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ENERGY STORAGE: FERC'S TECHNICAL CONFERENCE AND NOPR

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Overview

- Background
- Technical Conference: *Utilization in the Organized Markets of Electric Storage Resources as Transmission Assets Compensated Through Transmission Rates, for Grid Support Services Compensated in Other Ways, and for Multiple Services.*
- Notice of Proposed Rulemaking: *Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators*

Background

- Over the last few years, FERC has taken steps to encourage energy storage development through a series of orders.
  - FERC recognized that developments in storage can bring economic and reliability benefits to consumers.
  - Recent analysis indicates that energy storage costs will decrease by 50% over the next five years.
- FERC staff held a technical conference to discuss using electric storage resources in organized markets on November 9.
- FERC issued a notice of proposed rulemaking on electric storage participation in RTO and ISO markets on November 17.

Storage: Developments at FERC (cont.)

Order No. 755: Frequency Regulation Compensation in the Organized Wholesale Power Markets

- Created new compensation rules for frequency regulation.
- RTOs and ISOs must compensate frequency regulation resources based on the actual service provided and adopt a two-part market-based compensation method for frequency regulation services that rewards faster-ramping resources (capacity payment reflecting opportunity costs + market-based performance payment).

Order No. 784: Third Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies

- Opens the ancillary services markets to storage project developers.
- Public utility transmission providers must take into account speed and accuracy of resources.

Storage: Developments at FERC (cont.)

Order No. 792: Small Generator Interconnection Agreements and Procedures

- Revised the *pro forma* Small Generator Interconnection Agreement and Small Generator Interconnection Procedures to specifically make energy storage eligible to connect to the grid.
- Revised the definition of Small Generating Facility to explicitly include storage devices.

Order No. 819: Third-Party Provision of Primary Frequency Response Service

- Permits voluntary sales of primary frequency response service at market-based rates by sellers with market-based rate authority for sales of energy and capacity.

Storage: Developments at FERC (cont.)

- In April 2016, FERC Staff issued data requests to ISOs and RTOs and a Request for Comments to determine whether electric storage resources face barriers to participating in the capacity, energy, and ancillary service markets that potentially lead to unjust and unreasonable wholesale rates.
- If there are potential barriers, Staff wanted to determine whether tariff changes are warranted.
- Data requests covered topics including:
  - Eligibility of electric storage resources to participate in RTO and ISO markets.
  - Technical qualification criteria and performance requirements for market participation.
  - Treatment of electric storage resources when receiving electricity for later injection to the grid.

Electric Storage Resources Technical Conference

- On November 9, 2016, FERC staff held a technical conference to discuss utilizing electric storage resources in organized markets as transmission assets compensated through transmission rates, for grid support services that are compensated in other ways, and for multiple services.
  - Electric storage resources are facilities that can receive electric energy from the grid and storage it for later injection of electricity back to the grid.
- FERC recognizes that electric storage resources can provide services to entities including RTOs/ISOs, distribution utilities, and other markets and can fit into one or more of the traditional asset functions of generation, transmission, and distribution.

Panel 1: Utilization of Electric Storage Resources for Transmission Service

- General agreement that storage is unique and can perform both load-type and supply-type functions.
- Can electric storage resources be considered to be assets that can provide transmission service?
  - One commenter stated that there is a place in PJM markets for storage and there may be limited application for storage to be useful as a rate based transmission asset.
  - One commenter stated that electric storage resources are as able to provide services as transmission. Their participation is a regulatory issue and is not a technical issue.
  - Another commenter stated that a storage resource is a non-transmission alternative. Regardless of how it is characterized, FERC should address whether storage resources that provide transmission service can receive cost-of-service compensation for that service.

Panel 1: Utilization of Electric Storage Resources for Transmission Service (cont.)

- Two primary cross-subsidization issues: (1) concerns that transmission customers will bear the costs; and (2) concerns about the potential impact storage may have on competition in wholesale markets.
- How should cross-subsidization and RTO/ISO independence concerns be addressed?
  - Panelists discussed various scenarios in which storage assets can function under the transmission resource model. The storage assets could also be selected in an RTO planning process.
  - One commenter offered an alternative where a third-party (e.g., transmission owner's affiliate) could provide a contract-based reliability service to the transmission owner.
  - Another commenter stated that there are opportunities to pursue both cost-based and market-based rate services and that cost allocation mechanisms can be developed to ensure proper cost allocation.
  - FERC Staff agreed that the industry could use more imagination in transmission planning (e.g., look at load shapes).

