on January 1, 2021; and (2)

inverter-based DERs interconnected after the Pilot Program started without DER Management devices installed on them. PPL MB at 11-12.

PPL asserts that these proposals are necessary and appropriate because they will help the Company fully realize the benefits of actively monitoring and managing DERs. PPL states that, as demonstrated by the Pilot Program, the Company can leverage the smart inverters' grid support functions to improve safety, reliability and resiliency, reduce interconnection costs for DER interconnection applicants (*e.g.*, avoidance of paying for distribution system upgrades), mitigate the impact of DERs on the distribution system, and increase the distribution circuits' hosting capacity by monitoring and managing DERs in the service territory. PPL MB at 12.

PPL submits that the Commission should approve the Second DER Management Plan because it will help improve the safety, reliability, adequacy, and resiliency of the Company's electric service. As a regulated EDC, PPL must provide safe, reliable, adequate, and reasonable service, as required under the Public Utility Code. PPL argues that the deployment of DERs continues to present challenges to the Company complying with that statutory duty. PPL avers that without active management and monitoring of DERs, however, distribution system operators are severely limited in their ability to respond to these changing dynamics and the issues created by DERs. PPL states that as distribution systems have become increasingly similar to transmission, *i.e.*, a mix of demand and generation, the need to balance generation and demand becomes vitally important. PPL contends that such balancing cannot be accomplished without the ability to monitor and manage generation assets on the grid. PPL MB at 13-15.

PPL states that, moreover, by negatively affecting the voltage on the electric distribution system, solar and other intermittent resources can result in delayed interconnection or the need for potentially costly distribution system reinforcements before additional DERs can be installed. PPL contends that without the ability to directly

communicate with and manage customer DERs to leverage grid support functionality, the amount of intermittent generation that can be interconnected on the distribution circuits must be limited to maintain system stability and reliability. PPL also contends that without such ability to monitor and manage the DERs, the reliability, safety, and efficiency of electric service would be placed at increased risk with each new DER interconnected to the distribution system. PPL states that even with existing levels of DER penetration, PPL's distribution system can experience safety, reliability, adequacy, and resiliency issues due to DERs. PPL asserts that active management and monitoring of DERs is necessary to address these issues in a prudent, efficient, and effective way. PPL also asserts that it has demonstrated the limitations of relying on autonomous settings to resolve voltage violations, as other parties in this proceeding have suggested. PPL MB at 15-21.

PPL also argues that the Commission should approve the Second DER Management Plan because it will help address climate change and sustainability objectives. PPL MB at 21-24. Additionally, PPL avers that the Second DER Management Plan should be approved because it will help address the significant resource adequacy issues that the Commonwealth is facing due to significant increases in electric demand. PPL submits that, although other parties have suggested various forms of data collection instead of the Company's proposal, such data collection alone cannot provide the situational awareness and system-wide connectivity needed to meet these resource adequacy challenges and help de-stress the transmission system. PPL MB at 24-28.

PPL asserts that it has demonstrated that the active management and monitoring of DERs will produce significant benefits in excess of the Plan's costs. PPL also asserts that the other parties' arguments criticizing the projected costs and benefits have no merit, considering the conservative methodology used to generate the analysis. PPL states that the Company has demonstrated that even if the Plan's benefits were

removed completely, the Plan's absolute costs would not significantly impact customers' bills. Finally, PPL indicates its willingness to explore cloud-based communications in lieu of its DER Management devices, which would significantly reduce the largest driver of costs in the cost-benefit analysis and only increase the benefit-cost ratio projected by the Company in this proceeding. PPL MB at 28-40.

PPL contends that it has fully rebutted the JSPs' allegations that the Company has placed restrictions on inverters and projects; caused customers, solar installers, and inverter manufacturers to experience increased costs; affected customers' and inverter manufacturers' systems and communications; caused lost sales and delayed projects; and affected inverters' warranties. PPL MB at 41-44. Additionally, the Company contends that the Commission should disregard the JSPs' safety-related allegations concerning PPL's DER Management devices. PPL MB at 44-53. Finally, PPL argues that the other parties' recommendations either have been adopted or should be rejected. PPL MB at 53-59.

In its Reply Brief, PPL avers that its Second DER Management Plan is overdue, not premature, in that it will help address the daunting resource adequacy challenges facing the Commonwealth, and it will improve and maintain the safety, reliability, adequacy, and resiliency of PPL's electric service. PPL states it is the first to propose active management and monitoring of DER because, unlike other electric utilities, PPL has invested the time and resources over the last 10 years to prepare itself for the Second DER Management Plan. PPL Reply Brief (RB) at 4-9.

PPL asserts that the other parties' criticisms of its cost-benefit analyses are not credible. PPL contends it properly treated an increase in hosting capacity as a benefit, it is premature to make claims about cost shifting, multiple benefit categories accrue only to active management, and incremental hosting capacity benefits were not double counted. PPL explains that its initial cost-benefit analysis was prepared as part of

its Program Year 2 Annual Report for the DER Management Pilot Program, and that the cost-benefit analysis presented in rebuttal tried to respond to other parties' criticisms about the initial cost-benefit analysis. PPL maintains that the OSBA's criticisms of the cost-benefit analyses lack merit, that SEF errs in arguing that the cost-benefit analyses are missing essential information, and that other parties incorrectly argue that PPL's cost-benefit analyses did not comply with the First DER Management Plan settlement. PPL states that it did not analyze autonomous settings separately in a cost-benefit analysis, because IEEE Standard 1547-2018 had been incorporated into the Commission's regulations for DERs since the Commission-approved the Settlement in the First DER Management Plan proceeding. PPL RB at 9-20.

PPL submits that issues concerning cost recovery and allocation of costs associated with the Second DER Management Plan are properly reserved for a base rate proceeding. PPL states that, nonetheless, to better inform the Commission's decision making, the Company presented detailed information about the Second DER Management Plan's rate impact in this proceeding. PPL RB at 20-24.

PPL states that it fully evaluated and responded to the other parties' suggested alternatives to the Company's proposal. PPL asserted it was not feasible, practical, efficient, or cost-effective to try to rely on third-party aggregators to assure distribution system reliability and power quality. PPL avers that it investigated and responded to parties' contentions about using autonomous functions instead of implementing the Second DER Management Plan. PPL also avers that it evaluated the use of advanced DER modeling, cloud-based communications, and/or APIs. PPL RB at 24-30.

