DER Aggregator Participation Model: Overview

Maria Belenky
Market Design, PJM

NJBPU Technical Conference
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Key Terms

The **DER Aggregator Participation Model** allows DER aggregations to participate in PJM wholesale markets where technically capable.

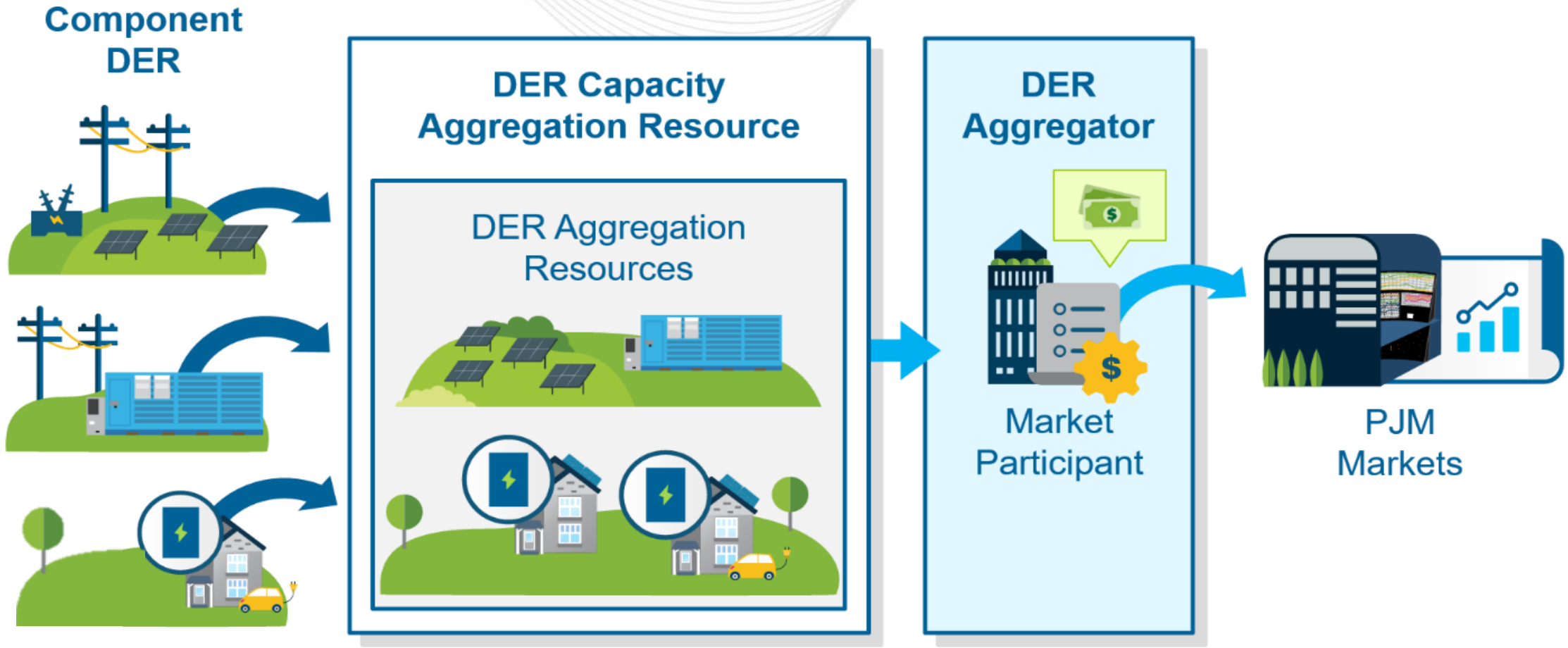
"Component DER" is a resource that is located on a distribution system that participates in the Energy, capacity and/or ancillary services markets of PJM through the DER Aggregator Participation Model. A Component DER may not exceed 5 MW. A Component DER is associated with one EDC account number and may include several "DER."

"DER Aggregation Resource" comprises one or more Component DER and is the "market unit" used by a DER Aggregator to participate in PJM's wholesale market. A DER Aggregation Resource must be at least 100 kW.

"DER Capacity Aggregation Resource" comprises one or more DER Aggregation Resource that participates in the Reliability Pricing Model.

"DER Aggregator" is the entity that aggregates one or more DER for purposes of participation in the capacity, Energy and/or ancillary service markets of the RTOs/ISOs.

PJM DER Aggregation Model Framework



Capacity Must Offer: No

Locational Requirement: PJM zone

Accreditation:

The capacity value of a DER Capacity Aggregation Resource will be determined by summing the capacity values of the underlying Component DER, calculated based on the rules for the underlying technology type.

Mitigation:

DER Capacity Aggregation Resources will be subject to the MOPR and MSOC in accordance with the rules for the underlying technology type. The offer price should be no lower/higher than the megawatt-weighted average of the aggregated resources in the Sell Offer.

A DER Capacity Aggregation Resource may segment offers for the Component DER subject to mitigation, based on the underlying technology of the Component DER.

Energy Must-Offer Requirement:

Yes

Testing:

DER Aggregation Resources with a capacity commitment must simultaneously test all Component DER within the aggregation at least 1x/DY; the DER Aggregator may perform an unlimited number of tests.

Registration

Process: A complete registration form must be submitted for each Component DER and DER Aggregation Resource.

Locational Requirements:

All Component DER within a DER Aggregation Resource must share a primary pricing node, except those participating in the limited multi-nodal option.

A DER Aggregation Resource may be multi-nodal if it consists of no more than one Component DER or group of Component DER at a single pricing node that is >100 kW and is within one EDC territory and state. The RTO cap on multi-nodal resources is 167 MW.

EDC Review:

Two periods: a 15-day period to review a Component DER and a 45-day period to conduct any incremental reliability assessment of the DER Aggregation Resource

Double Counting:

The EDC is to review Component DER for retail/wholesale double counting based on whether the same service is also being provided at the retail level.

Component DER located at a NEM premise are permitted to participate with injections in ancillary services markets only.

DA/RT Market Operations

Commitment & Dispatch:

DER Aggregation Resources must be self-scheduled into the DA/RT Market with a fixed megawatt quantity or a dispatchable range (i.e., PJM will not commit these resources but will dispatch them economically based on the dispatchable range).

A multi-nodal DER Aggregation Resource must self-schedule into the DA/RT Energy Market at a fixed megawatt quantity; it is not permitted to indicate a dispatchable range.

Price/Cost Offers:

DER Aggregators are to submit both price and cost-based offers.

DER Aggregation Resources that consist of Component DER that do not have the technology type documented in PJM Manual 15 will have a default cost-based offer of $0/MWh.

Overrides:

EDC may override PJM dispatch to preserve distribution system reliability; DER Aggregator should update the applicable bidding parameters of the affected DER Aggregation Resource to reflect the override.

DERAs are not eligible for LOC or PAI excusals due to EDC override and will be subject to any applicable deviation changes/penalties.

Metering & Telemetry

Metering: Component DER must have metering equipment that provides integrated hourly kilowatt-hour values on an EDC account basis.	• For non-interval metered residential DER Aggregation Resources, the Aggregator must ensure that a representative sample of Component DER have metering equipment that provides integrated hourly kilowatt-hour values on an EDC account basis. • Metering equipment must have a maximum error of +/-2% over the full range of the metering equipment.
Telemetry: The DER Aggregator must provide telemetry for each DER Aggregation Resource.	• Telemetry is not required if the aggregation is less than 10 MW and is exclusively participating in the energy market, with the exceptions described in the PJM manuals. • DER telemetry will be required on a one-minute scan rate, except where the service the DER Aggregation Resource is providing requires faster scan data (e.g., regulation).

Settlement

Provision of Meter Data:
The DER Aggregator must provide all individual Component DER meter data necessary to facilitate the settlement of the resource.

