



BICKY CORMAN
Energy and Environmental Law

1250 Connecticut Avenue, NW • Suite 700
Washington, DC 20036
main 202.261.3529
fax 202.261.3508
mobile 202.213.1672
bickycormanlaw.com

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VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, Filing Room
Harrisburg, PA 17120

Re: Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan; Docket No. P-2019-3010128: **[1] VERIFIED PETITION OF JOINT SOLAR PARTIES FOR RESCISSION OR AMENDMENT OF PPL ELECTRIC'S DISTRIBUTED ENERGY RESOURCES MANAGEMENT PILOT, and REQUEST FOR EXPEDITED PROCEEDING; and [2] NOTICE OF APPEARANCE ON BEHALF OF TESLA, INC., SUNRUN, INC., SUN DIRECTED, AMERICAN HOME CONTRACTORS, and SOLAR ENERGY INDUSTRIES ASSOCIATION**

Dear Secretary Chiavetta:

Enclosed for filing with the Pennsylvania Public Utility Commission are the Joint Solar Parties' Petition for Rescission or Amendment of PPL Electric's Distributed Energy Resources Management Pilot, and Request for Expedited Proceeding; and Notice of Appearance filed on behalf of Tesla, Inc., Sun Directed, American Home Contractors, Sunrun, Inc., and Solar Energy Industries Association ("Joint Solar Parties").

Please contact me if you have any questions concerning these filings.

Very truly yours,

Bernice I. Corman, PA BAR #332915
BICKY CORMAN LAW, PLLC
Phone: (202) 213-1672
Email: bcorman@bickycormanlaw.com



*Counsel to Tesla, Inc., Sunrun, Inc., Sun
Directed, American Home Contractors, and
Solar Energy Industries Association*

Attachments

cc: Presiding Officer
Service List

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

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

**VERIFIED PETITION OF JOINT SOLAR PARTIES FOR RESCISSION OR
AMENDMENT OF
PPL ELECTRIC’S DISTRIBUTED ENERGY RESOURCES MANAGEMENT PILOT;
and REQUEST FOR EXPEDITED PROCEEDING**

AND NOW, come Tesla, Inc. (“Tesla”), Sun Directed, American Home Contractors (“AHC”), Sunrun, Inc. (“Sunrun”) and the Solar Energy Industries Association (“SEIA”) (collectively, the “Joint Solar Parties” or “JSPs”) pursuant to 66 Pa. C.S. § 703(g) and 52 Pa. Code § 5.572, and respectfully request that the Pennsylvania Public Utility Commission (“Commission”) rescind the December 17, 2020 Order (“December 17, 2020 Order”) issued in this docket, in which the Commission approved various tariff modifications and waivers of regulations that enabled PPL Electric Utilities Corporation (“PPL Electric” or “PPL”) to implement a Distributed Energy Resource (“DER”) Management Plan (“DER Management Plan” or “Pilot”).

In the alternative, the JSPs respectfully request that the Commission amend its December 17, 2020, Order to require that the Pilot allow customers to opt-out of participating therein.

Additionally, the JSPs respectfully urge the Commission to address this Petition expeditiously to limit the significant harm the Pilot is now causing to the distributed solar market in PPL territory.

The Approved Pilot permits PPL to require installation of a PPL-owned DER Management device (known as “Connect DER” or PPL’s “Management Device”) on the inverter of a customer-owned solar system to monitor and control the inverter. The stated goals of the Pilot are:

... 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 function.¹

In order to ensure that customers' inverters are compatible with PPL's Management Device, PPL published an Approved Smart Inverter List that limits the types of inverters all customers interconnecting after January 1, 2021 must use² to only those that both meet (1) certain IEEE and UL standards,³ as well as (2) PPL's internal testing for compatibility with its Management Device.⁴

Despite stakeholders' concerns that restricting the pool of inverters to those that meet PPL's bespoke requirements would unduly hamper the market,^{5, 6} to date, PPL has completed testing and approved for use inverters by only 11 manufacturers.⁷ This limitation has occurred despite many additional manufacturers producing models that adhere to the IEEE and UL standards that serve as the first criteria of PPL's inverter approval requirements. By artificially restricting the pool of eligible smart inverters, the Pilot has increased the costs of distributed solar installations, caused and exacerbated equipment sourcing issues for installers, delayed the timing of installation and operation

¹ Stated in the November 17, 2020 Recommended Decision ("RD") issued in this docket, Section V.B., p. 16 (citing Settlement Term ¶ 54 (emphasis theirs)). The Recommended Decision was adopted by the Commission in its December 12, 2020 Order.

² RD, Section IV, Stipulated Findings of Fact ("SFOF"), ¶ 26.

³ The requirements are set forth in PPL's Rules for Electric Service, Rule 12, Section C, available at: https://www.pplelectric.com/-/media/PPLElectric/At-Your-Service/Docs/Current-Electric-Tariff/Supplement-322---Rule-12_11012021.ashx.

⁴ Those tests, which are intended to confirm that the inverter is compatible with PPL's ConnectDER, include basic communications protocol testing, ensuring inverters can receive various commands via its local communication interface, and validating end-to-end testing between the inverter and the utility's DER Management Device. *See* PPL's Revised DER Management Pilot Implementation Plan, at pp. 9-10.

⁵ *See* Surrebuttal Testimony of Sustainable Energy Fund by John Costlow dated March 19, 2020, filed September 23, 2020 in this docket, Statement 1-SR, at pp. 3-4.

⁶ *See* Direct Testimony of Sustainable Energy Fund by Ronald Celentano dated February 5, 2020, filed September 23, 2020 in this docket, Statement No. 2, at pp. 10-11.

⁷ PPL's Approved Smart Inverter List is [here](#).

of distributed solar systems, forced customers to reduce the size of solar installations, and severely limited the types and variety of solar systems that can be installed.

