**BEFORE THE**
**PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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| Petition of PPL Electric Utilities Corporation for | : | |
| Approval of Tariff Modifications and Waivers of | : | P-2019-3010128 |
| Regulations Necessary to Implement its | : | |
| Distributed Energy Resources Management Plan | : | |

# RECOMMENDED DECISION

Before
Emily I. DeVoe
Administrative Law Judge

Mary D. Long
Administrative Law Judge

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# I. INTRODUCTION

This decision recommends approval without modification of the Joint Petition for Settlement, which resolves the dispute regarding PPL Electric Utilities Corporation's Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources (DER) Management Plan. The settlement outlines the Company's plan for the installation of smart inverters, the initiation of a Pilot Program to test and evaluate the effectiveness of monitoring DERs through the use of management devices connected to inverters and the effectiveness of actively managing DERs. Under the terms of the Settlement, it is to become effective on January 1, 2021. We recommend that the Commission approve the Settlement because it is in the public interest.

# II. HISTORY OF THE PROCEEDINGS

On May 24, 2019, PPL Electric Utilities Corporation (PPL, Company or PPL Electric) filed a Petition for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan (Petition) with the Public Utility Commission (Commission).

On July 29, 2019, Trinity Solar filed Comments on the Company's Petition. Comments were also filed by Sustainable Energy Fund (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.

On July 30, 2019, the Office of the Consumer Advocate (OCA) filed an Answer to the Petition. Also, on July 30, 2019, the Natural Resources Defense Council (NRDC) and Sunrun Inc. (Sunrun) filed petitions to intervene, and Answers to PPL's Petition.

On August 22, 2019, PPL filed correspondence inquiring about the procedural status of the proceeding and requesting that the matter being assigned to an administrative law judge for hearings.

The matter was assigned to Administrative Law Judge Emily I. DeVoe (ALJ DeVoe), and on August 22, 2019, ALJ DeVoe issued an Interim Order granting the Petitions to Intervene filed by NRDC and Sunrun. By notice dated August 28, 2019, a prehearing conference was scheduled to take place on September 11, 2019. A prehearing conference order was also issued on August 28, 2019.

On August 30, 2019, NRDC and Sunrun jointly filed a Preliminary Objection to PPL's August 22, 2019 correspondence, as well as a Motion for Leave to Reply and Reply to PPL's August 22, 2019, correspondence.

On September 3, 2019, SEF filed a Petition to Intervene in these proceedings.

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.

A prehearing conference was convened on September 11, 2019. PPL, OCA, NRDC, Sunrun, and SEF were present and represented by counsel. ALJ DeVoe granted SEF's petition to intervene, without objection from any party. Additionally, 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.

On September 20, 2019, NRDC and Sunrun separately filed Petitions for Interlocutory Review and Answer to Material Questions.

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.

By Opinion and Order entered October 17, 2019, the Commission determined that the petitions for interlocutory review were improperly before the Commission as premature and returned the matter to the Office of Administrative Law Judge (OALJ).

A further prehearing conference was convened on November 15, 2019.

On November 18, 2019, the ALJs[1] issued a Prehearing Order setting forth the litigation schedule, dismissing the Preliminary Objection filed by NRDC and Sunrun on August 30, 2019 as moot, and scheduling evidentiary hearings for April 8 and 9, 2020.

On January 13, 2020, PPL filed an unopposed Motion for a Protective Order, which was granted on January 16, 2020.

On March 17, 2020, the Commission issued a Notice cancelling the evidentiary hearings scheduled for April 8 and 9, 2020. Subsequently, the parties contacted the presiding officers via email requesting that hearing be continued to allow the parties additional time for settlement negotiations.

Ultimately, a Notice was issued on July 14, 2020, scheduling telephonic evidentiary hearings for September 2-3, 2020.

PPL served direct testimony on December 11, 2019, and OCA, NRDC, and SEF served written direct on February 5, 2020. PPL served rebuttal testimony on March 4, 2020 and

[1] By notice dated November 18, 2019, Administrative Law Judge Mary D. Long was added as an assigned presiding officer.

was the only party to do so. On March 19, 2020, OCA, NRDC, and SEF served written surrebuttal testimony.

On August 27, 2020, PPL 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 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.

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.

On September 3, 2020, PPL, 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.

On September 8, 2020, an Interim Order was entered admitting into the record the Stipulation for Admission of Evidence along with and the filings, statements, and exhibits listed therein.

On October 5, 2020, the parties filed a Joint Petition for Settlement and Statements in Support as directed. The record closed on October 5, 2020.

## III. JOINT STIPULATION FOR ADMISSION OF EVIDENCE

In their September 3, 2020 Joint Stipulation for the Admission of Evidence, the parties stipulated to the authenticity and admission of the following testimony and exhibits:

PPL Electric's Testimony and Exhibits

- PPL Electric Statement No. 1 – Direct Testimony of Salim Salet, including PPL Electric Exhibit SS-1.

- PPL Electric Statement No. 2 – Direct Testimony of Wanda Reder.

- PPL Electric Statement No. 3 – Direct Testimony of Karen Miu, PhD., including PPL Electric Exhibit KM-1 and PPL Electric Exhibit KM-2 (HIGHLY CONFIDENTIAL).

- PPL Electric Statement No. 4 – Direct Testimony of Stephen Whitley, including PPL Electric Exhibits SW-1 and SW-2.

- PPL Electric Statement No. 5 – Direct Testimony of Aaron Bayles.

- PPL Electric Statement No. 1-R – Rebuttal Testimony of Salim Salet, including PPL Electric Exhibits SS-1R through SS-3R.

- PPL Electric Statement No. 2-R – Rebuttal Testimony of Wanda Reder, including PPL Electric Exhibits WR-1R through WR-3R.

- PPL Electric Statement No. 4-R – Rebuttal Testimony of Stephen Whitley.

- PPL Electric Statement No. 5-R – Rebuttal Testimony of Aaron Bayles.

- PPL Electric Statement No. 6-R – Rebuttal Testimony of Matthew Wallace, including PPL Electric Exhibits MW-1R through MW-5R.

- PPL Electric Statement No. 7-R – Rebuttal Testimony of Bethany L. Johnson (Proprietary and Non-Proprietary Versions), including PPL Electric Exhibit BLJ-1R.

- PPL Electric Statement No. 1-RJ – Rejoinder Testimony of Salim Salet, including PPL Electric Exhibit SS-1RJ.

- PPL Electric Statement No. 2-RJ – Rejoinder Testimony of Wanda Reder.

