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Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

*Re:* *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

Dear Ms. Bose:

PJM Interconnection, L.L.C. hereby submits this statement in advance of its participation in the upcoming November 9, 2016 technical conference in the above-captioned proceeding.

Respectfully submitted,

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**STATEMENT OF PJM INTERCONNECTION, L.L.C.**

PJM Interconnection, LLC ("PJM") is pleased to submit this Statement in order to assist the Commission in its consideration of the topics posed in Panel 1- "Utilization of Electric Storage Resources for Transmission Services" of the Commission's November 9, 2016 Technical Conference in the above-captioned proceeding. These comments seek to constructively add to the discussion as to whether or not there are circumstances where electric storage resources should be considered transmission resources in the Regional Transmission Organization ("RTO") transmission planning process.

Introduction

At the outset, it is worth noting that PJM has been successful to date in incorporating over 300 MW of emerging electric storage resource technologies, such as batteries and flywheels, into its ancillary service markets. As will be explained by Eric Hsia during his comments on Panel 2- "Utilization of Electric Storage Resources for Grid Support Services", PJM has implemented the Commission's Order No. 755 in a manner which has recognized the fast response of these resources for the provision of critical ancillary services such as Regulation. Moreover, traditional electric storage resources such as pumped storage have long been participants in PJM's markets.

The question of whether there are circumstances where electric storage resources can be considered a transmission asset is one which requires careful consideration of the overall market opportunities provided to all resources and whether there are particular "niche" applications where electric storage resources can provide a more cost-effective solution than construction of new transmission or a transmission upgrade. As a general principle, the Commission should not bend the market design to give electric storage resources (or any other technology) a competitive edge over other resources such as generation or demand response, which could also be used to alleviate constraints on the system before they become reliability violations. However, while market solutions should remain the primary vehicle for addressing constraints on the system, the Commission should not simply ignore the fact that targeted niche deployment of electric storage resources, either coupled with or in lieu of transmission upgrades, could address specialized transmission needs in a cost-effective manner where market solutions are not feasible or have not come forward. The Commission attempted to balance these concerns in the *Western Grid* [1]case, but PJM concurs with the Commission that this proceeding may be a good time to reexamine these issues, lest the restrictions on an electric storage resource's use, as detailed in the *Western Grid* case, start to overwhelm its value in different applications.

[1] *W. Grid Dev., L.L.C.*, 130 FERC ¶ 61,056, at P 47, *reh'g denied*, 133 FERC ¶ 61,029 (2010) (*Western Grid*).

The Role of Non-Transmission Solutions in PJM's Planning Process

From its inception, the PJM planning process was designed to work in tandem with, not as a substitute for, development of resources through the PJM markets. The planning process is a transmission planning process, not an Integrated Resource Plan process. As a result, the planning process provides a fifteen year "look ahead" through the Regional Transmission Expansion Plan ("RTEP") as to the state of the transmission grid and identifies constraints on the system which either presently or in the future could become reliability violations. This information, along with Locational Marginal Prices ("LMP") developed through the PJM energy market and forward price signals developed in the PJM capacity market, are all designed to inform and incent the development of non-transmission solutions. These non-transmission solutions include generation, energy efficiency or demand response at locations on the system where those resources can both realize their full value to the grid and help defer or obviate the need for transmission solutions. In this sense, transmission solutions identified in the RTEP should be viewed as a "backstop" when market solutions have not addressed the issue from either a reliability or market efficiency viewpoint.

The nature of the transmission problem being identified is an important element that must be considered in the transmission planning process. If the reliability need is immediate, PJM cannot wait for development of market based solutions and instead orders transmission upgrades. For other locations on the grid, the RTEP, as well as the information provided through the markets, provides information as to areas on the system where constraints may well turn into reliability violations in the future. Moreover, if the reliability need is not immediate, or the need is more economic in nature to alleviate congestion, market-based resources such as generation or demand response are analyzed to see if they obviate the need for transmission solutions and therefore do not even trigger the tests for development of a market efficiency transmission solution.