Perhaps of even greater concern is that the data generated through Pilot implementation are confirming that insertion of PPL's Management Device into the customer's system is *not* yielding the promised benefits.⁸ To the contrary, the Pilot is causing numerous, significant, technical problems, including disrupting customers' ability to use and monitor their distributed solar systems, and interfering with production of Solar Renewable Energy Credits ("SRECs").

These two problems are exacerbated by the fact that the Pilot is not poised to be adjusted until at least March 2025,⁹ and provides no procedures that would allow the Commission to adjust (or terminate) the Pilot until the Pilot "nears its conclusion."¹⁰

Nor does the Pilot provide any ability for a customer to opt out.¹¹ While utility pilot programs focused on specific customer classes typically allow for voluntary customer participation in programs that are sometimes experimental in nature, this Pilot requires the participation of every new customer who is installing a new distributed solar system in PPL territory.¹² Thus, the participation requirement has in effect made the Pilot's interconnection requirements the law of the land, although the rules changes required to enable the Pilot did not undergo traditional notice-and-comment rule-making in a state-wide proceeding, as required by the Commonwealth Documents Law.¹³ Rather, the Commission's Pilot approval was in part based upon the parties' agreement to participate in a state-wide process if and when the Commission instituted same.¹⁴ But as the Commission has not done so,

⁸ As JSPs will describe later in this filing, PPL's first annual report regarding this Pilot demonstrates that the utility has yet to demonstrate any advantage of utility control or monitoring of inverters, as compared to simply requiring adherence to IEEE 1547-2018 smart inverter setting requirements.

⁹ RD SFOF, ¶ 31.

¹⁰ RD, p. 41.

¹¹ RD, pp. 66 – 67.

¹² RD SFOF, ¶ 26.

¹³ 45 P.S. §§ 1101 - 1611.

¹⁴ RD, p. 67.

the parties lack that as a vehicle through which they could otherwise highlight for the Commission the drastic problems being caused by Pilot implementation.

Cumulatively, these substantive and structural problems have hampered distributed solar installations, slowed the pace of solar deployments in PPL territory, and generally made solar ownership less enticing to customers, making it more difficult for Pennsylvania to meet state clean energy goals, such as Gov. Josh Shapiro's pledge for the state to generate 30 percent of its energy from renewables by 2030 and the Pennsylvania Climate Action Plan's target to, by 2025, cut in-state greenhouse gas emissions by 26 percent.^{15, 16} Indeed, these problems have caused or been a significant contributing factor to one of the nation's largest solar installers ceasing operations entirely in PPL's territory.¹⁷ Additionally, smaller installers operating in PPL's territory say they have been forced to raise the price of residential solar systems in the territory due to PPL's limits on which inverter types are allowed to be installed.

In no other territory in which they operate are the JSPs aware of a program in which the utility is allowed to mandate installation of a utility-owned device on the inverter of a customer-owned solar system to monitor or control the customer's inverter. The JSPs respectfully submit it is unreasonable and anti-competitive for PPL to force its customers and the solar industry to bear the cost of PPL's experiment into whether utility control of inverters can outperform the IEEE 1547-2018 standards, which were drafted and approved through a rigorous national review process that involved utilities, solar industry representatives, and other stakeholders. Other utility territories with far denser

¹⁵ "Josh Shapiro Releases Plan to Boost Pennsylvania's Economy by Cutting Red Tape and Spurring Innovation." *Shapiro for Governor*. 25 July 2022. <https://joshshapiro.org/news/josh-shapiro-releases-plan-to-boost-pennsylvanias-economy-by-cutting-red-tape-and-spurring-innovation/>.

¹⁶ "Pennsylvania Climate Action Plan." Pennsylvania Department of Environmental Protection. September 2021. <https://www.dep.pa.gov/Citizens/climate/Pages/PA-Climate-Action-Plan.aspx>.

¹⁷ Tesla, one of the nation's largest installers of residential solar and solar-plus-storage systems, informed PPL on July 18, 2023 that it had ended its energy operations in the territory due to problems arising from Pilot implementation.

penetrations of distributed solar systems than compared to PPL¹⁸ have identified IEEE 1547-2018 autonomous smart inverter settings as the optimal way for customer-sited clean energy systems to improve grid reliability. JSPs note that current interconnection rules in any event require that inverters comply with IEEE 1547-2018, i.e., require that inverters be able to autonomously respond to grid conditions in a manner that can improve grid health.

For all these reasons, the JSPs respectfully request that the Commission rescind the Pilot effective immediately to prevent further disruption, or, in the alternative, that the Commission direct PPL to allow for an opt out from Pilot participation. The JSPs also request expedited consideration of this Petition so that the numerous customer and industry harms do not persist, which will further impede the installation of distributed solar in PPL's territory.

I. BACKGROUND AND PROCEDURAL HISTORY

1. On May 24, 2019, PPL filed a Petition in the above-captioned docket seeking Commission approval of tariff modifications to the net metering and interconnection provisions in PPL's DER Management Plan, and to waive nine of the Commission's regulations implementing the Alternative Energy Portfolio Standards Act ("AEPS Act").^{19, 20} Under PPL's proposal, customers seeking to interconnect new DERs on PPL's distribution system would be required to: (1) use PPL-approved smart inverters that are compliant with IEEE 1547-2018 and forthcoming

¹⁸ For example, all California, Hawaii and New York investor-owned utilities use IEEE 1547 autonomous smart inverter settings for voltage regulation rather than employing any direct utility control of inverters.

¹⁹ May 24, 2019, Petition of PPL Electric Utilities Corporation for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan, Docket No. P-2019-3010128 (hereinafter, "PPL's Petition").

²⁰ The AEPS Act of 2004, 73 P.S. §§ 1648.1-1648.8, revised by Act 35 of 2007 (effective July 2007) and Act 129 of 2008 (effective November 2008) enables customer-generators to interconnect their generating facilities with the distribution systems of electric distribution companies such as PPL. 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." 73 P.S. § 1648.5. Pursuant to this directive, the Commission promulgated regulations that govern the interconnection and net metering of customer-generators' facilities (codified at 52 Pa. Code, Ch. 75).