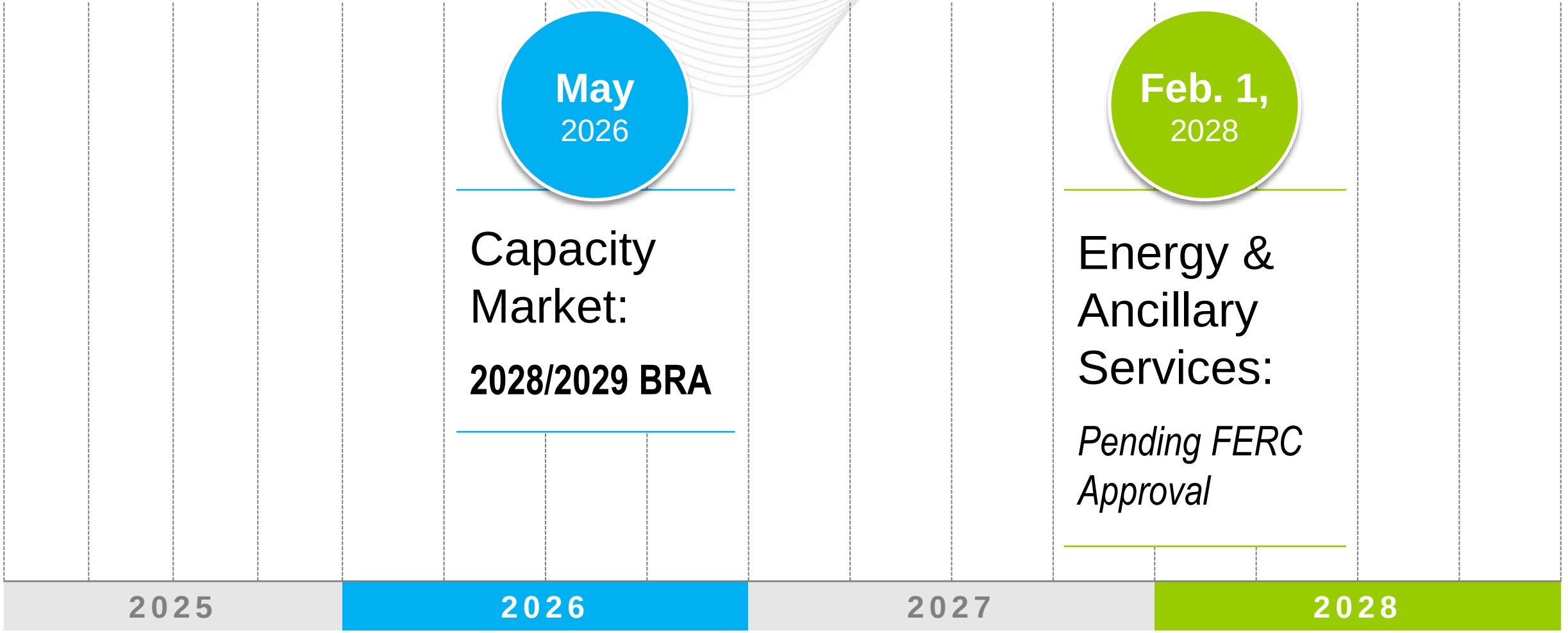
Meter Data Submission Deadline:
Meter data for all Component DER within an aggregation must be submitted the next business day.*

Settlement:

- PJM will settle a DER Aggregation Resource by summing all load reduction and injection megawatt-hours for the underlying Component DER within the aggregation.
- Component DER located at a NEM premise participating with injections in ancillary services markets will not be settled for energy.
- Order 745 rules will apply for DR resources that are part of DER aggregations.

** Pending FERC approval*

Implementation Dates



Contact

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DER Aggregator Participation Model

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AN EXELON COMPANY

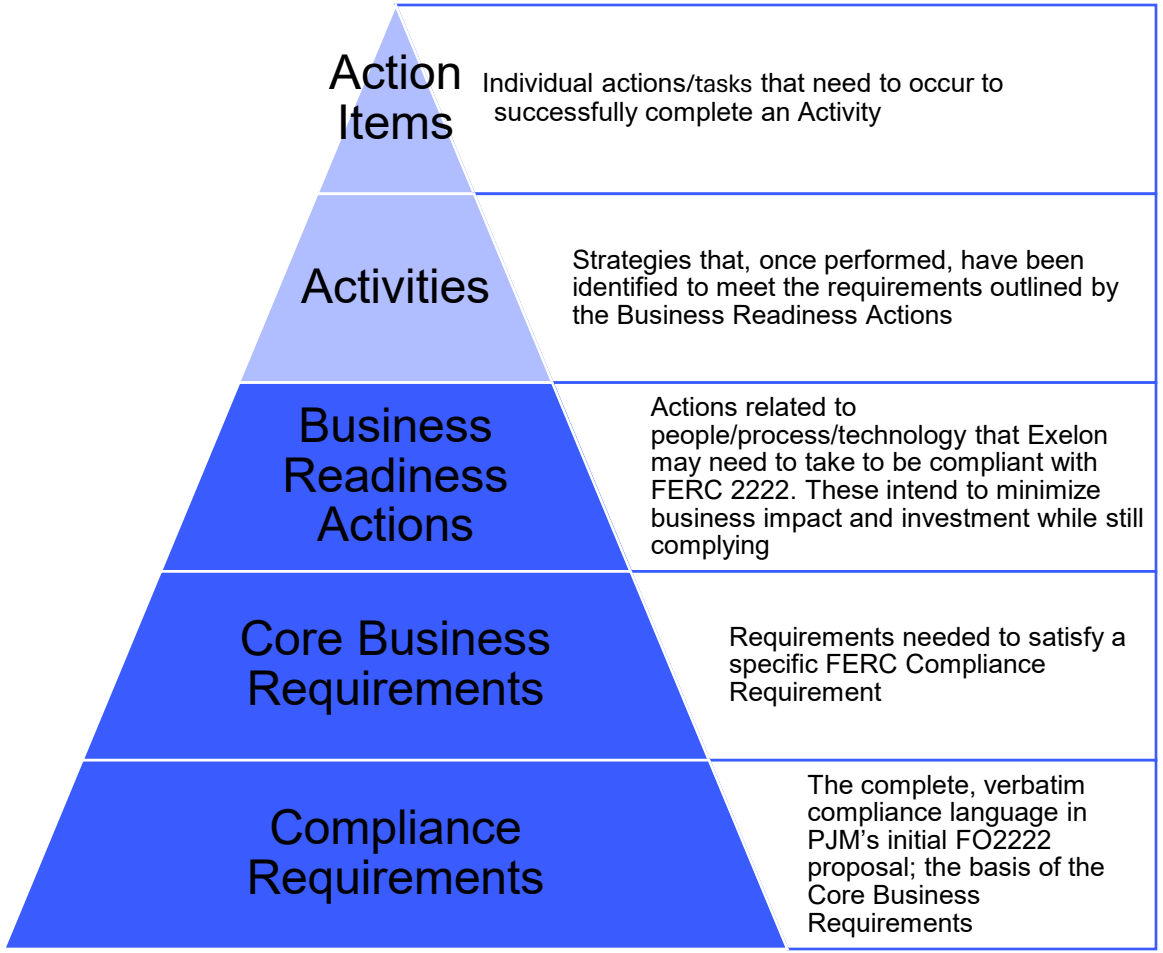
January 17, 2025

DER Aggregation Registration and Other Processes

Jequita Fowler| Principal Business Program Manager, Smart Grid

Meeting Compliance at ACE

- Utility developed Program Management Plan to meet requirements for FERC Compliance.
- Overseeing the compliance efforts led by the respective business organization's Implementation Lead.
- Establishing a framework to identify and communicate risks to sponsors and stakeholders, minimizing their impact on compliance
- Creating a structured accountability system where each Team Lead identifies the necessary work, tasks, and costs to meet FERC business requirements
- Steering a change management process, facilitated by each business organization, to implement the necessary changes in processes and systems



A Program Management Plan was developed across the utility to outline the strategic steps necessary for ACE to achieve Day 1 compliance with FERC Order No. 2222 and meet the targeted outcomes.

Targeted Outcomes

60-DAY REGISTRATION REVIEW

Enable registration of DER aggregators and a seamless customer experience

CUSTOMER JOURNEY GAP

Enable seamless customer journey for existing PHI DER customers considering aggregation

METERING AND BILLING GAP

Enable metering compliance and data sharing for accurate customer billing

ENGINEERING IMPACT ANALYSIS

Enable assessment of distribution reliability risks due to proposed DER aggregations

OPERATIONAL COORDINATION

Enable operators to safeguard reliability by coordinating with DER aggregators and PJM

Best Practices for FERC Order No. 2222 Retail Regulation Implementation

Coalition Advocating DER Regulation Efficiency ("CADRE")

Frank Lacey

January 17, 2025

Overview

- Introduction
- Best Practices for DER-related Retail Regulations for DER Participation in Wholesale Markets
- Conclusions

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Introduction

Introduction

- Coalition Advocating DER Regulation Efficiency (“CADRE”)
  - Evolving Coalition
    - DR Providers
    - Retail Energy Providers
    - Solar Energy Providers
    - Storage Resource Providers
    - Trade Associations
  - Focused on Assuring Regulation Efficiency that Allows for Competitive DER and DER Aggregation Markets.
  - All Consumers Win.

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Introduction

FERC Order No. 2222 establishes distributed energy resources ("DER") and DER aggregations as electricity resources able to participate in wholesale energy markets. FERC has required that the wholesale market operators (PJM for the New Jersey electricity market) modify their operating platform to allow DERs to participate in energy, capacity and ancillary service markets to the extent feasible. This state docket (EO24020116) is focused on developing state jurisdictional policies required to implement a federally-regulated service. CADRE's comments focus on retail integration of a wholesale product. We also describe some opportunities that the Board could implement to maximize the value of DER. These comments are not intended to limit the Board's ability to develop, design or implement retail DER programs. In fact, we encourage the Board to implement retail DER programs. This clarification is important so that the Board, the EDCs and other stakeholders will better understand the difference and the scope of CADRE's comments in this docket.

