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
Docket No. AD16-25-000
November 9, 2016, Washington, DC

Agenda

1. Welcome and Opening Remarks **10:00 a.m. to 10:15 a.m.**[1]

2. Panel Discussions

The Commission has recognized that electric storage resources can mimic a transmission function under certain circumstances, including when operated solely at the independent market operator's direction to provide voltage support or to address thermal overload situations on relevant transmission facilities.[2] The Commission has also recognized that, if an electric storage resource recovers its costs as a transmission asset and participates in Regional Transmission Organization (RTO)/Independent System Operator (ISO) markets, or sells other wholesale electric services, this could raise concerns with respect to competition due to cross-subsidization and RTO/ISO independence concerns.[3] Electric storage resources may also be capable of providing a compensated grid support service, such as the services that a generator may provide

[1] All times are eastern daylight time.

[2] *W. Grid Dev., LLC*, 130 FERC ¶ 61,056, at P 47, *reh'g denied*, 133 FERC ¶ 61,029 (2010) (*Western Grid*). In *Western Grid*, the Commission classified the electric storage resource at issue as transmission because it would be operated in a way that would "mimic a wholesale transmission function." *Id.* P 43.

[3] *See id.* P 45; *see also Nev. Hydro Co.*, 122 FERC ¶ 61,272 (2008) (*Nevada Hydro*); *Third-Party Provision of Ancillary Services; Accounting and Financial Reporting for New Electric Storage Technologies*, 135 FERC ¶ 61,240, at P 7 (2011) (Notice of Inquiry).

under a reliability must-run contract, rather than, or in conjunction with, providing transmission service. Finally, electric storage resources may be capable of providing both wholesale electric service(s) and retail and/or end-use service(s) at once. The following panels will explore issues that may arise in the context of electric storage resource utilization as transmission assets, for grid support services, and for multiple services in the RTO/ISO markets, as well as the compensation that such resources may receive for the transmission or wholesale electric services that they provide.

Panel 1 -
Utilization of Electric Storage Resources for Transmission Services **10:15 a.m. to 11:45 a.m.**

In *Western Grid*, the Commission accepted a proposal to use electric storage resources as transmission assets based on the particular use proposed (voltage support or thermal overload protection for relevant transmission facilities) and on other conditions proposed by the applicant, including a commitment to forego any sales into wholesale organized markets.[4] This latter condition was primarily intended by the applicant to address the Commission's concerns with respect to (1) the impact on competition when one market participant may recover its costs through cost-based rates on file with the Commission while others may not and (2) the impact on RTO/ISO independence if the RTO/ISO is made responsible for the profitability of the electric storage project's charging and discharging activity, rather than simply carrying out a market participant's instructions.[5] The purpose of this panel will be three-fold: (1) discuss additional potential modes of electric storage resource operation (i.e., beyond providing voltage support or thermal overload protection for relevant transmission facilities) that could be characterized as transmission service; (2) discuss additional methods of addressing concerns about competition due to cross-subsidization and RTO/ISO independence concerns; and (3) discuss operational considerations when using electric storage resources as both transmission assets and providers of other wholesale electric services.

In determining which additional electric storage resource operations could be characterized as transmission service in the first issue to be discussed in this panel, we note that, in general, in order to be classified as a transmission asset whose costs can be included in transmission rates, a facility would need to be "used and useful" for transmission service.[6] Electric storage advocates often make the argument that an

[4] *Western Grid*, 130 FERC ¶ 61,056 at PP 18-24, 45-46.

[5] *See id.* PP 19, 21-23; *see also id.* PP 48-50.

[6] *See, e.g., New England Power Co.*, 42 FERC ¶ 61,016, at 61,078, *order on reh'g*, 43 FERC ¶ 61,285, *reh'g denied*, 44 FERC ¶ 61,092 (1988) ("In general, the used and useful standard provides that an asset may be included in a utility's rate base only when

(continued ...)

electric storage resource's ability to defer or avoid the costs of a traditional transmission asset makes it used and useful for transmission service. The first set of questions below focus on potential modes of electric storage operation that could be characterized as transmission service, including the argument and potential issues associated with the utilization of electric storage resources to defer or avoid transmission investment. Panelists are also welcome to pose other arguments as to why electric storage resources could be classified as transmission assets, such as the argument that electric storage resources can, in certain circumstances, provide some of the same benefits that transmission facilities provide. The second and third sets of questions focus on the implications of permitting electric storage resources to both classify as a transmission asset and provide wholesale electric services, regardless of the reason that such resources are classified as transmission assets.

