COMMONWEALTH OF PENNSYLVANIA

PATRICK M. CICERO
Consumer Advocate

OFFICE OF CONSUMER ADVOCATE
555 Walnut Street, 5th Floor, Forum Place
Harrisburg, Pennsylvania 17101-1923
(717) 783-5048
(800) 684-6560

@pa_oca
/pennoca
FAX (717) 783-7152
consumer@paoca.org
www.oca.pa.gov

May 24, 2024

Via Electronic Mail Only
Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street
Harrisburg, PA 17120

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

Dear Secretary Chiavetta:

Attached for electronic filing please find the Office of Consumer Advocate's Comments in the above-referenced proceeding.

Respectfully submitted,

/s/ Darryl A. Lawrence
Darryl A. Lawrence
Senior Assistant Consumer Advocate
PA Attorney I.D. # 93682
DLawrence@paoca.org

Enclosures:
cc: Christopher F. Van de Verg, Assistant Counsel (**email only**: cvandeverg@pa.gov)
Tiffany L. Tran, Assistant Counsel (**email only**: tiftran@pa.gov)
Joseph P. Cardinale, Assistant Counsel (**email only**: jcardinale@pa.gov)
Karen Thorne, Regulatory Review Assistant (**email only**: kathorne@pa.gov)
Certificate of Service

CERTIFICATE OF SERVICE

Distributed Energy Resources Participation in Wholesale Markets	: :	Docket No. L-2023-3044115

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 Comments, 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 24th day of May 2024.

***Served Word®-Compatible Copies via Electronic Mail**

SERVICE BY E-MAIL ONLY

NazAarah Sabree, Small Business Advocate
Office of Small Business Advocate
555 Walnut Street
1st Floor, Forum Place
Harrisburg, PA 17101
ra-sba@pa.gov

Allison Kaster, Esquire
Pennsylvania Public Utility Commission
Bureau of Investigation & Enforcement
400 North Street, 2nd Floor West
Harrisburg, PA 17120
akaster@pa.gov

Christopher F. Van de Verg*
Assistant Counsel
Pennsylvania Public Utilities Commission
cvandeverg@pa.gov

Karen Thorne*
Regulatory Review Assistant
Pennsylvania Public Utilities Commission
kathorne@pa.gov

Tiffany L. Tran*
Assistant Counsel
Pennsylvania Public Utilities Commission
tiftran@pa.gov

Joseph P. Cardinale*
Assistant Counsel
Pennsylvania Public Utilities Commission
jcardinale@pa.gov

SERVICE BY E-MAIL ONLY(Continued)

Matthew Finnegan
Regulatory Affairs Analyst
ProtoGen, Inc.
m.finnegan@protogenenergy.com

Corey Cochran
Keyes & Fox LLP
1012 Jenifer Street
Madison, WI 53703
ccochran@keyesfox.com

/s/Darryl A. Lawrence
Darryl A. Lawrence
Senior Assistant Consumer Advocate
PA Attorney I.D.# 93682
DLawrence@paoca.org

David T. Evrard
Assistant Consumer Advocate
DEvrard@paoca.org

Counsel for:
Office of Consumer Advocate
555 Walnut Street
5th Floor, Forum Place
Harrisburg, PA 17101-1923
717-783-5048

Dated: May 24, 2024

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Distributed Energy Resources Participation in Wholesale Markets	:	Docket No.: L-2023-3044115

Comments of the Office of Consumer Advocate

I. INTRODUCTION

On February 22, 2024, the Pennsylvania Public Utility Commission (Commission) initiated an Advance Notice of Proposed Rulemaking (ANOPR), Docket No. L-2023-3044115 [1] to consider any changes or additions to the Commission's regulations or policies to align with Federal Energy Regulatory Commission (FERC) Order 2222, *Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators*.[2] The Commission seeks comments from interested stakeholders, including members of the regulated industry, statutory advocates, the public, and any other interested parties regarding the topics set forth in the ANOPR. The Commission notes that some of these topics may be appropriately resolved in regulations while others might be more appropriate for policy statements, contained in electric distribution company (EDC) tariffs, or adjudicated on a case-by-case basis, and the Commission specifically seeks comments on how to best administer each topic.[3]

---

[1] *Distributed Energy Resources Participation in Wholesale Markets*, Dock. No. L-2023-3044115, (Order entered Feb. 22, 2024) (ANOPR), available at: https://www.puc.pa.gov/pcdocs/1817408.pdf
[2] Order No. 2222, 172 FERC ¶ 61,247 (2020), *order on reh'g*, Order No. 2222-A, 174 FERC ¶ 61,197, *order on reh'g*, Order No. 2222-B, 175 FERC ¶ 61,227 (2021).
[3] ANOPR at 1 - 2.

FERC Order 2222 requires regional transmission organizations (RTOs), including PJM Interconnection, L.L.C. (PJM), to allow aggregations of distributed energy resources (DERs) to participate in PJM wholesale markets. This enables DERs to offer all the services they are technically capable of providing. "A Distributed Energy Resource (DER) is any resource located on the electric distribution system, any subsystem thereof or behind a customer meter…"[4] Order 2222 enables DER participation in PJM markets in the form of DER aggregations. A DER aggregator (DERA) is an entity that registers one or more DER aggregations (DER Aggregation[s]) to participate in the PJM capacity, energy and/or ancillary service markets.

The Pennsylvania Office of Consumer Advocate (OCA) appreciates this opportunity to provide these Comments on the ANOPR. The OCA recognizes that the Commonwealth has existing regulations and statutes in place through the Public Utility Commission and the Pennsylvania Office of Attorney General (OAG) that will provide guidance on how to contend with the multitude of issues presented by the ANOPR. Attached to these Comments as Appendix A is a whitepaper authored by Frank A. Felder, Ph.D.[5] at the request of the OCA, which addresses most of the questions posed in the ANOPR (Felder Whitepaper). The OCA's Comments here will seek to address only those areas of the ANOPR not covered by the Felder Whitepaper, or that may need further clarity.[6]

[4] ANOPR, p. 2, citing FERC Order No. 2222 ¶ 114.

[5] Frank A. Felder, Ph.D. is Principal, Independent Electricity Consultants, LLC, located in Reston, Va. He is the former Director of the Rutgers Energy Institute and Research Professor at the Bloustein School of Planning and Public Policy, Rutgers University. Frank's consulting, research, and teaching has spanned over a dozen countries in Africa, Europe, the Middle East, and North America. He holds a Ph.D. from M.I.T. and is a former nuclear engineer and submarine officer for the U.S. Navy.

[6] For a complete discussion of the issues presented in the ANOPR, see the Felder Whitepaper attached hereto as Appendix A.

The OCA specifically reserves the right to provide reply comments as to issues raised by the other commentors, if an opportunity for reply comments is provided. The OCA looks forward to continuing to work with the Commission and other stakeholders on this important matter.

II. COMMENTS

In the following sections the OCA will address those areas not covered by the Felder Whitepaper. The OCA notes that its Comments at this point in the proceeding are preliminary and expects that many of the issues in this matter will likely require additional stakeholder inputs before the Commission can reach a final determination.

V. D. Adjudication of Disputes Regarding the Registration of DERs (ANOPR, p. 27-29)

The PUC seeks comment on whether its existing application process for net metering customer-generators, 52 Pa. Code § 75.17, or its existing dispute resolution regulations, 52 Pa. Code Chapters 1 (relating to rules of administrative practice and procedure), 3 (relating to special provisions) and 5 (relating to formal proceedings), or both, can or should be adapted to facilitate adjudication of disputes about DERA registration of its Component DERs with PJM, consistent with Order 2222 and PJM's DAPM, and if so, the specific changes to the PUC's regulations that would facilitate this adaption.

The OCA submits that the existing application process for net metering customer-generators under 52 Pa. Code Section 75.17, and the existing dispute resolution regulations, 52 Pa. Code Chapters 1, 3 and 5 should be adapted to adjudicate the disputes about DERA registration of its Component DER's with PJM, consistent with Order 2222 and PJM's DAPM.

The text of Section 75.17 appears to be well suited for the registration of DERs, with only minimal changes necessary to remove "net metering customer-generators". The OCA submits that after all comments are received, the Commission should provide a draft regulation for further comment.

V. F. Protection of DER Owners from Unfair Trade Practices or Excessive Risk in the Wholesale Markets (ANOPR, p. 31-35)

The PUC seeks comment on whether the **UTPCPL [Pennsylvania Unfair Trade Practices and Consumer Protection Law]** applies to the DERA-Component DER relationship and whether and how the PUC's EGS regulations can or should be adapted to address consumer protection in the DERA-Component DER relationship, consistent with Order 2222 and PJM's DAPM, and if so, what specific changes to the PUC's regulations would address these matters.

The OCA submits that the Pennsylvania Unfair Trade Practices and Consumer Protection Law (UTPCPL) should apply to any and all DERA-Component DER relationships and that the PUC's EGS Regulations should be adapted to address consumer protection in the DERA-Component DER relationship consistent with Order 2222 and PJM's DAPM.