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Best Practices

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Best Practices for DER Regulations

1. **Define DER and DERA**
   - Distributed Energy Resources ("DER") and DER Aggregators are new wholesale market participants, enabled by FERC Order No. 2222.
   - DER are not Third Party Suppliers ("TPS"), DR providers, BGS Suppliers, or any other service provider defined in NJ energy regulations
   - Don't force fit these market participants into regulations designed for other services.
   - DER and DERA are federally regulated, wholesale electricity market entities and need to interact with the EDCs to facilitate service to customers.
   - Retail (state) regulations should be focused on and limited to the EDC/DERA relationship.
2. **Licensing of DER Aggregators**
   - DERA Licensing may be appropriate in order to facilitate timely and effective metering and customer-related data transfers and other interactions between the DER aggregators and the EDCs.
   - Licensing could be a pre-requisite to engage in Board's dispute resolution process

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Best Practices for DER Regulation

3. Recognize the state/federal jurisdictional boundaries

- DER participation can be both a wholesale market service and a distribution-level service (this proceeding focuses on wholesale)
- There are areas that fall into the Board's jurisdiction, for example, the DER aggregators' interface with the EDC.
- Other areas, such as the contract with the customer and the customer interface, are not state-jurisdictional when the resource participates in the wholesale market.
- Do not feel compelled to over-regulate.

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Best Practices for DER Regulation

4. Interconnection

- "*Allowing for bi-directional flow increases the amount of DERs that can be interconnected at that location when the infrastructure is in place to handle the changing demand and generation profiles. … While each electric public utility distribution system is unique, utilities are fully expected to meet these future needs by adopting a potentially standardized and coordinated approach to maximizing distribution level flexibility and replacing grid infrastructure that is not designed for the modern grid. These grid modernization costs should be included in future rate filings*." 2019 New Jersey Energy Master Plan, p. 178.
- Costs for interconnections should be tariff-based and fixed to a $/kW charge or socialized across all distribution customers.
  - Allows for fair and competitive interconnection process
  - Eliminates first mover advantages/disadvantages
  - Speeds interconnection process
- Interconnection processes should be automated, streamlined and have defined utility response times at every step of the process.
- Interconnection processes should be similar across all EDCs.

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Best Practices for DER Regulation

5. **Distribution Level Benefits**
   - DERs can provide distribution benefits if EDCs utilize the resources to relieve constraints.
   - EDCs should deploy DERs and DER aggregations in retail programs to maximize benefit of DER resources.
   - DER aggregations participating in wholesale markets are built at no cost to the EDCs.
   - Can be used to manage distribution constraints
   - DERs provide benefits to EDCs by allowing them to avoid or delay capital investment
   - The Board should develop programs that allow EDCs to utilize these aggregations to relieve constraints while managing or delaying grid investments.

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Best Practices for DER Regulation

6. Cost Allocation

- "*The state should direct the electric public utilities to develop plans that integrate grid modernization and capacity improvements that support demand growth from electrification, demand flexibility, DER penetration, grid resilience, and grid efficiency.*" 2019 New Jersey Energy Master Plan p. 176.
- Grid is evolving and growing.
- Modern grid needs to support:
  - Order No. 2222 implementation,
  - Distribution level DER aggregations,
  - EV charging,
  - General electrification initiatives,
  - Renewable resources, and
  - Other new technologies.
- Customers benefit from grid evolution and new technologies.
- Allocating costs to individual customers creates first mover disadvantages, slowing grid evolution.
- Traditional distribution allocation approaches will continue to provide value to all customers.
- DERs participating in wholesale markets will reduce energy, capacity and ancillary services costs for all customers.
- Distribution costs flowing to ratepayers can be offset by those savings.
- Customers can also benefit from retail (state developed) EDC DER programs.

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Best Practices for DER Regulation

7. **Double Compensation**
   - Determination of double compensation falls to the Board.
   - Multiple services can be provided at the same time.
   - Providing two or more services is fundamentally different from being compensated multiple times for the same service.
   - Wholesale and retail services provide different benefits to different constituencies.
   - The Board should expressly allow and encourage the provision of multiple services from DERs and DER Aggregations.
8. **Metering**
   - Enable, but not require, device level metering.
   - Device level metering allows contribution from individual resources, like storage, when other resources at the same location might not be able to provide service.
   - PJM currently prohibits resources co-located with a NEM resource from providing energy and capacity services.
   - PJM has encouraged stakeholders to develop device level metering practices. PJM is looking for leadership from states and EDCs on this issue.
   - EDCs need to develop metering systems that will provide customers and their DER agents access to real-time metering data.

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Best Practices for DER Regulation

9. **EDI Upgrades**
   - Data needs for effective DER services are robust.
   - Real-time data is a requirement to maximizing consumer benefit from DER participation in wholesale markets.
   - The Board should begin investigating DERA needs and implementing modern data transfer protocols at EDCs.
   - This investigation should be opened ASAP, preceding other regulatory changes.
10. **Dispute Resolution**
   - Enable rapid dispute resolution processes.
   - EDC rejection of DER registrations and EDC dispatch overrides will be costly to consumers and DER service providers.
   - Commissions should work to enable rapid solutions to EDC/DERA disputes on these issues.

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Best Practices for DER Regulation

11. **EDC Dispatch Overrides**
    - Override rules and process should be completely transparent.
    - PJM does not provide relief to a DER aggregation that is dispatched, but the dispatch is over-ridden by EDC.
    - If an EDC override is found to impose unnecessary costs on DERA, the EDC should be responsible for those costs.
    - Those costs should not be recoverable in distribution rates.
12. **EDCs acting as DERAs**
    - In restructured energy markets, EDCs should leverage third-party providers to operate DERAs in competitive wholesale energy markets.
    - EDCs acting as DERAs in wholesale markets will have a natural business interest in exerting competitive advantage in registrations, overrides and other areas that could impose significant harm on DERs and DER Aggregators.

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Best Practices for DER Regulation

13. **Billing**
    - Waive existing retail billing requirements for DER services provided by TPS providers.
    - DER products might not be kW- or kWh-based.
    - DER aggregator might offer to pay or charge a customer $XX.00 per month to provide retail electric service tied to the ability to manage solar, storage and EV charging.
    - Allow and encourage flexibility.
    - These are products regulators have been seeking since the advent of restructuring.
    - If a DER product cannot be billed appropriately, it cannot be sold to a customer.
14. **Equity**
    - The Board should recognize that any DER market participation benefits all customers.
    - Enable programs to support lower-income customers who wish to participate in DER markets.

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Conclusion

Summary

- Efficient DER retail regulations should be creative and flexible and recognize that the grid, and usage of the grid is evolving.
- DER and DER aggregations will provide customer benefits.
- FERC Order No. 2222 aggregations provide a valuable wholesale service.
- The same aggregations can provide value at the retail level if EDCs are required to utilize those resources.
- The 2019 NJ Energy Master Plan supports robust development of the grid and a fully functioning DER market.

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Electric Advisors Consulting is a firm dedicated to helping electricity market participants find business solutions in the maze of regulations impacting them. Frank Lacey is the founding Principal of the firm. Frank has worked in the energy field at the intersection of regulation and business strategy for over 30 years.

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DER Registration Processes

NJ BPU Technical Conference for FERC Order 2222 | January 17, 2025

Introduction to Voltus

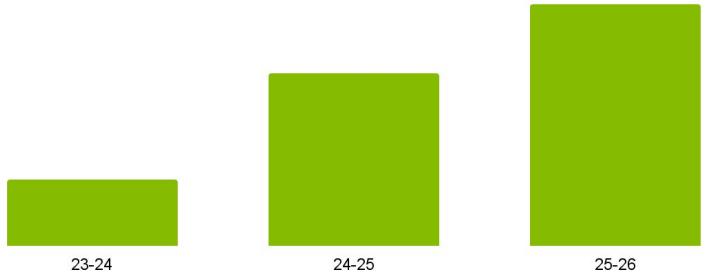
Voltus's distributed energy resource (DER) platform connects DERs to wholesale markets.

Voltus manages thousands of DER megawatts in wholesale capacity, ancillary service, and energy markets.

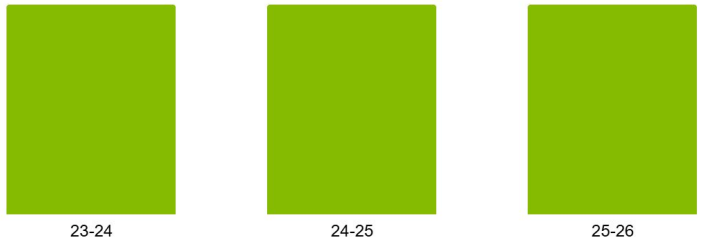
Voltus is the **only** provider in **all nine** US and Canadian power markets

DER Scale is Happening Now

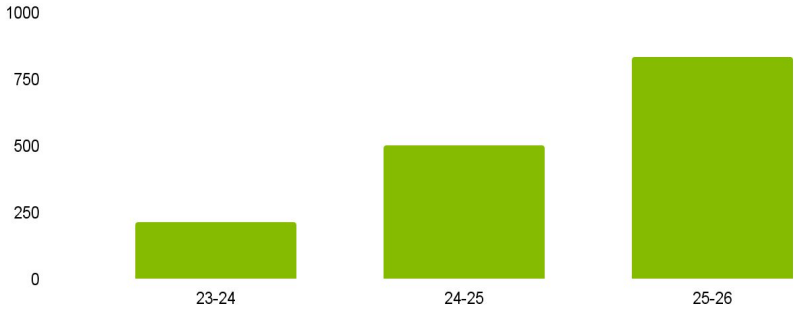
Voltus PJM Capacity MW



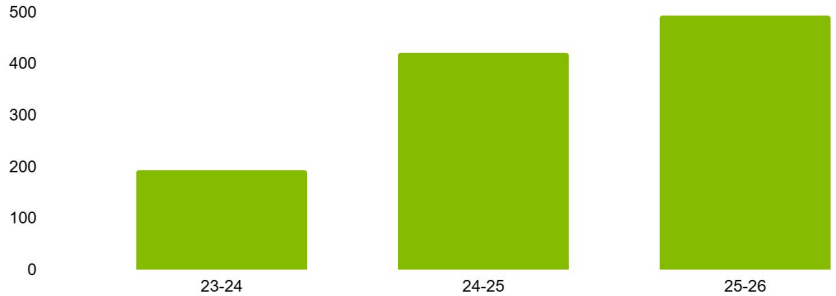
Voltus Synchronized Reserve MW



Voltus PJM Capacity Sites



Voltus Synchronized Reserve Sites



Location Detail

Cancel | Save | Register | Copy

Export: XML

Location *

EDC Account Number *

Location ID

Address Line 1

City

CSP VOLTUS

EDC * DLCO

Business Segment: Data Center with Crypto Mining

Address Line 2

State * PA

Status: Active

Zone * DUQ

Zip Code

Pricing Point

Allow EDC to submit data

Allow LSE to submit data

Utility Residential Participation?

