

COMMONWEALTH OF PENNSYLVANIA



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April 15, 2025

Via Electronic Mail

Administrative Law Judge John M. Coogan (Via Email: jcoogan@pa.gov)
Office of Administrative Law Judge
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor
Harrisburg, PA 17120

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

Dear Judge Coogan:

Please find enclosed a copy of the Reply Brief being submitted on behalf of the Office of Consumer Advocate in this proceeding.

Copies have been served on the parties as indicated on the enclosed Certificate of Service.

Respectively,

/s/Christy Appleby

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Enclosures

cc: Secretary Rosemary Chiavetta (Cover Letter and Certificate of Service Only)
Certificate of Service

CERTIFICATE OF SERVICE

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

I hereby certify that I have this day filed electronically on the Commission’s electronic filing system and served a true copy of the following document, the Office of Consumer Advocate’s Reply Brief, upon parties of record in this proceeding in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant), in the manner and upon the persons listed below.

Dated this 15th day of April 2025.

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Dated: April 15, 2025

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

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

REPLY BRIEF
OF THE
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I. INTRODUCTION

The OCA incorporates, by reference, the Procedural History section of its Main Brief and now addresses only procedural developments that extend beyond those already identified. OCA M.B. at 1-4. On the same date that OCA timely submitted its Main Brief, March 25, 2025, Main Briefs were also submitted by PPL, the Joint Solar Parties (JSP), the Office of Small Business Advocate (OSBA) and the Sustainable Energy Fund (SEF). Pursuant to the procedural schedule established for this case, and in accordance with Sections 5.501-5.502 of the Public Utility Code (Code), the OCA submits this Reply Brief.

II. LEGAL STANDARD

The OCA incorporates, by reference, the Legal Standards section of its Main Brief. OCA M.B. at 5 to 6.

III. SUMMARY OF REPLY ARGUMENT

PPL proposed an unprecedented and expensive program which mandates utility-owned active control of every interconnected DER on its system. PPL supports its proposal with cost-benefit analyses that exaggerate the benefits of PPL's program. PPL dismissed the alternatives proposed by the parties, refused to provide an assessment of benefits or costs of these alternatives, and created a false impression that DER II is necessary. PPL argues that other options to maintain system safety and reliability are inadequate without supporting evidence. The Commission should reject PPL's DER II without prejudice and allow PPL to refile once it has completed a DER orchestration plan.

IV. REPLY ARGUMENT

A. Other utility programs with greater levels of interconnected DERs demonstrate that PPL's proposal to mandate full monitoring and control of all interconnected DERs through utility-owned devices is unnecessary.

PPL argues that DER II will help improve the safety, reliability, adequacy, and resiliency of the Company's electric service. PPL M.B. at 13-21. PPL also argues that PPL DER II will help address climate change and sustainability objectives by facilitating and encouraging increased deployments of DERs. PPL M.B. at 21-24. PPL also claims that DER II will help address resource adequacy challenges. PPL M.B. at 24-28.

PPL's unprecedented DER II proposal makes utility control of DERs mandatory and requires the installation of an approximately \$1,000 device, paid for by ratepayers, on every DER connected to PPL's system. OCA St. 1SR at 4. PPL's DER II is the only program in the country that would mandate full monitoring and control of DERs through utility-owned devices. *See* OCA M.B. at 13-19. However, PPL creates a false narrative in which its proposed DER II is the only proposal that can achieve PPL's objectives. OCA M.B. at 41.

Substantial record evidence demonstrates that PPL's DER II is unnecessary to improve the safety, reliability, adequacy, and resiliency of PPL's electric service beyond other reasonable alternatives. Other utilities with larger quantities of DERs than PPL do not need the control PPL requests in DER II. PPL's Main Brief argues that voltage violations and DER impacts necessitate implementation of the Company's proposal and the proposed level of active management of all DER, including small DER, but PPL cannot point to a single other utility that has needed this type and scope of DER plan in order to maintain reliable, safe, adequacy and resiliency. *See* PPL M.B. at 13-21.

The OCA's Main Brief discussed multiple jurisdictions, including San Diego and Hawaii, where utilities are demonstrating today that DERs can be managed reliably, safely, and efficiently in the absence of dedicated controls used in PPL's DER Pilot. OCA M.B. at 14-17; OCA St. 1SR at 5. OCA witness Nelson testified that "[b]oth San Diego and Hawaii have current DER penetrations that are a decade or more ahead of PPL's projected growth and they both continue to operate their grids safely and reliably." OCA M.B. at 15; OCA St. 1SR at 5. As such, OCA witness Nelson further testified that "there is no imperative to controlling small DER and that the means with which San Diego and Hawaii have been managing their grids are safe and reliable." OCA St. 1SR at 6.

Moreover, while PPL cites to an analysis projecting that Pennsylvania will rank sixth out of all states in DER capacity by 2035 (PPL M.B. at 14), recent data shows that Pennsylvania ranks 14th in distributed solar capacity as of June 2024 and 28th in per capita distributed solar capacity. OCA St. 1 at 33. Despite projected growth, states like Arizona, California, Hawaii, Massachusetts, and Rhode Island have five to ten times more DER per capita today than Pennsylvania and are likely to remain far ahead of PPL into the future. *Id.* Yet, none of these states, or any state in the country, have DER management programs that require mandatory full monitoring and control of DERs through utility-owned devices. *See* OCA M.B. at 14-17

PPL frames the management of DERs as all or nothing, while ignoring that other utilities and utility regulators found other DER management strategies appropriate and cost effective. OCA St. 1SR at 6 (internal citations omitted). Nowhere in its testimony or brief does PPL contend the reliability, safety, or cost effectiveness of the many programs that demonstrate alternative DER management strategies cited in testimony by the OCA, the other parties, or by PPL itself. OCA St. 1SR at 6.

