



July 10, 2026

VIA E-FILING

Secretary Matthew L. Homsher
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

Re: *In re: Distributed Energy Resources Participation in Wholesale Markets*
Docket No. L-2023-3044115

Dear Secretary Homsher,

Please find enclosed for filing the Reply Comments of the Energy Justice Advocates in regard to the Notice of Proposed Rulemaking Order on the above-referenced docket. Should you have any questions, please do not hesitate to contact me. Thank you.

Sincerely,

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**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

In re: Distributed Energy Resources
Participation in Wholesale Markets

Docket No. L-2023-3044115

REPLY COMMENTS OF THE ENERGY JUSTICE ADVOCATES

July 10, 2026

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I. Introduction

On June 10, 2026, POWER Interfaith, Sierra Club, Vote Solar, Physicians for Social Responsibility Pennsylvania, Clean Air Council, Pennsylvania Stands Up, and Third Act Pennsylvania (collectively, the “Energy Justice Advocates” or “EJA”), submitted comments (“Comments”) on the proposed regulation (“Proposed Regulation”) of the Pennsylvania Public Utility Commission (“PA PUC”) to implement Order No. 2222 of the Federal Energy Regulatory Commission (“FERC”).¹

EJA respectfully submits these reply comments (“Reply Comments”) in response to comments filed by other parties on the Proposed Regulation. While EJA believes that its previously-filed Comments address many of the issues raised in other parties’ comments, it offers these Reply Comments to provide additional commentary and context where it may be helpful on points of disagreement and agreement with other commenting parties. To the extent these Reply Comments do not specifically discuss a particular contention by a particular commenting party, this should not be construed as agreement, but rather as a determination that the concerns implicated have already been adequately addressed in EJA’s Comments.

¹ Energy Justice Advocates, Comments, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

II. Reply Comments

A. Reply comments regarding complementary wholesale and retail contributions from DER aggregations

The Proposed Regulation provided that customers enrolled in a net metering tariff may not enroll a distributed energy resource (“DER”) in an aggregation serving PJM Interconnection’s (“PJM”) energy and capacity markets (though participating in PJM ancillary services markets would be permissible).² EJA’s Comments recommended that for the final regulation (“Final Regulation”), the PA PUC adopt measures to maximize complementary wholesale and retail contributions from DER aggregations while preventing double-counting.³ In particular, EJA recommended that the Final Regulation shift away from prohibiting net metering customers from participating in aggregations serving PJM energy and capacity markets towards a model which simply proscribes double compensation for the provision of the same service at the wholesale and retail levels.⁴

Several commenters urged the PA PUC to move in the opposite direction. For example, the Energy Association of Pennsylvania (“EAP”),⁵ PPL Electric Utilities Corporation (“PPL”),⁶ and PECO Energy Company (“PECO”)⁷ all recommended that the Final Regulation continue the

² Pa. P.U.C., Notice of Proposed Rulemaking Order, Proposed Regulation, § 57.263(a)(1), *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (Dec. 18, 2025).

³ Energy Justice Advocates, Comments, at 15, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁴ Energy Justice Advocates, Comments, at 15–16, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁵ Energy Association of Pennsylvania, Comments, at 7–8, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁶ PPL Electric Utilities Corporation, Comments, at 19–20, 26–27, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁷ PECO Energy Company, Comments, at 3–4, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

basic approach of the Proposed Regulation but extend it to foreclose ancillary market participation as well.

EJA believes that its Comments address and resolve concerns with its Recommendation #7 reflected in these comments.⁸ There is no legal barrier to the PA PUC promulgating a Final Regulation that maximizes concurrent and complementary retail and wholesale market participation by DERs while preventing double-counting. Order No. 2222, for its part, allows state public utility commissions to condition retail program participation on not participating in duplicative wholesale programs to prevent double-counting.⁹ But it does not require it. And there is a public interest in alleviating the demand crisis in PJM's markets by finding ways to get more out of Pennsylvania's resources, including DERs.

The Proposed Regulation takes an important step toward that objective by authorizing net metered DERs to participate in PJM ancillary services markets.¹⁰ The Comments opposing this are unavailing. Since net metered DERs are not dispatched by electric distribution companies ("EDCs") (or by any party), they do not actually supply any ancillary services. Preventing such DERs from offering those ancillary services into the PJM market when they could do so today, but for legal barriers, needlessly constricts supply. In a context of high and growing demand, this puts upward pressure on prices.

While conceding that net metering customers do not provide ancillary services, PPL asserts that net metering customers are effectively compensated for providing ancillary services

⁸ Energy Justice Advocates, Comments, at 15–16, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁹ *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at PP 160–162 (2020).

¹⁰ Pa. P.U.C., Notice of Proposed Rulemaking Order, Proposed Regulation, § 57.263(a)(1), *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (Dec. 18, 2025).

because the compensation for net metering customers is calculated with reference to the retail rate, which includes ancillary services.¹¹ To the extent that PPL believes that the net metering compensation rate is unreasonable, that concern needs to be addressed in a proceeding concerning that compensation rate. In the present proceeding, the only issue for decision is whether to write regulations to allow or foreclose net metered DERs from providing to PJM ancillary services which they are capable of providing but are not currently providing. Legally prohibiting those DERs from doing so will prevent much-needed actual ancillary services from relieving price pressure in PJM, but it will do nothing to alter the net metering compensation rate.

This logic of allowing DERs to do more to increase supply of necessary grid services to demand-constrained PJM markets also applies to energy and capacity markets. EJA's Recommendation #7 calls for the Final Regulation to be written in a way that locks in the principle of prohibiting double compensation for the provision of the same service to wholesale and retail purchasers but does not lock out DERs from maximizing the supply they can offer to wholesale markets that are under immense pressure to find new supply.¹²

This provides clear regulatory direction to EDCs, but also allows for EDC tariffs to evolve as technology becomes available to provide more fine-grained bidirectional metering and control of DERs at lower and lower prices. Technology is developing quickly in this space. As noted in the comments of the Coalition Advocating DER Regulation Efficiency ("CADRE"), the

¹¹ PPL Electric Utilities Corporation, Comments, at 20, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

¹² Energy Justice Advocates, Comments, at 15–16, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); see Philadelphia Energy Authority, Comments, at 7, 10, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

Maryland Public Service Commission recently issued an order that recognizes the viability and value of device-level bidirectional metering to support the implementation of Order No. 2222.¹³

Another potential solution could be based on drawing information from inverters. An example is provided by the Hawaiian Electric Company (“HECO”). HECO has adopted IEEE 2030.5, meaning interconnecting DERs must implement the IEEE 2030.5 communications protocol, enabling two-way, real-time communication between the inverter and HECO’s server. Where a utility communicates with inverters through such an interface, the attribution question of which device is injecting and when can be addressed at the inverter level rather than through device-level submetering in the traditional sense. PPL has also recently obtained approval for a DER management program using smart inverters that similarly includes within it measures that would provide visibility by PPL at the inverter level for DERs.¹⁴

This principles-based approach to structuring the Final Regulation’s provision on complementary market participation is also likely to be more durable over time with regard to other regulations. For example, PPL calls for the PA PUC to write the Final Regulation in a way that categorically bans net metered DERs from participating in PJM ancillary services markets, citing the above-discussed concerns with how the net metering rules calculate compensation with reference to retail rates.¹⁵ But what if those net metering rules are, as has been under discussion

¹³ Coalition Advocating DER Regulation Efficiency, Comments, at 16, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026) (citing Md. Pub. Serv. Comm’n, Order No. 92398, Order on Electric Utilities’ VPP/DER Conceptual Reports and Office of Cybersecurity Status Report, *Interconnection Workgroup and the Implementation of FERC Order No. 2222 and Retail Grid Services in Maryland*, Case No. 9778 (May 6, 2026)).

¹⁴ Pa. P.U.C. Press Release, *PUC Approves Modified Plan for PPL’s Second Distributed Energy Resource Management Program*, (Nov. 20, 2025), <https://www.puc.pa.gov/press-release/2025/puc-approves-modified-plan-for-ppl-s-second-distributed-energy-resource-management-program-11202025>.