- PPL Electric Statement No. 3-RJ – Rejoinder Testimony of Karen Miu, PhD., including PPL Electric Exhibit KM-1RJ (HIGHLY CONFIDENTIAL).

- PPL Electric Statement No. 4-RJ – Rejoinder Testimony of Stephen Whitley.

- PPL Electric Statement No. 6-RJ – Rejoinder Testimony of Matthew Wallace, including PPL Electric Exhibits MW-1RJ and MW-2RJ.

- PPL Electric Statement No. 7-RJ – Rejoinder Testimony of Bethany L. Johnson, including PPL Electric Exhibit BLJ-1RJ.

OCA'S Testimony and Exhibits

- OCA Statement No. 1 – Direct Testimony of Ron Nelson (CONFIDENTIAL and Public Versions), including OCA Schedule REN-1 and OCA Schedule REN-2, the latter of which contains CONFIDENTIAL and HIGHLY CONFIDENTIAL information.

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

NRDC'S Testimony and Exhibits

- NRDC Statement No. 1 – Direct Testimony of Harry Warren (Proprietary and Non-Proprietary Versions), including NRDC Exhibits A through C.

- NRDC Statement No. 1-SR – Surrebuttal Testimony of Harry Warren, including NRDC Exhibit HW-SR1.

SEF'S Testimony and Exhibits

- SEF Statement No. 1 – Direct Testimony of John M. Costlow (Proprietary and Non-Proprietary Versions), including SEF Cross Examination Exhibit 1 (contains CONFIDENTIAL and HIGHLY CONFIDENTIAL information).

- SEF Statement No. 2 – Direct Testimony of Ronald E. Celentano, including SEF Cross Examination Exhibit 2.

- SEF Statement No. 1-SR – Surrebuttal Testimony of John M. Costlow.

- SEF Statement No. 2-SR – Surrebuttal Testimony of Ronald E. Celentano.

These filings, statement, and exhibit were admitted into the record by Interim Order entered September 8, 2020.

## IV. STIPULATED FINDINGS OF FACT

The Joint Petitioners agree to the following findings of fact in support of the Settlement:[2]

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-

[2] Settlement ¶ 75 and Settlement Appendix B. Although some of the Stipulated Findings of Facts are arguably recitations of the parties' arguments and positions or of settlement terms, they are included here in full for the completeness of this decision.

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. 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.)

27. 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.)

28. 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.)

29. 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.)

30. 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.)

31. 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.)

32. 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.)

33. 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.)

34. 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.)

35. 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.)

36. 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.)

37. 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.)

38. 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.)

39. 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.)

40. 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.)

41. 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.)

42. 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.)

43. 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.)

44. 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.)

45. 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.)

46. 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.)

47. 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.)

48. 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.)

49. "In said base rate case, the Joint Petitioners may challenge the amount of the Company's claim, the prudency 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.)

50. 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.)

51. 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.)

52. 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.)

53. 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.)

54. 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.)

55. 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.)

56. 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.)

57. 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.)

58. 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.)

59. 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.)

60. 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.)

61. 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.)

62. 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.)

## V. DESCRIPTION OF THE JOINT PETITION FOR SETTLEMENT

The Settlement, which is fully executed by PPL, OCA, NRDC, and SEF, consists of 21 pages plus Appendices A-H. The Appendices to the Settlement are as follows: Appendix A - a *pro forma* Tariff Supplement, Appendix B - proposed findings of fact, Appendix C - proposed conclusions of law, Appendix D - proposed ordering paragraphs, Appendix E - PPL's Statement in Support, Appendix F - OCA's Statement in Support, Appendix G - NRDC's Statement in Support, and Appendix H - SEF's Statement in Support. Sunrun was not a signatory to the Settlement; however, the Joint Petitioners indicate in the Settlement that Sunrun

will not file an objection to the Settlement.[3] Notably, the Joint Petitioners agree that if the Settlement is approved without modification, they will waive their right to file exceptions.

The Joint Petitioners agreed to the settlement terms[4] set forth below:

## 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

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[3] Settlement p.1, n.1.

[4] For ease of reference, the original paragraph numbering has been retained. *See*, Settlement, pp. 14-15.

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.[5] 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.

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.

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[5] 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.

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 prudency 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.

# VI. LEGAL STANDARDS

Electric distribution companies (EDCs), such as PPL, are required to "file a tariff with the Commission that provides for net metering consistent with" Chapter 75 of the

Commission's regulations.[6] 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."[7]

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."[8] Such petition also "must set forth the purpose of, and the facts claimed to constitute the grounds requiring the . . . waiver."[9]

It is the policy of the Commission to encourage settlements.[10] In order to accept a settlement, the Commission must first determine that the proposed terms and conditions are in the public interest.[11] The decision of the Commission must be supported by substantial evidence.[12] "Substantial evidence" is such relevant evidence that a reasonable mind might accept as adequate to support a conclusion.[13] More is required than a mere trace of evidence or a suspicion of the existence of a fact sought to be established.[14]

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6 52 Pa.Code § 75.13(c).

7 52 Pa.Code § 75.13(k).

8 52 Pa.Code § 5.43(a).

9 *Id*.

10 52 Pa.Code § 5.231(a).

11 *Pa. Pub. Util. Comm'n v. York Water Co.*, Docket No. R-00049165 (Order Entered Oct. 4, 2004); *Pa. Pub. Util. Comm'n v. C.S. Water and Sewer Assocs.*, 74 Pa. P.U.C. 767 (1991).

12 *See* 2 Pa.C.S. § 704.

13 *Norfolk & W. Ry. Co. v. Pa. Pub. Util. Comm'n*, 413 A.2d 1037 (Pa. 1980); *Erie Resistor Corp. v. Unemployment Comp. Bd. of Review*, 166 A.2d 96 (Pa. Super. 1961); *Murphy v. Pa. Dept. of Public Welfare, White Haven Center*, 480 A.2d 382 (Pa. Cmwlth. 1984).

14 *Id.*

## VII. BACKGROUND OF THE DISPUTE

PPL is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania.[15] It is a wholly-owned direct subsidiary of PPL Corporation. It is a public utility and 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.[16] The Alternative Energy Portfolio Standards (AEPS) Act of 2004,[17]enables customer-generators to interconnect their generating facilities with the distribution systems of EDCs, like PPL.[18] The AEPS Act directed the Commission to "develop the technical and net metering interconnection rules for customer-generators to operate renewable onsite generators in parallel with the electric utility grid."[19] Pursuant to this directive, the Commission promulgated regulations that govern the interconnection and net metering of customer-generators' facilities.[20]

A customer who so chooses may install a Distributed Energy Resource, such as solar panels or batteries.[21] If a customer chooses a photovoltaic (PV) installation, inverters are needed to transform the direct current power created by the PV technology so it can flow as alternating current[22] on the power system.[23] Many DERs require an inverter to connect to the power system.[24] Smart inverters differ from traditional inverters in that smart inverter functions

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15 PPL St. No. 1, 1:10-14.