(1) Potential Modes of Electric Storage Operation That Could be Characterized as Transmission Service

The *pro forma* Open Access Transmission Tariff (OATT)[7] defines "Transmission Service" as "Point-To-Point Transmission Service," which is "[t]he reservation and transmission of capacity and energy on either a firm or non-firm basis *from the Point(s) of Receipt to the Point(s) of Delivery . . . .*"[8]

(a) Beyond providing voltage support or thermal overload protection for relevant transmission facilities, as addressed in *Western Grid*, what other modes of electric storage resource operation (e.g. ancillary services) can be

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the item is used and useful in providing service, and that current ratepayers should bear only the costs incurred in providing service to them."); *see also Policy Statement on Hold Harmless Commitments*, 155 FERC ¶ 61,189, at P 59 (2016) ("[C]apital costs of facilities that are used and useful and provide service to customers would normally be recoverable in rates under general ratemaking principles . . . .").

[7] *Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*, Order No. 888, FERC Stats. & Regs. ¶ 31,036 (1996), *order on reh'g*, Order No. 888-A, FERC Stats. & Regs. ¶ 31,048, *order on reh'g*, Order No. 888-B, 81 FERC ¶ 61,248 (1997), *order on reh'g*, Order No. 888-C, 82 FERC ¶ 61,046 (1998), *aff'd in relevant part sub nom. Transmission Access Policy Study Group v. FERC*, 225 F.3d 667 (D.C. Cir. 2000), *aff'd sub nom. New York v. FERC*, 535 U.S. 1 (2002).

[8] *Pro Forma* OATT sections 1.35 (emphasis added), 1.48.

considered transmission service, and why?

(b) Assume that an electric storage resource is used to defer or entirely avoid a transmission investment in traditional wires infrastructure used for transmission service by providing capacity or energy at the point of delivery rather than transporting it from the point of receipt. Is it appropriate to consider this activity the same as transmission service, or should the benefits that electric storage resources provide when used for transmission deferral or avoidance be considered differently?

(2) Methods of Addressing Concerns About Competition Due to Cross-Subsidization and RTO/ISO Independence Concerns

(a) Assume that electric storage resources were allowed to receive cost-based cost recovery for the transmission services and/or transmission deferral or avoidance benefits that they provide, while also participating in wholesale electric markets. Under this scenario, how would cross-subsidization and RTO/ISO independence concerns raised in *Western Grid* and *Nevada Hydro* be addressed?

i. For example, could the electric storage resource use only a portion of its total storage capacity to provide the cost-based rate services and include the costs of only that portion of its storage capacity in its cost-based rates, while using the remainder of its capacity to provide market-based rate services?

ii. Alternatively, if the electric storage resource uses the same storage capacity to provide both cost-based and market-based services, how could these concerns be addressed? What additional steps might be needed to address these concerns?

(3) Operational Implications of Using Electric Storage Resources as Both Transmission Assets and Providers of Other Wholesale Electric Services

To the extent that an electric storage resource could be used in whole or in part as a transmission asset while simultaneously using some portion of its capacity to offer wholesale electric services in the RTO/ISO markets, it may be operated both by the relevant balancing area authority as a transmission asset and by, or at the instruction of, a market participant while selling into wholesale electric markets.

(a) Is simultaneous operation by both a balancing area authority and market participant possible? Is it practical? Or would it be easier to treat the capacity used as a transmission asset as a separate resource from the capacity used to provide wholesale electric services to prevent any operational concerns or conflicts?