UL Standard 1741 (or until that standard is finalized, UIL Standard 1741-SA); and (2) install devices to enable PPL's real-time monitoring and control of customers' DER.²¹

2. On July 30, 2019, Motions to Intervene were filed by the Natural Resources Defense Council ("NRDC") and Sunrun, who, along with the Office of the Consumer Advocate ("OCA") answered in opposition to PPL's Petition. On September 3, 2019, an additional Motion to Intervene was filed by Sustainable Energy Fund ("SEF"), which also opposed PPL's Petition.

3. On September 20, 2019, Sunrun and NRDC each filed Petitions for Interlocutory Review and Answer to Material Questions, asking the Commission to find that PPL's petition should be denied in favor of addressing the issue through a procedure applicable on a statewide basis and initiating a statewide stakeholder process allowing for Commonwealth-wide input on the issue. OCA filed a Brief in Support of Sunrun's and NRDC's Petitions. Seven non-intervenors filed comments supporting the Answer of NRDC and recommending that the Commission deny PPL's Petition.

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

5. On December 11, 2019, PPL served its written direct testimony and exhibits. On February 5, 2020, OCA, NRDC, and SEF served their written direct testimony and exhibits. On March 4, 2020, PPL served its written rebuttal testimony and exhibits. On March 19, 2020, OCA, NRDC, and SEF served their written surrebuttal testimony and exhibits. On August 26, 2020, PPL served its written rejoinder testimony and exhibits.

²¹ PPL's Petition, p. 2.

6. On August 27, 2020, the parties sent an email to the ALJs informing them they had reached a settlement in principle of all issues with OCA, NRDC, and SEF and that Sunrun had represented to the parties that it would not file objections to the Joint Petition for Settlement. On October 5, 2020, PPL, OCA, NRDC, and SEF filed a Joint Petition for Settlement of All Issues. On December 17, 2020, the Commission entered an Order adopting without modification the Joint Stipulation for Approval of Settlement of All Issues without modification; approving PPL'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; approving PPL's requested waiver 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, as well as any additional regulations necessary to implement the DER Management Plan as modified by the Joint Petition for Approval of Settlement of All Issues; and adopting the Recommended Decision of Administrative Law Judges Emily I. DeVoe and Mary D. Long, dated November 17, 2020.

7. ALJs DeVoe and Long found that under the Settlement, the Joint Petitioners agreed that effective January 1, 2021, new DERs interconnecting with the Company's distribution system must have smart inverters installed that meet specified industry standards, as well as PPL's testing for the communications requirements under IEEE 1547-2018.²²

8. ALJs DeVoe and Long directed that PPL "... undertake its testing processes in an expeditious matter so as not to delay interconnections."²³

9. ALJs DeVoe and Long further required that PPL publish a list of smart inverters meeting the above-enumerated requirements be publicly available and regularly updated on PPL's website.²⁴

²² RD SFOF, ¶¶ 26, 27.

²³ *Id.*, ¶ 26. *See also*, RD, V.A. ¶ 48.

²⁴ *Id.*

10. The ALJs found that the Settlement authorizes PPL 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.²⁵

11. The ALJs directed that two control groups be established for the pilot program.²⁶

12. The ALJs directed that the Pilot program begin on January 1, 2021, and end three years after the second control group is established, or “Program Year 3.”²⁷

13. The ALJs built no off-ramps into the Pilot. Instead, they ruled that “through settlement, the parties have agreed to the implementation of a Pilot and can be adjusted if and when PPL Electric files a petition to continue or adjust its DER Management Proposal in Program Year 2.”²⁸

14. In response to intervenors’ position that changes to the interconnection rules should be decided in a state-wide proceeding,²⁹ the ALJs found that: “[A]ll parties agree to participate in a state-wide proceeding, if or when one is held.”³⁰

15. On December 23, 2020, PPL filed its compliance tariff pursuant to the December 17, 2020, Order. On January 19, 2021, PPL filed its DER Management Pilot Implementation Plan. On February 8, 2021, NRDC, Sunrun, OCA, and SEF filed comments on PPL’s DER Management Pilot Implementation Plan. On March 1, 2021, PPL filed its Revised DER Management Pilot Implementation Plan.

²⁵ *Id.*, ¶ 28 (emphasis theirs). *See also* RD, V.B. 54.

²⁶ *Id.*, ¶ 29.

²⁷ *Id.*, ¶ 30. *See also*, RD, V.B. ¶ 54.

²⁸ RD, p. 70.

²⁹ RD, p. 67.

³⁰ RD SFOF, ¶ 52.

16. Among other things, NRDC noted in its February 2021 comments continued concern with the pace with which PPL was testing inverters.³¹

17. Under the Revised DER Management Pilot Implementation Plan, Program Year Zero commenced on January 1, 2021, and would conclude once PPL enrolled 75 DER customers in Control Group 1 and 1,000 DER customers in Control Group 2. Control Group 1 comprises the first 75 DER customers who applied to interconnect by 75 circuits selected by PPL. Control Group 2 comprises 1,000 DER customers who apply for interconnection regardless of their location on the system. Control Group 1 and Control Group 2 customers' DERs operate with autonomous grid support functions only and are monitored but not controlled by PPL. PPL initially estimated that it would complete enrollment in the control groups by July 2021, but it did not complete enrollment until March 21, 2022, which ended Program Year Zero on that date.

18. On March 22, 2022, Program Year 1 began, requiring annually that the first 3,000 DERs interconnecting to PPL's grid install a device which enables PPL's real-time monitoring and control of customers' DER.

19. On February 28, 2023, PPL filed its Second Revised DER Management Pilot Implementation Plan. On March 22, 2023, Program Year 2 began. On April 20, 2023, PPL filed in this docket its first annual DER Management Report ("Report") and corresponding data sets, providing details regarding how PPL managed and monitored inverters under the Pilot.