16 *Id.*

17 73 P.S.§§ 1648.1-1648.8, revised by Act 35 of 2007 (effective July 2007) and Act 129 of 2008 (effective November 2008).

18 *See* 73 P.S.§ 1648.5.

19 *Id*.

20 *See* 52 Pa.Code, Ch. 75.

21 PPL St. No. 1, 7:1.

22 With direct current power, the electric charge (current) only flows in one direction. Electric charge in alternating current, on the other hand, changes direction periodically.

23 OCA St. No. 1, 6:10-13.

24 *Id.* at 7:5.

"allow for more elaborate monitoring and communication of the grid status, the ability to receive operation instructions from a centralized location, and the capability to make autonomous decisions to improve grid stability, support power quality, and provide ancillary services."[25]

PPL explained that electric transmission and distribution systems in Pennsylvania and the United States are currently undergoing significant changes,[26] and 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.[27] PPL argued that it can be difficult for it to meet its obligation to provide reasonable, safe, and reliable electric service to all of its customers, including those who have not installed DERs.[28] As a result, PPL posited it must simultaneously balance distribution system demand and supply to avoid potential safety and reliability issues.[29] At the same time, PPL recognized the benefits of alternative energy sources in combating climate change and wants to encourage their deployment in the Company's service territory.[30]

PPL explained that it developed its DER Management Plan, in order to 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.[31] PPL noted that it requested Commission approval to proactively implement the 2018 revisions to the Institute of Electrical and Electronics Engineers (IEEE) Standard 1547, "Standard for

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25 *Id.* at 6:15-7:2.

26 PPL St. No. 1-R, p. 4.

27 *Id.*

28 *Id.*

29 *Id.*

30 *Id.*

31 PPL St. No. 1-R, pp. 4-5.

Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces" (IEEE Standard 1547 or IEEE 1547-2018)[32] and the related revisions to Underwriters Laboratories (UL) Standard 1741, "Inverters, Converters and Controllers for use in Independent Power Systems" (UL Standard 1741)[33, 34] 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)[35]; and (2) install DER Management devices that enable PPL Electric to monitor and proactively manage the DERs' smart inverter settings.[36]

In the Company's rebuttal testimony, PPL 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.[37] PPL would communicate with these DER Management devices using its established Radio Frequency (RF) Mesh network, which was

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[32] This standard outlines the 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, 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.)

[33] As for UL Standard 1741, it 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). (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.)

[34] PPL St. No. 1, p. 6.

[35] 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).

[36] PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.

[37] PPL St. No. 1-R, p. 7.

deployed in accordance with the Company's Commission-approved Smart Meter Plan, Act 129 of 2008, and the Commission's related orders.[38]

By communicating with the DER Management devices, PPL explained that it could monitor the DERs and utilize the smart inverters' grid support functions,[39] and that 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.[40] PPL explained that its 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[41] and would increase its distribution circuits' hosting capacity, thereby allowing more DERs to interconnect with its distribution system.[42]

Additionally, PPL argued that 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.[43] 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.[44]

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38 *See* PPL St. No. 1-R, pp. 7-8; PPL St. No. 1, p. 28.

39 PPL St. No. 1-R, pp. 4-5.

40 PPL St. No. 1, pp. 16-21.

41 PPL St. No. 3, pp. 6-14; PPL St. No. 3-RJ, pp. 2-3.

42 PPL St. No. 1-R, pp. 16-17.

43 PPL St. No. 6-R, pp. 10-11; PPL Exh. MW-1R; PPL St. No. 6-RJ, p. 2; PPL Exh. MW-1RJ.

44 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.)

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.[45]

The Joint Petitioners now aver that these and other issues were thoroughly investigated through discovery and litigation. In the end, the Joint Petitioners were able to reach a Settlement that resolved all the issues in this proceeding.

## VIII. DISCUSSION OF THE JOINT PETITION FOR SETTLEMENT

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 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.[46]

### A. Smart Inverters

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

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

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[45] *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.

[46] *See* Settlement ¶¶ 48-63.

proceeding; (2) when smart inverters meeting IEEE 1547-2018 and the revisions to UL Standard 1741 would be commercially available; and (3) what requirements, if any, should apply in the interim before those smart inverters become commercially available.[47]

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."[48] 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."[49] OCA similarly argued that issues regarding the implementation of IEEE 1547-2018 should be addressed in a statewide proceeding.[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."[51] 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."[52] 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."[53] SEF also argued that the issues raised by PPL Electric's DER Management Petition should be addressed in a statewide proceeding.[54]

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47 *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.

48 NRDC St. No. 1, p. 10.

49 *Id.* at 11 (emphasis omitted).

50 OCA St. No. 1, pp. 30-31, 45-50.

51 *Id.* at 30-31, 46.

52 SEF St. No. 1, (Non-Proprietary), p. 15.

53 *Id.*

54 *Id.* at 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.[55] PPL also argued that none of the parties established that the other EDCs in Pennsylvania are ready or even willing to implement IEEE 1547-2018.[56] 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.[57] 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.[58]

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."[59] 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.[60]

SEF expressed a concern about the number of smart inverters that the Company had tested to date under its interim requirements.[61] Therefore, if the Commission ultimately approved the Company's DER Management Petition, SEF "recommend[ed] that the effective

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55 PPL St No. 1-R, pp. 56-68; PPL St. No. 4-R, pp. 5-15.

56 PPL St. No. 1-R, p. 60.

57 PPL St. No. 1-R, p. 11; PPL St. No. 2-R, pp. 3-4.

58 PPL St. No. 1-R, p. 11.

59 NRDC St. No. 1-SR, p. 3.

60 *Id.*

61 SEF St. No. 1-SR, pp. 3-4.

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."[62]

Furthermore, OCA still argued that PPL 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.[63]

In the Company's rejoinder testimony, PPL disagreed with NRDC's proposed January 1, 2022 start date for requiring IEEE 1547-2018 compliant smart inverters.[64] 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."[65] Therefore, PPL argued it should be permitted to begin implementing its DER Management proposal as soon as the Commission enters its Order approving the Company's Petition.[66] PPL also responded to SEF's concerns about the number of inverters certified as meeting the Company's interim requirements.[67] The Company argued 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."[68] The Company argued, "[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."[69]

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62 SEF St. No. 1-SR, p. 4.

