

VPPs: Development Challenges and Opportunities

CESA Members Meeting Detroit, MI 2026

Presenters:

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Todd Olinsky-Paul, CESA (Moderator)



Illinois Virtual Power Plant Development

CESA Members Meeting 2026

How did we get here?



- September 2021: Climate and Equitable Jobs Act
 - DG rebate for solar, storage paired with solar
 - Jan 2025: NM changed from full retail rate to supply only
 - December 2024: Multi-year Integrated Grid Plans
 - ICC Order for ComEd VPP workshops
 - ICC ordered ComEd development of Bring Your Own Device Load Reduction program
- Nov 2025: Clean and Reliable Grid Affordability Act
 - Created interim Scheduled Dispatch VPP
 - Comprehensive VPP by 2028
- June 2026: ICC approves ComEd Scheduled Dispatch VPP tariff

Current Programs

Bring Your Own Device Load Reduction	DG Rebate* & Scheduled Dispatch VPP	VPP
Utility tariff filing	Legislation	Legislation
Thermal Storage & Smart Thermostat Load Reduction	BTM solar and/or battery storage, <5MW.	any device that can be controlled to respond to pricing, provide services, or inject into grid
STLR: TBD depending on RFP TSLR: \$60/kWh, min 75 kWh	Base rebate \$250/kWDC (large non-residential) or \$300/kWDC (residential & small commercial) + \$10/kW dispatched	Must have no penalties for non-performance, and higher payment for LMI participants. Can be upfront or performance payment.
STLR: May – Sept, 30 min notice TSLR: 4-8pm year round	4-6pm or 4-7pm 6/1 – 9/30	5-year commitment
	Mandatory participation after CRGA.	Must transition customers from SDVPP, incorporate other programs.

Challenges

- **Program and Tariff Complexity**

- Web of eligibility requirements, compensation levels, and performance commitments
- Multiple categories of customers depending on when their system was installed
- Different tariffs for each utility territory

- **Setting incentives**

- Hard to define the 'but-for' value
- Is it the amount needed to cause the action or the cost savings?

- **Data management**

- Interoperability and data tracking across aggregators
- Consistency across states in same RTO re: DER rules

Thank you!



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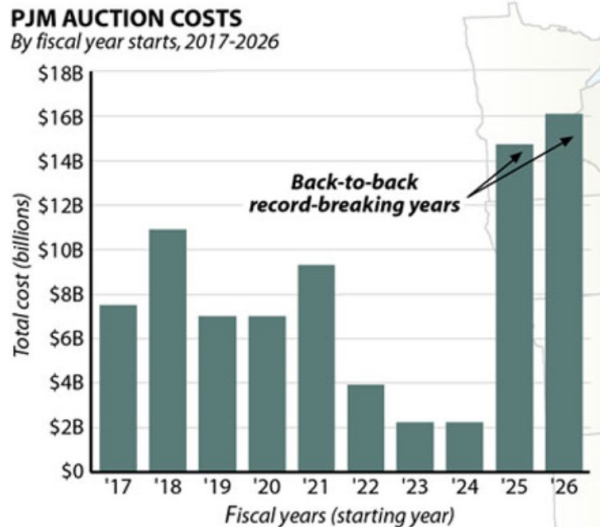
VPP PROGRAM DEVELOPMENT