Meter Equipment

Add Meter Equipment

Meter Type	Meter Equipment	Status	Review Date	Interval	Installation Date	Installation QA Plan	Certification
CSP Meter	Voltus/Voltlet	Approved	09/30/2021	Minute	02/10/2022	Voltus Meter QA V3	I certify the meter has been installed according to this QA Plan.

(1 of 1) 1 5

1 record(s)

Registration Input

Peak Load Contribution (kW)

Winter Peak Load (kW)

Capacity Loss Factor 1.00800

Energy Loss Factor 1.03700

Max Load (kW)

Maximum Load Reduction Capability (kW)

Load Reduction Method

Manufacturing (kW) 0.000

HVAC (kW) 0.000

Generator (kW) 0.000

Number of Generators 0

Batteries (kW) 0.000

Lighting (kW) 0.000

Water Heaters (kW) 0.000

Refrigeration (kW) 0.000

Plug Load (kW)

Registrations

Reg ID	Registration Name	Program	Status	Effective Date	Termination Date	LSE
		Economic	Confirmed	07/20/2024	08/24/2025	FESC
		Load Management DR Full	Confirmed	06/01/2024	05/31/2025	N/A

Registration Detail

Cancel | Save | Change End Date | Copy | Extension | Search | Resource Outage

Export:

Name * | CSP: VOLTUS | Status: CONFIRMED

Reg ID | Program *: Economic | Hold Scheduling | Hold Settlement

Effective Date *: 07/20/2024 | Termination Date *: 08/24/2025 | Allow Modification: EDC, LSE

EDC DLCO (Large) ZONE: DUQ | LSE FESC | Pricing Point

Residential Registration?

Markets

RT Energy | Regulation | Synchronized Reserve | Secondary Reserve

DA Energy | Inflexible | Flexible | Batch Load

CBL Test

CBL Method: Manual

+ Submit CBL Test | Add CBL Test | + Upload Meter Data

		Basis Window						RRMSE					
Action	Report Type	Start Date	End Date	Start Hour	End Hour	CBL Method	Date Run	Score (%)	Result	# of Days	Run status	Summary	Submitted by
	RRMSE	04/02/2024	05/31/2024	14	19	3 Day Types with SAA (DEFAULT)	06/20/2024	10.777	Fail	29	Successful		

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1 record(s)

Synchronized Reserve

SR Area: RTO | + SR Information

Locations

Energy Loss Factor: 1.037 | Maximum Load Reduction Capability (kW)

Actions	Location ID	Location	Status	Zone	EDC Account Number	Pricing Point	Address	Energy Loss Factor	Max Load Reduction (kW)	Meter Type	RERRA
			CONFIRMED	DUQ		DUQ_RESID_AGG				CSP_METER	N/A

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PJM Systems Handle DERs at Scale Today

Enrollments, EDC and LSE review, data submission all in DR Hub portal

- Creation of “locations” and “enrollments”
- Qualification of metering hardware.
- Qualification of DERs for particular market products and special baselines.
- Process to avoid duplicate enrollments of the same location by multiple market participants.
- Process to avoid simultaneous dispatches for capacity/energy/ancillary services.
- EDC and LSE review of enrollments
- Submission of interval data to calculate performance after emergency, ancillary service, or energy dispatches.
- EDC review of meter data accuracy after dispatches.

Challenges

Based on Voltus's experience

- Mismatch between owners and providers of data. DER aggregators are asked to submit:
  - Pricing node
  - Peak Load Contribution (PLC)
  - Hourly interval data
- No automated/efficient way to flag when customers switch LSEs and pricing nodes.

PSEG

FERC Order No. 2222 Technical Conference

January 17, 2025

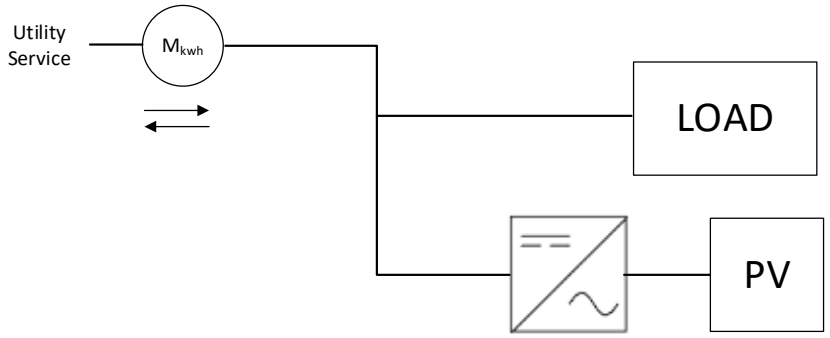
Panel 2: Operational and Technical Review

James G. Hubertus, Senior Director, Asset Strategy, Technology and Systems

FERC 2222 – Metering Challenges

Current State

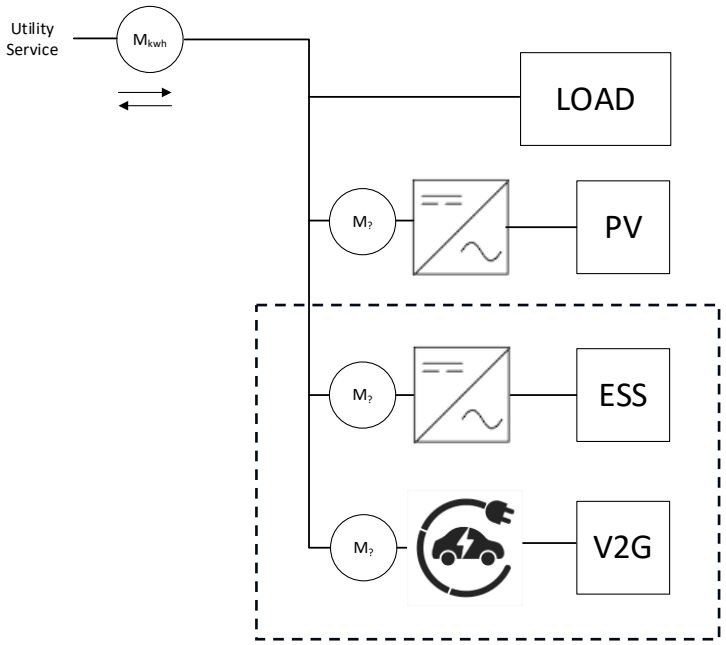
- Utility owns meter at the fence line which provides all required information for customer billing and load settlement, including net meter customers
- Does not go behind the meter



FERC 2222 – Metering Challenges

Potential FERC 2222

- If DER's are to play in other markets, then a new meter may now need to be installed at PV point of connection per PJM requirements
- Additional metering may be required for batteries, Vehicle to Grid, etc depending on requirement
- EDC must be able to properly measure or derive the retail load



Questions

- Who owns, maintains, reads the additional meters?
- What systems are required to support? AMI can help, but will need enhancements
- Utility vs. Aggregator responsibilities?

