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File #: 175564

October 5, 2020

VIA ELECTRONIC FILING

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

**Re: 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**

Dear Secretary Chiavetta:

Enclosed please find the Joint Petition for Settlement of All Issues for filing in the above-referenced proceeding. Copies will be provided as indicated on the Certificate of Service.

Respectfully submitted,



Devin Ryan

DR/jl
Enclosures

cc: Honorable Mary D. Long
Honorable Emily DeVoe
Certificate of Service

CERTIFICATE OF SERVICE

(Docket No. P-2019-3010128)

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

VIA E-MAIL ONLY

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Sustainable Energy Fund

Date: October 5, 2020



Devin Ryan

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of PPL Electric Utilities :
Corporation for Approval of Tariff :
Modifications and Waivers of Regulations : Docket No. P-2019-3010128
Necessary to Implement its Distributed :
Energy Resources Management Plan :

**JOINT PETITION FOR SETTLEMENT OF
ALL ISSUES**

TO ADMINISTRATIVE LAW JUDGES MARY D. LONG AND EMILY I. DEVOE:

PPL Electric Utilities Corporation (“PPL Electric” or the “Company”), the Office of Consumer Advocate (“OCA”), the Natural Resources Defense Council (“NRDC”), and the Sustainable Energy Fund (“SEF”), all parties in the above-captioned proceeding (hereinafter collectively referred to as the “Joint Petitioners”), hereby file this Joint Petition for Settlement of All Issues (“Settlement”) and respectfully request that Administrative Law Judges Mary D. Long and Emily I. DeVoe (the “ALJs”) and the Pennsylvania Public Utility Commission (“Commission”) approve this Settlement without modification.¹

As set forth and explained below, the Joint Petitioners have agreed to a Settlement of all issues in the above-captioned proceeding. The Settlement provides for the approval of PPL Electric’s Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement Its Distributed Energy Resources (“DERs”) Management Plan (“DER Management Petition”), as modified by the terms and conditions of the Settlement, including authorization for

¹ Sunrun, Inc. (“Sunrun”) is not a party to the Settlement but has indicated that it will not file an objection to the Settlement.

PPL Electric to file the form of tariff supplement provided as **Appendix A** hereto, to become effective on one day's notice.

I. INTRODUCTION

1. On May 24, 2019, PPL Electric filed its DER Management Petition, which initiated the above-captioned proceeding.

2. On July 29, 2019, Trinity Solar filed Comments on the Company's Petition.

3. On July 30, 2019, the OCA, NRDC, and Sunrun filed Answers to the Petition. NRDC and Sunrun also filed Petitions to Intervene. Further, Comments were filed by SEF, GridLab, the Solar Unified Network of Western Pennsylvania ("SUNWPA"), Energy Independent Solutions, LLC ("EIS"), the Interstate Renewable Energy Council, Inc. ("IREC"), the Pennsylvania Solar Energy Industries Association ("PASEIA"), and Exact Solar.

4. On August 22, 2019, PPL Electric filed a letter inquiring about the procedural status of the proceeding and requesting that the matter being assigned to an administrative law judge for hearings. An Interim Order also was issued granting NRDC and Sunrun's Petitions to Intervene.

5. On August 28, 2019, ALJ DeVoe issued the Prehearing Conference Order, which established procedural rules and required prehearing memoranda to be filed by Noon on September 9, 2019. A Notice also was issued scheduling the prehearing conference for September 11, 2019.

6. On August 30, 2019, NRDC and Sunrun filed: (1) a Preliminary Objection to PPL Electric's August 22, 2019 letter; and (2) a Motion for Leave to Reply & Reply to PPL Electric's August 22, 2019 letter.

7. On September 3, 2019, SEF filed a Petition to Intervene.

8. On September 9, 2019, PPL Electric filed an Answer to NRDC and Sunrun's Preliminary Objection as well as an Answer to NRDC and Sunrun's Motion for Leave to Reply & Reply. Also, prehearing memoranda were filed by PPL Electric, OCA, NRDC, and Sunrun.

9. On September 11, 2019, the prehearing conference was held as scheduled. At the prehearing conference, ALJ DeVoe established a deadline of September 20, 2019, for parties to file petitions for interlocutory review and answers to material questions. Further, the parties were directed to confer about a procedural schedule and propose a schedule by September 27, 2019.

10. On September 20, 2019, NRDC and Sunrun separately filed Petitions for Interlocutory Review and Answer to Material Questions. Also, NRDC filed a Notice of Appearance.

11. On September 25, 2019, ALJ DeVoe issued an Interim Order: (1) holding NRDC and Sunrun's Preliminary Objection to the August 22, 2019 letter and their Motion for Leave to Reply & Reply in abeyance; and (2) extending the due date for parties to submit a proposed procedural schedule from September 27, 2019, to November 6, 2019.

12. On September 30, 2019, PPL Electric filed a Brief in Opposition to, and OCA, NRDC, and Sunrun filed Briefs in Support of, the Petitions for Interlocutory Review and Answer to Material Questions.

13. On October 1, 2019, NRDC filed a corrected version of its Brief in Support of the Petitions for Interlocutory Review and Answer to Material Questions.

14. On October 17, 2019, the Commission entered an Opinion and Order denying NRDC's and Sunrun's Petitions for Interlocutory Review and Answer to Material Questions and returning the matter to ALJ DeVoe.

15. On November 6, 2019, PPL Electric submitted its proposed litigation schedule to ALJ DeVoe, noting that OCA and SEF did not oppose the Company's schedule. Further, Sunrun and NRDC filed their proposed litigation schedule with the Commission.

16. On November 7, 2019, PPL Electric filed a letter responding to NRDC and Sunrun's proposed litigation schedule.

17. On November 12, 2019, Sunrun filed a letter in reply to PPL Electric's November 7, 2019 letter.

18. On November 14, 2019, a Notice was issued scheduling a telephonic prehearing conference for November 15, 2019, before ALJ Long.

19. On November 15, 2019, the prehearing conference was held as scheduled, during which ALJ Long determined that PPL Electric's proposed litigation schedule would be used for this proceeding. Subsequently, a Notice was issued scheduling in-person evidentiary hearings for April 8-9, 2020, consistent with the adopted litigation schedule.

20. On November 18, 2019, the ALJs issued a Prehearing Order setting forth the litigation schedule and other procedural rules and requirements for the proceeding. Also, a Judge Change Notice was issued, officially assigning both ALJ Long and ALJ DeVoe to the case.

21. On December 11, 2019, PPL Electric served its written direct testimony and exhibits.

22. On January 13, 2020, PPL Electric filed an unopposed Motion for Protective Order.

23. On January 16, 2020, the ALJs issued an Order granting the Motion for Protective Order.

24. On February 5, 2020, OCA, NRDC, and SEF served their written direct testimony and exhibits.

25. On March 4, 2020, PPL Electric served its written rebuttal testimony and exhibits.

26. On March 16, 2020, the ALJs notified the parties that the April 8-9, 2020 in-person hearings would be canceled because the Commission's offices were being closed pursuant to the State of Emergency declared by Governor Wolf regarding COVID-19. The ALJs also instructed the parties to inform them by March 30, 2020, on how the parties would like to proceed.

27. On March 17, 2020, a Notice was issued canceling the in-person evidentiary hearings scheduled for April 8-9, 2020.

28. On March 19, 2020, OCA, NRDC, and SEF served their written surrebuttal testimony and exhibits.

29. On March 25, 2020, after consulting with the other parties on a scheduling proposal, PPL Electric sent an email to the ALJs proposing that the Company file a status report 30 days after March 30, 2020 (*i.e.*, by April 29, 2020), to advise the ALJs on the status of: (1) settlement; and (2) developing new dates for the evidentiary hearings. The ALJs subsequently agreed with this proposal.

30. On March 30, 2020, PPL Electric served its oral rejoinder testimony outlines.

31. On April 29, 2020, PPL Electric sent an email to the ALJs advising them that settlement negotiations were still ongoing, stating that evidentiary hearings did not need to be scheduled at this time, and proposing that the Company submit another status report within 30 days.

32. On April 30, 2020, the ALJs agreed with the Company's proposal and directed PPL Electric to submit its next status report by May 29, 2020.

33. On May 29, 2020, PPL Electric sent an email to the ALJs again advising them that settlement negotiations were still ongoing, stating that evidentiary hearings did not need to be

scheduled at this time, and proposing that the Company submit another status report within 30 days.

34. Later on May 29, 2020, the ALJs agreed with the Company's proposal and directed PPL Electric to submit its next status report by June 26, 2020.

35. On June 26, 2020, PPL Electric sent the ALJs an email informing them that the parties were still engaging in settlement negotiations. However, since hearings were again being held in Commission proceedings, the Company requested dates that the ALJs would be available for rescheduled hearings. The ALJs responded by indicating that they were available for telephonic evidentiary hearings during the weeks of August 24 and 31, 2020.

36. After the parties provided their availability during those two weeks, the ALJs sent an email on July 13, 2020, informing the parties that the telephonic evidentiary hearings would be scheduled for September 2-3, 2020.

37. On July 14, 2020, a Notice was issued scheduling the telephonic evidentiary hearings for September 2-3, 2020.

38. On July 23, 2020, the ALJs issued an Interim Order directing the service of oral rejoinder outlines by 12:00 PM on August 26, 2020, directing the submittal of a witness matrix by 12:00 PM on September 1, 2020, and rescheduling the evidentiary hearings for September 2-3, 2020.

39. On August 26, 2020, PPL Electric served its written rejoinder testimony and exhibits.

40. On August 27, 2020, PPL Electric sent an email to the ALJs informing them that the Company, OCA, NRDC, and SEF had reached a settlement in principle of all issues and that Sunrun had represented to the parties that it would not file an objections to the Joint Petition for

Settlement. The Company also requested that the September 2-3, 2020 hearings be canceled and that the testimony and exhibits be admitted into the record through stipulation.

41. On August 28, 2020, the ALJs issued an Interim Order canceling the September 2-3, 2020 hearings and directing the parties to file a Joint Stipulation for Admission of Evidence by September 3, 2020, and a Joint Petition for Settlement, including statements in support, by October 5, 2020. In addition, a Notice was issued canceling the September 2-3, 2020 hearings.

42. On September 3, 2020, PPL Electric, OCA, NRDC, and SEF filed a Joint Stipulation for Admission of Evidence.

43. On September 8, 2020, the ALJs issued an Interim Order granting the Joint Stipulation for Admission of Evidence.

44. The parties engaged in multiple rounds of discovery during the course of the proceeding.

45. The Joint Petitioners are in full agreement that the Settlement is in the public interest and should be approved by the Commission.

46. The Settlement agreed to by the Joint Petitioners is as follows:

II. SETTLEMENT TERMS

47. PPL Electric's DER Management Petition, including the *pro forma* tariff supplement attached thereto, shall be approved in its entirety as revised by and subject to the terms and conditions of this Settlement, as specified in the following sections:

A. SMART INVERTERS

48. Effective January 1, 2021, new DERs interconnecting with the Company's distribution system must have smart inverters installed that meet: (1) Underwriters Laboratories ("UL") Standard 1741 Supplement A ("UL 1741 SA"); and (2) the Company's testing for the

communications requirements under the 2018 revisions to the Institute of Electrical and Electronics Engineers (“IEEE”) Standard 1547, “Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces” (“IEEE Standard 1547” or “IEEE 1547-2018”). The Company shall undertake its testing processes in an expeditious matter so as not to delay DER interconnections. These requirements shall be known as the “Interim Requirements.” The list of smart inverters that meet the Interim Requirements will be publicly available and regularly updated on the Company’s website. An initial list will be published on or before December 1, 2020.

49. The Interim Requirements shall be used by PPL Electric until January 1, 2022. At that point, the Company will transition to requiring new DERs to have smart inverters installed that meet IEEE 1547-2018 and have been certified with IEEE 1547.1 / UL 1741 Supplement B (“UL 1741 SB”).

50. Notwithstanding Paragraphs 48 and 49, *supra*, if a customer installs a new inverter on an existing DER installation or upgrades an existing DER installation after January 1, 2021, the customer may install a replacement inverter of similar make and model as the existing inverter; provided, however, that any such inverter must meet the Commission’s applicable standards and requirements set forth in its regulations.

51. This Settlement’s provisions requiring the installation of smart inverters and DER management devices shall not apply to DER installations whose interconnection applications are submitted to PPL Electric before January 1, 2021. The Company reserves the right to propose in a future proceeding that its DER Management Plan be required for existing DERs. All of the Joint Petitioners reserve their rights to oppose such a proposal and to raise any arguments in opposition thereto.

52. The smart inverters that are installed consistent with Paragraphs 48 and 49, *supra*, must have one of their communications ports dedicated to use by PPL Electric. In the event that the customer's DER requires two communications ports to operate (such as in a solar plus battery storage set-up), PPL Electric will provide a three-communications port solution at no direct cost to that customer.

53. PPL Electric shall not be responsible for purchasing, owning, installing, or maintaining the customers' smart inverters.

B. PILOT PROGRAM

54. The Company shall be authorized to conduct a pilot program ("pilot" or "pilot program") 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. The pilot program will begin on January 1, 2021, and will end three years after the second control group is established pursuant to Paragraph 57, *infra*. The three years after the second control group is established will be referred to as Program Year 1, Program Year 2, and Program Year 3.

55. During the pilot program, the Company shall be authorized to purchase and install DER management devices on all new DER with inverters installed under Paragraphs 48 and 49, up to an annual limit of 3,000 DER management devices. DERs installed above the annual limit shall not be part of the pilot program. All DER management devices shall be owned, operated, and maintained by the Company at no direct cost to interconnecting customers. The annual cap

on the number of DER management devices will not be an annual cap on the number of new DERs that can be interconnected with the Company's distribution system.

56. Paragraph 55 notwithstanding, the Company shall not deny or delay the permission to connect and operate a DER due to unavailability of DER management devices. Any DER not equipped with a DER management device for this reason shall not be part of the pilot program.

57. Two control groups for the remote active management pilot program shall be established. The first group shall include any DERs connected during the pilot program to the first 75 circuits for which interconnection applications are received by the Company on or after January 1, 2021.² The second group shall include the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021. DERs connected during the pilot program in the first group shall count toward the 1,000 DERs in the second group. After the second group comprises 1,000 DERs, DERs interconnected to the first 75 circuits will still be added to the first group. For both control groups, DER inverters will operate under autonomous settings only. While the Company may monitor DER operations in the control group by collecting data through the DER management devices, the Company shall not make operational decisions regarding the distribution system based on that information. For DERs that are not part of the control groups, the Company shall be permitted to actively manage the grid support functions of DER inverters using the DER

² To preserve the integrity of the 75 distribution circuit control group, it will not include any of the following 12 distribution circuits, due to the presence of remotely managed DERs (*e.g.*, participants in PPL Electric's Keystone Solar Future Project) and/or similar Company-owned facilities (*e.g.*, batteries) on these distribution circuits during the term of the pilot program: (1) Leola No. 3 Distribution Circuit; (2) Leola No. 5 Distribution Circuit; (3) Prince No. 2 Distribution Circuit; (4) South Akron No. 4 Distribution Circuit; (5) Cocalico No. 1 Distribution Circuit; (6) Letort No. 1 Distribution Circuit; (7) Letort No. 2 Distribution Circuit; (8) Buck No. 3 Distribution Circuit; (9) East Petersburg No. 1 Distribution Circuit; (10) Newport No. 1 Distribution Circuit; (11) Crackersport No. 2 Distribution Circuit; and (12) Renovo No. 2 Distribution Circuit. Customers located on these 12 distribution circuits may still be a part of the second control group, consisting of the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021.

management devices and the Company's DERMS and may make operational decisions based on DER operational information obtained through the DER management devices.

58. For all new DERs interconnected with the Company's distribution system after January 1, 2021, Volt/VAR shall be used as the default voltage management mode for all inverters, and the Company shall establish default Volt/VAR settings. The Company shall also establish default settings for voltage ride-through and frequency ride-through functions consistent with PJM Interconnection LLC's ("PJM") standards. Alternative voltage management modes and settings may be used to reduce or eliminate distribution system upgrade costs to interconnecting customers with the customer's agreement.

59. For DERs in the remote active management group, the Company may only manage the following grid support functions of the smart inverters: (1) Volt/VAR; (2) Constant Power Factor; (3) Remote On/Off; (4) Voltage Ride-through; (5) Frequency Ride-through; and (6) Volt/Watt. Volt/VAR shall be the default voltage management mode for all actively controlled inverters. Volt-Watt may only be enabled and managed with the consent of the interconnecting customer. Settings for voltage ride-through and frequency ride-through shall be maintained in accordance with PJM's standards. PPL Electric will only use the Remote On/Off function on battery storage or solar systems that have not safely isolated or "islanded" from the distribution system: (1) in emergency situations, such as a gas leak or fire in the vicinity of the DER; or (2) during a power outage.

60. Monitoring and/or management of DER inverters by the Company during the pilot program shall not be used to enable the Company to offer services in PJM wholesale markets. Monitoring and/or management of DER inverters by the Company during the pilot program to support distribution grid services beyond system safety and reliability (e.g., conservation voltage

reduction) shall only be permitted after separate application by the Company and approval by the Commission. Monitoring and/or management of inverters by DER customers or third parties during the pilot program to offer services in PJM wholesale markets, or to offer distribution grid services as such might be established during the pilot program, will be permitted subject to any limitations caused by the Company's management of the inverters to manage distribution system safety and reliability as part of the pilot program.

61. Within 30 days after the Commission enters an Order approving this Settlement, PPL Electric will file a detailed plan at this docket explaining how the Company will implement and conduct the pilot program ("Pilot Implementation Plan"), including the goals of the pilot program, the use cases the Company plans to test and evaluate, the specific methods and approaches for testing each use case, the methods by which PPL Electric will communicate the pilot program's requirements to customers and DER installers, and any additional information PPL Electric believes is necessary to include in the annual reports that will be submitted pursuant to Paragraphs 66 and 67, *infra*. Within 10 days after the Pilot Implementation Plan is filed, a technical collaborative shall be convened to discuss the Pilot Implementation Plan. Within 20 days after the Pilot Implementation Plan is filed, the Joint Petitioners may file written Comments on the Company's Pilot Implementation Plan. PPL Electric agrees to give due consideration to the written Comments but retains the ultimate discretion to accept or reject the Joint Petitioners' feedback in its Pilot Implementation Plan. If any changes are made to the Pilot Implementation Plan based on the Joint Petitioners' feedback, the revised Pilot Implementation Plan will be filed at this docket within 20 days after the deadline for the Joint Petitioners' Comments.

62. Within 60 days after the end of Program Year 2, PPL Electric will be permitted to file a petition with the Commission to: (a) extend the program and make such other changes to the

program as the Company may request; (b) continue installing the DER management devices on new DERs in its service territory; and/or (c) authorize the Company to remotely and actively manage (i) the DERs that were in the control groups described in Paragraph 57, *supra*, (ii) the DERs that have enrolled and will enroll in the program, and (iii) any new DERs that will interconnect with the Company's distribution system after the program concludes. PPL Electric reserves the right to request that the Commission continue the existing remote active management program until litigation over a petition filed pursuant to Paragraph 62 concludes. If no such petition is filed within 60 days after the end of Program Year 2, the remote active management program will end after the Program Year 3. All of the Joint Petitioners reserve their rights to file answers in opposition to any petition filed pursuant to this paragraph and to raise any arguments in opposition thereto.