II. THE PARTIES

20. PPL, a corporation organized and existing under the laws of the Commonwealth of Pennsylvania and a wholly owned direct subsidiary of PPL Corporation, furnishes electric distribution, transmission, and default supply services to approximately 1.4 million customers

³¹ Comments of the Natural Resources Defense Council on Pilot Implementation Plan filed February 8, 2021 in this docket, p. 2.

throughout its certificated service territory. Pursuant to this Commission's December 17, 2020 Order, PPL is administering a three-year pilot program, whose Year 1 commenced January 1, 2021. The Program is predicated upon PPL's assuming direct operation and management control over customer and third-party owned smart inverter settings. Program participation -- mandated for all customers applying to interconnect new DERs to PPL's distribution system, requires that customers install for new DER installations, smart inverters approved by PPL as compatible with PPL's DER Management Device.

21. Tesla, which is registered to do business in Pennsylvania, is a corporation organized under the laws of Delaware, with corporate headquarters at 1 Tesla Road, Austin, TX. Tesla's mission is to accelerate the world's transition to a sustainable energy economy through the manufacture and deployment of electric vehicles, electric vehicle charging stations, and sustainable energy products, such as rooftop solar, battery energy storage systems, and auxiliary inverters and products. Some of Tesla's energy products include the Megapack grid scale battery energy storage system, the Powerwall residential battery energy storage system, and the Solar Roof. As of July 18, 2023, Tesla had installed 537 Powerwall battery energy storage units in PPL territory. However, because of significant difficulties that Tesla and its customers experienced participating in the mandatory Pilot, Tesla ceased operations in PPL territory after that date. In addition to Tesla's direct installation, an additional 254 Tesla Powerwalls have been installed in PPL's territory by third-party installers as of December 2023. Tesla is also a commercial customer of PPL, currently purchasing power to supply its electric vehicle chargers in the utility's territory. In June 2023, Tesla ceased operating in PPL territory, having found that the Pilot's required insertion of PPL's Management Device in the inverters of customers' solar and solar-plus-storage

systems prohibited Tesla from being able to ensure those systems adequately performed, and otherwise deterred its sales of its solar and battery products.

22. Sun Directed is a corporation organized under the laws of Pennsylvania, with corporate headquarters at 2820 E. College Ave., Suite K, State College, PA 16801. Sun Directed employs 11. Sun Directed has been helping Pennsylvanian residents and businesses realize energy independence since 2008, by providing them with reliable energy and finance solutions that reduce their energy expenses, slash their carbon footprints, and providing outage security. Since 2020, Sun Directed has had to deny providing solutions to commercial leads with single phase service, having found there are no viable options for them due to PPL's restrictions.

23. AHC, which is registered to do business in Pennsylvania, is a corporation organized under the laws of Delaware, with corporate headquarters located at 11820 W. Market Place, Fulton, MD 20759. AHC's mission is to accelerate is to accelerate the world's transition to sustainable energy through the deployment of sustainable energy products, such as solar roof, rooftop solar, and battery energy storage systems. However, due to significant difficulties that AHC and its customers experienced participating in the mandatory Pilot, AHC limited operations in PPL territory after June 2023.

24. Sunrun is the nation's largest residential solar, storage, and energy service company in the country with over 900,000 customers across 23 states, the District of Columbia, and Puerto Rico. Sunrun has an ownership interest in DERs in Pennsylvania and the PPL service territory. Sunrun petitioned to intervene in this docket on July 30, 2019 and was granted intervention through an interim order issued on August 22, 2019.

25. SEIA is a 501(c)6 non-profit trade association with a business address of 1425 K Street, N.W., Suite 1000, Washington, DC. Founded in 1974, SEIA is the national trade association for

the solar and solar + storage industries. In partnership with their 1,000 member companies, which include manufacturers, residential, community solar, commercial, and utility-scale solar developers, installers, construction firms, investment firms, and service providers, SEIA advocates for policies that shape fair market rules that promote competition and the growth of reliable, low-cost solar power. SEIA’s vision is to represent an industry that will be the single largest source of new energy generation over the next decade and to grow as the national voice of a larger, more unified and diverse industry. SEIA has over 30 member companies in Pennsylvania, with many more national firms also doing business there.

III. ARGUMENT

26. Under the Public Utility Code, the Commission may, at any time, after notice and opportunity to be heard, rescind, or amend any order made by it. 66 Pa. C.S. § 703(g).

27. The standards for granting reconsideration or clarification of a prior Commission order are set forth in *Duick v. PG&W*, Docket No. C-R0597001, 56 Pa. P.U.C. 553, 559 (Dec. 17, 1982) (“*Duick*”), in which the Commission stated:

A petition for reconsideration, under the provisions of 66 Pa. C.S. § 703(g), may properly raise any matters designed to convince the commission that it should exercise its discretion under this code section to rescind or amend a prior order in whole or in part. In this regard we agree . . . that “[p]arties . . . cannot be permitted by a second motion to review and reconsider, to raise the same questions which were specifically considered and decided against them . . . “What we expect to see raised in such petitions are new and novel arguments, not previously heard, or considerations which appear to have been overlooked by the commission.

28. The Commission has further stated that a “petition for reconsideration is properly before us where the petitioner pleads newly discovered evidence, alleges errors of law, or a change in circumstances.” *Application of Superior Water Company*, Docket No. A-212955 F0012, 2004 Pa. PUC LEXIS 267, *10 (Order entered February 12, 2004).

29. Based upon: (A) new evidence showing that Pilot implementation is significantly harming the distributed solar market while failing to provide discernible benefits to the grid or ratepayers, as compared to autonomous smart inverter settings; (B) considerations which appear to have been overlooked by the Commission; and (C) the Commission's legal error in approving what amounted to an amendment to interconnection rules without adhering to traditional notice-and-comment requirements, as well as the establishment of a program that is proving anti-competitive, the JSPs seek rescission of the Commission's December 20, 2020 Order approving the Pilot in its entirety, or, in the alternative, an amendment to the Order directing PPL to allow distributed solar interconnections to opt out of out of the Pilot.