Panelists:

- W. Mason Emnett, Senior Attorney, NextEra Energy Resources, LLC
- Tom Kaslow, Director, Market Design & Policy, FirstLight Power Resources, Inc.
- Mike Kormos, Senior VP Wholesale Markets and Transmission Policy, Exelon Corp.
- Kiran Kumaraswamy, Market Development Director, AES Energy Storage
- Paul F. McGlynn, Senior Director – System Planning Division, PJM Interconnection, L.L.C.
- Raja Sundararajan, Vice President Regulatory Services, American Electric Power
- Edward Tatum, Vice President, Transmission, American Municipal Power

Lunch Break **11:45 a.m. to 12:45 p.m.**

Panel 2 -
Utilization of Electric Storage Resources for Grid Support Services **12:45 p.m. to 1:45 p.m.**

While transmission planners strive to anticipate transmission needs in advance, unexpected changes in load or generation supply may result in immediate reliability concerns that require a near-term solution until a more permanent solution, such as a transmission upgrade, can be implemented. For example, a generator in an RTO/ISO market may decide to retire earlier than expected, causing a reliability issue that the RTO/ISO cannot address through transmission upgrades or other means in the necessary time frame. Oftentimes, the RTO/ISO can only address such an issue by contracting with the generator to stay in operation until a more permanent solution is found. These contracts are sometimes called Reliability Must Run (RMR) contracts or System Support Resource contracts,[9] and by virtue of their focus on preventing a reliability issue on the electric system, they can be considered a form of interim grid-support provided by non-transmission solutions. Moreover, the cost of these contracts is neither recovered through the RTO/ISO's transmission rates nor assigned to the RTO/ISO's customers in the same fashion as are transmission costs.

In the past, only a resource already located in the affected area, such as the retiring generator itself, could likely provide such interim grid support in a timely fashion. However, electric storage resources are often both modular and easily transportable;

[9] *See, e.g.*, Midcontinent Independent System Operator, Inc. FERC Electric Tariff, Attachment Y-1 (Standard Form System Support Resource Agreement).

indeed, many are actually built into repurposed standard shipping containers. Thus, they may well be deployable on a timescale rapid enough to serve an interim non-transmission grid support function, if permitted to compete.

The purpose of this panel will be to explore potential models to enable an electric storage resource to provide a compensated grid support service rather than, or in conjunction with, being compensated for providing transmission service. Panelists should be prepared to discuss the following questions.

(1) How are the costs of RMR contracts assigned to RTO/ISO customers as compared to the costs of transmission assets? How could such cost recovery and assignment provisions for RMR units apply to electric storage resources contracted to address an interim grid support need?

(2) What alternative models may be relevant, such as Blackstart procurement or local resource adequacy procurement? How do existing cost recovery and cost assignment for those models compare to those for transmission assets?

(3) To the extent that rapidly deployable resources such as some electric storage resources are permitted to compete to supply interim non-transmission alternative grid support services, are there any practical considerations that must be taken into account when issuing requests for proposals when an interim non-transmission grid support need is identified?

(4) How quickly can electric storage resources of different sizes and for different purposes be deployed and redeployed if one interim need ends but another is identified elsewhere on the system? Under what circumstances, if any, would these interim and potentially short-term contracts be of interest to developers of electric storage resources?

(5) How will the interim projects be included in the planning and operating models of relevant planners?

Panelists:

- Charles Bayless, Associate General Counsel, North Carolina Electric Membership Corporation (on behalf of The National Rural Electric Cooperative Association)
- Jason Burwen, Policy Director, Energy Storage Association
- F. William (Bill) Capp, President, Grid Storage Consulting
- Michael DeSocio, Senior Manager, Market Design, NYISO
- John Fernandes, Director, Policy & Market Development, Renewable Energy Systems (RES) Americas
- Eric Hsia, Manager, Performance Compliance, PJM Interconnection, L.L.C.
- Neil Millar, Executive Director, Infrastructure Development, California ISO

Panel 3 -
Utilization of Electric Storage Resources for Multiple Services **1:45 p.m. to 3:00 p.m.**

The purpose of this panel is to discuss any practical considerations for electric storage resources providing multiple services at once, whether to multiple entities or the same entity, particularly if one or more are wholesale electric services to the RTOs/ISOs and others are retail and/or end-use services. Rather than speaking at a high, conceptual level about multiple services, staff strongly encourages panelists to be prepared to discuss concrete examples of multiple services that electric storage resources can provide, whether they can be provided simultaneously, whether they can be provided by the same electric storage resource capacity or different portions of the total electric storage resource capacity, and what technical limitations may apply. Panelists should be prepared to answer the following questions:

(1) Simultaneous use of the same electric storage resource capacity
   (a) What, if any, services can be provided simultaneously from the same storage capacity?
      i. For example, is it technically possible for an electric storage resource to provide reactive supply and voltage control service and regulation service from the same electric storage resource capacity at the same time? What about other combinations of service, such as spinning reserves and regulation? Or, is it only possible to provide those or other services at different times using the same capacity?
      ii. If two or more services can only be provided by the same storage capacity at different times, what, if any, are the technical implications of making simultaneous sales of those services from the same capacity? For instance, if an electric storage resource is providing transmission or grid support but is only needed to address discrete transmission issues (e.g., to be available in the event a specific transmission line becomes congested or is taken out of service), can it offer other services when not needed for this transmission purpose? Does the answer to this question depend in part on whether the discrete issue to be addressed will be fairly predictable as to when it occurs (e.g., fairly predictable daily transmission line congestion v. fairly unpredictable transmission line outage due to contingency)?
   (b) Assuming simultaneous use of capacity is technically feasible for particular services, how could or should the costs of that electric storage resource capacity be shared among the services? Does it only matter how such costs are shared if one or more of the simultaneous services are provided under cost-based rates to captive customers? How would double and/or overcompensation need to be defined, evaluated, and prevented if an electric storage resource is paid to provide multiple services with the same capacity?

(c) Assuming the same electric storage resource capacity is used simultaneously for multiple services, would prioritization of services be necessary and, if so, how could it be meaningfully accomplished in light of the need for an electric storage resource that was partially or totally discharged serving the lower priority service to recharge in order to provide the higher priority service? A generator that sells, for example, interruptible service to one customer and spinning reserves from the same capacity to another customer can quickly cut service to the interruptible customer in order to devote that output to the higher priority customer when a contingency triggers the need for spinning reserve. In this scenario, if an electric storage resource were the seller and partially discharged from the shared-use storage capacity in order to serve the interruptible customer, and then the electric storage resource is called upon to provide the higher priority service, under which, if any, circumstances would it be able to serve that higher priority need without some diminution in service due to the prior discharge for the lower priority service?

(d) What concerns do the RTOs/ISOs and other grid operators have about allowing an electric storage resource to sell services to other entities with the capacity that is already participating in their markets or providing a transmission service or grid support service? How would the fact that some resources are utilized to provide multiple services simultaneously be included in the study models and the study processes of relevant planners? Would there be any reliability impacts on the grid if electric storage resources are used for multiple applications? Would non-performance penalties designed for existing resources, which may not share electric storage resources' need to recharge when switching from lower priority service to a higher priority service, need to be revisited if electric storage resources and other technically capable resources are utilized to provide multiple services simultaneously?

(2) Segregation of electric storage resource capacity for different services

(a) As an alternative to simultaneous use of the same storage capacity, what issues may arise in connection with segregation of storage capacity for different services that would be separately compensated?

i. Could transmission-connected electric storage resources be capable of providing services to multiple entities using different portions of their capacity? If so, would any special metering or telemetry requirements be necessary in order to allow tracking of the portion of the storage capacity that was used for each service?

ii. Would the answer to the prior question change if the electric storage resource were instead connected at the distribution level or behind a retail customer meter? How, if at all, can energy discharged to sell a wholesale electric service be segregated from energy discharged to serve end-use load?

Panelists:

- Ted Ko, Director of Policy, Stem
- Michael Kintner-Meyer, Staff Scientist, Pacific Northwest National Laboratory
- Lorenzo Kristov, Principal, Market Infrastructure and Policy, California ISO
- Troy Miller, Director of Grid Solutions, S&C Electric Company
- Aparna Narang, Director, Short-Term Electric Supply, Pacific Gas and Electric Company
- Jeff Nelson, Director, FERC Rates and Market Integration, Southern California Edison
- Sarah Van Cleve, Energy Policy Advisor, Tesla Motors, Inc.
- Manal Yamout, Vice President, Policy & Markets, Advanced Microgrid Solutions

3. Closing Comments and Adjournment 3:00 p.m. to 3:05 p.m.