PANEL AT CESA ANNUAL MEETING DETROIT MI

Sept 17th, 2026

PROBLEM PERSPECTIVE

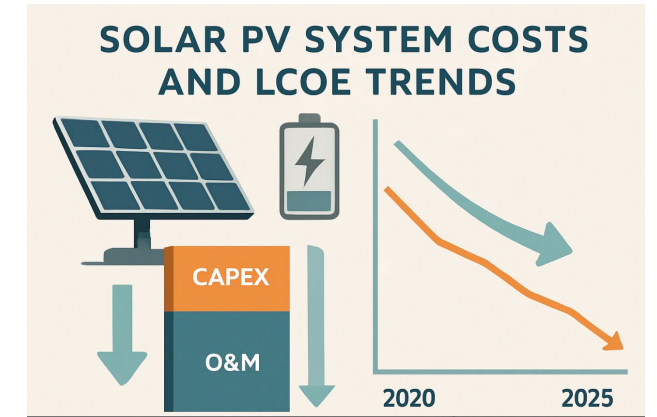
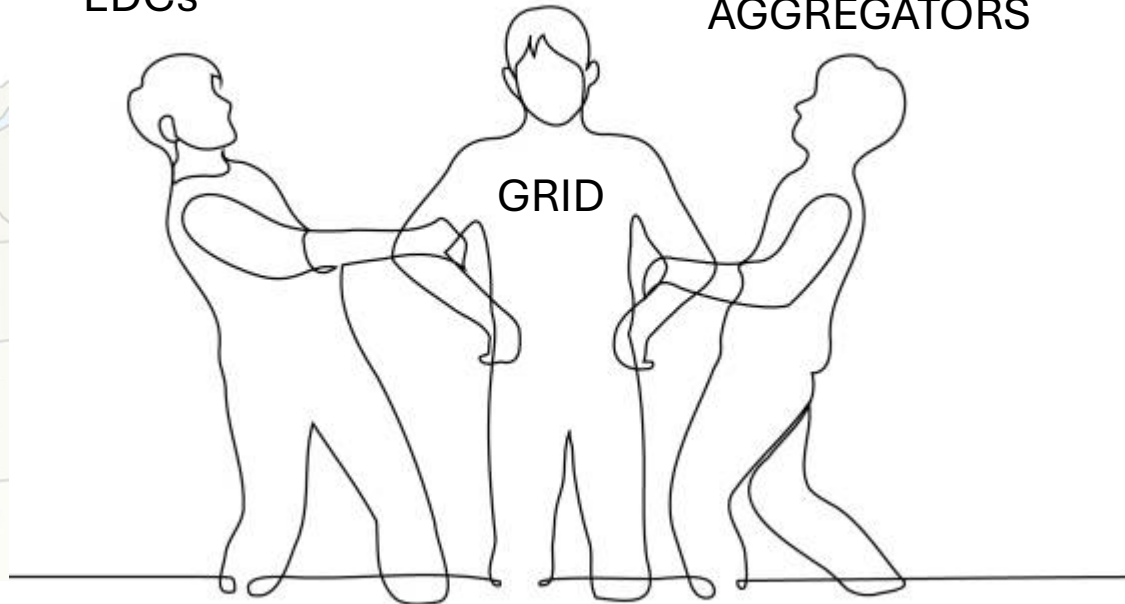
ISO (PJM) CENTRALIZED



EDCs

DER DEVELOPERS/ AGGREGATORS

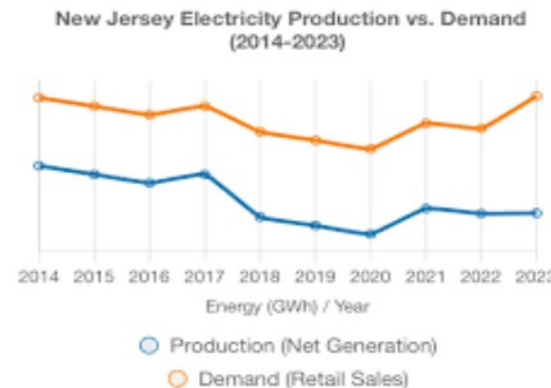
GRID EDGE (DISTRIBUTED)



EDCs

- System Reliability
- Peak Load Service
- NEM Billing
- Revenue Requirement

RATEPAYERS AND TAXPAYERS



DER DEV-AGGs

- Speed to Power
- Cost Competitive
- Clean Energy
- Incentives



VPP Goals

EO 2 requires the BPU to establish a VPP program that reduces peak demand.

Reducing peak demand is not only about reduced energy use it is a key driver in capturing long term savings for all ratepayers by reducing capacity needs at auction, providing grid services that avoid the need for traditional wires solutions and reducing the need to build or utilize peaker plants.

The Straw aims to establish a framework for a new grid infrastructure that is more flexible, and best utilizes all its resources. This future will require continued coordination between workstreams.

Two Phased Approach

- **Short Term**
 - An EDC run program that utilizes existing Demand Response and VPP Pilot Programs as a backbone to achieve peak demand reduction goals outlined in the Straw
- **Long Term**
 - A compensation tariff that will support a robust open market.