¹⁵ PPL Electric Utilities Corporation, Comments, at 34, 58, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

for some time, changed? If the PA PUC follows PPL's recommendation, it will have baked into its Order No. 2222 regulation a prohibition that may become out of date and inconsistent as net metering rules change. It is more practical and straightforward, instead, to write into the regulation the principle that no DER shall receive double compensation for selling the same service at the same time at the wholesale and retail levels.

Similarly, there is no basis to impose an arbitrary once per year limit on switching between retail and wholesale supply provision for DERs, as EAP recommends. EAP suggests that switching between wholesale and retail markets based on where the price is highest constitutes some form of unsavory "arbitrage" that should be prohibited.¹⁶

In fact, this is how markets are intended to work. Price is how markets signal the need for greater supply. Preventing supply from moving to where price is highest breaks the logic of the market and prevents the price relief that results from supply rebalancing alleviating demand crunches. In contrast, enabling smooth switching between retail and wholesale enables smooth rebalancing. As EJA's Comments indicate, at a minimum the metering period provides a reasonable tempo for switching, and this is routinely accomplished in the retail choice supply market.¹⁷

¹⁶ Energy Association of Pennsylvania, Comments, at 8, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

¹⁷ Energy Justice Advocates, Comments, Exh. B, Technical Report of Michael Freeman, at 27, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

B. Reply comments regarding consumer protection measures

The Proposed Regulation provided few consumer protection measures, though numerous commenters in addition to EJA called for such measures to be added.¹⁸ The Office of Consumer Advocate offered seven, including aggregator licensing, a code of conduct, fully informed and affirmative consent, and a bar on service termination for aggregation charges. EJA welcomes this consensus and writes to reinforce it, because consumer confidence in aggregation markets is critical to equitably accomplishing the purposes of Order No. 2222.

1. Code of conduct

EJA agrees with the other parties urging a DER aggregator (“DERA”) code of conduct and licensing framework built on Pennsylvania’s electric generation supplier model.¹⁹ The agreement is striking. It unites consumer advocates, an environmental organization, the utilities’ trade association, and a distribution company.²⁰ Pennsylvania already licenses the brokers, marketers, and aggregators that solicit retail customers, and holds them to a code of conduct and

¹⁸ Office of Consumer Advocate, Comments, at 12–15, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 8, 11–14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Natural Resources Defense Council, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Philadelphia Energy Authority, Comments, at 6, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Energy Association of Pennsylvania, Comments, at 13–14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Duquesne Light Company, Comments, at 3, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); PECO Energy Company, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

¹⁹ Energy Justice Advocates, Comments, at 13–14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁰ Natural Resources Defense Council, Comments, at 14–15, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Energy Association of Pennsylvania, Comments, at 13–14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Duquesne Light Company, Comments, at 3, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

to marketing rules.²¹ A DERA that enrolls a customer’s distributed resources for compensation is the same kind of retail-facing intermediary. The PA PUC can adapt this architecture rather than build a new one. It should place the framework in the Final Regulation, in force before aggregator participation begins, rather than defer it to a later docket.

2. Enrollment protections

EJA agrees that enrollment must rest on a customer’s informed, affirmative consent.²² EJA urged the same, including standardized disclosures in plain language in all the languages used in the service territory.²³ These protections matter most for financially stressed households, who, as the Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania (“CAUSE-PA”) documents, are the likeliest to be drawn by promises of savings and the least able to absorb hidden costs.²⁴ CAUSE-PA also recommends barring automatic reenrollment and forbidding punitive cancellation fees.²⁵ EJA supports these terms. A right to exit means little if departure carries a penalty the customer cannot afford.

²¹ 66 Pa. Cons. Stat. § 2809(a); 52 Pa. Code § 54.122; 52 Pa. Code §§ 54.31–54.43; 52 Pa. Code §§ 111.1–111.14.

²² Office of Consumer Advocate, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 13–14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²³ Energy Justice Advocates, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁴ Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 2–4, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁵ Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

3. Customer control

EJA agrees that a household's basic needs come before an aggregator's dispatch rights, and that DER aggregation participants need to be able to override automated control of vital equipment to protect health and safety.²⁶ Equally important, aggregation charges should be separated from basic service charges, such that nonpayment can never trigger a customer's termination of utility service.²⁷

4. Incorporation into this proceeding

EJA disagrees with two positions in the record. First, PECO would move consumer protection and licensing to a separate, later proceeding.²⁸ That course risks leaving customers unprotected when aggregator participation begins. The protections belong in this rulemaking, so that they are in force before the market opens.²⁹ Second, CADRE asks the PA PUC to declare that no state licensing requirement applies to DER services.³⁰ EJA opposes that request. It would

²⁶ Energy Justice Advocates, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Office of Consumer Advocate, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 12, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁷ 52 Pa. Code § 56.83(3); Office of Consumer Advocate, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 11–12, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); Energy Justice Advocates, Comments, at 12–13, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁸ PECO Energy Company, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

²⁹ See Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 9–10, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026); see also Natural Resources Defense Council, Comments, at 14, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

³⁰ Coalition Advocating DER Regulation Efficiency, Comments, at 11, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

strip Pennsylvania customers of protection at the very moment a new and unfamiliar market opens to them, and it rests on a misreading of the jurisdictional line, which the next section addresses.

5. Jurisdiction

The PA PUC can regulate the aggregator-customer relationship without intruding on federal jurisdiction. FERC’s authority under Order No. 2222 reaches the wholesale markets and the rules for participating in them, which FERC identified as the barrier the order was meant to remove.³¹ FERC fixed the limit of its own rule. Order No. 2222 reaches only “transactions occurring on the wholesale market.”³² The rule does not curtail state authority. FERC confirmed that Order No. 2222 does not “preclude or limit state or local regulation of: retail rates; distribution system planning, distribution system operations, or distribution system reliability; distributed energy resource facility siting; and interconnection of resources to the distribution system that are not subject to [FERC] jurisdiction[.]”³³ Consumer protection falls on the state side of that line. Rules governing how an aggregator markets to, contracts with, discloses to, and bills a Pennsylvania customer regulate the retail relationship, not the wholesale bid.

The Public Utility Code supplies the authority for the retail side. The PA PUC supervises every public utility in the Commonwealth and must ensure that service is adequate, safe, and

³¹ *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at P 26 (2020).

³² *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at P 58 (2020) (internal citations omitted).

³³ *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at P 61 (2020).

reasonable.³⁴ The Code already requires the brokers, marketers, and aggregators that serve retail electric generation supply customers to hold a PA PUC license, and it directs the PA PUC to set consumer-protection standards for them.³⁵ A DERA that solicits and enrolls Pennsylvania customers is engaged in similar activities. The PA PUC stated its intent to limit its oversight of DER aggregators on the theory that their wholesale market activities are federally regulated.³⁶ However, that framing conflates the wholesale transaction with the retail relationship, and risks leaving Pennsylvania customers unprotected. EJA urges the PA PUC to exercise its retail-side authority and provide that protection.

C. Reply comments regarding integrated distribution planning

The Proposed Regulation does not address hosting capacity maps or integrated distribution planning. Its provisions are confined to the mechanics of aggregation: purpose, definitions, general provisions, EDC review of Component DER applications, Component DER operations, and disputes.³⁷

EJA put hosting capacity maps and integrated distribution planning squarely before the PA PUC in its own Comments.³⁸ EJA proposed that Component DERs be tracked in a public registry, with sensitive information redacted, both to police double-counting and to assist infrastructure planning. It explained that such a registry would build toward public distribution

³⁴ 66 Pa. Cons. Stat. § 501(b); 66 Pa. Cons. Stat. § 1501.

³⁵ 66 Pa. Cons. Stat. § 2809(a); 66 Pa. Cons. Stat. § 2809(f).

³⁶ Pa. P.U.C., Notice of Proposed Rulemaking Order, at 26, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (Dec. 18, 2025).

³⁷ Pa. P.U.C., Notice of Proposed Rulemaking Order, Proposed Regulation, §§ 57.261–57.266, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (Dec. 18, 2025).