Maintaining the Market Model and Not Singling Out Resources Based on Technology

As a general matter, electric storage resources should not be singled out for treatment different from other resources. The Commission has consistently recognized, as an overarching principle, not choosing specific technologies but instead ensuring that the market is technology-neutral consistent with reliability needs. In general, the Commission should approach this issue the same way. For example, the Commission, as well as several states, have recently been interested in fostering the development of new renewable, demand response and energy efficiency resources. Although specific compensation and market design modifications have been made to accommodate the unique nature of each of these resources (modifications themselves that have been highly controversial), in each instance the Commission worked *within* the market model, rather than singling out the resource for some specialized regulatory treatment such as inclusion in rate base. The Commission should approach electric storage resources the same way, and should not let the technology drive the compensation model but instead allow

these resources to realize their potential through the market by offering services that they are capable of providing.

"Niche" Applications of Electric Storage Resources as a Transmission Solution

Notwithstanding the foregoing, the Commission is appropriately asking whether there are specific circumstances where electric storage resources can serve a specialized function to address a transmission need. The short answer is "yes", as such circumstances do exist and should be accommodated in the RTEP process. For example, in those circumstances where it is clear that neither generation nor demand response resources have developed in a particular location sufficient to address an identified reliability violation, the PJM planning process could look at specialized applications of electric storage resources as a means to either defer or displace a needed transmission upgrade. In these narrow circumstances, PJM could, for example, envision an expansion of the notion of what kind of solutions are eligible for submittal through the Order No. 1000 competitive solicitation process so as to allow a developer to submit a proposal for installation of an electric storage resource, either combined with other transmission upgrades or on its own, for consideration to solve the identified violation. PJM would analyze these electric storage submittals just as PJM analyzes a host of other transmission solutions and, if they are both more effective and cost efficient than a traditional transmission solution (and where the proposal does not carry with it significant technology risk), they could serve as the appropriate solution for inclusion in the RTEP to either defer or displace a competing transmission solution.

The same would hold true for the analysis of electric storage solutions in lieu of a traditional transmission upgrade for those projects which do not go through the Order No. 1000 competitive solicitation process. From a practical standpoint, given the current maturity of battery technology, it is far more likely that electric storage resources would be submitted for consideration by Transmission Owners as they principally would be for lower voltage upgrades on incumbent Transmission Owner facilities. Per Order No. 1000, these types of upgrades are not eligible for competitive solicitation.

Hypothetical Example of a "Niche" Application Considered through the RTEP

At the most basic level, planning criteria violations are based on the balance of load and generation in a given area and the performance of the transmission grid under specific contingency conditions. Such violations are typically mitigated in the planning process by enhancements to transmission infrastructure, but can also be resolved by a change to the load/generation balance, such as the addition of an energy source in the constrained area.

As an example, a criteria violation would arise with respect to a load pocket served by a limited number of transmission facilities if the capability of those facilities was insufficient to serve the peak customer load following the loss of one transmission element. The violation could be resolved by adding another transmission feed into the area or enhancing the capability

of the most limiting transmission element. The addition of a generating resource in the constrained area would also resolve the violation if it was of sufficient size, was sufficiently and predictably available, and was subject to dispatch by system operators.

Electric storage resources have a similar ability to resolve criteria violations, but would have availability limitations that would need to be overcome. Transmission solutions are considered in planning analyses to have 24/7 availability. Traditional generation resources have relatively low forced outage rates and are, therefore, assumed to be available in planning studies to mitigate reliability criteria violations. However, electric storage resources would have to be sized and designed to ensure that energy could be discharged to the grid for a sufficient number of hours to provide certainty to grid operators that transmission facility loadings can be managed within limits consistent with normal customer load cycles. Equally important, sufficient time would be required to recharge the resources in order to ensure their availability for the next Operating Day. These limitations and requirements become more complicated if the criteria violations requiring resolution are related to winter conditions, where two peak load periods are experienced each day. This simple load pocket example is perhaps the easiest to visualize in terms of the potential viability of electric storage as a solution to planning criteria violations. The applicability of storage to contingencies involving networked portions of the grid should not be ruled out, but could involve much greater complexities related to operational and availability requirements.

