STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

IR 20-166

ELECTRIC DISTRIBUTION UTILITIES

Investigation into Compensation of Energy Storage Projects for Avoided Transmission and Distribution Costs

Comments of Public Service Company of New Hampshire d/b/a Eversource Energy

January 11, 2021

OVERVIEW

Energy Storage encompasses many technologies, including battery electric energy storage (e.g., Lithium-Ion, Lead Acid, and Flow batteries), thermal energy storage (e.g., cryo and geothermal storage), and potential/kinetic energy storage (e.g., pumped hydro, compressed air). All of these energy storage technologies and markets are in different states of maturity and commercial viability. Battery energy storage is one of the most common technologies used by electric utilities for deferring Transmission and Distribution investments and is further explored in these comments. As markets and technologies improve, Public Service Company of New Hampshire d/b/a Eversource Energy ("Eversource" or the "Company") continues to evaluate the integration of additional technologies.

Eversource categorizes the deferral of Transmission and Distribution modifcations or upgrades as a Non-Wires Alternative ("NWA"), and defines an NWA as an electricity grid investment or project that uses non-traditional solutions, such as Distributed Energy Resources ("DERs")[1] to defer the need for specific Transmission or Distribution ("T&D") equipment modification or upgrades needed for adequate, safe, and reliable electricity service.

Eversource, as the electric distribution grid operator, continues building its expertise, skills, and competencies to support energy storage and other NWAs. It is incumbent on Eversource to retain grid visibility and dispatch rights for all energy storage and other NWA solutions the Company relies upon for system needs. Eversource maintains that NWA process development

[1] DERs include energy storage, Distributed Generation ("DG"), as well as Energy Efficiency ("EE"), Demand Response ("DR"), and grid software and controls.

(including energy storage) is intrinsic to the Electric Distribution Companies' ("EDCs") obligation to safely, securely, and reliably operate and maintain the distribution grid and ensure that customers receive the benefits of energy storage and NWAs that fulfill an identified system need.

The responses in this document are directed to the items identified by the Legislature in RSA Chapter 374-H and the Commission's October 12, 2020 Order of Notice in this docket and are made in the context of energy storage as an NWA to traditional T&D solutions.

COMMENTS

1. **How public policy can best help establish accurate and efficient price signals for energy storage projects that value their ability to avoid transmission and distribution costs while simultaneously reducing wholesale electricity market prices.**

Deferring T&D costs with energy storage needs to be done within an approved and evolving systematic process that is inclusive of multiple technologies with an objective of identifying the best technical fit and least cost solution taking into consideration both technical and economic components. Eversource is in the process of developing an NWA tool and process to be used for this purpose. When ready, that tool will be provided as part of Eversource's Least Cost Integrated Resource Plan ("LCIRP") filing in Docket No. DE 20-161.

Distribution-sited NWAs (except for EE and DR) designed to mitigate transmission thermal or voltage violations have yet to be implemented in most transmission jurisdictions within the United States. Unless these NWAs clear in wholesale markets as capacity resources or hold an obligation and associated financial penalties for non-performance, ISO-NE is limited by its tariffs from reliably counting on NWAs with certainty to defer or obviate necessary transmission upgrades. EE and DR are exceptions because ISO-NE has a mechanism to track participation and performance in the wholesale markets.

In these comments Eversource focuses on distribution sited energy storage NWAs as alternatives specifically to traditional distribution solutions only.

In September of 2020, Eversource developed a Distribution System Planning Guide ("Planning Guide") to provide a consistent, uniform approach to designing an efficient and reliable electric distribution system that ensures the quality of service expected by customers. That Planning Guide has been provided as part of Eversource's LCIRP filing.

The Planning Guide aligns with applicable safety codes, regulatory requirements, and industry standards. It establishes uniform criteria and design standards across the Company's and its affiliates' service territories for all aspects of the System Planning process, including goals for system performance and identification of suitable design solutions, including energy storage NWA solutions to meet those goals. The System Planning process is currently under review in the Company's LCIRP docket.

As outlined in the Planning Guide, energy storage NWA solutions may not be suited to address every planning need on the distribution system and will depend upon performance needs, economics, and the Company's planning criteria to determine such suitibility. The Company has identified several project types – capacity, reliability, resiliency, and voltage – that may or may not be suited to address the planning needs. Eversource notes that even if a project falls within one of the discussed categories, an energy storage solution's applicability will depend on specific project circumstances.

The table below summarizes the suitability of energy storage for various project types.

Table 1: Summary of Energy Storage Solution Suitability for Various Project Types

Project Type	Substations	Distribution Feeders
Capacity	**N-0 Risk:** NWA may be suitable **N-1 Risk:** Traditional solution prioritized, but NWAs may be applicable in specific locations	Traditional upgrade prioritized
Reliability/ Resiliency	**Bulk Station:** Traditional solution prioritized **Non-Bulk Station**: Specific NWA use cases may be suitable, especially when combined with traditional resiliency solutions	NWAs may be suitable for niche applications for critical customers
Voltage/Power Quality	**Steady-State**: Traditional solutions suitable **Transient**: Energy storage may be suitable to integrate DER in high penetration areas	**Steady-State**: Traditional solutions prioritized **Transient**: Energy storage may be suitable to integrate DER in high penetration areas

Because of the significant complexities of Distribution Engineering and System Planning and the evolving nature of the supply portfolio in New England, as well as the complex impacts of DERs, Eversource System Planning has developed an in-house platform and methodology to evaluate the applicability of energy storage to meet specific distribution needs. To highlight the complexities, Table 2 is an example that provides an overview of application considerations for the use of energy storage for the project types summarized in Table 1.