³⁸ Energy Justice Advocates, Comments, Exh. B, Technical Report of Michael Freeman, at 10–11, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

system hosting capacity maps, which in turn would lay the foundation for comprehensive integrated distribution planning and the cost reductions that planning can drive.³⁹ EJA's accompanying technical report carried the point further, recommending that the PA PUC require EDCs to develop a mapping tool that shows the maximum hosting capacity each part of the distribution grid can accept. The report pointed to working examples. Utilities in New Jersey and California publish such maps, ten other states require them, and utilities in fifteen states provide them voluntarily.⁴⁰ EJA asked the PA PUC to use the Final Regulation to meet immediate needs and to lay this foundation for a more affordable and sustainable system.

Two other parties pressed the same theme, and EJA supports their recommendations. The Office of Consumer Advocate proposed a program for integrating distributed energy into distribution planning and lowering costs. It urged the PA PUC to require EDCs to fold the impacts of aggregation into their long-term infrastructure improvement plans and to publish hosting capacity maps that show where distributed resources can connect, where they relieve constraints, and where upgrades are needed.⁴¹ CAUSE-PA urged the PA PUC to require each EDC to assess the effect of distributed resources and aggregations through detailed, forward-looking plans that weigh costs and benefits and account for demand-side resources.⁴² These recommendations track a national trend. Over the past decade, approximately twenty states have

³⁹ Energy Justice Advocates, Comments, at 11, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁴⁰ Energy Justice Advocates, Comments, Exh. B, Technical Report of Michael Freeman, at 10, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁴¹ Office of Consumer Advocate, Comments, at 15–16, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁴² Coalition for Affordable Utility Services and Energy Efficiency in Pennsylvania, Comments, at 15, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

adopted distribution-planning requirements, including integrated plans built around hosting capacity analysis, grid needs assessment, and non-wires alternatives.⁴³

EJA supports these recommendations for the reasons set out in its Comments. Planning that anticipates distributed energy, rather than reacting to it one interconnection at a time, avoids stranded investment and curbs the upgrade costs that ultimately land on ratepayers.⁴⁴ Done well, it treats distributed energy as a grid resource that can defer or avoid conventional spending, which lowers cost and expands access to affordable renewable power. The PA PUC has clear authority to act. Order No. 2222 leaves state authority over distribution system planning untouched, and the PA PUC can build on the long-term infrastructure improvement plans that EDCs already file.⁴⁵

D. Reply comments regarding technical contribution potential of DER aggregations in Pennsylvania

The Proposed Regulation and its accompanying PA PUC order did not incorporate specific projections of the technical potential for DER aggregations in Pennsylvania to supply grid services to PJM's energy, capacity, and ancillary services markets. However, a number of commenting parties indicated that the contribution potential may be significant.⁴⁶

⁴³ Lisa C. Schwartz et al., *State Requirements for Electric Distribution System Planning*, Lawrence Berkeley Nat'l Lab'y, at 8 (Dec. 2024), <https://emp.lbl.gov/publications/state-requirements-electric>.

⁴⁴ Energy Justice Advocates, Comments, at 11, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026).

⁴⁵ *Participation of Distributed Energy Res. Aggregations in Mkts. Operated by Reg'l Transmission Orgs. & Indep. Sys. Operators*, Order No. 2222, 172 FERC ¶ 61,247, at P 61 (2020).

⁴⁶ See, e.g., Voltus, Inc., Comments, at 5 & n.5, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026) ("Residential smart thermostats already installed in AMI-metered Pennsylvania homes represent an estimated 1,009 MW (roughly a 1 GW) of demand response that could be reducing grid stress today, but that potential remains stranded for lack of data access."); Natural Resources Defense Council, Comments, at 2, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115

EJA agrees that the contribution potential is certainly material and may indeed be significant. In support of commenters' preliminary estimates, EJA offers here some preliminary estimates of its own, and gratefully acknowledges the assistance of Christina Gosnell, Zane Selvans, and Kathryn Mazaitis of Catalyst Cooperative and Michael Freeman of Emerald Energy Consulting in preparing those estimates. In short, there is good reason to believe that Pennsylvania DERs are substantially under-utilized relative to their full potential to contribute to PJM markets through aggregation. This provides all the more reason for the PA PUC to adopt a Final Regulation that is designed to accelerate the equitable deployment of DER aggregations in Pennsylvania.

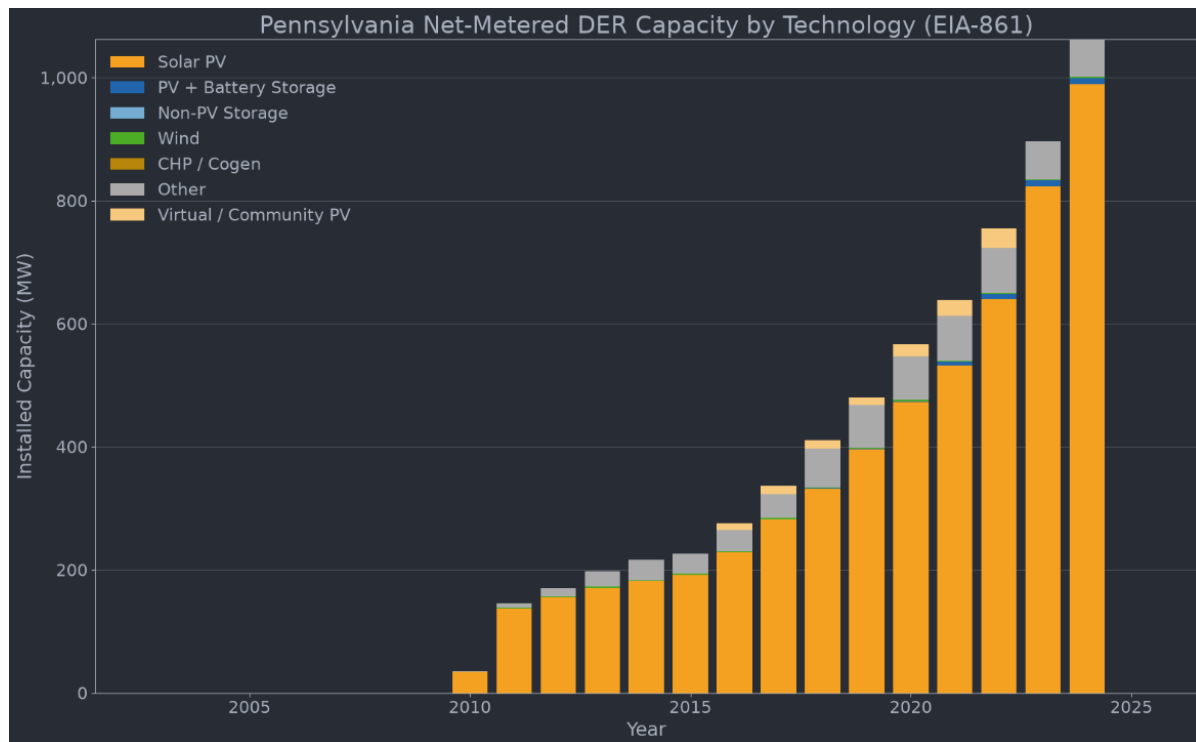
1. Existing net metering customers

As the PA PUC implements DER aggregation, it is likely that energy resources that have previously participated in retail demand response or net metering programs will instead begin participating in wholesale markets as part of an aggregated DER. Opening the wholesale market in this way will likely spur investment in new residential DERs. While we will not attempt to forecast the scale of small-scale solar photovoltaics ("PV") growth that will result from Order No. 2222 implementation, we summarize the scale of existing net metered solar PV in Pennsylvania in recent years. This can serve as a baseline scale of the potential capacity of this resource.

(June 10, 2026) ("PJM is in the midst of a capacity shortfall that is likely to last for several years. . . . [DERs] avoid PJM's problematic interconnection queue and delays from transmission construction, thereby representing a potential source of new capacity that may be available years sooner than traditionally interconnected resources."); Office of Consumer Advocate, Comments, at 1, *Distributed Energy Resources Participation in Wholesale Markets*, Docket No. L-2023-3044115 (June 10, 2026) ("With the rapid deployment of data center large loads in Pennsylvania and in the PJM . . . region, DERs have the potential to help buttress reliability and mitigate price increases, so long as they are implemented efficiently and with strong ratepayer protections.").