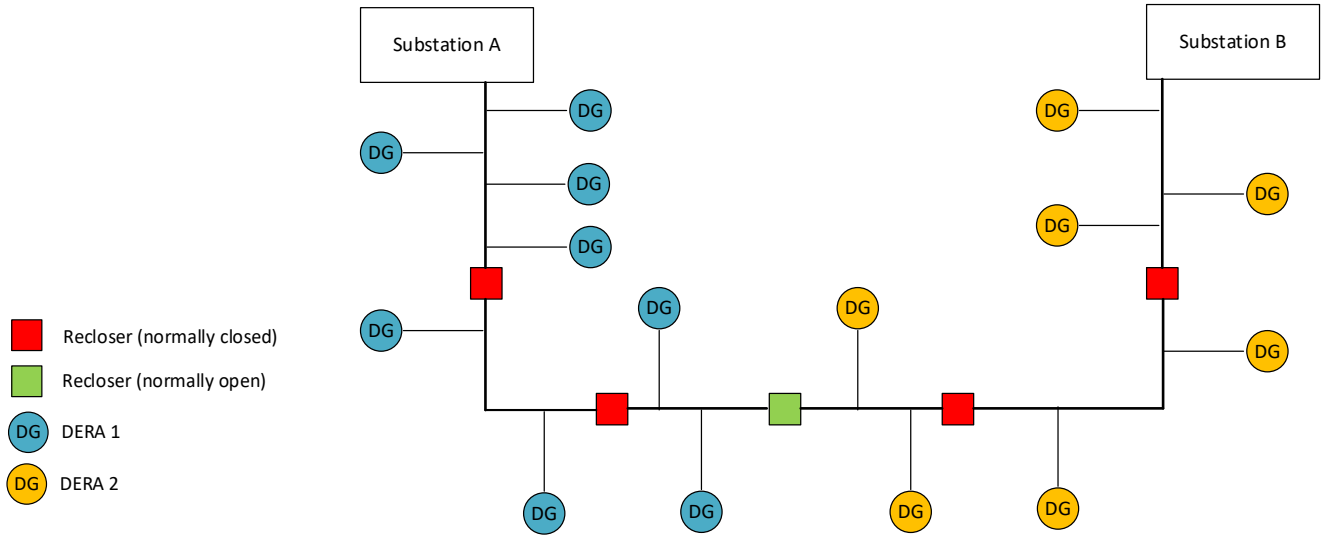
Takeaway – Depending on rules, FERC 2222 implementation may require new metering assets, systems, people and processes

FERC 2222 – Operating Challenges

Normal Operation

DERA – Distributed Energy Resource Aggregator

- DERA 1 resources operate on common circuit from Substation A
- DERA 2 resources operate on common circuit from Substation B



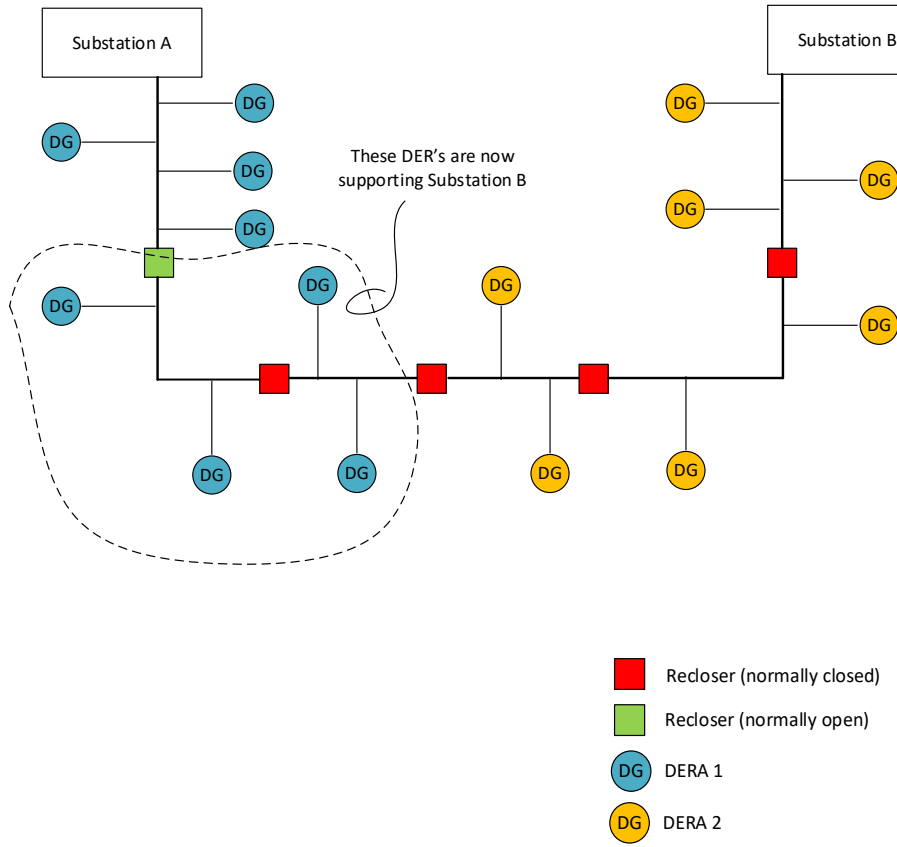
FERC 2222 – Operating Challenges

Abnormal Operation

- Utility needed to reconfigure the reclosers for work, some DERA 1 resources feed Station B

Questions/Challenges

- EDC will need to reconfigure circuits for various reasons, often times with no advanced notice. Under these scenarios, what are the roles for EDC, Aggregator, Dispatch Agent and PJM?
- If a section needs to be removed from service, what are consequences for not meeting obligations?
- With large increase in DERs, EDC's will require enhanced visibility and operability of Distribution networks (DERMS, DMS)



Takeaway – EDC must maintain the ability to safely and reliably operate the system, which will affect DERA operation

Distribution Utility – Technology

DERMS (Distributed Energy Resource Management System)

Purpose: DERMS provides real-time monitoring, control, and optimization of distributed energy resources.

Support for FERC 2222:

- Aggregation Management: Coordinates DERs as virtual power plants (VPPs), enabling them to meet wholesale market requirements
- Market Participation: Interfaces with wholesale market operators (ISOs/RTOs) to bid aggregated DER services (e.g., demand response, energy storage, generation)
- Real-Time Grid Operations: Ensures DER actions align with grid reliability, safety, and operational constraints
- Forecasting and Optimization: Forecasts DER availability and optimizes dispatch schedules to maximize value

DMS (Distribution Management System)

Purpose: DMS ensures reliable and efficient distribution grid operations, providing visibility and control over distribution assets.

Support for FERC 2222:

- Grid Visibility: Enhances situational awareness of DER locations, capacities, and statuses
- Operational Coordination: Manages coordination between aggregated DERs and traditional grid operations
- Outage Management: Incorporates DERs into restoration processes during grid outages
- Voltage and Reactive Power Control: Ensures DER contributions do not negatively impact voltage stability and power quality
- Scenario Analysis: Enables operators to model the impacts of DER aggregation and market participation on the grid

Takeaway – New systems will be required, scope determined by role of EDC

Cybersecurity & System Interoperability

Interoperability Standards

Data Protection and Privacy

System Security

Real-Time Monitoring and Incident Response

Compliance with Standards

From US DOE, Cybersecurity Considerations for Distributed Energy Resources on the U.S. Electric Grid, October 2022

"The DER industry must partner with energy sector and government efforts to address these challenges over the next decade. This means ensuring that new controls and software interfaces for these smart devices are cybersecure and standardized to mitigate emerging cyber risks. Securing DER also will require addressing the varying ways that DER operate, including their different controls and the fact that owner/operator entities do not have a defined role in securing the grid. Other challenges in addressing DER include assessing how DER cyberattacks could affect grid operations, creating a DER trust model, and extending supply chain security efforts to include DER."

Takeaway – EDC has strong cyber protection in place. DERs will be expected to meet EDC minimum requirements

NJBPU Technical Conference

Josh Keeling, UtilityAPI

January 17th, 2025

UTILITYAPI

About UtilityAPI

UtilityAPI provides secure data access and integration between utilities, states, and third parties in PJM and across North America

Fortune 500 Utilities

Leading Climate Tech Companies

Department of Energy-Funded Solution

GRID ALTERNATIVES

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FERC 2222: Data Access Challenges

- **Coordination across complex ecosystem of stakeholders**: DER Owners, DER Aggregators, CIS/MDM Vendors, EDC, PJM
  - Significant investment of time and resources by all to meet participation requirements
- **Numerous potential points of failure** due to complexities and fidelity requirements
- **Investments in grid modernization often disconnected** from 2222 implementation planning and bespoke to regulatory contexts
- **Interconnection and DERA registration** processes cumbersome, ambiguous, and opaque
- **Inconsistent deployments** between EDCs leads to higher costs and less transparency

Key NJ AMI Ruling Highlights

14:5-10.3 AMI Data Collection and Availability

- Each EDC shall collect billing quality interval usage AMI data, for all customers in intervals no greater than 15min
- Each EDC shall be capable of offering 5 minute data collection… No later than PJM’s planned implementation date for FERC 2222

14:5-10.4: Ownership and Sharing of AMI data

- Each EDC shall make a customer’s AMI data access available and shareable using the Green Button Data Standard
- Each EDC shall enable Green Button Connect and/or Green Button Download as a means for customers or their authorized agents to access AMI data

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FERC 2222 Data Sharing Responsibility Matrix

Order 2222 Requirement	EDC Responsibility	Key Gaps (Business as Usual)	Data Access Requirement
DER Qualification	Onboard, review and approve every DER participating in each Aggregation	Lack of customer or third party access to key parameters for qualification (e.g. pNode, T-zone, dual participation flags, interconnection constraints, etc.) DERA registration process used for data discovery	Single interface for aggregator data requests Ensure GBC includes relevant registration parameters pre-application
DERA Registration	Validate and record Letters of Authorization (LOA) for each DER within an aggregation	Manual process for acquisition and review with poor auditability Disconnect between interconnection and DERA data review	Digital LOAs, tracked and managed through settlement and auditing Automatic validation due to single source of truth
Settlement	Individually upload daily interval data for every associated DER, and for the Aggregation Pricing Node to PJM's DR Hub Review accuracy of DERA settlement data within ISO reporting mechanism	Revenue quality interval data not available within 24 hour requirement DERA reliance on own meters leads to disputes in settlement	Single source for aggregator and ISO, with logged notification, delivery and access events Interval data flows include both raw (<24 hr lag) and post-VEE data (24-72 hr lag)