Table 2: Application Considerations for Energy Storage as an NWA

	Dependability Considerations	Implications
Battery Electric Storage Systems (BESS)	For energy storage to be considered a reliable NWA solution, it must be directly dispatched by the EDC.	Station-sited and utility-owned units are the most reliable. Utility controlled behind the meter ("BTM") storage follows the same considerations as demand response and EV charge management programs – which are less reliable grid assets.

Energy storage systems are dispatchable resources, and dispatchability is a critical driver of value for NWA solutions. Rather than relying on a statistical forecast of availability, dispatchable resources can be actively controlled when the system need arises. However, the resource dependability of an NWA is tied to whether the EDC has direct control of the resource.

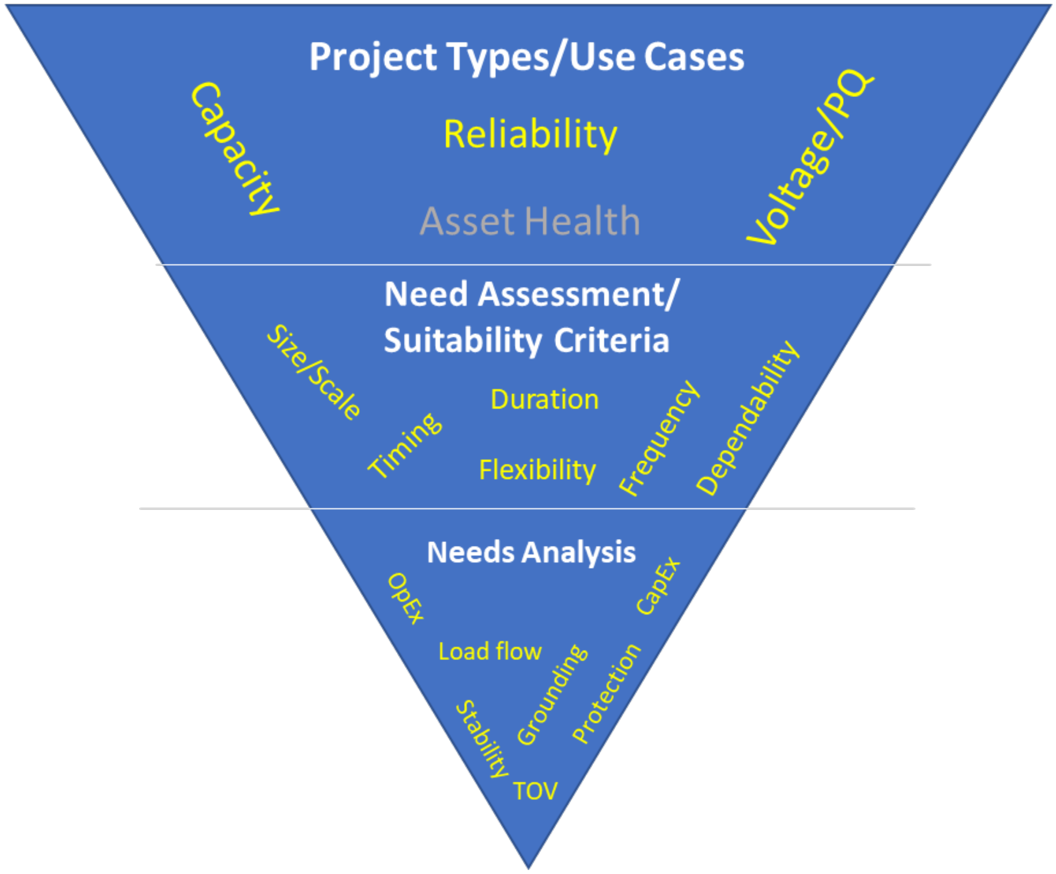
With direct control, the Company’s system operators can deploy the NWA resource in the same way they perform switching operations to address overload conditions.

A resource dispatched based on a contractual schedule is not the most dependable NWA solution for multiple reasons. First, a pre-set schedule may not meet the needs that arise in real-time on the distribution system. Second, even with penalties for non-performance, the resources may not perform when needed, resulting in a negative impact on customers. Here, EDC requirements of dispatchable resources differ from ISO requirements. Because the EDCs have locational-specific requirements for NWAs to help alleviate constraints, EDCs cannot draw on the same statistical equilization the ISO draws on. In other words, the EDC’s pool of resources to address an NWA is significantly smaller than an ISO market pool, as such requires higher individual reliability. Issues such as maintenance problems or disruptions in control systems may prevent the resource from meeting its obligations. Utility-owned and dispatched resources provide a much higher level of confidence that the NWA solution will meet the need as it evolves.

Any assessment of an NWA solutions’ suitability to meet distribution needs begins with considering which project types and use cases are applicable, as previously stated and summarized in Table 1. These use cases narrow the solution space for energy storage NWAs to certain types of capacity, reliability, and voltage projects on certain portions of the distribution system. Figure 1 below shows Project Types/Use Cases as the first level of assessment of NWA suitability.