63. Regardless of whether this remote active management program is continued or not, the Company will be authorized to continue: (a) requiring new DERs to have IEEE 1547-2018 compliant smart inverters per Paragraph 49, *supra*; (b) utilizing the smart inverters' automated grid support functions per Paragraph 58, *supra*; and (c) monitoring the DERs that have the Company's DER management devices installed per Paragraph 55, *supra*, provided that such monitoring shall continue only with written customer consent.

C. COST RECOVERY OF DER MANAGEMENT DEVICES

64. PPL Electric is authorized to make a claim in its next base rate case to recover the capital costs and expenses associated with the DER management devices that the Company will purchase, own, install, and maintain pursuant to Paragraph 55, *supra*. In said base rate case, the Joint Petitioners may challenge the amount of the Company's claim, the prudence and reasonableness of the costs and expenses, and the manner in which those costs and expenses are recovered; provided, however, that the Joint Petitioners will not argue that the pilot program for

remote monitoring and active management was imprudent or unreasonable, except to the extent that the Company retains discretion over the Pilot Implementation Plan.

D. STATEWIDE PROCEEDING

65. The Company agrees to participate in any statewide proceeding initiated by the Commission that focuses on smart inverters, DER management devices, IEEE 1547-2018, IEEE 1547.1, and/or UL 1741, and the Company will give due consideration to revise its default voltage management and ride-through modes and settings, as well as other DER management protocols, to help achieve greater statewide consistency.

E. REPORTING REQUIREMENTS

1. Annual Reports Submitted to the Commission

66. The annual reports shall be filed with the Commission in Docket No. P-2019-3010128, providing detail quantitative information germane to evaluation the results of the pilot program. The reports shall be publicly available and shall not contain any identifying customer information. The annual reports shall be filed within 30 days following the end of each program year.

67. Annual reports shall include, but not be limited to, the following information: (1) the number of times and the locations at which the Company actively managed each grid support function and the average duration that the function was actively managed; (2) the grid benefits achieved in each instance of active management, including, but not limited to, real-time grid constraint mitigation; (3) the amounts of net generation lost due to the Company's active management of grid support functions in each instance; (4) distribution system upgrades avoided due to increased hosting capacity attributed to monitoring; (5) distribution system upgrades avoided due to increased hosting capacity attributed to autonomous functioning; (6) distribution system upgrades avoided due to increased hosting capacity attributed to active management; (7)

system operation comparisons of circuits under autonomous inverter operation versus active management; (8) operational descriptions of how active management was executed and implemented (e.g., day-ahead and real-time remote setting alterations [i.e., remotely dispatch autonomous Fixed Power Factor, Active Power Limit, Volt-Watt and Volt-VAR settings to multiple DERs]); and (9) performance measures related to active management, and where applicable monitoring, including, but not limited to, communication reliability (e.g., communication uptime) and data quality. Reports shall include data in electronic formats that support analysis (i.e., Excel or other machine-readable data where appropriate). Pursuant to Paragraph 61, the Joint Petitioners may agree to additional reporting requirements after the filing of the Pilot Implementation Plan. Any additional reporting requirements shall include data in electronic formats that support analysis (i.e., Excel or other machine-readable data where appropriate).

68. In addition, the annual report will set forth the number of DERs installed, the number of DER management devices installed, and the capital costs and expenses associated with the purchase, installation, ownership, and maintenance of the DER management devices.

2. Annual Reports to Individual DER Customers

69. PPL Electric shall send an individualized annual report to each new DER customer, whose smart inverter's grid support functions are used by the Company during the annual reporting period. The customer's annual report shall provide the following information for the annual reporting period: (a) the amount of the DER's net generation loss due to the use of the automated grid support functions set forth in Paragraph 58, *supra*; (b) the aggregate amount of DERs' net generation loss due to the Company's active management of the grid support functions set forth in Paragraph 59, *supra*; (c) the method and technique used to calculate the DER's net generation loss; (d) the number of times each grid support function was used on an automated basis and the average

duration of that function's automated use; and (e) the number of times that PPL Electric actively managed each grid support function and the average duration that the function was actively managed. In addition, for the events where a Constant Power Factor is temporarily used to override an existing Volt/VAR curve, the customer's annual report will show the existing Volt/VAR curve, the Power Factor that was temporarily used, and the duration of the event. For the events where a new Volt/VAR curve is issued, the new curve will be included in the report. The customer's annual report will be sent to the customer within 30 days following the cash-out of the customer's banked excess generation, which typically occurs at the end of each PJM Planning Year.

F. COMPLIANCE TARIFF SUPPLEMENT

70. Upon Commission approval of the DER Management Petition, PPL Electric shall file a compliance tariff supplement consistent with the *pro forma* tariff supplement attached hereto as **Appendix A**. The compliance tariff supplement will be effective on one day's notice.

G. ELECTRIC VEHICLES

71. Electric vehicles ("EVs") shall be exempt from the requirements of Section II.B. of this Settlement.

H. DATA ON PROGRAM PERFORMANCE

72. Within 30 days after the end of each program year, PPL Electric will provide the following data on an anonymous basis to SEF:

- a. Raw Meter Data – 15-minute interval data for participants (delivered kWh, received kWh, RMS voltage).
- b. DER Management Data – 15-minute inverter data for participants (kW & voltage).

73. PPL Electric will use generic but unique identifiers for each customer to anonymize the customers' names and account numbers when providing the data to SEF.

I. NO PRECEDENTIAL EFFECT

74. The Commission's approval of PPL Electric's DER Management Plan, as modified by this Settlement, shall not serve as precedent for any other electric utility's proposal to monitor and manage DERs interconnected with their distribution systems. This Settlement reflects a carefully-crafted compromise of the Joint Petitioners' positions and is based on the unique circumstances of PPL Electric.

III. PROPOSED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDERING PARAGRAPHS

75. The Joint Petitioners respectfully request that the ALJs and the Commission adopt the proposed findings of fact, conclusions of law, and ordering paragraphs set forth in **Appendices B through D** attached hereto.

IV. THE PUBLIC INTEREST

76. Commission policy promotes settlements. See 52 Pa. Code § 5.231. Settlements reduce the time and expense that parties must expend litigating a case and, at the same time, conserve administrative resources. The Commission has indicated that settlement results are often preferable to those achieved at the conclusion of a fully litigated proceeding. See *id.* § 69.401. In order to accept a settlement, the Commission must first determine that the proposed terms and conditions are in the public interest. *Pa. PUC v. York Water Co.*, Docket No. R-00049165 (Order Entered Oct. 4, 2004); *Pa. PUC v. C.S. Water and Sewer Assocs.*, 74 Pa. P.U.C. 767 (1991).

77. This Settlement was achieved by the Joint Petitioners after an extensive investigation of PPL Electric's DER Management Petition, including extensive informal and formal discovery and the service of written direct testimony by PPL Electric, OCA, NRDC, and

SEF, written rebuttal testimony by PPL Electric, written surrebuttal testimony by OCA, NRDC, and SEF, and written rejoinder testimony by PPL Electric.

78. Approval of the Settlement avoids the necessity and costs of further administrative and potential appellate proceedings.

79. Attached as **Appendices E through H** are Statements in Support submitted by PPL Electric, OCA, NRDC, and SEF. In their respective Statements in Support, each Joint Petition explains why, in its view, the Settlement is just and reasonable, in the public interest, and a reasonable compromise of the disputed issues in this proceeding.

V. CONDITIONS OF SETTLEMENT

80. This Settlement is conditioned upon the Commission's approval of the terms and conditions contained herein without modification. If the Commission modifies the Settlement, then any Joint Petitioner may elect to withdraw from this Settlement and may proceed with litigation and, in such event, this Settlement shall be void and of no effect. Such election to withdraw must be made in writing, filed with the Secretary of the Commission and served upon all Joint Petitioners within five (5) business days after the entry of an order modifying the Settlement. The Joint Petitioners acknowledge and agree that this Settlement, if approved, shall have the same force and effect as if the Joint Petitioners had fully litigated this proceeding.

81. This Settlement is proposed by the Joint Petitioners to settle certain issues in the instant proceeding. If the Commission does not approve the Settlement and the proceedings continue to further hearings, the Joint Petitioners reserve their respective rights to present additional testimony and to conduct full cross-examination, briefing, and argument. The Settlement is made without any admission against, or prejudice to, any position which any Joint Petitioner may adopt in the event of any subsequent litigation of this proceeding.

82. This Settlement may not be cited as precedent in any future proceeding, except to the extent required to implement this Settlement.

83. This Settlement is being presented only in the context of this proceeding in an effort to resolve the proceeding in a manner which is fair and reasonable. The Settlement is the product of compromise. This Settlement is presented without prejudice to any position which any of the Joint Petitioners may have advanced and without prejudice to the position any of the Joint Petitioners may advance in the future on the merits of the issues in future proceedings except to the extent necessary to effectuate the terms and conditions of this Settlement. This Settlement does not preclude the Joint Petitioners from taking other positions in proceedings of other public utilities.

84. If the presiding administrative law judges adopt the Settlement without modification, the Joint Petitioners waive their rights to file Exceptions.

VI. CONCLUSION

WHEREFORE, the Joint Petitioners, by their respective counsel, respectfully request as follows:

1. That the Honorable Administrative Law Judges Mary D. Long and Emily I. DeVoe recommend approval of and the Pennsylvania Public Utility Commission approve this Settlement, including all terms and conditions thereof without modification; and

2. That PPL Electric Utilities Corporation's Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement Its Distributed Energy Resources Management Plan is granted as modified by the terms and conditions of the Settlement.

Respectfully submitted,



Date: October 5, 2020

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Appendix A – Pro Forma Tariff Supplement

PPL Electric Utilities Corporation

RULES FOR ELECTRIC SERVICE RULE 12- DISTRIBUTED ENERGY RESOURCE (DER) INTERCONNECTION SERVICE

A. PURPOSE

The Distributed Energy Resource Interconnection Service (DERIS) shall be applied to all new DER interconnections with the distribution system effective January 1, 2021, and as further provided in this Rule. DERs shall include inverter-based alternative energy sources and systems, as defined in the Alternative Energy Portfolio Standards Act of 2004 (73 P.S. §§ 1648.1 - 1648.8), and storage resources (batteries).

B. APPLICATION

- (1) This Rule shall apply to all inverter-based DERs, whose interconnection applications are received on or after January 1, 2021.
- (2) This Rule shall apply to all customers who receive Basic Utility Supply Service under Rate Schedules RS, GS-1, GS-3 and LP-4.

C. DEVICE REQUIREMENTS

(1) Renewable Energy Connection –

The online portal allows customers to apply to interconnect the DER Management Devices with the distribution system. Refer to the REMSI Renewable Energy Connection under PPL Electric's Electric Rates and Rules for additional information.

<https://www.pplelectric.com/utility/about-us/electric-rates-and-rules.aspx>

(2) Smart Inverters —

From January 1, 2021, through December 31, 2021, all new inverters connected to the distribution system must meet: (1) UL 1741 Supplement A as amended or supplemented and (2) the communication requirements under IEEE 1547-2018 as tested by or on behalf of the Company. Beginning January 1, 2022, new inverters connecting to the distribution system must comply with IEEE 1574-2018 and must be certified to UL 1741 Supplement B. The list of smart inverters that meet these requirements will be made publicly available and regularly updated on the Company's REMSI website.

(Continued)

DISTRIBUTED ENERGY RESOURCE (DER) INTERCONNECTION SERVICE (Continued)

C. DEVICE REQUIREMENTS (Continued)

(2) Smart Inverters (Continued) -

Notwithstanding the above, if a customer installs a new inverter on an existing DER installation or upgrades an existing DER installation after January 1, 2021, the customer may install a replacement inverter of a similar make and model as the existing inverter, provided that any such inverter meets the Commission's applicable standards and requirements set forth in its regulations.

(3) DER Management Device –

All DERs whether Customer-Owned or Third Party-Owned that are applying to interconnect with PPL Electric's distribution system must install smart inverters as defined in Rule 12(C)(2). Additionally, for the term of the pilot program described in Rule 12(D), a DER Management Device owned, installed, and maintained by the Company will be connected to the data port of the smart inverter for any new DER installation. The DER Management Device may use the Meter Network radios to connect wirelessly to PPL Electric's RF mesh network. These devices shall be installed and maintained in accordance with Company's "Rules for Electric Meter and Service Installations (REMSI)". Refer to the REMSI DER Management Device section as well as the Commission-approved Settlement and the Pilot Implementation Plan filed at Docket No. P-2019-3010128 for additional information.

D. PILOT PROGRAM

Beginning January 1, 2021, the Company will conduct a pilot program to test and evaluate: (1) the costs and benefits to the distribution system operation and design of monitoring DERs through the DER Management Devices 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 the distribution system operation of active management of DERs through DER management devices as compared to the benefits available through the use of inverter autonomous grid support functions.

(Continued)

DISTRIBUTED ENERGY RESOURCE (DER) INTERCONNECTION SERVICE (Continued)

D. PILOT PROGRAM (Continued)

Two control groups for the pilot program will be established. The first group shall include any DERs connected during the pilot program to the first 75 circuits for which interconnection applications are received by the Company on or after January 1, 2021. The second group shall include the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021. DERs connected during the pilot program in the first group shall count toward the 1,000 DERs in the second group. After the second group comprises 1,000 DERs, DERs interconnected to the first 75 circuits will still be added to the first group. For both control groups, DER inverters will operate under autonomous settings only unless otherwise agreed to by the Company and the interconnecting customer. While the Company may monitor DER operations in the control group by collecting data through the DER Management Devices, the Company shall not make operational decisions regarding the distribution system based on that information. For DERs that are not part of the control groups, the Company shall be permitted to actively manage the grid support functions of DER inverters using the DER Management Devices and the Company's Distributed Energy Resources Management System (DERMS) and may make operational decisions based on DER operational information obtained through the DER Management Devices.

The pilot program will begin January 1, 2021, and will end three years after the control groups are established. Refer to the Commission-approved Settlement and the Pilot Implementation Plan filed at Docket No. P-2019-3010128 for more information on the details and design of the pilot program.

E. ANNUAL REPORTS

Pursuant to the Commission-approved Settlement and the Pilot Implementation Plan filed at Docket No. P-2019-3010128, the Company shall file annual reports with the Commission providing detailed quantitative information germane to evaluation of the results of the pilot program. The reports shall be publicly available and shall not contain any identifying customer information. The annual reports shall be filed within 30 days following the end of each program year.

Appendix B – Proposed Findings of Fact

1. PPL Electric is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania. (PPL St. No. 1, p. 1.)
2. PPL Electric is a wholly-owned direct subsidiary of PPL Corporation. (PPL St. No. 1, p. 1.)
3. PPL Electric has developed a Distribution Energy Resource Management System (“DERMS”) to gather DER data, provide DER system forecast capabilities, and provide DER management capabilities. (PPL St. No. 1, p. 13.)
4. The DERMS originally became operational in October 2019 as part of the Company’s Keystone Solar Future Project. (PPL St. No. 1, pp. 27-28.)
5. The DERMS platform incorporates DERs and offers functionality such as Volt/VAR optimization (“VVO”), power quality management, and DER coordination. (PPL St. No. 1, p. 27.)
6. PPL Electric filed a Petition seeking Commission approval of tariff modifications and waivers of regulations necessary to implement its DER Management Plan. (PPL St. No. 1, p. 6.)
7. The Plan would govern the interconnection and operation of new DERs deployed in the Company’s service territory. (PPL St. No. 1, p. 6.)
8. Under the DER Management Plan, PPL Electric would be able to monitor and manage the DERs interconnected with its distribution system. Specifically, through the Company’s Petition, PPL Electric requested to proactively implement the 2018 revisions to the Institute of Electrical and Electronics Engineers (“IEEE”) Standard 1547, “Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric

Power Systems Interfaces” (“IEEE Standard 1547” or “IEEE 1547-2018”) and the related, forthcoming revisions to Underwriters Laboratories (“UL”) Standard 1741, “Inverters, Converters and Controllers for use in Independent Power Systems” (“UL Standard 1741”). (PPL St. No. 1, p. 6.)

9. Under the Company’s original proposal, customers applying to interconnect new DERs with PPL Electric’s distribution system would be required to: (1) use Company-approved smart inverters that are compliant with IEEE 1547-2018 and forthcoming UL Standard 1741 (or until that standard is finalized, UL Standard 1741-SA); and (2) install DER Management devices that enable PPL Electric to monitor and proactively manage the DERs’ smart inverter settings. (PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.)

10. In the Company’s rebuttal testimony, PPL Electric updated its proposal such that the Company would purchase, install, own, and maintain the DER Management devices at no direct cost to the participating DER customers. (PPL St. No. 1-R, p. 7.)

11. PPL Electric plans on using DER Management devices made by ConnectDER LLC (“ConnectDER”). (PPL St. No. 1-R, p. 7.)

12. The ConnectDER device consists of two components: (1) a meter collar that is installed between the meter and the customer-owned meter base; and (2) a “dongle,” which is a small communications device that is plugged into the smart inverter and communicates wirelessly with the meter collar. The radio transmitter in the meter collar then transmits information to PPL Electric’s system using the Company’s Radio Frequency (“RF”) Mesh network. (PPL St. No. 1-R, pp. 7-8.)

13. The RF Mesh network was deployed in accordance with the Company's Commission-approved Smart Meter Plan, Act 129 of 2008, and the Commission's related orders. (PPL St. No. 1, p. 28.)

14. The smart inverters that comply with IEEE 1547-2018 come equipped with many grid support functions, including: (1) fixed power factor, volt/VAR, volt/watt, and reactive power; (2) frequency/watt; (3) low and high voltage and frequency ride through; and (4) power curtailment and remote on/off capability. (PPL St. No. 1, p. 14.)

15. PPL Electric proposed to use the following five grid support functions in both autonomous and active management modes as part of its DER Management proposal: (1) Volt/VAR; (2) Constant Power Factor; (3) Remote On/Off; (4) Voltage Ride-through; and (5) Frequency Ride-through. (PPL St. No. 1-R, pp. 24-25; PPL Exh. SS-1R.)

16. Volt/VAR, also commonly referred to as "Volt-Var Mode" or "Voltage-reactive power mode," is intended to stabilize grid voltages and enable the DERs to either supply or absorb reactive power in response to local voltage issues. The amount of reactive power that gets injected or absorbed is dictated by a curve defining the percentage of reactive power (Q) versus per-unit voltage (V) at the DER. A typical Volt/VAR curve is set with four pairs of data points (V, Q) as shown in Figure 1 of PPL Electric Statement No. 1-R. The Volt/VAR mode also includes a dead-band, located between V2 and V3. Reactive power injection or absorption will only occur when voltage is outside of the dead-band, *i.e.*, voltage drops below V2 or rises above V3. (PPL St. No. 1-R, pp 25-26.)

17. Under the Company's DER Management proposal, Volt/VAR would be the default enabled voltage regulating mode for all inverter-based DERs. (PPL St. No. 1-R, p. 26.)

18. Remote On/Off function, also commonly referred to as “Connect/Disconnect function,” allows the inverter to be connected or disconnected remotely. (PPL St. No. 1-R, p. 31.)

19. PPL Electric proposed to use Remote On/Off in only two scenarios: (1) emergency situations, such as a gas leak or fire in the vicinity of the DER; and (2) situations where DERs back-feed a segment of the distribution system that was de-energized due to an outage, also known as “unintentional islanding.” (PPL St. No. 1-R, p. 31.)

20. Constant Power Factor mode, also commonly referred to as “Fixed Power Factor Function” or “Specified Power Factor,” allows the inverter to operate at a specific power factor based on a pre-determined or real time system voltage need. (PPL St. No. 1-R, p. 34.)