63 OCA St. No. 1-SR, pp. 16-20.

64 PPL St. No. 1-RJ, p. 3.

65 PPL St. No. 1-RJ, p. 7.

66 *Id.*

67 *Id.* at p. 17.

68 *Id.* at 17-18.

69 *Id.* at 18.

Under the Settlement, the Joint Petitioners present a reasonable compromise of their positions regarding PPL'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.[70] The Company shall undertake its testing processes in an expeditious matter so as not to delay DER interconnections, and these requirements shall be known as the "Interim Requirements."[71] The list of smart inverters that meet the Interim Requirements will be publicly available and regularly updated on the Company's website, and an initial list will be published on or before December 1, 2020.[72] 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.[73]

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.[74] 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 shall not be responsible for purchasing, owning, installing, or maintaining the customers' smart inverters.[75]

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70 Settlement ¶¶ 48-49.

71 *Id.*

72 *Id.*

73 *Id.*

74 Settlement ¶ 50.

75 Settlement ¶ 53.

PPL argues these settlement provisions enable it 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. It argues 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. PPL notes that this January 1, 2022 start date is consistent with the evidence demonstrating that smart inverters complaint with IEEE 1547-2018 and UL Standard 1741-SB will be commercially available by that date. Thus, PPL argues that 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.

PPL argues that 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.

OCA addresses the Settlement's provisions regarding smart inverters in its Statement in Support and submits that these provisions, taken together, are in the public interest and in the interest of PPL Electric's ratepayers. OCA explains how, although it recognizes the importance of implementing smart inverters, OCA's primary point of contention was the additional requirements PPL sought to implement, such as a DER Management Device that would allow the Company to remotely monitor and manage the DER.

OCA argues that the Settlement amicably resolves the issues between the OCA and the Company, and allows the Company to begin requiring smart inverters for new DER applicants pursuant to interim requirements pending the adoption of the applicable industry standards,[76] which is consistent with other states, such as California, that currently utilize interim

[76] *See* Settlement ¶¶ 48-49.

requirements pending the adoption of the applicable industry standards.[77] In addition, OCA argues that 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.[78]

NRDC and SEF did not specifically address the smart inverter portion of the settlement.

### 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."[79] The Settlement clarifies that this provision 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.

Under the Settlement, the Company reserves the right to propose in a future proceeding, however, that its DER Management Plan be required for existing DERs, and all of the Joint Petitioners reserve their rights to oppose such a proposal and to raise any arguments in opposition thereto.[80]

PPL argues 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

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77 *See* OCA St. 1 at 20-21.

78 *See* OCA St. 1 at 19.

79 PPL St. No. 1, p. 6 (emphasis added).

80 Settlement ¶ 51.

proceeding, applying the Plan to DER installations whose interconnection applications are submitted before January 1, 2021. Thus, PPL argues these terms are just and reasonable, are in the public interest, and should be approved without modification.

None of the other parties specifically addressed this portion of the settlement in their statements in support.

### 3. Communications Ports on Smart Inverters

SEF raised an issue concerning the number of communications ports on the smart inverters.[81] 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."[82] 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."[83] 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.[84]

In his rejoinder testimony, PPL 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.[85] The Company advised it 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.[86] In cases where three communications ports are

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81 SEF St. No. 1-SR, p. 5.

82 *Id.*

83 *Id.*

84 *Id.*

85 PPL St. No. 1-RJ, p. 16.

86 *Id.*

needed, such as in a solar plus storage situation, PPL agrees to provide a multi-port solution at no direct cost to that customer.[87] Therefore, PPL Electric argued that SEF's concern about the number of communications ports on the smart inverters was moot.[88]

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.[89]

PPL argues 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, PPL posits that the provisions are just and reasonable, are in the public interest, and should be approved without modification.

None of the other parties addressed this portion of the settlement in their statement in support.

## 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.[90] As stated above, PPL

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87 *Id.*

88 *Id.*

89 Settlement ¶ 52.

90 PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.

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.[91] Through the use of these DER Management devices, PPL noted it could monitor the DERs and utilize the smart inverters' grid support functions.[92] 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.[93]

OCA, NRDC, and SEF disagreed that PPL should be permitted to install the DER Management devices for all new DER interconnections and use them to monitor and remotely manage the DERs.[94] 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.[95] 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 . . . ."[96] 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.[97] 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

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91 PPL St. No. 1-R, p. 7.

92 PPL St. No. 1-R, pp. 4-5.

93 PPL St. No. 1, pp. 16-21.

94 OCA St. No. 1, pp. 12-54; NRDC St. No. 1, pp. 7-9; SEF St. No. 1 (Non-Proprietary), p. 10.

95 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.

96 OCA St. No. 1, p. 16.

97 NRDC St. No. 1, pp. 13-14, 18-19.

parameters."[98] However, NRDC recommended that "[s]takeholders, including PPL, should be permitted to propose pilot programs" so that they can "gather data on the benefits and costs of these additional grid services if necessary."[99]

In rebuttal, PPL maintained that its proposal was not premature.[100] 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 potential problems, rather than addressing them only after DER penetration levels increase to the point where PPL Electric is experiencing widespread issues.[101]

Additionally, PPL Electric argued that its proposal to monitor and remotely manage DERs is much more beneficial than exclusively using the smart inverters' autonomous functions.[102] PPL alleged that pre-set autonomous functions are precisely calculated and determined based on historical data and system behaviors[103] and they cannot adapt to future changes to the distribution circuit or distribution system, unless those pre-set parameters are manually changed.[104] PPL explained that this would require customers or PPL to physically adjust the autonomous setting(s), locally, on each inverter that needs to be changed.[105] PPL noted that such a process would require substantial time, effort, and expense.[106]

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98 NRDC St. No. 1, p. 19.

99 NRDC St. No. 1, p. 10.

100 PPL St. No. 1-R, pp. 44-53.

101 PPL St. No. 1-R, pp. 44-48.

102 PPL St. No. 1-R, pp. 73-78.

103 PPL St. No. 1-R, p. 73.

104 *Id.*

105 *Id.*

106 *Id.*

PPL also argued there were many situations where autonomous settings would need to be adjusted.[107] Moreover, PPL explained that 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.[108] The Company 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 load[109]; (4) avoiding unnecessary system upgrades; (5) improving fault location capability; and (6) providing visibility of unintentional islanding conditions, where DERs fail to shut off during an outage.[110]

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.[111] However, both NRDC and SEF made pilot program recommendations.

