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Hon. Kathleen H. Burgess
Secretary to the Commission
New York State Public Service Commission
Empire State Plaza, Agency Building 3
Albany, New York, 12223-1350

RE: CASE 18-E-0130 – In the Matter of Energy Storage Deployment Program

As a provider of an innovative large-scale, long-duration storage solution that can be flexibly sited, Hydrostor appreciates the opportunity to reply to stakeholder comments on the New York State Energy Storage Roadmap (the “Roadmap”).

Introduction

Hydrostor is a technology provider, project developer and delivery agent for Advanced-Compressed Air Energy Storage (A-CAES), which we believe could be an important storage technology pathway well-suited to New York’s bulk system needs going forward. A-CAES is a scalable (50-500+ MW), fuel-free/emissions-free, and long-duration (4-24+ hours) energy storage solution that is uniquely suited to the replacement of fossil generation at scale and support grid reliability through its synchronous generators and operating characteristics that are similar to conventional gas turbines. Unlike other long-duration energy storage technologies, such as pumped storage hydro and traditional compressed air energy storage, A-CAES can be flexibly sited where the grid requires it (i.e. it does not require pre-existing topology/caverns or salt formations). It is also a resource with 30+ years of operability and long-duration capability, unlike the to-date more commonly deployed lithium-ion batteries. Of further note, A-CAES is immediately available and based entirely on proven and bankable technologies, including standard mechanical equipment from Tier 1 OEM suppliers with decades of service history.

Hydrostor’s Overall Responses

Hydrostor is encouraged by the level of interest in the Roadmap and the potential for energy storage generally to contribute positively to the New York electricity grid.

After reviewing stakeholder comments on the Roadmap, Hydrostor notes the following four points.

1. Many parties commented on the market’s inability to adequately compensate energy storage. As noted in our September 10 comments on the Roadmap, Hydrostor is also keenly aware of the market’s stand-alone insufficiency to 1) value the full suite of benefits storage can provide, and 2) enable long-term revenue sufficiency to enable adequate financing and development of new storage resources. We agree with stakeholders that given this situation, direct procurement will be the most efficient means to cost-effectively achieve New York’s energy storage goals.
2. Many parties recommended a standalone storage Renewable Energy Credit (“REC”) to fill the gap between storage’s value and market compensation. Hydrostor strongly supports a standalone storage REC, however, unless it provides long-term certainty tied to the project life of a diverse array of storage projects (A-CAES, for example, has a greater than 30-year project life), it will not be enough to result in the deployment of storage projects. It is also important to recognize the value of storage diversity/fuel diversity in New York to the electricity grid over the long term.

3. Parties supported adjusting the capacity market to allow short-duration (i.e. <4-hours) storage to participate. Hydrostor does not support this change, particularly since there are other currently commercially-available, geographically-siteable long-duration storage technologies, including A-CAES, that are better suited to ensuring reliable and guaranteed capacity to the system at all times. We further note that it would be a departure from established best practices in other markets that have explored the applicability of storage to capacity markets, such as California that requires a minimum 4-hour duration for storage to qualify for Resource Adequacy in CAISO.
4. Parties suggested imposing capacity maximums (size restrictions) on projects eligible under the mandate. Hydrostor is firmly against any size restrictions as they could unjustifiably eliminate serious consideration of larger-scale resources like A-CAES that have significant cost-effective and geographically-flexible application opportunities in the New York, and therefore such restrictions would negatively impact ratepayers and the grid by arbitrarily removing an entire set of cost-effective resources from consideration.

1. Realistic and Cost-Effective Achievement of New York’s Energy Storage Goals Requires Procurement and/or Long-Term Recognition as a Network Asset

Many parties have commented on the market’s inability to fully compensate energy storage for the value it provides the grid. There is a broad consensus amongst stakeholders that the solution to this is direct procurement. Furthermore, the development of new storage technologies is simply not realistically financeable under current market constructs and require long-term revenue certainty to be cost-effectively deployed onto the grid. Markets that have achieved success in their efforts to deploy storage have generally recognized this either via 1) direct procurement mechanisms (e.g. California); 2) regulatory recognition of network benefits of storage, enabling a portion of the asset to be financially recognized via long-term rate-basing, with the remainder of the asset providing broader grid services (e.g. Australia); or 3) a combination of both approaches (e.g. Chile).