According to U.S. Energy Information Administration (“EIA”) data reported by utilities under Form 861,⁴⁷ in 2024, the most recent year for which statewide data is available, approximately 1 GW of net metered solar PV capacity was available in Pennsylvania.⁴⁸

Figure A. Installed Net Metered Capacity in Pennsylvania



As shown in the figure above, very little of this solar PV is equipped with battery storage. In 2024, the Pennsylvania grid additionally had just under 1 GW of utility-scale solar PV installed.⁴⁹

⁴⁷ U.S. Energy Info. Ass’n, *Annual Electric Power Industry Report, Form EIA-861 detailed data files* (Oct. 7, 2025), <https://www.eia.gov/electricity/data/eia861/>.

⁴⁸ Catalyst Coop., *Annual time series of net metering by customer and fuel class*, Pub. Util Data Liberation Project (“PUDL”), https://data.catalyst.coop/preview/pudl/core_eia861_yearly_net_metering_customer_fuel_class (Most recent data of 2024) (Where the dataset is filtered to state = “PA” and combined by tech_class across all utilities in the state for each year with data available. PUDL login credentials can be created to access dataset).

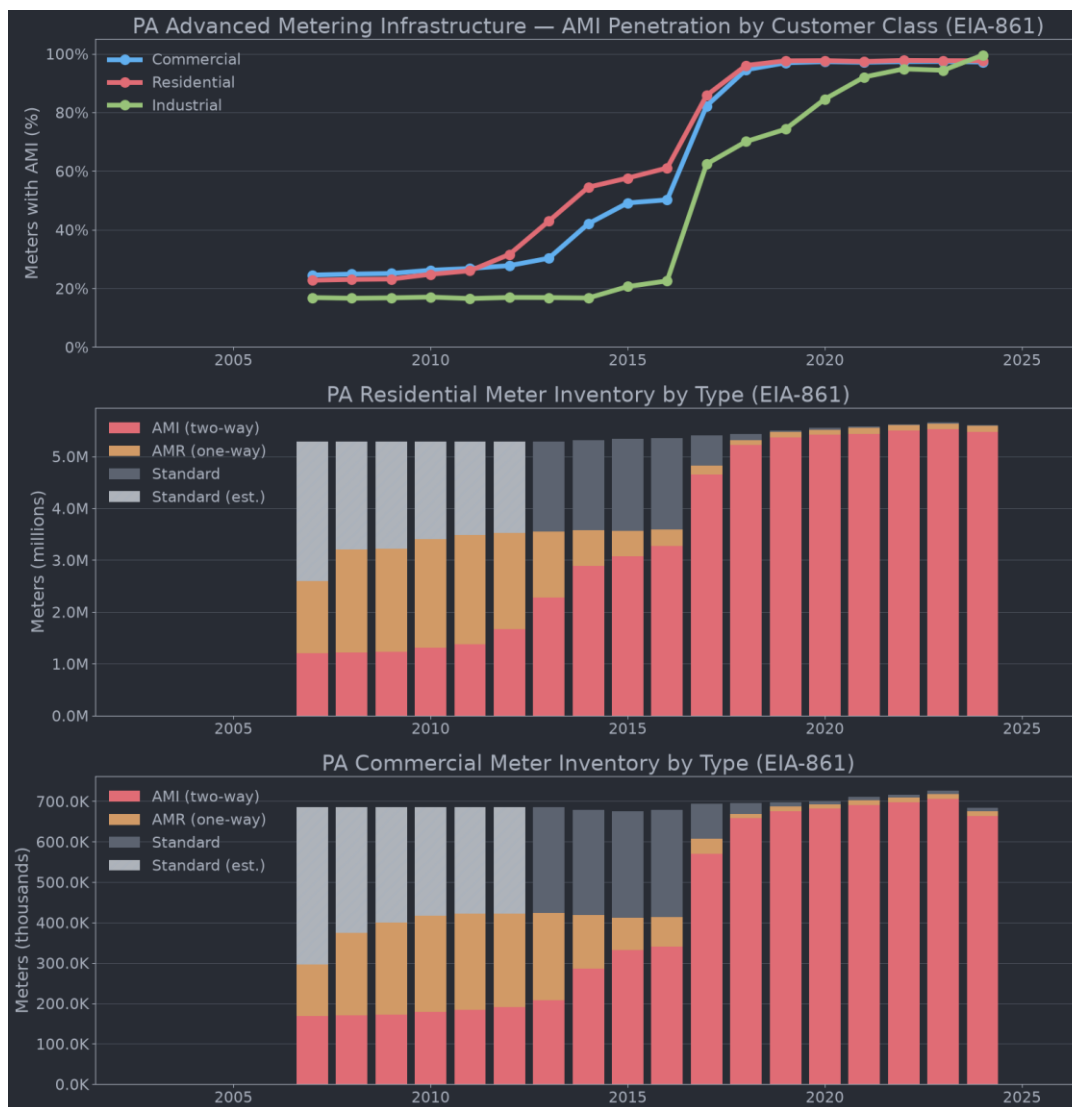
⁴⁹ U.S. Energy Info. Ass’n, *Form EIA-860 detailed data with previous form data (EIA-860A/860B)*, (2024), <https://www.eia.gov/electricity/data/eia860/> (Where the relevant workbook is titled “3_3_Solar_Y2024.xlsx” and then is filtered to State = “PA” and the sum of Summer Capacity (MW) is 873.9 MW).

The existing net metered solar PV in Pennsylvania, which in mid-2026 is likely substantially more than 1 GW, represents the floor for solar PV DERs that could participate in an aggregated DER wholesale market.

EIA data also reveals widespread deployment of advanced metering infrastructure (“AMI”) in the Commonwealth, as displayed in the figure below.⁵⁰ Thus, widespread deployment of additional solar PV, batteries, and grid-connected cooling and heating DERs would not be hindered by metering infrastructure. The Pennsylvania grid is well suited for widespread aggregated DER deployment, and many DER technologies will likely be rapidly scaled if wholesale DER aggregation is effectively implemented.

⁵⁰ Catalyst Coop., *Annual time series of advanced metering infrastructure (AMI) and automated meter reading (AMR) by state, sector, and balancing authority*, PUDL, https://data.catalyst.coop/preview/pudl/core_eia861_yearly_advanced_metering_infrastructure (Most recent data of 2024) (Where the dataset is filtered to state = “PA” and advanced_metering_infrastructure is summed across utilities to represent all AMI meters and non_amr_ami is summed across utilities to represent all standard meters).

Figure B. Advanced Metering Infrastructure Across Customer Classes in Pennsylvania



2. Existing retail programs

While solar net metering programs are relatively established in Pennsylvania, retail programs for other DER eligible technologies remain minimal. This is especially the case for emergent technologies like electric vehicles (“EVs”) and batteries, as demonstrated through Act 129 compliance filings. Act 129, which serves as the foundation of Pennsylvania’s primary Energy Efficiency and Conservation program, requires EDCs with over 100,000 customers to