21. Since Volt/VAR is the default voltage regulation mode under the Company’s DER Management proposal, the Constant Power Factor function would remain deactivated under normal operating conditions. However, the Company averred that it may need to use Constant Power Factor temporarily in certain situations, such as during a distribution system reconfiguration where the DER is transferred to another feeder because of outages, system maintenance, or equipment failure, but the Volt/VAR curve is inadequate to support the voltage characteristics of the new feeder. (PPL St. No. 1-R, pp. 34-35.)

22. Voltage Ride-through, if enabled, allows inverters to continue operating or “ride-through” during momentary voltage and frequency deviations. (PPL St. No. 1-R, p. 37.)

23. Under the Company’s DER Management proposal, Voltage Ride-through settings would be enabled during the DER’s interconnection. (PPL St. No. 1-R, p. 37.)

24. Frequency Ride-through allows inverters to continue operating or “ride-through” during momentary frequency deviations. (PPL St. No. 1-R, p. 39.)

25. PPL Electric proposed that the Company be permitted to enable the Frequency Ride-through settings during the DER's interconnection. (PPL St. No. 1-R, p. 39.)

26. Parties argued over whether the Company's DER Management proposal was necessary given the level of DERs deployed on the Company's electric distribution system. (*See, e.g.*, PPL St. No. 1, pp. 6-8; PPL St. No. 2, pp. 9-22; PPL St. No. 3, pp. 3-14; PPL St. No. 4, pp. 4-10; OCA St. No. 1, pp. 17-39; NRDC St. No. 1, p. 29; SEF St. No. 1 (Non-Proprietary), pp. 5-9.)

27. For example, OCA, NRDC, and SEF contended that the Company's proposal to monitor and manage DERs through the use of DER Management devices was premature. (*See, e.g.*, OCA St. No. 1, pp. 17-39; NRDC St. No. 1, p. 29; SEF St. No. 1 (Non-Proprietary), pp. 5-9.)

28. PPL Electric argued, however, that it needed to implement its DER Management proposal now because, among other reasons, it was already experiencing issues on its distribution system due to its inability to monitor and manage DERs on the system. (*See, e.g.*, PPL St. No. 1, pp. 6-8; PPL St. No. 2, pp. 9-22; PPL St. No. 3, pp. 3-14; PPL St. No. 4, pp. 4-10; PPL St. No. 1-R, pp. 43-56; PPL St. No. 2-R, pp. 11-15; PPL St. No. 4-R, pp. 2-5; PPL St. No. 3-RJ, pp. 2-3; PPL Exh. KM-1RJ (HIGHLY CONFIDENTIAL).)

29. In their surrebuttal testimony, both NRDC and SEF recommended that the Commission approve pilot programs in lieu of any complete approval of the Company's DER Management proposal. (*See* NRDC St. No. 1-SR, p. 22; SEF St. No. 1-SR, pp. 10-14.)

30. In the Company's rejoinder testimony, PPL Electric argued that a pilot program was not necessary and that its DER Management proposal, as modified by the Company's rebuttal testimony, should be approval in its entirety. (PPL St. No. 1-RJ, pp. 1-6, 20-21, 26.)

31. However, if the Commission were to approve a pilot program, PPL Electric's rejoinder testimony set forth how such a pilot program should be conducted. (PPL St. No. 1-RJ, pp. 26-33.)

32. Under the Settlement, the Joint Petitioners have agreed that effective January 1, 2021, new DERs interconnecting with the Company's distribution system must have smart inverters installed that meet: (1) UL 1741 SA; and (2) the Company's testing for the communications requirements under IEEE 1547-2018. The Company shall undertake its testing processes in an expeditious matter so as not to delay DER interconnections. These requirements shall be known as the "Interim Requirements." The list of smart inverters that meet the Interim Requirements will be publicly available and regularly updated on the Company's website. An initial list will be published on or before December 1, 2020. (Settlement ¶ 48.)

33. The Interim Requirements shall be used by PPL Electric until January 1, 2022. At that point, the Company will transition to requiring new DERs to have smart inverters installed that meet IEEE 1547-2018 and have been certified with IEEE 1547.1 / UL 1741 Supplement B ("UL 1741 SB"). (Settlement ¶ 49.)

34. In addition, the Settlement authorizes PPL Electric to conduct a pilot program 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. (Settlement ¶ 54.)

35. Two control groups for the remote active management pilot program shall be established. The first group shall include any DERs connected during the pilot program to the first 75 circuits for which interconnection applications are received by the Company on or after January 1, 2021. The second group shall include the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021. DERs connected during the pilot program in the first group shall count toward the 1,000 DERs in the second group. After the second group comprises 1,000 DERs, DERs interconnected to the first 75 circuits will still be added to the first group. For both control groups, DER inverters will operate under autonomous settings only. While the Company may monitor DER operations in the control group by collecting data through the DER management devices, the Company shall not make operational decisions regarding the distribution system based on that information. For DERs that are not part of the control groups, the Company shall be permitted to actively manage the grid support functions of DER inverters using the DER management devices and the Company's DERMS and may make operational decisions based on DER operational information obtained through the DER management devices. (Settlement ¶ 57.)

36. This pilot program will begin on January 1, 2021, and will end three years after the second control group is established. The three years after the second control group is established will be referred to as Program Year 1, Program Year 2, and Program Year 3. (Settlement ¶ 54.)

37. The Settlement provides that within 60 days after the end of Program Year 2, PPL Electric will be permitted to file a petition with the Commission to: (a) extend the program and make such other changes to the program as the Company may request; (b) continue installing the DER management devices on new DERs in its service territory; and/or (c) authorize the Company to remotely and actively manage (i) the DERs that were in the control groups, (ii) the DERs that have enrolled and will enroll in the program, and (iii) any new DERs that will interconnect with

the Company's distribution system after the program concludes. PPL Electric also reserves the right to request that the Commission continue the existing remote active management program until litigation over such a petition concludes. If no such petition is filed within 60 days after the end of Program Year 2, the remote active management program will end after the Program Year 3. Further, all of the Joint Petitioners reserve their rights to file answers in opposition to any petition filed pursuant to this paragraph and to raise any arguments in opposition thereto. (Settlement ¶ 62.)

38. However, regardless of whether this remote active management program is continued or not, the Company will be authorized to continue: (a) requiring new DERs to have IEEE 1547-2018 compliant smart inverters; (b) utilizing the smart inverters' automated grid support functions; and (c) monitoring the DERs that have the Company's DER management devices installed, provided that such monitoring shall continue only with written customer consent. (Settlement ¶ 63.)

39. The Settlement also states that additional details about the pilot program will be set forth in a Pilot Implementation Plan to be filed at this docket within 30 days after the Commission enters an Order approving the Settlement. The Pilot Implementation Plan will include information about the goals of the pilot program, the use cases the Company plans to test and evaluate, the specific methods and approaches for testing each use case, the methods by which PPL Electric will communicate the pilot program's requirements to customers and DER installers, and any additional information PPL Electric believes is necessary to include in the annual reports. Within 10 days after the Pilot Implementation Plan is filed, a technical collaborative shall be convened to discuss the Pilot Implementation Plan. Within 20 days after the Pilot Implementation Plan is filed, the Joint Petitioners may file written Comments on the Company's Pilot Implementation Plan.

PPL Electric agrees to give due consideration to the written Comments but retains the ultimate discretion to accept or reject the Joint Petitioners' feedback in its Pilot Implementation Plan. If any changes are made to the Pilot Implementation Plan based on the Joint Petitioners' feedback, the revised Pilot Implementation Plan will be filed at this docket within 20 days after the deadline for the Joint Petitioners' Comments. (Settlement ¶ 61.)

40. To assist in the review and evaluation of the Company's DER Management proposal and pilot program, the Settlement sets forth detailed reporting requirements for the Company. (Settlement ¶¶ 66-69.)

41. Specifically, PPL Electric will file publicly-available annual reports with the Commission within 30 days following the end of each program year. These annual reports shall include, but will not be limited to, all of the information set forth in Paragraphs 67 and 68 of the Settlement. (Settlement ¶¶ 66-68.)

42. The Company also will send an individualized annual report to each new DER customer whose smart inverter's grid support functions are used by the Company during the annual reporting period. The annual report will be sent to the customer within 30 days following the cash-out of the customer's banked excess generation, which typically occurs at the end of each PJM Planning Year. Such an annual report will provide all of the information set forth in Paragraph 69 of the Settlement. (Settlement ¶ 69.)

43. Moreover, PPL Electric will provide certain anonymized data to SEF within 30 days after the end of each program year. The Company will use generic but unique identifiers for each customer to anonymize the customers' names and account numbers when providing the data to SEF. (Settlement ¶¶ 72-73.)

44. As for the smart inverter settings that PPL Electric will utilize as part of the DER Management proposal, parties argued in the proceeding about: (1) the various smart inverter settings that should be used, if at all; (2) whether such settings should only be used autonomously; and (3) under what circumstances and to what extent the settings would be used. (*See, e.g.*, OCA St. No. 1, pp. 13-15; NRDC St. No. 1, pp. 8, 23-25, 32-33; SEF St. No. 1 (Non-Proprietary), pp. 10-14; PPL St. No. 1-R, pp. 24-42, 73-78, 82-85.)

45. Under the Settlement, for all new DERs interconnected with the Company's distribution system after January 1, 2021, Volt/VAR shall be used as the default voltage management mode for all inverters, and the Company shall establish default Volt/VAR settings. The Company shall also establish default settings for voltage ride-through and frequency ride-through functions consistent with PJM Interconnection LLC's ("PJM") standards. Alternative voltage management modes and settings may be used to reduce or eliminate distribution system upgrade costs to interconnecting customers with the customer's agreement. (Settlement ¶ 58.)

46. For DERs in the remote active management group, the Settlement states that the Company may only manage the following grid support functions of the smart inverters: (1) Volt/VAR; (2) Constant Power Factor; (3) Remote On/Off; (4) Voltage Ride-through; (5) Frequency Ride-through; and (6) Volt/Watt. Volt/VAR shall be the default voltage management mode for all actively controlled inverters. Volt-Watt may only be enabled and managed with the consent of the interconnecting customer. Settings for voltage ride-through and frequency ride-through shall be maintained in accordance with PJM's standards. PPL Electric will only use the Remote On/Off function on battery storage or solar systems that have not safely isolated or "islanded" from the distribution system: (1) in emergency situations, such as a gas leak or fire in the vicinity of the DER; or (2) during a power outage. (Settlement ¶ 59.)

47. During the proceeding, SEF also raised an issue concerning DERs that require two communications ports on smart inverters in order to operate, such as solar plus battery storage set-ups. (SEF St. No. 1-SR, p. 5.)

48. PPL Electric explained in rejoinder testimony that “where three communications ports are needed, such as in a solar plus storage situation,” the Company “will provide a multi-port solution at no direct cost to that customer.” (PPL St. No. 1-RJ, p. 16.)

49. The Settlement memorializes this commitment by the Company, stating that smart inverters “must have one of their communications ports dedicated to use by PPL Electric,” but if “the customer’s DER requires two communications ports to operate (such as in a solar plus battery storage set-up), PPL Electric will provide a three-communications port solution at no direct cost to that customer.” (Settlement ¶ 52.)

50. In addition, OCA expressed a concern in its surrebuttal testimony about the potential costs and expenses involved with PPL Electric purchasing, installing, owning, and maintaining the DER Management devices. (*See* OCA St. No. 1-SR, pp. 6-7, 9-10.)

51. Under the Settlement, there will be an annual limit of 3,000 on the number of DER Management devices that PPL Electric can purchase and install during the pilot program. (Settlement ¶ 55.)

52. However, the “annual cap on the number of DER management devices will not be an annual cap on the number of new DERs that can be interconnected with the Company’s distribution system.” (Settlement ¶ 55.)

53. By placing an annual cap on the number of DER Management devices that will be purchased and installed during the pilot program, the Settlement helps contain the potential costs and expenses associated with the pilot program. (*See* Settlement ¶ 55.)

54. As for the recovery of those costs and expenses, the Settlement states that “PPL Electric is authorized to make a claim in its next base rate case to recover the capital costs and expenses associated with the DER management devices that the Company will purchase, own, install, and maintain.” (Settlement ¶ 64.)

55. “In said base rate case, the Joint Petitioners may challenge the amount of the Company’s claim, the prudence and reasonableness of the costs and expenses, and the manner in which those costs and expenses are recovered; provided, however, that the Joint Petitioners will not argue that the pilot program for remote monitoring and active management was imprudent or unreasonable, except to the extent that the Company retains discretion over the Pilot Implementation Plan.” (Settlement ¶ 64.)

56. Parties contended that the issues raised by the Company’s DER Management Petition should be addressed in a statewide proceeding. (*See* OCA St. No. 1, pp. 4, 52; NRDC St. No. 1, pp. 9-10, 32; SEF St. No. 1 (Non-Proprietary), pp. 9-10, 16.)

57. PPL Electric disagreed with those parties and maintained that it should be permitted to move ahead on its own to address the issues presented by DERs on its electric distribution system. (*See, e.g.*, PPL St. No. 1-R, pp. 56-68; PPL St. No. 4-R, pp. 5-15.)

58. Under the Settlement, the Company agrees to participate in any statewide proceeding initiated by the Commission that focuses on smart inverters, DER management devices, IEEE 1547-2018, IEEE 1547.1, and/or UL 1741, and the Company will give due consideration to revise its default voltage management and ride-through modes and settings, as well as other DER management protocols, to help achieve greater statewide consistency. (Settlement ¶ 65.)

59. In its DER Management Petition, PPL Electric proposed certain tariff changes associated with the implementation of its DER Management proposal. (*See* PPL St. No. 1, pp. 22-23; PPL Exh. SS-1.)

60. Specifically, the Company proposed to establish a new rule in its retail tariff entitled “Rule 12 – Distributed Energy Resources Interconnection Service” or “DERIS.” (PPL St. No. 1, pp. 22-23; PPL Exh. SS-1.)

61. The DERIS provided customer application details and technical DER equipment standards under the DER Management proposal. (PPL St. No. 1, pp. 22-23; PPL Exh. No. SS-1.)

62. A copy of the *pro forma* tariff supplement setting forth the new Rule 12 was included as PPL Electric Exhibit SS-1. (*See* PPL Exh. SS-1.)

63. Under the Settlement, PPL Electric shall file a compliance tariff supplement consistent with the *pro forma* tariff supplement attached to the Settlement as Appendix A. This compliance tariff supplement will be effective on one day’s notice. (Settlement ¶ 70.)

64. Questions also were raised concerning the applicability of the Company’s DER Management proposal to electric vehicles (“EVs”). (*See, e.g.*, SEF St. No. 1 (Non-Proprietary), p. 10; OCA St. No. 1-SR, pp. 8-9.)

65. Ultimately, PPL Electric represented in testimony that its current DER Management proposal would not apply to EVs. (*See* PPL St. No. 1-RJ, p. 10.)

66. The Settlement accordingly provides that EVs shall be exempt from the requirements of Section II.B. of the Settlement, which outlines the “Pilot Program.” (Settlement ¶ 71.)

67. OCA and SEF also raised concerns about the precedential effect the instant proceeding could have on other EDCs operating in Pennsylvania. (*See* OCA St. No. 1, p. 29; SEF St. No. 1 (Non-Proprietary), p. 4.)

68. The Settlement expressly states that the Commission's approval of PPL Electric's DER Management Plan, as modified by the Settlement, shall not serve as precedent for any other electric utility's proposal to monitor and manage DERs interconnected with their distribution systems. Indeed, the Settlement reflects a carefully-crafted compromise of the Joint Petitioners' positions and is based on the unique circumstances of PPL Electric. (Settlement ¶ 28.)

Appendix C – Proposed 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. PPL Electric is a “public utility,” an “electric distribution company” and a “default service provider” as defined in Sections 102 and 2803 of the Public Utility Code, 66 Pa. C.S. §§ 102, 2803.

3. 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).

4. Similarly, Section 5.43 of the Commission’s regulations provides that a petition for waiver of a regulation “must set forth clearly and concisely the interest of the petitioner in the subject matter, the specific . . . waiver . . . requested, and cite by appropriate reference the statutory provision or other authority involved.” 52 Pa. Code § 5.43(a). Such petition also “must set forth the purpose of, and the facts claimed to constitute the grounds requiring the . . . waiver.” *Id.*

5. “Unless the Commission otherwise orders, a public utility . . . may not change an existing and duly established tariff, except after notice of 60 days to the public.” 52 Pa. Code § 53.31.

6. 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).

7. In addition, an EDC and default service provider (“DSP”) “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).

8. Commission policy promotes settlements. 52 Pa. Code § 5.231. Settlements reduce the time and expense the parties must expend litigating a case and at the same time conserve administrative resources.

9. Settlement results are often preferable to those achieved at the conclusion of a fully litigated proceeding. *See* 52 Pa. Code § 69.401.

10. In order to accept a settlement, the Commission must first determine that the proposed terms and conditions are in the public interest. *Pa. PUC v. York Water Co.*, Docket No. R-00049165 (Order Entered Oct. 4, 2004); *Pa. PUC v. C.S. Water and Sewer Assocs.*, 74 Pa. P.U.C. 767 (1991).

11. The decision of the Commission must be supported by substantial evidence. *See* 2 Pa. C.S. § 704.

12. “Substantial evidence” is such relevant evidence that a reasonable mind might accept as adequate to support a conclusion. More is required than a mere trace of evidence or a suspicion of the existence of a fact sought to be established. *Norfolk & Western Ry. Co. v. Pa. PUC*, 413 A.2d 1037 (Pa. 1980); *Erie Resistor Corp. v. Unemployment Comp. Bd. of Review*, 166 A.2d 96 (Pa. Super. 1961); *Murphy v. Comm., Dept. of Public Welfare, White Haven Center*, 480 A.2d 382 (Pa. Cmwlt. 1984).

13. The terms and conditions set forth in the Settlement are supported by substantial evidence and are in the public interest. Therefore, PPL Electric’s DER Management Petition, as modified by the Settlement, is approved.

Appendix D – Proposed Ordering Paragraphs

1. That the Joint Petition for Approval of Settlement of All Issues filed on October 5, 2020, is approved without modification.

2. That PPL Electric Utilities Corporation's Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement Its Distributed Energy Resources Management Plan, as modified by the terms and conditions of the Settlement, is hereby granted.

3. That PPL Electric Utilities Corporation's requested waivers of all or portions of Sections 75.13(c), 75.13(k), 75.22, 75.34, 75.35, 75.37, 75.38, 75.39, and 75.40 of the Commission's regulations, as well as any additional waivers of regulations necessary to implement the DER Management Plan as modified by the Joint Petition for Approval of Settlement of All Issues filed on October 5, 2020, are hereby granted.

4. That PPL Electric Utilities Corporation shall file a tariff supplement to become effective on one day's notice that is consistent with the *pro forma* tariff supplement attached as Appendix A to the Joint Petition for Approval of Settlement of All Issues.

5. That any directive, requirement, disposition or the like contained in the body of this Opinion and Order, which is not the subject of an individual Ordering Paragraph, shall have the full force and effect as if fully contained in this part.

Appendix E – PPL Electric’s Statement in Support

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of PPL Electric Utilities :
Corporation for Approval of Tariff :
Modifications and Waivers of Regulations : Docket No. P-2019-3010128
Necessary to Implement its Distributed :
Energy Resources Management Plan :

**PPL ELECTRIC'S
STATEMENT IN SUPPORT OF THE
JOINT PETITION FOR SETTLEMENT OF
ALL ISSUES**

I. INTRODUCTION

PPL Electric Utilities Corporation (“PPL Electric” or the “Company”) hereby files this Statement in Support of the Joint Petition for Settlement of All Issues (“Settlement”) entered into by PPL Electric, the Office of Consumer Advocate (“OCA”), the Natural Resources Defense Council (“NRDC”), and the Sustainable Energy Fund (“SEF”), all parties in the above-captioned proceeding (hereinafter collectively referred to as the “Joint Petitioners”)¹ in the above-captioned proceeding. PPL Electric respectfully requests that Administrative Law Judges Mary D. Long and Emily I. DeVoe (the “ALJs”) recommend approval of, and the Commission approve, the Settlement, including the terms and conditions thereof, without modification.