In fact, there are alternative methods for monitoring DERs depending on use case and latency requirements. OCA St. 1 at 43. PPL's proposal to install a DER management device on every interconnected DER to provide dedicated communications for real time monitoring is unprecedented and not cost-effective. *See* OCA M.B. at 13-22. OCA witness Nelson testified as follows in addressing the minimal additional value PPL's DER II provides:

The benefit of this dedicated communications channel is in providing real time visibility, however, this use case does not align with how the Company quantified the value of DER monitoring. Based on the Company's assessment, the quantifiable value of DER monitoring is overwhelmingly in improving planning models for increased load and DER capacity. These use cases do not require real time monitoring and could be served by much less frequent, and less costly, monitoring to inform, for example, monthly, quarterly, or annual planning updates. Thus, the active monitoring use cases do not support the Company's proposed DER management strategy, as the active management provides minimal additional value.

OCA St. 1 at 43-44.

PPL's claim that it requires control of every connected DER is unreasonable. OCA witness Nelson testified:

As I thoroughly rebutted in this testimony, PPL's claims that it requires control of every connected DER are baseless, untrue, and contradicted by its own testimony. This is a repetition of the Company's all-or-nothing position, is a scare tactic to coerce agreement with the Company's plan, without proper consideration of alternative options. The claim that the minimum level of compliance necessary is 100% is exceptionally ridiculous, as to be insulting. By this logic, if even one DER is to be uncontrolled, PPL cannot effectively manage its system. Unfortunately, even PPL's 2nd DER Plan cannot provide 100% compliance, as numerous devices appear to not have been under the Company's control during the pilot, due to installation issues and other failures. Obviously, PPL can continue to manage its electric system, and will benefit from managing any number of DER, not only 100% of them, as demonstrated by all U.S. investor-owned utilities today.

OCA St. 1 at 33-34.

PPL bears the burden of proof in this proceeding to support its plan with substantial evidence. However, the record evidence in this proceeding shows that other jurisdictions with

significantly more DERs provide safe, reliable, adequate, and resilient electricity service with plans that help address climate change, resource adequacy, and sustainability objectives by facilitating and encouraging increased deployments of DERs. *See* OCA M.B. at 13-17, 19-20. PPL's DER II is not the only means by which to achieve benefits from active monitoring of DERs or address resource adequacy issues. *Id.* Instead, it is the only plan in the country that proposes mandatory active monitoring of all interconnected DERs using a device management system. *Id.* PPL has not met its burden of proof through substantial evidence showing that DER II is necessary for the provision of safe and adequate service.

B. PPL's cost-benefit analyses are flawed and do not demonstrate that active management of all DERs is cost-effective.

PPL argues that DER II will produce significant benefits in excess of cost. PPL M.B. at 28-40. Specifically, PPL argues that DER II is projected to produce \$65.5 million in net benefits according to PPL's filings. PPL M.B. at 28-32. PPL also argues that DER II is supported by its initial cost-benefit analysis (CBA). PPL M.B. at 32-35. PPL further argues that other parties' criticism of PPL's cost-benefit analyses lack merit and should be rejected. PPL M.B. at 37-40.

1. PPL's initial cost benefit analysis was insufficient, necessitating a second cost-benefit analysis.

In arriving at a projection that DER II is projected to produce net benefits, PPL initially provided the total costs and benefits associated with DER II in its first cost-benefit analysis (CBA). *See* OCA M.B. at 23-25. The largest benefit from PPL's initial CBA was from reduced truck rolls associated with voltage violations, which represented 51% of the total benefits. *Id.* OCA witness Nelson challenged whether this was a credible benefit as follows:

First, the Company inflates the number of reduced truck rolls by assuming that all voltage violations resolved would have otherwise resulted in a complaint to the Company requiring a response. Such an assumption is extremely unreasonable, as

voltage violations are a reasonably common event. In 2023, the Company reported only 42,198 voltage complaints from its customers. Of the total voltage complaints, the Company had 25,458 actual truck rolls for voltage violations. For that same period, the Company calculated that the pilot program could reduce 13,586 truck rolls. The suggestion that the DER Pilot could potentially have reduced voltage violation complaints and associated truck rolls by more than half is not reasonable. Suggesting that DER customers participating in a pilot of less than 10,000 customers can offset half the truck rolls of a Company with approximately 1,400,000 customers is unreasonable. First of all, 1,400,000 customers led to approximately 42,000 voltage complaints. Suggesting that under 10,000 DER customers will file over 13,000 complaints does not reflect the reality PPL currently experiences. Second, the Company states that “Even on the circuits with the highest penetrations of active management DERs, the total collective reactive power support capabilities are less than the 600 kVAR provided by a typical distribution capacitor bank on PPL Electric’s system.” That is, the Company typically deploys a 600 kVAR capacitor bank to resolve voltage issues on distribution circuits. Meanwhile, the capabilities of active management on any circuit is far less than this 600 kVAR of one capacitor bank, yet somehow, the active management events are attributed a reduction of more than half of all truck rolls.

My second concern is that the reduction in truck rolls is clearly not a scalable benefit for ratepayers. If the DER pilot successfully reduced half of all related voltage violations, as predicted by the Company, all utility truck rolls related to voltage violations would be avoided within a couple of years, which is clearly not a realistic result. The maximum benefits of avoiding all voltage violation truck rolls appear to be much less than \$18 million per year.

OCA St. 1 at 38-39.

OCA witness Nelson further testified that PPL’s initial cost benefit analysis did not demonstrate that any truck rolls have actually been avoided and that the evaluation of truck rolls is speculative. OCA St. 1 at 39. As such, cost savings attributed to reduced truck rolls cannot reasonably be shown to result from the pilot that supports cost-effectiveness. *Id.*

There are also issues with PPL’s calculation of benefits related to increased hosting capacity savings in its initial CBA. OCA St. 1 at 40-41. OCA witness Nelson testified:

My concern is that the value of capacity and energy savings is exaggerated because it assumes that any increase in hosting capacity is immediately and fully utilized. In reality, the benefit of increased hosting capacity can only be experienced once existing hosting capacity is depleted. The Company reports that there are only 153 MW of DER on its system, while 115 circuits have at least 1 Megawatt of DER

capacity interconnected. Therefore no appreciable part of PPL's system has significant DER capacity, nor should it lack hosting capacity now or for many years into the future. Simply put, increased hosting capacity has little incremental or marginal value at this time, largely due to low DER penetrations, and therefore it is not reasonable to assume every additional increment of hosting capacity creates value.