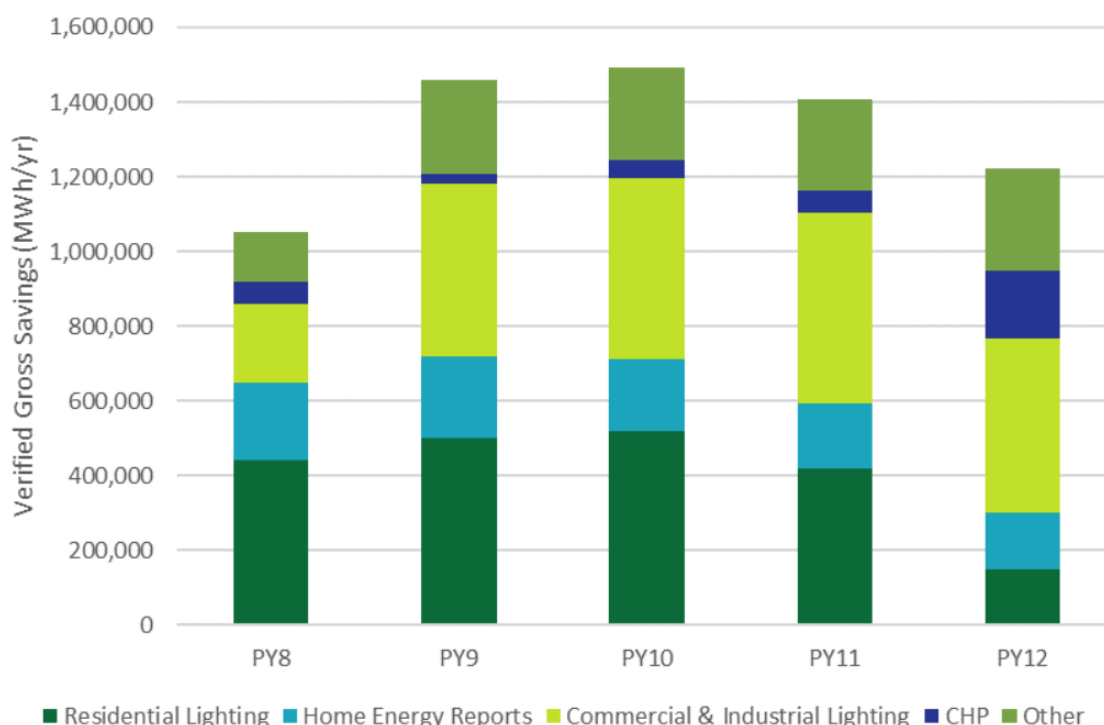
file and implement energy efficiency and demand reduction programs to meet PUC-set energy savings targets. The covered EDCs serve approximately 99% of Pennsylvania electric customer accounts, making Act 129 the state’s dominant demand-side energy efficiency framework.⁵¹ Since its inception in 2009, over four different “Phases” of implementation, Act 129 programs have produced approximately 20 million MWh⁵² of annualized energy savings, mostly through static energy efficiency measures, in particular residential and commercial lighting upgrades. Figure C below highlights savings under Phase III, from 2016 (PY8) through 2021 (PY12).⁵³

⁵¹ Pa. P.U.C., *Retail Electricity Report: Activity Report 2024*, at 5, Table 2 (Dec. 2025), <https://www.puc.pa.gov/media/3747/retail-elec-choice-report-2024-final.pdf> (Explanation of calculation: (Total Act 129 eligible customers: Duquesne light customers + First Energy customers + PECO customers + PPL customers)/(Total customers: Duquesne light customers + First Energy customers + PECO customers + PPL customers + Citizens customers + Pike customers + UGI customers + Wellsboro customers) = percentage of customer accounts covered by Act 129).

⁵² Explanation of calculation: Phase I verified savings + Phase II verified savings + Phase III savings + Phase IV target = approximate MWh of annualized, additional energy savings to date (See GDS Assocs., Inc. et al., *Act 129 Statewide Evaluator Final Annual Report, Phase I: June 1, 2009–May 31, 2013*, at 16, Table 1-2 (Mar. 4, 2014), <https://www.puc.pa.gov/pcdocs/1274547.pdf> (providing Phase I verified savings); see also GDS Assocs., Inc. et al., *Act 129 Statewide Evaluator Phase II Final Report*, at 31, Table 2-13 (Feb. 28, 2017), https://www.puc.pa.gov/Electric/pdf/Act129/Act129-SWE_PhaseII_FinalAR.pdf (providing Phase II verified savings); see also NMR Grp., Inc. et al., *SWE Annual Report: Act 129 Phase III and Program Year 12*, at 18, Table 14 (Mar. 31, 2022), <https://www.puc.pa.gov/pcdocs/1746475.pdf> (providing Phase III verified savings); see also Pa. P.U.C., Implementation Order, at 7–8, Table 2, *Energy Efficiency and Conservation Program*, Docket No. M-2020-3015228 (June 18, 2020), <https://www.puc.pa.gov/pcdocs/1666981.docx> (providing Phase IV projected savings)).

⁵³ NMR Grp., Inc. et al., *SWE Annual Report: Act 129 Phase III and Program Year 12*, at 9, and App J., at 457–458 (Mar. 31, 2022), <https://www.puc.pa.gov/pcdocs/1746475.pdf>.

Figure C. Top Saving Program Performance through Phase III⁵⁴



Act 129 EDC compliance reports identify some demand response programs, but these programs have mostly been limited to commercial and industrial (“C&I”) demand response rather than customer-sited DER eligible technologies. In Phases I and III, demand response programs included air conditioner load controls and smart thermostats, but savings were minimal compared to C&I demand response programs.⁵⁵ Phases I–IV of Act 129 implementation do not appear to have any compensation programs for EVs or batteries.

⁵⁴ NMR Grp., Inc. et al., *SWE Annual Report: Act 129 Phase III and Program Year 12*, App J., at 457–458 (Mar. 31, 2022), <https://www.puc.pa.gov/pcdocs/1746475.pdf>.

⁵⁵ GDS Assocs., Inc. et al., *Act 129 Statewide Evaluator Final Annual Report, Phase I: June 1, 2009–May 31, 2013*, at 87, Table 2-22 and at 139, Table 3-9 (Mar. 4, 2014), <https://www.puc.pa.gov/pcdocs/1274547.pdf> (C&I demand reductions represented 61.5% of total reductions during Phase I, and PECO’s Smart AC program was only introduced in PY 4); NMR Grp., Inc. et al., *SWE Annual Report: Act 129 Phase III and Program Year 12*, at 70, Table 72, at 72, Table 74, at 73, Table 76, at 75, Table 78, at 77, Table 80, and at 79, Table 82 (Mar. 31, 2022), <https://www.puc.pa.gov/pcdocs/1746475.pdf> (Large C&I made up the bulk of demand response performance across all EDCs, PECO’s smart AC saver contributed to residential DR shown in Table 72).

Phase V of Act 129, which just began in June 2026, does include EV managed charging and battery programs for peak shaving, but projected impacts are relatively minimal. Across all EDCs' battery programs, participation is projected at 7,197 customers and will contribute approximately 16 MW of peak shaving capacity.⁵⁶ Projected EV participation sits at 29,890 customers across all EDCs, contributing about 5.73 MW of capacity.⁵⁷ Combined, the projected

⁵⁶ See PPL Elec. Utils. Corp., Revised Energy Efficiency and Conservation Plan: Act 129 Phase V, at 64, Table 26, *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057329 (May 26, 2026), <https://www.puc.pa.gov/pcdocs/1932782.pdf> (Providing PPL projected participation. Explanation of calculation: PPL projected participation + PECO projected participation + First Energy projected participation = total projected battery program participation.); see also PECO Energy Co., Revised Act 129 Phase V Energy Efficiency and Conservation Plan: PECO Program Years 18 to 22, at 41, Table 9, *Petition of PECO Energy Company for Approval of Its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057328 (Apr. 30, 2026), <https://www.puc.pa.gov/pcdocs/1926991.pdf> (providing PECO projected participation); see also FirstEnergy Pa. Elec. Co., Revised Phase V Energy Efficiency & Conservation Plan, Appx. B, Table 9 at 8 and 22, *Petition of FirstEnergy Pennsylvania Electric Company for Approval of a Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057327 (Apr. 15, 2026), <https://www.puc.pa.gov/pcdocs/1923306.pdf> (providing FirstEnergy projected participation).

See PPL Elec. Utils. Corp., Revised Energy Efficiency and Conservation Plan: Act 129 Phase V, at 64, Table 26, *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057329 (May 26, 2026), <https://www.puc.pa.gov/pcdocs/1932782.pdf> (Providing PPL projected battery capacity. Explanation of calculation: (Average of PPL projected summer battery capacity and winter battery capacity + PECO projected battery capacity + Average of First Energy projected summer battery capacity and winter battery capacity) = total projected battery capacity); see also PECO Energy Co., Revised Act 129 Phase V Energy Efficiency and Conservation Plan: PECO Program Years 18 to 22, at 41, Table 9, *Petition of PECO Energy Company for Approval of Its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057328 (Apr. 30, 2026), <https://www.puc.pa.gov/pcdocs/1926991.pdf> (providing PECO projected battery capacity); see also FirstEnergy Pa. Elec. Co., Revised Phase V Energy Efficiency & Conservation Plan, Appx. B, Table 9 at 8 and 22, *Petition of FirstEnergy Pennsylvania Electric Company for Approval of a Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057327 (Apr. 15, 2026), <https://www.puc.pa.gov/pcdocs/1923306.pdf> (providing FirstEnergy projected battery capacity).