Panel 2: Utilization of Electric Storage Resources for Grid Support Services

- What models can enable an electric storage resource to provide a compensated grid support service, rather than or in conjunction with, being compensated for providing transmission service?
  - One commenter expressed interest in a competitive process if it is done expeditiously and if it can reduce costs.
  - One commenter supports a competitive process. The resources that cost less and that can maintain reliability should be chosen to provide service.
  - Another commenter welcomes a solicitation process and stated that whether storage resources can capture value across all spectrums needs to be examined. Storage needs to be able to cross asset classes to enable it to be a more affordable and efficient resource.

Panel 3: Utilization of Electric Storage Resources for Multiple Services

- Can storage resources provide multiple services? Can they be provided by the same electric storage resource capacity or different portion of the total electric storage resource capacity? What technical limitations are there?
  - One commenter has a 1200 MW storage facility that provides regulation, spinning, and non-spinning reserves that can both produce and store. The resource experiences risk with the ability to provide future ancillary services if it is 50% islanding and 50% service.
  - One commenter has a 7 MW 3-hour energy storage system that provides frequency regulation, voltage support, and coincident peak support. It is looking into using the system for islanding as well. If a resource has multiple uses, it needs prioritization.
  - Another commenter echoed the need for prioritization and noted the importance of having options on how to manage state of charge.
  - Another commenter has multi-use storage that provides service across the four traditional services – transmission, distribution, wholesale market, or customer-located services (e.g., backup power).

Panel 3: Utilization of Electric Storage Resources for Multiple Services (cont.)

- Assuming simultaneous use is feasible, how should the cost of the resource be shared?
  - One commenter noted that cost allocation issues arise when the resource is providing services at cost based rates and market based rates. One commenter identified a few models that should be further discussed – (1) system operator operates the device; (2) merchant storage devices contracts out the reliability service to the ISO; (3) network operator owns the device and contracts it out.
  - One commenter stated that resources should not be permitted to charge at wholesale and discharge at retail.
  - Another commenter stated that FERC needs to address the performance requirements and penalties for failing to provide service. FERC should also address situations where there is an emergency and a need for the resource to operate immediately.

Electric Storage Participation in RTO and ISO Markets

- FERC issued a Notice of Proposed Rulemaking on November 17, 2016.
- Purpose:
  - To remove barriers to the participation of energy storage resources and distributed energy resource aggregations in the RTO and ISO capacity, energy, and ancillary services markets.
- Proposals:
  - Revisions to 18 C.F.R. § 35.28
  - Revisions to RTO and ISO tariffs

Revisions to Section 35.28

- What does Section 35.28 apply to?
  - Section 35.28 applies to any public utility that owns, controls, or operates facilities used for the transmission of electric energy in interstate commerce and to any non-public utility that seeks voluntary compliance with jurisdictional transmission tariff reciprocity conditions.
- New Proposed Definitions in Section 35.28(a):
  - Electric Storage Resource
  - Distributed Energy Resource
  - Distributed Energy Resource Aggregator
  - Organized Wholesale Electric Markets

Revisions to Section 35.28 (cont.)

- Section 35.28(g) addresses tariffs and operations of Commission-approved ISOs and RTOs.
- Proposal:
  - RTOs and ISOs must revise their tariffs to establish a participation model for electric storage resources and distributed energy resource aggregators.
  - The market rules must:
    - Recognize the physical and operational characteristics of the resources; and
    - Accommodate the participation of the resources in organized wholesale energy markets.

RTO and ISO Tariff Revisions

- Participation Model for Energy Storage Resources must:
  - Ensure eligibility in the organized wholesale energy markets;
  - Incorporate bidding parameters;
  - Ensure resource can be dispatched and can set the wholesale market clearing price as both a wholesale seller and wholesale buyer;
  - Establish a minimum size requirement no greater than 100 kW; and
  - Provide that sale for resale must be at the wholesale LMP

Eligibility to Participate in Organized Wholesale Electric Markets

- RTOs/ISOs should revise their tariffs to provide:
  - Electric storage resources should be eligible to provide services that the RTOs/ISOs do not procure through a market mechanism (e.g., blackstart, primary frequency response, and reactive power).
  - If compensation for the services exists, electric storage resources should receive compensation commensurate with the service provided.
  - Electric storage resources can de-rate its capacity to meet minimum run-time requirements to provide capacity or other services.
    - In RTOs/ISOs with capacity markets, the de-rated capacity value for electric storage resources should be consistent with the quantity of energy that must be offered into the day-ahead energy market for resources with capacity obligations.
  - Participation in ancillary service markets should be based on the resource's ability to provide services when it is called upon and not on the real-time operating status of the resource.