Q. How does a reduction in the value of benefits impact the overall cost-effectiveness of the DER Pilot program?

A. A more reasonable accounting of the potential benefits of reduced truck rolls and increased hosting capacity would significantly reduce the evaluated cost-effectiveness of the pilot. When considering the total costs of the pilot (including what the Company considers to be startup costs, and telecommunications costs), and rejecting the unreasonable benefit assumptions described above, the pilot is not cost-effective. Even if the pilot were found to be cost-effective as a whole, the reduced benefits has a more important impact on the cost-effectiveness for small DER.

OCA St. 1 at 40.

PPL's evaluation of the use cases contained in its initial CBA also point out shortcomings with DER II. *See* OCA St. 1 at 45-50. OCA witness Nelson summarized these shortcomings as follows:

The Company's use cases indicate that the value of active management is minimal. The only demonstrated value of active management in use case #3, \$38,000, is insignificant in relation to the \$13.24 million cost of active management through the pilot. The Company's estimated savings of use case #2 is speculative and demonstrably unrealistic and therefore should not be considered in assessing the value of active management. These use cases demonstrate that autonomous management of DER provides significant value to the distribution system, while requiring little, if any, investment in management capabilities.

OCA St. 1 at 49-50.

As PPL's initial CBA was reasonably criticized by the parties, PPL submitted a second CBA "to address various criticisms by witnesses for other parties questioning the cost-effectiveness of the Plan." PPL St. 2R at 2. However, this second CBA contradicted the first CBA. *See* OCA M.B. at 26; OCA St. 1SR at 17.

2. PPL's second cost-benefit analysis contains flaws and is contrary to settlement of the pilot DER proceeding.

After reviewing the critiques of the parties regarding its initial CBA, PPL entered a new CBA into evidence through Rebuttal Testimony. OCA St. 1SR at 17. OCA witness Nelson testified:

I assume that PPL will respond to any critiques of this new CBA in rejoinder testimony but I will not have the opportunity to respond in written testimony. This is fundamentally inequitable as it deprives the OCA (and the other parties who critique the CBA) the opportunity to respond to PPL's critiques in written testimony and it deprives the Commission of having a full and complete record. Not only is this a voluminous study entered as part of rebuttal testimony, it is unrecognizable when compared to the Company's initial filing. This is important because it is an implicit admission that the initial cost-benefit analysis suffered from an extremely poor methodology and that it was, in short, wrong. While the Company's new cost-benefit analysis may be more voluminous, it is still as inadequate as the first and suffers from several methodological flaws.

OCA St. 1SR at 17.

PPL's second CBA did not alleviate the OCA's concerns with PPL DER II. OCA witness Nelson testified:

In fact, several new questions emerged based on my review of the new CBA that underscore the need to evaluate alternatives to the Company's proposed mandatory active management approach to DER integration. PPL's CBA continues to exaggerate benefits and obfuscate the incremental benefits of the 2nd DER Plan over other alternative management strategies, such as autonomous settings, much less evaluate the costs and benefits of alternative strategies.

OCA St. 1SR at 17-18.

The new CBA touts of avoided distribution upgrades associated with incremental hosting capacity from active management of DERs as one of the single largest benefits underpinning the CBA valued at \$13,336,556. OCA M.B. at 32. However, PPL's claims regarding benefits attributable to avoided distribution upgrades is also at odds with the evidence from PPL's own DER Pilot findings. OCA M.B. at 32; PPL M.B. at 30. In the Company's 2024 DER Management Report under the subsection describing its analysis of capital deferral opportunities, the Company

states that “[a]s of March 21, 2024, PPL Electric has identified three (3) studies which can result in \$1,664,000, all attributed to autonomous volt/var curves for customers applying to interconnect to the distribution system.” OCA St. 1SR at 25 (internal citations omitted). As such, OCA witness Nelson testified that PPL’s second CBA contradicted the DER Pilot findings that the three major avoided capital upgrade deferrals identified in their own analysis are attributable, not to active management through DER Management Devices, but instead to autonomous inverter settings in the form of volt/var curves. OCA St. 1SR at 25.

OCA witness Nelson noted that autonomous controls can reduce potential impacts by the same magnitude, or greater, than PPL’s own analysis of its active use case. OCA St. 1SR at 25.

OCA witness Nelson testified as follows:

Indeed, findings from a study by a consortium of National Laboratories funded by the US Department of Energy demonstrate that autonomous inverter settings can provide substantial benefits to the grid, particularly around managing voltage impacts. Importantly, the study’s authors also recognize that DER integration costs and associated hosting capacity can be very dependent on the specific conditions present on a given distribution feeder, such as the length of the line, the type of customer classes present, and the existing utility assets. I do not find the Company’s interpretation of the CBA that “Because the benefits of active management can be location specific, it is preferable to enable that capability in as many DER locations as possible” compelling. The fact that autonomous inverter settings can play a large role in managing potential DER impacts to the grid, coupled with the fact that costs to increase hosting capacity are very dependent on the case by case nature of the grid and the interaction with existing equipment, actually emphasizes the need to target the use of more expensive active management. This calls for more rigorous study on the part of the Company to justify a mandatory active management approach in all instances of DER adoption.

OCA St. 1SR at 25-26.