In the ANOPR the Commission provides that it is unclear whether a DERA would be subject to the UTCPL's prohibition or enforcement provisions.[7] The Commission provides that it is unsure that the UTCPL's definitions of "trade" and "Commerce"[8] cover a DERA aggregating a Consumer DER's available energy for sale in PJM's wholesale market, but does provide that a DERA that sells equipment or services to a customer to operate a Component DER, would more likely to be covered by the UTPCL.[9]

As provided in the ANOPR:

> The Pennsylvania Unfair Trade Practices and Consumer Protection Law (UTPCPL), "[u]nfair methods of competition and unfair or deceptive acts or practices in the conduct of any trade or commerce… are hereby declared unlawful." The key UTPCPL terms "trade" and "commerce" are limited to "the advertising, offering for sale, sale or distribution of any services and any property, tangible or intangible, real, personal or mixed, and any other article, commodity, or thing of value wherever situate, and includes any trade or commerce directly or indirectly affecting the people of this Commonwealth." The Pennsylvania Attorney General may promulgate regulations to implement the UTPCPL and is authorized to bring an action against any person that uses any unlawful trade practice.[10]

[7] ANOPR pg. 33.
[8] 73 P.S. §§ 201-1—201-7.
[9] ANOPR pg. 33
[10] *Id*. (internal citations omitted).

The OCA recommends that the Commission seek guidance from the Pennsylvania Office of Attorney General for recommendations, questions, and concerns as to how the UTPCPL will apply to any and all DERA – DER interactions as the Office of Attorney General is responsible for UTPCPL enforcement.

V. G. Prevention of Double Compensation or Double Counting Between Retail and Wholesale Market Participation, Including Rules Governing DER Owners' Ability to Switch Between Retail and Wholesale Market Participation (ANOPR, p. 35-39)

> 20. Does the PUC have authority to decide whether to permit net metering customers to participate in DERAs, noting FERC's statement that "under a [RERRA]'s jurisdiction over its retail programs, such a [RERRA] is able to condition a distributed energy resource's participation in a retail distributed energy resource program on that resource not also participating in the RTO/ISO markets"?

Yes, under the authority granted to the Commission by the Alternative Energy Portfolio Standards Act, it has the ability to condition a net metering customer's participation in a retail DER program upon that resource's not participating in the wholesale markets for energy and capacity.[11] That said, however, it may not be appropriate to limit a net metering customer's participation in the wholesale ancillary services markets. As PJM observed in its initial Order 2222 compliance filing:

> Ancillary services would not be restricted for net energy metering sites, and participation would be allowed, assuming all operational requirements can be met. Ancillary services, specifically regulation and reserves, are services that are being provided above and beyond retail compensation, and would otherwise not be provided absent wholesale market participation.[12]

As noted above, the OCA offers these responses to several Commission questions raised in the ANOPR that are not addressed in the much more extensive discussion provided in the Whitepaper of Frank A. Felder.

---

[11] 73 P.S. §§ 1648.2, 1648.5

[12] Order No. 2222 Compliance Filing of PJM Interconnection, L.L.C., FERC Docket No. ER22-962 (February 1, 2022)

III. CONCLUSION

The OCA submits these Comments and the attached Felder Whitepaper for the Commission's consideration. The OCA appreciates the opportunity to provide comments and looks forward to continuing to work with the Commission and other stakeholders on this important matter.

Respectfully Submitted,

/s/ Darryl A. Lawrence

Darryl A. Lawrence
Senior Assistant Consumer Advocate
PA Attorney I.D. # 93682
E-Mail: DLawrence@paoca.org

David T. Evrard
Assistant Consumer Advocate
PA Attorney I.D. # 33870
E-Mail: DEvrard@paoca.org

Counsel for:
Patrick M. Cicero
Consumer Advocate

Office of Consumer Advocate
555 Walnut Street 5th Floor, Forum Place
Harrisburg, PA 17101-1923
Phone: (717) 783-5048
Fax: (717) 783-7152

DATE: May 24, 2024

Appendix A

Pennsylvania Office of Consumer Advocate

Whitepaper

Distributed Energy Resources Participation in Wholesale Markets, Docket No. L-2023-3044115

Frank A. Felder, Ph.D.[1]

I. Introduction

On February 22, 2024, the Pennsylvania Public Utility Commission (PUC) initiated an Advance Notice of Proposed Rulemaking (ANOPR), Docket No. L-2023-3044115, to consider any changes or additions to the PUC's regulations or policies to align with Federal Energy Regulatory Commission (FERC) Order 2222, Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators.[2]

FERC Order 2222 requires regional transmission organizations (RTOs), including PJM Interconnection, L.L.C. (PJM), to allow aggregations of distributed energy resources to participate in PJM wholesale markets. This enables distributed energy resources (DERs) to offer all services they are technically capable of providing. "A Distributed Energy Resource (DER) is any resource located on the electric distribution system, any subsystem thereof or behind a customer meter. These resources may include, but are not limited to, electric storage resources, intermittent generation, distributed generation, demand response, energy efficiency, thermal storage, and electric vehicles, and their supply equipment."[3]

Prior to Order 2222, DERs were restricted from participation in PJM markets by minimum size requirements and certain qualification and performance requirements. DERs also faced commercial and transactional barriers, such as the costs associated with metering, telemetry, and communications equipment. FERC found that DER participation in PJM markets will provide a variety of benefits in energy, capacity, and ancillary services markets. The objective of Order 2222 is to remove barriers to DER participation in these markets, enhance competition and, in turn, help to ensure that PJM markets produce just and reasonable rates.[4]

Order 2222 enables DER participation in PJM markets in the form of DER aggregations. A DER aggregator (DERA) is an entity that registers one or more DER aggregations (DER Aggregation[s]) to participate in the PJM capacity, energy and/or ancillary service markets. DERAs help DERs collectively meet the minimum size and operational requirements required by PJM. DERAs also help DERs to share commercial and transactional costs, which DERs could otherwise not afford individually. In response to Order 2222, PJM revised its tariff to establish DERAs as a type of market participant that can register DER Aggregations under one or more participation models in the PJM tariff designed to accommodate the physical and operational characteristics of each DER Aggregation.[5] PJM refers to its rules for the DERA participation in its wholesale markets as the DERA Participation Model (DAPM).[6]

---

[1] Independent Electricity Consultants, LLC

[2] Order No. 2222, 172 FERC ¶ 61,247 (2020), *order on reh'g*, Order No. 2222-A, 174 FERC ¶ 61,197, *order on reh'g*, Order No. 2222-B, 175 FERC ¶ 61,227 (2021).

[3] ANOPR, p. 2, citing FERC Order No. 2222 ¶ 114.

[4] ANOPR, pp. 2-3, citing FERC Order No. 2222 ¶ 3, ¶ 4, and ¶ 5.

[5] ANOPR, pp. 2-3, citing FERC Order No. 2222 ¶ 5, ¶ 6, and ¶ 118.

[6] ANOPR, p. 9.

This paper discusses DER- and DERA-related consumer issues and identifies specific actions that the PUC can take to protect consumers. Although the context of this whitepaper is FERC Order No. 2222 and wholesale electricity markets, the ratepayer issues and recommended PUC responses generally apply to all DERs, whether compensated through retail rates or wholesale electricity markets. The major finding of this paper is the following:

> **Major finding:** There are multiple and credible consumer protection issues associated with DERs and DERAs. However, with appropriate regulation and consumer safeguards implemented by the PUC, DERs and DERAs have the potential to improve the reliability, resiliency, and efficiency of the electric power sector and benefit consumers by providing them with more cost-effective options to meet their electricity demand.

After briefly summarizing the DERA policy context presented in FERC Order 2222 and PJM's subsequent compliance filings, this whitepaper identifies and discusses the important consumer protection issues, many of them based upon applicable lessons learned from existing wholesale and retail electricity markets. Next it presents longer-term and emerging consumer-related DER and DERA issues for the PUC to consider. It then responds to the PUC's informational requests.

II. The Policy Context of Distributed Energy Resources and Their Aggregation

DER costs are decreasing, their capabilities are improving, and their deployment is accelerating.[7] For instance, the cost of distributed solar photovoltaics (PV) has fallen 40%-70% since 2010, and worldwide PV, electric vehicle (EV), and heat pump additions are expected to continue.[8] U.S. homes with smart thermostats are expected to increase from 10% to 34% by 2030 and behind-the-meter batteries are expected to increase form 2 GW to 27 GW by 2030.[9] Within PJM, there are approximately 7,000 megawatts (MW) of non-wholesale DERs.[10]

In many states, including Pennsylvania, qualifying DERs located behind the meter may sell their electricity at the retail rate via net metering programs.[11] Net metering is attractive for DERs because the retail rate is higher than PJM market payments. DERs that are not behind the meter cannot sell at retail rates or participate in the net metering program but may participate in PJM's wholesale markets. FERC

---

[7] Ben Hertz-Shargel, Transformation in the U.S. distributed energy resource market, Wood Mackenzie, June 30, 2023, (available at: https://www.woodmac.com/news/opinion/transformation-distributed-energy-resource-market/) finds that the U.S. DER market will almost double between 2022 and 2027, with 262 gigawatts (GW) of new DER and demand flexibility to be installed between 2023 and 2027. See also PAPUC, Electric Power Outlook for Pennsylvania 2022-2027, August 2023, pp. 9-10 citing the North American Electric Reliability Corporation (NERC) Long-Term Reliability Assessment, December 2022, p. 10, available at: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf.