The Settlement, if approved, will resolve all of the issues raised by the Joint Petitioners in this proceeding. As explained herein, the Settlement is just and reasonable and is in the public interest. Thus, it should be approved without modification.

The Settlement was achieved only after a comprehensive investigation of PPL Electric’s Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to

¹ Sunrun, Inc. (“Sunrun”) is the only other party in this proceeding and, as noted in the Joint Petition for Settlement of All Issues, will not be filing an objection to the Settlement.

Implement Its Distributed Energy Resources (“DERs”) Management Plan (“DER Management Petition”). During this proceeding, PPL Electric responded to many formal discovery requests (several of which had multiple subparts). In support of their positions, PPL Electric, OCA, NRDC, and SEF served testimony and accompanying exhibits. The Joint Petitioners also participated in several settlement discussions and formal negotiations, which ultimately led to the Settlement.

Finally, the Joint Petitioners, as well as their experts and counsel, have considerable experience in Commission proceedings. Their knowledge, experience, and ability to evaluate the strengths and weaknesses of their litigation positions provided a strong basis upon which to build a consensus on the settled issues.

For these reasons and the reasons set forth below, the Settlement is just and reasonable and in the public interest, and PPL Electric’s DER Management Petition, as modified by the Settlement, should be approved.

II. COMMISSION POLICY FAVORS SETTLEMENT

Commission policy promotes settlements. *See* 52 Pa. Code § 5.231(a). Settlements reduce the time and expense that the parties must expend litigating a case and, at the same time, conserve administrative resources. The Commission has stated that settlement results are often preferable to those achieved at the conclusion of a fully-litigated proceeding. *See* 52 Pa. Code § 69.401. To accept a settlement, the Commission must first determine that the proposed terms and conditions are in the public interest. *Pa. PUC v. York Water Co.*, Docket No. R-00049165 (Order Entered Oct. 4, 2004); *Pa. PUC v. C.S. Water and Sewer Assocs.*, 74 Pa. P.U.C. 767 (1991). As explained herein, the terms of the Settlement are in the public interest and should be adopted without modification.

III. THE SETTLEMENT IS IN THE PUBLIC INTEREST

In PPL Electric's DER Management Petition, the Company requested Commission approval of tariff modifications and waivers of regulations necessary to implement its DER Management Plan. (PPL St. No. 1, p. 6.) This Plan would govern the interconnection and operation of new DERs deployed in the Company's service territory and would enable the Company to monitor and manage the DERs interconnected with its distribution system through the use of smart inverters and DER Management devices. (PPL St. No. 1, p. 6.)

The fundamental purpose of PPL Electric's DER Management Plan is to provide the Company with the necessary tools to operate its distribution system safely and reliably. (PPL St. No. 1-R, p. 4.) As explained in the Company's DER Management Petition, electric transmission and distribution systems in Pennsylvania and the United States are currently undergoing significant changes. (PPL St. No. 1-R, p. 4.) In particular, the increasing deployment and use of DERs, such as solar panels and batteries, are upending the traditional electric grid model of large scale generation located at significant distances from customers. (PPL St. No. 1-R, p. 4.) By allowing customers to both consume and produce electricity at what were traditionally points of delivery, DERs force the electric distribution system to perform in a way for which it was not originally designed and, as a result, place an increasing stress on the grid. (PPL St. No. 1-R, p. 4.)

However, even as the deployment of DERs in PPL Electric's service territory continues to increase, the Company still must provide reasonable, safe, and reliable electric service to all of its customers, including those who have not installed DERs. (PPL St. No. 1-R, p. 4.) This can be particularly difficult because electricity cannot be readily stored. (PPL St. No. 1-R, p. 4.) As a result, PPL Electric and all electric utilities must simultaneously balance distribution system

demand and supply to avoid potential safety and reliability issues. (PPL St. No. 1-R, p. 4.) At the same time, PPL Electric recognizes the benefits of alternative energy sources in combating climate change and wants to encourage their deployment in the Company's service territory. (PPL St. No. 1-R, p. 4.)

Ultimately, these considerations led PPL Electric to develop its DER Management Plan, which the Company argued would help facilitate the interconnection of more DERs on its distribution system, while also enabling the Company to monitor and manage the DERs so that they do not negatively affect the distribution system needing to provide electric service to approximately 1.4 million customers. (PPL St. No. 1-R, pp. 4-5.) In order to implement that Plan, PPL Electric has requested Commission approval to proactively implement the 2018 revisions to the Institute of Electrical and Electronics Engineers ("IEEE") Standard 1547, "Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces" ("IEEE Standard 1547" or "IEEE 1547-2018") and the related revisions to Underwriters Laboratories ("UL") Standard 1741, "Inverters, Converters and Controllers for use in Independent Power Systems" ("UL Standard 1741"). (PPL St. No. 1, p. 6.)

Specifically, under the Company's original proposal, customers applying to interconnect new DERs with PPL Electric's distribution system would be required to: (1) use Company-approved smart inverters that are compliant with IEEE 1547-2018 and forthcoming UL Standard 1741 (or until that standard is finalized, UL Standard 1741-SA)²; and (2) install DER Management devices that enable PPL Electric to monitor and proactively manage the DERs' smart inverter settings. (PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.) In the Company's rebuttal

² The new UL Standard 1741 has recently been finalized, as seen in Paragraph 49 of the Settlement. It is referred to as UL Standard 1741 Supplement B ("UL Standard 1741-SB").

testimony, PPL Electric updated its proposal such that the Company would purchase, install, own, and maintain the DER Management devices at no direct cost to the participating DER customers, rather than having the participating customers purchase and install the DER Management devices. (PPL St. No. 1-R, p. 7.) PPL Electric would communicate with these DER Management devices using its established Radio Frequency (“RF”) Mesh network, which was deployed in accordance with the Company’s Commission-approved Smart Meter Plan, Act 129 of 2008, and the Commission’s related orders. (PPL St. No. 1-R, pp. 7-8; PPL St. No. 1, p. 28.)

By communicating with the DER Management devices, PPL Electric could monitor the DERs and utilize the smart inverters’ grid support functions. (PPL St. No. 1-R, pp. 4-5.) Doing so would provide several substantial benefits to customers, the Company, and the Commonwealth by improving the safety, quality, efficiency, stability, and reliability of the Company’s operations and service while facilitating the increased deployment of DERs through the Company’s service territory. (PPL St. No. 1, pp. 16-21.) In fact, PPL Electric’s proposal would address the issues that the Company is experiencing on its distribution system today due to the two-way power flows caused by DERs. (PPL St. No. 3, pp. 6-14; PPL St. No. 3-RJ, pp. 2-3.) The Company’s proposal also would increase its distribution circuits’ hosting capacity, thereby allowing more DERs to interconnect with its distribution system. (PPL St. No. 1-R, pp. 16-17.)

Further, through the installation of the DER Management devices, the Company estimated that it would be able to reduce the installation costs for new DER installations that are less than 15 kW by approximately \$393 to \$2,300. (PPL St. No. 6-R, pp. 10-11; PPL Exh. MW-1R; PPL St. No. 6-RJ, p. 2; PPL Exh. MW-1RJ.) The installation cost is reduced because the

need to install equipment, such as AC disconnect and potential breaker panel changes, can be eliminated through the use of the DER Management device selected by the Company. (PPL St. No. 6-R, p. 10; PPL Exh. MW-1R.) Therefore, PPL Electric argued that its proposal would benefit the deployment of DERs in its service territory by: (1) increasing the circuits' hosting capacity and, therefore, facilitating the interconnection of more DERs with the Company's distribution circuits; and (2) substantially reducing the installation costs for most new DER interconnections.³

OCA, NRDC, and SEF generally disagreed with the Company's proposal for various reasons. For example, some or all of those parties raised issues concerning: (1) the need for the DER Management Plan; (2) the timing of the proposal; (3) the costs associated with PPL Electric's proposal; (4) the smart inverter grid support functions that PPL Electric would utilize and under what circumstances the Company would employ them; (5) the types of DERs that would be subject to the proposal; and (6) the Company's position that these issues should be addressed in this proceeding, as opposed to a statewide proceeding. (*See, e.g.*, OCA St. No. 1, pp. 12-54; NRDC St. No. 1, pp. 7-33; SEF St. No. 1 (Non-Proprietary), pp. 4-16; OCA St. No. 1-SR, pp. 1-22; NRDC St. No. 1-SR, pp. 2-23; SEF St. No. 1-SR, pp. 2-14.) These and other issues were thoroughly investigated through discovery and litigated by the Joint Petitioners.

In the end, the Joint Petitioners were able to reach a Settlement that resolved all of the issues in this proceeding. The Settlement consists of two principal parts: (1) requirements for smart inverters on PPL Electric's electric distribution system beginning January 1, 2021; and (2) a pilot program to test and evaluate the costs and benefits of (a) monitoring the DERs and

³ On an annual basis, approximately 80% of the DERs interconnected to PPL Electric's distribution system are less than 15 kW. (PPL St. No. 6-R, p. 10.) Compared to the average cost for a residential 6.2 kW solar PV system of approximately \$16,740 provided by NRDC witness Warren (NRDC St. No. 1, p. 20), the Company estimated that its proposal would reduce the total cost of that system by approximately 2.3% to 13.7%. (PPL St. No. 6-R, p. 10.)

remotely managing the smart inverters' grid support functions, versus (b) relying on other means to maintain distribution system status visibility and using the smart inverters' autonomous grid support functions. (*See* Settlement ¶¶ 48-63.)

As explained in the following sections, the Settlement reflects a carefully-balanced compromise of the interests of all of the Joint Petitioners. Therefore, the Settlement is just, reasonable, and in the public interest, and it should be approved without modification.

A. SMART INVERTERS

1. Requirements for Smart Inverters that Meet the New IEEE and UL Standards

In the Company's DER Management Petition, PPL Electric proposed to proactively implement IEEE 1547-2018 and the revisions to UL Standard 1741, by requiring all new DERs interconnecting with the Company's distribution system to use Company-approved smart inverters that are compliant with those standards.⁴ (PPL St. No. 1, p. 6.)

By way of background, IEEE Standard 1547 is formally identified as "IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces." (PPL St. No. 2, pp. 4-5.) This standard outlines technical requirements concerning the interconnection and interoperability performance of DERs, including operation and testing, safety, maintenance, and security requirements. (PPL St. No. 2, p. 5.) The standard also specifies that a DER must be equipped with additional grid support functions. (PPL St. No. 2, p. 5.) Specifically, the revised IEEE Standard 1547 standardized inverter capability requirements, incorporated improved communication interface standards, expanded grid support functions (such as requiring the capability to actively regulate voltage,

⁴ At the time of filing the DER Management Petition, the revisions to UL Standard 1741 were still forthcoming. (PPL St. No. 1, p. 6.) Until that revised standard was finalized, the Company proposed using UL Standard 1741-SA. (PPL St. No. 1, p. 6.) However, these revisions to UL Standard 1741 were recently finalized as UL Standard 1741-SB. (*See* Settlement ¶ 49.)

ride through abnormal voltage/frequency conditions, and provide frequency response), and improved anti-islanding protections. (PPL St. No. 2, p. 5.) The original version of IEEE Standard 1547 (adopted in 2003) was limited to electrical requirements. (PPL St. No. 2, p. 5.) However, IEEE 1547-2018 includes both electrical as well as interoperability and communication requirements. (PPL St. No. 2, p. 5.)

As for UL Standard 1741, it also applies to DERs and governs the physical testing procedures that manufacturers must perform to certify that a DER inverter meets IEEE 1547-2018. (PPL St. No. 2, p. 7.) In other words, UL Standard 1741 certifies performance, ensuring that every inverter is manufactured, programmed, and tested to adhere to the interconnection standard and is the standard to which all inverters must be listed. (PPL St. No. 2, p. 7.) UL Standard 1741 is harmonized with IEEE Standard 1547 and IEEE 1547.1 (the testing standard).⁵ (PPL St. No. 2, p. 7.) As noted previously, the revisions to UL Standard 1741 were recently finalized as UL Standard 1741-SB. (Settlement ¶ 49.)

DERs interconnecting with the distribution system in the coming years are expected to be inverter-based, specifically equipped with “smart inverters” that comply with IEEE 1547-2018 and provide grid support functionality relating to voltage, frequency, communication, and controls. (PPL St. No. 2, p. 6.) When widely used and adopted, the Company maintained that IEEE 1547-2018 will enable a higher saturation of DERs on the distribution system, while maintaining grid safety and reliability and providing new benefits for the distribution system and customers. (PPL St. No. 2, p. 6.)

⁵ While IEEE 1547 provides specifications and requirements for the interconnect tests, it does not provide test procedures. (PPL St. No. 2, p. 8.) IEEE 1547.1 defines the type, production and commissioning tests that shall be performed to demonstrate conformance with the technical requirements in IEEE 1547. (PPL St. No. 2, p. 8.) IEEE 1547.1 was approved earlier in 2020. (PPL St. No. 2-RJ, p. 5.)

By tapping into the potential of smart inverters that are compliant with the new IEEE and UL standards, the Company argued that its DER Management Plan could produce substantial benefits to customers, the Company, and the Commonwealth by improving the safety, quality, efficiency, stability, and reliability of the Company's operations and service while facilitating the increased deployment of DERs through the Company's service territory. (PPL St. No. 1, pp. 16-21; PPL St. No. 2-R, pp. 5-6.)

Once those standards are finalized, however, manufacturers need to make design and supply chain changes before compliant products are available for purchase in the marketplace. (PPL St. No. 2, p. 9.) As a result, PPL Electric's direct testimony set forth an interim plan that could be used for testing, if it is needed, to bridge the gap between when the Company's Petition may be approved and when certified IEEE 1541.1 / UL Standard 1741 equipment is available in the marketplace. (PPL St. No. 2, p. 9.) Particularly, the interim approach would require compliance with UL Standard 1741 SA and would also require compliance with the communication technical requirements specified in section 10.7 of IEEE 1547-2018. (PPL St. No. 2, p. 9.)

There was some disagreement among the parties as to: (1) whether the Company should be permitted to adopt IEEE 1547-2018 through this proceeding rather than a statewide proceeding; (2) when smart inverters meeting IEEE 1547-2018 and the revisions to UL Standard 1741 would be commercially available; and (2) what requirements, if any, should apply in the interim before those smart inverters become commercially available. (*See, e.g.*, NRDC St. No. 1, pp. 10-11; SEF St. No. 1 (Non-Proprietary), pp. 9-10, 15; OCA St. No. 1, pp. 30-31, 46; SEF St. No. 2, p. 15.)

In its direct testimony, NRDC proposed that the Commission undertake a statewide stakeholder proceeding, pursuant to which “[a]ll new inverters installed in the Commonwealth should be compliant with IEEE 1547-2018 beginning January 1, 2022, when compliant hardware is expected to be listed and available.” (NRDC St. No. 1, p. 10.) Outside of that stakeholder process, NRDC recommended that “Pennsylvania utilities should be allowed . . . to use UL 1741 SA compliant inverters, DER management devices, and DERMS . . . on a case-by-case basis and by mutual agreement of utilities and interconnecting customers.” (NRDC St. No. 1, p. 11) (emphasis omitted). OCA similarly argued that issues regarding the implementation of IEEE 1547-2018 should be addressed in a statewide proceeding. (OCA St. No. 1, pp. 30-31, 45-50.) As support, OCA claimed that there would be enough time to have a statewide proceeding to implement IEEE 1547-2018 because “smart inverters that comply with this standard may not be available until 2022.” (OCA St. No. 1, pp. 30-31, 46.) In addition, SEF averred that it was “unknown if any of the inverter manufacturers have produced a product yet” for the revised UL Standard 1741 because, at the time of submitting its direct testimony, the revisions to UL Standard 1741 had “yet to be finalized.” (SEF St. No. 1, (Non-Proprietary), p. 15.) To the extent that PPL Electric would test and approve smart inverters for use under its proposal, SEF believed “this procedure could lead to significant delays for the DER owner.” (SEF St. No. 1, (Non-Proprietary), p. 15.) SEF also argued that the issues raised by PPL Electric’s DER Management Petition should be addressed in a statewide proceeding. (SEF St. No. 1 (Non-Proprietary), pp. 9-10.)

In rebuttal, PPL Electric explained how the other parties’ recommendations for a statewide proceeding should be rejected for several reasons, including the fact that the Company has distinct characteristics from its peer EDCs that warrant PPL Electric being able to take action

now by proactively implementing the new IEEE and UL standards and the Company's DER Management Plan. (PPL St No. 1-R, pp. 56-68; PPL St. No. 4-R, pp. 5-15.) In fact, none of the parties established that the other EDCs in Pennsylvania are ready or even willing to implement IEEE 1547-2018. (PPL St. No. 1-R, p. 60.) The Company also noted by the time this proceeding concludes in 2020, the applicable IEEE and UL standards will be in place, and smart inverters that are certified as meeting IEEE 1547-2018 will be commercially available. (PPL St. No. 1-R, p. 11; PPL St. No. 2-R, pp. 3-4.) And, in the unlikely event that the standards would not be published or compliant smart inverters would not be commercially available when this proceeding ends, PPL Electric set forth an interim plan. (PPL St. No. 1-R, p. 11.)

In surrebuttal testimony, NRDC recommended that PPL Electric "be authorized to require that inverters certified to IEEE-1547-2018 be used in all new DER installations after January 1, 2022." (NRDC St. No. 1-SR, p. 3.) NRDC also proposed that the Commission initiate a "statewide stakeholder process for all other Pennsylvania utilities . . . to develop criteria for voltage control and ride-through defaults" and that the Company should participate in that proceeding. (NRDC St. No. 1-SR, p. 3.)

However, SEF expressed a concern about the number of smart inverters that the Company had tested to date under its interim requirements. (SEF St. No. 1-SR, pp. 3-4.) Therefore, if the Commission ultimately approved the Company's DER Management Petition, SEF "recommend[ed] that the effective date of such approval should be set in such a way that allows for significantly more smart inverters to become commercially available before the tariff is effective." (SEF St. No. 1-SR, p. 4.) Furthermore, OCA still argued that PPL Electric should not be permitted to require smart inverters compliant with IEEE 1547-2018 because, according

to OCA, such requirements should be adopted for all the Pennsylvania EDCs in a statewide proceeding. (OCA St. No. 1-SR, pp. 16-20.)

In the Company's rejoinder testimony, PPL Electric disagreed with NRDC's proposed January 1, 2022 start date for requiring IEEE 1547-2018 compliant smart inverters. (PPL St. No. 1-RJ, p. 3.) The Company explained that it "has a robust and detailed interim solution for using certified smart inverters until the IEEE 1547-2018 and UL 1741 standards are finalized and published." (PPL St. No. 1-RJ, p. 7.) Therefore, PPL Electric should be permitted to begin implementing its DER Management proposal as soon as the Commission enters its Order approving the Company's Petition. (PPL St. No. 1-RJ, p. 7.) PPL Electric also responded to SEF's concerns about the number of inverters certified as meeting the Company's interim requirements. (PPL St. No. 1-RJ, p. 17.) The Company demonstrated that it already approved inverters from six major inverter brands and "is rapidly evaluating additional major brands that it expects will also satisfy these requirements." (PPL St. No. 1-RJ, pp. 17-18.) Thus, "[b]y the time the Commission approves the DER Management Petition, customers will have many choices of smart inverters that meet the Company's interim requirements." (PPL St. No. 1-RJ, p. 18.)