A. New Evidence Shows that Pilot Implementation is Significantly Harming the distributed solar market while failing to provide discernible benefits to the grid or ratepayers, as compared to autonomous inverter settings.

1. New Information Shows that the Pilot Hinders Growth, Competition, and Innovation in the Distributed Solar Market by Limiting which Inverters can be Used, Increasing the Cost of Solar Installs, Causing Equipment Sourcing Issues, and Discouraging Installation of Innovative DER Systems

30. Data emerging from Pilot implementation show that the Pilot is causing harm not only to local solar customers, installers, and manufacturers, but also to the solar industry writ large, stemming from the requirement that each distributed solar inverter used in PPL territory be tested by PPL for compatibility with PPL's DER Management Device. Said limitation has increased the local price of distributed solar installations, has caused installers, including Tesla, Sun Directed and AHC, who operated in PPL territory, to endure equipment sourcing issues, and limited their ability to deploy certain innovative DER systems therein, rendering PPL's Pilot anticompetitive and anti-innovative.

31. PPL's severe limitation on the types of DER inverters available for use in PPL has resulted in higher prices for distributed solar systems and caused equipment sourcing issues for installers. For example, Tesla has experienced significant difficulties in sourcing the inverters on the PPL-Approved

Smart Inverter List and has sourced inverters at a higher price than it otherwise would have without PPL's additional restrictions. Due to these restrictions, prior to ending its operations in PPL, Tesla was preparing to implement a PPL-specific project price "add" of \$0.09 per watt for projects served from Tesla's Manheim warehouse and \$0.05 per watt for projects served from Tesla's Norristown warehouse to reflect the higher costs of PPL-approved inverters. This price adder would have caused PPL customers to pay between \$500 and \$900 more for a 10-kilowatt solar system. However, rather than implement the price adder, Tesla ultimately decided to end its installation operations in PPL territory due to the numerous problems associated with the Pilot.

32. Local installers also report experiencing sourcing and pricing problems in PPL territory like those experienced by Tesla. Michael Shadow, CEO and President of Sun Directed, a solar installer based in State College, Pennsylvania, said he has significant problems sourcing the inverters on PPL's list and has had to sell systems at a premium to account for the PPL-specific restrictions. "We work with the largest supply houses, and none of them have the ability to get some of these inverters," he said. "Other inverters on PPL's list are too expensive and end up pricing the job out. It's a harder sale because the systems cost more. I know there are jobs we're not selling in PPL territory because of these restrictions and increases in costs. The restrictive list there is definitely driving up the costs and extending the payback period for solar systems."

33. PPL's inverter restrictions also discourage installation of innovative DER systems in which inverters are integrated directly into distributed energy systems. Several newer battery energy storage system offerings come with integrated inverters for both the storage and solar systems. Some of the current battery storage offerings with integrated inverters include the Tesla Powerwall+, the Electriq Power PowerPod 2 DC-Coupled, the Panasonic EVERVOLT Home Battery, and the Generac PWRcell. These systems are designed so that inverters for solar and storage systems are

located within the battery housing, allowing for a simplified installation process. However, if the inverters integrated into a solar-plus-storage system are not included on the PPL-Approved Smart Inverter List, then the system would become impractical to install in PPL's territory, and the efficiencies of such products would be lost. This problem will intensify in the near future, as more DC-coupled solar and storage systems with integrated inverters are introduced to the market.³²

34. Cumulatively, these issues caused by PPL's Pilot have suppressed competition in the utility's territory by effectively allowing PPL to act as a gatekeeper for what solar and battery storage technologies can be deployed. The anticompetitive nature of PPL's Pilot has been further exacerbated because it has also caused installers to leave the territory. Not only are installers and customers excessively limited in how they can design distributed solar systems, but PPL's Pilot has limited the number of available sellers, giving consumers fewer options in multiple stages of the process of purchasing a home energy system.

2. New Information Also Shows the Pilot is Disrupting Customers' Solar System Functionality, Limiting the Size of Certain Solar Installations, and Impairing Customer Experience with Distributed Solar

35. The installation of PPL's DER Management Devices on customer-owned distributed solar inverters has caused significant disruption to the daily functioning of customer solar systems, threatening to damage customers' confidence in the reliability and efficacy of distributed solar in PPL's territory, and impairing customers' ability to size, design, and use their distributed solar systems as they would have had the Pilot not existed.

³² In DC-coupled solar-plus-storage systems, DC power generated from solar panels travels to a charge controller that feeds directly into the battery, eliminating the need to invert solar electricity from DC to AC and then back to DC for the energy to be stored in the battery. DC-coupling allow for greater system efficiencies than AC-coupled systems, because fewer inversions are required before the energy is used, resulting in smaller energy losses. DC-coupling also allow for material efficiencies and cost savings because it allows solar and battery storage systems to share a single inverter rather than requiring multiple inverters for the system.

36. For example, Tesla brand solar systems using PPL's approved inverters have been negatively affected by system disruptions under the Pilot, as follows:

a. PPL's device obstructs customer visibility of system functioning: PPL's DER Management Device has interfered with customers' ability to view data from their solar inverters, preventing customers from monitoring their solar production and other elements of how their system is functioning. This problem is present on solar systems that require multiple inverters. The disruption occurs primarily because PPL changes the communication settings on inverters when it connects its DER Management Device, and these changes can interfere with the ability of some solar inverters to connect to the home's Wi-Fi router. Customers typically make use of smart phone apps to monitor their daily and hourly solar production, giving them confidence that their system is working as intended. Disruptions into this system visibility frustrate customers because they are unable to monitor the functioning of a system which they own and for which they have often paid tens of thousands of dollars. Since the start of the Pilot, there have been at least 47 multi-inverter Tesla systems in PPL's territory in which system communications have been knocked offline due to the presence of PPL's DER Management Device. Those systems total 698 kW-AC in size. In any of those cases in which Tesla attempted to restore a customer's visibility into inverter functioning, the fix would in turn disrupt PPL's ability to monitor the customer's inverter – and PPL and Tesla service technicians frequently alternated on fixing their respective communications problems. Due to these ongoing issues, Tesla has paused all monitoring cases in PPL territory so does not send a Field Services Tech out to a site to change the connection back in a way that allows the customer to view the functioning of their own system.