PPL states that SEF's rebuttal testimony on cybersecurity and healthcare related contentions were inappropriately raised in rebuttal testimony and should be rejected. PPL argues that SEF's cybersecurity-related claims are bald assertions and do

not constitute substantial evidence. PPL denies that the Second DER Management Plan is about controlling generation, that it would change customers' electric suppliers without consent, or that it would cut off electric supply to those customers relying on critical medical equipment. PPL states that SEF's rate impact claims should be denied because the Company's proposal would put downward pressure on base rates. PPL RB at 30-36.

PPL argues that the JSPs raise a series of arguments in their Main Brief that lack merit. PPL states that nothing under its proposal inhibits or precludes DERs from contracting with aggregators or participating in third-party aggregation. PPL avers that the JSPs' claims that PPL's DER Management Pilot Program has affected solar and inverter companies' communications with inverters are flawed and overstated, or that the Company has since resolved or developed solutions for the issues. PPL claims that it fully rebutted the JSPs' claims that PPL's inverter testing requirements are unreasonable and go beyond the requirements of IEEE 1547-2018 and UL 1741-SB. PPL states that it included evidence of a real-life example to support on/off functionality as an important safety feature. PPL submits that existing DERs would not immediately become subject to the Second DER Management Plan's requirements. PPL contends that the JSPs are wrong in asserting that it is not in the interest of DER customers, manufacturers, or installers to design inverters in a manner to deliver mandated reactive power capability simultaneously with maximum desired power output. PPL asserts that the JSPs' position that DER owners should be compensated for the grid services they provide should be rejected. PPL denies that its method of connecting its DER Management devices violates the National Electrical Code. PPL RB at 36-52.

PPL argues that the JSPs' request that the Commission order PPL to either replace SolarEdge inverters in which it has installed its Device, or pay $2 million into a fund for replacement of inverters with PPL's Device installed and thermal damage, be rejected because it: was improperly raised for the first time at the briefing stage, amounts to a request for damages that the Commission lacks authority to award, and goes beyond

the scope of relief that can be granted in this voluntary Petition proceeding. PPL RB at 53-56. Finally, PPL avers that the JSPs improperly introduce and rely on several pieces of extra-record evidence in their Main Brief. PPL RB at 56-58.

2. JSPs' Position

The JSPs are an ad hoc group of entities, all of whom are in the business of installing solar energy and battery storage equipment, manufacturing said equipment, or providing grid services via aggregation of said equipment, or are a trade association representing same. The JSPs assert they have been impacted by PPL's First DER Management Plan, and will be further impacted if PPL's Second DER Management Plan is approved as proposed. JSPs MB at 1-3.

The JSPs argue that the Commission should decline to approve PPL's program, as it unreasonably and unlawfully exceeds Pennsylvania's standards. First, the JSPs assert that PPL's testing requirements exceed those of IEEE and UL, and that PPL is not authorized to bar manufacturers and configurations that are certified as standards-compliant from interconnecting based on its unilateral resolution of a standards gap. JSPs MB at 11-16.

Second, the JSPs assert that PPL's tacit claim of exclusivity over reactive power overreaches. The JSPs claim that PPL disregarded evidence put forth that the JSPs have participated in programs involving their management of customers' reactive power. The JSPs also claim that PPL misunderstands the implications of its demands that the manufacturer design an inverter large enough to produce sufficient reactive power to meet PPL's needs, as well as the customer's interest in real power. The JSPs underscore that the Commission has the responsibility to determine who shall manage reactive power capability. JSPs MB at 16-18.

Third, the JSPs aver that PPL overplays its concern that its control of customers' inverters is required to use remote on/off functions on battery storage or solar systems that have not safely isolated, or "islanded" from the distribution system. The JSPs state that anti-islanding capability is already built into inverter-based systems certified to IEEE 1574 standards and tested in accordance with UL 1741. JSPs MB at 18-19.

Fourth, the JSPs contend that it is squarely the responsibility of this Commission to decide whether the levels of penetration seen today warrant the Commission's granting PPL a monopoly over monitoring and management of residential customers' DERs. JSPs MB at 19-20.

The JSPs next argue that PPL fails to demonstrate why its program, with its first-in-the-nation features, must be approved now. The JSPs state that, similarly, PPL offers no credible factual bases for its projections of future DER rates. The JSPs also state that PPL has refused to explore whether it could achieve its objectives through a voluntary program, and that PPL's proposed retroactive reach is unreasonable to customers whose very expensive equipment will be subject to utility control they never envisioned. JSPs MB at 20-26.

Finally, the JSPs argue that PPL has failed to show the costs of its program are reasonable. First, the JSPs contend that PPL's cost/benefit analysis is suspect, as it has greatly changed over the course of the proceeding. Additionally, the JSPs submit that PPL's cost-benefit analysis is itself significantly flawed. JSPs MB at 26-31.

Second, the JSPs aver that PPL failed to conduct the analyses required by the Commission, and the analyses it did do are flawed. The JSPs state that PPL failed to adequately compare the costs and benefits of active management of DERs by PPL to the benefits available by using alternate approaches. The JSPs also assert that PPL failed to

analyze alternative methods it could use to obtain monitoring data. The JSPs state that when PPL did compare use of autonomous smart meter inverter functions compared to active management in regard to the efficacy of voltage control, the analysis was notably unscientific. JSPs MB at 31-36.

Third, the JSPs assert that PPL has failed to analyze the magnitude of harm its program has done and will do to the JSPs, other solar customers and companies, and the public interest generally. As relief, the JSPs request that the Commission bar PPL from requiring that inverters be tested for compatibility with PPL's Device; deny the Petition, although PPL may continue to require smart inverter settings that provide voltage regulation via autonomous functions; or, if the Commission chooses not to deny approval, then make the Program voluntary, and its requirements and testing applicable only to voluntarily participating DERs; and order PPL to immediately cease connecting to SolarEdge inverters to power its Devices, and replace SolarEdge inverters in which it has installed its Device, or pay $2 million into a fund for replacements of inverters with PPL's Devices installed and thermal damage. JSPs MB at 36-60.