Green Button Connect (GBC) and 2222 Implementation

Maximizing AMI Investments

- Broad-based solution already required through AMI rulings
- Only requires minor adjustments to serve 2222 implementation requirements
- Reduces OpEx (labor) costs and speeds processes for all parties

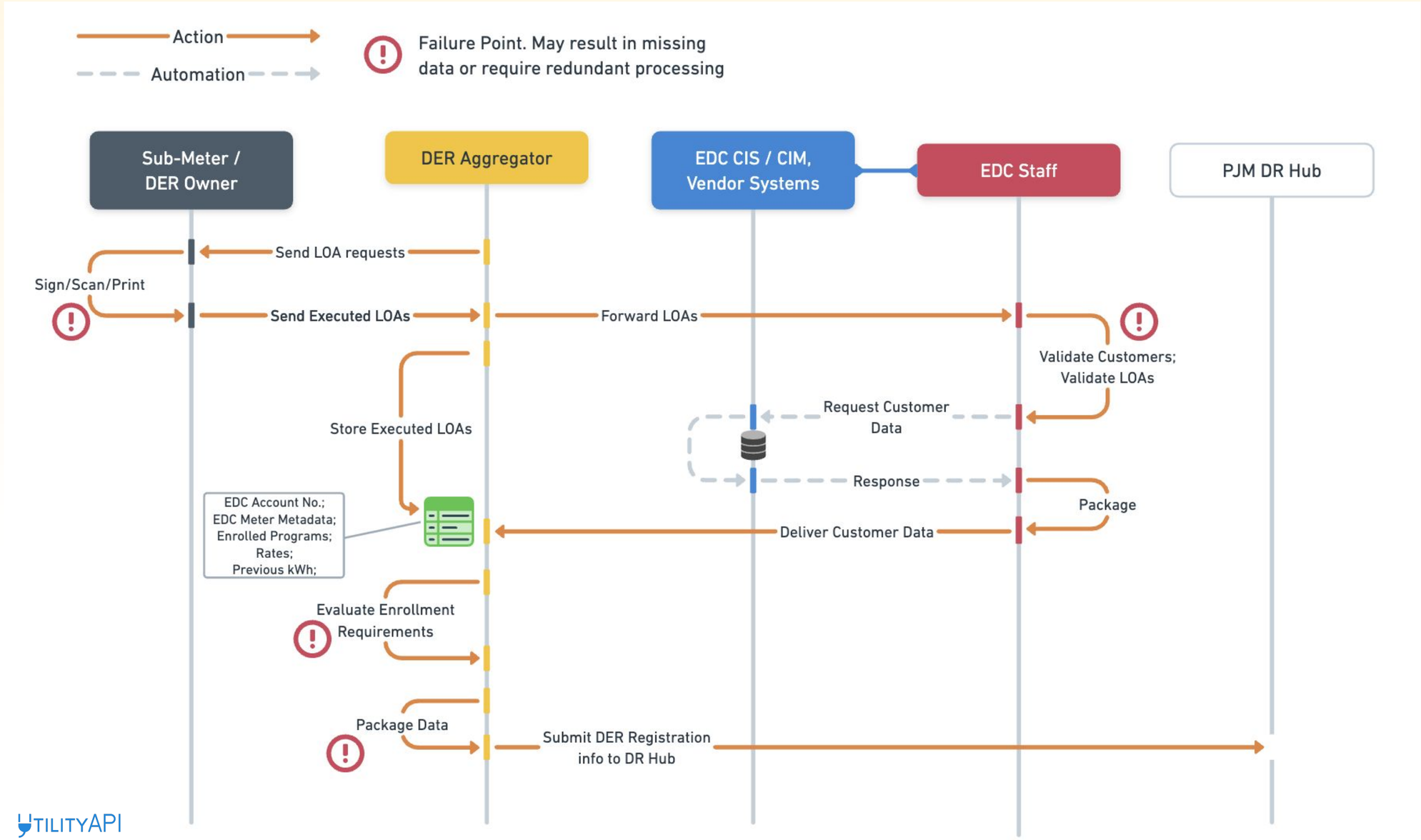
Security & Privacy

- Facilitates seamless, secure, auditable data transfer between customers, aggregators, EDCs, and PJM
- Enables authenticated consent to ensure customer rights are protected

Single Source of Truth

- Allows aggregators to screen customers early, reducing unnecessary applications
- Ensures a single source of truth, reducing disputes and errors

Enrollment and Review: Business as Usual



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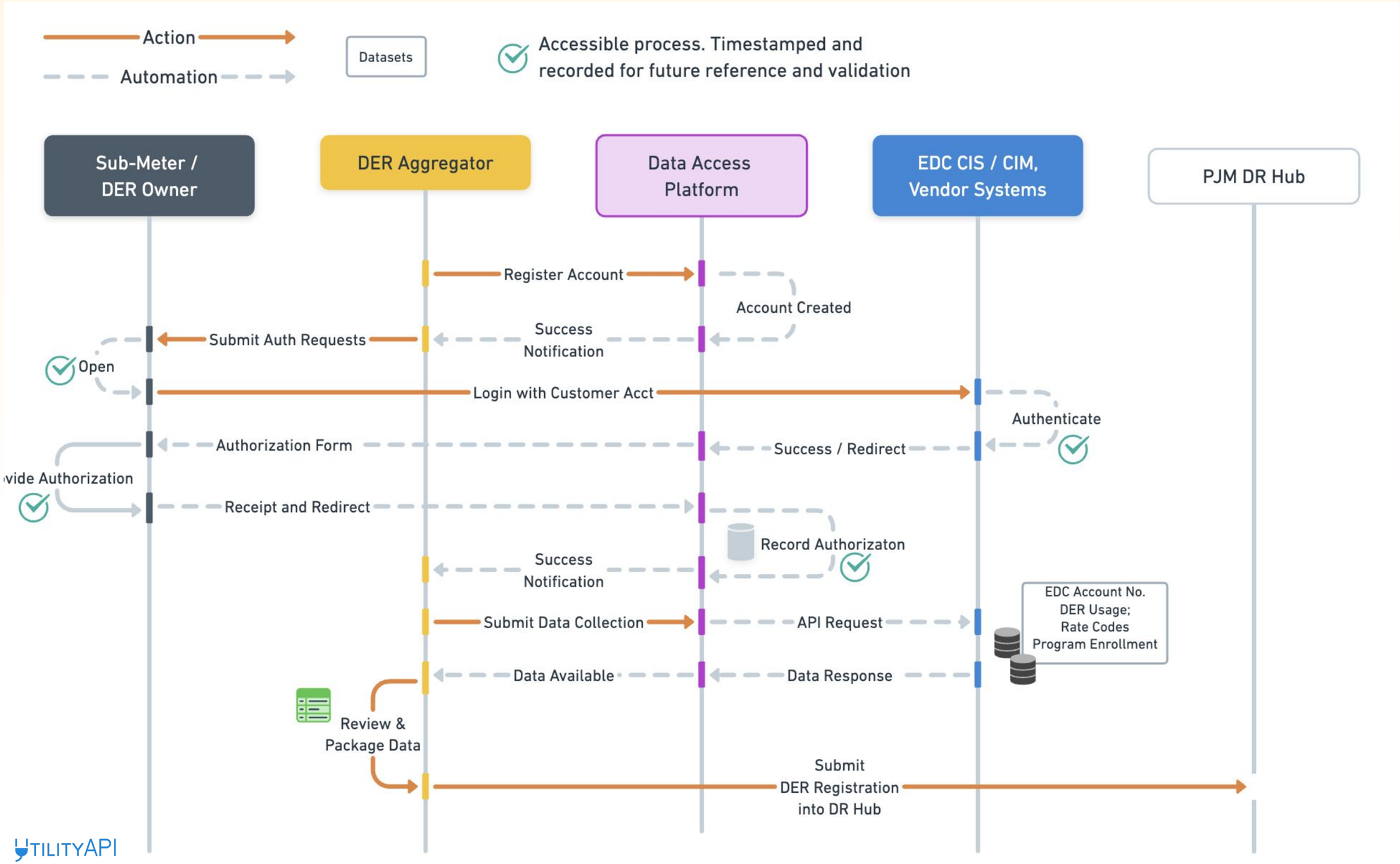
Enrollment and Review: Data Access Platform