Under the Settlement, the Joint Petitioners have reached a reasonable compromise of their positions regarding PPL Electric's proposed requirements for smart inverters. Effective January 1, 2021, new DERs interconnecting with the Company's distribution system must have smart inverters installed that meet: (1) UL 1741 SA; and (2) the Company's testing for the communications requirements under IEEE 1547-2018. The Company shall undertake its testing processes in an expeditious matter so as not to delay DER interconnections. These requirements shall be known as the "Interim Requirements." The list of smart inverters that meet the Interim

Requirements will be publicly available and regularly updated on the Company's website. An initial list will be published on or before December 1, 2020. These Interim Requirements will be used by PPL Electric until January 1, 2022, at which point the Company will transition to requiring new DERs to have smart inverters installed that meet IEEE 1547-2018 and have been certified with IEEE 1547.1 / UL Standard 1741-SB. (Settlement ¶¶ 48-49.)

However, if a customer installs a new inverter on an existing DER installation or upgrades an existing DER installation after January 1, 2021, the Settlement provides that the customer may install a replacement inverter of similar make and model as the existing inverter, so long as any such inverter meets the Commission's applicable standards and requirements set forth in its regulations. (Settlement ¶ 50.) The Settlement also removes any uncertainty about whether the inverters will continue to be customer-owned property after these requirements are adopted, by stating that PPL Electric shall not be responsible for purchasing, owning, installing, or maintaining the customers' smart inverters. (Settlement ¶ 53.)

In sum, these settlement provisions enable PPL Electric to begin requiring smart inverters on its electric distribution system beginning January 1, 2021, and enabling the Company and customers to experience the substantial benefits of smart inverters. The Settlement will provide customers and DER installers with a well-known variety of smart inverters approved for use under the Company's Interim Requirements, while permitting the Company to fully transition to requiring smart inverters that meet IEEE 1547-2018 and UL Standard 1741-SB beginning January 1, 2022. As seen above, this January 1, 2022 start date is consistent with the evidence demonstrating that smart inverters compliant with IEEE 1547-2018 and UL Standard 1741-SB will be commercially available by that date. Thus, under either the Interim Requirements

starting January 1, 2021, or the requirements beginning January 1, 2022, customers and DER installers will have a full complement of smart inverters from which to choose.

For these reasons, the Settlement reflects a reasonable compromise of the Joint Petitioners' positions regarding the Company's proposed requirements for smart inverters. Therefore, these provisions are just and reasonable, are in the public interest, and should be approved without modification.

2. Grandfathering of DERs Whose Interconnection Applications Are Submitted before January 1, 2021

As explained previously, PPL Electric's DER Management Plan "would govern the interconnection and operation of new DERs deployed in the Company's service territory." (PPL St. No. 1, p. 6) (emphasis added).

The Settlement clarifies that its provisions requiring the installation of smart inverters and DER Management devices shall not apply to DER installations whose interconnection applications are submitted to PPL Electric before January 1, 2021. The Company reserves the right to propose in a future proceeding, however, that its DER Management Plan be required for existing DERs. All of the Joint Petitioners reserve their rights to oppose such a proposal and to raise any arguments in opposition thereto. (Settlement ¶ 51.)

These settlement provisions help define the scope and applicability of the DER Management Plan (as modified by the Settlement) and ensure that the Joint Petitioners' agreement to the Settlement does not restrict their rights to propose or oppose, in a future proceeding, applying the Plan to DER installations whose interconnection applications are submitted before January 1, 2021. Thus, these terms are just and reasonable, are in the public interest, and should be approved without modification.

3. Communications Ports on Smart Inverters

SEF raised an issue concerning the number of communications ports on the smart inverters. (SEF St. No. 1-SR, p. 5.) SEF observed that “inverters are equipped with two (2) RS 485 connectors on multi-inverter systems,” but “one port from the master inverter is used to communicate with the slave inverters.” (SEF St. No. 1-SR, p. 5.) For example, “[i]n AC Couple solar plus battery storage solutions, the other port is used to communicate with the battery system or energy management system.” (SEF St. No. 1-SR, p. 5.) Therefore, in situations where the customer’s DER set-up requires two communications ports on the smart inverter, SEF believed that the Company’s DER Management Plan would “limit the ability of DER owners to control and monitor their DER inverters” because there would not be a communications port available for the Company’s DER Management device. (SEF St. No. 1-SR, p. 5.)

In his rejoinder testimony, PPL Electric witness Salet explained that the Company’s DER Management Plan will not limit the ability of DER owners to monitor and control their smart inverters. (PPL St. No. 1-RJ, p. 16.) The Company has evaluated inverters with three ports that would allow the Company to connect its DER Management device without impacting the ability for the customer to manage their energy infrastructure. (PPL St. No. 1-RJ, p. 16.) In cases where three communications ports are needed, such as in a solar plus storage situation, PPL Electric will provide a multi-port solution at no direct cost to that customer. (PPL St. No. 1-RJ, p. 16.) Therefore, PPL Electric argued that SEF’s concern about the number of communications ports on the smart inverters was moot. (PPL St. No. 1-RJ, p. 16.)

Under the Settlement, the smart inverters must have one of their communications ports dedicated to use by PPL Electric. However, in the event that the customer’s DER requires two communications ports to operate (such as in a solar plus battery storage set-up), PPL Electric will provide a three-communications port solution at no direct cost to that customer. (Settlement

¶ 52.) Thus, these settlement provisions address the issue raised by SEF regarding the number of communications ports that PPL Electric and the customer may use on the smart inverter. As a result, the provisions are just and reasonable, are in the public interest, and should be approved without modification.

B. PILOT PROGRAM

1. Pilot Program to Test and Evaluate Monitoring DERs and Remotely Managing the Smart Inverters' Grid Support Functions

In addition to requiring smart inverters that meet IEEE 1547-2018 and the revisions to UL Standard 1741, the other major component of PPL Electric's DER Management Petition was the Company's proposal to require the installation of DER Management devices for all new DER interconnections with the Company's distribution system. (PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.) As stated above, PPL Electric updated its proposal in rebuttal testimony such that the Company would purchase, install, own, and maintain the DER Management devices at no direct cost to the participating DER customers, rather than having the participating customers purchase and install the DER Management devices. (PPL St. No. 1-R, p. 7.) Through the use of these DER Management devices, PPL Electric could monitor the DERs and utilize the smart inverters' grid support functions. (PPL St. No. 1-R, pp. 4-5.) PPL Electric argued that its proposal would provide substantial benefits to customers, the Company, and the Commonwealth by improving the safety, quality, efficiency, stability, and reliability of the Company's operations and service and would facilitate the increased deployment of DERs through the Company's service territory. (PPL St. No. 1, pp. 16-21.)

OCA, NRDC, and SEF disagreed that PPL Electric should be permitted to install the DER Management devices for all new DER interconnections and use them to monitor and remotely manage the DERs. (OCA St. No. 1, pp. 12-54; NRDC St. No. 1, pp. 7-9; SEF St. No. 1

(Non-Proprietary), p. 10.) In general, OCA and SEF alleged that the Company's proposal was premature because the DER penetration levels in the Company's service territory were lower than those of electric utilities in other states. (OCA St. No. 1, pp. 17-39; SEF St. No. 1 (Non-Proprietary), pp. 5-9; SEF St. No. 2, pp. 6-8, 10-11.) OCA also argued that "it is unclear where the benefits from IEEE 1547-2018's autonomous functions end and where the benefits of monitoring and controlling DERs begin[]." (OCA St. No. 1, p. 16.) Furthermore, although NRDC supported the use of smart inverters and the autonomous use of their grid support functions, NRDC opposed PPL Electric's proposal to actively manage the grid support functions. (NRDC St. No. 1, pp. 13-14, 18-19.) Similar to OCA, NRDC alleged that "PPL has not provided evidence" of the benefits from monitoring and remotely managing the DERs "relative to what can be achieved through inverters' autonomous operation based on preset parameters." (NRDC St. No. 1, p. 19.) However, NRDC recommended that "[s]takeholders, including PPL, should again be permitted to propose pilot programs" so that they can "gather data on the benefits and costs of these additional grid services if necessary." (NRDC St. No. 1, p. 10.)

In rebuttal, PPL Electric maintained that its proposal was not premature. (PPL St. No. 1-R, pp. 44-53.) Among other points, the Company referenced the issues it was currently experiencing on its distribution system due to DERs and argued that it needed to get ahead of future issues, rather than addressing them only after DER penetration levels increase to the point where PPL Electric is experiencing wide-spread issues. (PPL St. No. 1-R, pp. 44-48.)

Additionally, PPL Electric demonstrated that its proposal to monitor and remotely manage DERs is much more beneficial than exclusively using the smart inverters' autonomous functions. (PPL St. No. 1-R, pp. 73-78.) Pre-set autonomous functions are precisely calculated and determined based on historical data and system behaviors. (PPL St. No. 1-R, p. 73.) They

cannot adapt to future changes to the distribution circuit or distribution system, unless those pre-set parameters are manually changed. (PPL St. No. 1-R, p. 73.) This would require customers or PPL Electric to physically adjust the autonomous setting(s), locally, on each inverter that needs to be changed. (PPL St. No. 1-R, p. 73.) Such a process requires substantial time, effort, and expense. (PPL St. No. 1-R, p. 73.)

PPL Electric provided many examples where autonomous settings would need to be adjusted, including: (1) changes to feeder load and voltage profile that affect the pre-set Volt/VAR curve; (2) changes to the transmission and distribution grid characteristics, such as distribution reclosing times, transmission clearing times, and coordination with behaviors of synchronous machines, that may require the pre-set voltage and frequency ride-through settings to be changed; and (3) temporary transfers of DERs from one distribution circuit to another, which may necessitate a temporary override of the Volt/VAR curve using the Constant Power Factor setting. (PPL St. No. 1-R, pp. 73-77.) Moreover, remote monitoring and management is absolutely needed for utilities' "black start" capability, which is the process of restoring power without relying on the external electric power transmission system to recover from a complete or partial shutdown. (PPL St. No. 1-R, pp. 77-78.) The Company also noted the many benefits of monitoring DERs, such as: (1) providing PPL Electric with data on the dynamic generation output of DERs; (2) improving the Company's overall system planning functions; (3) mitigating issues such as hidden load⁶; (4) avoiding unnecessary system upgrades; (5) improving fault

⁶ PPL Electric explained that it is experiencing hidden load issues due to the current levels of DER penetration. (PPL St. No. 1-R, p. 46.) When a fault occurs on the distribution system, nearby DERs are designed to trip offline in response. (PPL St. No. 1-R, p. 46.) When service is restored, the DERs generally have a reconnect time delay of a few minutes before they resume generating power. (PPL St. No. 1-R, p. 46.) During that delay, the load that is normally served by the DERs must now be served by the Company until the DERs resume generation. (PPL St. No. 1-R, p. 46.) Without real-time monitoring of DERs, the system cannot know how much hidden load PPL Electric needs to serve until the DERs come back online. (PPL St. No. 1-R, p. 46.) As a result, the Company's and the customers' equipment could be potentially damaged by overloading, thereby delaying service restoration. (PPL St. No. 1-R, pp. 46-47.)

location capability; and (6) providing visibility of unintentional islanding conditions, where DERs fail to shut off during an outage. (PPL St. No. 1-R, p. 78.)

In their surrebuttal testimony, OCA, NRDC, and SEF continued to argue that the Company's proposal to monitor and remotely manage DERs through the DER Management devices was unsupported. (OCA St. No. 1-SR, pp. 2, 10, 16; NRDC St. No. 1-SR, pp. 5-6; SEF St. No. 1-SR, p. 10.) However, both NRDC and SEF made pilot program recommendations.

First, NRDC proposed "a pilot program designed to demonstrate the incremental costs vs. the incremental benefits of communication with and control of newly installed DER inverters." (NRDC St. No. 1-SR, p. 2.) "In that pilot," the Company "would be permitted to purchase, install, own and maintain DER Management devices at no direct costs to DER customers." (NRDC St. No. 1-SR, p. 2.) "The pilot should be large enough to allow PPL to evaluate the range of specific use cases it has noted in the testimony of its Witnesses, and it should be structured to evaluate the benefits and costs of external control against a population of IEEE-1547-2018 compliant inverters operating autonomously." (NRDC St. No. 1-SR, p. 16.)

Second, SEF recommended that the Commission approve the Company's proposal as a pilot program, subject to various requirements, an alternative to approving the Company's DER Management Petition in full. (SEF St. No. 1-SR, pp. 10-14.) Specifically, SEF's pilot program proposal would run for a period of 30 months once PPL Electric "certifie[d] 80% of the inverters in the market." (SEF St. No. 1-SR, pp. 10-11) Under that pilot program, DER customers would have to "opt-in for PPL Electric to control their inverter(s)" and could "opt-out at any time." (SEF St. No. 1-SR, p. 13.) The Company also would be required to provide monthly reports and other data to the parties so that they could properly evaluate the pilot program. (SEF St. No. 1-SR, pp. 11-12, 14.)

In its rejoinder testimony, PPL Electric asserted that the Company should be permitted to implement its DER Management proposal as proposed, based on the evidence presented in this proceeding. (PPL St. No. 1-RJ, p. 26.) Therefore, no pilot program was necessary. (PPL St. No. 1-RJ, p. 33.) However, in the event that the Commission decided that it would be more prudent to test and evaluate some of these technologies, PPL Electric recommended that the pilot program be focused on the remote active management aspect of its DER Management Plan. (PPL St. No. 1-RJ, pp. 26-27.) Therefore, to the extent that the Commission believed a pilot program was more appropriate, PPL Electric set forth a comprehensive recommendation for a five-year pilot program, which would test and evaluate the benefits of remote active management of DERs as compared to the use of the smart inverters' automated grid support functions. (PPL St. No. 1-RJ, pp. 27-33.) Notably, this pilot program would have a control group consisting of the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021, and would require the Company to submit detailed annual reports to the Commission and participating customers. (PPL St. No. 1-RJ, pp. 28, 31-33.)

Under the Settlement, the Joint Petitioners have agreed that the Company can conduct a pilot program, the design of which reflects a reasonable compromise of their competing pilot program proposals. (Settlement ¶¶ 54-63.)

Specifically, this pilot program will 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. The pilot

program will begin on January 1, 2021, and will end three years after the second control group is established. The three years after the second control group is established will be referred to as Program Year 1, Program Year 2, and Program Year 3. (Settlement ¶ 54.)

Two control groups for the remote active management pilot program shall be established. These control groups will operate under autonomous settings only. The first group shall include any DERs connected during the pilot program to the first 75 circuits for which interconnection applications are received by the Company on or after January 1, 2021.⁷ The second group shall include the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021. DERs connected during the pilot program in the first group shall count toward the 1,000 DERs in the second group. After the second group comprises 1,000 DERs, DERs interconnected to the first 75 circuits will still be added to the first group. For DERs that are not part of the control groups, the Company shall be permitted to actively manage the smart inverters' grid support functions. (Settlement ¶ 57.)

To further develop the details of the pilot program, the Settlement also provides that PPL Electric will file a detailed plan at this docket explaining how the Company will implement and conduct the pilot program ("Pilot Implementation Plan"). This Pilot Implementation Plan will be filed within 30 days after the Commission enters an Order approving the Settlement and will include details on the goals of the pilot program, the use cases the Company plans to test and evaluate, the specific methods and approaches for testing each use case, the methods by which

⁷ To preserve the integrity of the 75 distribution circuit control group, it will not include any of the following 12 distribution circuits, due to the presence of remotely managed DERs (*e.g.*, participants in PPL Electric's Keystone Solar Future Project) and/or similar Company-owned facilities (*e.g.*, batteries) on these distribution circuits during the term of the pilot program: (1) Leola No. 3 Distribution Circuit; (2) Leola No. 5 Distribution Circuit; (3) Prince No. 2 Distribution Circuit; (4) South Akron No. 4 Distribution Circuit; (5) Cocalico No. 1 Distribution Circuit; (6) Letort No. 1 Distribution Circuit; (7) Letort No. 2 Distribution Circuit; (8) Buck No. 3 Distribution Circuit; (9) East Petersburg No. 1 Distribution Circuit; (10) Newport No. 1 Distribution Circuit; (11) Crackersport No. 2 Distribution Circuit; and (12) Renovo No. 2 Distribution Circuit. Customers located on these 12 distribution circuits may still be a part of the second control group, consisting of the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021. (Settlement ¶ 57 n.2.)

PPL Electric will communicate the pilot program's requirements to customers and DER installers, and any additional information PPL Electric believes is necessary to include in the annual reports. Under the Settlement, the Joint Petitioners will have an opportunity to provide their feedback on the Pilot Implementation Plan before it is finalized by the Company. (Settlement ¶ 61.)

The Settlement also sets forth procedures for continuing or adjusting the program when it nears its conclusion. Within 60 days after the end of Program Year 2, PPL Electric will be permitted to file a petition with the Commission to: (a) extend the program and make such other changes to the program as the Company may request; (b) continue installing the DER management devices on new DERs in its service territory; and/or (c) authorize the Company to remotely and actively manage (i) the DERs that were in the control groups, (ii) the DERs that have enrolled and will enroll in the program, and (iii) any new DERs that will interconnect with the Company's distribution system after the program concludes. But if no such petition, the remote active management program will end after the Program Year 3. Also, regardless of whether this remote active management program is continued or not, the Company will be authorized to continue: (a) requiring new DERs to have IEEE 1547-2018 compliant smart inverters; (b) utilizing the smart inverters' automated grid support functions; and (c) monitoring the DERs that have the Company's DER management devices installed, provided that such monitoring shall continue only with written customer consent. (Settlement ¶¶ 62-63.)

The Settlement's provisions regarding the pilot program are just and reasonable and in the public interest. As explained above, this pilot program will test and evaluate the benefits of monitoring and the benefits of active management versus autonomous functions. While PPL Electric argued that the benefits of monitoring and remote active management were well-

established, other parties disagreed with the Company's analysis. This pilot program will enable the Company to gather valuable data on these issues and present PPL Electric's findings to the Commission, the Joint Petitioners, and any interested stakeholders. Moreover, such data will be extremely valuable to the Company, the Commission, and the Joint Petitioners if and when PPL Electric files a petition to continue or adjust its DER Management proposal in Program Year 2. Similarly, the data gathered through this pilot program can be used to better inform the decisions made in any statewide Commission proceeding related to IEEE 1547-2018 and UL Standard 1741-SB. Lastly, the Settlement clarifies the procedures for the continuation or adjustment of the pilot program when it nears its end, as well as the requirements and conditions that will survive the pilot program if it concludes. For these reasons, these settlement provisions should be adopted without modification.

2. Annual Cap on the Number of DER Management Devices that PPL Electric Can Purchase and Install During the Pilot Program

Under the Company's original proposal, as noted previously, new DER customers would have to install DER Management devices that enable PPL Electric to monitor and proactively manage the DERs' smart inverter settings. (PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.)

Other parties raised concerns about the additional costs this proposal would impose on new DER customers. For example, NRDC argued that the Company's original proposal would "impose costs on each and every interconnecting customer by requiring the installation and maintenance of a communication interface." (NRDC St. No. 1, p. 7.) NRDC maintained that the Company had "not provided sufficient information on the cost and reliability of the communications devices it plans to require its customers to buy, nor documented that there is an appropriate supply chain and equipment availability." (NRDC St. No. 1, p. 8.) Likewise, SEF

contended that “the total unit cost for the DER management device . . . could increase the total installation cost by 6% or 10% for small residential systems.” (SEF St. No. 2, p. 11.)