The next level of assessment evaluates NWA solutions’ suitability to meet specific needs on the distribution system. Eversource has developed a suitability analysis to assess: 1) the types of projects that an NWA solution might be suited for; and 2) the kind of NWA that might be applicable to resolve a particular planning need. Once an NWA’s suitability and projects have been established, the NWA’s technical and economic viability for the specific need is evaluated using various analysis tools.

Figure 1. Illustration of NWA Solution Suitability Criteria for Distribution Projects and Needs



Criteria that can be generally applied to determine which projects are best suited for particular NWA solutions include but are not limited to the following:

1. Project Type: Generally, certain types of capacity, reliability, and voltage projects may be suitable for NWA solutions (see Table 1). If existing assets that pose a reliability risk through their asset health index[2] are part of the proposed capital projects, a traditional system upgrade is always selected over NWAs (see item 2 below).

2. Asset Condition: The typical life expectancy of a distribution substation transformer is 60 years. An NWA solution would not be proposed to resolve capacity needs for a transformer near

[2] Health index is built using EPRI's calculation method called PTX. PTX tool calculated normal and abnormal aging indices based on oil data which sampled periodically. Eversource combines the normal and abnormal indices with a weighted average formula, with weights based on their relative importance, to calculates a total index, referred here as the health index.

the end of its useful life. Eversource would consider an NWA for upgrading station transformers that have an asset health index of 0.5 or more. It is shown from historical data that health index is strongly correlated with the remaining insulation life, measured using degree of polymerization (“DP”). Historically, it is observed that degree of polymerization falls below 400 (new insulation paper is approximately at 1000) when health index increases beyond 0.45. Eversource has set the replacement recommendation threshold at 0.5. Industry/literature recommends transformers with DP less than 400 as replacement candidates. Any further drop in DP, in the sub-300 range, leaves the transformer in significant danger of unanticipated turn-to-turn fault due to impulse. Eversource maintains the asset health index for all of its station transformers. This strategy ensures that an NWA with a ten-year life can be fully utilized without additionally needing to construct the wires solution because of asset conditions.

3. Project Capacity: The size of an NWA solution—meaning its kilowatt (“kW”) capability—is defined by how much capacity is needed at the worst forecasted condition under both N-0, and N-1 conditions under a range of forecast scenarios through the long-term planning horizon. Initial procurements can screen for NWA solution opportunities below a certain size threshold to limit potential reliability impacts from NWA solution non-performance or outage. Size thresholds would be established upon review of the System Planning assessment and the range of associated load at risk, as well as the number of contingent events driving system constraints. For grid-forming energy storage applications, the short circuit ratio (short circuit of electric system at the point of interconnection divided by energy storage size) should be greater than 1.0 at a minimum and optimally greater than 2.0. For grid-following energy storage applications, the short circuit ratio should be greater than 2.0 at a minimum and optimally greater than 3.0. If the solution does not pass the short circuit ratio screen, a detailed study is required. When energy storage is applied inside or in the substation vicinity, consideration should be given to future substation expansions. The energy storage should not restrict expected long-term substation upgrades.

4. Need Duration: The amount of time that the need persists for a single event, under N-0 and N-1 conditions in a range of forecast scenarios through the long-term planning horizon, defines the solution's capability to provide a service over time. For example, because substation N-1 events can potentially last for several days or even weeks, an NWA solution can be more challenging to implement to address capacity and reliability risks in these situations.

5. Need Timing: The lead time to implementation helps to define which technologies might be suitable. NWA solutions should only be considered where they can be deployed in time to address a need. Recognizing that it takes time to procure an NWA solution, a timing screen can be used to exclude consideration of particular types of NWA solutions for grid needs that are expected to develop within a specific time frame. Some NWA solutions like DR and EE can be reviewed and implemented within one to three years, while smaller batteries can take two to three years, and larger batteries require three to five years.

6. Need Frequency: The frequency of a need can help determine how the technology will be used (e.g., charge/discharge cycle for energy storage) and inform the contract parameters for a solution.

7. NWA Dependability: Typically, the need for an NWA is driven by extreme grid conditions, such as peak load days or high DER penetration. Specifically, in these times of stress on the system, an NWA's ability to be physically available to provide the prescribed capacity relief is critical.

8. NWA Flexibility: With the system conditions changing rapidly over time, any solution deployed needs to be flexible enough to account for changes in operational schedules, dispatch needs, curtailment needs, etc.

9. NWA Technology: Certain NWA technologies might be suitable as NWA solutions, depending on the nature of the grid need. Other technologies may be unsuitable due to several factors including dispatchability, controllability, and dependability. For inverter-based NWA solutions, the inverter design can significantly impact control performance, fault-handling, transient voltages, and other technical performance issues that affect the NWA's ability to function as a viable replacement for a traditional solution.

During the distribution planning process, Eversource's System Planning develops a list of planned capital projects that may be candidates for deferral through NWA solutions deployment. The applicability of NWA solutions to meet a particular need is evaluated using the suitability criteria discussed above.

Once a list of capital projects that might be suitable for NWA solutions is developed, each project on the list is thoroughly evaluated from a technical and economic perspective using the NWA Screening Tool. The tool develops the most cost-effective and technically feasible NWA solution for the need, taking into account: 1) Capability of the NWA solution to address the need; 2) Dependability of the NWA technology or service; 3) Flexibility or adaptability of the NWA solution to changing system conditions; 4) Total cost of ownership of the NWA solutions; and 5) Longevity of the NWA in deferring the need.