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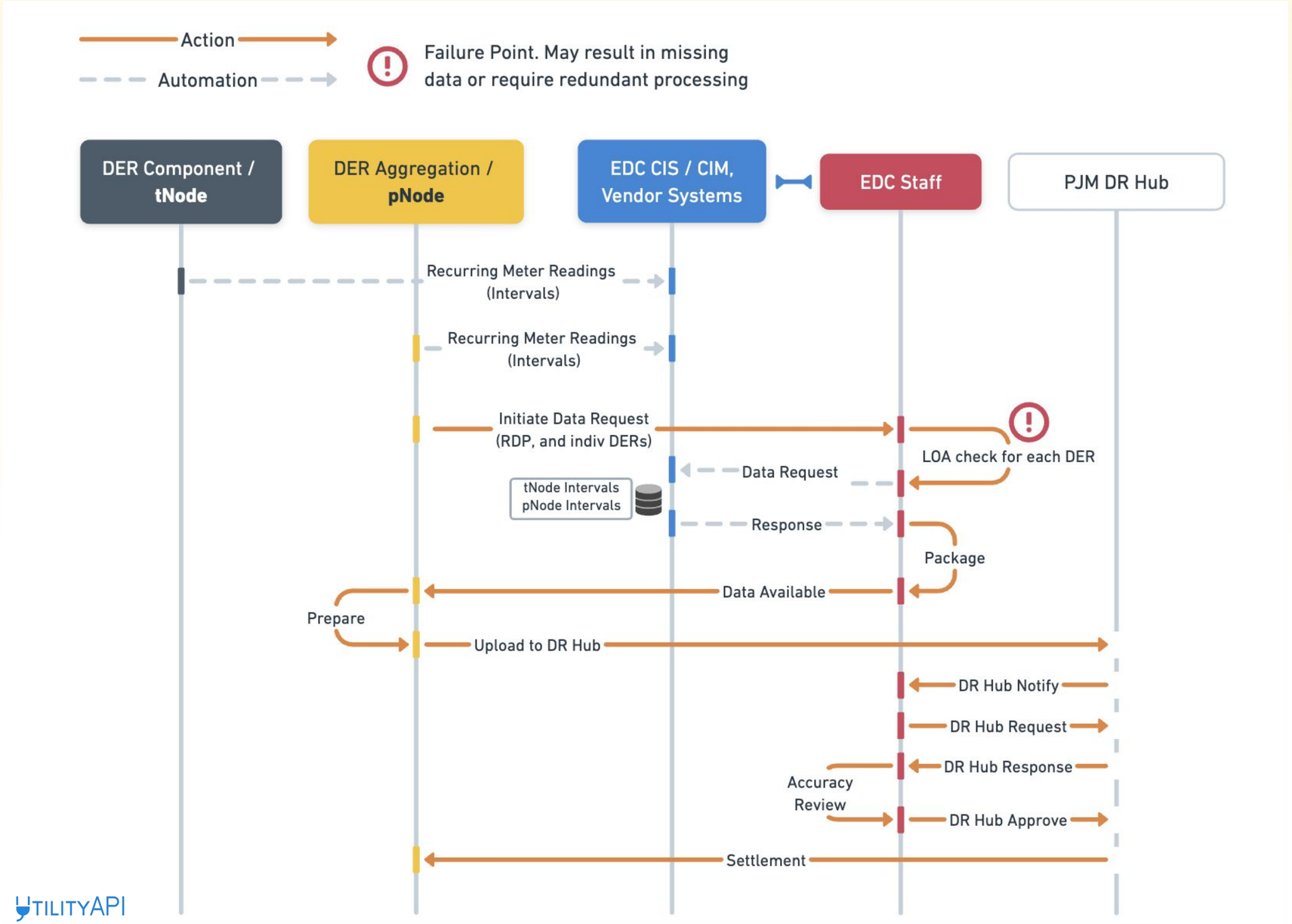
Settlement: Business as Usual



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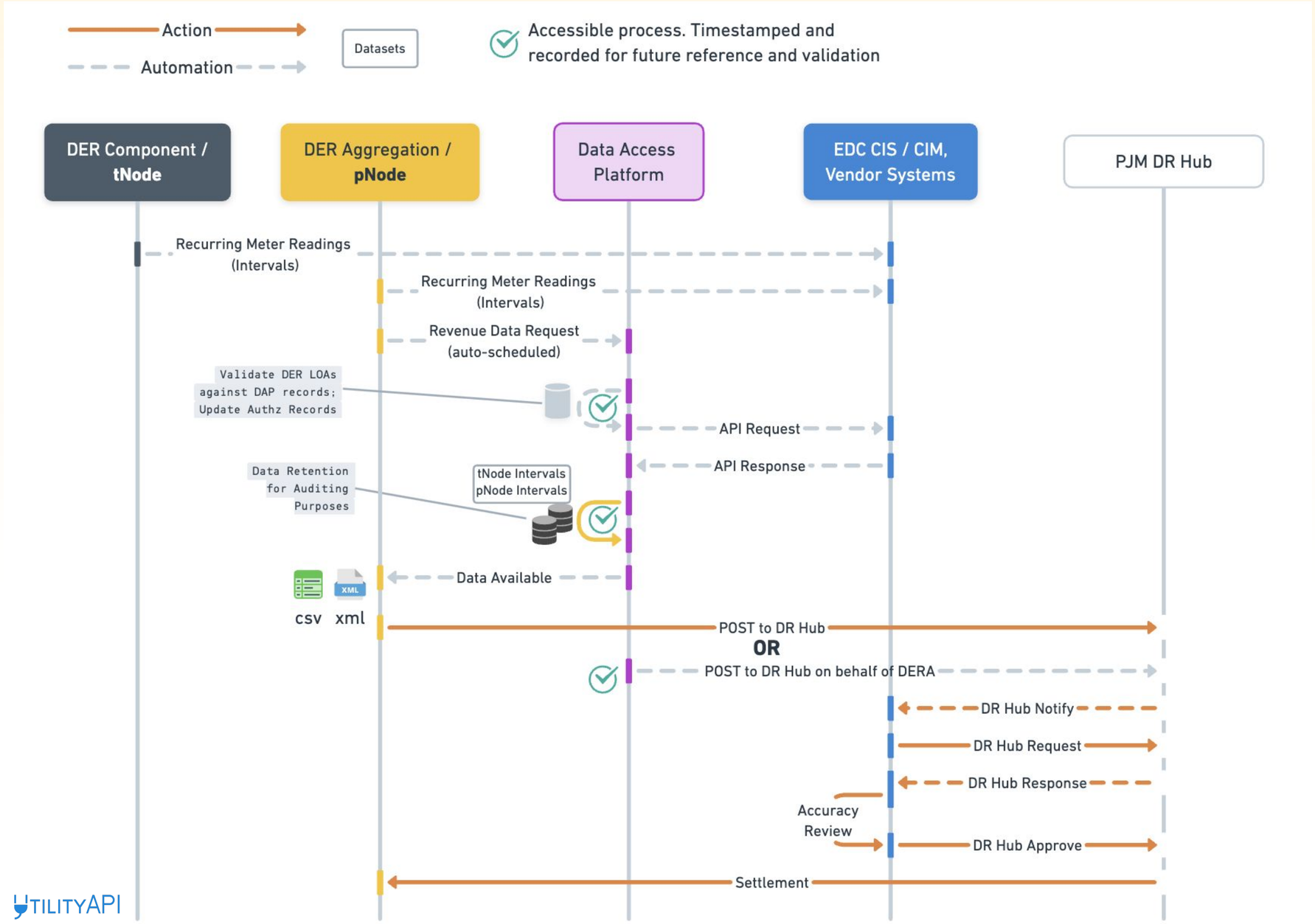
Settlement: Data Access Platform



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Impactful Data Access Practices for 2222

Sharing Registration Data Proactively

- **Action**: Provide key data around DERA registration/qualification within Green Button Connect (e.g. pNode, T-zone, dual participation flags, interconnection constraints)
- **Impact**: Reduces number of bad applications, allows aggregators to pre-screen sites, reduces customer confusion, lowers likelihood of disputes during DERA review
- **Level of Effort**: Very low if GBC already implemented, small integration and business process change.

Robust Settlement Data

- **Action**: Ensure interval data feeds in GBC can meet settlement requirements and provide option to automatically provide back end feed to PJM DR Hub (or equivalent), including raw and revenue quality AMI.
- **Impact**: Single source of truth reduces disputes and errors, including raw data provides intermediate solution to tight windows without having to reconfigure/replace meters; offsets manual validation processes.
- **Level of Effort**: Medium, depending on utility system configuration, but should not require new software solution if robust GBC in place.

Impactful Data Access Practices for 2222

Uniform Registration Process

- **Action**: Embed DERA registration process as track within GBC registration flow.
- **Impact**: Ensures common tracking of DERA activity and provides clear visibility of consent, data flows, terms and conditions, eliminates redundant manual processes, discourages use of manual Letters of Authorization (LOA).
- **Level of Effort**: Very low effort simply involving common agreement on terms and conditions.

Common Consent Process

- **Action**: Require GBC to include a common set of terms across utilities for consent, authentication, and authorization that includes multiple methods (SSO, MFA, one-time passcodes).
- **Impact**: Provides consistent, streamlined auditable, and secure method to ensure customer consent is truly and accurately achieved.
- **Level of Effort**: Very low effort simply involving common agreement on configuration.

Thank you!

Josh Keeling, Chief Growth Officer
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Dual participation, dispatch overrides, and telemetry requirements

January 2025

adhoc

Dual Participation

Each RTO/ISO must:

1. Allow distributed energy resources that participate in one or more retail programs to participate in its wholesale markets.

2. Allow distributed energy resources to provide multiple wholesale services.

3. Include any appropriate restrictions on the distributed energy resources' participation in RTO/ISO markets through distributed energy resource aggregations, if narrowly designed to avoid counting more than once the services provided by distributed energy resources in RTO/ISO markets.

FERC O. 2222 at 160.