In response to these concerns, PPL Electric updated its proposal in its rebuttal testimony. Under the updated proposal, the Company would purchase, install, own, and maintain the DER Management devices at no direct cost to the participating DER customers, rather than having the participating customers purchase and install the DER Management devices. (PPL St. No. 1-R, p. 7.)

After PPL Electric updated its DER Management proposal, NRDC raised concerns about: (1) the costs and expenses that the Company would incur; and (2) the availability and supply chain of the DER Management devices selected by PPL Electric. (NRDC St. No. 1-SR, pp. 4-5, 9.) NRDC first observed that PPL Electric’s updated proposal to purchase, own, install, and maintain the DER Management devices “address[ed] [its] concern about the direct costs to DER customers.” (NRDC St. No. 1-SR, p. 5.) However, NRDC expressed a concern about the availability of the DER Management devices the Company planned to utilize. (NRDC St. No. 1-SR, pp. 9-12.) According to NRDC, “the rebuttal testimony of PPL Witnesses indicate[s] that the current and prospective capabilities of ConnectDER may be inadequate to supply PPL, if PPL required these devices for all DER interconnections under 15 kW.” (NRDC St. No. 1-SR, p. 9.) This purported lack of availability “could create a bottleneck that slows DER installations, if a sufficient supply of devices is not available.” (NRDC St. No. 1-SR, p. 9.)

Additionally, OCA was concerned about the costs and expenses associated with PPL Electric’s updated proposal. In its surrebuttal testimony, OCA stated that the Company “is proposing to spend \$755 plus ongoing maintenance costs for every DER installation on its system” by purchasing, installing, owning, and maintaining the DER Management devices.

(OCA St. No. 1-SR, p. 6.) However, the potential rate impact would be entirely dependent on the number of DER Management devices that are actually installed. (OCA St. No. 1-SR, pp. 6-7.) According to OCA, PPL Electric “failed to demonstrate that ratepayers should bear this cost,” and it would be “unreasonable to expose ratepayers to the uncapped rate increase implicit in the Company’s Revised DER Management Plan.” (OCA St. No. 1-SR, p. 7.)

In PPL Electric’s rejoinder testimony, the Company refuted any concerns about the DER Management devices’ availability and supply chain. PPL Electric explained that it will maintain a running inventory for minimum of three months’ worth of system demand, starting at 400 units, which will be replenished monthly. (PPL St. No. 1-RJ, p. 5.) ConnectDER LLC (“ConnectDER”) will maintain minimum of three months’ worth of inventory, which will be available for immediate delivery. (PPL St. No. 1-RJ, p. 5.) ConnectDER’s manufacturer, Allen Integrated Assemblies (“AIA”), will maintain an allocated inventory for PPL Electric of the necessary parts and components to assemble an additional three months’ worth of units, which can all be delivered within one month’s time. (PPL St. No. 1-RJ, p. 5.) For additional materials beyond the nine-month supply, the longest lead time is three months. (PPL St. No. 1-RJ, p. 5.) AIA can hire and train additional labor in two weeks’ time. (PPL St. No. 1-RJ, p. 5.) In addition, based on the Company’s experience with DER installations in its service area, it takes customers a minimum of approximately six weeks to install their DER systems after they receive the PPL Electric’s approval. (PPL St. No. 1-RJ, p. 5.) Therefore, the Company will be able to foresee the demand coming. (PPL St. No. 1-RJ, p. 5.) ConnectDER also has provided PPL Electric with a letter of prioritization, showing that demand by other utilities should not affect the Company’s demand for the DER Management devices. (PPL St. No. 1-RJ, p. 5.)

Furthermore, PPL Electric rebutted OCA's claims about the potential rate impact of the Company's proposal. (PPL St. No. 7-RJ, pp. 4-6.) Primarily, the Company observed that it is not seeking approval in this proceeding for immediate recovery of the capital costs and expenses associated with the DER Management devices. (PPL St. No. 7-RJ, p. 4.) Therefore, parties will still be able to investigate and challenge the amount of capital costs and expenses that the Company proposes to recover in a future proceeding, which will most likely be a base rate case. (PPL St. No. 7-RJ, pp. 4-5.) Moreover, OCA's "example" of the potential rate impact of the Company's updated proposal was based on unrealistic assumptions and misrepresented how rates would actually be determined in a future base rate case. (PPL St. No. 7-RJ, pp. 4-5.)

Under the Settlement, the Joint Petitioners have agreed to an annual cap of 3,000 DER Management devices that can be installed during the pilot program. Any DERs installed above the annual limit will not be part of the pilot program. Stated otherwise, the annual cap on the number of DER Management devices will not be an annual cap on the number of new DERs that can be interconnected with the Company's distribution system. The Company also will not deny or delay the permission to connect and operate a DER due to unavailability of DER management devices. Any DER not equipped with a DER Management device for this reason shall not be part of the pilot program. (Settlement ¶¶ 55-56.)

These settlement provisions address the supply chain issues raised by NRDC and the cost concerns raised by OCA. By placing the annual cap on the number of DER Management devices that can be installed during the pilot program, the Joint Petitioners know the maximum number of DER Management devices that may be purchased and installed by the Company in a given year. Therefore, the Joint Petitioners have a clearer understanding about: (1) the number of DER Management devices that PPL Electric will procure and install in a given year; and (2)

the estimated costs associated with the pilot program. At the same time, the Settlement clarifies that this annual cap and any supply chain issues with the DER Management devices will not impair or impede the ability of DERs to interconnect with the Company's electric distribution system. Thus, these settlement provisions are just and reasonable, are in the public interest, and should be approved without modification.

3. Grid Support Functions that Will Be Used Autonomously and Managed Remotely

In their direct testimony, NRDC and OCA alleged that there was a lack of detail about the grid support functions that the Company would actually use, including the parameters governing how long and how often those functions could be used. (NRDC St. No. 1, pp. 7-8, 24; OCA St. No. 1, pp. 11-12, 14-15.) However, both recognized that the autonomous use of smart inverters' grid support functions would provide many benefits. (NRDC St. No. 1, p. 18; OCA St. No. 1, p. 19, 27.)

In the Company's rebuttal testimony, PPL Electric witness Salet provided a comprehensive list of the grid support functions that the Company would use under its DER Management Plan as well as details about when, how much, and how long those functions would be used by the Company. (PPL St. No. 1-R, p. 24; PPL Exh. SS-1R.) As explained in that exhibit (*i.e.*, PPL Exh. SS-1R), PPL Electric proposed to use the following grid support functions in both autonomous and active management modes: (1) Volt/VAR⁸; (2) Constant Power Factor⁹;

⁸ Volt/VAR, also commonly referred to as "Volt-Var Mode" or "Voltage-reactive power mode," is intended to stabilize grid voltages and enable the DERs to either supply or absorb reactive power in response to local voltage issues. The amount of reactive power that gets injected or absorbed is dictated by a curve defining the percentage of reactive power (Q) versus per-unit voltage (V) at the DER. (PPL St. No. 1-R, p. 25.)

⁹ Constant Power Factor mode, also commonly referred to as "Fixed Power Factor Function" or "Specified Power Factor," allows the inverter to operate at a specific power factor based on a pre-determined or real time system voltage need. Under the DER Management proposal, Volt/VAR would be the default voltage regulation mode. Therefore, under normal operating conditions, the Constant Power Factor function would remain deactivated. (PPL St. No. 1-R, p. 34.)

(3) Remote On/Off¹⁰; (4) Voltage Ride-through¹¹; and (5) Frequency Ride-through¹². (PPL St. No. 1-R, pp. 24-25; PPL Exh. SS-1R.)

In surrebuttal testimony, NRDC recommended that PPL Electric be authorized to set smart inverters' default autonomous Volt/VAR settings as well as their autonomous ride-through settings consistent with PJM Interconnection LLC's ("PJM") recommendations. (NRDC St. No. 1-SR, pp. 2-3.) However, as stated previously, NRDC continued to disagree with PPL Electric's proposal to remotely and actively manage those settings. (NRDC St. No. 1-SR, pp. 4, 13-14.) Further, SEF argued that PPL Electric should not be permitted to use the Remote On/Off function on solar plus storage systems when there is a power outage. (SEF St. No. 2-SR, pp. 2-3.)

PPL Electric responded to SEF's argument about the Remote On/Off function in the Company's rejoinder testimony. (PPL St. No. 1-RJ, p. 22.) The Company explained that for solar plus storage, PPL Electric has no intention of shutting down a battery storage system or the solar system during outage situation. (PPL St. No. 1-RJ, p. 22.) With either a DC coupled or an AC coupled solar plus storage, the Company would only remotely turn off the inverter connected to the distribution system in the case where its grid side failed to disconnect and is back-feeding into a de-energized and faulted line section, or if there is an emergency situation such as a gas leak. (PPL St. No. 1-RJ, p. 22.)

The Settlement specifically addresses these issues about the grid support functions that PPL Electric may use autonomously and may actively manage. Under the Settlement, all new

¹⁰ Remote On/Off function, also commonly referred to as "Connect/Disconnect function," allows the inverter to be connected or disconnected remotely. (PPL St. No. 1-R, p. 31.)

¹¹ Voltage Ride-through, if enabled, allows inverters to continue operating or "ride-through" during momentary voltage and frequency deviations. (PPL St. No. 1-R, p. 37.)

¹² Frequency Ride-through allows inverters to continue operating or "ride-through" during momentary frequency deviations. (PPL St. No. 1-R, p. 39.)

DERs interconnected with the Company's distribution system after January 1, 2021, Volt/VAR shall be used as the default voltage management mode for all inverters, and the Company shall establish default Volt/VAR settings. The Company shall also establish default settings for voltage ride-through and frequency ride-through functions consistent with PJM's standards. Alternative voltage management modes and settings may be used to reduce or eliminate distribution system upgrade costs to interconnecting customers with the customer's agreement. (Settlement ¶ 58.)

In addition, for DERs in the remote active management group, the Company may only manage the following grid support functions of the smart inverters: (1) Volt/VAR; (2) Constant Power Factor; (3) Remote On/Off; (4) Voltage Ride-through; (5) Frequency Ride-through; and (6) Volt/Watt.¹³ Volt/VAR shall be the default voltage management mode for all actively controlled inverters. Volt-Watt may only be enabled and managed with the consent of the interconnecting customer. Settings for voltage ride-through and frequency ride-through shall be maintained in accordance with PJM's standards. Consistent with the Company's rejoinder testimony, PPL Electric will only use the Remote On/Off function on battery storage or solar systems that have not safely isolated or "islanded" from the distribution system: (1) in emergency situations, such as a gas leak or fire in the vicinity of the DER; or (2) during a power outage. (Settlement ¶ 59.)

As a result, these settlement provisions clarify the grid support functions that PPL Electric can establish and use under its proposal. The Company also anticipates providing more details about these grid support functions, including when and to what extent they may be used,

¹³ "When enabled, volt / watt mode limits real power production based on distribution system voltage" by having the inverter curtail "generation in order to bring or keep voltage in balance." (OCA St. No. 1, p. 14.) Volt-Watt was not required under the Company's proposal; however, the Company reserved the right to offer Volt-Watt function to customers as an alternative to system upgrades at the time of interconnection on a case-by-case basis. (PPL St. No. 1-R, pp. 41-42.)

in the Pilot Implementation Plan that will be filed pursuant to Paragraph 61 of the Settlement. Therefore, the Joint Petitioners will have another opportunity to provide feedback on the parameters for these functions. Thus, these settlement provisions are just and reasonable, are in the public interest, and should be approved without modification.

4. Non-Participation in PJM Wholesale Markets

On September 17, 2020, the Federal Energy Regulatory Commission (“FERC”) issued Order No. 2222 at Docket No. RM18-9-000, which “remove[d] barriers to the participation of distributed energy resource aggregations in the Regional Transmission (RTO) and Independent System Operator (ISO) markets (RTO/ISO markets).” *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*, 172 FERC ¶ 61,247, P1 (Sept. 17, 2020) (“Order No. 2222”).

Under the Settlement, PPL Electric’s pilot program is focused on testing and evaluating the benefits of monitoring DERs and the benefits of remotely managing DERs versus relying on the smart inverters’ autonomous functions. (Settlement ¶ 54.) PPL Electric has agreed not to use the monitoring and/or management of DER inverters during the pilot program to offer services in PJM wholesale markets. Also, monitoring and/or management of DER inverters by the Company during the pilot program to support distribution grid services beyond system safety and reliability (e.g., conservation voltage reduction) shall only be permitted after separate application by the Company and approval by the Commission. As to the impact of the Company’s Settlement on DER customers and third parties who may want to offer services in PJM wholesale markets, the Settlement clarifies that such actions are permitted subject to any limitations caused by the Company’s management of the inverters to manage distribution system safety and reliability as part of the pilot program. (Settlement ¶ 60.)

These settlement provisions are just and reasonable and in the public interest because they clarify the scope and impact of PPL Electric’s monitoring and management of DERs during the term of the pilot program. In light of FERC’s Order No. 2222, there may have been some uncertainty as to whether the Company would be able to aggregate the DERs and participate in the PJM wholesale markets during the pilot program. However, PPL Electric has committed to focus on the testing and evaluation of the pilot program. For these reasons, these settlement provisions should be adopted without modification.

C. COST RECOVERY OF DER MANAGEMENT DEVICES

In the Company’s direct testimony, PPL Electric explicitly stated that it “is not requesting any ratemaking findings as part of this proceeding, including whether these projected capital investments should be recovered by the Company.” (PPL St. No. 1, p. 28 n.16.) Even after PPL Electric updated its proposal in the Company’s rebuttal testimony, such that the Company would purchase, install, own, and maintain the DER Management devices, PPL Electric explained that it was “not making a claim to recover the capital costs and expenses associated with the ConnectDER DER Management devices in this proceeding.” (PPL St. No. 1-R, p. 21.) Rather, “[a]ny such proposal will be made in a future proceeding, most likely a base rate case.” (PPL St. No. 1-R, p. 21.)

Under the Settlement, PPL Electric is authorized to make a claim in its next base rate case to recover the capital costs and expenses associated with the DER Management devices that the Company will purchase, own, install, and maintain. In said base rate case, the Joint Petitioners may challenge the amount of the Company’s claim, the prudence and reasonableness of the costs and expenses, and the manner in which those costs and expenses are recovered; provided, however, that the Joint Petitioners will not argue that the pilot program for remote

monitoring and active management was imprudent or unreasonable, except to the extent that the Company retains discretion over the Pilot Implementation Plan. (Settlement ¶ 64.)

This settlement provision is just and reasonable because it helps ensure that the Joint Petitioners do not relitigate the merits of the DER Management devices or the pilot program in the Company's next base rate case. Rather, such issues should be addressed in the proceeding initiated by the Company's petition to continue or adjust the pilot program. (*See* Settlement ¶ 62.) As seen in this proceeding, issues regarding smart inverters, DER Management devices, and the pilot program are exceedingly complex and are better suited for a non-base rate proceeding. Thus, this settlement provision should be adopted without modification.

D. STATEWIDE PROCEEDING

As explained in Section III.A.1., *supra*, OCA, NRDC, and SEF argued that the issues raised by PPL Electric's DER Management Petition should be addressed in a statewide proceeding. However, the Company demonstrated that the instant proceeding was better suited to resolve those issues for several reasons.

In the end, the Joint Petitioners have reached a Settlement that fully resolves all the issues raised in the instant proceeding. Nonetheless, the Joint Petitioners recognized that the Commission could still initiate a statewide proceeding that focuses on smart inverters, DER Management devices, IEEE 1547-2018, IEEE 1547.1, and/or UL Standard 1741 after its approval of the Settlement. Accordingly, the Settlement provides that PPL Electric will participate in any statewide proceeding initiated by the Commission that focuses on those issues, and the Company will give due consideration to revise its default voltage management and ride-through modes and settings, as well as other DER management protocols, to help achieve greater statewide consistency. (Settlement ¶ 65.) This settlement provision appropriately addresses the impact that a statewide proceeding on these issues could have on PPL Electric's DER

Management proposal. Thus, the settlement provision is just and reasonable, is in the public interest, and should be adopted without modification.

E. REPORTING REQUIREMENTS

In this proceeding, OCA made a series of recommended conditions on the Commission's approval of PPL Electric's DER Management Petition, including detailed reporting requirements on "customer generation losses," "when, where, and how often voltage regulation functions are utilized," "the impact of using new versus conventional planning tools," and "criteria related to the provision of grid services from the DERs under PPL's control (if applicable)." (OCA St. No. 1, pp. 52-53.)

In rebuttal, PPL Electric agreed to many of these reporting requirements, including tracking and reporting the real power reductions experienced by customers under the Company's proposal. (PPL St. No. 1-R, pp. 85-87.) PPL Electric also stated that it would send an annual report to each new DER customer, whose grid support functions are used during that annual reporting period. (PPL St. No. 1-R, p. 86.) In that annual report, the Company would provide the amount of generation loss experienced by the customer for the past year. (PPL St. No. 1-R, p. 86.) PPL Electric also would track and report when, where, and how often voltage regulation functions are utilized. (PPL St. No. 1-R, p. 86.) Additionally, PPL Electric agreed to report on when non-wires alternatives are installed in order to defer distribution system upgrades. (PPL St. No. 1-R, p. 87.)

Subsequently, when SEF made its alternative pilot program recommendation in its surrebuttal testimony, SEF proposed that PPL Electric "provide monthly reports to Parties" with various pieces of information about the pilot program, such as "the number of new DER customers connected" and "all the reports outlined" on pages 85 to 87 of PPL Electric witness Salet's rebuttal testimony. (SEF St. No. 1-SR, pp. 11-12.)

In rejoinder, PPL Electric averred that its updated proposal substantially addressed the customer protection concerns raised by the OCA, including the submission of annual reports to the Commission and individual customers that would provide the Commission, stakeholders, and customers with significant oversight of the DER Management Plan. (PPL St. No. 1-RJ, p. 12.) Moreover, as set forth in the Company's pilot program alternative, PPL Electric would provide extensive annual reports to the Commission, stakeholders, and individual customers about the progress of the DER Management Plan and the impact, if any, on participating customer-generators' production. (PPL St. No. 1-RJ, pp 12, 31-33.)

The Settlement sets forth comprehensive reporting requirements, broken down by: (1) the annual reports to be filed with the Commission within 30 days following the end of each program year; and (2) the individualized annual reports to be sent to each new DER customer whose smart inverter's grid support functions are used by the Company during the annual reporting period. (Settlement ¶¶ 66-69.) Among other things, the annual reports will provide detailed information about the grid support functions used and the costs/benefits associated with the use of those functions. (Settlement ¶¶ 67, 69.) The annual reports filed with the Commission also will set forth the number of DERs installed, the number of DER Management devices installed, and the capital costs and expenses associated with the purchase, installation, ownership, and maintenance of the DER Management devices. (Settlement ¶ 68.) Such information will enable the Commission, the Joint Petitioners, and interested stakeholders to track the progress of the pilot program and the costs and expenses associated with it. Further, the Joint Petitioners may agree to additional reporting requirements after the filing of the Pilot Implementation Plan. (Settlement ¶ 67.) As a result, these settlement provisions will help provide the interested parties with the information needed to evaluate the pilot program. Based

on the foregoing, these settlement provisions are just and reasonable, are in the public interest, and should be approved without modification.