[8] International Energy Agency, Unlocking the Potential of Distributed Energy Resources: Power system opportunities and best practices, May 2022, https://iea.blob.core.windows.net/assets/3520710c-c828-4001-911c-ae78b645ce67/UnlockingthePotentialofDERs_Powersystemopportunitiesandbestpractices.pdf.

[9] Ryan Hledik and Kate Peters, Real Reliability: The Value of Virtual Power, Volume I: Summary Report, The Brattle Group, May 2023, available at https://www.brattle.com/wp-content/uploads/2023/04/Real-Reliability-The-Value-of-Virtual-Power-Full-Report.pdf.

[10] PJM, Distributed Energy Resources, 2024, https://www.pjm.com/-/media/about-pjm/newsroom/fact-sheets/distributed-energy-resources.ashx.

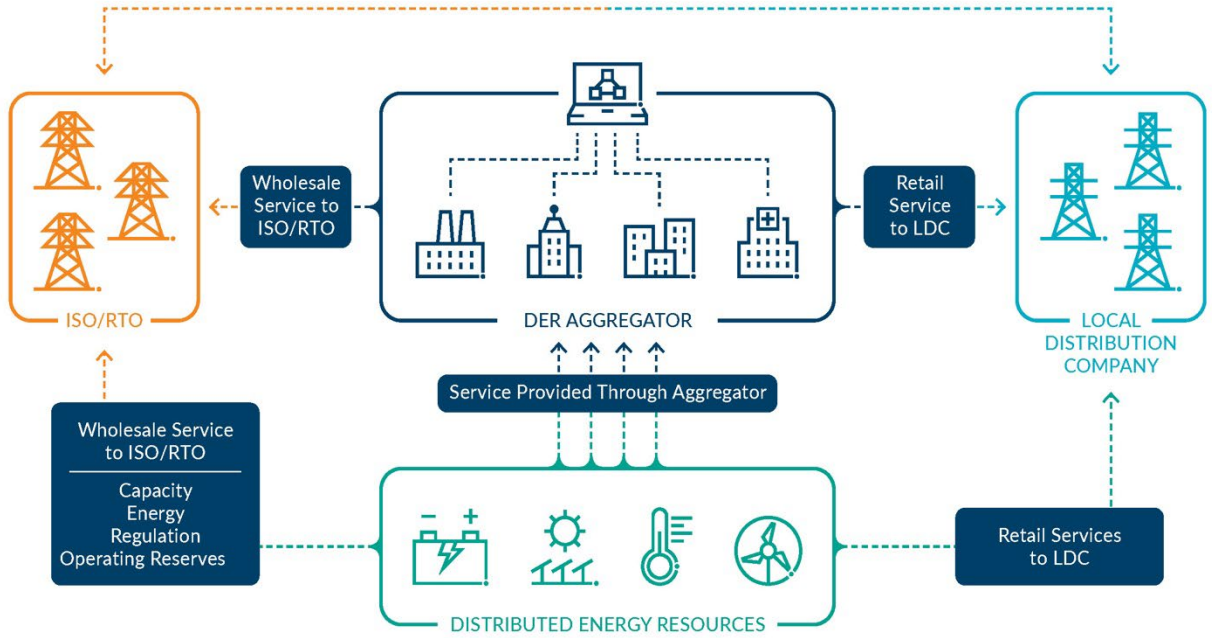
[11] PUC, Net Metering – Use of Third Party Operators, Docket No. M-2011-2249441, https://www.puc.pa.gov/filing-resources/issues-laws-regulations/aeps-act/. See also PA Department of Environmental Protection, https://www.dep.pa.gov/Citizens/solar/Pages/Residents.aspx.

Order 2222 should enable behind-the-meter DERs to participate in PJM's wholesale markets more easily, but they are unlikely to do so if their net metering compensation is greater than PJM market payments.

Figure 1 illustrates how DERs can provide either retail or wholesale services directly or via DERAs. The term *virtual power plant* (VPP) is commonly used to refer to a portfolio of DERs that are actively controlled. Physically, many types of DERs (e.g., solar panels and battery storage) inject electricity into the distribution system either from behind the customer's meter or upstream of electrical loads. Since DERs and DERAs can inject electricity into the distribution system, the flow of electricity is bidirectional on the distribution system. This bidirectional flow of electricity raises both safety and reliability issues. Without proper safety standards, interconnection studies, and maintenance and operational practices, the safety of utility workers, DER operators, and the public may be at risk.[12] Moreover, there are also important and credible reliability concerns, such as the operation of inverter-based solar resources.[13]

> **Finding 1:** DERs require appropriate safety and equipment interconnection policies, standards, and technical requirements to provide safe and reliable electricity to consumers.

Figure 1: Schematic of DERs, DERAs, and Retail and Wholesale Services[14]



DERAs aggregate one or more DERs and sell to the wholesale market, PJM, the combined set of market products such as energy, capacity, and ancillary services. Since DERs are connected to the distribution system, they are regulated by the PUC. If they provide retail services, those services are regulated by the

[12] SDGE, Risk Assessment Mitigation Phase Risk Mitigation Plan, Distributed Energy Resources – Safety and Operational Concerns, Nov. 30, 2016, https://www.sdge.com/sites/default/files/SDGE-4_RAMP_Distributed_Energy_Resources_FINAL.pdf.

[13] PAPUC, Electric Power Outlook for Pennsylvania 2022-2027, August 2023, pp. 9-10 citing the North American Electric Reliability Corporation (NERC) Long-Term Reliability Assessment, December 2022, available at: https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_LTRA_2022.pdf.

[14] Claire Gotham, FERC Order 2222 Levels the Playing Field for Distributed Energy Resources, February 18, 2021, https://blog.protiviti.com/2021/02/18/ferc-order-2222-levels-the-playing-field-for-distributed-energy-resources/.

PUC. If they participate in the PJM wholesale market, they are also regulated by the FERC via PJM's tariff. Not only is the flow of electricity bidirectional, so is the flow of information. To perform their functions, DERAs communicate information in both directions with the electric distribution company (EDC), the local utility company that their aggregated DERs are connected to. They also communicate information to PJM if they are selling to them. DERs must also communicate information in both directions with their DERA.

In response to FERC Order No. 2222, PJM modified its tariff, operating agreement, and reliability assurance agreement. "Component DERs" are resources within the PJM region located on a distribution system or behind a customer meter; a "DER Aggregation Resource" is used by a DERA to participate in the PJM markets via the "DER Aggregator Participation Model" (DAPM). A "DER Aggregator" is a PJM market participant and has executed a "DER Aggregator Participation Service Agreement."[15] PJM, EDCs, DERAs, and the PUC each have distinct roles and responsibilities. EDCs verify that each Component DER complies with PUC regulations, whether it is participating in an EDC retail program, and whether the DER Aggregation Resource's participation in PJM markets poses a threat to the reliable and safe operation of the distribution system.[16] If disputes arise, either PJM or the PUC will resolve it depending on the dispute's jurisdictional nature.[17] PJM dispatches the DER Aggregation Resource or Component DERs, but EDCs may override PJM's operational decisions in accordance with the EDC's tariffs and PUC regulations.[18] This intricate and interwoven set of roles and responsibilities affects the investment in and operation of DERs and, therefore, the interests of consumers in having a safe, reliable, and efficient electricity system.

> **Finding 2:** The PUC, FERC, EDCs, PJM, the PJM Independent Market Monitor, and the public need varying types and amounts of information, with appropriate protections for confidentiality, to plan, operate, and evaluate DER and DERA policies.

Although it is common to refer to the *bulk power system* (that is, generation and transmission) and the *distribution system* as two systems, they are in fact part of the same system. This is because electricity flows are seamlessly based upon the laws of physics across transmission and distribution facilities. In contrast, the jurisdictional boundaries, and therefore policies and regulations, are separate, resulting in potential gaps or contradictory overlaps between jurisdictions.[19]

> **Finding 3:** In the context of emerging technologies and policies and a physically interconnected system, but with dual jurisdictions, it is vital that the PUC and the FERC share information, coordinate policies and regulations, and reassess the deployment and operation of DERs and DERAs over time.

These three findings regarding public and worker safety and reliability, the communication of information across jurisdictional boundaries, and the reassessment of DER-related policies over time form the foundation of consumer-related DER and DERA issues, as discussed in the next section.

III. Consumer Issues Related to Distributed Energy Resources and Their Aggregation

[15] ANOPR, pp. 6-7.
[16] ANOPR, pp. 9-10.
[17] ANOPR, p. 10.
[18] ANOPR, p. 10.
[19] PUC ANOPR, pp. 3-4 citing FERC Order No. 2222, ¶ 33, ¶ 44, ¶ 61, and ¶ 64.