Dispatch Overrides

Each RTO/ISO must:

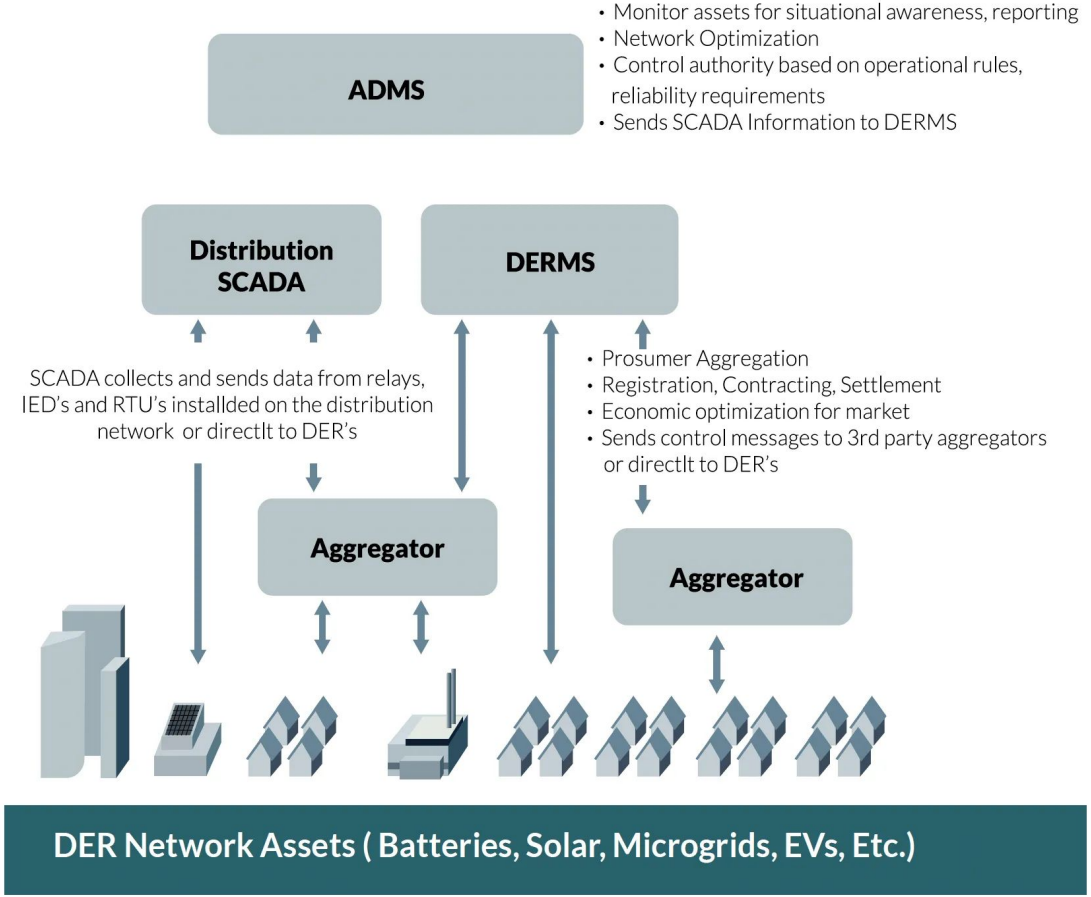
- Include coordination protocols and processes for the operating day that allow distribution utilities to override RTO/ISO dispatch of a DERA in circumstances where such override is needed to maintain the reliable and safe operation of the distribution system.

- Ensure that such processes be non-discriminatory and transparent but still address distribution utility reliability and safety concerns.

FERC O. 2222 at 310.

Telemetry requirements

IT/OT infrastructure considerations



GridSME: An Introduction to ADMS and DERMS

atlantic city electric℠

AN EXELON COMPANY

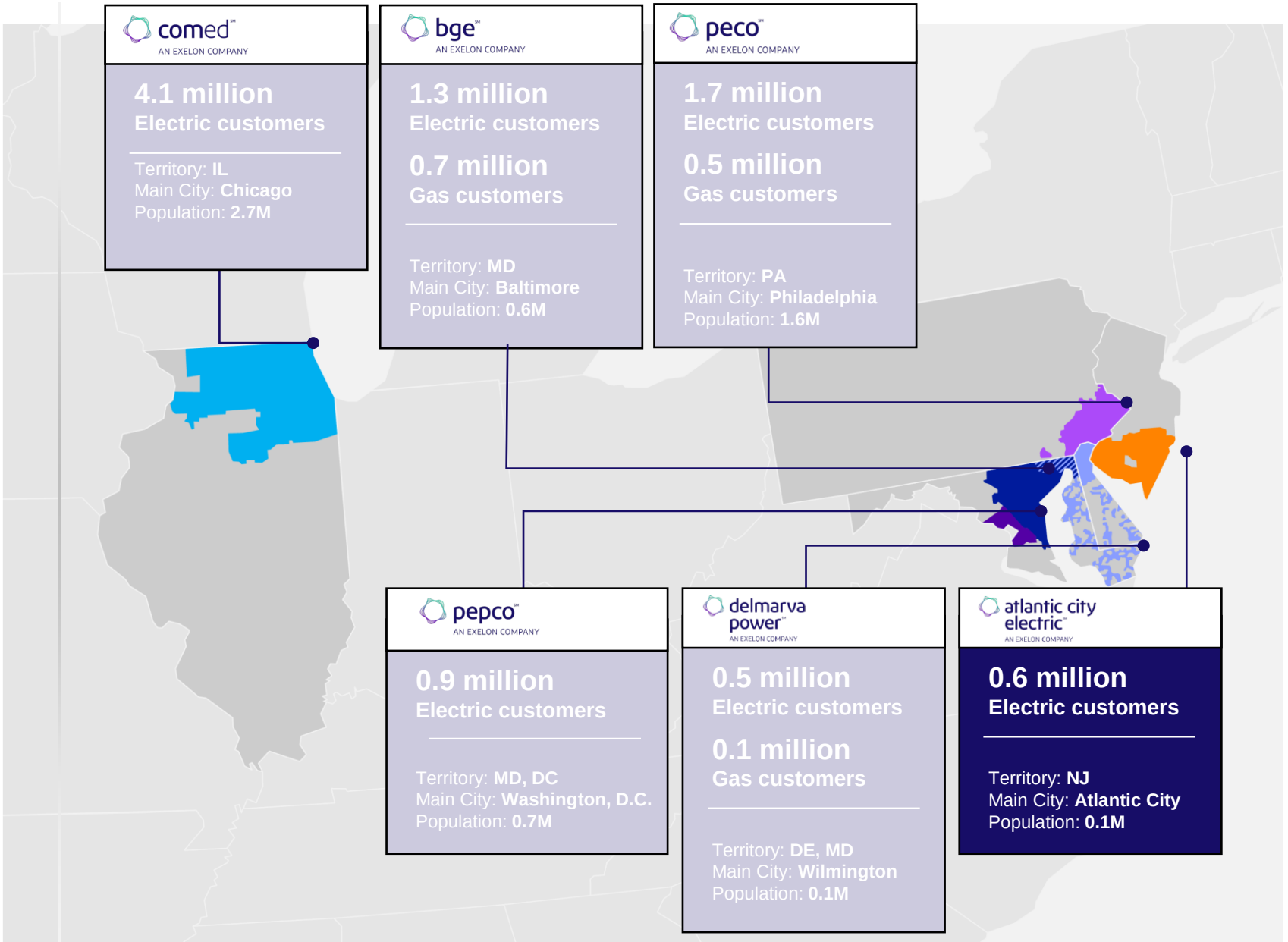
January 17, 2025

Addressing the Costs of FERC Order 2222

Rosemary Jojic | Manager of DER Interconnection, GPC Strategy

Background

- Atlantic City Electric (ACE) serves 600,000 customers in southern NJ.
- ACE is an Operating Company within Exelon, who serves over 10 million T&D customers within PJM's footprint.
- ACE's FERC 2222 Compliance will be aligned with NJ laws and regulations, but will also support compliance with Exelon's operating companies in DC, MD, DE, IL, and PA.



(1) Customer count reflects the sum of Exelon's total gas and electric customer base; Exelon consolidated customer count may not sum due to rounding

Role of RERRA (BPU) from PJM Compliance Tariff

1. RERRAs will **oversee all physical interconnection of Component DER to distribution facilities** for purposes of participating in PJM markets exclusively through a DER Aggregation Resource.
2. RERRAs will play an essential role in **overseeing and settling disputes** between DER Aggregators and distribution utilities during pre-registration bilateral coordination regarding the locational and data components necessary for the DER Aggregator's registration with PJM.
3. During the distribution utility review process, PJM has explicitly identified **RERRAs as an option for parties to settle disputes prior to initiating the PJM dispute resolution process** and will require that parties take disputes to the applicable RERRA when the dispute arises under any applicable tariffs, agreements, and operating procedures of the electric distribution company, and/or the rules and regulations of the RERRA.
4. RERRAs will have the **option to directly influence and oversee the operational relationship between the distribution utility, the DER Aggregator, and the Component DER,** for purposes of physically dispatching DER Aggregation Resources and the Component DER therein.
5. The RERRA will have the option to **oversee the conditions under which a distribution utility may override PJM's dispatch** for purposes of preserving distribution system reliability and will have exclusive jurisdiction to adjudicate disputes arising under that oversight.

ACE's Initial Compliance Considerations