b. Inverter communication issues conceal actual harm to customer systems: The system communication disruptions caused by PPL's device also have prevented customers and manufacturers from being alerted to actual problems with solar energy production. When a customer's inverter stops registering solar production, systems are often designed to automatically alert both the customer and manufacturer of the problem. For Tesla systems, under normal circumstances, a problem with system functionality would automatically prompt a system error code to be sent to a remote technician, who can schedule a home service call if one is needed to address the problem. In other instances, the technician may be able to address the issue remotely without the need for a service visit. However, due to problems caused by PPL's DER Management Device, both the customer and Tesla have been inundated with alerts that falsely report that the customer's solar system has stopped producing energy. These alerts not only cause frustration and concern among customers, but the high number of false positives also obscures instances in which customer systems have actually stopped producing energy due to damage or defect. The communication disruption caused by PPL's DER Management Device prevents manufacturers from remotely viewing error codes, which makes it impossible to remotely diagnose any issue that may arise with a customer's system. Additionally, PPL's Device has blocked the communication needed for Tesla to push firmware updates to customer inverters, meaning some inverters on PPL's system may no longer have the latest functionality that new firmware can provide.

c. PPL has limited certain solar system designs to using a single inverter: On March 17, 2023, PPL informed Tesla via email that due to the ongoing inverter communication problems being experienced by multi-inverter solar systems, PPL would no longer grant

permission to operate (PTO) to any multi-inverter Tesla system. Accordingly, from mid-March until Tesla ended its PPL operations in July of 2023, this restriction limited Tesla to installing solar systems sized at 11.4 kW-AC output when using the Solar Edge inverter, and to systems sized at 9.6 kW-AC output when the using the Delta inverter. As Tesla began to experience issues sourcing other inverters on PPL's Approved Smart Inverter List, customer solar system sizes were further restricted to even smaller system sizes.³³ Due to PPL's single-inverter design restriction, at least four PPL customers were forced to reduce the size of the solar systems they ordered. Cumulatively, these solar systems were reduced in size by 22.32 kW-AC, resulting in less total solar being deployed in PPL's territory and lost revenue for Tesla. Additionally, numerous customers cancelled existing solar system orders, after they were informed of PPL's single-inverter design restrictions for Tesla systems. In the first half of 2023, 29 PPL customers canceled solar orders totaling 438.18 kW-AC in size after being informed of PPL's restriction on the installation of multi-inverter Tesla systems. Further, PPL's change to inverter requirements has caused significant installation delays for certain solar systems, forcing customers to wait months in some cases while PPL determined its course of action.

d. Inverter communication problems disrupt customer SREC production: The disruption of communications regarding inverter functioning caused by PPL's DER Management Device also is impeding the ability of customer solar systems to record and report the production data needed to generate SRECs. Of the 47 Tesla systems in PPL's territory in which system communications were knocked offline due to the presence of PPL's DER Management Device, at least six of those systems with a total size of 86.8 kW-

³³ The list is provided *supra*, n. 7.

AC also reported that their SREC monitoring had been knocked offline. SRECs are a financial instrument created to represent the positive environmental attributes of solar energy production, and solar customers' ability to generate and sell SRECs as their distributed systems produce energy is an important financial incentive to improve the economics of home solar ownership. As PPL's DER Management Devices are in fact responsible for blocking reporting of solar production for SREC purposes, the JSPs respectfully submit that the utility is financially harming the customers or entities who otherwise own those SRECs.

37. Tesla experienced these disruptions with increasing frequency since the Pilot's launch in early 2021, and the problems worsened considerably from spring 2022 until the time Tesla ceased operations. During that time period, Tesla initiated numerous conversations with PPL to find a shared fix that would allow customers' solar systems to function without disruption. However, despite a concerted effort by both Tesla and PPL to resolve the issue by means of a technical fix, a solution has not materialized. In email communications, the utility concluded that the ongoing disruptions experienced by Tesla solar customers is being caused by the presence of the Tesla solar and storage equipment – indicating that PPL thinks the problem lies with customer-purchased, customer-sited pieces of equipment that have been successfully deployed and operated in more than 500,000 solar installations globally, rather than with the novel device the utility is connecting to Tesla's equipment.³⁴

38. As the bulk of the problems Tesla systems are experiencing are due to PPL's Management Devices interfering with communications and functionality of other combinations of solar system and inverters, the JSPs expect that these types of problems could be faced by other systems as well.

³⁴ "Tesla announces 500,000 solar installations deployed." *Electrek*. 19 December 2022. <https://electrek.co/2022/12/19/tesla-solar-installations-stats/>.

39. Additionally, as both large and local third-party installers often sell Tesla distributed solar and storage equipment, any disruptions, or limitations to Tesla systems in PPL, also affects the broader solar industry.

3. PPL’s April 2023 DER Management Report Provides Little to No Evidence that the Pilot is Providing Benefits to the Grid or Ratepayers, Compared to Autonomous Smart Inverter Settings.

40. PPL’s Pilot seeks to answer the question of whether direct utility control of customer-sited solar inverters can lead to better grid health and ratepayer outcomes compared to simply requiring solar customers to use the autonomous smart inverter capabilities under IEEE 1547-2018. PPL’s Report includes evidence showing that active management of customer inverters is being used seldomly and is failing to provide sufficient benefits to the grid and to customers. For example, despite PPL listing five potential grid support functions it can provide through active management, the utility has used only one such function: it employed power factor changes 768 times via active management.³⁵ Even when actively managing that sole function, PPL’s Report shows limited grid benefits. PPL states in its Report that it defines grid benefits achieved from active management as “the change in the number or severity of voltage violations present on the system in the time intervals before and after the active management of one or more DERs.”³⁶ However, PPL’s Report reveals that the utility’s active management frequently did more harm than good. Of the 736 instances of active management documented in the Report’s Appendix C, 430 such events resulted in a higher number of voltage violations after PPL intervened, 180 resulted in no change to the number of violations, and only 126 resulted in fewer voltage violation.³⁷ Regarding the magnitude of voltage violations listed in Appendix F, PPL’s Report makes it difficult to assess the efficacy

³⁵ *Id.*, at p. 7.