As discussed extensively in the OCA’s Main Brief, the most significant flaw in the second CBA is that PPL assigned increased hosting capacity¹ as the primary benefit to ratepayers. OCA

¹ The Interstate Renewable Energy Council defines hosting capacity as follows:

M.B. at 27-34; OCA St. 1SR at 18. PPL claims \$27,393,149 of total benefits associated with increases in hosting capacity related to active management, and another \$98,615,335 in benefits associated with monitoring for a total benefit of \$126,008,484. OCA St. 1SR at 18. However, PPL is not obligated as a regulated electric distribution company to increase hosting capacity and the increase to hosting capacity under DER II requires that non-DER customers pay for the increase in hosting capacity instead of DER developers. OCA witness Nelson testified:

These benefits represent 57% and 86% of the total benefits the Company finds for active management and the active management plus monitoring cases, respectively. However, the Company does not have an obligation to serve export facilities and to provide hosting capacity the same way that it does for load customers. For load customers, the Company has an obligation to provide a service to these customers; no such obligation to serve exists for customers desiring to export onto the distribution system. This is evidenced by the fact that export facilities are directly assigned upgrade costs when triggered during interconnection. While I am not a lawyer, it is further evidenced by the fact that the Company does not earn a return on equity for upgrades caused by export facilities. If the Company had an obligation to serve export, it would be a financial taking from shareholders not to pay the Company a return on its investment.

The Company, however, seems confused about its obligation to serve customers on its system stating in a response to discovery that inquiring about its obligation to serve export it stated “the Company ... offer(s) net metering to eligible customer-generators.” It is clearly distinct to have an optional net metering tariff and an obligation to serve export facilities. The Company adds further confusion to its obligation to serve by stating in in [sic] the same OCA discovery question that “PPL has a responsibility to provide adequate, safe, efficient, reliable, and reasonable service to its customers, including customer-generators participating in net metering.” However, PPL does not have service standards for export service quality, reliability, or available hosting capacity that parallel load requirements. To conclude, PPL does not have an obligation to plan for hosting capacity or to serve export facilities that require hosting capacity. Therefore, increased hosting capacity is not a ratepayer benefit, it is a cost shift from ratepayers to DER developers that don’t have to pay for system upgrades or any of the investments used to increase said hosting capacity (e.g., DERMS).

[T]he amount of DERs that can be accommodated on the distribution system at a given time and at a given location under existing grid conditions and operations, without adversely impacting safety, power quality, reliability or other operational criteria, and without requiring significant infrastructure upgrades.

OCA St. 1SR at 18 (internal citations omitted).

OCA St. 1SR at 18-19 (internal citations omitted).

There are issues with how the new CBA assesses the 5 MW of incremental hosting capacity that it claims is attributable to active management. *See* OCA M.B. at 31-33. While the new CBA quantifies this 5 MW benefit from active management of DER and calls it an incremental benefit to using autonomous controls, it was actually being compared to an unmanaged base case without the use of autonomous controls. OCA M.B. at 31. This is evidenced by the fact that PPL reports autonomous inverter controls yield a benefit of 6 MW of incremental hosting capacity over the same base case (i.e., “nameplate”) scenario, indicating that autonomous controls can reduce potential impacts by the same magnitude, or greater, than PPL’s own analysis of its active management use case. *Id.*

Also, currently, hosting capacity is assessed and paid for on a case-by-case basis for DERs seeking to interconnect to the grid. OCA St. 1SR at 26. When a DER seeks to interconnect and insufficient hosting capacity is available, the DER is assessed the costs of expanding hosting capacity. OCA St. 1SR at 26. Although PPL claims that the 2nd DER Plan will defer or eliminate future distribution capital investment that, otherwise, would have to be recovered from all customers, this is not necessarily the case for DER hosting capacity. *Id.*

Connecting DER customers would benefit from avoided capital costs from incremental hosting capacity improvements since PPL proposes that costs would be incorporated into base rates. OCA St. 1SR at 27. However, statistically, most of the costs of PPL DER II will be paid by the more than 90% of customers who do not have a DER. *Id.*

Similarly, the avoided infrastructure costs benefit DER customers only insofar as they are paid for by all ratepayers instead of being paid for by interconnecting DER customers. OCA St.

1SR at 27. It is unreasonable to justify the approval of DER II based on the claimed benefits arising out of a cost shift from DER customers to all ratepayers.

PPL also argues that it rebutted parties' claims that the CBA failed to fully capture or consider costs. PPL M.B. at 39. First, PPL states: "[f]or example, OCA's objection to the exclusion of capital costs associated with DERs interconnected between 2030 and 2034 was reasonable considering the cost-benefit analysis includes capital investments forecasted from 2025 to 2030. (OCA St. 1SR at 35)." PPL M.B. at 39. However, PPL's argument mischaracterizes Mr. Nelson's testimony. The entirety of OCA witness Nelson's testimony that PPL cites to is below:

Q. How could the mandatory control of all DERs balloon the costs of the 2nd DER Plan?

A. PPL assumes that the average cost of the DER program is \$1,051 per device. Although I identify significant additional costs in my Direct Testimony that could be included in this program cost, let us assume that this is the true cost of the 2nd DER program per device. PPL thus projects that the total cost of the 2nd DER plan through 2030 is \$80.1M. This considers only solar facilities through 2030. Based on the Company's forecast for the following four years through 2034, there will be an additional 82,218 DER connected, for an additional \$86.4M. However, as the impacts of other types of DER become significant, for example storage and electric vehicles ("EVs") which should be considered in the Company's orchestration plan, PPL may recommend that these DER are similarly managed, and the number of DER's under PPL's management would increase even further. PPL projects 145,825 Light Duty EVs by 2030, nearly double the number of behind-the-meter DER PPL projects in its cost analysis. Similarly managing these EVs would add \$153.2M, tripling the total cost of DER management. Looking further to 2039, 524,252 EVs add \$550.1M to the cost of DER management. Although alternative methods of managing all these DER could be developed in the future that reduce these costs, PPL's 2nd DER Plan is proposed as a permanent solution, contains no clauses requiring reconsideration, and makes no commitments to pursuing and deploying lower cost alternative program designs in the future.

OCA St. 1SR at 35.

