Regulatory Design for Energy Storage Aggregation

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Agenda

- Introduction and VPP History
- Energy Policy Design Institute (EPDI)
- Why Storage? Why Aggregation?
- What services does VT want from VPPs?
- What locations and configurations does VT want?
- Fundamental design principles for VPP related policy
- Policy design principles for Wholesale-Retail VPPs

Introduction and History

- Started working at Stem, Inc. in 2015
- Stem was the pioneer in energy storage aggregation
- My history ~ Storage Aggregation/Virtual Power Plant history
  - 2014 - First pilots with California utilities
  - 2015 – Southern California Edison Local Capacity contracts
  - 2015 – BQDM (New York), first Non-Wires Alternatives (NWA)
  - 2016 – California Demand Response Auction Mechanism (DRAM)
  - Leading party in CAISO VPP rules development
  - Engaged deeply in development of FERC Order 2222

Energy Policy Design Institute (EPDI)

- Neutral organization dedicated to better, faster development of regulations, programs
- Contrast
  - Electric Power Research Institute (EPRI) = research to inform policymaking
  - EPDI = tools for policy design informed by deep subject matter experience
- EPDI Approach
  - Shared Dictionary
  - Vision and Objectives
  - Design Principles
  - Prioritized Series of Design Questions
  - Facilitated Collaboration based on deep subject matter experience
- Currently applying approach to Maryland Energy Storage Program Workgroup – design for statewide 3GW storage target

What is storage aggregation?

- EPDI first step: Terminology, a “shared dictionary” for this design project
- For today, using Storage Aggregation and Virtual Power Plant(VPP) interchangeably
- EPDI definition is narrower than DOE Liftoff report
- VPP = An aggregation of resources that participates in markets as a single resource
- Different than a portfolio or fleet of assets managed by a single entity
  - In a portfolio, assets are not coordinated for a combined response, each asset reacts independently
  - Liftoff Retail Model is not a VPP if assets are a responding individually to prices or rates
  - Liftoff Utility Model is not always a VPP.

State	VPP	Not VPP
California	DRAM, DIDF	ELRP, DIDF
New York	NWA	Retail DR, VDER
Massachusetts	Sunrun ISO-NE DR	Connected Solutions

Why Storage?

- EPDI second step: Why? (Vision and Objectives)
- States usually cite three major drivers for storage deployment
  - Renewables Integration / Reliability
  - Grid Modernization / Capacity Growth
  - Resilience
- Not trying to answer today – but important to keep in mind
- Regulations and Programs should work to deploy storage for the state's priority drivers
- Seems obvious, but makes a difference in policy design

Why VPPs?

- Until recently, storage services delivered by single assets (1 asset = 1 resource)
- What are the benefits of aggregation? (multiple assets = 1 resource)
  - Resource Scale – maximum value from smaller resources
  - Resource Reliability – Liftoff report notes this advantage
  - Resource Flexibility
- Relating back to Why Storage?
  - VPPs help renewables integration / grid reliability same as a single asset
  - VPPs help with Grid Mod / Capacity growth same as a single asset
  - VPPs typically do not provide resilience as an aggregated resource, individual assets in VPP can

What services does VT want from VPPs?

- EPDI next step: Scope and Priorities
- Trick Question – Should not pre-determine what VPPs are used for
- Treat a VPP the same as a single storage asset: mechanisms to procure, compensate or incentivize storage are the mostly the same for a VPP
- Enable VPPs to compete on a level playing field
  - Remove barriers to participation that are unique to VPPs
  - Make sure VPPs are eligible to participate in all mechanisms and can participate on the same basis
  - Example: RFP for energy storage resource has a requirement that bidder must have already applied for interconnection before bidding
    - Unreasonable barrier to VPPs because not all asset sites have been identified prior to a bid.

What locations and configurations of VPPs are needed?

- Also a Trick Question – Should not be pre-determined
- Establish mechanisms and use pricing to express value at different locations - “If you pay for it, they will come”
- Mechanisms and regulations should not specify configurations, mix of asset types, etc
- Top principle of VPP policy: “Don’t look behind the curtain” (unless absolutely necessary)

What are some foundational design principles for VPPs?

- "Opportunities" in Liftoff report mostly about deploying more DERs, to get VPPs to form.
- EPDI's primary work: translate hands-on experience into policy design principles that form the foundation of new policies and programs
- ***Full Participation***: All markets and services that single site resources access, but no dedicated mechanisms for VPPs*
- ***Fair competition***: All mechanisms allow fair competition between VPPs and single asset resources*
- ***Incentives:*** Deployment incentives go to underlying resources, not the VPP*
- ***Multi-Use:*** Enable multi-use of assets in VPP as much as possible**
- ***Abstraction:*** Don't look inside unless truly necessary**
- ***Asset Separation:*** Distinguish asset in VPP from host customer premises, if desired by owner

*Established in Maryland Workgroup **Stem policy win in FERC Order 2222

Select Principles for Wholesale-Retail VPPs

- Specific to FERC Order 2222 type VPPs, aggregating DERs to participate in ISO/RTO markets
- ***Provable Risk:*** Ability to participate in VPPs or provide services should not be restricted. Entity proposing restrictions need to prove a risk.
  - (Stem win) Order 2222: requires states and utilities to prove a reliability risk before placing restrictions
- ***Reliability Independence***: Distribution grid reliability is independent of wholesale transaction
  - (Stem loss) Order 2222: ISO provides mechanism for distribution utility to override wholesale dispatch
- ***Reasonable Overhead:*** Overhead for individual small sites to participate in VPP should not be unreasonable. E.g. metering and telemetry

THANK YOU

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