With appropriate consumer protections and regulation, increasing numbers of DERs, whether participating with or without DERAs, have the potential to benefit consumers. DERs provide consumers with additional options to meet their electricity needs. They may also enhance competition and reduce distribution costs while maintaining or improving reliability and resiliency, so long as the appropriate federal and state policies are in place and updated over time.

The emergence of DERs and DERAs, and their potential impact on Pennsylvania ratepayers, is not occurring in a policy vacuum. U.S. consumers have 30 years of experience with electricity industry restructuring and wholesale and retail electricity markets.[20] Although the electricity restructuring lessons-learned literature is lengthy and differing, a reasonable assessment is that, 30 years ago, assessments for consumer protections were underestimated, additional protections were deployed after the fact, and now, continued vigilance is still needed.[21] The PUC can apply these lessons to its DER and DERA policies to anticipate, avoid, and mitigate adverse consequences for consumers.

This section identifies and describes consumer issues with DERs in general, and in the context of FERC Order No. 2222 and PJM's Compliance Filings. First, issues related to DERAs are discussed, followed by those related to EDCs.

III. A. Distributed Energy Resource Aggregators

III. A. 1. Market Power and Market Manipulation

DERAs provide products and services to the electric grid and are compensated either via retail policies or wholesale electricity markets, such as PJM. As profit maximizing entities, DERAs individually or in conjunction with their affiliates may behave in ways that are anticompetitive, inefficient, or harmful to electricity consumers. DERAs' affiliates may include EDCs, generation owners, traders and marketers, and electric generation suppliers (EGSs). Depending on the affiliate, they may be subject to federal or state jurisdiction. For example, EGSs and EDCs are regulated by states. DERAs are regulated by both the FERC and state PUCs.

DERAs may exercise market power individually or in coordination with their affiliates. This is the intentional withholding of supply or demand to profitably increase or decrease market electricity prices in electricity, capacity, and ancillary services at the expense of market efficiency. Consumers are harmed by the inefficiencies created by the exercise of market power. Although DERAs are relatively small, slight changes in supply or demand in wholesale electricity markets can lead to substantial price changes due to price-inelastic demand and the potential for DERAs to coordinate their anticompetitive actions with their affiliates.[22]

---

[20] CA PUC, Order Instituting Rulemaking on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation, and Order Instituting Investigation on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation,R.94-04-031 and I.94-04-032, April 20, 1994, aka the "Blue Book", https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/community-choice-aggregation-and-direct-access/blue-book.pdf.

[21] For a review of the electricity restructuring literature, see James Bushnell, Erin T. Mansur, and Kevin Novan, Review of the Economics Literature on U.S. Electricity Restructuring, February 23, 2017, https://arefiles.ucdavis.edu/uploads/filer_public/e0/ee/e0eefda6-9fe2-4f88-8ca6-a00f25379754/restructuring_review.pdf.

[22] Gary Taylor, Shaun Ledgerwood, Romkaew Broehm, and Peter Fox-Penner, Market Power and Market Manipulation in Energy Markets: From the California Crisis to the Present, Public Utilities Reports, 2015, pp. 27-31.

DERAs may also manipulate electricity markets individually or in coordination with their affiliates. Market manipulation is a serious and ongoing problem that harms consumers.[23] According to the FERC, it is unlawful for electricity market entities to defraud or make untrue or misleading statements.[24] Another common example of market manipulation is entities behaving anticompetitively in one market to increase their profits in another.[25] For instance, a DERA could inject and withdraw power in the PJM day-ahead market to increase the value of the financial transmission rights (FTRs) that it or its affiliate owns.

Another type of market manipulation involves demand response. Both FERC Order 2222 and the ANOPR include energy efficiency and demand response in the definition of DERs.[26] To participate in PJM markets, energy efficiency and demand response require establishing a baseline of electricity consumption against which the reduction in consumption is measured. Since the baseline is inputted and cannot be measured when the energy efficiency or demand response measures are installed or activated, the establishment of the baseline is susceptible to market manipulation, and those costs are passed to retail electricity customers.[27]

Complicating the monitoring and mitigation of DER and DERA market power is the dual jurisdiction of federal and state regulators, and the potential for there to be thousands or more DERAs with extensive affiliate relationships that need to be monitored and potentially mitigated.

> **Finding 4:** Since wholesale electricity markets are subject to market power and market manipulation for a variety of reasons, DERAs and individual DERs, either independently or in concert with their affiliates, may be able to exercise market power or manipulate markets to the detriment of consumers and market efficiency.

III. A. 2. Double Payments and Switching Between Retail and Wholesale Compensation

DERAs and individual DERs may be compensated as retail participants (i.e., net metering resources), wholesale (PJM) market participants, or both.[28] Both the FERC and the PUC are clear that DERAs and individual DERs may not be paid twice for the same service.[29]

When receiving retail compensation, the services DERAs and individual DERs provide are not well defined. They are selling energy, some amount of capacity depending on the resource, and avoiding some transmission and distribution services. In contrast, when participating in the PJM wholesale markets, their services are defined by the markets they sell into, e.g., energy, capacity, and ancillary services.

---

[23] According to the FERC: "Conduct involving fraud and market manipulation poses a significant threat to the markets overseen by the Commission, and is an enforcement priority. Such misconduct undermines the Commission's goal of providing efficient energy services at a reasonable cost, because the financial harm imposed by such actions ultimately is borne by consumers." https://www.ferc.gov/enforcement-legal/enforcement/prohibition-energy-market-manipulation

[24] https://www.ferc.gov/enforcement-legal/enforcement/prohibition-energy-market-manipulation

[25] Gary Taylor, Shaun Ledgerwood, Romkaew Broehm, and Peter Fox-Penner, Market Power and Market Manipulation in Energy Markets: From the California Crisis to the Present, Public Utilities Reports, 2015, p. 16.

[26] PUC ANOPR, p. 2 citing FERC Order No. 2222, ¶ 114.

[27] For example, see FERC Order Approving Stipulation and Consent Agreement, Docket No. IN23-11-000, August 21, 2023, https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230821-3024&optimized=false. See also Jim Pierobon, FERC Settlements Illustrate Attempts to 'Game' Demand Response Programs, July 26, 2013, https://energycentral.com/c/ec/ferc-settlements-illustrate-attempts-game-demand-response-programs. Market manipulation, of course, is not limited to energy efficiency, demand response, DERAs, or individual DERs.

[28] PA ANOPR, p. 11.

[29] PA ANPOR, p. 33-36 and FERC Order NO. 2222, ¶ 160.

Finding 5: When simultaneously receiving retail compensation and wholesale market payments, a precise definition of what DERAs and individual DERs are selling is necessary to prevent double payment.

Double payment can be avoided if DERAs and individual DERs are only allowed to receive either retail compensation or wholesale market payments. The ANOPR contemplates the ability of DERAs and individual DERs to switch back and forth between retail compensation and wholesale market compensation,[30] which complicates the ability of EDCs to verify that DERAs and individual DERs are not receiving double payments.

Finding 6: Allowing for DERAs and individual DERs to switch back and forth between receiving retail compensation or wholesale market compensation may enable them to receive double payments or avoid regulatory oversight.

III. A. 3. DERA Impacts on Distribution Interconnection and Planning

As the number of individual DERs and DERAs increases, EDCs will have more interconnection requests, which may result in extensive distribution interconnection queues like those that exist with transmission. The average time projects spend in the transmission queue increased from three to five years from 2015 to 2023.[31] A DERA's DERs may be at different locations on the distribution system, compounding the difficulty of evaluating its interconnection request. At the transmission level, only approximately 20% of generation projects and their associated interconnections have been completed.[32] Furthermore, some generation interconnection requests are done for strategic purposes, i.e., to block, delay, or increase the cost of competing projects.[33] The result has been growing interconnection queues, low completion rates, and delays in completing projects. The FERC has found that generation interconnections have been used to avoid needed transmission expansion, favoring myopic approaches over broader and more effective system-wide ones.[34]

Finding 7: With the likely substantial increase in DERs, whether individual or aggregated, there is a substantial potential for long DER interconnection queues, strategic behavior, low completion rates, delays, and adverse effects on system-wide distribution planning.