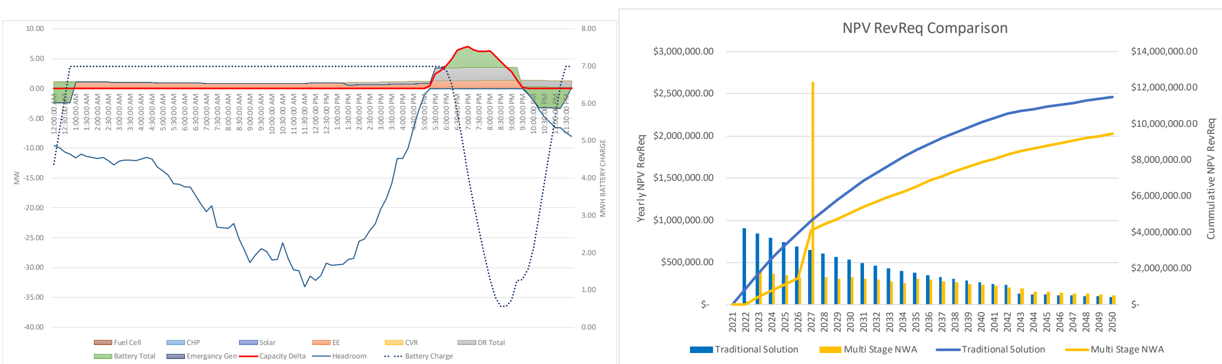


Figure 2: a) Technical Analysis of Dispatch Capabilities; b) Revenue Requirement Comparison of Traditional and NWA Solution

The ability of energy storage to defer distribution cost and simultaneously reduce wholesale market prices may not be possible in many cases due to the distribution need and incompatibility of wholesale market opportunities. The distribution deferral need has to be the priority use case at all times to be able to rely on the NWA for reliability. While there will be opportunities for the energy storage to be used for market participation, such storage would need to be significant in size and dispatched often to impact prices. Also, the energy storage owner would be responsible for any financial penalties resulting from non-compliance wtih ISO-NE dispatch instructions while meeting distribution system needs.

There are various energy storage assets in ISO-NE today that operate and earn revenue either through a power purchase agreement with an off-taker, or by directly participating in the wholesale market to capture energy, capacity, and ancillary market revenues. However, these types of assets that are used solely to generate wholesale or other market revenues would not be appropriate to relieve a thermal, voltage, or transient criteria on the distribution system.

An energy storage asset used for T&D purposes should be unique in its value proposition. To ensure system planners and operators can count on the asset during both peak and off-peak times, its primary objective should be to be dispatched for the reliability and resiliency need of the local system. While there may be addtional uses such as participation in energy, capacity, and ancillary markets, those uses should be secondary to reliability and resiliency.

Eversource, as an EDC, is the only entity with a real-time understanding of distribution capacity, power-quality needs on an hourly basis, or resiliency needs before and during a storm event. Eversource holds the obligation to ensure dispatch of the energy storage including ensuring charging preceding dispatch time, and the ultimate responsibility for system performance. Eversource would not bid the energy storage asset into the ISO-NE capacity market, as participation in that market is tied to performance requirements including associated financial penalties that may, in some instances, create a conflict of interest between a bulk and distribution system need. As an example, in a load constraint feeder, a battery is asked to discharge as an NWA while the bulk markets, due to high DER availability, see an oversupply and negative prices, indicating the battery should be charging. Therefore, refraining from market participation resolves the conflict in a way that preserves the EDC's performance of assessing distribution capacity.

Eversource could operate the energy storage system to capture the incremental value, which would directly flow back to our customers and offset the energy storage NWA cost. But this option would only be available to the extent there are no impending needs to dispatch an energy storage NWA during a given day.

2. **How to compensate energy storage projects that participate in wholesale electricity markets for avoided transmission and distribution costs in a manner that provides net savings to consumers**.

In an EDC-owned model, there is no need to compensate energy storage beyond the normal rate treatments as all additional benefits that can be gained from the use of the energy storage (e.g, peak reduction benefits) will flow back to all customers through reductions in the cost of the energy storage that customers are paying for as noted in the response above.

In a non-EDC owned model, when a competitive solicitation is held for an energy storage asset, the process will allow the participants to bid based on their specific economics. When a solicitation is held, it is expected to save customers over the traditional solution based on the Company's NWA analysis. Therefore, any contract between the EDC and the third party provider of the energy storage is the compensation the third party would receive from customers, and the third party can participate in the wholesale markets in whatever manner it chooses, so long as the third party meets its contractual obligations for service to the distribution system and recognizes that the consequences, financial or otherwise, for failing to meet ISO-NE rules are solely the responsibility of the third party.

For BTM storage owned by customers or third parties, there is an argument for a need to provide an incentive to transfer the T&D deferral value directly to the customers. See the response to question 4 below for a detailed review of BTM energy storage.

3. **How best to encourage both utility and non-utility investments in energy storage projects**.