As shown above, OCA witness Nelson's reference to numbers beyond 2030 is *based on PPL's own projections*. OCA St. 1SR at 35. OCA witness Nelson made no objection regarding the exclusion of capital costs associated with DERs interconnected between 2030 and 2034, but

instead pointed out that PPL's own projections indicate that PPL's proposal to make the plan permanent will likely add significant costs going forward, especially if the plan includes EVs in the future. *Id.*

Additionally, PPL claims that “[s]imilarly, OCA’s criticism that the CBA does not account for costs related to projected EV adoption is meritless because EVs were exempt from the Pilot Program and are not included in the proposed Second DER Management Plan.” PPL M.B. at 39. However, the OCA clearly stated that “DER II excludes electric vehicles (EVs) and other controllable loads from potential management.” OCA M.B. at 12 *citing* OCA St. 1 at 21. OCA witness Nelson testified that “[w]hen the 2nd DER Plan strategy is expanded to other, non-solar, DER such as Electric Vehicles (“EVs”), the 2nd DER Plan could triple in costs by 2030, and add more than half a billion dollars in management costs by 2039.” OCA St. 1SR at 2. Given that PPL proposes to make DER II permanent, OCA witness Nelson testified to the potential impact of a permanent PPL DER II if the plan is expanded to other DERs over time, not that the pilot of PPL’s DER II proposal included EV.

Instead, OCA witness Nelson noted that, given that the majority of the hosting capacity improvements from the DER management device are from an increase in monitoring and visibility in the planning sphere, PPL should focus its efforts on improving its planning tools and interconnection process and rules, as opposed to mandating deployment of field devices. OCA St. 1SR at 23. OCA witness Nelson testified:

PPL witness Davis acknowledges, but does not contradict my position that planning functions, such as this hosting capacity assessment, does not require real-time DER monitoring, which the Company is prescribing with the DER Management strategy. This amounts to the Company assigning a huge benefit to improving its planning processes, attributing that benefit to its 2nd DER Plan to make it “cost effective,” when it could improve its planning processes (as it should anyway), at much lower cost, as an alternative to the 2nd DER Plan strategy. Therefore, the DER Management device is not the only credible way to achieve higher confidence in

small DER output, and the Company should develop alternate plans for how to improve their analysis of hosting capacity that do not require real time data feeds from every DER to be installed in the future on its system.

OCA St. 1SR at 23-24.

Additionally, OCA witness Nelson noted that the second CBA's touting of future avoided wholesale energy purchase costs is not an appropriate standard to assess benefits for active management of DERs. OCA M.B. at 33-34; PPL M.B. at 30. OCA witness Nelson testified as follows:

Similar to the infrastructure investments, the reduction in wholesale energy benefit of \$22/MWh is not appropriate for this analysis since it fails to account for PPL's [Net Energy Metering] rate structure. While it is true that PPL may see a reduction in the need to purchase wholesale energy to meet its load obligations with incremental DER adoption, those reduced costs are only one half of the equation. PPL, in fact, raises this issue, while not fully integrating its implications, stating that "DERs already benefit from net metering that compensates them at the full retail rate, which substantially exceeds the value of the energy they displace."

OCA St. 1SR at 28. Under PA statute, PPL must compensate Net Energy Metering (NEM) customers at the retail rate for any excess kWh. OCA M.B. at 34; 73 P.S. § 1648.5. Therefore, the kWh from additional DER generation espoused under DER II would reduce wholesale energy costs but will also lead to additional expenses to compensate customers for their net-exports. OCA M.B. at 34.

PPL also argues that it limited the scope of its cost-benefit analysis to not consider alternatives and that a separate analysis for autonomous inverter settings was not included because the Institute of Electrical and Electronic Engineers (IEEE) standard has been incorporated into the Commission's regulations for DERs. PPL M.B. at 39-40. Smart inverters with voltage regulations, frequency support, and ride-through capabilities are required for all new DER interconnections. PPL M.B. at 40. "As such, Concentric concluded that it was unnecessary to conduct a separate

analysis to account for autonomous functions that are already required by regulation.” PPL M.B. at 40.

Under the settlement of PPL’s first DER management program, PPL was required to evaluate “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.” See OCA M.B. at 28-29 citing *Petition of PPL Electric for Approval of Tariff Modifications and Waivers of Regulations Necessary to Implement its Distributed Energy Resources Management Plan*, Docket No. P-2019-3010128, *Recommended Decision* at 16 (Nov. 17, 2020) (*PPL DER I R.D.*). Contrary to the prior settlement of PPL’s DER I, PPL’s assessment of hosting capacity benefits were not properly assessed against the “base case” scenario of using autonomous advanced inverter settings. See OCA M.B. at 28-30; Tr. 226-27. Instead, PPL chose to use nameplate capacity as the assumed baseline of using nameplate DER capacity, which skews the results of the second CBA and is an unreasonable assumption as a baseline. See OCA M.B. at 30-31.

PPL did not provide a clear comparison of the value of autonomous smart inverter functions in comparison to the active management benefits in the DER Pilot. OCA M.B. at 28. PPL also did not consider whether autonomous function can maintain distribution system reliability in the face of substantial DER growth. *Id.*

PPL was required under the PPL DER I Settlement to compare the cost and benefits of the distribution system operation of active management of DERs as compared to the benefits available through the use of inverter autonomous grid support functions. See OCA M.B. at 28-31; *PPL DER I R.D.* at 16. PPL’s decision to not comply with the Settlement disadvantages all parties, including PPL, when evaluating PPL’s Pilot. *Id.* at 30.

PPL's claim that a separate analysis using a baseline of autonomous functions is unnecessary as smart inverters with voltage regulations, frequency support, and ride-through capabilities are required for all new DER interconnections is unreasonable. *See* PPL M.B. at 40. Simply because all new DERs require smart inverters compliant with IEEE standards to permit autonomous functioning and active monitoring does not mean that evaluation of autonomous functioning as a baseline under the previous settlement is now irrelevant. The assumed 'baseline' of using nameplate DER capacity to calculate incremental hosting capacity is a worst-case scenario, skews the results of the CBA, and is an unreasonable assumption. OCA M.B. at 30. PPL, however, *sua sponte* decided that it did not need to comply with the settlement in PPL DER I without any support beyond the Commission's regulations' incorporation of IEEE smart inverter standards that PPL believes makes the analysis agreed to in settlement moot.