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- **Existing assets –**
- Smart thermostats, EV chargers, smart water, heaters, battery storage that are not receiving compensation for curtailment or injection already
- Similar to a BYOD set up, but assumes that many of these will be hardware that received EE or EV incentives during install.
- Emerging technologies such as balcony solar, bidirectional EVSE, and smart panels offer expanded DER participation.



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Short term solution – Interim VPP Program

Timeline

Board Order for filings – October 2026

Filings due to the Board – December 31, 2026

Programs begin – June 1, 2027, July 1, 2027 for those
currently administered through Triennium order

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Interim VPP Program

Minimum Filing Requirements include:

- Program description
 - Eligibility and enrollment descriptions, event dispatch protocols, timelines, narratives explaining how the program meets the objectives of the straw, implementation timeline
- Forecast table
- Budget worksheets and cost-effectiveness measures
- Enabling Infrastructure details
 - Communication protocols, estimates on the number of devices, etc
- Planning and Operations Integration
 - How will the EDCs incorporate VPP provided services into distribution planning and operations during the program
- Performance Measurement and EM&V Plan
 - Baseline methodology, proposed metrics

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Interim VPP Program

Minimum Filing Requirements cont.

- Peak Demand Reduction Target - 3% for life of program
- Cost Savings Target
- Aggregator Solicitation Plan
 - Evaluation criteria, fees, anticipated number of aggregators by resource type or customer segment, how Triennium contractors will transition
- EDC Aggregator Contract Disclosures
 - EDCs must disclose total contracted value consistent with requirements including customer pass through
- Transition Strategy
 - A plan to migrate customers in the Interim plan to migrate to the long term tariff without re-enrollment
- Reporting
 - Quarterly, Annual, post season and event level

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Long term solution – VPP Tariff and other coordinated workstreams

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Long-term VPP

The long-term VPP will focus on creating a compensation-based tariff that is resource neutral:

- Support an open market that provides performance-based compensation
- Has appropriate DERM architecture to support robust system
 - Grid DERMs
 - Edge DERMs
- Allows for revenue stacking (i.e. distribution-level services, PJM wholesale) but prevents double payment for identical grid service

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EDC Ownership & Administration

The Straw contemplates a role for EDC ownership and/or administration of storage for specific use cases.

The Straw also notes that there are open questions on the impact EDECA may have on EDC ownership for transmission scale storage.

The Straw suggests the clearest use case for EDC ownership and/or administration would be constrained circuits, which would be identified in the PSUP.

The Straw prioritizes customer/ aggregator ownerships over EDC ownership.

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Grid Mod Key Areas



To define a market-driven, flexible, services-based ecosystem which expands both the interconnection capacity for and service participation of grid-edge DER.

Interconnection streamlining (**complete**)

- Administrative Code 14:8-5 updates

Proactive Planning Requirements (**ongoing**)

- Improved load forecasting
- Improved monitoring and control
- Optimal use of inverters
- VPP foundations

EDC Grid Flexibility Services (**underway**)

- Innovation study
- V2G/V2X
- Localized VPPs

Interconnection Cost Allocation (**near term**)

- Transparent upgrade cost validation
- Efficient group studies on common segments
- Broader Cost/Benefit sharing alternatives



Long-term VPP-related workstreams

Grid Mod – Grid Flexibility Services

The BPU has established this *second* GMF Workgroup: **Grid Flexibility Services**. The primary goal of this workgroup is to create a **service architecture** that standardizes the integration, interoperability, aggregation and orchestration of interconnected and aggregated DER, such that a broad range of flexibility services can be called upon from these assets.

The Workgroup will focus on **a)** Characterizing needed grid service elements **b)** Identifying interoperability barriers for heterogeneous DER service delivery **c)** Determining appropriate service value and compensation amounts and methods and **d)** Initiating data collection pilots that will support the development of a commercial scale VPP program built upon this service architecture.