⁵⁷ See PPL Elec. Utils. Corp., Revised Energy Efficiency and Conservation Plan: Act 129 Phase V, at 64, Table 26, *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057329 (May 26, 2026), <https://www.puc.pa.gov/pcdocs/1932782.pdf> (Providing PPL projected participation. Explanation of calculation: PPL projected participation + PECO projected participation + First Energy projected participation + Duquesne Light projected participation = total projected EV program participation); see also PECO Energy Co., Revised Act 129 Phase V Energy Efficiency and Conservation Plan: PECO Program Years 18 to 22, at 41, Table 9, *Petition of PECO Energy Company for Approval of Its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057328 (Apr. 30, 2026), <https://www.puc.pa.gov/pcdocs/1926991.pdf> (providing PECO projected participation); see also FirstEnergy Pa. Elec. Co., Revised Phase V Energy Efficiency & Conservation Plan, Appx. B, Table 9 at 8 and 22, *Petition of FirstEnergy Pennsylvania Electric Company for Approval of a Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057327 (Apr. 15, 2026), <https://www.puc.pa.gov/pcdocs/1923306.pdf> (providing FirstEnergy

impact of Phase V EV and battery programs represents about 3.6% of the total Phase V peak demand reduction goal of 607.6 MW, with less than 1% attributable to EVs.⁵⁸ As noted at the beginning of this section, Act 129 demand reduction targets are set by the PUC, and Act 129 sets a financial limitation that “the total cost of any plan...shall not exceed 2% of the electric distribution company’s total annual revenue as of December 31, 2006.”⁵⁹ This financial limitation hamstrings demand reduction potential under Act 129; aggregated DERs participating in a wholesale market would have no such financial cap. As detailed in the section below, Pennsylvania has more than 110,000 EVs, all of which could contribute to managed charging programs. Therefore, Act 129 programs only touch the surface of potential EV DER capacity.

projected participation); *see also* Duquesne Light Co., Phase V Energy Efficiency and Conservation Plan—Revised, at 152, Table 9, *Petition of Duquesne Light Company for Approval of its Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057325 (May 22, 2026), <https://www.puc.pa.gov/pcdocs/1932064.pdf> (providing Duquesne Light projected participation).

See PPL Elec. Utils. Corp., Revised Energy Efficiency and Conservation Plan: Act 129 Phase V, at 64, Table 26, *Petition of PPL Electric Utilities Corporation for Approval of its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057329 (May 26, 2026), <https://www.puc.pa.gov/pcdocs/1932782.pdf> (Providing PPL projected battery capacity. Explanation of calculation: PPL projected EV capacity + PECO projected battery capacity + First Energy projected battery capacity + Duquesne Light projected battery capacity= total projected battery capacity); *see also* PECO Energy Co., Revised Act 129 Phase V Energy Efficiency and Conservation Plan: PECO Program Years 18 to 22, at 41, Table 9, *Petition of PECO Energy Company for Approval of Its Act 129 Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057328 (Apr. 30, 2026), <https://www.puc.pa.gov/pcdocs/1926991.pdf> (providing PECO projected battery capacity); *see also* FirstEnergy Pa. Elec. Co., Revised Phase V Energy Efficiency & Conservation Plan, Appx. B, Table 9 at 8 and 22, *Petition of FirstEnergy Pennsylvania Electric Company for Approval of a Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057327 (Apr. 15, 2026), <https://www.puc.pa.gov/pcdocs/1923306.pdf> (providing FirstEnergy projected battery capacity); *see also* Duquesne Light Co., Phase V Energy Efficiency and Conservation Plan—Revised, at 152, Table 9, *Petition of Duquesne Light Company for Approval of its Phase V Energy Efficiency and Conservation Plan*, Docket No. M-2025-3057325 (May 22, 2026), <https://www.puc.pa.gov/pcdocs/1932064.pdf> (providing Duquesne Light projected battery capacity).

⁵⁸ Pa. P.U.C., Implementation Order, at 12, Table 1, *Energy Efficiency and Conservation Program*, Docket No. M-2025-3052826 (June 18, 2025), <https://www.puc.pa.gov/pcdocs/1883669.pdf>.

⁵⁹ 66 Pa. Cons. Stat. § 2806.1(g).

3. EVs

As of the end of 2025, the Pennsylvania Department of Transportation reported 110,721 EVs registered within the state.⁶⁰ Pennsylvania EV registrations have increased by 19,700–22,800 vehicles per year since 2021.⁶¹ The grid benefits of incorporating these EVs into DER aggregations that can be dispatched to meet PJM market needs could be substantial. As part of an aggregated DER, the EVs in Pennsylvania would offer more grid benefits than the 29,890 EVs projected to contribute to EV charging programs via Act 129 compliance plans. The untapped fleet of EVs exemplifies an existing resource on the ground in Pennsylvania that could be immediately incorporated into an aggregated DER and contribute to wholesale markets.

EVs can serve as DERs in at least two ways. First, the timing of EV charging demand can be managed to avoid times of peak system demand or preferentially charge when the grid has a surplus of variable, zero-marginal cost resources available that might otherwise be curtailed. This mode is often referred to as “V1G.” Second, some systems can discharge the vehicle’s battery and deliver it to the grid. These systems can both time-shift demand *and* act as dispatchable energy supply. This is known as “V2G.”⁶² Both modes are also capable of providing ancillary services, including frequency regulation and voltage support.⁶³ As bidirectional charging equipment becomes more common and vehicle manufacturers gain experience with its operation

⁶⁰ Commonwealth of Pa. Dep’t of Transp. Bureau of Motor Vehicles, *Report of Registrations for Calendar Year 2025*, at PDF p. 56, <https://www.pa.gov/content/dam/copapwp-pagov/en/penndot/documents/public/dvspubsforms/bmv/registration-reports/reportofregistration2025.pdf> (data reported Dec. 31, 2025).

⁶¹ U.S. Dep’t of Energy Office of Critical Minerals and Energy Innovation, *Vehicle Registration Counts by State, at Year 2021 – 2024*, <https://afdc.energy.gov/vehicle-registration> (last accessed July 8, 2026).

⁶² U.S. Dep’t of Energy, *Vehicles-to-Grid Integration Assessment Report*, at 52–53, 68 (Jan. 2025), https://www.energy.gov/sites/default/files/2025-01/Vehicle_Grid_Integration_Assessment_Report_01162025.pdf.

⁶³ Naga Nithin Manne and Jason Harper, *V1G Frequency Regulation: Algorithm Development, Validation & Analysis at Scale*, Argonne Nat’l Lab’y, at 10 (June 2026), <https://www.osti.gov/servlets/purl/3022899>; U.S. Dep’t of Energy, *Vehicles-to-Grid Integration Assessment Report*, at 51 (Jan. 2025), https://www.energy.gov/sites/default/files/2025-01/Vehicle_Grid_Integration_Assessment_Report_01162025.pdf.

and the implications for battery longevity, V2G will provide a large DER base. Typical vehicle battery capacities in the U.S. are between 60–100 kWh, and typical Level 2 chargers (those installed in most EV owners’ garages) operate at about 11 kW.⁶⁴ Thus, approximately 1.2 GW of capacity (11 kW x 110,721) is effectively already sitting in EV chargers throughout the Commonwealth that could be used with bidirectional charging equipment; that opportunity will only increase with time.

In the meantime, with effective Order No. 2222 implementation, DER aggregators could actively manage and dispatch EV charging load (for many more EVs than just those covered in retail programs) to minimize customer bills, minimize impacts on system reliability, or maximize other system benefits. DER aggregators can ensure managed EV charging loads are appropriately shaped to reduce peak capacity requirements, reduce curtailment of variable, zero-marginal cost generation, and improve frequency regulation; these improvements increase affordability for all customers.⁶⁵ There is substantial charging load flexibility that can be taken advantage of in an active charge management system; WeaveGrid studied EV charging behaviors in a sample of 880 Baltimore Gas & Electric customers and found that the median EV spent 15.5 hours at home, 12.8 hours plugged in, and only 2.3 hours charging.⁶⁶

⁶⁴ Dan Dadovic, *EV Charging Levels Explained*, ChargeCalcs (Apr. 18, 2026), <https://chargecalcs.com/blog/ev-charging-levels-explained>.