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."[112] In that pilot, NRDC argued that the Company "would be permitted to purchase,

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107 PPL St. No. 1-R, pp. 73-77.

108 PPL St. No. 1-R, pp. 77-78.

109 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.)

110 PPL St. No. 1-R, p. 78.

111 OCA St. No. 1-SR, pp. 2, 10, 16; NRDC St. No. 1-SR, pp. 5-6; SEF St. No. 1-SR, p. 10.

112 NRDC St. No. 1-SR, p. 2.

install, own and maintain DER Management devices at no direct costs to DER customers."[113] NRDC explained:

> 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 again a population of IEEE-1547-2018 compliant inverters operating autonomously.[114]

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.[115] 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."[116] Under SEF's proposed pilot program, DER customers would have to "opt-in for PPL Electric to control their inverter(s)" and could "opt-out at any time,"[117] and the Company would be required to provide monthly reports and other data to the parties so that they could properly evaluate the pilot program.[118]

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.[119] Therefore, PPL argued, no pilot program was necessary.[120] However, in the event that the Commission decided that it would be more prudent to test and evaluate some of these technologies, PPL recommended that the pilot program be focused on the

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113 *Id.*

114 *Id.* at 16.

115 SEF St. No. 1-SR, pp. 10-14.

116 *Id.* at 10-11.

117 *Id.* at 13.

118 *Id.* at 11-12, 14.

119 PPL St. No. 1-RJ, p. 26.

120 *Id.* at 33.

remote active management aspect of its DER Management Plan.[121] Therefore, to the extent that the Commission believed a pilot program was more appropriate, PPL 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.[122] Notably, PPL's proposed 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.[123]

Under the Settlement, the Joint Petitioners agree that the Company can conduct a Pilot Program, the design of which reflects a reasonable compromise of their competing pilot program proposals.[124]

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.[125] The Pilot Program will begin on January 1, 2021, and will end three years after the second control group is established. [126] 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.[127]

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121 *Id.* at 26-27.

122 *Id.* at 27-33.

123 *Id.* at 28, 31-33.

124 Settlement ¶¶ 54-63.

125 Settlement ¶ 54.

126 *Id.*

127 *Id.*

Under the Settlement, two control groups for the remote active management pilot program shall be established. These control groups will operate under autonomous settings only. For DERs that are not part of the control groups, the Company shall be permitted to actively manage the smart inverters' grid support functions.[128]

To further develop the details of the pilot program, the Settlement also provides that PPL will file a detailed plan at this docket explaining how the Company will implement and conduct the pilot program (Pilot Implementation Plan). [129] 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 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. [130] 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.[131]

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. [132] But if no such petition is

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128 Settlement ¶ 57.

129 Settlement ¶ 61.

130 *Id.*

131 *Id.*

132 Settlement ¶¶ 62-63.

filed, the remote active management program will end after the Program Year 3.[133] 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.[134]

PPL argues that the Settlement's provisions regarding the Pilot Program are just and reasonable and in the public interest. PPL explains that this Pilot Program will test and evaluate the benefits of monitoring and the benefits of active management versus autonomous functions. While PPL argued that the benefits of monitoring and remote active management were well-established, PPL noted that the other parties disagreed with the Company's analysis. PPL argues that 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, PPL explains that 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, PPL notes that 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, PPL argues 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, PPL requests that these settlement provisions should be adopted without modification.

OCA argues that 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

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133 *Id.*

134 *Id.*

Management Device.[135] OCA explains that organizing the control groups in the manner described in the Settlement 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.

OCA notes that, prior to Settlement, it 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.[136] Given the lack of data demonstrating the actual benefits of this device and the costs associated with it, OCA requested that the Commission deny the Company's Petition. However, OCA now argues that establishing a Pilot Program provides PPL 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.

OCA details 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, PPL will have to file an Implementation Plan which will ensure 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. Additionally, 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, which will limit the Pilot Program in scope and cost.[137] OCA also argues that, 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 base rate case, the OCA and other

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135 Settlement ¶ 54.

136 *See generally* OCA St. 1.

137 Settlement ¶¶ 55.

signatory parties have reserved their right to challenge the reasonableness and prudency of these costs and how those costs are recovered.[138]

OCA explains that the Pilot Program is a reasonable resolution to the issues presented in this proceeding as it will allow the key stakeholders to analyze PPL's approach to estimating the DER Management Device's incremental benefit, review the data produced by the Pilot Program, and determine the extent to which customers benefit from these devices and whether PPL Electric can or should continue installing these devices in the future. OCA argues that the Pilot Program also contains important provisions that ensure it is temporary, limited in scope and cost, and establishes sufficient reporting requirements.

NRDC explains that one of its principal concerns was that the Company's initial proposal did not demonstrate the marginal value of active management of customer DERs beyond the autonomous functions performed by smart inverters.[139] NRDC argues that the Pilot Program provided for in the Settlement provides the Company an opportunity to make that demonstration. NRDC also pointed out that it had raised a concern that the Company had not demonstrated the capability or reliability of its DER Management devices.[140] It argues that the Pilot Program will provide the Company an opportunity to demonstrate the capabilities of the ConnectDER LLC (ConnectDER) devices it proposes to deploy.[141] NRDC argues that 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.[142]

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138 Settlement ¶ 64.

139 *See*, NRDC Statement 1, p. 7.

140 NRDC St. No. 1, p. 25-26.

141 Settlement, ¶¶ 11-12.

142 *Id.* at ¶ 10, NRDC St. No. 1, p. 25-26.

SEF observes that the settlement enhances PPL's relationship with its customers because under the terms of the Joint Petition, PPL has agreed to conduct the Pilot Program, which, 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's grid.

### 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.[143]

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."[144] 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."[145] 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."[146]

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,

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143 PPL St. No. 1, p. 6; PPL St. No. 2, p. 4.

144 NRDC St. No. 1, p. 7.

145 *Id.* at 8.

146 SEF St. No. 2, p. 11.

rather than having the participating customers purchase and install the DER Management devices.[147]

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.[148] 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."[149] However, NRDC expressed a concern about the availability of the DER Management devices the Company planned to utilize.[150] 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."[151] This purported lack of availability "could create a bottleneck that slows DER installations, if a sufficient supply of devices is not available."[152]

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.[153] However, the potential rate impact would be entirely dependent on the number of DER Management devices that are actually installed.[154] According to OCA, PPL "failed to

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147 PPL St. No. 1-R, p. 7.

