



Storage as a Transmission-Only Asset

Follow-up and Example Use Cases and Timelines

Brent Oberlin

(413) 540-4512 | BOBERLIN@ISO-NE.COM



Proposed Effective Date: July 2024

- 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)
- 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 to address system concerns identified in Needs Assessments and Public Policy Transmission Studies
- Today's Transmission Committee (TC) discussion is intended to further discuss storage as transmission-only asset (SATO), provide responses to previously discussed open items, and to discuss example use cases and timelines
- FERC filing is targeted for the end of the year to support future Solutions Studies and Requests for Proposal (RFP)



Background

- What is a SATOA?
 - A SATOA is an energy storage device connected to the PTF at 115 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 hurdles in undertaking this as a concept. To avoid issues identified, these two concepts will guide 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 proposed design takes these concepts into account



FOLLOW-UP FROM APRIL TC



Change to Desired Effective Date

- The April TC presentation showed an effective date of December 2023, which does not allow sufficient time for implementation at the ISO
- The updated effective date has been changed to July 2024



Follow-up from Stakeholder Questions

- Some stakeholders asked how a SATOA would affect available operating reserves or, specifically, a Capacity Scarcity Condition (CSC)*
 - SATOA will not be included in the market dispatch and pricing software (UDS) or counted toward available reserve capability
 - SATOA are not market assets and not intended to provide operating reserves
 - ISO would not utilize SATOA to maintain operating reserves
 - ISO may utilize SATOA in an emergency to mitigate load-shedding when a SATOA may help and market actions are unavailable
 - SATOA output may reduce system load such that the dispatch software could increase reserve designations on market assets, but this would be a second-order effect if it were feasible in the emergency condition

**A CSC is defined in MR1 Section III.13.7.2.1, but can be briefly summarized for discussion as a 5-minute interval when the TMNSR or TMOR reserve constraint penalty factors set the reserve clearing price for a Capacity Zone because available reserves are less than the requirement.*



Follow-up from Stakeholder Questions, cont.

- Use of automatic controls to place the SATOA into service immediately following the occurrence of the N-1-1 contingency
 - Automatic controls would introduce extra complexity in modeling and operating SATOAs, and may lead to a SATOA's stored energy being exhausted before it is truly needed
 - The ISO has confirmed its position that such a control scheme would be considered a Remedial Action Scheme (RAS) and is therefore not acceptable
- Providing reactive capability
 - The April TC presentation stated the reactive output was expected 24/7
 - However, various storage technologies may not reasonably accommodate 24/7 operation in this manner
 - Therefore, provision of reactive power 24/7 is not a requirement
 - Provision of reactive capability is required when the SATOA is “charging” or “discharging”
 - When comparing solutions, a storage device that will provide reactive power 24/7 will be looked at more favorably than a storage device that cannot, assuming all other factors are similar



Follow-up from Stakeholder Questions, cont.

- Ramp Rate
 - The SATOA(s) will be manually dispatched by ISO Operators who may provide a desired ramp rate or any ramp rate limitations, such as maximum and minimum, for the SATOA(s)
- Pricing Node
 - The ISO's understanding is MISO needed to create pricing nodes because they only calculate Locational Marginal Prices (LMPs) at generator locations due to the size of their footprint
 - New England already calculates LMPs at all nodes, so a separate pricing node for the SATOA is not needed