Given that the reliability and dependability limitations of the third-party owned BTM resources are subject to customer override capabilities, the most reliable approach to energy storage for NWA solutions is a model based on utility ownership and control of solutions in front of the customer meter. EDCs are uniquely situated to derive additional distribution system benefits over time. A deep understanding and knowledge of the transmission and distribution system (e.g., circuits, substations, etc.), the ISO-NE operational requirements, the forward capacity market, and the behaviors of customers, would allow the Company to dispatch NWA solutions in a manner that maximizes the value of a given energy storage program.

An example of this model is with the Company's affiliate's project involvoing an EDC-owned battery currently under construction in Provincetown, Massachusetts. The project will address a reliability issue in the event of a loss of a source to the Wellfleet substation, and defer the construction of a distribution line through a national seashore area from Wellfleet to Provincetown. As a utility-owned asset, the EDC is responsible for maintaining and operating the facility to address concerns regarding the possibility of voltage fluctuations and issues with power factor and power quality in a weak area of the distribution system. The EDC will ensure the asset is operated to maximize value while ensuring no adverse impact on the distribution system over time, regardless of customer load and generation in the project area.

Utility operation and control align the operation of the asset with its primary purpose of grid reliability and resiliency. Operational decisions can impact the reliability of elements within the energy storage NWA solution. The core function of the energy storage solution is to serve the reliability needs of the system. As a result, incentives to operate the assets for purposes other than the NWA introduce potential conflict between vendors' interests and the grid's interests, potentially creating risk to reliability. The pursuit of incremental value should include consideration for the equipment's long-term performance and asset health.

Entering long-term contracts with vendors also carries a risk for customers. The markets for the technologies that make up the elements of energy storage solutions are maturing. As a result, market consolidation will continue for the foreseeable future. Mergers and acquisitions will result in vendors changing asset ownership; others will go out of business. Level and quality of service, honoring of warranty, and asset supply chain continuity are additional concerns. Any ownership model aside from utility ownership introduces additional stakeholders requiring margin from the project before returning value to customers. EDC ownership and operation ensures the flexibility to operate the assets most cost-effectively in the future.

Eversource strongly recommends against the third-party ownership model for reasons noted in this response. To the extent this model is pursued, the level of risk borne by customers should not increase. Fundamentally, the contracting provisions must ensure the third party provides an asset to customers that fulfills the intended primary function as an NWA solution element.

In any ownership model, reliable operations begin with the detailed engineering and solutions development process. Qualified and knowledgeable electrical engineers must ensure the energy storage NWA solution elements can provide the required system benefits throughout the planning horizon. Detailed engineering should consider: integrating the device with surrounding protection and control schemes; the impacts of distributed energy resources; and the adequacy of the solution element's design limitations.

When third-party ownership of an energy storage NWA is required, the Company recommends robust contractual, financial, and operational contract provisions to ensure reliable operations. In a third-party ownership model, there is a risk the owner may decide to remove the element from the solution in pursuit of a more lucrative market opportunity. To offset this risk, the Company suggests including contractually biding penalties for non-performance commensurate with the impacts that customers would experience in the energy storage solution's failure.

The primary risk of third-party ownership is the operational availability of the assets. The Company intends to establish contractual requirements for active control and dispatch of energy storage needed for system reliability. Direct control, including the availability of communications, should be contractually obligated. In the case of storage, the state of charge/discharge must be maintained in a condition to dispatch the resource. Failure of assets to deliver when called upon will result in penalties commensurate with the system's consequence with a minimum penalty. Repetitive failures will result in a contractual breach and disqualification of the vendor in future solicitations.

Another risk of third-party ownership is the financial solvency (or insolvency) of the contracted company. To account for this, the Company could require vendors/aggregators to bond individual projects and resource aggregations during construction and procurement for newly acquired resources. If a vendor fails to fulfill the bond's terms, the Company could claim the bond on behalf of customers as a way to gain compensation for damages. Existing solutions could be procured through the contract and include operational and control components.

Once constructed, operational risks also exist with a new asset. Vendors should be required to provide Engineering, Procurement and Construction (EPC) warranties for at least the first 24 months of operation to allow time to identify latent deficiencies in manufacturing and early "infant mortality" failures. The vendor should establish Original Equipment Manufacturer ("OEM") warranties and provide proof of compliance with warranty terms.

Additionally, vendors can mitigate operational risks by executing OEM's recommended maintenance and operating equipment per OEM instructions. Failure to enforce OEM maintenance and operating instructions would be considered a breach of contract requirements. The Company could require vendors to routinely inspect equipment and provide the Company with information regarding any known degraded conditions, equipment failures, causes of failure, and remedies to conditions within an agreed-upon period, further reducing operational risk.

Depending on the individual elements in the energy storage solution, the technical and operational requirements for third-party owned solutions may vary. Fundamentally, a proposal and a contract's technical specifications must capture all information needed for the third party to ensure it can deliver the same level of reliability as the traditional solution. Standard technical requirements included in a solicitation are:

a. Location of the solution;

b. Technology requirements such as inverter capabilities, control software capabilities, and grounding;

c. Performance and testing requirements; and,

d. Minimum technology requirements such as cycling requirements of energy storage.

Operationally, the Company requires direct control and dispatch of the asset to serve as an NWA and its primary function. Third-party solutions must integrate operational control systems with real-time system operations in order to fulfill the primary function of the asset. Functional requirements related to the active control of the solution include:

a. Availability requirements;

b. Over-ride allowance;

c. Method for dispatch; and,

d. Communications requirements. a. system operating parameters for routine and emergency usage; and,

e. Maximum allowed degradation in acceptable performance.