148 NRDC St. No. 1-SR, pp. 4-5, 9.

149 *Id.* at 5.

150 *Id.* at 9-12.

151 *Id.* at 9.

152 *Id.*

153 OCA St. No. 1-SR, p. 6.

154 *Id.* at 6-7.

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."[155]

In PPL Electric's rejoinder testimony, the Company addressed these concerns about the DER Management devices' availability and supply chain. PPL 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.[156] ConnectDER will maintain minimum of three months' worth of inventory, which will be available for immediate delivery.[157] ConnectDER's manufacturer, Allen Integrated Assemblies (AIA), will maintain an allocated inventory for PPL 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.[158] PPL explained that of additional materials beyond the nine-month supply, the longest lead time is three months[159], and that AIA can hire and train additional labor in two weeks' time.[160] In addition, PPL explained that 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.[161] Therefore, the Company noted it will be able to foresee the demand coming.[162] PPL also explained that ConnectDER has provided PPL with a letter of prioritization, showing that demand by other utilities should not affect the Company's demand for the DER Management devices.[163]

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155 *Id.* at 7.

156 PPL St. No. 1-RJ, p. 5.

157 *Id.*

158 *Id.*

159 *Id.*

160 *Id.*

161 *Id.*

162 *Id.*

163 *Id.*

Furthermore, PPL Electric addressed OCA's claims about the potential rate impact of the Company's proposal.[164] 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.[165] Therefore, PPL argued 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.[166] Moreover, PPL posited that 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.[167]

Under the Settlement, the Joint Petitioners agree to an annual cap of 3,000 DER Management devices that can be installed during the Pilot Program.[168] 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.[169] Any DER not equipped with a DER Management device for this reason shall not be part of the Pilot Program.[170]

PPL argues that these settlement provisions address the supply chain issues raised by NRDC and the cost concerns raised by OCA. PPL explains that by placing the annual cap on the number of DER Management devices that can be installed during the pilot program, the Joint

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164 PPL St. No. 7-RJ, pp. 4-6.

165 *Id.* at p. 4.

166 *Id.* at pp. 4-5.

167 *Id.*

168 Settlement ¶¶ 55-56.

169 Settlement ¶¶ 55-56.

170 *Id.*

Petitioners know the maximum number of DER Management devices that may be purchased and installed by the Company in a given year. Therefore, PPL explains, 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, PPL argues that these settlement provisions are just and reasonable, are in the public interest, and should be approved without modification.

The other parties did not expressly address this portion of the Settlement in their Statements in Support.

### 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.[171] However, both recognized that the autonomous use of smart inverters' grid support functions would provide many benefits.[172]

In the Company's rebuttal testimony, PPL 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.[173] As explained in that exhibit (*i.e.*, PPL Exh. SS-1R), PPL proposed to use the following grid support functions in both autonomous and active management modes:

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171 NRDC St. No. 1, pp. 7-8, 24; OCA St. No. 1, pp. 11-12, 14-15.

172 NRDC St. No. 1, p. 18; OCA St. No. 1, p. 19, 27.

173 PPL St. No. 1-R, p. 24; PPL Exh. SS-1R.

(1) Volt/VAR[174]; (2) Constant Power Factor[175]; (3) Remote On/Off[176]; (4) Voltage Ride-through[177]; and (5) Frequency Ride-through[178]. [179]

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.[180] However, as stated previously, NRDC continued to disagree with PPL Electric's proposal to remotely and actively manage those settings.[181] 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.[182]

PPL Electric responded to SEF's argument about the Remote On/Off function in the Company's rejoinder testimony.[183] The Company explained that for solar plus storage, PPL

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174 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.)

175 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.)

176 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.)

177 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.)

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

179 PPL St. No. 1-R, pp. 24-25; PPL Exh. SS-1R.

180 NRDC St. No. 1-SR, pp. 2-3.

181 *Id.* at 4, 13-14.

182 SEF St. No. 2-SR, pp. 2-3.

183 PPL St. No. 1-RJ, p. 22.

Electric has no intention of shutting down a battery storage system or the solar system during outage situation.[184] 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.[185]

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 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. [186] The Company shall also establish default settings for voltage ride-through and frequency ride-through functions consistent with PJM's standards. [187] 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.[188]

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.[189] 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

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184 *Id.*

185 *Id.*

186 Settlement ¶ 58.

187 *Id.*

188 *Id.*

189 "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.)

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.[190]

PPL argues that these settlement provisions clarify the grid support functions that PPL Electric can establish and use under its proposal. The Company notes it anticipates providing more details about these grid support functions, including when and to what extent they may be used, in the Pilot Implementation Plan that will be filed pursuant to Paragraph 61 of the Settlement, and therefore, the Joint Petitioners will have another opportunity to provide feedback on the parameters for these functions. Thus, PPL argues these settlement provisions are just and reasonable, are in the public interest, and should be approved without modification.

The other parties did not expressly address this portion of the Settlement in their Statements in Support.

### 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)."[191]

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

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190 Settlement ¶ 59.

191 *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).

relying on the smart inverters' autonomous functions.[192] Importantly, PPL Electric agrees not to use the monitoring and/or management of DER inverters during the Pilot Program to offer services in PJM wholesale markets. Also, per the Settlement, 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.[193] 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.[194]

PPL argues that 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, PPL argues 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 has committed to focus on the testing and evaluation of the Pilot Program. For these reasons, PPL argues these settlement provisions should be adopted without modification.

The other parties did not expressly address this portion of the Settlement in their Statements in Support.

## 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

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192 Settlement ¶ 54.

193 Settlement ¶ 60.

194 *Id.*

capital investments should be recovered by the Company."[195] 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."[196] Rather, "[a]ny such proposal will be made in a future proceeding, most likely a base rate case."[197]

Under the Settlement, PPL 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 as part of the Pilot Program.[198] The Joint Petitioners may challenge the amount of the Company's claim, the prudency 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.[199]

PPL argues 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.[200] PPL notes that, 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.

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195 PPL St. No. 1, p. 28 n.16.

196 PPL St. No. 1-R, p. 21.

197 *Id.*

198 Settlement ¶ 64.

199 Settlement ¶ 64.

200 *See* Settlement ¶ 62.

OCA argues that 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 prudency of these costs and how those costs are recovered.[201] OCA takes the position that the Pilot Program contains important provisions that ensure it is temporary, limited in scope and cost, and establishes sufficient reporting requirements. Accordingly, OCA argues that provisions are in the public interest and should be approved without modification.