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Long-term VPP-related workstreams

Storage

- Garden State Energy Storage Program Phase 1
 - Transmission level storage that will bid into the existing wholesale markets, two tranches have been initiated
- Garden State Energy Storage Program Phase 2
 - Support rapid adoption of smaller, decentralized energy storage resources that may participate in future VPP aggregations
 - Initial program rollout will complement VPP efforts to enable deployment of new BTM distributed storage resources and support nascent storage market while the long-term tariff is established
 - Straw expected mid-August

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Thank You!

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Regulatory and Policy Considerations for VPP Integration in Grid Modernization in Washington, D.C.

Enabling DER Aggregation, Market Participation, Interoperability, and Utility Coordination at Scale: A Regulatory Roadmap for VPP Integration within DC's Grid Modernization, Clean Energy, and Resilience Framework

Presented by: **Laura A. Ward, Ph.D.**

DOE Energy Innovator Fellow at Department of Energy and Environment (DOEE) DC

Reviewed by: Mentor **Thomas Bartholomew**, Associate Director, Department of Energy and Environment (DOEE) DC

Coordinated by: **Daniel White**, Energy Program Specialist, Department of Energy and Environment (DOEE) DC

CLEAN ENERGY STATE ALLIANCE (CESA)

DC GRID MODERNIZATION & FERC ORDER 2222

Detroit, MI, September 2026



Why is the District of Columbia at a Critical Inflection Point for VPP Integration?

The District of Columbia imports approximately 96% of its power from PJM outside DC. With limited ability to develop large-scale generation or transmission, DC leverage local DC leverage local Distributed Energy Resources (DERs) and VPPs to manage costs, ensure resilience, and meet its statutory clean energy commitments.

DC's Clean Energy Mandates

Carbon neutrality by 2045. 100% renewable electricity by 2032. 15% local solar production by 2041. DERs are essential tools, not optional, for decarbonization, resilience, peak reduction, and affordability under Clean Energy DC.

PJM Capacity Crisis Hits DC Hard

Data centers and AI facilities are driving rapid load growth across PJM. Generator retirements and interconnection backlogs are tightening reserve margins. Rising capacity prices are increasing electricity costs for DC residents and businesses, and DC has no large-scale generation buffer.

FERC Order 2222: A New Market Opportunity

FERC Order 2222 (issued 2020) removes barriers for DER aggregations to participate directly in PJM capacity, energy, and ancillary services markets. PJM received final FERC approval in July 2025. Full implementation begins February 2028. DC must act before early 2027 to support capacity market registration.

VPPs: The Cost-Effective Local Solution

VPPs aggregate rooftop solar, BTM batteries, EVs, smart appliances, and demand response to act like a power plant, without new expensive infrastructure. The Brattle Group (2023) found VPPs provide resource adequacy at 40–60% of the cost of alternatives, and 60 GW nationally could save \$15–\$35 billion over the next decade.

How Can DC Implement FERC Order 2222 Through Two Distinct Pathways?

FERC Order 2222 requires state and local action to be effective. DC has two options. The report recommends Path B long-term, but Path A must come first. It is the minimum foundation without which VPPs cannot meaningfully participate in PJM markets.

Path A: Minimum Set of Policies (Start Here)

Needed for Meaningful PJM Market Participation

- Builds on existing DC and PJM rules, no major regulatory overhaul required
- Enables VPPs to participate in PJM wholesale markets if they choose
- Without Path A, VPPs may operate in DC without District oversight or rules
- Covers 13 core policy topics ([see Table 2](#))
- Recommended as Phase 1, implement before February 2028

Path B: More Robust Policies (Next Phase)

Supports Economically and Technically Viable VPPs

- District-specific rules beyond PJM minimums
- Open-access DER registry; common data platform for third parties
- Time-based dual participation rules (wholesale + retail at different times)
- DCPSC-specific dispatch override procedures
- Device-level submetering support
- Generic DCPSC proceeding on infrastructure cost recovery

Which Policies Should DC Advance to Enable VPP Integration?

Table 2 from the DC regulatory roadmap identifies 13 policy topics. Six are directly **REQUIRED** by FERC Order 2222 (marked Necessary). Seven are supportive but critical, including customer data access, which stakeholders unanimously called the single important prerequisite.