⁶⁵ See Akhilesh Ramakrishnan et al., *Demonstrating the Full Value of Managed Electric Vehicle Charging*, Brattle (Jan. 2026), <http://brattle.com/wp-content/uploads/2026/01/Demonstrating-the-Full-Value-of-Managed-Electric-Vehicle-Charging-1.pdf> (prepared by Brattle for EnergyHub); see also U.S. Dep’t of Energy, *Vehicles-to-Grid Integration Assessment Report*, (Jan. 2025), https://www.energy.gov/sites/default/files/2025-01/Vehicle_Grid_Integration_Assessment_Report_01162025.pdf; Naga Nithin Manne and Jason Harper, *VIG Frequency Regulation: Algorithm Development, Validation & Analysis at Scale*, Argonne Nat’l Lab’y, at 10 (June 2026), <https://www.osti.gov/servlets/purl/3022899>.

⁶⁶ WeaveGrid, *EV Managed Charging Utility Program Insights*, at slide 13–15 (May 6, 2025), <https://restservice.epri.com/publicattachment/93436> (prepared by WeaveGrid for EPRI IWC); see also Brad Harris, *The Value of Managed Charging: An Illustrative Example from PJM*, WeaveGrid (Mar. 5, 2026), <https://www.weavegrid.com/news/cost-effective-ev-managed-charging>.

Active EV managed charging offers a more rigorous and beneficial alternative to passively managed charging under a simple time-of-use (“TOU”) rate. Studies suggest that a naive TOU approach can lead to an undesirable spike in demand immediately following the transition to off-peak pricing.⁶⁷ Specifically, looking at just wholesale market cost of electricity savings, Brattle estimates managed charging programs can save \$30–40/EV/yr relative to unmanaged charging.⁶⁸ Smart charge management systems offering these benefits are already being deployed at scale. For example, in Texas, Octopus Energy offers up to a 30% discount on charging to EV owners who enroll their vehicle in the managed charging program.⁶⁹ Estimates vary on the physical system benefits (e.g., kW/EV) possible with actively managed EV charging, but it is clear that incorporating Pennsylvania’s 110,721 EVs into actively managed DER aggregations would offer capacity well beyond the 5.73 MW projected under Phase V Act 129 compliance.

4. Battery storage

Although it is difficult to quantify the number of batteries in Pennsylvania that may be currently eligible for DER aggregation, deploying batteries more broadly could significantly

⁶⁷ AES and Camus, *Getting Ahead of the EV Tipping Point: Proactive EV Management Strategies for an Efficient and Flexible Grid*, at 16 (Oct. 2024), <https://www.aes.com/sites/aes.com/files/2024-10/Electric-Vehicle-EV-Charging-FINAL.pdf>; see Smart Elec. Power All., *Demonstration of Utility Smart Charge Management for Multiple Benefit Streams* (July 2025), https://sepapower.org/wp-content/uploads/2025/12/SEPA_Managed-Smart-Charging-Report_web.pdf; see also Akhilesh Ramakrishnan et al., *Demonstrating the Full Value of Managed Electric Vehicle Charging*, Brattle (Jan. 2026), <http://brattle.com/wp-content/uploads/2026/01/Demonstrating-the-Full-Value-of-Managed-Electric-Vehicle-Charging-1.pdf> (prepared by Brattle for EnergyHub); U.S. Dep’t of Energy, *Vehicles-to-Grid Integration Assessment Report*, at 95 (Jan. 2025), https://www.energy.gov/sites/default/files/2025-01/Vehicle_Grid_Integration_Assessment_Report_01162025.pdf.

⁶⁸ Akhilesh Ramakrishnan et al., *Demonstrating the Full Value of Managed Electric Vehicle Charging*, Brattle, at 9 (Jan. 2026), <http://brattle.com/wp-content/uploads/2026/01/Demonstrating-the-Full-Value-of-Managed-Electric-Vehicle-Charging-1.pdf> (prepared by Brattle for EnergyHub).

⁶⁹ Octopus Energy, *Intelligent Octopus for Electric Vehicles*, <https://octopusenergy.com/intelligent-octopus-ev> (last accessed July 8, 2026).

expand Pennsylvania’s DER capacity, especially when paired with solar. According to EIA data, battery systems only accounted for about 0.1% of Pennsylvania’s total electricity generation capacity as of the end of 2024.⁷⁰ At the same time, existing retail programs for battery storage are modest; under Phase V of Act 129, batteries are projected to contribute about 16 MW of peak shaving capacity, representing less than 3% of Phase V peak demand reduction goals.⁷¹ This creates a significant opportunity for effective implementation of Order No. 2222 to encourage increased battery deployment.

Currently, battery storage is benefiting from a favorable combination of tax incentives and declining technology costs. Unlike wind and solar, batteries may qualify for production tax credits and Federal Investment Tax Credits (“ITCs”).⁷² Stackable incentives can further increase the value of these credits, raising the total ITC for a leased battery system to as much as 50% in some cases.⁷³ Battery costs have also fallen sharply over the past decade, declining from \$1,474/kWh in 2010 to \$108/kWh in 2025, as shown in Figure D below.⁷⁴

⁷⁰ Explanation of calculation: (Nameplate capacity of operating battery storage generators listed in EIA-860 + inverter capacity of net metered PV systems with battery storage)/nameplate capacity of all operating generators listed in EIA-860 (See Catalyst Coop., *Annual time series of net metering by customer and fuel class*, PUDL, https://data.catalyst.coop/preview/pudl/core_eia861_yearly_net_metering_customer_fuel_class (Most recent data of 2024) (Providing inverter capacity of net metered PV systems with battery storage); Catalyst Coop., *Annual time series of non-net metered generation by customer and fuel class*, PUDL, https://data.catalyst.coop/preview/pudl/core_eia861_yearly_non_net_metering_customer_fuel_class (Most recent data of 2024) (Providing nameplate capacity of operating battery storage generators); Catalyst Coop., *Annual time series of all generator attributes*, PUDL, https://data.catalyst.coop/preview/pudl/out_eia_yearly_generators (Most recent data of 2024) (Providing nameplate capacity of all operating generators in Pennsylvania)).

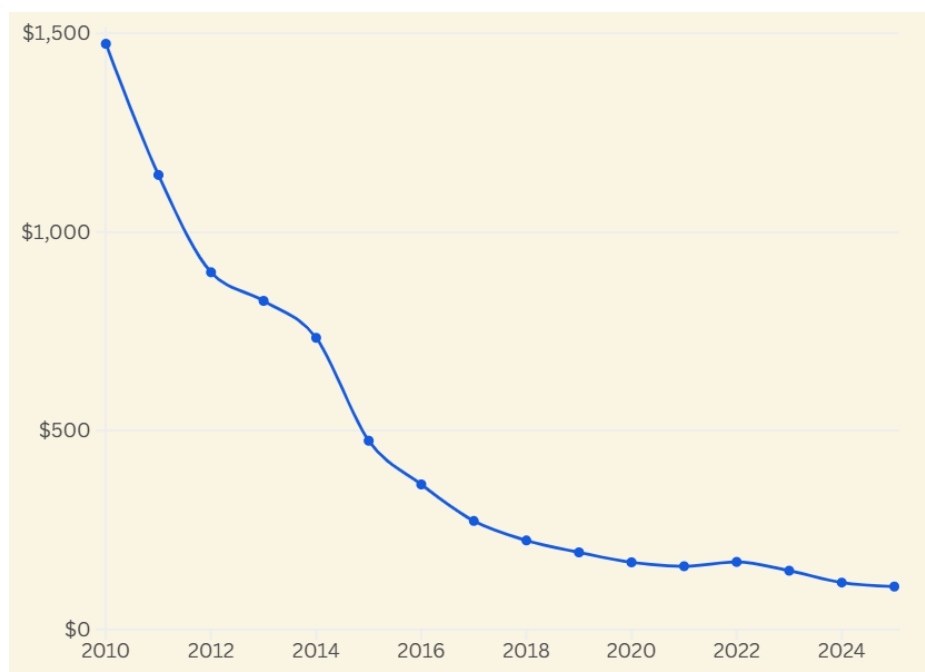
⁷¹ See calculations *supra* notes 56 and 57.