III. A. 4. Consumer Protection of Individual DERs from DERAs

The ANOPR raises the issue regarding consumer protection of individual DER owners, who are likely to be ratepayers, from DERAs.[35] If the experience with EGSs is an indicator, this is potentially a serious

---

[30] PA ANOPR p. 39.
[31] Berkeley Lab, Queued Up: 2024 Edition: Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2023, April 2024, https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_R2.pdf.
[32] Berkeley Lab, Queued Up: 2024 Edition: Characteristics of Power Plants Seeking Transmission Interconnection as of the End of 2023, April 2024, https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_R2.pdf.
[33] See Frank A. Felder, Market versus planning approaches to transmission and distribution investment. Transmission Network Investment in Liberalized Power Markets, 2020, pp. 257-274 and RTO Insider, MISO Committed to Crackdown on Interconnection Queue Submittals, Departures, May 1, 2024, https://www.rtoinsider.com/miso-restricting-interconnection-requests/?utm_source=hootsuite&utm_medium=&utm_term=&utm_content=&utm_campaign=.
[34] FERC, Docket No. RM21-17-000, Building for the Future Through Electric Regional Transmission Planning and Cost Allocation and Generator Interconnection, April 21, 2022, ¶ 161.
[35] ANOPR, pp. 31-35.

concern. Some EGSs, but by no means all or most, engage in anti-consumer activities such as slamming, price gouging, aggressive marketing, and other practices.[36] Several states have revised their laws or are considering legislation to reform their retail energy markets.[37]

> **Finding 8:** The aggregation of DERs by DERAs has the potential to result in anti-consumer practices by some DERAs in their marketing, pricing, and other business activities.

III. B. Electric Distribution Companies

In the context of DERAs, three major consumer issues arise with EDCs. First, the EDC may use its position as the owner, planner, and operator of its distribution system to favor its DERA or EGS affiliates. Second, even if an EDC does not have DERA or EGS affiliates, it may try to shift some of its distribution-related costs onto DERAs, thereby improving the EDC's profitability. Third, if DER technological advances and cost declines continue, there may be a rapid increase in DERA distribution interconnection requests, potentially overwhelming the ability of the EDC to process them timely.

III. B. 1. EDCs with DERA or EGS Affiliates

EDCs, as planners and operators of the distribution system, may favor their DERA affiliates. They can do this through discriminatory behavior, such as rejecting non-affiliated DERA interconnection requests or imposing conditions that raise the costs of interconnections to make non-affiliated DERAs uneconomical.

EDCs may own DERs that are part of their distribution assets as non-wires alternatives and may have affiliates that are DERAs or EGSs. If an EDC owns DERs as distribution assets, presumably their planning, installation, and operation are conducted to maximize the value these DER assets provide the distribution system. The revenues from any sales of energy, capacity, and ancillary services from DERs owned by EDCs are credited toward the costs of the DER facilities to minimize the rate impact. If the EDC does not have any DERA or EGS affiliates, then there is no concern that the EDC will plan and operate its DER assets to benefit its affiliates.

If, however, the EDC has DERA or EGS affiliates within the PJM footprint, then the potential exists for the EDC to plan and operate its distribution DERs to benefit its affiliates, who are not subject to cost of service ratemaking by the PUC, at the expense of ratepayers. For instance, an EDC-owned battery could charge and discharge so as to lower the energy costs of its EGS affiliate or reduce the output of a DERA that is competing with the EDC's DERA affiliate.

> **Finding 9:** EDCs that have DERA or EGS affiliates have the incentive and means to use their role in interconnecting DERAs and planning and operating their distribution systems to favor their affiliates at the expense of consumers.

III. B. 2. EDC Distribution Planning and DERs and Cost Shifting

Regardless of whether EDCs have DERA or EGS affiliates, EDCs have the incentives and means to shift distribution costs that are not associated with DERA interconnections to DERAs. The assignment of joint costs for capital assets that have multiple uses, such as distribution lines, transformers, and related

---

[36] Susan M. Baldwin and Frank A. Felder. "Residential energy supply market: Unmet promises and needed reforms." *The Electricity Journal* 32, no. 3, 2019, pp. 31-38.

[37] Energy Choice Coalition, In Northeastern States, Energy Choice Under Attack as Electricity Retailers Get Restricted, Feb. 7, 2020, https://www.energychoicecoalition.org/blog/2020/2/7/in-northeastern-states-energy-choice-under-attack-as-electricity-retailers-get-restricted.

facilities is challenging.[38] In between rate cases, the EDC's rates are set and any reduction in its costs increases its profitability. If instead of the EDC's shareholders paying for distribution assets, some or all those costs can be imposed upon DERAs, then the EDCs may be better off, even if a future rate case resets the EDCs' rates accordingly (which may not occur).

Finding 10: EDCs have the incentives and means to shift distribution costs to DERAs.

III. B. 3. Ability of EDCs to Process Large Numbers of DERAs, Whether Retail or Wholesale

In its Order No. 2222, the FERC requires that PJM and EDCs process DERAs' interconnection requests within 60 days.[39] The EDCs' ability to do so depends, in part, on the number of DERA interconnection requests and the amount of internal and external staffing assigned. Further complicating this process and timeline is the ability of DERAs to switch to and from being retail to wholesale assets, which may require updating or reperforming the DERA interconnection studies.[40] A surge of applications may occur as DER technologies improve, or if net metering policies are rescinded, potentially preventing EDCs from meeting the FERC's 60-day requirement. The long generation interconnection queue in PJM and the rest of the U.S. foreshadows a similar problem with DERs discussed previously. A long DERA interconnection queue delays the potential benefits of DERAs for consumers, and it may detract from EDCs performing their other responsibilities to the detriment of consumers.

Finding 11: Improved DER performance and cost reductions along with policy changes may result in a surge of DERA interconnection applications. This could prevent EDCs from processing them and may adversely affect other EDC responsibilities.

IV. Longer-Term and Emerging Distributed Energy Resource Issues

The combined dynamics of technological progress and evolving federal and state policies suggest that additional DERA issues that FERC Order No. 2222 and the PUC ANOPR may not have anticipated may come to the forefront. FERC Order 2222 acknowledges that it does not cover several important issues. These include the impacts of subsidizing DERs on RTO/independent system operator (ISO) markets, the impacts of DERs on system variability and unpredictable operation, the impacts of DERs on distribution reliability and operations, DER distribution system benefits, DERMS (distributed energy resource management systems), privacy, and cybersecurity.[41] However, many of these topics are raised by the ANOPR. Other emerging DER issues include increased digitalization and its impact on the electricity sector and machine learning and artificial intelligence advances that support DERAs.

---

[38] To illustrate the challenges of cost allocation of joint costs, economists refer to the 'wool-mutton' problem. "A well-known example of a joint cost is the cost of producing wool and mutton from sheep. If mutton is produced, wool is produced as a byproduct and the production of one does not constrain the production of the other." Mohammad Harunuzzaman and Sridarshan Koundinya, Cost Allocation and Rate Design for Unbundled Gas Services," The National Regulatory Research Institute, May 2000, pp. 40-41, https://pubs.naruc.org/pub/FA860A29-00F5-C7CD-1DF1-A8DC6A98E71B.

[39] ANOPR, p. 9.

[40] PSEG, In the Matter of New Jersey's Distributed Energy Resource Participation in Regional Wholesale Electricity Markets, Docket NO. EO24020116.

[41] FERC Order No. 2222, ¶ 362 and ¶363.

One set of likely emerging issues involve DER interconnection issues similar to those the FERC considered in its Order No. 2023.[42] As more and more DERs and DERAs request interconnections, there may be need to consider alternatives to the queue-based interconnection approach and consider cluster-based ones. If queues become lengthy, there may be a need to consider ways to filter out interconnection requests that are unlikely to materialize and evaluate EDC performance.

Furthermore, the U.S. and international experience with RTO/ISO markets and retail access is that multiple reforms are needed as new problems arise and existing problems change. Some examples include the need for reforming markets and products, market power and manipulation, generation interconnection delays, shifting transmission costs to interconnecting generation, the lack of transparency of RTOs/ISOs, and anti-consumer behavior and profiteering by EGSs.[43] Equity has a concern with respect to solar PV deployment and similar issues may arise with broader DER developments that policymakers should consider.[44]

> **Finding 12**: Technological advancements, federal and state regulatory dynamics, and experience with wholesale and retail electricity markets strongly indicate that when incorporating DERAs into electricity markets, anticipated problems may be underestimated and new problems may arise, requiring regulatory responses.

FERC Order No. 2222 and accompanying PUC policies are in effect taking the first steps to an open access distribution system in which EDCs provide in a non-discriminatory manner DERs and DERAs information, interconnection, planning, and operations.

Table 1 lists the twelve Findings and cross references them to the PUC's request for information that is discussed below in Section V.

[42] Order No. 2023, 186 FERC ¶ 61,199 (2024), Improvements to Generator Interconnection Procedures and Agreements, https://www.ferc.gov/media/e1-rm22-14-001.
[43] All discussed above, except for RTO/ISO lack of transparency. See FERC Docket No. RM17-2-000, Order 844, Uplift Cost Allocation and Transparency in Markets Operated by Regional Transmission Organizations and Independent system Operators, April 19, 2018.
[44] U.S. Department of Energy, Solar Futures Study, September 2021, https://www.energy.gov/sites/default/files/2021-09/Solar%20Futures%20Study.pdf.