In its Reply Brief, the JSPs assert that PPL failed to show that the high costs of its program produce benefits that outweigh the serious harm it causes. Specifically, the JSPs summarize that there is no other program in the country that eliminates customer choice to this degree; mandates utility control; invades customers' property; and takes customers' property (their DERs) without compensation, all as a condition of interconnecting. PPL's program increases costs, causes delays, blocks market entry of new products, and blocks competition by third parties who could do what PPL is doing more cost-effectively. PPL's program requirements exceed national and Pennsylvania standards (specifically IEEE 1547-2018 and 52 Pa. Code § 75.22), and PPL's program implementation (in particular, its method of Device installation) damages customers' inverters, voids customers' warranties, and violates NEC requirements. JSPs RB at 1-2.

The JSPs applaud PPL's acknowledgement that employment of the Enphase modem and cloud-based communications would be far more cost-effective than would be further use of PPL's Device. However, the JSPs state that PPL's proposed alternative remains unreasonable, and the case cited by PPL[2] fails to offer useful precedent. JSPs RB at 3-6.

The JSPs submit that PPL has not rebutted the JSPs' allegations concerning the adverse effects of the DER Management Pilot Program and Second DER Management Plan. The JSPs argue that PPL fails to address the JSPs' allegations that PPL's Program is anti-competitive; PPL fails to effectively rebut the JSPs' allegations that PPL's Device interfered with customers' power production or that PPL's Program is the only program in the country that has seized the services provided by customers' DERs without compensation; PPL's Main Brief barely addresses the JSPs' concerns that PPL's program has been and will be mandatory; and PPL's Main Brief says nothing in response to the JSPs' allegations that PPL's method of installation violates the NEC. JSPs RB at 6-11.

The JSPs state that PPL erroneously identifies Tesla as the only inverter manufacturer it has blocked from market entry. The JSPs also state that PPL overstates the abundance of options on its approved smart inverter list. The JSPs aver that PPL does not fully understand the products it is attempting to regulate, or the full impact of its programs on how those products operate in conjunction with PPL's Device. The JSPs state that the restrictions that are visible on PPL's smart inverter list are unreasonable. JSPs RB at 11-20.

---

[2] *Petition of PECO Energy for Approval of its Smart Meter Technology Procurement and Installation Plan*, Docket No. M-2009-2123944 (Recommended Decision entered July 12, 2013).

The JSPs argue that the provided robust support for their position that PPL's Program has increased costs. The JSPs state that small and large manufacturers alike may conclude that PPL's expectations that manufacturers perpetually engage in lengthy and expensive troubleshooting as the price of operating under PPL's Program makes operating in PPL territory a losing business proposition. The JSPs submit that it is unreasonable of PPL to expect the whole DER community to lose value and opportunities to deploy more solar and storage through the Commonwealth so as to permit PPL to continue with its expensive and soon-to-be rate-based grand experiment. The JSPs aver they have amply supported their claims that PPL's Program has resulted in delays that have caused installers and customers to endure losses, and installers to lose sales and revenues. JSPs RB at 20-26.

The JSPs state that PPL grossly misleads in claiming that SolarEdge has inappropriately denied warranty claims. Additionally, the JSPs state that PPL's method of connecting to SolarEdge inverters is unsafe, unauthorized, and violative of the National Electrical Code. The JSPs assert they have demonstrated that PPL's method of powering its device was unauthorized, dangerous, and non-compliant with the NEC. The JSPs also assert that PPL's expert witness opinions as to the soundness of PPL's method of installation are not credible. JSPs RB at 26-42.

3. OCA's Position

The OCA submits that PPL's proposed Second DER Management Plan should be rejected. Alternatively, should the Commission consider approving the plan, then the OCA recommends that PPL be required to submit a DER Orchestration Plan, which the OCA avers would provide more transparency regarding its plans for orchestrating all DERs and delivering value to ratepayers. OCA MB at 1, 41-43.

The OCA argues that PPL's proposed Second DER Management Plan is a radical departure from how other jurisdictions approach DER management and is unnecessary for PPL's distribution system. The OCA is unaware of any other utility that mandates full monitoring and control of DERs. The OCA avers those other jurisdictions, which are further ahead of PPL in terms of DER deployment and penetration levels, demonstrate that other management strategies are more effective and economical. The OCA also avers that PPL's proposal fails to reasonably differentiate between DER sizes. Specifically, the OCA suggests that small DERs under 200 kW do not produce benefits exceeding the costs to manage them as proposed by PPL. OCA MB at 13-19.

The OCA contends that PPL's proposal is not cost-effective if it is expanded to other non-solar DER, and PPL's proposal omits costs from the Pilot Program that should be included. The OCA also asserts PPL's active monitoring of DERs provides minimal benefit at a high cost and PPL's cost-benefit analysis is flawed. The OCA highlights that PPL introduced a new cost-benefit analysis in rebuttal testimony that significantly deviates from PPL's analysis presented in direct testimony. The OCA argues that the two cost-benefit analyses contradict each other, and the analysis introduced in rebuttal testimony exaggerates benefits and obfuscates the incremental benefits of its proposal over other alternative management strategies, such as autonomous settings. OCA MB at 19-34.

The OCA states that PPL presents a false dichotomy where the Commission is seemingly required to choose between PPL controlling and monitoring all eligible DERs, or unmonitored and uncontrolled DERs with little, to no, required capabilities. The OCA cites three alternative management strategies that it contends PPL could have chosen to employ: 1) advanced DER modeling; 2) cloud-based communications; and 3) third-party aggregations to deliver management capabilities. The OCA recommends that PPL be required to conduct a DER Orchestration Plan to

evaluate the cost-effectiveness of several pathways for monitoring and controlling DERs. OCA MB at 34-39.

The OCA remarks that PPL did not provide any cost allocation proposals for allocating and recovering the costs of its proposals from the cost-causers. Consequently, the OCA recommends that export tariffs be evaluated prior to having costly and mandatory DER requirements to avoid shifting the cost of DER management to ratepayers that do not own DERs. The OCA notes that the Company presents no proposal for allocating or recovering the costs of its proposal going forward. The OCA states that the Commission cannot determine whether PPL's proposal results in just and reasonable rates if it approves PPL's approval then puts off consideration of the rate impact for ratepayers who do not own DERs to a later base rate proceeding. OCA MB at 39-41.

In its Reply Brief, the OCA avers that other utilities with larger quantities of DERs than PPL do not need the control that PPL requests in its proposal. The OCA asserts that PPL's proposal is unnecessary to improve the safety, reliability, adequacy, and resiliency of PPL's electric service beyond other reasonable alternatives. The OCA reiterates its criticism that PPL's cost-benefit analyses are flawed and do not demonstrate that active management of all DERs is cost-effective, or that it will decrease PPL's revenue requirement in a future base rate case. OCA RB at 2-16.