In support of proper operations, third parties must perform proper predictive, preventive, and corrective maintenance per OEM recommendations. Operational requirements related to the maintenance and operation of the solution include

a. Preventive and predictive maintenance plans;

b. Response commitments to out of service conditions;

c. Inventory of critical spare parts; and,

d. Data collection and retention requirements.

4. **The costs and benefits of a potential bring your own device program; how such a program might be implemented; any statutory or regulatory changes that might be needed to create, facilitate, and implement such a program; and whether such a program should include all distributed energy resources or be limited to distributed energy storage projects.**

The costs and benefits of a potential bring your own device program:

Costs that might be expected to be incurred in a bring your own device (BYOD) program would include:

High-Level Quantifiable Costs

Cost Type	Description
Customer Incentives	Incentives cover a portion of the battery cost and can be designed as an annual pay-per-performance fee or upfront incentive
Start-Up Costs	Software integration, third-party engineering, program management, and marketing and customer acquisition
Program Administration	Costs include software, program management, EM&V, customer acquisition and management fee, and third-party engineering
Performance Management Fee	Company management compensation to recruit and dispatch customers' assets
Participant Cost	Net costs incurred by customers (include upfront customer cost-incentives paid to customers)

Benefits that may be expected in a BYOD program:

High-Level Quantifiable Benefits

Benefit Type	Description
Energy	Energy benefit is the avoided energy cost represented in $/kWh.
Energy DRIPE	Energy DRIPE benefit is the energy demand reduction-induced price effect, which represents the reduction of energy prices due to the decrease in energy demand represented in $/kWh.
Capacity	The capacity benefit is the avoided capacity cost represented in $/kW
Capacity DRIPE	The capacity DRIPE benefit is the capacity demand reduction-induced price effect, which represents the reduction of capacity prices due to a decrease of the capacity requirement represented in $/kW.
Transmission	Transmission benefit is the avoided cost associated with deferring the transmission upgrades cost represented in $/kW.
Distribution	Distribution benefit is the avoided cost associated with deferring the distribution upgrade costs represented in $/kW.
Reliability	Reliability benefit is associated with increased generation reliability due to reducing or shifting load.
Non-Energy Impact (NEI)	These benefits are not associated with energy, such as increased customer property values, outage reductions, capital, and O&M costs due to avoiding the purchase of a backup generator, non-embedded emissions, avoided collections and terminations, and federal tax credits.

How such a program might be implemented:

Overview

Eversource's affiliates have experience in administering and operating a BYOD and DER program in their Massachusetts and Connecticut service territories and Eversource has experience on a pilot basis in New Hampshire. The program experience has included the enrollment of both commercial and industrial (C&I) and residential battery storage systems, integrating those units into a Distributed Energy Resource Management System ("DERMS") platform, dispatching those batteries to reduce peak loads, calculating performance through inverter data, conducting Evaluation, Measurement, and Verification ("EM&V") studies, and paying customers. Furthermore, Eversource has a long track record of successfully implementing customer-facing programs through its EE offerings. As such, the Company believes that it is uniquely qualified to implement a BYOD, BTM, storage program, and that it should be the program administrator in any envisioned program.

The Company has already invested the time and resources to set up a non-system model based DERMS platform with with limited functionality that enables dispatch of resources to reduce system-wide peak load.. The platform allows for integrating different battery types and manufacturers into a single point of control where the assets can be monitored and dispatched in a coordinated fashion. The development and initial set-up fees for this software have already been paid for through other funding sources. Establishing a parallel system would be redundant and cost-inefficient.

Additionally, many major battery providers have already been integrated into the Company's DERMS platform. The only additional cost from a software perspective from adding additional storage units would be an increase in the variable costs associated with having additional MWs under control. Eversource can serve as the program administrator to avoid needing a different entity to incur the cost and time of setting up a DERMS and the associated necessary technology integrations.

In order to dispatch BTM resources in a NWA application that addresses a local need on the distribution system, the Company would build upon its existing DERMS capabilities by adding an interface to provide system operators with real time visibility into both available energy storage resources as well as loading and voltage conditions on the distribution system. Together, this information would allow operators to confirm that energy storage resources are sufficient to address the system constraint in real time.

Customer Incentives

In a BYOD program, the Company would recommend a pay-for-performance incentive design for customer-sited storage. A pay-for-performance design will help ensure that the benefits of battery storage systems are realized. Pay-for-performance incentives are a valuable tool to motivate customers to keep the battery systems in good working order and available for dispatch when necessary. Customers only receive payments for verified kW dispatches. If customers do not perform, they are not penalized out of pocket, but their performance calculation is impacted, and the overall value of the incentive will be lower. This compensation structure ensures that benefits will be realized because there is no payment unless the dispatches that generate the benefits occur.

Operational Control

In a proposed implementation, Eversource would administer the program and would have priority operational control over the storage units. Outside of dispatches for program purposes, the unit owner would have operational control of the unit for uses such as backup power or managing load for TOU rate purposes. To the extent that customers have the ability to override dispatch in an NWA application, for planning purposes, the Company would assume an availability rate to account for an estimate of customer override. In the event a customer chooses to override the Company's dispatch signal the customer would not receive performance compensation. Eversource, in its role as program administrator, should have operational control over the assets because the EDC is the entity best suited to: 1) ensure that the storage units do not cause any harm to the distribution system; and 2) extract the maximum value from these devices.