Participation of the Electric Storage Resource in Energy and Ancillary Service Markets

Following on the foregoing example, the question then arises as to whether electric storage resources can also participate in PJM's markets during those times when they are not being operated to address a particular reliability constraint. The Commission's *Western Grid* case discussed a host of limitations on that participation, particularly as it relates to the resource being dispatched and operated by the RTO/ISO itself. PJM believes one possible way to address this issue with fewer regulatory restrictions would be to allow the electric storage resource owner to offer into those other markets, and have any corresponding market revenues deducted from any costs of the resource included in transmission rates. In this way, the resource would not simply lie unused in those hours when it otherwise could provide energy or ancillary services. Transmission ratepayers could then receive the value of those market revenues as an offset to the entity's revenue requirement. Further, to avoid Transmission Owners themselves effectively becoming market participants in violation of corporate separation rules and the Commission's standards of conduct,[2] the electric storage resource could be housed in a separate company, be it independent or an affiliate of the Transmission Owner, which would have a contract for reliability-based services with the Transmission Owner. Those contract payments would then be

[2] *See e.g. Open Access Same-Time Information System (formerly Real-Time Information Networks) and Standards of Conduct*, Order No. 889, 75 FERC 61,078 (1996).

eligible for inclusion in transmission rates net of market-related revenues generated by the electric storage resource.

Questions for Commission Consideration and Guidance

When considering possible paradigms for electric storage resources to participate as transmission assets and also participate as a source of energy or ancillary services in an RTO market, the Commission should look to address several important questions, including but not limited to the following:

1. As a threshold matter, can the definition of "transmission asset" considered in planning processes include an electric storage resource? Although PJM does not consider other resources, such as generation or demand response "transmission assets" (nor should it), is there a sufficient basis in law and policy for electric storage resources to be considered "transmission assets" when they are deployed to address niche applications on the transmission grid?

2. Assuming the electric storage resource can be considered a transmission asset, how should the Planning Authority treat the future anticipated revenue stream of the asset from all markets when comparing the costs of the electric storage resource to alternative transmission proposals?

3. If the electric storage resource offers into the energy or ancillary service markets, should it be required to bid at cost to avoid price suppression resulting from its ability to receive revenues through rate base treatment?

4. Are there are other ways to avoid concerns with cross-subsidization when electric storage resources are allowed to receive cost recovery as transmission facilities while also participating in wholesale electric markets? Will it be sufficient if the RTO/ISO simply directs when the resource is needed for transmission reliability solutions so as to create an effective "right to recall" the unit to perform specialized functions outside of their overall market participation?

Next Steps

PJM posits that the circumstances where an electric storage resource could be considered as a transmission asset would be rare and highly location specific. Electric storage resources should not become a ready alternative to resources competing in PJM's markets. However, in highly constrained areas of PJM's system where construction of new generation (or even new transmission) may not be possible due to issues associated with land use, emissions permitting, or other societal impediments, or in instances where an electric storage resource can help alleviate the upgrades required to meet a pre-contingency condition by being called upon to operate post contingency, an electric storage resource potentially could be a more cost effective "last resort" that would avoid requiring a more costly transmission-only solution.

Many questions arise with this paradigm. But just as PJM has allowed Qualified Transmission Upgrade (QTU) solutions to serve as capacity resources in its capacity market in specialized situations, by the same token all parties should be open to considering electric storage resources' value as displacing transmission in those niche areas where generation or demand response resources have simply not come forward to alleviate a constraint or address a violation due either to economics or siting difficulty.

PJM believes consideration of this topic deserves further deliberation, but also requires further guidance from the Commission on the issues outlined above such as the bounds of what would constitute undue discrimination and limits on consideration and compensation of the asset to avoid market distortions. Further, in order for the Commission to address these issues in an informed way, the industry may need to present specific situations that Planning Authorities and ultimately the Commission can use as "test cases" to help further develop future policy. PJM stands ready to work with the Commission and stakeholders on these and other issues going forward.