The OCA states that PPL's willingness to explore cloud-based communications is not fully developed or supported in its filing. The OCA asserts that PPL's lack of exploration of cloud-based communications is one of many reasons why requiring a DER Orchestration Plan is reasonable and prudent. Instead of rushing an unprecedented program into implementation without the necessary details, PPL should complete a DER Orchestration Plan as recommended by the OCA so that all interested stakeholders, including the Commission, have a clear understanding of what PPL is

proposing along with the necessary supporting evidence. Additionally, the OCA recommended that, given the lack of certainty or supporting analysis by PPL as to a reasonable size threshold for mandatory utility or alternative controls, no DER should be subject to mandatory control under PPL's proposal until further analysis is completed regarding DER orchestration. OCA RB at 17-25.

4. OSBA's Position

The OSBA avers there is insufficient evidence to indicate how well-performing or cost-effective the Company's Pilot Program was. The OSBA asserts that the cost-benefit analysis presented by PPL in rebuttal testimony was flawed and fails to provide the necessary evidence that the benefits of active management outweigh the costs. The OSBA requests that 1) PPL's proposal be denied without prejudice; 2) PPL's Pilot Program be extended for two years beyond March 21, 2025; and 3) PPL be ordered to perform a full cost-benefit analysis as outlined by OSBA's witness so that all interested parties can fully review any future DER program proposed by PPL. OSBA MB at 2-8. The OSBA's Reply Brief reiterates its criticisms of the cost-benefit analysis presented by PPL in rebuttal testimony. OSBA RB at 2-5.

5. SEF's Position

SEF's mission is to promote and invest in energy efficiency, renewable energy and energy education that provide opportunities and benefits for PPL ratepayers. SEF avers that PPL's proposed Second DER Management Plan is premature, not in the best interest of customers, not in the public's interest, and therefore is not just and reasonable. SEF MB at 3, 5.

SEF argues that control over DERs is not needed in order to achieve reliability, and utility control over DER generation undermines the longstanding goals of

deregulating the electric generation market. Additionally, SEF avers that PPL's control over a DER facility is inconsistent with 66 Pa.C.S. § 2807(d)(1) where PPL can change the customer's electricity supplier without consent. SEF MB at 7.

SEF asserts that PPL's Second DER Management Plan presents risks to individuals who rely on their DER systems for healthcare equipment, batteries, and electric vehicles. SEF states that actively controlled DER systems instead of autonomous control also increase the risk of cyber security incidents. SEF contends that everything PPL argues for in its Petition can be secured by autonomous control as opposed to actively controlling DERs. SEF MB at 8-9.

SEF advocates that the Commission consider the drawbacks of allowing each utility to create its own individual DER plan. SEF suggests that the Commission instead institute a state-wide proceeding to ensure that all relevant parties are included. SEF MB at 9-10.

Finally, SEF argues that PPL failed to provide essential information on its Pilot Program necessary for the Commission to determine whether PPL should commence with its proposed Second DER Management Plan. SEF requests that the Commission not approve PPL's Petition, and that the Commission adopt a statewide proceeding for DER regulations. SEF MB at 10-11.

In its Reply Brief, SEF argues that PPL's Second DER Management Plan will stifle, not encourage, the renewable energy benefits from DER systems. SEF RB at 2-5. SEF contends that PPL fails to describe why combining pre-installation inverter standards with monitoring and autonomous control is insufficient to prevent or manage risks. SEF also contends that PPL failed to properly study and evaluate the benefits of autonomous control. SEF RB at 5-7. SEF states that, despite all of PPL's claims of

savings, the Company is unable to commit to not raising customer prices on distribution services based on the costs of its proposal. SEF RB at 7-8.

6. PPLICA's Position

PPLICA did not file testimony or submit briefs in this proceeding.

VI. RECOMMENDATION

In approving PPL's First DER Management Plan and Pilot Program, Chairman Dutrieuille stated, in part, that she "commended PPL for being in the vanguard of distributed energy advancement" and "[t]aking this next step in managing distributed energy has the potential to permit PPL to better control power quality, reliability, and safety throughout the grid while further fostering investment in resources such as rooftop solar and combined heat and power."[3] The Second DER Management Pilot Program continues to pursue similar goals. *See* PPL MB at 6-7.

However, after reviewing the record evidence and briefs of the parties, I find that PPL has not met its burden of proof in this proceeding. Although PPL presented numerous arguments in support of its proposal, for all the following reasons discussed below, I find that the parties opposing the proposal (the JSPs, the OCA, the OSBA, and SEF) presented evidence outweighing the evidence presented by PPL. Accordingly, I recommend that the Commission deny PPL's Petition.

[3] Statement of Chairman Gladys Brown Dutrieuille, *Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan*, Docket No. P-2019-3010128 (Dec. 17, 2020).

Scope of Second DER Management Plan

PPL's proposed Second DER Management Plan would remove the annual cap of 3,000 DER Management devices and require that all customer-owned and third party-owned, inverter-based DER system installations be equipped with DER Management devices so that the Company can actively monitor and manage the DERs. PPL avers that active management will resolve the issues caused by DERs on the distribution system while maintaining and improving the safety, reliability, adequacy, and resiliency of the Company's electric service. PPL MB at 6. The JSPs, the OCA, and SEF contend that PPL has not justified that active management feature of its program, as opposed to alternative management options. JSPs MB at 20-26; OCA MB at 34-39; SEF MB at 7-9. PPL avers that alternatives such as autonomous functions do not provide all the benefits that active management and monitoring do. PPL RB at 3.

I agree with the parties opposing the Second DER Management Plan that PPL has not demonstrated why the scope of its proposed active monitoring and control of DER devices is reasonable or necessary. The JSPs demonstrated that PPL's proposal contains extreme, first-in-the-nation features and other jurisdictions with higher rates of solar penetration rely on an array of tools, e.g., custom smart inverter setting profiles, grid modernization investments, voluntary flexibility interconnection options, and compensation for customers and non-utility service providers who both provide and receive grid services, without causing power quality or reliability issues. JSPs MB at 20-22. The OCA similarly established that it is unaware of any other utility that mandates full monitoring and control of DERs as proposed by PPL, and that other jurisdictions, which are ahead of PPL in terms of DER deployment and penetration levels, use other more effective and economical management strategies. OCA MB at 13-19. As the JSPs explain, if PPL's proposal is approved as designed, customers will be subject to a level of utility control they may not have envisioned. JSPs MB at 23-24.