The OCA, as a signatory to the previous settlement, disagrees. PPL's analysis devalues the potential that autonomous smart inverter controls have for improving hosting capacity without the additional cost of the DER management device and is contrary to settlement. OCA M.B. at 30.

C. There is a lack of substantial evidence that DER II will decrease PPL's revenue requirement in a future base rate case.

PPL claims that DER II will decrease PPL's revenue requirement in base rate proceedings. PPL M.B. at 35-36. However, this claim is speculative and lacks evidentiary support. As discussed in the OCA's Main Brief, the costs for DER II are excessive and likely to grow over time. OCA M.B. at 22. Moreover, PPL states that "[a]fter setting aside the reduced capital costs and expenses from the Company's DER Management Pilot Program and Second DER Management Plan, the estimated revenue requirement impact is approximately \$7,089,896, resulting in an estimated average residential **bill increase** of \$4.13 per year." PPL M.B. at 35 (emphasis added). Even according to PPL's estimates, DER II will increase revenue requirement.

D. PPL's incorporation of cloud-based communications is vague and lacks support in the record.

PPL notes that the largest cost component in the second CBA was the cost of the DER management devices that PPL hopes to mandatorily install on all interconnected DERs. PPL M.B. at 36. PPL states that if the Company shifts to incorporating cloud-based communications that eliminate the need to install DER management devices at customer locations, the cost-benefit ratio will increase. *Id.*

This section of PPL's Main Brief further illustrates why a DER Orchestration Plan is necessary. PPL is requesting to make the program permanent. PPL M.B. at 23 ("the second DER Management Plan makes the plan permanent."). However, PPL merely "indicated its willingness to explore cloud-based communications in lieu of its DER Management devices, which would significantly reduce the largest driver of costs in the cost-benefit analysis and only increase the benefit-cost ratio projected by the Company in this proceeding. (*See* PPL Electric St. No. 1-RJ at 4-5, 14-15; PPL Electric St. No. 10-R at 9, Table SWW-2.)." PPL M.B. at 29. As is evident from PPL's citation, PPL only mentioned that it would be willing to explore cloud-based communication in Rejoinder Testimony. *See* PPL Electric St. No. 1-RJ at 4-5, 14-15. PPL's citation to Rebuttal Testimony does not contain any information regarding cloud-based communication and it is unclear why PPL provided this citation. *See* PPL Electric St. No. 10-R at 9, Table SWW-2.

PPL's willingness to explore cloud-based communications is not fully developed or supported in its filing. PPL's filings contain no plan or cost estimates for phasing in cloud-based communications. Moreover, PPL's filing does not contain any detail as to how it will explore and implement cloud-based communications.

PPL's lack of exploration of cloud-based communications is one of many reasons why requiring a DER Orchestration Plan is reasonable and prudent. Instead of rushing an unprecedented

program into implementation without the necessary details, PPL should complete a DER Orchestration Plan as recommended by the OCA so that all interested stakeholders, including the Commission, have a clear understanding of what PPL is proposing along with the necessary supporting evidence.

E. The OCA's recommendations are reasonable.

PPL argues that the OCA's recommendations should be rejected. PPL M.B. at 53-55. First, PPL notes that in Surrebuttal Testimony the OCA changed its recommendation that the Commission exempt all DERs with a capacity of 200 kW or less from mandatory participation in active management and provide the DERs with the option to participate in active DER management. PPL M.B. at 53-54. PPL argues that the OCA changed its recommendation even though PPL did not make any programmatic changes in its rebuttal testimony. PPL M.B. at 53. In Surrebuttal Testimony, OCA witness Nelson explained that the reason for changing his recommendation was due to PPL's lack of constructive response to his recommendations and as discussed above and in the OCA's Main Brief, PPL's fundamentally flawed new CBA. *See* OCA St. 1SR at 2-3. OCA witness Nelson testified as follows:

Based on the Company's voluminous rebuttal, I am revising my Direct Testimony recommendation. Specifically, I am now recommending the Commission to reject PPL's 2nd DER Plan. It is not salvageable. Until a more suitable DER management plan and cost recovery is designed and re-evaluated, the Commission should not require the proposed mandatory active control and the associated devices for DER of any size. While I had made constructive suggestions in Direct Testimony about necessary analysis of alternatives to the high costs of the 2nd DER Plan, the Company has refused to evaluate the costs and benefits of alternatives in their Rebuttal, doubled down on its narrative of a false dichotomy, and presented a contrived CBA that is laden with unsupported assumptions. Thus, given the flaws in the CBA, without sufficient evaluation of alternative options, and without a clearer understanding of potential total costs and how they will be allocated, PPL's DER should be rejected. Further, I recommend that the Commission require PPL to pursue further development and evaluation of DER management offerings before re-filing any subsequent 2nd DER Plan[.]

OCA St. 1SR at 2-3.

As discussed in the OCA's Main Brief, the OCA's recommendation is that PPL's DER II be denied without prejudice and that PPL should be required to complete a DER Orchestration Plan prior to re-filing. *See* OCA M.B. at 42-43.