Policy Topic	DC-Specific Proposed Policy & Context
DER Registry	Require Pepco and wholesale VPPs to use a manual registry for stationary DERs (e.g., solar). Registry can interface with a wholesale market regional registry. Provides Pepco visibility into DERs on its system and tracks which DERs are aggregated in any VPP.
Access to Customer Data	Full and uniform implementation of Green Button Connect My Data in the District, with daily meter reads to comply with PJM's one-business-day DER data submission requirement. DCPSC issued an order July 15, 2026, directing Pepco to file updated cost information. This is the #1 stakeholder priority.
Aggregator Registration / Licensing	Aggregation registration/licensing rules promulgated by the DCPSC. Ensures VPPs comply with DC laws and regulations and provides the District with information about operating VPPs.
Dispute Resolution (Necessary)	Normal DCPSC dispute resolution procedures apply. FERC Order 2222 clarifies states can actively resolve disputes between DERAs and utilities, for example Pepco's rejection of specific DERs from a VPP.
Interconnection (Necessary)	Interconnection rules that allow BTM batteries and electric vehicles to export to the grid. FERC Order 2222 requires all aggregated DERs to have an interconnection agreement. DC's Small Generator Interconnection Rules exist but need updating for BTM storage export.
DERA Registration and EDC Review (Necessary)	DCPSC sets clear coordination registration procedures and standards for Pepco's registration and review of DERs. FERC Order 2222 requires Pepco to inform VPPs of any DER concerns within 60 days of registration.
EDC/DERA Operations Coordination (Necessary)	Processes for ongoing coordination on data flows and communications among PJM, DERAs/VPPs, and Pepco. At minimum, follow PJM processes. Critical during PJM's operating day: if distribution problems arise, Pepco must inform VPPs in time to adjust cleared schedules.
Communications Protocols	DERAs and VPPs use standard internet or communications protocols such as IEEE 2030.5. Pepco has already indicated it plans to adopt IEEE 2030.5 as its primary VPP communications standard.
Dispatch Override (Necessary)	Pepco informs DERAs/VPPs of DER overrides based on PJM rules and criteria, not DCPSC-specific rules. FERC Order 2222 explicitly allows distribution utilities to override DER dispatch for reliability and safety. DC must have clear rules for how this occurs.
Grid Services Authorization	No specific District rules needed at this stage. Use PJM's rules and registration requirements. Future Path B would add DCPSC-specific authorization for DERAs to provide distribution-level grid services.
Metering	Existing DCPSC metering and rules used for measurement and operations. Revenue-class metering is currently the only form allowed for settlement. Path B would add device-level submetering.
Dual Participation (Necessary)	DERA/VPPs and DERs cannot participate in PJM's markets if they are also participating in specified retail programs (e.g., net metering). FERC deferred dual participation policy to state regulators. DC must set these rules to prevent double-counting.
Program Cost Recovery	Follow standard DCPSC rules to assess prudence, cost-effectiveness, and cost allocation of Pepco's proposed VPP programs and infrastructure investments. Develop policies to address cost recovery of costs created by DERAs, including possible DERA administration or registration fees.

★ Six policies marked (Necessary) are directly required by FERC Order 2222. All 13 should be implemented, as several provide value regardless of whether VPPs participate in PJM markets.

DC's Grid Modernization Initiatives & Their VPP Connection

DC's grid modernization ecosystem is active but fragmented. Several initiatives underway provide the building blocks for VPP deployment, but none are yet targeted specifically at implementing FERC Order 2222. Connecting these dots is a critical next step.

1. Green Button Connect My Data (Formal Case 1130)

DC Initiative: DCPSC has issued multiple orders (2020–2022) directing Pepco to implement Green Button Connect My Data. July 2026 order directed Pepco to file updated cost information.

VPP Connection: Customer data access is the #1 prerequisite for VPP participation in PJM. PJM requires DER aggregators to submit metered data within one business day, impossible without Green Button implementation.

2. Small Generator Interconnection Rules (15 D.C.M.R. Chapter 40)

DC Initiative: Small Generator Interconnection Rules are in place under Formal Case No. 1050.

VPP Connection: FERC Order 2222 requires all DERs in a VPP to have interconnection agreements. Current rules need updating to explicitly allow BTM storage and EVs to export to the grid, a required Path A action.