I also agree with the JSPs that PPL failed to adequately provide analyses comparing the costs and benefits of active management of DERs with the use of inverter autonomous grid support functions. JSPs MB at 31-36. The OCA also demonstrated that PPL failed to provide a clear comparison of the value of autonomous smart inverter functions in comparison to active management benefits. OCA MB at 28-29. Such analyses were one of the stated purposes of the Pilot Program where settlement terms provided for the testing and evaluation of "…the costs and benefits to distribution system operation of *active management* of DERs as compared to the benefits available through the use of inverter autonomous grid support functions." *Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan*, Docket No. P-2019-3010128, Recommended Decision at 16 (Order entered Dec. 17, 2020) (emphasis in original). Without such analyses, it is not possible to fully evaluate whether PPL's proposed Second DER Management Plan is either reasonable or necessary.

Second DER Management Plan Standards

The JSPs in particular also raised a number of credible harms resulting from Second DER Management Plan standards. Commission regulations provide standards for certification of interconnecting DERs. 52 Pa. Code § 75.22. However, as explained by the JSPs, PPL requires additional requirements from interconnecting DERs. JSPs MB at 11-20. As a result of the standards imposed by PPL, the JSPs demonstrated harm to the JSPs, other solar customers and companies, and the public interest generally. Specifically, the JSPs demonstrated:

- lost sales resulting from PPL's program restrictions;
- failure to account for additional losses to Pennsylvania businesses and customers;
- blocked or limited market entry;
- failure to account for the interference with customers' communications and power generation;
- blocked or impeded competition from third-party grid services providers; and
- failure to account for its device installation voiding customers' warranties and causing thermal damage.

JSPs MB at 36-60.

As averred by the JSPs, no other U.S. utility requires that DERs be tested for compatibility with a utility-owned DER Management Device in order to receive approval to interconnect. JSPs MB at 12. I agree with the JSPs that PPL's additional requirements erode uniformity and the market certainty that the standards are intended to provide. *Id.* at 15. SEF similarly argues that a piecemeal approach to DER rules and procedures may cause inconsistencies and confusion in the Pennsylvania DER market. SEF MB at 9. The JSPs note that in other settings the Commission has put interpretations of existing standards through notice and comment in a state-wide proceeding. JSPs MB at 16 (citing *Standards for Electronic Data Transfer and Exchange Between Electric Distribution Companies And Electric Generation Suppliers*, Docket No. M-00960890F0015 (Tentative Order entered Jan. 13, 2012)). SEF explicitly advocates for a state-wide proceeding to develop comprehensive state-wide DER policies and regulations. SEF MB at 9.

Cost-Benefit Analyses

I also find merit in the parties' criticisms that PPL failed to provide reliable or positive cost-benefit analyses to support its proposal. The JSPs convincingly argue that PPL's cost-benefit analyses presented in this proceeding are undermined by both changing analyses as well as overstating the amount of benefits PPL's program would provide from incremental hosting capacity. JSPs MB at 26-31. The OCA similarly asserts that PPL introduced a new cost-benefit analysis in rebuttal testimony that deviates from the analysis PPL presented in direct testimony. OCA MB at 26. In addition to criticizing the cost-benefit analysis introduced in PPL's rebuttal testimony, the OSBA also highlights PPL's changing cost-benefit analyses. OSBA MB at 5-7. PPL itself undermines confidence in its cost-benefit analyses where it asserts that even without benefits the rate impact is "minimal." PPL RB at 36.

I also note PPL asserts that the JSPs rely on, and improperly attempt to introduce, several items of extra-record evidence in their Main Brief. PPL RB at 56-58. As was stated in the Briefing Order issued on February 13, 2025, parties were advised not to include any extra-record evidence in their briefs. Accordingly, the only evidence I considered in writing this Recommended Decision was that evidence admitted into the record during the February 11 and 12, 2025 evidentiary hearings.

In conclusion, I find that the parties opposing PPL's Second DER Management Plan have presented evidence of greater weight than PPL and I recommend that the Commission deny PPL's Petition.

VII. CONCLUSIONS OF LAW

1. The Commission has jurisdiction over the subject matter and the parties to this proceeding. 66 Pa.C.S. §§ 501, 1302, 1303.

2. Section 5.41 of the Commission's regulations states, in part, that "[p]etitions for relief under the act or other statute that the Commission administers, must be in writing, state clearly and concisely the interest of the petitioner in the subject matter, the facts and law relied upon, and the relief sought." 52 Pa. Code § 5.41(a).

3. The proponent of a rule or order bears the burden of proof pursuant to Section 332(a) of the Public Utility Code, which provides that the party seeking a rule or order from the Commission has the burden of proof in that proceeding. 66 Pa.C.S. § 332(a).

4. "[A] litigant's burden of proof before administrative tribunals as well as before most civil proceedings is satisfied by establishing a preponderance of evidence which is substantial and legally credible." *Samuel J. Lansberry, Inc. v. Pa. Pub. Util. Comm'n,* 578 A.2d 600, 602 (Pa. Cmwlth. 1990). The preponderance of the evidence standard requires proof by a greater weight of the evidence. *Commonwealth v. Williams,* 732 A.2d 1167 (Pa. 1999).

5. Once the party with the burden of proof makes out a *prima facie* case, the burden of proof shifts to the opposing party. The Commission must measure the weight and credibility of all evidence, and simply because the party with the burden of proof has presented a *prima facie* case does not obligate the Commission to credit this evidence or give it any special weight. If the opposing party presents evidence found to be of co-equal (or greater) weight, than the party with the burden of proof will not have met its burden. *Milkie v. Pa. Pub. Util. Comm'n*, 768 A.2d 1217 (Pa. Cmwlth. 2001).

6. Any finding of fact necessary to support an adjudication of the Commission must be based on substantial evidence. *Met-Ed Indus. Users Group v. Pa. Pub. Util. Comm'n*, 960 A.2d 189 (Pa. Cmwlth. 2008) (citing 2 Pa.C.S. § 704).

Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion. *Borough of E. McKeesport v. Special/Temporary Civil Serv. Comm'n,* 942 A.2d 274 (Pa. Cmwlth. 2008). Substantial evidence must be "more than a scintilla and must do more than create a suspicion of the existence of the fact to be established." *Kyu Son Yi v. State Bd. of Vet. Med*., 960 A.2d 864, 874 (Pa. Cmwlth. 2008) (citation omitted).