The EDC would augment its existing DERMS capabilities with an interface to real time grid conditions to communicate with various battery storage system technologies. The DERMS platform would send communications via an application programming interface "("API") to each of the battery storage systems participating in the Program via the storage project developer or manufacturer.

This approach's benefit is that it is scalable and allows many battery storage systems to participate in the program. Once an integration between a battery storage system vendor and the EDC's DERMS platform takes place, the EDC can effectively control the storage units as an aggregated block and will not be trying to control each unit or each technology provider.

All technical communications and coordination would be handled through the DERMS platform. Administrative coordination between storage owners and the EDC in its role as program administrator could be handled through the EDC's program manager.

Eversource's affiliate is currently employing this approach in its Massachusetts service territory, where it is actively controlling and managing customer-sited storage assets.

Impact on EDC Operations

The installation of a large number of relatively small BTM energy storage facilities that are aggregated and subsequently controlled in a unified manner in a limited geographic area without any control by Eversource raises concerns regarding the possibility of voltage fluctuations, pockets of overload, and issues with power factor and power quality. At the local feeder level, unforeseen changes in load caused by aggregated energy storage can conflict with real-time system operations such as switching, where operators may be dispatching other resources. In a local contingency event, aggregated energy storage charging behavior may result in unexpected pockets of overload relative to equipment ratings.

However, the program's proposed ownership model (customer and third-party) and implementation design would positively benefit EDC operations. In this proposed design, the EDC has operational control over the storage assets and can dispatch those assets appropriately. Suppose this program and its subsequent iterations resulted in a material level of storage located throughout the distribution system. In that case, it may be possible to dispatch storage assets in a way that would lead to reduced wear on key pieces of distribution equipment, which in turn could help increase reliability.

Assuming Eversource has full visibility and dispatch authority, aggregated BTM storage assets may be a reliable asset to improve the performance, reliability, power quality, and resiliency of the Company's distribution system. With reliably controlled BTM storage assets at the Company's disposal, planners and grid operators will have more opportunities to unlock the value of potential NWAs or other non-traditional solutions to optimize the grid's value investments.

<u>Administrative Tasks Needed to Implement Program</u>

To successfully implement a BYOD program, Eversource believes the administrative tasks listed below would be required. Eversource has experience in all these activities, within its existing EE, BYOD and DR programs.

Daily Program Administrator Activities

- Acquire and enroll customers;
- Manage customer enrollments;
- Dispatch units;
- Add battery assets into the appropriate groupings within the DERMS platform;
- Work with third-party lenders; and
- Answer customer and vendor questions about the program.

Monthly Program Administrator Activities

- Review dispatch strategy and load reductions;
- Review marketing strategy, course-correct if necessary,
    - Work with Company's marketing department and outside vendors to develop collateral materials;
- Update and maintain program website, either as a standalone site or part of Company's website;
- Review new technology providers for inclusion in the program;
- Work with DERMS provider to integrate new battery and inverter manufacturers into the platform;
- Respond to regulatory inquiries;
- Issue incentives; and

- ISO-NE reporting, if applicable.

Yearly Program Administrator Activities

- Regulatory filings;
- Program updates;
- Calculate customer performance, incentive settlement;
- Third-party EM&V review, if necessary; and
- ISO-NE reporting, if applicable.

Enrollment for BYOD Program

Easy enrollment is critical for successful implementation of a BYOD program. BYOD programs, especially for residential customers, require a mass-market type of approach for enrollment.

The process described below includes the potential steps to enroll assets into a BYOD program. Where possible, Eversource will interface with existing systems, such as its distributed generation portal, to streamline the enrollment and interconnection process. This will benefit the customer as well as Eversource.

Below is the implementation schedule, including the process for submitting a project application and obtaining approval:

1. Customers will apply to participate in the program by filling out an application. Applications will be submitted to the program administrator.
2. When submitting an application customer must accept the terms and conditions of the program.
3. Customers will upload any required documentation with their application as part of a request for enrollment in the program. At a minimum, the application will require the following information:
    a. Customer information (name, address, and account number);
    b. Battery system information (manufacturer, number of units, and kW/kWh);
    c. Whether it is co-located with a renewable resource;

d. Confirmation of metering/inverter configuration; and

e. Any required attachments such as:

    i. Valid interconnection agreement; and

    ii. Vendor quote (if a new system).

4. If the system is already activated, it will be considered enrolled if it meets the following eligibility guidelines:

a. The customer's service address is located in the territory served by this program;

b. The equipment is eligible, and if it is delivered by an approved installer;

c. There is a valid interconnection agreement for the number of assets declared in the application; and

d. An approved application from the program administrator

5. The application would be available on Eversource's landing page for the program and potentially on the battery partners' websites. The customer information collected on the application will be saved in a database for review and approval by Eversource personnel.

Using an online dashboard, Eversource will match pending customer utility accounts with existing electric customer accounts, review uploaded materials, and resolve any administrative and application processing issues. Battery partners should be able to submit applications on behalf of customers, following the same procedure.

The Company will utilize its existing interconnection protocols and fast track procedures.

