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# **DISTRIBUTED ENERGY RESOURCES IN WHOLESALE MARKETS**

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# About AEE and our members

- AEE represents more than 100 companies and organizations that span the advanced energy industry and its value chains.
- Technologies represented include energy efficiency, demand response, solar photovoltaics, solar thermal electric, wind, energy storage, electric vehicles, advanced metering infrastructure, transmission and distribution efficiency, fuel cells, hydro power, advanced nuclear power, combined heat and power, and enabling software.
- Used together, these technologies and services will create and maintain a higher-performing energy system—one that is reliable and resilient, diverse, cost-effective, and clean—while also improving the availability and quality of customer-facing services.



# The Vision: Stacking Values and Fully Utilizing DERs in Wholesale and Retail Markets

- Stacking of revenues from multiple services has long been seen as key to supporting growth of energy storage
  - RMI's October 2015 report "The Economics of Battery Energy Storage" describes value stacking most clearly
  - Four case studies comparing costs of projects to revenues from various wholesale (FR, spin and non-spin, etc.) and retail (demand charge avoidance, T&D deferral, etc.) applications.
- Cost declines and state policy support have allowed storage and DERs to grow, but barriers to stacking values and full utilization remain



# Why Push for Dual Participation and Full Utilization?

- Customers are increasingly adopting DER technology
  - Driven by consumer preference, declining costs, expanding use cases
- Improving utilization through the provision of multiple services, at wholesale and retail, lowers overall system costs
- Storage and DERs often provide ancillary services and grid flexibility more reliably and efficiently than traditional generation
  - Frequency regulation, reserves, fast ramping/response
- Market integration gives RTOs/ISOs visibility of DER operations and capabilities, improving reliability and resilience



# What Are The Obstacles to Achieving The Vision?

- Existing wholesale market rules and practices that create barriers to participation by distributed storage and DERs
  - Failure to account for physical and operational characteristics
  - Lack of a participation model or clear path for participation
  - Lack of clarity of roles (communications, interconnection, etc.)
- Market designs that favor traditional generation resources (inadvertently or otherwise)
  - For example, existing market designs favor resources that provide a lot of something for a long time, ruling out valuable contributions over shorter periods
- Regulatory structures and jurisdictional disputes that threaten to “silo” distributed storage and DERs into specific markets and services



# FERC Actions to Address Barriers to Participation

- Order No. 841: Participation of Energy Storage Resources in RTO/ISO Markets
  - Required RTOs/ISOs to remove barriers to ability of energy storage to provide all services they are technically capable of providing
    - Ordered the creation of a “participation model” for storage
  - Explicitly included participation of distributed energy storage (e.g., located on the distribution grid or behind the meter).
  - Finds that allowing these resources to participate is essential to ensure just and reasonable rates.
- Proposal to Require RTOs/ISOs to Remove Barriers to Participation of Aggregated DERs
  - Would, if finalized, require RTOs/ISOs to ensure that aggregated DERs can provide all services they are technically capable of providing
    - Relies on existing participation models



# Framework for Aggregated DER Participation

- AEE members have asked FERC to require RTOs/ISOs to develop a framework or “checklist” to guide the development of market rules for aggregated DER participation that (among other things):
  - Allow DERs to access all wholesale markets and provide all services they are technically capable of providing
  - Allow aggregation beyond a single pricing node
  - Credit aggregated DERs for net supply (along with the current required credit for net reductions behind-the-meter) (i.e., allow injection)
  - Permit DERs to export power and ramp up and down
  - Allow DERs to participate in both wholesale and retail markets
  - Allow both in-front-of and behind-the-meter DERs to participate
  - Establish reasonable telemetry, communications, and control equipment requirements focused on ensuring RTO/ISO visibility
  - Clearly define the roles and responsibilities of DER aggregators, RTOs/ISOs, and distribution utilities with respect to operational coordination



# Market Design Challenges (non-exhaustive list)

- Bias toward providing a large amount of a product over a long time period excludes energy-limited resources
  - Capacity duration requirements
  - Year-long large block capacity procurement
  - Day-ahead and real-time only settlements
- Failure to value fast response times and the “work” fast responding resources do
- Emerging proposals to value “fuel attributes” of specific technologies





# Fragmented Wholesale and Retail Markets

- Traditional regulatory frameworks rely on historic notions of the division between federally-regulated wholesale markets and state-regulated retail markets
  - A “two-way” energy system challenges these historic notions
  - Applying these historic notions risks forcing DERs into silos
- Some (but not all) states and many (but not all) utilities assert FERC lacks jurisdiction to allow DERs to participate in wholesale markets, and that states must have the final word
  - Asserting distribution system reliability and cost concerns
  - Asking that FERC allow states (and coops and munis) to “opt-out” and bar DER participation in wholesale markets