Eligibility to Participate in Organized Wholesale Electric Markets (cont.)

- FERC seeks comment on issues including:
  - Whether eliminating the requirement for a resource to be online and synchronized to the grid would be impactful given the continued need to have an energy schedule.
  - Whether the requirement to have an energy schedule to provide ancillary services can be adjusted to allow energy storage resources to participate in ancillary service markets independent of offering energy to the RTO/ISO.
  - Whether dispatch and pricing of energy and ancillary services would continue to be internally consistent if a resource were not required to offer to provide energy to offer to provide ancillary services.
  - Whether the resource's capability to provide an ancillary service without an energy schedule can be determined in regular performance tests the RTO/ISO conducts.
  - Whether a resource's start-up time and ramp capability are generally represented in bidding parameters and would adequately guarantee the resource's ability to provide other services absent energy market participation.

Bidding Parameters

- RTOs/ISOs should revise their tariffs to provide:
  - The participation model should incorporate bidding parameters that reflect and account for the physical and operational characteristics of electric storage resources.
    - E.g., greater flexibility to transition from charging and discharging.
  - Electric storage resources must submit (as applicable) state of charge, upper charge limit, lower charge limit, maximum energy charge rate, and maximum energy discharge rate as bidding parameters.
  - Electric storage resources may submit minimum charge time, maximum charge time, minimum run time, and maximum run time as optional bidding parameters.
  - RTO/ISOs should allow electric storage resources to self-manage their state of charge and upper and lower charge limits.

Eligibility to Participate as a Wholesale Seller and Wholesale Buyer

- RTOs/ISOs should revise their tariffs to provide:
  - Electric storage resources can be dispatched and can set the wholesale market clearing price as a wholesale seller and wholesale buyer.
  - RTOs/ISOs must accept wholesale bids from electric storage resources to buy energy.
  - Electric storage resources cannot be prohibited from participating in organized wholesale markets as price takers.

- FERC preliminarily concluded that allowing an electric storage resource to participate as a supply and demand resource simultaneously is necessary to maximize the resource's value in organized wholesale electric markets.

Minimum Size Requirement

- RTOs/ISOs should revise their tariffs to provide:
  - The participation model for electric storage resources should establish a minimum size requirement for participation in the organized wholesale electric markets that does not exceed 100 kW.
    - This includes minimum capacity requirements, minimum offer requirements, and minimum bid requirements for resources participating under the electric storage resource participation model.

- FERC preliminarily concluded that the minimum size requirement balances the benefits of increased competition with the ability of RTO/ISO market clearing software to effectively model and dispatch smaller resources often located on the distribution system.

Energy Used to Charge Electric Storage Resources

- RTOs/ISOs should revise their tariffs to provide:
  - Sales for resale by electric storage resources must be at the wholesale LMP.

- FERC seeks comments on whether metering and accounting practices need to be established in the RTOs/ISOs tariffs to facilitate compliance with this.
  - A commenter raised the concern that behind-the-meter electric storage resources should not be allowed to charge at a wholesale rate and discharge to service a retail customer as a means for the retail customer to avoid paying the retail rate.

Other RTO and ISO Tariff Revisions

- RTOs/ISOs must also define qualification criteria
  - Ensure the RTO/ISO is able to dispatch the resource

- RTOs/ISOs should make additions/modifications to its tariff to specify:
  - Whether resources that qualify to use the participation model for electric storage resources will participate in the organized wholesale electric markets through existing or new market participation agreements; and
  - Whether particular existing market rules apply to resources participating under the electric storage resource participation model.

Issues for Comment

- FERC seeks comments on issues including:
  - Can the requirement to have an energy schedule to provide ancillary services be adjusted so that electric storage resources and other technically-capable resource could participate in the ancillary service markets independent of offering energy to the RTO/ISO?
  - Are there conditions under which an RTO/ISO should not allow an electric storage resource to manage its state of charge and upper and lower charge limits?
  - Should there be a mechanism that identifies bids and offers coming from the same resource that ensures the price for the offer to sell is not lower than the price for the bid to buy during the same market interval so that an RTO/ISO does not accept both the offer and bid of a resource using the electric storage resource participation model for that interval?
  - Are there any existing RTO/ISO rules that unnecessarily limit the ability of resources using the participation model for electric storage resources to set prices in the organized wholesale electric markets?
  - Should the participation model allow make-whole payments when a participating resource is dispatched as load and the price of energy is higher than the resource's bid price?