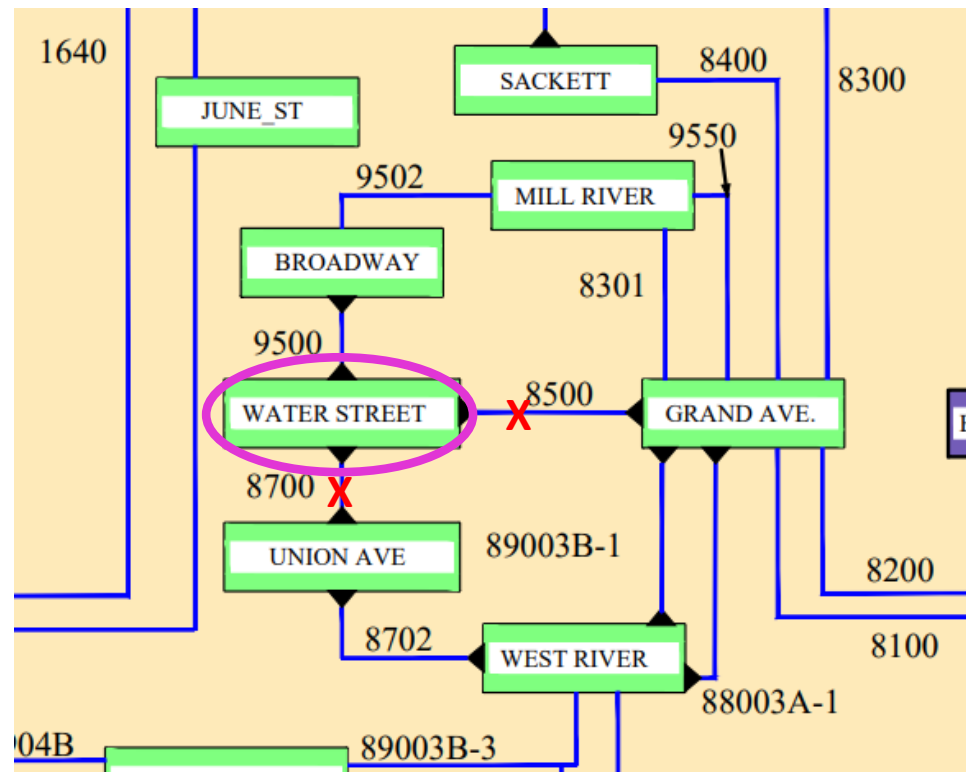


EXAMPLE USE CASES

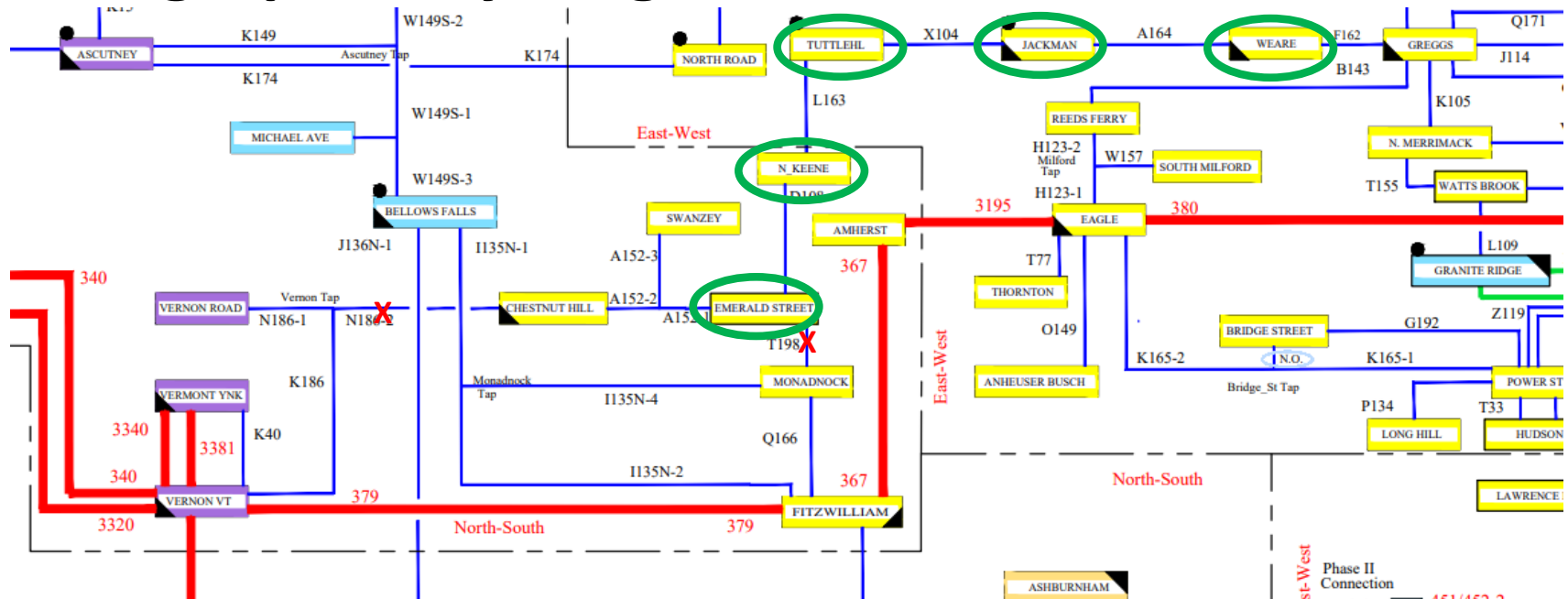


Example Use Case – Simple Example – Geographically Small

- Using Water St., as a fictitious example, assume that loss of the 8500 cable, followed by the loss of the 8700 cable causes either the 9502 or the 9500 cable to overload
- A SATOA located at Water St., could solve this issue by decreasing flow on the 9502/9500 path by 30 MW, and may provide a further decrease in current flow by providing local reactive support



Example Use Case – Second Example – Geographically Large