Table 1: Listing of Findings and their Applicability to the Pennsylvania Public Utility Commission's Request for Information

Finding	References
Finding 1: DERs require appropriate safety and equipment interconnection policies, standards, and technical requirements to provide safe and reliable electricity to consumers.	V.A. V.E. V.K.
Finding 2: The PUC, FERC, EDCs, PJM, the PJM Independent Market Monitor, and the public need varying types and amounts of information, with appropriate protections for confidentiality, to plan, operate, and evaluate DER and DERA policies.	V.B. V.J. V.K.
Finding 3: In the context of emerging technologies and policies and a physically interconnected system, but with dual jurisdictions, it is vital that the PUC and the FERC share information, coordinate policies and regulations, and reassess the deployment and operation of DERs and DERAs over time.	V.A. V.C. V.E. V.H. V.I. V.J. V.L. V.O.
Finding 4: Since wholesale electricity markets are subject to market power and market manipulation for a variety of reasons, DERAs and individual DERs, either independently or in concert with their affiliates, may be able to exercise market power or manipulate markets to the detriment of consumers and market efficiency.	V.J.
Finding 5: When simultaneously receiving retail compensation and wholesale market payments, a precise definition of what DERAs and individual DERs are selling is necessary to prevent double payment.	V.B. V.J.
Finding 6: Allowing for DERAs and individual DERs to switch back and forth between receiving retail compensation or wholesale market compensation may enable them to receive double payments or avoid regulatory oversight.	V.A. V.G.
Finding 7: With the likely substantial increase in DERs, whether individual or aggregated, there is a substantial potential for long DER interconnection queues, strategic behavior, low completion rates, delays, and adverse effects on system-wide distribution planning.	V.A. V.J.
Finding 8: The aggregation of DERs by DERAs has the potential to result in anti-consumer practices by some DERAs in their marketing, pricing, and other business activities.	V.D. V.F. V.J.
Finding 9: EDCs that have DERA or EGS affiliates have the incentive and means to use their role in interconnecting DERAs and planning and operating their distribution systems to favor their affiliates at the expense of consumers.	V.F. V.J. V.M.
Finding 10: EDCs have the incentives and means to shift distribution costs to DERAs.	V.C. V.J.
Finding 11: Improved DER performance and cost reductions along with policy changes may result in a surge of DERA interconnection applications. This could prevent EDCs from processing them and may adversely affect other EDC responsibilities.	V.A. V.J. V.N.
Finding 12: Technological advancements, federal and state regulatory dynamics, and experience with wholesale and retail electricity markets strongly indicate that when incorporating DERAs into electricity markets, anticipated problems may be underestimated and new problems may arise, requiring regulatory responses.	V.A. V.J. V.O.

V. Response to the Pennsylvania Public Utility Commission's Request for Information

The section below has a major heading (e.g., V. A, V. B., etc.) for each topic that the PUC requested more information on. The text in *italics* is the verbatim wording from the PUC ANOPR, except that numbers have replaced bullets for ease of reference. The following text in standard typeface responds to the PUC's request.

The PUC notes that some of these topics may be appropriately resolved in regulations while others might be more appropriate for policy statements, contained in electric distribution company (EDC) tariffs, or adjudicated on a case-by-case basis, and the PUC specifically seeks comment on how to best administer each topic.[45]

In general, these topics should be resolved in generic rulemakings applicable to all EDCs instead of adjudicated on a case-by-case basis to ensure uniformity among the EDCs and the results codified in the PUC's regulations.

V. A. Changes to Distribution DER Interconnection Rules (ANOPR, p. 19-22)

The PUC seeks comment on whether its existing interconnection regulations for customer-generators, 52 Pa. Code §§ 75.31—40, can be adapted to address interconnection of a Component DER participating in a DER Aggregation Resource with EDC distribution facilities, consistent with Order 2222 and PJM's DAPM, and, if so, the specific changes to the PUC's interconnection regulations that would facilitate this adaption.

The PUC existing interconnection regulations can be adapted to include provisions of a Component DER participating in a DER Aggregation resources with EDC distribution facilities consistent with Order 2222 and PJM's DAPM. The aggregation of Component DERs may require specific technical requirements and review not envisioned in the current PUC interconnection regulations.

The PUC also seeks comment on the following sub-topics raised by stakeholders:

1. *How will Component DERs previously not subjected to interconnection (energy efficiency and demand response resources) be integrated into an aggregation?*

   If aggregated into a new or existing DERA, existing DERs must comply as part of or along with the same interconnection processes for proposed DERAs, and their proposed Component DERs, to ensure that they can be safely and reliably operated. Existing DERs that are aggregated must also comply with any PUC regulations applicable to proposed DERAs and their Component DERs. The DERA interconnection process should account for the types of Component DERs, such as energy efficiency and demand response) being aggregated by a DERA. The DERA interconnection process is discussed further below in response to the information requested.

2. *In consideration of future technology advancement through distributed energy resource management systems (DERMS) and other technologies that may allow for utility direct control and overrides, should approval of interconnection requests extend to consideration of an option for firm and non-firm approval categories to reduce the need for system upgrades?*

   Yes, the approval of interconnection requests should extend to considerations of a safe and reliable option for firm and non-firm approval categories to reduce the need for system upgrades. Permitting a

[45] ANOPR, pp. 1-2.

non-firm option allows DERAs to decide if the more extensive system upgrades for firm service are worthwhile. It would also allow DERAs to come online more quickly, although subject to operational and other restrictions to ensure safety and reliability, while waiting for the completion of the additional upgrades needed for firm service.

3. *Under what conditions will direct control vs. monitoring be required?*

   The conditions under which direct control versus monitoring are required should be determined based upon the technical safety and reliability standards for the distribution system. The associated costs should be paid for by the DERA.

4. *How should the DER aggregation review process differ for different use cases, market services, DER compositions or grid conditions?*

   The DER aggregation review process needs to ensure that the DERA and Component DERs are planned and operated in a safe and reliable manner, regardless of the DERA's use case, market composition, DER composition, or grid conditions. The review process should evolve over time to incorporate technological, regulatory, and business developments, as well as learnings from prior experience.

5. *How should load assumptions be adjusted to accommodate the use of load-modifying resources?*

   EDCs' load assumptions used in their long-term infrastructure improvement plans (LTIIPs) should be adjusted to reflect existing and forecasted load-modifying resources. These load-modifying resources should help reduce or delay the amount of distribution investment needed, which will benefit consumers, while maintaining safety and reliability.

6. *What data will DERAs need to provide to EDCs and to what extent can this leverage existing PJM registration data requirements?*

   DERAs will need to provide all the necessary data to EDCs for EDCs to determine if DERAs are operating safely and reliably, the necessary distribution system upgrades and costs, and ensure that DERAs comply with all PUC regulations, including not receiving double compensation. DERA data requirements and data formats should be coordinated among and between the EDCs and PJM to streamline the DERAs' data provision.

7. *How should these data be documented?*

   These data should be documented based upon standard industry practices that ensure privacy, confidentiality, and cybersecurity. Data should be retained for the entire period, if not longer, of the DERAs' existence. DER owners own all the data that their DERs create. The PUC should have access to these data upon request, subject to confidentiality provisions.

8. *Where should automation versus manual coordination and communication between EDCs, the DERA and PJM be required?*

   The decision to select automation versus manual coordination and communication between EDCs, the DERA and PJM should first be based upon safety and reliability. In a particular case, if both approaches are safe and reliable, then costs should be the determining factor.

9. *How should the PUC ensure that the EDC DER registration approval process is efficient to consistently meet PJM's 60-day timeline and avoid potential "over-registration"?*

   The PJM and EDC DER registration processes should be coordinated as much as possible to avoid duplication of efforts by DER applicants. Information that is needed for both the PJM and EDC DER registration processes should be requested in identical data formats. Moreover, EDCs should coordinate their registration processes as much as possible so that DER applicants are required to submit the same data in the same format across EDCs. Over time, the PJM and EDC DER registration processes will need to be updated and improved to improve their efficiency and eliminate unnecessary and duplicate steps. The PJM and EDC DER registration processes need to protect the privacy, confidentiality, and cybersecurity of the DER applicants' data. A generic rulemaking instead of adjudicated on a case-by-case basis should be used to ensure uniformity among the EDCs and the results codified in the PUC's regulations.

10. *How should the PUC clarify and harmonize the relationship between DER interconnection under PUC regulations with DER interconnection to PJM's small generator interconnection rules, if needed?*

    The PUC should require the Pennsylvania EDCs to harmonize each of their DER interconnection requests and requirements with PJM, with each other, and with PJM's small generator interconnection rules. The PUC should then review and adopt a set of PUC DER interconnection regulations through a generic rulemaking. Over time, these DER interconnection regulations will need to be updated in concert with PJM to account for technological, regulatory, and economic changes.

V. B. Changes to Metering Requirements (ANOPR, p. 22-25)

The PUC seeks comment on whether its existing metering regulations for customer-generators, 52 Pa. Code § 75.14 (relating to meters and metering), can be adapted to facilitate provision of metering and telemetry data by DERAs to public utilities, consistent with Order 2222 and PJM's DAPM, and if so, whether and what specific changes to the PUC's interconnection regulations that facilitate this adaption.

52 Pa. Code § 75.14 should be amended to make clear that any metering or associated equipment required by DERAs on Component DERs should not be paid for by EDCs.