Next, PPL argues that OCA witness Nelson's recommendation in Direct Testimony requiring a 200-kW threshold for mandatory PPL DER management device installation should also be rejected. PPL M.B. at 54. Specifically, according to PPL, "OCA witness Nelson has not considered or has given insufficient weight" to problems identified by PPL witness Walling regarding a 200 kW threshold. PPL M.B. at 54. PPL states that the problems created by DERs are location and circuit-specific and that the cumulative impact of multiple small DERs on the same circuit can be greater than one or few DERs. *Id.*

To the contrary, OCA witness Nelson specifically addressed the specific issues raised by PPL witness Walling in Surrebuttal Testimony as follows:

PPL witness Walling disagrees that the potential impact of DERs on the grid is directly proportional to the size or capacity of the DER, stating "the impact of DERs on a distribution system is fact-sensitive and location specific. Consequently, the cost-effectiveness of a size-based threshold for applying active DER management may be materially less than Mr. Nelson assumes. This depends on the distribution of DERs of various sizes across PPL Electric's distribution system." Setting aside that the impact of DER can be proportional to both the size of a DER and the location of DERs, PPL's observation that the "impact of DERs on a distribution system is fact-sensitive and location specific" specifically implies that some areas would benefit less from active management than others. PPL has not presented an evaluation of how these factors impact the cost-effectiveness of the 2nd DER Plan on different circuits, and the implications of where DER can be cost-effectively managed. Nor has PPL performed an evaluation of what size of DER is cost effective to manage, given the effectively fixed costs per DER of the 2nd DER Plan proposal. PPL witness Walling states elsewhere that "At some threshold, active management becomes desirable and more cost-effective than other alternatives." PPL has not performed an evaluation of what this threshold is for circuits and on which circuits DER can be cost-effectively managed.

OCA St. 1SR at 32-33. In fact, OCA witness Nelson similarly responded to additional claims by PPL witness Salet on this issue in his Surrebuttal Testimony. *See* OCA St. 1SR at 33.

There was no lack of consideration by OCA witness Nelson and there is no justification as to how OCA witness Nelson gave insufficient weight to this issue. OCA witness Nelson further testified as follows:

While I do not disagree that, for example, 1,000 small DER in aggregate can create similar issues as a single large DER of the same capacity (ignoring that many small DER have much more diffuse impacts due to locational dispersion, differences in cloud cover, orientation, and shading), the significant difference to the Company's proposal is that the 1,000 small DER are 1,000x more costly to control than the single large DER. Thus, a solution that is cost effective for the single large DER, or even for the 1,001st DER including the 1,000 small and one large DER, may not be cost effective for the 1,000 small DER. If a solution is cost-effective for large DER, but not cost effective for small DER, then small DER should use a different management solution. To be clear, it is not my position that the Company should simply ignore small DER, with no intention to monitor, manage, or influence their impacts on the system.

OCA St. 1SR at 34.

PPL's claim that it requires control of every connected DER is baseless and contradicted by its own testimony. OCA St. 1SR at 33. OCA witness Nelson testified as follows:

This is a repetition of the Company's all-or-nothing position, is a scare tactic to coerce agreement with the Company's plan, without proper consideration of alternative options. The claim that the minimum level of compliance necessary is 100% is exceptionally ridiculous, as to be insulting. By this logic, if even one DER is to be uncontrolled, PPL cannot effectively manage its system. Unfortunately, even PPL's 2nd DER Plan cannot provide 100% compliance, as numerous devices appear to not have been under the Company's control during the pilot, due to installation issues and other failures. Obviously, PPL can continue to manage its electric system, and will benefit from managing any number of DER, not only 100% of them, as demonstrated by all U.S. investor-owned utilities today.

OCA St. 1SR at 33-34. Moreover, PPL's claim that it requires control of all connected DERs contradicted by the fact that no other utility has deemed such mandatory control of all DER necessary or cost-effective. OCA M.B. at 13-21.

PPL also stated that OCA witness Nelson’s description of a 200-kW threshold for active DER management in Australia is incorrect. PPL M.B. at 54. However, OCA witness Nelson is correct in his understanding and testified as follows:

The Company responded that the 200 kW threshold which I reference in Australia were published by Energy Networks Australia, a national body which represents Australia’s electric and gas transmission and distribution companies. As such, PPL concludes this threshold is a recommendation, but not a requirement, although it is acknowledged that the recommendation was relatively broadly adopted by Australian electric distribution companies. The Company further references recent actions by AEMO to August 2024, requiring that every new DER with a capacity of 5 kW or less be capable of having its real power production remotely turned down or off in emergency situations as part of Emergency Solar Management. The Company goes on to cite a “significant challenge” of Non-compliance with smart inverter settings in Australia, noting 55 per cent of audited inverters with visible settings were incorrectly configured in some way, and noting that the Company’s proposed 2nd DER Plan can ensure compliance with smart inverter settings requirements.

...

Q. Is the apparent justification for the Australian Energy Market Operator’s recent recommendation to control small DER applicable to PPL’s current condition?

A. No. The Australian Energy Market Operators’ role, as the name implies, is to manage energy markets at the bulk power level, in stark contrast to PPL’s role as a distribution network operator within the PJM Independent System Operator’s bulk power system. AEMO’s need to enable the ability to turn off all small DER in rare emergency conditions, was driven by “ever growing output from solar was posing an increasing threat to the safety and security of the grid because it was pushing out all other forms of generation that were needed to help keep the system stable.” This condition resulted because “rooftop solar was periodically supplying more than 100 per cent of the state's demand.” As a reminder, PPL has forecasted 77,156 new DER installations by 2030, in comparison to Australia’s 3.92 million DER customers in 2024; 50 times more DER customers in Australia than PPL. Even if the comparison to Australia’s bulk power needs was fair, PPL’s solution would have astronomical costs for management of those small DER, assuming the Company’s expected costs of more than \$1,000 per device. Rather than demonstrating a realistic threshold analysis for where DER management is a necessary utility capability, PPL has referenced an unrelated issue faced only in the location of highest penetration of DER on earth.

OCA St. 1SR at 9-11 (internal citations omitted). PPL offered no evidence to rebut OCA witness Nelson's testimony in Rejoinder Testimony.