F. COMPLIANCE TARIFF SUPPLEMENT

In this proceeding, PPL Electric proposed to establish a new rule in its retail tariff entitled “Rule 12 – Distributed Energy Resources Interconnection Service” or “DERIS.” (PPL St. No. 1, p. 22.) A copy of the *pro forma* tariff supplement filed by the Company with its DER Management Petition setting forth the new DERIS tariff rule was provided as PPL Electric Exhibit SS-1. (See PPL Exh. SS-1.) The originally-filed DERIS provided customer application details and technical DER equipment standards under the DER Management Plan. (PPL St. No. 1, p. 23; PPL Exh. SS-1.) Specifically, these tariff pages provided details about the device requirements, including smart inverters, DER management devices, and DER monitoring and management. (PPL St. No. 1, p. 23; PPL Exh. SS-1.)

OCA and SEF raised concerns about the Company’s specifications for the grid support functions being outlined in another document (*i.e.*, the Company’s DER Management Plan White Paper), instead of the DER Management Petition, the Company’s *pro forma* tariff supplement, or both. (OCA St. No. 1, pp. 11-12, 35-39; SEF St. No. 1 (Non-Proprietary), p. 4.)

In the Company’s rebuttal testimony, PPL Electric explained that there was no requirement for the Company to include the DER Management Plan White Paper in its DER Management Petition. (PPL St. No. 1-R, p. 42.) Also, no need exists to list all the specifications word-for-word in the Company’s Commission-approved tariff because there are many regulatory requirements that PPL Electric must follow that are not included in its tariff. (PPL St. No. 1-R, p. 43.) In fact, if the Commission directed the Company follow those specifications in its Order approving the DER Management Petition, PPL Electric would be required to follow the Commission’s Order. See 66 Pa. C.S. § 501(c) (stating that “[e]very public utility, its officers,

agents, and employees . . . shall observe, obey, and comply with” the Commission’s “regulations or orders, and the terms and conditions thereof”). Furthermore, all of these specifications will be set forth in the Company’s Rules for Electric Meter & Service Installations (“REMSI”), which is incorporated explicitly into PPL Electric’s proposed Rule 12 – Distributed Energy Resource (DER) Interconnection Service. (PPL St. No. 1-R, p. 43.) The Company’s REMSI is publicly-available on the Company’s website.¹⁴ (PPL St. No. 1-R, p. 43.) Therefore, customers, DER owners, DER installers, and any other interested persons will be able to access the Company’s website and obtain a complete list of the Company’s specifications for the grid functions that PPL Electric will use under the DER Management Plan. (PPL St. No. 1-R, p. 43.)

The Settlement provides that upon Commission approval of the DER Management Petition, PPL Electric shall file a compliance tariff supplement, effective on one day’s notice, that is consistent with the *pro forma* tariff supplement attached to the Settlement as **Appendix A**. As seen in Appendix A of the Settlement, the *pro forma* tariff supplement has been updated to reflect the terms of the Settlement. All of the Joint Petitioners were provided a copy of the *pro forma* tariff supplement before executing the Joint Petition for Settlement of All Issues. Therefore, PPL Electric should be permitted to file a compliance tariff supplement consistent with Appendix A, pursuant to the Settlement. Thus, this settlement term is just and reasonable, is in the public interest, and should be approved without modification.

G. ELECTRIC VEHICLES

Another issue raised in this proceeding was whether PPL Electric’s DER Management Petition would apply to electric vehicles (“EVs”). (See OCA St. No. 1, p. 44; SEF Set. No. 1, pp. 9-10.)

¹⁴ See “Rules for Electric Meter & Service Installations (REMSI),” available at <https://www.pplelectric.com/remsi>.

In the Company's rebuttal testimony, PPL Electric clarified that "[a]n EV is a load installed behind the meter and generally will not be impacted by the Company's proposal." (PPL St. No. 1-R, p. 82.) "However, if the EV is used as a battery outputting power onto the grid through an inverter, it will fall under the DER Management proposal." (PPL St. No. 1-R, p. 82.)

OCA witness Nelson contended in his surrebuttal testimony that PPL Electric did not address the installation costs or explain how DER Management devices would interconnect to EVs. (OCA St. No. 1-SR, pp. 8-9.)

In rejoinder, PPL Electric clarified that it was no longer proposing to include EVs under its present DER Management Plan. (PPL St. No. 1-RJ, p. 10.) But, in the future, as standards and EV technology develop and mature, PPL Electric will continue to evaluate impact to safety and reliability on the distribution system. (PPL St. No. 1-RJ, p. 10.)

The Settlement states that EVs are exempt from the requirements of Section II.B. of this Settlement. (Settlement ¶ 71.) Therefore, the Settlement effectively memorializes the Company's statement in its rejoinder testimony that EVs would not be included under its present DER Management Plan. Thus, this settlement provision is just and reasonable, is in the public interest, and should be adopted without modification.

H. DATA ON PROGRAM PERFORMANCE

As explained in Section III.E., OCA, SEF, and PPL Electric all submitted testimony about the reporting requirements that should be adopted as part of this proceeding. In addition to the detailed annual reports PPL Electric will be submitting pursuant to the Settlement, the Company also agreed to provide SEF with certain pieces of anonymized data within 30 days after the end of each program year. Specifically, the Settlement states that the Company will provide: (1) Raw Meter Data – 15-minute interval data for participants (delivered kWh, received kWh, RMS voltage); and (2) DER Management Data – 15-minute inverter data for participants

(kW & voltage). (Settlement ¶ 72.) When providing the data to SEF, PPL Electric will use generic but unique identifiers for each customer to anonymize the customers' names and account numbers when providing the data to SEF. (Settlement ¶ 73.) As a result, the settlement provision will provide SEF with data that will be useful in evaluating the Company's pilot program, while protecting the customers' personal information. Accordingly, the settlement provision is just and reasonable and in the public interest. Therefore, it should be approved without modification.

I. NO PRECEDENTIAL EFFECT

In its direct testimony, OCA averred that PPL Electric's DER Management Petition, if approved, "would be precedent setting." (OCA St. No. 1, p. 29.) SEF likewise asserted that the Company's proposal "will have great consequence across entire industries." (SEF St. No. 1 (Non-Proprietary), p. 4.)

As PPL Electric explained in its rebuttal testimony, however, PPL Electric has distinct characteristics from its peer EDCs that warrant the Company being able to implement its proposal. (PPL St. No. 1-R, p. 59.) For example, without a DERMS, an EDC cannot implement a proposal similar to PPL Electric's DER Management Plan. (PPL St. No. 1-R, p. 60.) However, to the best of the Company's knowledge, PPL Electric is the only EDC in Pennsylvania with a DMS, deployed and fully functional FISR, a DERMS, and an RF Mesh network designed for DER communications. (PPL St. No. 1-R, p. 60.) PPL Electric's service territory also has some of the highest solar radiation in the Commonwealth. (PPL St. No. 1-R, pp. 60-61.) Further, the Company's distribution system is much more rural with much longer circuits compared to other EDCs in Pennsylvania. (PPL St. No. 1-R, p. 61.) Long distribution circuits make managing voltage more challenging due to the line losses associated with long distribution lines. (PPL St. No. 1-R, p. 61.)

The Settlement provides that the Commission's approval of PPL Electric's DER Management Plan, as modified by this Settlement, shall not serve as precedent for any other electric utility's proposal to monitor and manage DERs interconnected with their distribution systems. (Settlement ¶ 74.) This Settlement reflects a carefully-crafted compromise of the Joint Petitioners' positions and is based on the unique circumstances of PPL Electric. (Settlement ¶ 74.) Therefore, this settlement provision addresses the concerns about the precedential effect of the Commission approving PPL Electric's DER Management Petition in this proceeding. Thus, this settlement provision is reasonable and in the public interest and should be approved without modification.

IV. CONCLUSION

Through cooperative efforts and the open exchange of information, the Joint Petitioners have arrived at a Settlement that resolves all issues in the proceeding in a fair and equitable manner. The Settlement is the result of detailed examination of PPL Electric's DER Management Petition through many discovery responses, testimony and accompanying exhibits, followed by the presentation of counter-positions on some issues, and then settlement negotiations. A fair and reasonable compromise has been achieved in this case, as is evident by the fact that all active parties have agreed to the resolution of the issues in this proceeding.

Based on the foregoing, PPL Electric respectfully requests that Your Honors and the Commission approve the Joint Petition for Settlement of All Issues without modification.

Respectfully submitted,



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Date: October 5, 2020

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Appendix F – OCA’s Statement in Support

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of PPL Electric Utilities Corporation :
for Approval of Tariff Modifications and Waivers : Docket No. P-2019-3010128
of Regulations Necessary to Implement its :
Distributed Energy Resources Management Plan :

STATEMENT OF
THE OFFICE OF CONSUMER ADVOCATE
IN SUPPORT OF
THE JOINT PETITION FOR SETTLEMENT OF ALL ISSUES

The Office of Consumer Advocate (OCA), one of the signatory parties to the Joint Petition for Settlement of All Issues (Settlement), finds that the proposed terms and conditions of the Settlement are in the public interest and in the interest of PPL Electric’s ratepayers. The OCA respectfully requests that the Pennsylvania Public Utility Commission (Commission) approve the Settlement, without modification, for the reasons set forth below:

I. BACKGROUND

On May 24, 2019, PPL Electric Utilities Corporation (PPL Electric or the Company) filed its Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan (Petition). Through its Petition, the Company requested Commission approval to waive several Commission regulations and modify its tariff to add Rule 12, entitled Distributed Energy Resource Interconnection Service (DERIS or Rule 12). Petition, App. A. As drafted, Rule 12 would require that new Distributed Energy Resource (DER) applicants install a ‘smart inverter,’ consistent with recently updated industry standards, and a DER management device as a condition for interconnection. Petition ¶

36. The latter device would allow the Company to remotely monitor and manage a customer's DER. Petition ¶ 37.

On July 30, 2019, the OCA filed an Answer recommending that the Commission not grant the Company's Petition at this time, as it was premature and omitted critical information. Rather, the OCA noted that these issues are best dealt with on a statewide level considering the broad impacts this will have to regulators, utilities, and customer generators of Pennsylvania. Answers and Petitions to Intervene were also submitted by the Sustainable Energy Fund (SEF), Natural Resources Defense Council (NRDC), and Sunrun Inc. (Sunrun). Although not seeking to intervene in the proceeding, the following parties submitted Comments requesting denial of the Petition, or in the alternative, requesting a suspension of the tariff revisions and establishment of a stakeholder proceeding to thoroughly examine the major policy and technical issues: Trinity Solar, GridLab, the Solar Unified Network of Western Pennsylvania, Energy Independent Solutions, LLC, the Interstate Renewable Energy Council, the Pennsylvania Solar Energy Industries Association, and Exact Solar.

The Petition was assigned to the Office of Administrative Law Judge and was further assigned to Administrative Law Judges Emily I. DeVoe (ALJ DeVoe) and Mary D. Long (ALJ Long) for investigation and the scheduling of hearings.

On September 20, 2019, NRDC and Sunrun separately filed Petitions for Interlocutory Review and Answer to Material Questions (Interlocutory Review Petitions) seeking interlocutory Commission review of whether the Company's Petition implicated matters of statewide concern and should be denied in favor of addressing these issues in a state forum. By Opinion and Order entered October 17, 2019, the Commission determined that the Interlocutory Review Petitions were prematurely before the Commission and returned the matter to the Office of Administrative

Law Judge. On November 18, 2019, a Prehearing Order was issued setting forth a litigation schedule in this matter.

On February 5, 2020, after investigation and review of the Company's filing, the OCA filed the Direct Testimony of Ron Nelson, OCA Statement 1.¹ On behalf of the OCA, Mr. Nelson recommended, *inter alia*, that the Commission reject PPL Electric's Petition and require a state-wide proceeding for implementing the relevant updated industry standards. On March 19, 2020, in further support of its position, the OCA filed the Surrebuttal Testimony of Ron Nelson, OCA Statement 1-SR.

On March 6, 2020, the Governor of the Commonwealth of Pennsylvania, Tom Wolf, issued a Proclamation of Disaster Emergency (Proclamation). The Proclamation established the existence of a disaster emergency throughout the Commonwealth as a result of the novel coronavirus (hereinafter COVID-19). Shortly thereafter, on March 15, 2020, Governor Wolf issued an Executive Order implementing telework protocol for state employees beginning March 16, 2020, and the closing of all state offices in Dauphin County and the Capitol Complex.

As a result of these unforeseen circumstances, a Cancellation Notice was issued canceling the evidentiary hearings scheduled in April. Subsequently, the parties requested that the Presiding Officers hold the litigation schedule in abeyance to provide additional time for settlement discussions, noting that the parties would provide status reports every thirty days. On July 23, 2020, after some time had passed, the Presiding Officers issued an Interim Order rescheduling the evidentiary hearings for September 2 and 3, 2020.

¹ Ron Nelson is a Director with Strategen Consulting and has worked with numerous consumer advocates on issues related to cost of service modeling, rate design, grid modernization, DER valuation and integration, and performance-based regulation. OCA St. 1 at 1. Prior to this, Mr. Nelson was employed with the Minnesota Attorney General's Office for five years, leading the office's works on cost of service, rate design, renewable energy program design, performance-based regulation, and utility business model issues. OCA St. 1 at 1-2. Mr. Nelson's resume is attached to his Direct Testimony. See OCA St. 1, Sch. REN-1.

Between March 2020 and September 2020, the parties engaged in extensive settlement negotiations that involved numerous conference calls, informal discovery, and internal discussions to work through the complex and many issues involved in this proceeding. On August 27, 2020, the parties informed the Presiding Officers that a settlement in principle of all issues in this proceeding had been reached between PPL Electric, NRDC, SEF, and the OCA. Sunrun stated that it would not object to the Settlement.

On August 28, 2020, the Presiding Officers issued an Interim Order Cancelling Hearing and Ordering Parties to Submit Stipulation for Admission of Evidence and Joint Petition for Settlement. In accordance with the above, the parties filed the Joint Stipulation for the Admission of Evidence on September 3, 2020, requesting that the parties' testimony and exhibits be entered into the evidentiary record. The Joint Stipulation for the Admission of Evidence was granted by the Presiding Officers on September 8, 2020. The OCA now submits this Statement in Support of the Settlement.

II. SETTLEMENT TERMS AND CONDITIONS

The terms and conditions of the Settlement satisfactorily address the issues raised in the OCA's Answer and testimony. The OCA recognizes that this Settlement contains modifications from the original recommendations proposed by the OCA. The OCA submits, however, that the agreed upon Settlement achieves a fair resolution of the many complex issues presented in this proceeding.

In this Statement in Support, the OCA addresses those areas of the Settlement that specifically relate to important issues that the OCA raised in this case. The OCA expects that other parties will discuss how the Settlement's terms and conditions address their respective

issues and how those parts of the Settlement support the public interest standard required for Commission approval.

For these reasons, and those that are discussed in greater detail below, the OCA submits that the Settlement is supported by substantial evidence, is in the public interest and in the interest of PPL's ratepayers, and should be approved by the Commission without modification.

A. Smart Inverters (Settlement ¶¶ 48-53)

The Settlement contains several provisions related to 'smart inverters,' one of the two devices the Company was asking the Commission to require for new DER applicants as part of Rule 12. Generally, the Settlement provides that as of January 1, 2021, new DERs connecting with PPL Electric's distribution system must have smart inverters installed as a condition of interconnection. Settlement ¶ 48. Between January 1, 2021, and December 31, 2021, the smart inverters must meet the interim requirements: (1) Underwriters Laboratories ("UL") Standard 1741 Supplement A ("UL 1741 SA"); and (2) the Company's testing for the communications requirements under the 2018 revisions to the Institute of Electrical and Electronics Engineers ("IEEE") Standard 1547. Settlement ¶ 48. After December 31, 2021, the Company will transition to requiring new DERs to have smart inverters installed that meet IEEE 1547-2018 and have been certified with IEEE 1547.1 / UL 1741 Supplement B ("UL 1741 SB"). Settlement ¶ 49. Moreover, the Settlement provides that PPL Electric shall not be responsible for purchasing, owning, installing, or maintaining the customers' smart inverters. Settlement ¶ 53.²

² The Settlement also includes a grandfather clause stating that existing DER installations are not subject to the smart inverter requirements and that if a customer installs a new inverter on an existing DER installation or upgrades an existing DER installation after January 1, 2021, the customer may install a replacement inverter of similar make and model as the existing inverter; provided, however, that any such inverter must meet the Commission's applicable standards and requirements set forth in its regulations. Settlement ¶¶ 50-51.

The OCA submits that these provisions, taken together, are in the public interest and in the interest of PPL Electric's ratepayers. From the beginning of this proceeding, the OCA has recognized the benefits that smart inverters can provide to local distributions systems. OCA Answer at 6. Likewise, the OCA's witness, Mr. Nelson, encouraged the adoption of smart inverters and the applicable industry standards in an appropriate manner. OCA St. 1 at 52. Such adoption is consistent with the policy statement set forth by the National Association of Regulatory Utility Commissioners (NARUC):

Resolved that the Board of Directors of the National Association of Regulatory Utility Commissioners, convened at its 2020 Winter Policy Summit in Washington, DC, recommend State commissions, consistent with the practices and procedures of that State, convene proceedings that engage stakeholders soon; utilize existing research and experience and make evidence-based decisions to adopt the current IEEE 1547; and align implementation of the standard with the availability of certified equipment.

PPL Electric St. 2-R, Exh. WR-2R.

Although the OCA was concerned with PPL Electric's proposal to accelerate implementation of smart inverters prior to the applicable industry standards being finalized, the OCA's primary point of contention was the additional requirements PPL Electric sought to implement, such as the DER Management Device that would allow the Company to remotely monitor and manage the DER. Accordingly, the OCA recommended that the Commission deny PPL Electric's Petition as it was premature, lacked important details and consumer protections, and provided too much discretion to PPL Electric. OCA St. 1 at 52. Moreover, the OCA requested that the Commission open a statewide collaborative to implement IEEE 1547-2018. Id.

The Settlement, however, amicably resolves the issues between the OCA and the Company. The Settlement allows the Company to begin requiring smart inverters for new DER applicants pursuant to interim requirements pending the adoption of the applicable industry

standards.³ Settlement ¶¶ 48-49. This is consistent with other states, such as California, that currently utilize interim requirements pending the adoption of the applicable industry standards. OCA St. 1 at 20-21. In addition, the autonomous functions associated with smart inverters, such as voltage and frequency ride-through, voltage regulation, and power factor settings can begin to provide benefits to PPL Electric’s distribution grid, such as increased DER hosting capacity and greater electric stability of the system. See OCA St. 1 at 19.

As will be discussed in more detail below, however, the Company’s original proposal to require a DER Management Device to allow for remote monitoring and management has been severed from the smart inverter requirements. Instead, the Settlement sets forth a temporary, limited pilot program to test the incremental benefits of the DER Management Device and remote monitoring and management (Pilot Program), rather than making it a permanent requirement as originally requested by the Company.

It should be noted, however, that the OCA continues to advocate for a statewide proceeding to uniformly adopt the new industry standards with participation from a broad array of stakeholders. To this end, the Settlement provides that the “Company agrees to participate in any statewide proceeding initiated by the Commission that focuses on smart inverters, DER management devices, IEEE 1547-2018, IEEE 1547.1, and/or UL 1741, and the Company will give due consideration to revise its default voltage management and ride-through modes and settings, as well as other DER management protocols, to help achieve greater statewide consistency.” Settlement ¶ 65. This ensures that as statewide protocols are adopted in any future

³ As indicated in direct testimony, while IEEE 1547-2018 had been adopted at the time of the Company’s filing, the attendant certification standards, IEEE 1547.1 and UL 1741, had yet to be finalized and adopted. OCA Answer at 5. The certification standards are expected to be finalized and published no later than the fourth quarter of 2020. PPL Electric Exh. WR-1R. Compliant inverters are expected to be available on the market during 2021. Accordingly, the Company will be utilizing the interim requirements until Jan. 1, 2022, at which time it will utilize the applicable industry standards. Settlement ¶¶ 48-49.

statewide stakeholder proceeding, PPL Electric is ready and able to conform to Commission requirements.