# DERs Exist in a Jurisdictional Grey Area

- FERC defines a DER as:
  - “a source or sink of power that is located on the distribution system, any subsystem thereof, or behind a customer meter. These resources may include, but are not limited to, electric storage resources, distributed generation, thermal storage, and electric vehicles and their supply equipment.”
- DERs thus reside on the state- and locally-regulated distribution grid, or behind the meter at the customer site, **BUT**
- They can be a *source or sink* of power → create two-way flows of power, include generating and non-generating techs
- The wholesale services they provide thus may occur over state- and locally-regulated distribution facilities
  - This is not unprecedented, but FERC’s decisions on authority over transactions occurring on “dual use” facilities are muddled



# FERC Authority Over DER Participation and State and Local Regulator “Opt-Out”

- Order No. 719 and 745
  - FERC allows state and local regulators to “opt-out” and prevent retail customers from participating in wholesale demand response
- *Advanced Energy Economy Decision*
  - FERC confirms it has exclusive jurisdiction over which resources can participate in the wholesale market
  - Allowing state and local regulators to “opt-out” and bar resources from wholesale market participation is an exercise of FERC’s discretion, and not required by FPA
- Order No. 841-A (May 16, 2019)
  - Rejected arguments for an “opt-out” for energy storage resources located on the distribution grid or behind the meter
  - Commissioner McNamee dissent: FERC lacks jurisdiction to allow distributed storage to participate in wholesale markets because distribution facilities are used.



# Complementary Federal and State Regulation of DER Market Participation

## FERC

- Terms and conditions of participation in wholesale markets, including who can participate
- Rates for some (but not all) wholesale sales from DERs
- Rates, terms, and conditions of any transmission or wholesale services provided by DERs

## State / Local Regulators

- Terms and conditions of retail market service provided by DERs and retail DER programs
- Distribution interconnection agreements\*
- Reliability, safety, and cost impacts on distribution facilities
- Siting of DERs (in some cases)

- State and local regulators have ample authority to address reliability safety, and cost impacts of DER participation in wholesale markets, and terms and conditions of retail programs including who participates (regardless of wholesale impacts)
  - Cannot, however, regulate *who* can participate in wholesale markets, or *how*
  - Requires active coordination of wholesale and retail operations



# Open Questions and Needed Next Steps

- Final Rule from FERC on Aggregated DER Participation
  - Will FERC exercise discretion on “opt-out”?
  - Court challenges coming on Order No. 841
- Education regarding capabilities and value of distributed storage and DER aggregations, and business models
  - System operators and RTO/ISO staffs
  - State Regulators
  - Utilities
- Clarification of roles and responsibilities
  - Interconnection processes
  - Communications and coordination between DER aggregators, RTOs/ISOs, distribution operators



# Thank You!

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# **APPENDIX**

# Federal and State jurisdiction – a quick refresher on the “basics”

- FPA Section 201(b) (16 U.S.C. § 824(b)):
  - “The provisions of this subchapter shall apply to the transmission of electric energy in interstate commerce and to the sale of electric energy at wholesale in interstate commerce, but . . . shall not apply to any other sale of electric energy. The Commission shall have jurisdiction over all facilities for such transmission or sale of electric energy, but shall not have jurisdiction . . . over facilities used in local distribution”
- FPA Section 205(a) (16 U.S.C. § 824d(a)):
  - “All rates and charges made, demanded, or received by any public utility for or in connection with the transmission or sale of electric energy subject to the jurisdiction of the Commission, and all rules and regulations affecting or pertaining to such rates or charges shall be just and reasonable”





# ELECTRICITY REGULATION: WHO IS RESPONSIBLE FOR WHAT?

## Federal Regulation (FERC)

- Federal Power Act
- Wholesale sales of electricity for resale in interstate commerce (*and matters “affecting or pertaining to”*)
- Transmission of electricity in interstate commerce (*and matters “affecting or pertaining to”*)
- Mergers and issuances of securities by FERC-regulated public utilities
- (Very) Limited “backstop” transmission siting authority
  - See 16 U.S.C. § 824p
- Siting/Permitting of hydro plants
  - Otherwise, no generation planning or siting control
- Reliability of bulk power system

## State Regulation (PUCs)

- State Public Utility Acts or similar
  - See, e.g., VA. CODE ANN. §§ 56-235 *et seq.* and 56-576 *et seq.* (Electric Utility Regulation Act)
- Retail sales to end users (“*any other sale*”)
- Mergers and other commercial transactions by regulated utilities
- Low-voltage distribution lines
- Siting of power plants and transmission lines
  - See, e.g., MD. CODE ANN. PUB. UTIL. COS. § 7-207 (transmission and gen.)
- Resource planning; *i.e.* the generation types (coal, natural gas, renewable) used by a utility to serve customers