PPL further stated that OCA witness Nelson's testimony regarding size limits on DER management imposed by Ameren Illinois Company (Ameren) "are also incorrect because Ameren Illinois's experience is simply not comparable to PPL Electric's." PPL M.B. at 54. OCA witness Nelson testified as follows:

Q. Did the Company reference any other proceedings to support controlling and monitoring all DER?

A. Yes. Witness Davis cited processes in Illinois and Massachusetts. I have been highly involved in both Illinois' and Massachusetts' for several years on the topics of flexible interconnections, DERMS, and DER orchestration, among other issues. For this reason, I can confidently testify that Witness Davis is mistaken if he is suggesting these processes support the control and monitoring of small DERs. In fact, Ameren Illinois' own witness stated the following:

Currently, Ameren Illinois has no intent to directly control small (Level 1) DERs using DERMS. The logistics and cost of dedicated communications equipment for small (Level 1) DER sites cannot be justified at this time. The Company anticipates that if new programs or grid resiliency efforts require control of smaller DER, this would be accomplished through a third party or through the existing manufacturer's link to the DER. ... The Company expects that if DER control scenario' (sic) emerge, DERs smaller than 200 kW would typically not be subject to control unless special circumstances such as program participation warrant it.

OCA St. 1SR at 29-30 (internal citations omitted).

Ameren's testimony directly refutes PPL's proposal. Importantly, Ameren testified that small DER control is not cost-effective. OCA St. 1SR at 30. Furthermore, Ameren identifies more cost-effective pathways for controlling small DERs, such as using third parties or equipment manufacturers. *Id.* OCA witness Nelson testified that "Ameren's position is consistent with my experience in other jurisdictions. I am not aware of any jurisdiction that is seriously considering

small DER control because it is not cost-effective and other more cost-effective pathways exist.”

Id.

PPL provides no evidence showing how controlling small DERs is more cost effective for PPL than for Ameren. Importantly, Ameren’s testimony was forward looking and not about their current technology. OCA St. 1SR at 11. Ameren testified that the logistics and costs were too high and that they would use a more cost-effective pathway (that PPL has not evaluated) that relies on a third party or existing manufacturer’s link to the DER (i.e., an aggregator). OCA St. 1SR at 11. The Ameren testimony was unrebutted by PPL’s witnesses. Stating that “Ameren Illinois’s experience is simply not comparable to PPL Electric’s” (PPL M.B. at 54) is not substantial evidence.

PPL also states that active management at DERs at or below 200 kW provides “substantial value across all the use cases” that PPL witness Davis analyzed in testimony. PPL M.B. at 54-55. OCA witness Nelson testified as follows:

Q. Does PPL witness Cody Davis’ assertion that management of small DER “provides significant value across the many different use cases and benefit types” justify mandatory utility control?

A. No. PPL witness Davis appeals to the value of actively managing small DER, but this claim does not support any *necessity* to actively manage small DER in the way PPL proposes, nor the cost-effectiveness to do so. This includes claims regarding managing DER’s ability to resolve voltage violations, reduce truck rolls, offset capacitor investments, increase hosting capacity, or address any of the Pilot use cases. None of these values meaningfully contribute to the assessed benefits of the 2nd DER Plan, aside from hosting capacity. I thoroughly address the Company’s cost-benefit analysis, including hosting capacity, in the next section, showing that it is not cost effective to manage small DER.

OCA St. 1SR at 12.

PPL provided other examples of utility DER management programs that refute PPL's claim that mandatory control is necessary to manage DER. *See* OCA M.B. at 37. OCA witness Nelson testified:

Q. Did PPL provide other examples of Utility DER management programs that refute its claim that mandatory control is necessary to manage DER?

A. Yes. In rebuttal, PPL references Green Mountain Power's Bring Your Own Device Program and Duke Energy's PowerPair + Battery Control Program, ostensibly to demonstrate that other utilities are controlling DER in the same way as PPL proposes. However, these examples demonstrate exactly what I am advocating. Neither Green Mountain Power's nor Duke Energy's DER programs are mandatory and neither use utility-owned communications devices, relying instead on cloud-based communications using the customer's internet service. Duke Energy's program is also managed by a third-party aggregator, rather than the utility. These programs demonstrate a clear alternative to mandatory utility control that PPL has refused to seriously consider as an alternative to its proposal.

OCA St. 1SR at 12-13.

PPL's testimony is also contradictory between witnesses on this issue. OCA witness Nelson testified:

Q. Does PPL at other points acknowledge that other solutions exist to effectively manage DER?

A. Yes. Witness Bethany Johnson's testimony contradicts witness Salet's statement that "issues with DER management cannot be addressed by relying solely on voluntary compliance" as witness Bethany Johnson recognizes that traditional forms of electric infrastructure, such as poles, wires, and capacitors are also an alternative to the Company's proposal and sufficient to safely and reliably provide service. Witness Lee Krevat similarly describes, in detail, the alternative options taken by SDG&E and HECO to manage DER, including Advanced Energy Storage, Phase Measurement Units, line capacitor upgrades, dynamic voltage control, CPUC's Phase 3 advanced functions including Scheduled power values and modes, VAR inverters, and line sensors. Indeed, any combination of DER management strategies and these other electric infrastructure options can be employed to maintain safe and reliable service. However, PPL has refrained from evaluating the costs and benefits of any of these alternative options for maintaining system reliability. While I agree that DER Management can be beneficial, the objective for just and reasonable DER management should be to evaluate which of the many DER management pathways (autonomous vs. active control, mandatory vs. incentive-based, utility vs. third-party ownership) provides the greatest net benefits.

PPL flatly refuses to provide a clear assessment of other pathways for DER management, providing only a flawed cost-benefit analysis of its own proposal[.]

OCA St. 1SR at 13-14.

Given the lack of certainty or supporting analysis by PPL as to a reasonable size threshold for mandatory utility or alternative controls, OCA witness Nelson recommended that no DER should be subject to mandatory utility control under DER II unless and until further analysis is completed regarding DER orchestration. OCA St. 1SR at 14. The OCA's recommendation is reasonable, prudent, and should be adopted by the Commission.

V. CONCLUSION

For the reasons set forth above and in the OCA's Main Brief, the Office of Consumer Advocate respectfully requests that PPL's Petition be denied without prejudice. PPL should be permitted to file a DER Management Petition once it has completed a DER Orchestration Plan as outlined in the OCA's Main Brief.

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