



Storage as a Transmission-Only Asset

Introduction and Principles

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- Currently, the New England planning process and associated documents, such as the Tariff and the Transmission Operating Agreement, do not allow storage devices (storage) to be considered as a transmission asset when addressing identified needs and therefore storage is not available for treatment as a transmission asset eligible for Pool-Supported Pool Transmission Facility (PTF) treatment
- Stakeholders, including NESCOE, have expressed their desire to have storage considered as a transmission asset
 - During the 2019 Competitive Transmission Solicitation Enhancements effort
 - As part of the 2021/2022 Boston 2028 RFP Lessons Learned process
 - At various ISO and NEPOOL meetings

Introduction: Storage as a Transmission-Only Asset

- The ISO is developing a process to allow for storage to be considered as a transmission asset. This would allow storage to be considered as a solution to needs in both the Solutions Study process and the competitive solution process
- Today's Transmission Committee (TC) discussion is intended to discuss general principles for a storage as transmission-only asset (SATOA)
- FERC filing is targeted for the end of the year to support future Solutions Studies and RFPs



Background

- What is a SATOA?
 - A SATOA is an energy storage device connected to the PTF at 100 kV or higher which can inject stored power to address transmission system concerns
 - The storage medium will not be restricted to one particular technology. Batteries, air, water, large concrete blocks on cranes, etc. are all acceptable
- The ISO has identified some conceptual hurdles in undertaking this as a concept, and these are being taken into consideration in its proposal
 - Introduction of a SATOA cannot compromise reliability by introducing unmanageable operating burdens into the control room
 - A SATOA cannot have a significant impact on the markets
- The following slides take these concepts into account



REAL AND REACTIVE POWER



Real and Reactive Power

- When discussing a SATOA, the conversation can often be split into two capabilities in order to ensure adequate focus on a particular issue
- A SATOA has two capabilities:
 - Real power – the MW that are moved out of (discharging) or into (charging) the SATOA
 - Reactive power – the MVAR that are moved out of (capacitive) or into (reactive) the SATOA



REAL POWER



Real Power

- A SATOA can be a solution to a system need in a Solutions Study or the competitive solution process to address reliability, market efficiency, Public Policy, and eventually Longer-term Transmission concerns
- In Transmission Planning, the ISO will limit the use of a SATOA to being discharged post-second contingency (post N-1-1)
 - Decreases the likelihood of the SATOA being operated daily for months at a time, which could be the case if it addressed N-0 or N-1 concerns
 - Minimizes the impact on the markets by limiting the frequency of the SATOA charging/discharging
 - Limits the risk of the SATOA running out of stored energy before the second contingency for which it was installed occurs



Real Power, continued

- In Operations, the SATOA will be used as a last step to avoid load shedding or criteria violations, including but not limited to the transmission need it was selected to address
 - Operated after all other available market-facing resources are exhausted
 - May also be used to support significantly out of the ordinary conditions, such as system restoration or black start
 - Will not be used for regulation, price arbitrage, or other functions that can be provided by market assets



Real Power, continued

Additional restrictions will also be placed on the addition of SATOAs in planning the system to limit their impact on markets and to ensure that they are manageable by operators

- Each station will be limited to not more than 30 MW of charge/discharge capability from a SATOA(s)
 - Limits sudden impacts on Area Control Error and generation dispatch
- The total amount of SATOAs in New England will be limited to 300 MW of charge/discharge capability
 - Can be re-evaluated later once the ISO gains experience with SATOAs
- SATOAs cannot be used to address an IROL concern
 - Avoids impacts on pricing in reserve zones
 - Avoids the risk of an inter-area impact due to insufficient stored energy
- SATOAs at multiple stations cannot be used to solve the same or similar issues in one portion of the transmission system
 - Avoids the need to coordinate dispatch of SATOAs at multiple stations to solve the same concern
 - Avoids the cumulative impact on markets and Area Control Error of SATOAs simultaneously discharging



REACTIVE POWER



Reactive Power

- While the focus of a SATOA is its ability to inject real power, SATOAs also have the ability to produce reactive power much like a dynamic reactive transmission device, such as a synchronous condenser, a static VAR compensator (SVC), or a static synchronous compensator (STATCOM)
- The vast majority of dynamic reactive transmission devices installed in New England are operated continuously to maximize their contribution to voltage control
- As time goes on, the need for continuous voltage control on the system is increasing, where voltage control is needed both in steady state and in response to contingencies
- Therefore, any SATOA added to the system will be expected to provide continuous voltage control 24/7
- As part of the PTF, the SATOA would be pool-supported and not eligible for separate compensation for its reactive power capabilities under Schedule 2, consistent with synchronous condensers, SVCs, and STATCOMs



COST RECOVERY



Cost Recovery

- Since a SATOA is considered transmission, the cost of construction and operation are recovered through the Regional Network Service rate
- Costs incurred and revenues received for charging and discharging, respectively, in order to perform a SATOA's transmission function will be reflected in a transmission owner's annual revenue requirement
 - Revenues received for discharging the SATOA will be used to offset the owner's transmission revenue requirements
 - Costs incurred for charging the SATOA will be added to the owner's transmission revenue requirements
- Other than those described above, there will be no other payments made, such as under VAR, Black Start, Regulation, etc.



Conclusion

- The ISO received stakeholder requests to consider energy storage devices as transmission facilities and seeks to meet that request with this proposal
- To gain experience with the use of SATOAs and ensure minimal impact on the ability to operate the system and the markets, limitations on the installation and use of SATOAs are necessary
- The ISO plans to bring proposed Tariff modifications to the next meeting

Stakeholder Schedule for Storage as a Transmission-Only Asset

Proposed Effective Date – December 2023

Stakeholder Committee and Date	Scheduled Project Milestone
April 14, 2022 TC	Discussion of concepts
May 31, 2022 TC	Introduction of proposed Tariff redlines
June 7-8, 2022 MC	Introduction and discussion of settlement conforming changes
June 28, 2022 TC	Respond to stakeholder questions from previous meeting and continued review of proposed Tariff redlines
July 12-14, 2022 MC	Discussion on Tariff changes to enable settlement of SATOAs
July 27, 2022 TC	Vote on the proposed Tariff revisions and any proposed amendments
August 9-10, 2022 MC	Vote on the proposed Tariff revisions related to settlement provisions and any proposed amendments
Participants Committee September 8, 2022	Vote on the proposed Tariff revisions and any proposed amendments

Note: The need for discussion at the Reliability Committee is under review. Possible interaction with the RC is not reflected on the above schedule.

Questions

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