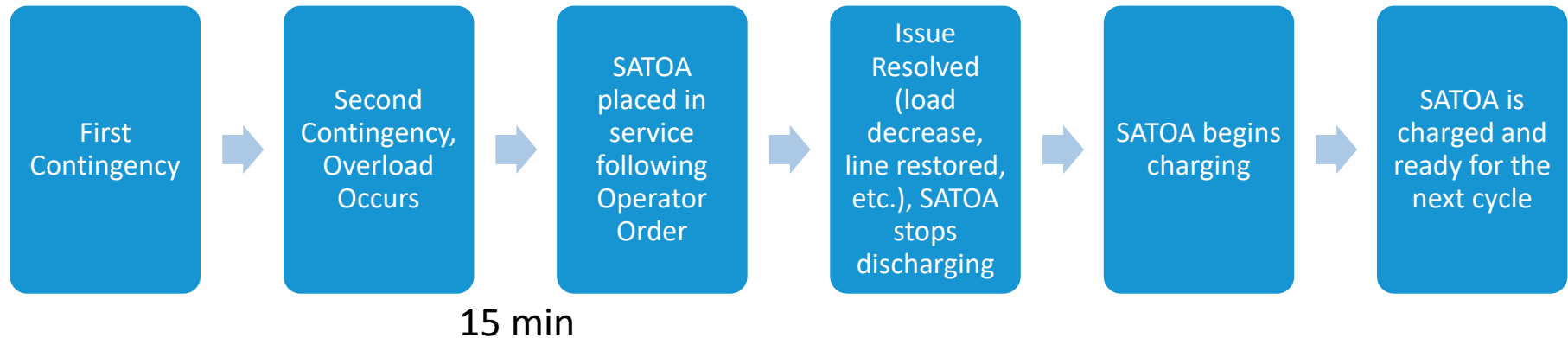


- Assume the T198 line is lost, followed by the loss of the N186/K186 line, which causes the F162 line to overload
- A SATOA located at Emerald St., N. Keene, Tuttle Hill, Jackman, or Weare could solve this issue by decreasing flow on the F162 path by 30 MW, and may provide a further decrease in current flow by providing local reactive support
- While these two examples involved areas served by three paths, examples exist with more supply lines. These examples were easiest to visualize