3. PSC VPP/DERMS Pilot RFP (July 2025)

DC Initiative: DCPSC issued RFP No. PSC-25-07 for a VPP or DERMS pilot project. PSC also awarded a \$3M contract to Ecogy Energy and Ecosuite for a solar aggregation and advanced inverter project.

VPP Connection: Pepco's planned utility DERMS (anticipated late 2028) will provide visibility into DER operations and support EDC review of DER participation in aggregations, a key Path A coordination requirement.

4. DCSEU CarbonSmart Affordability Operations (CSAO) Pilot

DC Initiative: DCSEU is preparing to launch the CSAO Pilot, evaluating emissions-aware operation of flexible DERs with performance-based incentives tied to GHG reductions.

VPP Connection: Directly demonstrates how VPPs can be designed to maximize climate benefits, not just market revenues, aligning with stakeholder feedback that VPPs must serve DC's broader policy goals.

5. DC Sustainable Energy Utility & Solar for All

DC Initiative: DCSEU manages efficiency and DER programs; Solar for All targets low-income households. DCSEU recommended as a neutral VPP program facilitator.

VPP Connection: Provides the equity and affordability layer for VPP deployment, targeting constrained circuits and affordable housing to offset rising electricity rates and severe weather vulnerabilities.

Lessons for DC from PJM Neighbors

Maryland, New Jersey, and Pennsylvania have all initiated FERC Order 2222 proceedings. Since Pepco serves both DC and Maryland customers, aligning DC's policies with existing regulatory framework can shorten timeline to establishing and implementing VPP regulations in DC.

State	VPP Status	Key Actions Taken	Lesson for DC
Maryland	Most Advanced	MDPSC Interconnection Work Group developing VPP regulations since Q3 2023. DRIVE Act (2024) requires VPP pilots, TOU tariffs, V2G. V2G regulations implemented Dec 2024. Order No. 92398 (May 2026) on customer data, DERMS, DER registries, metering, communications. VPP regulations expected Q3 2026.	Best model for DC. Pepco serves both jurisdictions, so aligned policies reduce utility burden. Maryland's draft regulations include specific timelines for VPP deficiency corrections and file transfer protocol specifications.
New Jersey	Advanced	NJBPU issued VPP Straw Proposal July 2026. Governor-directed, NJBPU-led proceeding. Intends to issue order directing VPP filings by October 2026. Two-phase implementation proposed.	Two-phase approach (retail pilots first, then full wholesale participation) is a strong model for DC's phased implementation strategy.
Pennsylvania	In Progress	PAPUC Docket No. L-2023-3044115, Notice of Proposed Rulemaking Order issued December 2025. Proceeding not yet complete.	DC should not wait for Pennsylvania, as it is behind schedule. Maryland and New Jersey are the relevant models.
District of Columbia	Early Stage	No FERC Order 2222 proceeding initiated. Green Button Connect My Data incomplete. No operating VPP program or pilot. Pepco DERMS anticipated late 2028. DCPSC RFP for VPP/DERMS pilot issued July 2025.	Immediate action required. DC risks VPPs operating without District oversight. Must initiate proceeding and complete foundational policies before early 2027.

How Should VPP Design Support DC's Broader Goals, According to Stakeholders?

Two workshops (March 26 and June 24, 2026) and a DOE RFI (June 2025, 13 responses) produced strong consensus. The central message: VPPs in DC must be more than a wholesale market vehicle. They must explicitly serve DC's climate, resilience, affordability, and equity commitments.

#1 Priority: Complete Green Button Button Connect My Data

Stakeholders across the board, including Mission: Data, identified lack of customer data access as the fundamental barrier to DER aggregation in PJM. PJM requires interval data within one business day for settlement. Aggregators face penalties or prohibition from participation if they cannot meet this. DCPSC must finish its work on Formal Case 1130.

Preferred Structure: Third-Party Aggregator Model

Most respondents support VPP programs owned and operated by third-party aggregators, not utility-owned DERs. Pepco itself prefers third-party aggregations receiving signals from a Pepco-owned DERMS via an edge-DERMS provider. Utility ownership places unfair capital costs on captive ratepayers.