7. The Commission is not required to consider expressly and at length each contention and authority brought forth by each party to the proceeding. *Univ. of Pa. v. Pa. Pub. Util. Comm'n*, 485 A.2d 1217 (Pa. Cmwlth. 1984). "A voluminous record does not create, by its bulk alone, a multitude of real issues demanding individual attention . . . ." *Application of Midwestern Fidelity Corp.*, 363 A.2d 892, 902, n.6 (Pa. Cmwlth. 1976). Further, a Commission decision is adequate where, on each of the issues raised, the Commission was merely presented with a choice of actions, each fully developed in the record, and its choice on each issue amounted to an implicit acceptance of one party's thesis and rejection of the other party's contention. *Popowsky v. Pa. Pub. Util. Comm'n*, 706 A.2d 1197 (Pa. 1997).

8. Every rate made, demanded, or received by any public utility shall be just and reasonable, and in conformity with regulations or orders of the Commission. 66 Pa.C.S. § 1301.

9. A public utility shall furnish and maintain adequate, efficient, safe, and reasonable service and facilities. 66 Pa.C.S. § 1501.

10. Electric distribution companies (EDCs) are required to "file a tariff with the Commission that provides for net metering consistent with" Chapter 75 of the Commission's regulations. 52 Pa. Code § 75.13(c).

11. An EDC and default service provider "may not require additional equipment or insurance or impose any other requirement" on a net metering customer-generator "unless the additional equipment, insurance or other requirement is specifically authorized under this chapter or by order of the Commission." 52 Pa. Code § 75.13(k).

12. PPL Electric Utilities Corporation did not carry its burden of proof in this proceeding.

VIII. ORDER

THEREFORE,

IT IS RECOMMENDED:

1. That the Petition filed by PPL Electric Utilities Corporation for Approval of its Second Distributed Energy Resources Management Plan at Docket No. P-2024-3049223 be denied.

2. That the Secretary's Bureau mark Docket No. P-2024-3049223 as closed.

Date: June 30, 2025

/s/
John M. Coogan
Administrative Law Judge

APPENDIX A

Petition of PPL Electric Utilities Corporation for Approval of its Second Distributed Energy Resources Management Plan, Docket No. P-2024-3049223

LIST OF PARTY TESTIMONY AND EXHIBITS

I. PPL

PPL Electric Exhibit 1 – May 20, 2024, initial filing, which included:

Petition of PPL Electric Utilities Corporation for Approval of its Second Distributed Energy Resources ("DER") Management Plan;
PPL Electric Exhibit SS-1 – PPL Electric's Second DER Management Plan;
PPL Electric Exhibit SS-2 – *Pro forma* tariff supplement modifying PPL Electric's "Rule 12 – Distributed Energy Resource (DER) Interconnection Service";

PPL Electric St. No. 1 – Direct Testimony of Salim Salet;

PPL Electric St. No. 2 – Direct Testimony of Aliesha Dombrowski-Diamond, including PPL Electric Exhibits AD-1 through AD-7;

PPL Electric St. No. 3 – Direct Testimony of Cody M. Davis, including PPL Electric Exhibits CD-1 through CD-12, of which the following Exhibits are HIGHLY CONFIDENTIAL: CD-5 through CD-7, CD-9 through CD-12;

PPL Electric St. No. 4 – Direct Testimony of Reigh A. Walling, including PPL Electric Exhibit RW-1;

PPL Electric St. No. 5 – Direct Testimony of Jay Johnson, including PPL Electric Exhibit JJ-1;

PPL Electric St. No. 6 – Direct Testimony of Dr. Elizabeth Cook, including PPL Electric Exhibit EC-1;

PPL Electric St. No. 7 – Direct Testimony of Lee Krevat, including PPL Electric Exhibits LK-1 through LK-11;

PPL Electric St. No. 8 – Direct Testimony of Dr. Karen Miu, including PPL Electric Exhibits KM-1 through KM-5, of which the following Exhibits are HIGHLY CONFIDENTIAL: KM-2 through KM-5; and

PPL Electric St. No. 9 – Direct Testimony of Kevin Underwood.

PPL Electric Statement No. 1-R – Rebuttal Testimony of Salim Salet, including PPL Electric Exhibits SS-1R through SS-8R.

PPL Electric Statement No. 1-SR – Surrebuttal Testimony of Salim Salet.

PPL Electric Statement No. 1-RJ – Rejoinder Testimony of Salim Salet.

Corrected PPL Electric Statement No. 2-R – Rebuttal Testimony of Aliesha M. Dombrowski-Diamond, Public and HIGHLY CONFIDENTIAL versions, including PPL Electric Exhibits AD-1R through AD-21R, Corrected AD-22R, and AD-23R through AD-35R, of which the following Exhibits are HIGHLY CONFIDENTIAL: AD-2R, AD-4R, AD-7R through AD-8R, AD-11R through AD-12R, AD-15R, AD-17R through AD-19R, AD-21R, Corrected AD-22R, AD-23R through AD-24R, AD-26R through AD-27R, AD-30R, AD-32R through AD-33R, and AD-35R.

PPL Electric Statement No. 2-RJ – Rejoinder Testimony of Aliesha M. Dombrowski-Diamond, Public and HIGHLY CONFIDENTIAL versions, including PPL Electric Exhibits AD-1RJ through AD-21RJ, of which the following Exhibits are HIGHLY CONFIDENTIAL: AD-1RJ to AD-3RJ, AD-5RJ through AD-7RJ, and AD-9RJ.

PPL Electric Exhibit 2 - Aliesha M. Dombrowski-Diamond Answer to JSP Set VII, Number 11

PPL Electric Statement No. 3-R – Rebuttal Testimony of Cody M. Davis, including PPL Electric Exhibits CD-1R through CD-3R.

PPL Electric Statement No. 3-RJ – Rejoinder Testimony of Cody M. Davis, including PPL Electric Exhibits CD-1RJ and CD-2RJ (HIGHLY CONFIDENTIAL).

PPL Electric Statement No. 4-R– Rebuttal Testimony of Reigh A. Walling, including PPL Electric Exhibits RW-1R and RW-2R.

PPL Electric Statement No. 4-RJ– Rejoinder Testimony of Reigh A. Walling.