SEF also believes that the Joint Petition 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), prudency and reasonableness of Company's claim for capital costs and expenses associated with the DER management devices in a future base rate case.[202]

NRDC did not specifically address this portion of the Settlement in its Statement in Support.

## D. Statewide Proceeding

As explained above, 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 argued that the instant proceeding was better suited to resolve those issues.

In the end, the Joint Petitioners 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

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201 Settlement ¶ 64.

202 *Id.*

approval of the Settlement.[203] 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.[204]

PPL argues that 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.

In its Statement in Support, 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, OCA explains that 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."[205] OCA argues that this ensures that as statewide protocols are adopted in any future statewide stakeholder proceeding, PPL is ready and able to conform to Commission requirements. OCA explains that the Settlement provisions allow PPL 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, OCA argues that these provisions are in the public interest.

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203 Settlement ¶ 65.

204 *Id.*

205 *Id.*

NRDC notes that from the outset of this proceeding, it has contended that the issues raised in the DER Petition were better suited to consideration as part of a statewide stakeholder process.[206] As part of the Settlement, NRDC notes that 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.[207] NRDC argues that the Settlement 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.

SEF did not specifically address this portion of the Settlement in its statement in support.

## 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)."[208]

In rebuttal, PPL agreed to many of these reporting requirements, including tracking and reporting the real power reductions experienced by customers under the Company's proposal.[209] PPL 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.[210] In that annual

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

207 Settlement. ¶ 65.

208 OCA St. No. 1, pp. 52-53.

209 PPL St. No. 1-R, pp. 85-87.

210 *Id.* at 86.

report, the Company would provide the amount of generation loss experienced by the customer for the past year.[211] PPL Electric also would track and report when, where, and how often voltage regulation functions are utilized.[212] Additionally, PPL agreed to report on when non-wires alternatives are installed in order to defer distribution system upgrades.[213]

Subsequently, when SEF made its alternative pilot program recommendation in its surrebuttal testimony, SEF proposed that PPL "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 witness Salet's rebuttal testimony.[214]

In rejoinder, PPL 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.[215] Moreover, as set forth in the Company's pilot program alternative, PPL 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.[216]

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

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211 *Id.*

212 *Id.*

213 *Id.* at 87.

214 SEF St. No. 1-SR, pp. 11-12.

215 PPL St. No. 1-RJ, p. 12.

216 *Id.* at 12, 31-33.

reporting period.[217] 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.[218] 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.[219]

PPL argues that 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, PPL notes the Joint Petitioners may agree to additional reporting requirements after the filing of the Pilot Implementation Plan.[220] As a result, PPL argues that these settlement provisions will help provide the interested parties with the information needed to evaluate the Pilot Program, and are just and reasonable, are in the public interest, and should be approved without modification.

OCA argues that the yearly reporting requirements will ensure that the Pilot Program proceeds in a transparent and informative manner. OCA explains that 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. OCA notes that these reporting requirements were adopted in the Settlement, in part, because of the recommendations made by OCA witness

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217 Settlement ¶¶ 66-69.

218 Settlement ¶¶ 67, 69.

219 Settlement ¶ 68.

220 Settlement ¶ 67.

Nelson.[221] Accordingly, the OCA supports the reporting requirements and submits that they are in the public interest.

In its Statement in Support**,** SEF identified the reporting requirement as one of the specific Settlement provisions it believed was in the public interest.

## F. Compliance Tariff Supplement

In this proceeding, PPL proposed to establish a new rule in its retail tariff entitled "Rule 12 – Distributed Energy Resources Interconnection Service" or "DERIS."[222] 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 Exhibit SS-1.[223] The originally-filed DERIS provided customer application details and technical DER equipment standards under the DER Management Plan.[224] Specifically, these tariff pages provided details about the device requirements, including smart inverters, DER management devices, and DER monitoring and management.[225]

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.[226]

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221 *See* OCA St. 1 at 52-54.

222 PPL St. No. 1, p. 22.

223 *See* PPL Exh. SS-1.

224 PPL St. No. 1, p. 23; PPL Exh. SS-1.

225 PPL St. No. 1, p. 23; PPL Exh. SS-1.

226 OCA St. No. 1, pp. 11-12, 35-39; SEF St. No. 1 (Non-Proprietary), p. 4.

In the Company's rebuttal testimony, PPL explained that there was no requirement for the Company to include the DER Management Plan White Paper in its DER Management Petition.[227] Also, it argued there was no need 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.[228] In fact, if the Commission directed the Company to follow those specifications in its Order approving the DER Management Petition, PPL argues it would be required to follow the Commission's Order.[229] Furthermore, PPL explains that 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's proposed Rule 12 – Distributed Energy Resource (DER) Interconnection Service.[230] PPL notes that its REMSI is publicly-available on the Company's website,[231] and 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.[232]

PPL argues that 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. The *pro forma* tariff supplement has been updated to reflect the terms of the Settlement. PPL explains that 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 argues that it should be permitted to file a compliance tariff supplement

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227 PPL St. No. 1-R, p. 42.

228 *Id.* at 43.

229 *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").

230 PPL St. No. 1-R, p. 43.

231 *See* "Rules for Electric Meter & Service Installations (REMSI)," *available at* https://www.pplelectric.com/remsi.

232 PPL St. No. 1-R, p. 43.

consistent with Appendix A, pursuant to the Settlement, and that this settlement term is just and reasonable, is in the public interest, and should be approved without modification.

None of the other parties addressed this section of the Settlement in their Statements in Support.

## G. Electric Vehicles

Another issue raised in this proceeding was whether PPL's DER Management Petition would apply to electric vehicles (EVs).[233]

In the Company's rebuttal testimony, PPL clarified that "[a]n EV is a load installed behind the meter and generally will not be impacted by the Company's proposal."[234] "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."[235]

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.[236]

In rejoinder, PPL Electric clarified that it was no longer proposing to include EVs under its present DER Management Plan.[237] But, in the future, as standards and EV technology

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233 *See* OCA St. No. 1, p. 44; SEF Set. No. 1, pp. 9-10.

234 PPL St. No. 1-R, p. 82.

235 *Id.*

236 OCA St. No. 1-SR, pp. 8-9.

237 PPL St. No. 1-RJ, p. 10.

develop and mature, PPL Electric will continue to evaluate impact to safety and reliability on the distribution system.[238]

The Settlement states that EVs are exempt from the requirements of Section II.B. of this Settlement.[239] 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, PPL argues this settlement provision is just and reasonable, is in the public interest, and should be adopted without modification.