Align VPPs with GHG Reductions & Equity

DCSEU emphasized that optimizing VPPs solely for market revenues does not maximize emissions reductions. Stakeholders called for performance-based incentives tied to verified GHG reductions, carbon-aware dispatch protocols, and targeting of affordable housing and low-income neighborhoods through DCSEU.

Recognize Non-Market Benefits in Cost- Effectiveness Screening

VPP programs should account for: mitigating local distribution grid congestion, providing backup power for critical infrastructure, creating ratepayer savings via deferred grid investments, and supporting building electrification, not just wholesale market revenues.

Pepco's Position: Contracts Over New Regulations

Pepco supports the policy framework but prefers handling operational coordination through bilateral DERA-specific contracts rather than new overarching District regulations. Pepco plans to adopt IEEE 2030.5 as its primary communications standard and anticipates its utility DERMS platform operational by late 2028.

 **Top 5 ranked policy priorities from workshop respondents:** (1) Access to Customer Data, (2) Interconnection, (3) EDC/DERA Coordination & Review, (4) Communications Protocols, (5) Dispatch Override.

Recommended Next Steps for DC:

PJM fully implements FERC Order 2222 in February 2028. DER aggregators must register for capacity markets by early 2027. DC must move on two parallel tracks immediately: complete foundational policies already in progress and initiate a dedicated FERC Order 2222 proceeding.

01

Immediate: Complete Green Button Connect My Data My Data (Formal Case 1130)

DCPSC must set a clear path for Pepco to implement a data exchange platform, especially for residential customers. This is the single most critical prerequisite for VPP participation in participation in PJM markets. Without it, no aggregator can meet meet PJM's one-business-day data submission requirement. requirement.

02

Immediate: Update Small Generator Interconnection Interconnection Rules

Revise 15 D.C.M.R. Chapter 40 to explicitly allow BTM storage and EVs to export to the grid. This is a FERC Order 2222 requirement and a prerequisite for any injecting DER to participate in a VPP. Clean energy advocates (CHESSA) have already flagged that existing standards need updating.

03

Near-Term: Initiate a FERC Order 2222 Proceeding at Proceeding at DCPSC

Three options: (a) **RFI**, broadest record but slowest; (b) **Rulemaking**, fastest, requires PSC staff effort; (c) **Leveraging Other States**, adopt Maryland/New Jersey regulations DC. **Recommended: Option (c)**, given Pepco's dual-jurisdiction presence. Include DCSEU in all proceedings.

04

Phase 1: Implement Path A Minimum Policies

Adopt all 13 Path A policies from Table 2. Allow third-party, non-Pepco VPPs to participate on an on an accelerated timeline. Support Pepco's DERMS investment (anticipated late 2028) as a critical a critical coordination infrastructure. Enable peak-shaving VPPs as the first priority given DC's exposure DC's exposure to high PJM capacity costs.

05

Phase 2: Implement Path B Robust Policies

After Path A is in place: open-access DER registry, common data platform, time-based dual participation dual participation rules, DCPSC-specific dispatch override procedures, device-level submetering, and a submetering, and a generic proceeding on DERA infrastructure cost recovery.

Questions:

Sarah Duffy, Illinois Power Agency:

1. What consumer protection requirements are others considering?
2. How can PUCs or states track individual devices to ensure they are not duplicated across aggregators?
3. Should there be a universal set of rules for how DER should be registered, interconnected, override rules, dispatch norms, etc., within the RTO?

Questions:

Paul Heitmann, New Jersey Board of Public Utilities:

1. How critical is DERMS implementation to successful VPP operation?
2. What is the proper compensation method for participating DERs?
3. How can aggregated DERs operating as a VPP assure dispatchability when needed?

Questions:

Laura Ward, DOEE/US DOE

1. IMPACT: What should be the primary measure of success for VPPs as they scale: megawatts aggregated, system costs avoided, reliability and resilience delivered, emissions reduced, customer savings, or some combination of these outcomes?
2. OBJECTIVE: What problem are we actually asking a VPP to solve, and should that objective be defined before we decide which technologies, incentives, markets, and regulatory structures to build around it?
3. CONSEQUENCES: As VPPs scale from pilots to grid resources, what unintended consequences should states design for now, before those consequences become embedded in regulation, markets, and infrastructure?

**Thank
You!**