PPL Electric Statement No. 5-R – Rebuttal Testimony of Jay Johnson.

PPL Electric Statement No. 5-RJ – Rejoinder Testimony of Jay Johnson, including PPL Electric Exhibit JJ-1RJ.

PPL Electric Statement No. 6-R – Rebuttal Testimony of Elizabeth Cook, Ph.D.

PPL Electric Statement No. 6-RJ – Rejoinder Testimony of Elizabeth Cook, Ph.D.

PPL Electric Statement No. 7-R– Rebuttal Testimony of Lee Krevat, including PPL Electric Exhibit LK-1R.

PPL Electric Statement No. 7-RJ – Rejoinder Testimony of Lee Krevat.

PPL Electric Statement No. 8-R– Rebuttal Testimony of Karen Miu, Ph.D, including PPL Electric Exhibit KM-1R (HIGHLY CONFIDENTIAL).

PPL Electric Statement No. 8-RJ – Rejoinder Testimony of Karen Miu, Ph.D, including PPL Electric Exhibit KM-1RJ (HIGHLY CONFIDENTIAL).

PPL Electric Statement No. 10-R – Rebuttal Testimony of Steven Wishart, including PPL Electric Exhibits SWW-1R and SWW-2R.

PPL Electric Statement No. 10-RJ – Rejoinder Testimony of Steven Wishart.

Corrected PPL Electric Statement No. 11-R– Rebuttal Testimony of Bethany L. Johnson, including Corrected PPL Electric Exhibit BLJ-1R and PPL Electric Exhibit BLJ-2R.

PPL Electric Statement No. 11-RJ – Rejoinder Testimony of Bethany L. Johnson.

PPL Electric Statement No. 12-R– Rebuttal Testimony of H. Landis Floyd II, PE, Public and HIGHLY CONFIDENTIAL versions, including PPL Electric Exhibits LF-1R through LF-3R.

PPL Electric Statement No. 12-RJ – Rejoinder Testimony of H. Landis Floyd II, PE.

PPL Electric Statement No. 12-RJ Supplemental – Supplemental Rejoinder Testimony of H. Landis Floyd II, PE, Public and HIGHLY CONFIDENTIAL versions, including PPL Electric Exhibit LF-1RJ Supplemental.

PPL Electric Statement No. 13-RJ – Rejoinder Testimony of Matthew Wallace, Public and HIGHLY CONFIDENTIAL versions, including PPL Electric Exhibit MW-1RJ.

II. JSPs

JSP Statement No. 1 – Direct Testimony of Joah White, including Exhibits JSP-JW-1 and Exhibit JSP-JW-2

JSP Statement No. 2 – Direct Testimony of Nicolas Zavala, including Exhibit JSP-NZ-1 (REDACTED and HIGHLY CONFIDENTIAL versions)

JSP Statement No. 3 – Direct Testimony of Michael Shadow, including Exhibit JSP-MS-1 (HIGHLY CONFIDENTIAL) and REDACTED Exhibit JSP-MS-2

JSP Statement No. 4 – Direct Testimony of Jordan Graham, including REDACTED Exhibit JSP-JG-1, Exhibit JSP-JG-2, Exhibit JSP-JG-3, Exhibit JSP-JG-4 (HIGHLY CONFIDENTIAL), and Exhibit JSP-JG-5

JSP Statement No. 5 – Direct Testimony of Russell Pierson, including Exhibit JSP-RP-1, Exhibit JSP-RP-2, and Exhibit JSP-RP-3

JSP Statement No. 6 – Direct Testimony of Marc Monbouquette, including Exhibit JSP-MM-1, Exhibit JSP-MM-2, and Exhibit JSP-MM-3 (REDACTED and HIGHLY CONFIDENTIAL versions)

JSP Statement No. 7 – Direct Testimony of Jason Bobruk, including Exhibit JSP-JB-1, Exhibit JSP-JB-2 (REDACTED and HIGHLY CONFIDENTIAL versions), and Exhibit JSP-JB-3

JSP Statement No. 8 – Direct Testimony of Kevin Joyce, including Exhibit JSP-KJ-1

JSP Statement No. 9 – Direct Testimony of Brian Lydic, including Exhibit JSP-BL-1

JSP Statement No. 10 – Direct Testimony of William Stahlman, including Exhibit JSP-WS-1 (REDACTED and HIGHLY CONFIDENTIAL versions), and Exhibit JSP-WS-2

JSP Statement No. 1-R – Rebuttal Testimony of Joan White

JSP Statement No. 1-SR – Surrebuttal Testimony of Joan White) (PUBLIC and REDACTED versions), including Exhibit JSP-JW-1SR, Exhibit JSP-JW-2SR, Exhibit JSP-JW-3SR, and Exhibit JSP-JW-4SR

JSP Statement No. 2-SR - Surrebuttal Testimony of Nicolas Zavala (PUBLIC and REDACTED versions), including Exhibit JSP-NZ-1SR, Exhibit JSP-NZ-2SR, Exhibit JSP-NZ-3SR (HIGHLY CONFIDENTIAL), Exhibit JSP-NZ-4SR, Exhibit JSP-NZ-5SR (HIGHLY CONFIDENTIAL), and Exhibit JSP-NZ-6SR (HIGHLY CONFIDENTIAL and REDACTED versions (replacement version))

JSP Statement No. 3-SR - Surrebuttal Testimony of Michael Shadow (PUBLIC and REDACTED versions), including Exhibit JSP-SD-1SR (HIGHLY CONFIDENTIAL), Exhibit JSP-SD-2SR (HIGHLY CONFIDENTIAL), Exhibit JSP-SD-3SR, Exhibit JSP-SD-4SR (HIGHLY CONFIDENTIAL), and Exhibit JSP-SD-5SR (HIGHLY CONFIDENTIAL)

JSP Statement No. 4-SR - Surrebuttal Testimony of Jordan Graham (PUBLIC and REDACTED versions), including JSP Exhibit JG-1SR (HIGHLY CONFIDENTIAL), JSP Exhibit JG-2SR (HIGHLY CONFIDENTIAL), JSP Exhibit JG-3SR, JSP Exhibit JG-4SR, JSP Exhibit JG-5SR, JSP Exhibit JG-6SR (HIGHLY CONFIDENTIAL), JSP Exhibit JG-7SR, JSP Exhibit JG-8SR (HIGHLY CONFIDENTIAL), JSP Exhibit JG-9SR, JSP Exhibit JG-10SR, JSP Exhibit JG-11SR, JSP Exhibit JG-12SR, JSP Exhibit JG-13SR, and JSP Exhibit JG-14SR