As stated by OCA witness Nelson, “a smart inverter will be a component of many DER facilities going forward because of the additional capabilities it offers.” OCA St. 1 at 7. These provisions allow PPL Electric to begin requiring the installation of smart inverters consistent with the interim requirements and, once finalized, the applicable industry standards. In addition, real world application will provide useful insight to the Commission when it convenes a statewide implementation proceeding. Accordingly, these provisions are in the public interest.

B. Pilot Program (Settlement ¶¶ 54-63)

Regarding the DER Management Device and the Company’s request to remotely monitor and manage new DER installations, the Settlement establishes a Pilot Program that is limited in scope and cost, and attempts to measure the incremental benefits of the DER Management Device. Settlement ¶ 54. That is, the benefits provided by the DER Management Device that cannot be obtained through a smart inverter and its autonomous functions.

To test the incremental benefits of the DER Management Device, the Pilot Program will establish two control groups that are not subject to remote management, but will only be monitored through the DER Management Device. Settlement ¶ 57. These control groups will only operate under the autonomous settings of the smart inverter. Id. The control groups are set forth as follows:

- a) The first control group is composed of the first 75 circuits that receive an interconnection application on or after January 1, 2021. Settlement ¶ 57. Once a circuit is placed within the control group, all DER installations during the Pilot Program on that control circuit will not be subject to remote management. Id. This ensures that like systems will be

clustered on a circuit, allowing the Company to test the benefits of the smart inverter's autonomous functions in a group setting.

- b) The second control group shall include the first 1,000 new DERs installed in the Company's service territory on or after January 1, 2021, regardless of where that DER is placed. Settlement ¶ 57. DERs installed as part of the first control group can count towards the second control group. Id. However, if the cap on the second control group is reached, DERs can continue to be placed into the first control group if they are installed on a control circuit. Id.

Organizing the control groups in the manner described ensures that the Pilot Program has a sufficient number and cluster of DERs with smart inverters in the control groups allowing the parties to evaluate the benefits of a smart inverter's autonomous functions separate and apart from the benefits of the DER Management Device and remote monitoring and management.

Any DER interconnection applicant that does not meet either requirement for the control groups will be within the test group. Those in the test group will be subject to remote monitoring and management through the DER Management Device. The Settlement limits the amount of DER Management Devices to 3,000 per Program Year. Settlement ¶ 55. Lastly, the Company will be responsible for purchasing, installing, and maintaining the DER Management Devices installed pursuant to the Pilot Program. Settlement ¶ 55.

Prior to Settlement, the OCA had expressed its concern with the Company's proposal to require DER Management Devices so that it may remotely monitor and manage DERs with the device. See generally OCA St. 1. Given the lack of data demonstrating the actual benefits of this device and the costs associated with it, the OCA requested that this Commission deny the Company's Petition. However, establishing a Pilot Program provides PPL Electric the

opportunity to develop the data necessary to determine the incremental benefits of these management devices and whether it is appropriate to implement these devices as a future requirement.

C. Consumer Protections Associated with the Pilot Program

There are several important consumer protections regarding the Pilot Program to ensure that the objectives are clear and that it is limited in scope and cost. First, the Settlement provides the following:

Within 30 days after the Commission enters an Order approving this Settlement, PPL Electric will file a detailed plan at this docket explaining how the Company will implement and conduct the pilot program (“Pilot Implementation Plan”), including the goals of the pilot program, the use cases the Company plans to test and evaluate, the specific methods and approaches for testing each use case, the methods by which PPL Electric will communicate the pilot program’s requirements to customers and DER installers, and any additional information PPL Electric believes is necessary to include in the annual reports that will be submitted pursuant to Paragraphs 20 and 21, *infra*. Within 10 days after the Pilot Implementation Plan is filed, a technical collaborative shall be convened to discuss the Pilot Implementation Plan. Within 20 days after the Pilot Implementation Plan is filed, the Joint Petitioners may file written Comments on the Company’s Pilot Implementation Plan. PPL Electric agrees to give due consideration to the written Comments but retains the ultimate discretion to accept or reject the Joint Petitioners’ feedback in its Pilot Implementation Plan. If any changes are made to the Pilot Implementation Plan based on the Joint Petitioners’ feedback, the revised Pilot Implementation Plan will be filed at this docket within 20 days after the deadline for the Joint Petitioners’ Comments.

Settlement ¶ 61. Accordingly, the Company will have to file its Pilot Implementation Plan shortly after Commission approval setting forth the goals of the pilot, the use cases, and the specific methods and approaches for testing each use case. Id. This ensures that the Pilot Program has prioritized objectives to assess the accuracy of the Company’s claims and whether these devices provide sufficient benefits in light of their cost.

Moreover, to limit the Pilot Program in scope and cost, the Settlement provides that the Pilot Program will run for a period of three program years with an annual cap of 3,000 DER

Management Devices per year. Settlement ¶¶ 55. Additionally, while the Company can track the costs associated with the Pilot Program and make a claim to recover the costs associated with the Pilot Program in the next PPL Electric base rate case, the OCA and other signatory parties reserve their right to challenge the reasonableness and prudence of these costs and how those costs are recovered. Settlement ¶ 64.

Lastly, as the Pilot Program is temporary in nature, the Settlement provides that, within 60 days after the end of Program Year 2, PPL Electric can file a Petition with the Commission to either extend the Pilot Program or request that the DER Management Devices become a requirement going forward including remote monitoring and management of DER devices in the Company's service territory. Settlement ¶ 62.

The Pilot Program is a reasonable resolution to the issues presented in this proceeding. It will allow the key stakeholders to analyze PPL Electric's approach to estimating the DER Management Device's incremental benefit, review the data produced by the Pilot Program, determine the extent to which customers benefit from these devices, and whether PPL Electric can or should continue installing these devices in the future. Yet, the Pilot Program contains important provisions that ensure it is temporary, limited in scope and cost, and establishes sufficient reporting requirements. Accordingly, these provisions are in the public interest and should be approved without modification.

D. Reporting Requirements (Settlement ¶¶ 66-69)

The Settlement also sets forth additional yearly reporting requirements to ensure that the Pilot Program proceeds in a transparent and informative manner. As set forth by the Settlement, the publicly available annual reports to the Commission will include the following information:

- The number of times and the locations at which the Company actively managed each grid support function and the average duration that the function was actively managed;
- The grid benefits achieved in each instance of active management, including, but not limited to, real-time grid constraint mitigation;
- The amounts of net generation lost due to the Company's active management of grid support functions in each instance;
- Distribution system upgrades avoided due to increased hosting capacity attributed to monitoring;
- Distribution system upgrades avoided due to increased hosting capacity attributed to autonomous functioning;
- Distribution system upgrades avoided due to increased hosting capacity attributed to active management;
- System operation comparisons of circuits under autonomous inverter operation versus active management;
- Operational descriptions of how active management was executed and implemented (e.g., day-ahead and real-time remote setting alterations [i.e., remotely dispatch autonomous Fixed Power Factor, Active Power Limit, Volt-Watt and Volt-VAR settings to multiple DERs]); and
- Performance measures related to active management, and where applicable monitoring, including, but not limited to, communication reliability (e.g., communication uptime) and data quality.

Settlement ¶ 67. Additional reporting requirements may be agreed to by the parties after the Company files the Pilot Implementation Plan. Id.

Customers who are participating in the Pilot Program will also receive annual reports identifying important information about how their DER is affected, including, *inter alia*, the amount of the DER's net generation loss due to the use of the automated grid support functions, the aggregate amount of DERs' net generation loss due to the Company's active management of the grid support functions, and the number of times that PPL Electric actively managed each grid

support function and the average duration that the function was actively managed. Settlement ¶ 69.

These reporting requirements are necessary to ensure that the appropriate data is collected and reported so that interested stakeholders may be able to make an informed decision as to whether these DER Management Devices provide sufficient benefits. These were adopted in the Settlement, in part, because of the recommendations made by OCA witness Nelson. See OCA St. 1 at 52-54. Accordingly, the OCA supports the reporting requirements and submits that they are in the public interest.

III. CONCLUSION

The OCA submits that the terms and conditions of the proposed Settlement of PPL Electric's Petition, taken as a whole, represents a fair and reasonable resolution of the issues raised by the OCA in this matter. Therefore, the OCA submits that the Settlement should be approved by the Commission, without modification as being in the public interest and in the interest of PPL Electric's ratepayers.

Respectfully Submitted,

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DATE: October 5, 2020
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Appendix G – NRDC’s Statement in Support

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of PPL Electric Utilities Corporation :
for Approval of Tariff Modifications and :
Waivers of Regulations Necessary to : Docket No. P-2019-3010128
Implement its Distributed Energy Resources :
Management Plan :

**PETITION OF NATURAL RESOURCES DEFENSE COUNCIL, INC. IN SUPPORT OF
THE JOINT PETITION FOR SETTLEMENT**

The Natural Resources Defense Council (“NRDC”), by and through undersigned counsel, submits that the Joint Petition for Settlement (“Joint Petition” or “Settlement”), filed in the above-captioned proceeding with the Commission on October 5, 2020, reflects a full settlement among each of the Joint Petitioners with respect to the issues raised by PPL Electric Utilities Corporation (“PPL” or “the Company”) in its *Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan* (“DER Petition), filed on May 24, 2019. As a result of settlement discussions, PPL, NRDC, the Office of the Consumer Advocate (“OCA”) and the Sustainable Energy Fund of Central Eastern Pennsylvania (“SEF”), have agreed upon terms embodied in the foregoing Joint Petition. NRDC offers this Statement in Support to further demonstrate that Settlement is in the public interest and should be approved without further modification.

I. Background

1. NRDC is a membership-based environmental organization and not-for-profit corporation with more than 1.4 million members nationwide, including more than 15,000 in the state of

Pennsylvania and more than 500 members in the Pennsylvania counties served by PPL.¹

NRDC's top institutional priority is building an equitable clean energy future through the increased use of energy efficiency, renewable energy, and renewables-based transportation electrification, with the ultimate goal of reducing air pollution from the combustion of fossil fuels.²

2. On May 24, 2019, PPL initiated the instant proceeding by filing the DER Petition, which sought approval for a plan requiring customers interconnecting distributed energy resources ("DERs") to (1) use PPL-approved smart inverters compliant with IEEE Standard 1547-2018 and the yet-to-be finalized UL Standard 1741; and (2) install communication devices that enable PPL to monitor and control customers' DERs.³

3. Initially, NRDC raised procedural objections to the DER Petition. Specifically, NRDC argued that the Alternative Energy Portfolio Standards ("AEPS") Act's requirement that standards for net metering and interconnection be developed pursuant to a "statewide" stakeholder process such as a rulemaking meant the development of such rules is inappropriate in the context of Petition proceedings specific to PPL's service area.⁴

4. NRDC also submitted written testimony providing substantive objections to the DER Petition.⁵ For instance, NRDC argued that: (1) the Company failed to demonstrate that manually controlling and monitoring customer DERs provides marginal benefits on a cost-benefits basis beyond the autonomous functions already performed by smart inverters; (2) that the Company's proposal could inappropriately curtail customer-generator's energy production; (3) that the

¹ NRDC Pet. to Intervene (July 30, 2019).

² *Id.*

³ DER Pet., 2.

⁴ NRDC's Br. in Support of Pet. for Interlocutory Review, 3-8 (September 30, 2019) (citing 73 P.S. § 1648.5).

⁵ *See generally* NRDC Statement 1 (Direct Test. of Harry Warren); NRDC Statement 1-SR (Surrebuttal Test. of Harry Warren).

Company had not sufficiently demonstrated that its proposed communications devices were cost-effective or reliable.⁶

5. NRDC also noted its support for certain goals identified by PPL's DER Petition, specifically the use of smart inverters as a general matter and interconnecting customers' smart inverters meeting certain evolving industry standards.⁷ NRDC also recognized that PPL has made a significant investment in DERMS infrastructure.⁸

6. NRDC advanced its interests in this proceeding by filing an Answer raising its substantive and procedural concerns with the DER Petition,⁹ by engaging in motions practice on the appropriate scope of the proceeding,¹⁰ and through the filing of written testimony.¹¹

II. Settlement

7. The Joint Petition comprehensively sets forth the procedural history of the case and the issues that were resolved through the Joint Petitioner's negotiations. The following paragraphs highlight several issues which were of particular importance to NRDC in its determination that the Joint Petition was in the best interests of NRDC's membership and in furtherance of NRDC's overall mission.

8. One of NRDC's principal concerns was that the Company's proposal did not demonstrate the marginal value of active management of customer DERs beyond the autonomous functions performed by smart inverters.¹² The Pilot Program provided for in the Settlement provides the

⁶ NRDC Statement 1, 7-8.

⁷ *Id.* at 13-14.

⁸ *Id.*

⁹ Ans. of NRDC (July 30, 2019).

¹⁰ *See id.*; Prelim. Objects. of Sunrun and NRDC (Aug. 30, 2019); Mot. for Leave to Reply of Sunrun and NRDC (Aug. 30, 2019); NRDC's Pet. for Interlocutory Rev. (Sept. 20, 2019); NRDC's Br. in Support of Pet. for Interlocutory Rev. (Oct. 1, 2019).

¹¹ *See generally* NRDC Statement 1; NRDC Statement 1-R.

¹² NRDC Statement 1, 7.

Company an opportunity to make that demonstration, To wit, the pilot is 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.”¹³

9. NRDC additionally raised a concern that the Company had not demonstrated the capability or reliability of its DER management devices.¹⁴ Toward that end, the Pilot Program outlined in the Joint Petition will provide the Company an opportunity to demonstrate the capabilities of the ConnectDER devices it proposes to deploy.¹⁵ The Company’s proposal to provide these devices at no direct cost to interconnecting customers represents a reasonable means of mitigating capability concerns and for addressing NRDC’s concern that the cost of such devices would disincentivize potential DER users from choosing to become customer-generators.¹⁶

10. From the outset of this proceeding, NRDC contended that the issues raised in the DER Petition were better suited to consideration as part of a statewide stakeholder process.¹⁷ As part of the Settlement, PPL has committed to participate in any statewide proceeding initiated by the Commission that focuses on smart inverters, DER management devices, and their relevant technical standards.¹⁸ The Settlement moreover provides that it shall not serve as precedent for

¹³ Joint Pet. ¶ 54.

¹⁴ NRDC Stmt. 1, 25-26.

¹⁵ Joint Pet., ¶¶ 11-12

¹⁶ *Id.* at ¶ 10, NRDC Statement 1, 25-26.

¹⁷ *E.g.*, Ans. of NRDC (July 30, 2019).

¹⁸ Joint Pet., ¶ 65.

any other electric utility's proposal to monitor and manage DERs.¹⁹ These terms represent a reasonable compromise of NRDC's position that the issues raised by the DER Petition are better addressed through rulemaking than petition proceedings.

III. Conclusion

For the foregoing reasons, NRDC respectfully submits that the Joint Petition is in the public interest and requests that the Administrative Law Judges and Commission approve the Joint Petition for Settlement without modification.

Respectfully submitted,

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DATED: October 5, 2020

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¹⁹ *Id.* at ¶ 74.

Appendix H – SEF’s Statement in Support

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

Petition of PPL Electric Utilities :
Corporation for Approval of Tariff :
Modifications and Waivers of : **Docket No. P-2019-3010128**
Regulations Necessary to Implement :
its Distributed Energy Resources :
Management Plan :

**Sustainable Energy Fund
Statement in Support of
Joint Petition for
Settlement of All Issues**

To Administrative Law Judges Mary D. Long and Emily I. Devoe:

The Sustainable Energy Fund (“SEF”)¹, by and through its Attorney, submits that the terms of the foregoing Joint Petition for Settlement of All Issues (“Joint Petition”) are in the public interest and represent a fair, just, reasonable and equitable balance of the interests of PPL Electric Utilities Corporation (“PPL Electric” or “Company”) and its customers. After settlement discussions, SEF, PPL Electric, the Office of Consumer Advocate (“OCA”), and the Natural Resources Defense Council (“NRDC”) have agreed upon the terms embodied in the foregoing Joint Petition.

¹ SEF is a non-profit organization dedicated to the use of renewable energy, clean energy technologies, energy conservation and energy education. Founded in 1999 pursuant to a settlement of PPL Electric Utility Corporation’s electric deregulation proceeding, SEF promotes clean and renewable energy initiatives to benefit customers within the PPL Electric service territory and throughout Pennsylvania.

I. BACKGROUND

SEF submits that the foregoing Joint Petition is in the public interest for the following reasons:

1. On May 24, 2019, PPL Electric filed with the Pennsylvania Public Utility Commission (“Commission”) a Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources (“DER”) Management Plan (“Petition”). In the Petition, PPL Electric requests approval to modify the terms and conditions of its DER Management Plan in the manner represented in the proposed tariff attached to the Joint Petition at Appendix A.

2. SEF filed a timely Petition to Intervene. A Prehearing Conference was held on November 15, 2019, at which time a litigation schedule was set.

3. Settlement discussions resulted in the foregoing Joint Petition. On September 3, 2020, PPL Electric, OCA, NRDC and SEF filed a Joint Stipulation for Admission of Evidence. On September 8, 2020, the ALJs issued an Interim Order granting the Joint Stipulation for Admission of Evidence.

II. SETTLEMENT TERMS

4. The specific details of the Settlement terms are provided in Paragraphs 47 through 74 of the Joint Petition. However, SEF initially observes that the settlement enhances PPL Electric’s relationship with its customers because under the terms of the Joint Petition, PPL Electric has agreed to conduct a pilot

program 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; 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. SEF believes that the pilot program, if performed according to design, will provide helpful data in determining whether the active management of DERs will result in increased safety and/or reliability on PPL Electric's grid. SEF also believes that the Joint Petition (Paragraph 64) allows for the control of costs by providing the opportunity for Joint Petitioners to challenge the amount (including the manner in which the costs and expenses are recovered), prudence and reasonableness of Company's claim for capital costs and expenses associated with the DER management devices in a future base rate case.

III. PUBLIC INTEREST

5. SEF submits that the foregoing Joint Petition is in the public interest for the reasons discussed in Paragraph 4 above as well as the following reasons:

(a). **Annual Reports**: Under the terms of the Joint Petition (Paragraph 66), PPL Electric agrees to provide annual reports to the Commission at Docket No. P-2019-3010128, providing detail quantitative information germane to the evaluation of the results of the pilot program. The reports shall be publicly available and shall not contain any identifying customer information. These

annual reports shall be filed within 30 days following the end of each program year.

(b). **Discontinue Litigation**: The Joint Petition discontinues expensive and unnecessary litigation and administrative burden.

6. The foregoing Joint Petition addresses and adjusts all substantial issues that are the subject of dispute. It appears unlikely that full litigation of these matters would result in SEF obtaining a superior outcome.

7. SEF supports the foregoing Joint Petition because it is in the public interest. However, in the event this matter proceeds to full litigation, SEF is prepared to take litigation positions that may differ from the terms of the proposed Joint Petition for Settlement of All Issues.

Respectfully submitted,



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Dated: October 3, 2020