⁷² Phoebe Skok, *What the Budget Bill Means for Energy Storage Tax Credit Eligibility*, pv mag. (July 10, 2025), <https://pv-magazine-usa.com/2025/07/10/what-the-budget-bill-means-for-energy-storage-tax-credit-eligibility/>.

⁷³ Phoebe Skok, *What the Budget Bill Means for Energy Storage Tax Credit Eligibility*, pv mag. (July 10, 2025), <https://pv-magazine-usa.com/2025/07/10/what-the-budget-bill-means-for-energy-storage-tax-credit-eligibility/>.

⁷⁴ Dan McCarthy, *Chart: Surprise — Batteries Got Cheaper Again Last Year*, Canary Media (Feb. 6, 2026), <https://www.canarymedia.com/articles/batteries/chart-surprise-batteries-got-cheaper-again>.

Figure D. Average Lithium-ion Battery Pack Price⁷⁵



This favorable market environment is already translating into growth. Ohm Analytics’ 2025 VPP market report highlighted a 153% increase in U.S. residential battery deployments compared to 2024, while also noting that only about 45% of all residential battery storage systems were enrolled in any kind of VPP program.⁷⁶ This suggests there is significant potential to both aggregate existing battery resources, and to encourage the deployment of new resources. California’s Demand Side Grid Support program offers one example of this potential. The program helped triple enrolled battery capacity from 369 MW in 2024, to 1.1 GW in 2025.⁷⁷

⁷⁵ Dan McCarthy, *Chart: Surprise — Batteries Got Cheaper Again Last Year*, Canary Media (Feb. 6, 2026), <https://www.canarymedia.com/articles/batteries/chart-surprise-batteries-got-cheaper-again>.

⁷⁶ Edward Storrs et al., *2025 VPP Market Report Executive Summary*, Ohm Analytics, at 5, 6 (Jan. 26, 2026), <https://21752392.fs1.hubspotusercontent-na1.net/hubfs/21752392/Ohm%20Analytics%202025%20VPP%20Market%20Report%20Executive%20Summary.pdf>.

⁷⁷ Kathleen Van Gorden, *What the 2025 Virtual Power Plant (VPP) Market Report Tells Us About the Storage-Led Shift — A Conversation with Ohm Analytics*, Virtual Peaker (May 27, 2026), <https://virtual-peaker.com/blog/what-the-2025-virtual-power-plant-vpp-market-report-tells-us-about-the-storage-led-shift-a-conversation-with-ohm-analytics/>.

Batteries are especially valuable when paired with distributed solar because they can convert otherwise intermittent solar generation into a more flexible resource. Currently, very little of Pennsylvania's net metered solar capacity has battery storage, as is shown in Figure A. Adding batteries to existing solar generation would allow customers to shift solar-generated power to periods of peak demand, creating both peak shaving benefits for the grid and economic benefits for customers, who can rely on stored energy and avoid purchasing expensive electricity during periods of peak demand.

These grid services can be further amplified by Virtual Power Plant (“VPP”) operators, which can aggregate many distributed systems into a larger resource that can participate in energy, capacity, and ancillary service markets to maximize economic and reliability benefits. SunRun, the U.S.’ largest VPP operator, revealed in its Q3 2025 financial results press release that more than 70% of new customers opted for installing batteries alongside solar.⁷⁸ If sufficient batteries were deployed alongside Pennsylvania’s existing net metered solar systems, the state’s 1 GW of net metered solar capacity⁷⁹ could become a more flexible grid resource, providing grid services during the highest peak hours, resilience benefits, and transmission benefits.⁸⁰ It is well documented that when comparing a solar-only system to a solar plus storage system that

⁷⁸ Sunrun Inc. Press Release, *Sunrun Reports Third Quarter 2025 Financial Results* (Nov. 6, 2025), <https://investors.sunrun.com/news-events/press-releases/detail/355/sunrun-reports-third-quarter-2025-financial-results>.

⁷⁹ Catalyst Coop., *Annual time series of net metering by customer and fuel class*, PUDL, https://data.catalyst.coop/preview/pudl/core_eia861_yearly_net_metering_customer_fuel_class (Most recent data of 2024) (Where the dataset is filtered to state = “PA” and combined by tech_class across all utilities in the state for each year with data available.)

⁸⁰ Indu Manogaran et al., *Savings in Action: Lessons Learned from a Vermont Community with Solar Plus Storage*, Nat’l Renewable Energy Lab’y, at vi (Jan. 2024), <https://docs.nrel.gov/docs/fy24osti/84660.pdf>.

provides an equal amount of kWh to the grid, the solar plus storage system will have substantially increased peak shaving potential.⁸¹

There are several business models for integrating batteries into VPPs that could be relevant in Pennsylvania. Octopus Energy, which has been growing steadily in the U.K. and Texas, represents one such promising model. Octopus Energy acts as an intermediary between retail customers and wholesale power markets by aggregating customer-side resources including batteries, heat pumps, smart meters, and EV chargers. In exchange for a customer's enrollment for a defined participation period, Octopus Energy offers an attractive rate structure and will subsidize up-front hardware costs. In Texas, for example, customers can receive Octopus Energy's Lunar Battery for \$45 per month, with no upfront or installation costs.⁸² Over the last 10 years, Octopus Energy has aggregated 1.7 GW of distributed capacity in the U.K. as a retail service provider, and is rapidly expanding in the U.S.⁸³ Recently, Octopus Energy signed an agreement with National Grid to provide flexible services to 6.5 million New York and Massachusetts customers through their software subsidiary, Kraken.⁸⁴

Another VPP aggregator that operates a similar model is the Texas-based company Base Power. Base Power exclusively aggregates home battery systems, which can be solar-integrated

⁸¹ Emma Elgqvist, *Energy Storage Economics*, Nat'l Renewable Energy Lab'y, at 13–15 (Aug. 17, 2017), <https://docs.nrel.gov/docs/fy17osti/70035.pdf>.

⁸² Octopus Energy, *Octopus PowerStore: Smarter, Fairer Home Battery Power*, <https://octopusenergy.com/lunar-x-octopus-energy> (last accessed July 8, 2026).

⁸³ Octopus Energy Grp. Ltd., *Annual Report and Financial Statements 2025*, at 6 (2025), https://octopusenergy.group/static/documents/OEGL_Financial_statements_Annual_Report_FY25.pdf.

⁸⁴ Lisa Martine Jenkins, *Inside Octopus Energy's Expansion Plans for the US Market*, Latitude Media (June 6, 2025), <https://www.latitudemedia.com/news/inside-octopus-energys-expansion-plans-for-the-us-market/>.

or standalone.⁸⁵ In March 2026, Base Power announced a partnership with Denton County Electric Cooperative (“CoServ”) to deploy 100 MW of residential batteries to better manage peak demand and strengthen reliability.⁸⁶ If implemented well, Order No. 2222 could enable DER aggregators like Octopus and Base Power to unlock significantly more battery capacity in Pennsylvania than is currently tapped by retail programs, providing broader grid and customer benefits.

⁸⁵ Derek Markham, *Powering Texas: How Base Power’s No-Cost Home Batteries Are Revolutionizing Energy Resilience*, CleanTechnica (Feb. 28, 2025), <https://cleantechnica.com/2025/02/28/powering-texas-how-base-powers-no-cost-home-batteries-are-revolutionizing-energy-resilience/>.

⁸⁶ CoServ Press Release, *CoServ and Base Power Launch 100 MW Residential Storage Program to Bring North Texas Homeowners Affordable Battery Backup Power*, (Mar. 6, 2026), <https://www.coserv.com/coserv-base-power-press-release/>.

III. Conclusion

In light of the foregoing, the Energy Justice Advocates respectfully request that the PA PUC consider their Comments and Reply Comments as it prepares its Final Regulation regarding DER aggregations.

Signatures

Dated: July 10, 2026

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