New York ISO
Independent System Operator

Storage as Transmission – Use Cases and Recommendations

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Agenda

- Project Background
- Developer Proposed Use Cases
- Non-Wires Alternatives
- Project Recommendation and Next Steps

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Project Background

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Storage as Transmission

- **Project Background:**
  - The unique characteristics of energy storage allow these assets to provide many potential services to grid operators. During normal operation, storage can have positive impacts on transmission systems by shifting demand, supporting ancillary services, and managing transmission congestion
  - In some select instances, storage used exclusively as a regulated transmission asset, instead of a market resource, might be able to provide an alternative option for providing the same services as traditional transmission solutions
  - Currently, the NYISO tariffs treat storage as a Generator, and there is no pathway by which a storage project could be evaluated as a regulated transmission asset, and no methods by which to operate a storage asset as transmission

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Storage as Transmission

- **Deliverable: Q4 Issue Discovery**
- **Project Description:**
  - This project will assess the current NYISO processes and whether a process for considering and evaluating a storage project as a regulated transmission asset, including options for cost recovery, is needed
  - Additionally, the project will consider if developing rules and methods for operating the storage as a regulated transmission asset to address identified reliability issues, is an appropriate next step

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Feedback Received after July 11 MIWG

- **We requested feedback at the 7/11 MIWG on:**
  - Additional issues and questions for consideration for storage as transmission
  - Actual storage as transmission in production (outside the NYCA) that have applicable use cases in the NYCA
- **Summary of additional issues received and thought experiments proposed:**
  - Is the ownership limited to TOs? Can the utilities buy assets that are already in development through a build transfer or a tolling agreement?
  - Can multiple storage as transmission assets be deployed in aggregate across the system?

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Feedback Received after July 11 MIWG

- **Summary of additional issues received and thought experiments proposed, continued:**
  - How the interconnection process studies market-based storage to address a transmission need – for example:
    - If a market-based storage resource applies for interconnection on a congested line, it is likely that the ESR would identify N-1 contingency scenarios and trigger an upgrade; however, if this ESR is studied as storage as transmission, it may be able to solve the constraints.
    - The behavior of a standalone ESR could be opposite what is requested from storage as transmission. A merchant developer will be targeting locations that will result in minimal or no upgrade costs, whereas storage as transmission would be seeking areas of congestion. However, if studied as a generator, the storage as transmission on the congested line could be disincentivized by large upgrade costs.

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Developer Proposed Use Cases

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N-1 Contingency

- **In this proposed use case, a storage asset would be used to respond to an N-1 contingency and would allow system operators time to react to the contingency event**
- **One proposed asset is a 200 MW/200 MWh battery at the Shore Road 345 kV substation**
  - In the event of a contingency, the storage as transmission would be discharged to keep the Dunwoodie – Shore Road 345 kV line under applicable ratings and reduce congestion
  - This use case is similar to Grid Booster batteries that are in development in Germany
- **However:**
  - This use case is likely to be considered a Remedial Action Scheme (RAS) and therefore would not be a preferred solution
  - Additionally, this use case could be addressed by a market-based resource

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Remedial Action Scheme

- **According to the NERC Glossary of Terms, a Remedial Action Scheme (RAS)/Special Protection System (SPS) is:**
  - "A scheme designed to detect predetermined System conditions and automatically take corrective actions that may include, but are not limited to, adjusting or tripping generation (MW and Mvar), tripping load, or reconfiguring a System(s)."
- **According to the New York State Reliability Council (NYSRC) Reliability Rules & Compliance Manual:**
  - "A Special Protection System (SPS) may be employed to provide protection for infrequent contingencies or for temporary conditions that may exist such as project delays, unusual combinations of system demand and equipment outages or unavailability, or specific equipment maintenance outages. An SPS may be applied to preserve system integrity in the event of severe facility outages and extreme contingencies. The decision to employ an SPS should take into account the complexity of the scheme and the consequence of correct or incorrect operation as well as benefits. An SPS should be used judiciously and when employed, should be installed consistent with good system design and operating policy."
- **NPCC Directory 7 outlines the reliability criteria for implementing a RAS "to ensure that RAS do not introduce unintentional or unacceptable reliability risks."**
- **Implementing a RAS/SPS adds complexity to planning and operations**

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Voltage Support Service

- **The proposed use case is for a 50 MW/50 MWh battery with a 1,500 MVAR reactive power capability inverter at the Oswego complex near the Edic 345 kV substation**
  - The storage as transmission would provide voltage support to maintain a consistent Central East interface transfer capability, specifically when generators in the Oswego area are not in service
- **However:**
  - We believe this analysis does not consider the Segment A transmission projects, which will have significant impacts
  - A Static Var Compensator may be a more cost-effective option for addressing the need
  - Additionally, this use case could be addressed by a market-based resource

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Reduced Local Capacity Requirement

- **The proposal is for a 200 MW/200 MWh battery interconnected in Zone J at the Mott Haven 345 kV substation**
  - The goal of this asset would be to increase transmission security limits in Zone J to improve local reliability and reduce the installed capacity requirement for Zone J
- **However, if the duration of the reliability need is more than an hour, such as a heatwave which could lead to a 7 hours deficiency*, the 1-hour duration of the proposed storage as transmission would not be sufficient to mitigate the need by itself**
  - Additionally, this use case could be addressed by a market-based storage resource

* Appendix F Transmission Security Margin (Tipping Point), 2022 Reliability Need Assessment (RNA)

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Curtailment Reduction

- **In this proposed use case, the storage would be used to unbottle renewables and reduce curtailment, primarily focused in Northern New York**
  - The assets would charge and discharge daily during set time periods that vary by season, with the storage charging during periods of high renewable generation and discharging during periods of low renewable generation
- **However, this use case could be addressed by a market-based resource**

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Non-Wires Alternatives

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Non-Wires Alternatives (Retail Tariff)

- The 2018 Energy Storage Order (NY PSC) required utilities to assess the procurement of storage and other resources (including energy efficiency and demand response) through retail non-wires alternatives (NWAs) to address a combination of:
  - Local reliability
  - Local load relief
  - Local environmental benefits
  - Wholesale services
- NWAs may be sited anywhere in the utility's distribution or transmission system
- The developer will retain the ownership of the storage asset, but the utility will have full dispatch rights of the resource
  - After the contract is complete, it may be renewed, or the storage resource operation will return to the developer, and the storage can participate in wholesale markets
- The cost of the contract is recovered by the utilities, and they may also offset the costs to ratepayers by participating in wholesale markets
- Since NWAs may be sited at the transmission level, where are there gaps with the NWA opportunities that storage as transmission would fill?

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Project Recommendation and Next Steps

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Final Report Recommendation

- **Develop an MDCP for a Storage as Transmission (SAT) model in 2024**
  - Further discussions will be needed on the following topics during the development of the MDCP:
    - How SAT can be considered in the CSPP
    - Ownership requirements for being a regulated asset (i.e., whether the SAT owner must be a TO)
    - Operating and reliability considerations
    - Scheduling and dispatch
    - Treatment of market revenues that result from SAT operation

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Immediate Project Next Steps

- **Draft the report for the project highlighting the discussions to date:**
  - Landscape of storage as transmission
  - Issues identified
  - Project recommendation moving forward
- **Return to an upcoming MIWG to discuss the report**

Questions?

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Our Mission & Vision

Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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