³⁶ *Id.*, at p. 9.

³⁷ *Id.*, at pp. 113-123.

of its program, because the definition of "Voltage Violation Magnitude" is not provided, making it unclear what a "Per Unit" violation means in this context.

41. Additionally, in many cases, the Report indicates that the potential benefits of active management are still only speculative. For example, the Report states:

At a glance, the data shows consistently lower numbers of voltage violations at control group locations [i.e., the group without active management]. Prior to the start of active management events, autonomous group locations experience less voltage violations despite having the same functionality (e.g., volt/var curve). This indicates that the initial control group installations are likely located in locations less prone to voltage violations than the initial active management locations. This must be considered when making any outcome comparisons.³⁸

However, the Report contains no further statistical analysis to investigate how the circuit conditions or changes described in this section of the Report might be attributable to autonomous inverter settings or active management. Without this level of analysis, PPL's statement is purely speculative that autonomous inverter circuits in the Pilot "are likely located in locations less prone to voltage violations."

42. The Report shows that to date, any cost savings realized during the Pilot are nearly entirely due to autonomous inverter functions. Section 13 of PPL's Report outlines eight use cases in which it envisions that autonomous inverter functionalities or active management of inverters could provide benefits to the grid. Across those eight use cases, nearly all the projected cost savings listed with a specific dollar amount are directly attributable to the use of autonomous volt-var curves rather than active utility management. In Use Case #6, which considered how voltage management could be used by the planning team to avoid specific system costs, PPL listed \$420,000 of projected costs savings attributed to autonomous volt-var curves and none for direct management.³⁹ In Use Case #7, which considered how voltage management could increase

³⁸ *Id.*, at pp. 9-10.

³⁹ *Id.*, at p. 16.

hosting capacity or defer capital upgrade costs for customer applying for interconnection, PPL listed \$841,500 of projected cost savings attributed to autonomous inverter functionality and \$1,500 in savings attributed to active management.⁴⁰ In total, the Report lists \$1,261,500 of projected cost savings related to autonomous inverter functionality and only \$1,500 related to utility active management of inverters.

43. Thus, the information in the Report clearly evidences that PPL's active management has yielded very little value. Instead, as has been shown above, the Pilot is causing harm.

44. Additionally, PPL's limited use of active management for the purpose of utility-controlled power factor changes is a circuitous method of addressing voltage violations and can cause problems of its own if used incorrectly. When using autonomous inverter settings, autonomous Volt-Var functionalities directly address the issue with which PPL's intervention is concerned: voltage. On the other hand, Power Factor does not measure voltage directly, but instead assumes that voltage will rise above or below thresholds based on the injection or absorption of real power. Meanwhile, the most penetrated distributed solar markets in the U.S. – Hawaii, California, and New York – use Volt-Var to manage voltage autonomously. These markets do not use fixed power factor or "actively managed" power factor.

B. Considerations That Appear to Have Been Overlooked by the Commission

45. In numerous instances in its testimony, PPL assured the Commission that its DER Management Device would not be a burden to customers and that PPL would assume full responsibility for troubleshooting the device. In PPL witness Matthew Wallace's rebuttal testimony, he stated that "the installation, commissioning, and troubleshooting of the ConnectDER DER Management device will be the responsibility of PPL Electric, adding no additional burden

⁴⁰ *Id.*, at pp. 16-17

to the customer.”⁴¹ Wallace also stated in rebuttal testimony that “a single ConnectDER DER Management Device can communicate with a DER that features multiple networked inverters.” In PPL witness Salim Salet’s rejoinder testimony, he stated that “PPL Electric’s DER Management Plan will not limit the ability of DER owners to monitor and control their smart inverters.”⁴²

46. However, as described above, customers have experienced significant burdens due to the DER Management Device, and PPL has failed to adequately troubleshoot the device as promised to ensure such burdens are alleviated, contrary to its numerous representations.

47. The JSPs respectfully submit that the Commission may have failed to consider the potential for burdens on the customer, and/or PPL’s unwillingness or inability to alleviate such burdens, because the Commission relied upon PPL’s promises that these conditions would not occur. The JSPs further respectfully submit that the Commission may have failed to provide for early curtailment of the Pilot, or any ability to opt out, based in part on it overlooking the potential that these conditions would occur.

C. The Approved Program Has Approved a Program that was Not Developed in Accordance with Law

48. Throughout the proceeding, stakeholders commented that institution of a program such as the present should be decided through a state-wide stakeholder process. For example, a representative of the Sustainable Energy Fund testified that the decision to permit a monopoly to control DER is a prodigious change in policy warranting a statewide process.⁴³ Further, NRDC argued in its Petition for Interlocutory Review that the adjustments to net metering interconnection rules required to enable the Pilot warranted a state-wide stakeholder process. Brief of Natural Resources

⁴¹ See PPL Electric Rebuttal Testimony by Mathew Wallace dated filed March 4, 2020, Statement No. 6-R, at p. 13.

⁴² See PPL Electric Rejoinder Testimony by Salim Salet dated August 26, 2020, filed in this docket on August 26, 2020, Statement No. 1-RJ, at p. 16.

⁴³ Direct Testimony of Sustainable Energy Fund by John Costlow dated February 5, 2020, filed in this docket on September 23, 2020, pp. 9 – 10.

Defense Council in Support of Petition for Interlocutory Commission Review and Answer to Material Questions, p. 5.