EXAMPLE TIMELINES FOR SATOA OPERATION



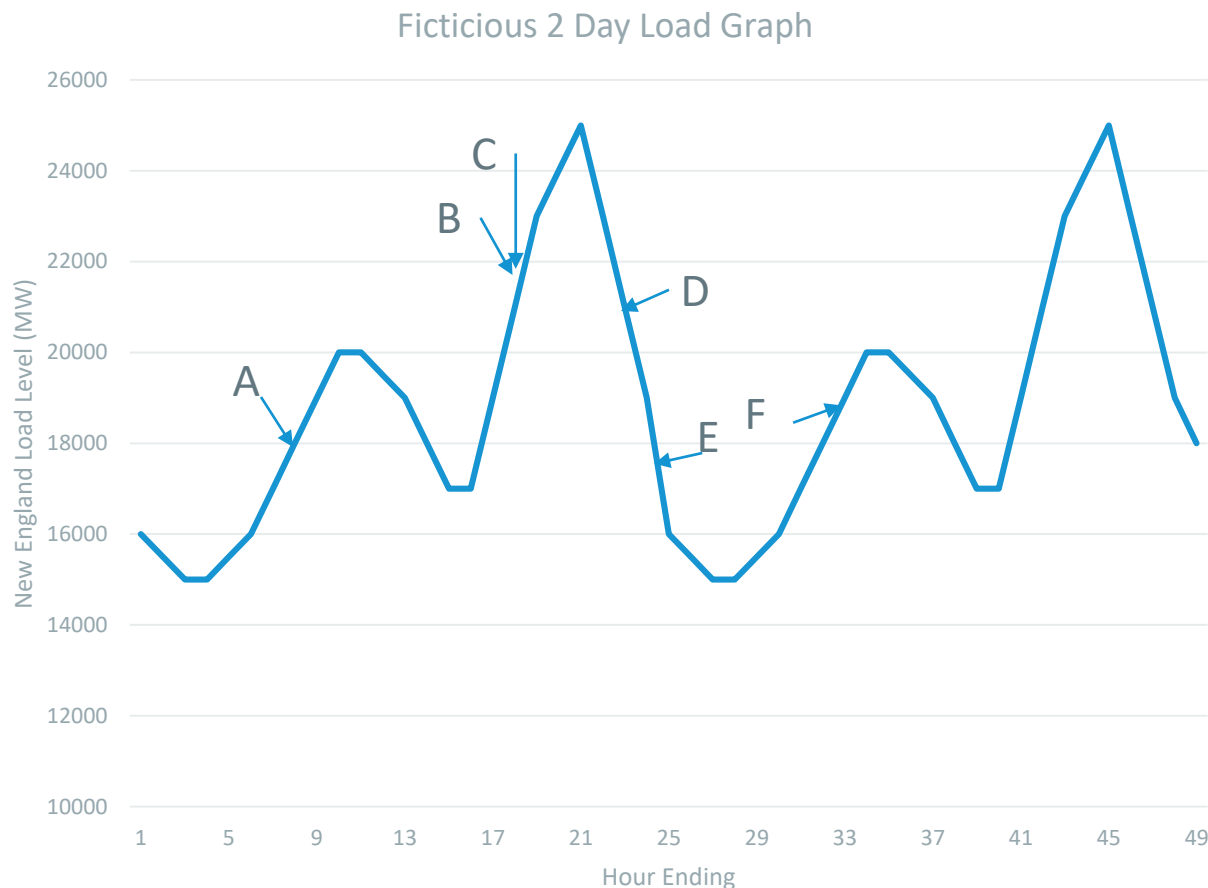
Example Timeline



- The ISO thought that it may be beneficial to go over an example timeline for the use of a SATOA
- There are two ways to visualize this
- This slide shows how each event happens as a series
- The next slide shows similar events, but against a fictitious load graph, so that charging and discharging windows can be seen

Events vs load graph

- A- first contingency
- B – second contingency
- C – SATOA in service
- D – SATOA removed from service
- E – SATOA begins charging
- F – SATOA fully charged



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 has provided further information related to open issues from the April TC meeting and has presented example use cases and timelines
- The ISO is targeting a Q4 2022 FERC filing



Stakeholder Schedule for Storage as a Transmission-Only Asset

Proposed Effective Date – July 2024

Stakeholder Committee and Date	Scheduled Project Milestone
April 14, 2022 TC	Discussion of concepts
May 31, 2022 TC	Continued discussion of concepts
June 7-8, 2022 MC	Introduction of settlement conforming changes
June 28, 2022 TC	Review of proposed Tariff redlines, conceptual amendments
July 12-14, 2022 MC	Discussion on Tariff changes to enable settlement of SATOAs
July 27, 2022 TC	Respond to questions, review incremental changes to Tariff redlines and 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

Questions

Brent Oberlin

(413) 540-4512 | BOBERLIN@ISO-NE.COM