None of the other parties addressed this section of the Settlement in their Statements in Support.

## H. Data on Program Performance

OCA, SEF, and PPL all submitted testimony about the reporting requirements that should be adopted as part of this proceeding. In addition to the detailed annual reports PPL will be submitting pursuant to the Commission, 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).[240]

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.[241]

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238 *Id.*

239 Settlement ¶ 71.

240 Settlement ¶ 72.

241 Settlement ¶ 73.

PPL argues that 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, PPL argues the Settlement provision is just and reasonable and in the public interest. Therefore, PPL states it should be approved without modification.

## I. No Precedential Effect

In its direct testimony, OCA averred that PPL's DER Management Petition, if approved, "would be precedent setting."[242] SEF likewise asserted that the Company's proposal "will have great consequence across entire industries."[243]

PPL explained in its rebuttal testimony, that it has distinct characteristics from its peer EDCs that warrant the Company being able to implement its proposal.[244] For example, without a DERMS, an EDC cannot implement a proposal similar to PPL's DER Management Plan.[245] However, PPL explained that to the best of the Company's knowledge, PPL 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.[246] PPL also explained that its service territory also has some of the highest solar radiation in the Commonwealth.[247] Further, PPL noted that the Company's distribution system is much more rural with much longer circuits compared to other EDCs in Pennsylvania.[248] Long distribution circuits make managing voltage more challenging due to the line losses associated with long distribution lines.[249]

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242 OCA St. No. 1, p. 29.

243 SEF St. No. 1 (Non-Proprietary), p. 4.

244 PPL St. No. 1-R, p. 59.

245 *Id.* at 60.

246 *Id.*

247 *Id.* at 60-61.

248 *Id.* at 61.

249 *Id.*

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.[250]

PPL argues that this Settlement reflects a carefully-crafted compromise of the Joint Petitioners' positions and is based on the unique circumstances of PPL Electric.[251] 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, PPL argues this settlement provision is reasonable and in the public interest and should be approved without modification.

NRDC noted this settlement provision in its Statement in Support, where it argued the Settlement was in the public interest and should be approved.

## IX. ANALYSIS AND RECOMMENDATION

The Commission encourages parties in contested on-the-record proceedings to settle cases.[252] Settlements eliminate the time, effort, and expense of litigating a matter to its ultimate conclusion, which may entail review of the Commission's decision by the appellate courts of Pennsylvania. Such savings benefit not only the individual parties, but also the Commission and all ratepayers of a utility, who otherwise may have to bear the financial burden such litigation necessarily entails.

By definition, a "settlement" reflects a compromise of the positions the parties of interest held, which arguably fosters and promotes the public interest. When active parties in a

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250 Settlement ¶ 74.

251 *Id.*

252 *See* 52 Pa.Code § 5.231.

proceeding reach a settlement, the principal issue for Commission consideration is whether the agreement reached suits the public interest.[253] In their supporting statements, PPL, OCA, NRDC, and SEF take the position that this Settlement resolves the issues in this case, fairly balances the interests of PPL and its ratepayers, is in the public interest, is consistent with the requirements, and should be approved.

There is no dispute that smart inverters offer many benefits to local distribution systems, and, like OCA witness Nelson explained, the adoption of smart inverters should be encouraged and is consistent with a NARUC policy statement.[254] The Settlement grandfathers in customers who submit an application prior to January 1, 2021, and the list of approved smart inverters will be publicly available for review by customers and installers. Furthermore, the parties represent that there should be a full complement of devices in the market from which to choose. Finally, although the Settlement requires that smart inverters must have one of their communications ports dedicated to use by PPL, and some customer's DER set-ups require both communications ports to operate, PPL has agreed to provide a three-communications port solution at no direct cost to that customer.[255]

The greater points of contention in this case were related to the Company's proposal to require the installation of DER Management devices for all new DER interconnections with the Company's distribution system. PPL presented evidence this 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.[256] OCA, NRDC, and SEF disagreed that PPL should be permitted to install the DER Management devices for all new DER interconnections and use them to monitor and

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253 *Pa. Pub. Util. Comm'n v. CS Water and Sewer Assocs.*, 74 Pa. PUC 767, 771 (1991).

254 OCA St. 1 at 52; PPL Electric St. 2-R, Exh. WR-2R.

255 Settlement ¶ 52.

256 PPL St. No. 1, pp. 16-21.

remotely manage the DERs.[257] While PPL argued that the benefits of monitoring and remote active management were well-established, the other parties disagreed with the Company's analysis.

Through Settlement, the parties have agreed to the implementation of a Pilot Program and various data reporting requirements. This Pilot Program will test and evaluate the benefits of monitoring and the benefits of active management versus autonomous functions. It will enable the Company to gather valuable data and present its findings to the Commission, the Joint Petitioners, and any interested stakeholders. This data will be 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.

As for cost recovery of the DER Management devices, the Settlement authorizes PPL 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. The Joint Petitioners may challenge the amount of the Company's claim, the prudency 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. This settlement provision ensures 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 and that the costs actually recovered by PPL are reasonable and prudent.

Finally, all the parties agree to participate in a state-wide proceeding, if or when one is held, and agree that the Settlement in this case shall have no precedential effect. These Settlement provisions ensure that PPL may move forward with implementing and testing new

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[257] OCA St. No. 1, pp. 12-54; NRDC St. No. 1, pp. 7-9; SEF St. No. 1 (Non-Proprietary), p. 10.

technology, while at the same time leaving the door open for other avenues of Commission action.

We find that the Settlement strikes an appropriate balance between the positions of the parties in a manner that is in the best interest of PPL's customers and is in the public interest. Accordingly, we recommend that the Commission approve the Settlement because it is in the public interest.

## X. 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. 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. 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. Pub. Util. Comm'n v. York Water Co.*, Docket No. R-00049165 (Order Entered Oct. 4, 2004); *Pa. Pub. Util. Comm'n 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. Pub. Util. Comm'n*, 413 A.2d 1037 (Pa. 1980); *Erie Resistor Corp. v. Unemployment Comp. Bd. of Review*, 166 A.2d 96 (Pa. Super. 1961); *Murphy v. Pa. Dept. of Public Welfare, White Haven Center*, 480 A.2d 382 (Pa. Cmwlth. 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.

## XI. ORDER

THEREFORE,

IT IS RECOMMENDED,

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.

Date: November 17, 2020

/s/
Emily I. DeVoe
Administrative Law Judge

/s/
Mary D. Long
Administrative Law Judge