Distributed Energy Resource Aggregations

- RTOs/ISOs must accommodate the participation of distributed energy resource aggregations in organized wholesale electric markets and establish market rules on:

  (1) eligibility to participate in the organized wholesale electric markets through a distributed energy resource aggregator;

  (2) locational requirements for distributed energy resource aggregations;

  (3) distribution factors and bidding parameters for distributed energy resource aggregations;

  (4) information and data requirements for distributed energy resource aggregations;

  (5) modifications to the list of resources in a distributed energy resource aggregation;

  (6) metering and telemetry system requirements for distributed energy resource aggregations;

  (7) coordination between the RTO/ISO, distributed energy resource aggregator, and the distribution utility; and

  (8) market participation agreements for distributed energy resource aggregators.

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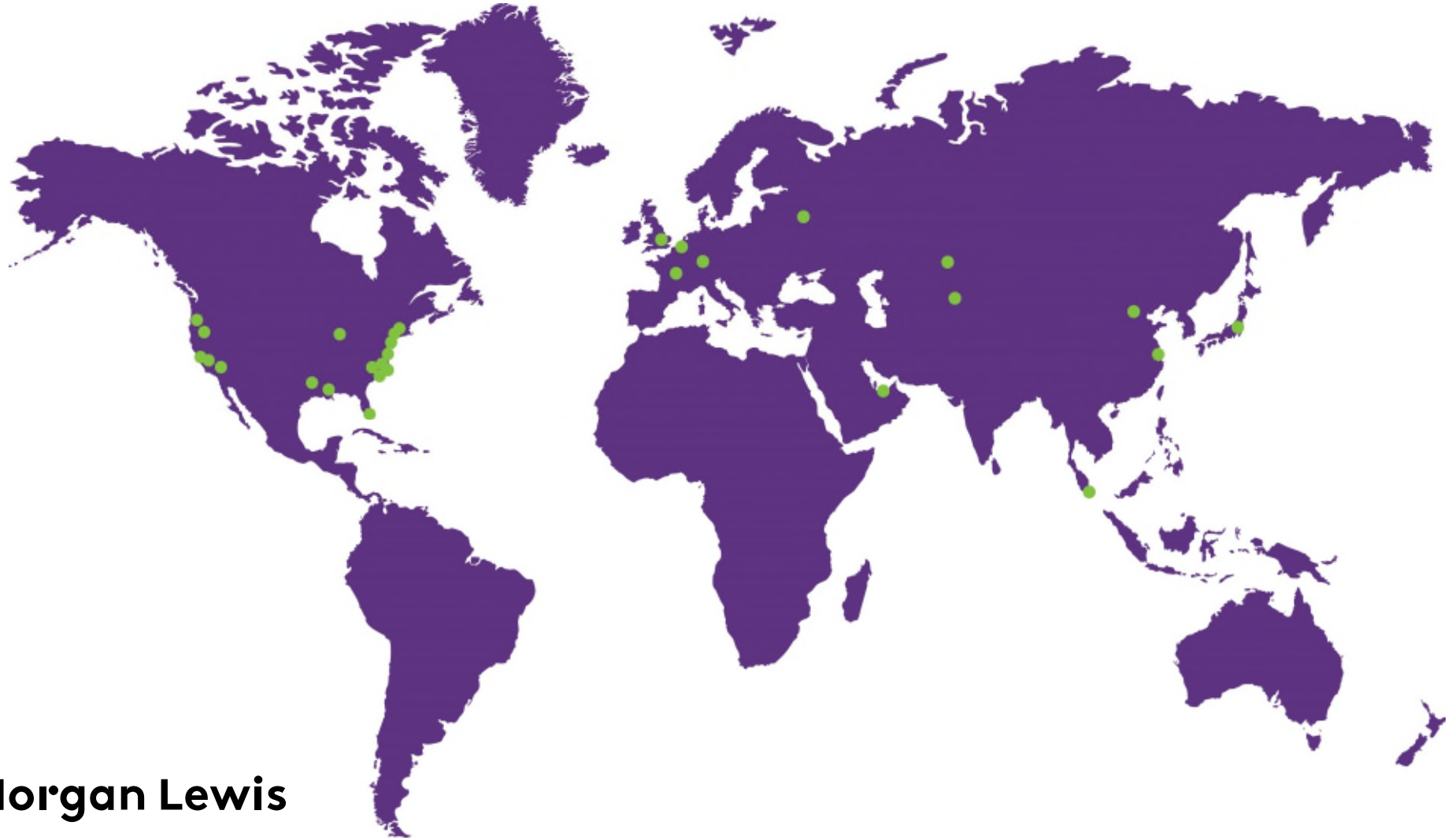

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