JSP Statement No. 5-SR - Surrebuttal Testimony of Russell Pierson (PUBLIC and REDACTED versions), including Exhibit JSP-RP-1SR (HIGHLY CONFIDENTIAL), Exhibit JSP-RP-2SR (HIGHLY CONFIDENTIAL), Exhibit JSP-RP-3SR, Exhibit JSP-RP-4SR (REDACTED), and Exhibit JSP-RP-5SR (REDACTED)

JSP Statement No. 6-SR - [CORRECTED] Surrebuttal Testimony of Marc Monbouquette (PUBLIC and REDACTED versions), including Exhibit JSP-MM-1SR, Exhibit JSP-MM-2SR (HIGHLY CONFIDENTIAL), and Exhibit JSP-MM-3SR

JSP Statement No. 7-SR - Surrebuttal Testimony of Jason Bobruk (PUBLIC and REDACTED versions), including Exhibit JSP-JB-1SR, Exhibit JSP-JB-2SR, Exhibit JSP-JB-3SR, Exhibit JSP-JB-4SR, Exhibit JSP-JB-5SR, Exhibit JSP-JB-6SR, Exhibit JSP-JB-7SR, Exhibit JSP-JB-9SR, Exhibit JSP-JB-10SR, Exhibit JSP-JB-11SR (HIGHLY CONFIDENTIAL), Exhibit JSP-JB-12SR, Exhibit JSP-JB-13SR, Exhibit JSP-JB-14SR, Exhibit JSP-JB-15SR, Exhibit JSP-JB-16SR, Exhibit JSP-JB-17SR, Exhibit JSP-JB-18SR, Exhibit JSP-JB-19SR (HIGHLY CONFIDENTIAL), Exhibit JSP-JB-20SR (HIGHLY CONFIDENTIAL), Exhibit JSP-JB-21SR, and Exhibit JSP-JB-22SR

JSP Statement No. 8-SR - Surrebuttal Testimony of Kevin Joyce

JSP Statement No. 9-SR - Surrebuttal Testimony of Brian Lydic, including Exhibit JSP-BL-1SR, Exhibit JSP-BL-2SR, Exhibit JSP-BL-3SR, Exhibit JSP-BL-4SR, and Exhibit JSP-BL-5SR

JSP Statement No. 10-SR - Surrebuttal Testimony of William Stahlman (REDACTED), including Exhibit JSP-WS-1SR, Exhibit JSP-WS-2SR, Exhibit JSP-WS-3SR (REDACTED), and Exhibit JSP-WS-4SR

JSP Statement No. 11-SR - Surrebuttal Testimony of Alex Dinh (PUBLIC and REDACTED), including Exhibit JSP-AD-1SR, Exhibit JSP-AD-2SR, Exhibit JSP-AD-3SR, Exhibit JSP-AD-4SR, Exhibit JSP-AD-5SR (HIGHLY CONFIDENTIAL), Exhibit JSP-AD-6SR (HIGHLY CONFIDENTIAL), Exhibit JSP-AD-7SR (HIGHLY CONFIDENTIAL), Exhibit JSP-AD-8SR, Exhibit JSP-AD-9SR, and Exhibit JSP-AD-10SR (HIGHLY CONFIDENTIAL)

JSP Statement No. 12-SR - Surrebuttal Testimony of Daniel Ferguson (PUBLIC and REDACTED), including Exhibit JSP-DF-1SR (HIGHLY CONFIDENTIAL), Exhibit JSP-DF-2SR (HIGHLY CONFIDENTIAL), Exhibit JSP-DF-3SR (HIGHLY CONFIDENTIAL), Exhibit JSP-DF-4SR, Exhibit JSP-DF-5SR, Exhibit JSP-DF-6SR, and Exhibit JSP-DF-7SR (REDACTED)

JSP Statement No. 13-SR - (Second Supplemental) Surrebuttal Testimony of Jacob Geller (PUBLIC and HIGHLY CONFIDENTIAL), including Exhibit JSP-JIG-1SR Exhibit JSP-JIG-2SR, Exhibit JSP-JIG-3SR, Exhibit JSP-JIG-4SR, Exhibit JSP-JIG-5SR, Exhibit JSP-JIG-6SR, Exhibit JSP-JIG-7SR, Exhibit JSP-JIG-8SR, Exhibit JSP-JIG-9SR, Exhibit JSP-JIG-10SR, Exhibit JSP-JIG-11SR (HIGHLY CONFIDENTIAL), Exhibit JSP-JIG-12SR, and Exhibit JSP-JIG-13SR (HIGHLY CONFIDENTIAL)

JSP Statement No. 14-SR – Surrebuttal Testimony of Bill Brooks (PUBLIC and HIGHLY CONFIDENTIAL), including Exhibit JSP-WB-1SR, Exhibit JSP-WB-2SR, Exhibit JSP-WB-3SR, Exhibit JSP-WB-4SR (REDACTED), Exhibit JSP-WB-5SR, Exhibit JSP-WB-6SR (HIGHLY CONFIDENTIAL), Exhibit JSP-WB-7SR, Exhibit JSP-WB-8SR, Exhibit JSP-JB-9SR, and Exhibit JSP-WB-10SR

JSP Statement No. 1-SRJ - Surrejoinder Testimony of Brett Hallgren, including Exhibit JSP-BH-1SRJ, Exhibit JSP-BH-2SRJ (HIGHLY CONFIDENTIAL), and Exhibit JSP-BH-3SRJ (HIGHLY CONFIDENTIAL)

III. OCA

OCA Statement No. 1 - Direct Testimony of Ron Nelson, including Exhibit RN-1

OCA Statement No. 1-SR - Surrebuttal Testimony of Ron Nelson

OCA Hearing Exhibit 1 - OCA Response to PPL Set III, No. 4

IV. OSBA

OSBA Statement No. 1 – Direct Testimony of Justin B. Farr

OSBA Statement No. 1-SR – Surrebuttal Testimony of Justin B. Farr, including Exhibit JBF-1SR

V. SEF

SEF Statement No. 1 - Direct Testimony of John M. Costlow, including SEF Exhibit 1

SEF Statement No. 1-R - Rebuttal Testimony of John M. Costlow