The PUC also seeks comment on the following sub-topics raised by stakeholders:

11. *How should interconnection regulations evolve to ensure alignment between EDC and PJM telemetry and metering to facilitate consistency and avoid extensive telemetry differences between DERA requirements and retail DERs?*

    Interconnection regulations should evolve to ensure alignment between EDC and PJM telemetry and metering. This will facilitate consistency and avoid extensive telemetry differences between DERA requirements and retail and wholesale DERs, while protecting the privacy, confidentiality, and cybersecurity of DER data. This will require ongoing coordination between the PUC, PJM, EDCs, the DER sector, and stakeholders to account for technological, regulatory, and economic changes.

12. *Should the PUC facilitate device-level metering and if so, how?*

    By having consistent DER interconnection regulations between and among PJM and EDCs, the PUC can facilitate safe, reliable, and economical use of device-level data. Device-level metering should be permitted and allowed to evolve as the technology improves over time. The privacy, confidentiality,

and cybersecurity of DER device-level metering must be protected and ensure that DER owners own their device-level metering.

V. C. Cost Allocation Issues for Facilities Allowing the Interconnection of DERs (ANOPR, p. 25-27)

The PUC seeks comment on whether its existing interconnection cost allocation regulations for customer-generators, 52 Pa. Code § 75.36(8), 75.38(e) and 75.39(e)(4) (relating to additional general requirements, level 2 interconnection review, level 3 interconnection review), can be adapted to address interconnection cost allocation among Component DERs, DERAs and EDCs, consistent with Order 2222 and PJM's DAPM, and, if so, the specific changes to the PUC's interconnection regulations that would facilitate this adaption.

The existing interconnection cost allocation regulations for customer-generators can be adapted to address interconnection cost allocation among Component DERs, DERAs and EDCs, consistent with Order 2222 and PJM's DAPM. The fundamental principal of these cost allocation regulations is that the interconnecting entity, whether a small generator, DER, or DERA, is allocated all the associated interconnection costs.

For those DERs and DERAs that are required to make an interconnection request, the above cited cost allocation regulations, 52 Pa. Code § 75.36(8), 75.38(e) and 75.39(e)(4), should apply. The term "applicable DERs and DERAs" may need to be added to these regulations as appropriate. Presumably, not all DERs would require an interconnection agreement. For example, if a residential customer installs a controllable thermostat, which is a DER, the customer would not be required to make an interconnection request.

The PUC also seeks comment on the following sub-topics raised by stakeholders:

13. How will DERA market participation impact retail rates?

Over time, DERA market participation should, with sufficient competition and prevention of double compensation, put downward pressure on retail rates. More competition should reduce the exercise of market power and introduce more efficient resources, thereby putting downward pressure on the wholesale component of retail rates. DERAs should also put downward pressure on transmission and distribution (T&D) rates by avoiding and postponing otherwise needed T&D investments, assuming that transmission owners and EDCs plan their systems appropriately in anticipation and response to the installation of DERs, Component DERs, and DERAs.

14. What cost recovery guidance, if any, is needed by EDCs for investments that may support both transmission and distribution?

Transmission owners and EDCs should coordinate their planning of T&D investments that anticipate and respond to the installation of DERs, Component DERs, and DERAs within and across their footprints, and that safely, reliably, and cost-effectively serve consumers. EDC investments made to interconnect DERs, Component DERs, and DERAs should be recovered from the interconnection applicant. To facilitate planning and reduce costs, EDCs should publicly provide distribution system hosting capacity maps if they are not already doing so that indicate which locations on their distribution systems DERs can be readily connected, where they can alleviate constraints, and where upgrades are required.

15. *How should EDCs distinguish cost allocation between grid modernization, general DER costs, and DERA-specific costs?*

    DERA-specific costs should be assigned to the DERA that causes these costs. General DER costs should be allocated pro rata across DERs, Component DERs, and DERAs. Grid modernization costs not associated with DERs, Component DERs, and DERAs should be allocated using existing policies.

16. *What cost recovery mechanisms should be used (upfront charges, usage charges, rates)?*

    DER interconnection costs, whether for retail DERs, Component DERs, or DERAs, should be recovered from the applicant via upfront charges. Many DER interconnection requests may not be completed, and consumers are at risk if the EDC does not recover these charges upfront and then later tries to assign any uncollected costs to ratepayers.

17. *What is the interplay between the direct procurements aspects of EDCs' default service plans and an EDC's costs to administer DERA participation in wholesale markets, if any?*

    There is no obvious interplay between the direct procurement aspects of EDCs' default service plans and their costs of administering DERA participation in wholesale markets.

V. D. Adjudication of Disputes Regarding the Registration of DERs (ANOPR, p. 27-29)

The PUC seeks comment on whether its existing application process for net metering customer-generators, 52 Pa. Code § 75.17, or its existing dispute resolution regulations, 52 Pa. Code Chapters 1 (relating to rules of administrative practice and procedure), 3 (relating to special provisions) and 5 (relating to formal proceedings), or both, can or should be adapted to facilitate adjudication of disputes about DERA registration of its Component DERs with PJM, consistent with Order 2222 and PJM's DAPM, and if so, the specific changes to the PUC's regulations that would facilitate this adaption.

No comment.

V. E. Management of Distribution Utility Overrides of DERs to Maintain Reliability, and Disputes Arising Therefrom (ANOPR, p. 29-31)

The PUC seeks comment on whether and how its regulations can or should be augmented to address EDC overrides of DER Aggregation Resource or Component DER operation, consistent with Order 2222 and PJM's DAPM, and, if so, the specific changes to the PUC's regulations that would address overrides.

See the responses to questions 18 and 19.

The PUC also seeks comment on the following sub-topics raised by EDC stakeholders:

18. *How should the distribution override process align with market bidding windows?*

    Whenever possible, the distribution override process should precede the PJM market bidding window. At all times, the override process should inform the DERA as soon and as far in advance as possible. There will be situations in which overrides will be required after the market bidding window has closed, and DERAs should be informed as soon as possible. The economic costs associated with any overrides should be borne by the DERA and not assigned to ratepayers.

19. *What EDC "real-time" update and override requirements should be addressed in DERA agreements to ensure the reliability and safety of the grid?*

DERA agreements should include all real-time, near real-time, and other update and override requirements to ensure the safety and reliability of the grid. These should be based upon technical requirements and industry standards and applied to all DERs in a non-discriminatory and transparent manner.

V. F. Protection of DER Owners from Unfair Trade Practices or Excessive Risk in the Wholesale Markets (ANOPR, p. 31-35)

The PUC seeks comment on whether the UTPCPL [Pennsylvania Unfair Trade Practices and Consumer Protection Law] *applies to the DERA-Component DER relationship and whether and how the PUC's EGS regulations can or should be adapted to address consumer protection in the DERA-Component DER relationship, consistent with Order 2222 and PJM's DAPM, and if so, what specific changes to the PUC's regulations would address these matters.*

No comment on whether the UTPCPL applies to the DERA-Component DER relationship.

The PUC regulations should establish a DERA code of conduct similar to its current EGS Code of Conduct.

V. G. Prevention of Double Compensation or Double Counting Between Retail and Wholesale Market Participation, Including Rules Governing DER Owners' Ability to Switch Between Retail and Wholesale Market Participation (ANOPR, p. 35-39)

The PUC seeks comment on whether its existing regulations on compensation for net metering customer-generators, 52 Pa. Code § 75.13, could or should be adapted to incorporate appropriate restrictions on double counting of services provided by a Component DER in wholesale and retail markets, on duplicative compensation for the same service, consistent with Order 2222 and PJM's DAPM, or on both, and, if so, what specific changes to the PUC's regulations would or should facilitate this adaption.

52 Pa. Code § 75.13 should be amended to prevent DERs from simultaneously being compensated in wholesale and retail markets for the same service, to require EDCs to certify that DERs are not double counting, and to require DERs that are found to have received double payment to refund such payments and face potential other administrative actions such as not being able to receive retail compensation in the future.

Suggested modifications to 52 Pa. Code § 75.13 are the following:

§ 75.13. General provisions.

(a) EDCs and DSPs shall offer net metering to customer-generators that are not simultaneously receiving payments from the region's wholesale electricity market that generate electricity on the customer-generator's side of the meter using Tier I or Tier II alternative energy sources, on a first come, first served basis. To qualify for net metering, the customer-generator shall meet the following conditions:

(c) An EDC shall file a tariff with the Commission that provides for net metering consistent with this chapter. An EDC shall file a tariff providing net metering protocols that enables EGSs to offer net metering to customer-generators taking service from EGSs so long as the customer-generator does not simultaneously receive payments from the region's wholesale electricity market. If a customer-generator is found to have received simultaneous net metering and wholesale electricity market payments, it must

refund its net metering payments and may be prohibited from receiving net metering payments in the future. EDCs shall certify that net metering customer-generators are not receiving payments from the region's wholesale electricity market. To the extent that an EGS offers net metering service, the EGS shall prepare information about net metering consistent with this chapter and provide that information with the disclosure information required under § 54.5 (relating to disclosure statement for residential and small business customers).