49. In its October 17, 2019, Opinion and Order denying NRDC's Petition for Interlocutory Review and returning the matter to the ALJs, the Commission stated that while the standard for interlocutory review had not been met, "the unique circumstances of the case supported the Commission's finding that review [by the ALJs] is warranted, in the interest of establishing a full and complete record upon which to review the question of scope, given the potential statewide implications of PPL's application to waive Commission Regulations implementing the AEPS Act's requirement that customer generators install inverter equipment that meets current Commission-approved statewide technical standards." October 17, 2019 Opinion and Order, pp. 2, 9.

50. The ALJs curtailed their review, however, and they approved the waivers based in part upon the parties' agreement to participate in a state-wide process if and when the Commission instituted one.⁴⁴

51. The JSPs respectfully submit that the failure to conduct a statewide proceeding was legal error as it was contrary to the Commonwealth's Document Law and the AEPS Act.

52. The JSPs further respectfully submit that the Commission's approval of the Pilot was legally erroneous as the Program is inherently anti-competitive, so is contrary to the State's strong pro-competition policies, such as those articulated in the state's Electric Choice Act, 66 Pa. C.S. § 2802.

III. REQUEST FOR EXPEDITED TREATMENT

53. The distributed solar market in PPL territory is experiencing ongoing significant harm due to Pilot implementation.

⁴⁴ RD, p. 67.

54. While the JSPs have filed their Petition for Rescission or Amendment under 66 Pa. C.S. § 703(g), which provides that the Commission may, at any time, after notice and opportunity to be heard, rescind or amend any order made by it, the JSPs respectfully contend that the Commission has already reviewed a substantial amount of testimony and discovery in this case, and resolved a significant number of issues.

55. Accordingly, the JSPs respectfully request that the Commission limit the scope of these proceedings to a narrow inquiry focusing exclusively on whether it should terminate the Pilot in its entirety, and/or allow for distributed solar systems to opt out of being subject thereto.

WHEREFORE, for all the foregoing reasons, the JSPs respectfully request that the Commission rescind the December 20, 2020 Order approving the Pilot and its implementation Plan in its entirety, and/or partially rescind and amend the Order to direct that the Pilot be adjusted to allow for an opt out for distributed solar systems.

Respectfully submitted,

Tesla, Inc.
Sun Directed
American Home Contractors
Sunrun, Inc.
Solar Energy Industries Association



By their Attorney:

Bernice I. Corman, PA Bar # 332915
BICKY CORMAN LAW, PLLC
1250 Connecticut Ave., NW, Suite 700
Washington, D.C. 20036
(202) 213-1672
bcorman@bickycormanlaw.com

VERIFICATION

I, JORDAN SOLMON GRAHAM, being a Senior Energy Policy Advisor at Tesla, Inc., hereby state that with the exceptions of Paragraphs 22, 23 and 32, the facts set forth in the Petition of the Joint Solar Parties are true and correct (or are true and correct to the best of my knowledge, information and belief) and that I expect Tesla to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

Date: 1/17/2024




Jordan Solomon Graham

VERIFICATION

I, MICHAEL J. SHADOW, being the Chief Executive Officer at Sun Directed, hereby hereby state that the facts set forth in Paragraphs 22 and 32 of the Petition of the Joint Solar Parties are true and correct (or are true and correct to the best of my knowledge, information and belief) and that I expect Tesla to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).

Date: _____

1/18/24



Michael J. Shadow

VERIFICATION

I, NICOLAS ZAVALA, being the Director of Operations at American Home Contractors (“AHC”), hereby state that the facts set forth in Paragraph 23 of the Petition of Joint Solar Parties are true and correct (or are true and correct to the best of my knowledge, information and belief) and that I expect AHC to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities).



Date: 1/18/24

Nicolas Zavala

I hereby certify that I have this day served a true copy of the foregoing document upon the parties listed below via electronic mail, in accordance with the requirements of 52 Pa. Code § 154 (relating to service by a party):

Darryl A. Lawrence, Esquire
David T. Evrard, Esquire
Office of Consumer Advocate
555 Walnut Street
Forum Place, 5th Floor
Harrisburg, PA 17101-1923
dlawrence@paoca.org

Andrew J. Karas, Esquire
Emily A. Collins, Esquire
Fair Shake Environmental Legal Services
647 E. Market Street
Akron, OH 44302
akaras@fairshake-els.org
ecollins@fairshake-els.org
Natural Resources Defense Council

Adam E. Gersh, Esquire
Flaster Greenberg, P.C.
1717 Arch Street, Suite 3300
Philadelphia, PA 19103
Adam.gersh@flastergreenberg.com
Sunrun, Inc.

Beren Argetsinger, Esquire
Keyes & Fox LLP
P.O. Box 166
Burdett, NY 14818
bargetsinger@keyesfox.com
Sunrun, Inc.

Kimberly A. Klock, Esquire
Michael Shafer
Assistant General Counsel
PPL Services Corporation
Two North Ninth Street
Allentown, PA 18101-1179
Kklock@pplweb.com
mjshafer@pplweb.com

Judith D. Cassel
Micah R. Bucy
Hawke, McKeon & Sniscak LLP
100 North Tenth Street
Harrisburg, PA 17101
Harrisburg, PA 17101
jdcassel@hmslegal.com
mrbucy@hmslegal.com
Sustainable Energy Fund

Devin T. Ryan
David B. MacGregor
Post and Schell, P.C.
17 N. 2nd Street, 12th Floor
Harrisburg, PA 17101-1601
dryan@postschell.com
dmacgregor@postschell.com
PPL Electric Utilities

Richard Kanaskie
Director and Chief Prosecutor
Bureau of Investigation and Enforcement
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
Harrisburg, PA 17120

Nicole Tillman, Executive Director
Pennsylvania Office of Small Business Advocate
Forum Place
555 Walnut Street, 1st Floor
Harrisburg, PA 17101

Dated this 18th day of January, 2024

/s/ Bernice I. Corman