<u>Benefits of the EDCs Administering the Program</u>

Eversource believes that substantial synergies can be achieved by allowing it to run a BYOD program in parallel with the Company's existing storage programs administered through the Company-administered EE programs. Cost savings and synergies could be achieved in the following areas:

- **Leverage Existing EDC Staff to Help Run the Program.** The incremental labor costs would be allocated directly to the program.

- **Leverage Existing EM&V Protocols.** The Company has worked to develop EM&V protocols for determining battery storage performance.

- **Leverage DERMS Platform.** The Company already has an established DERMS platform, and as program administrator, would have a cost-effective option to add functionality to enable its use for NWA applications.

- **Existing Relationships with Customers and Interconnection Data.** Eversource will utilize its existing customer relationships, its relationships with third party developers, and interconnection data to identify customers who may be interested in participating in the program. This would reduce marketing costs while also increasing the ability to market in a more targeted fashion and thereby, increase program uptake.

- **Marketing Functions.** The Company has well-established marketing operations, and a full-time department focused on promoting the EE programs managed by Eversource. This internal resource could be utilized to help promote the program, thereby negating the need for another organization to develop this type of effort from scratch or to rely exclusively on costly third parties to promote the program.

- **Paying Customer Incentives.** As the program administrator for New Hampshire's EE programs, as well as in Massachusetts and Connecticut, Eversource has existing contracts and procedures in place to pay incentives to customers. These existing pathways could be utilized at little incremental expense to pay customer incentives as part of the program.

Statutory or regulatory changes that might be needed to create, facilitate, and implement such a program:

There should be clear regulatory guidance that any proposed programs should be EDC-managed, or at a minimum, the EDCs should have the ability to compete for program administration. For all the reasons stated above, there are clear advantages to having an EDC-administered program. No other entity is as well-positioned to minimize costs and maximize benefits for customers.

Whether such a program should include all distributed energy resources or be limited to distributed energy storage projects:

It is reasonable to include any dispatchable distributed energy resources into this type of program. Aggregating dispatchable DERs, as opposed to passive DERs like solar, allows the Company to take advantage of scale. Eversource has developed a system architecture within its DERMS to be device agnostic. As long as integration between the DERMS platform and the device manufacturer is established, the DERMS and the end device will be able to communicate. At that point, a single system can control multiple device types and not just storage. This means a single entity can be responsible for marketing, enrollment, aggregation, and dispatch. This presents an opportunity for cost savings and administrative efficiency.

The development of a flexible load portfolio, comprised of many different types of DERs, can be deployed for multiple use cases. Use cases may include ISO peak load reduction, ISO capacity re-allocation, and T&D project offsets.

5. **Any statutory changes the general court should implement, including but not limited to changes to or exceptions from RSA 374-F or RSA 374-G, to enable energy storage projects to receive appropriate compensation for avoided transmission and distribution costs while also participating in wholesale energy markets**.

Given the relatively recent vintage of this proceeding and the timeframe for reporting to the Legislature, in Eversource's view recommendations on specific statutory changes is premature. Regardless, it is worthwhile to understand, in general, the kinds of changes to RSA 374-F or RSA 374-G that would be beneficial.

As made clear at the outset of these comments, Eversource and other EDCs have a continuing need to retain grid visibility and dispatch rights for all energy storage and other NWA solutions that would be relied upon for system needs. NWA process development (including for energy storage) is intrinsic to the EDCs' obligation to safely, securely, and reliably operate and maintain the distribution grid and ensure that customers receive the benefits of energy storage and NWAs that fulfill an identified system need. Moreover, given their position as grid operators EDCs are in a uniquely useful position to understand the system needs and ensure the development and deployment of resources that will benefit customers and the broader system.

Accordingly, in Eversource's view it is advisable and appropriate to amend the existing laws to allow for greater involvement of the EDC with fewer regulatory barriers. RSA 374-G already states as it purpose that "It is therefore in the public interest to stimulate investment in distributed energy resources in New Hampshire in diverse ways, ***including by encouraging New Hampshire electric public utilities to invest in renewable and clean distributed energy resources*** at the lowest reasonable cost to taxpayers benefiting the transmission and distribution system under state regulatory oversight." RSA 374-G:1 (emphasis added). Accordingly, EDCs are already encouraged to own or invest in NWAs (including energy storage), consistent with state policy. That participation in DER development and deployment, however, is subject to numerous regulatory burdens that substantially restrict what the EDC may do and how the assets may be developed and used. In Eversource's assessment, changes to the law that will more actively encourage the state's EDCs to own and develop these resources will not only further state policy, but will also ensure that the EDCs are in the best position to know when and where these assets will be deployed for the benefit of the distribution system and the customers it serves.

As one example of a potentially beneficial change, removing the barriers in the existing law to allow EDCs to invest in storage as a grid asset would put EDCs in a better position to assure that reliability and resiliency benefits flow to customers. EDCs would not be developing storage to offset generation or participate in wholesale markets, but to ensure that distribution system customers are reaping the benefits of a more reliable system while potentially offsetting other distribution investments. In Eversource's view, investments of this type should be encouraged – as contemplated in State policy – rather than restricted.

6. **Any other topic the commission reasonably believes it should consider in order to diligently conduct the proceeding.**

Eversource appreciates this opportunity to provide comments and looks forward to further participation in this important analysis.