Consistent with the concerns raised by EDCs, the PUC also seeks comments on the following sub-topics:

20. *Does the PUC have authority to decide whether to permit net metering customers to participate in DERAs, noting FERC's statement that "under a [RERRA]'s jurisdiction over its retail programs, such a [RERRA] is able to condition a distributed energy resource's participation in a retail distributed energy resource program on that resource not also participating in the RTO/ISO markets"?*

    No comment on the PUC's legal authority.

21. *Assuming the PUC does have requisite authority, should the PUC permit net metering customers to also participate in DERAs at the same time?*

    The PUC should not permit net metering customers to also participate in DERAs at the same time if that means receiving both wholesale and retail compensation. Net metering customers receive retail rate compensation that not only includes PJM wholesale market compensation but also transmission and distribution costs. If net metering customers also participated in DERAs, they would receive double compensation, thereby increasing the costs for all other ratepayers.

22. *Assuming the PUC does have requisite authority, should the PUC develop rules for when and how often a retail customer may switch between net metering and DERA participation?*

    Yes, the PUC should develop rules for when and how often a retail customer may switch between net metering and DERA participation. These rules should limit the number of times a customer may switch per year (for example, no more than once per year), and require that study and interconnection costs be paid for by the customer. Depending on the number of switching requests, the PUC may have to further restrict switching so that EDCs can process other DER interconnection requests. The PUC and EDCs should also try to anticipate any changes in technological, economic, regulatory or legal factors that may result in large numbers of DERs requesting to switch to avoid backlogs in processing DER interconnection requests.

V. H. Any Necessary Electronic Data Exchange Revisions (ANOPR, p. 39-41)

The PUC seeks comment on whether it should encourage or impose EDI and/or other data exchange protocols between and among EDCs, EGSs, DERAs and Component DERs to facilitate implementation of Order 2222, and, if so, what, if any, specific changes to the PUC's policies and regulations would or should facilitate this adaption.

The PUC also seeks comment on the following sub-topics raised by stakeholders:

23. *What DERA cybersecurity items require further evaluation?*

    The importance and evolving threat of cybersecurity requires constant evaluation, particularly as the potential number of Component DERs and DERAs increases over time. The PUC should encourage

standardized data exchange protocols between and among EDCs, EGSs, DERAs and Component DERs that protect the cybersecurity and privacy of DER data.

24. *What role will advanced metering infrastructure (AMI) data play in operational coordination?*

AMI will play a major role in operational coordination by providing important data to the DERAs, Component DERs, and EDCs. The PUC should require uniform AMI data requirements among and between the EDCs and PJM, and update them as necessary to accommodate changing technical, regulatory, and economic factors.

25. *How should the PUC ensure that processes are in place for efficient data exchange among and between Component DERs, DERAs and EDCs for customer authorizations?*

The PUC can help ensure that processes are in place for efficient data exchange among and between Component DERs, DERAs and EDCs by having uniform interconnection regulations among the EDCs and coordinating with PJM. Over time, the PUC will need to consider updating its regulations to accommodate changing technical, regulatory, and economic factors.

V. I. Small Utility Opt-in Procedures (ANOPR, p. 41-42)

The PUC seeks comment on procedures for small utilities to "opt-in" to Order 2222, and permit their retail customers to participate in DERAs, consistent with Order 2222 and PJM's DAPM, and any specific changes to the PUC's policies and regulations that would facilitate the opt-in process.

Small utilities should be encouraged to opt-in to Order 2222 and permit their retail customers to participate in DERAs. Small utilities, if they cannot accommodate DERAs at this time, should be required to provide the PUC with a report stating why they are unable and when they will be able to do so. In the interim, retail customers of small utilities wanting to participate in DERAs that do not opt-in should be able to petition their small utility requesting the utility to enable them to do so on an individual case-by-case basis. The utility should have to respond to their customer's request in a timely manner, either accommodating it or explaining why it cannot and when it will be able to do so.

V. J. Potential PUC Oversight Of DERAs (ANOPR, p. 42-43)

The PUC seeks comment on whether the PUC may assert jurisdiction to regulate DERAs, and, if so, what requirements should the PUC impose on DERAs, consistent with Order 2222 and PJM's DAPM, and what specific changes to the PUC's policies and regulations would facilitate the PUC's exercise of authority over DERAs.

The PUC has jurisdiction to regulate the interconnection of DERs to the distribution system.

No comment on whether the PUC may assert jurisdiction beyond interconnection regulations to regulate DERAs that solely participate in the PJM wholesale markets except that the PUC can restrict net metering generators from simultaneously receiving net-metering payments and wholesale electricity market payments including the switching of DERs and DERAs from wholesale compensation to retail compensation.

If DERAs participate partially or completely in retail compensation, then the PUC has jurisdiction beyond what is required for interconnection to prevent double counting and to regulate the switching process between retail and wholesale market participation. In addition to being subject to PUC interconnection regulation, DERAs should be required to register with the PUC and commit to abide by a retail DERA

code of conduct analogous to the EGS Code of Conduct (52 Pa. Code § 54.122). DERAs should affirm that they and their Component DERs do not receive double compensation from retail compensation and wholesale markets. The PUC also has jurisdictional oversight of EDCs and any affiliate relationships they might have.

If DERAs are EDCs, then they are subject to PUC regulation beyond interconnection.

EDCs that have DERA affiliates should be required to commit to not plan or operate EDC facilities in such a way that unfairly benefits their affiliates.

V. K. Cybersecurity Considerations (ANOPR, p. 43)

The PUC seeks comments on whether it should impose cybersecurity standards or requirements on Component DERs, DERAs or EDCs, consistent with Order 2222 and PJM's DAPM, and any specific changes to the PUC's policies and regulations that would facilitate appropriate levels of cybersecurity in the implementation of Order 2222.

DERs, Component DERs and DERAs should be required to follow appropriate levels of cybersecurity and protect data privacy as part of their interconnection agreement with EDCs. EDCs should also follow appropriate levels of cybersecurity, and protect data privacy in general and when interacting with DERs, Component DERs, and DERAs.

V. L. Distribution Level Benefits (ANOPR, p. 44)

The PUC seeks comment on whether and how it should account for the distribution level benefits of DERAs.

The PUC should account for the distribution-level benefits of DERs, whether Component DERs or DERAs, and regardless of whether their compensation is retail or wholesale. EDCs, as part of their long-term infrastructure improvement plans (LTIIP), should account for the impacts of DERA interconnections, including their impact on future distribution system infrastructure. Presumably the associated DERA-related distribution upgrades mitigate the costs of interconnecting DERAs, and EDCs can avoid making some investments as a result. To facilitate planning and reduce costs, EDCs should publicly provide distribution system hosting capacity maps if they are not already doing so that indicate which locations on their distribution systems DERs can be readily connected, where they can alleviate constraints, and where upgrades are required.

V. M. EDCs Acting as DERAs (ANOPR, p. 44)

The PUC seeks comment on whether and how it should mitigate conflicts of interest that may arise from an EDCs participating in wholesale markets as a DERA, consistent with Order 2222 and PJM's DAPM, and whether and what specific changes to the PUC's policies and regulations could facilitate such mitigation.

EDCs should only be allowed to participate in wholesale markets as a DERA if the DERA is a more cost-effective solution to a distribution problem than traditional distribution system infrastructure. In this case, EDCs should be required to offer the DERA's products to the relevant PJM markets at marginal costs, subject to any operational DERA restrictions, to satisfy the distribution system's needs. Any revenues from the sale of these products should be credited against the cost of the DERA infrastructure to the benefit of ratepayers. Like all market participants, EDC DERAs should be subject to review by the PJM Independent Market Monitor.

EDCs, whether they operate DERs or not, have a conflict of interest if they have EGS, DERA, or Component DER affiliates. EDCs must be required to treat all DERs, Component DERs, and DERAs in a transparent and non-discriminatory manner.

V. N. Billing Issues (ANOPR, p. 45)

The PUC seeks comment on whether and how it could make the billing relationships between EDC customers, DERAs and EDCs transparent to the customer, consistent with Order 2222 and PJM's DAPM, and whether and what specific changes to the PUC's policies and regulations could facilitate such transparency.

The billing relationship between EDC customers and DERAs should be a standalone dual-billing process that is conducted separate from the billing relationship between EDCs and their customers. If the EDC is involved in the billing between DERAs and their customers, there is a risk of non-collectables being assigned to ratepayers, increases in utility debt collection costs, and potential disputes of how to resolve partial payments.

V. O. Equity Concerns (ANOPR, p. 45)

The PUC seeks comment on how to identify and address potential equity concerns associated with the expected proliferations of DERAs in Pennsylvania in the coming years.

The penetration of DERs, such as solar PV panels, has disproportionately benefitted wealthier, home-owning, consumers who have the available financial resources to allow PV installation and avail themselves of net metering retail incentives. The PUC should track the installation of DERs, Component DERs, and DERAs to assess potential equity concerns associated with the expected proliferation of DERAs in Pennsylvania in the coming years. It could do so by requesting voluntary disclosure of socio-economic data, with privacy and confidentiality provisions, as part of the interconnection process.