With regards to the “Clean Peak”, which is the set of recommendations aimed at aligning the storage approaches with the Department of Environmental Conservation’s “peaker” regulations, including using the energy storage mandate to encourage replacement of “peaker” units, Enel notes “direct procurement mechanisms dedicated to this clean peak are necessary.”¹

With regards to a NYSERDA led energy storage procurement, the Long Island Power Authority (“LIPA”) notes “This likely would expedite the acquisition of storage, provide a basis for equitable cost sharing, and ensure a consistent and manageable deployment schedule.”²

Plus Power suggests using “NYSERDA’s current Large Scale Renewables (LSR) solicitation program as a launching point for encouraging bulk-connected storage” and that “NYSERDA commit to holding their first solicitation no later than the summer of 2019”³

Hydrostor agrees with stakeholders that near-term direct procurements, with long-term asset value recognition, are required, and we are generally supportive of the state-based procurement using LSR as a model, providing longer-term asset recognition than 10 years is available. Hydrostor also, or alternatively, suggests mandating targets through multi-cycle procurements undertaken by the various utilities, replicating California’s approach. Hydrostor sees strong potential for utility procurement to maximize ratepayer and grid value of energy storage, particularly given the unique

¹ Enel comments Pg. 1

² LIPA comments Pg. 4

³ Plus Power comments Pg. 6

nature of energy storage as both a generation asset and network asset. Utilities understand which interconnection points and project sizes best address these network system issues. Utilities can use this information to run competitive procurements and select developer bids which address their most pressing needs.

For either approach, Hydrostor recommends the Commission incorporate direct procurement into the mandate's enforceable deployment mechanisms. We also recommend that the Commission give serious consideration to how the network benefits of storage can be valued, while still enabling an asset to participate in the NYISO market and associated program for energy storage RECs. This would allow for a more comprehensive recognition of the full suite of benefits energy storage can provide, including the value of long-term storage assets, so as not to bias program results to very short lifespan devices with a lower headline cost (that end up costing ratepayers more money over the long run).

2. Creation of a Storage Specific REC

Noting the gap between grid value and market revenues, many stakeholders suggested creating a new REC applicable to standalone energy storage.

Key Capture Energy suggests the Commission "Create a 'Storage Credit' (SC) for the missing money necessary to finance energy storage projects."⁴

Plus Power recommends "defining a 'Downstate Clean Peak Storage REC'"⁵.

The Energy Storage Association ("ESA") suggests establishing a "Clean Resiliency Credit"⁶ that provides "a long-term contract arrangement with at least a ten-year commitment for that resource."⁷

Hydrostor agrees that a REC for standalone storage would help close the market gap. We also note that a such a storage REC would be in-line with the current REC program's goals, given that dispatchable emissions-free resources are required to decarbonize the power sector. However, Hydrostor notes that unless this storage REC provides long-term revenue certainty it will not result in energy storage deployments. Hydrostor sees a standalone storage REC as complementary to direct procurements, not as a replacement.

Hydrostor recommends the Commission establish a "Storage REC" program for standalone storage and ensure that this program is integrated with the required direct procurements. For example, the program could be based on a similar structure as the current LSR procurements but would need to ensure longer-term revenue certainty for storage resources to ensure their finance-ability and, in particular, to not bias program results to short-lifespan resources only (which would be highly cost-ineffective for New York ratepayers over the long run).

3. The Importance of Long Duration Storage in the Provision of Capacity

Some parties supported the staff recommendation to reduce the capacity market duration requirement to <4-hour. For example, in their comments, NYPA highlighted that it "supports efforts designed to enable shorter duration ES resources to participate in the capacity markets."⁸ Hydrostor respectfully disagrees with both these comments and the staff recommendation.

Hydrostor instead strongly recommends creating a capacity market which recognizes projects that deliver capacity for a meaningful duration (i.e. 4+ hours). This is not only important for reliability

⁴ Key Capture Energy comments Pg. 6.

⁵ Plus Power comments Pg. 5

⁶ ESA comments Pg. 8

⁷ ESA comments Pg. 9

⁸ NYPA comments Pg. 11

and assurance of resource availability during potential grid contingency scenarios, it also has precedent in jurisdictions such as California, which requires 4 hours of storage duration to provide Resource Adequacy, and the UK where 4+ hours duration energy storage projects can contract for 15-year without a derating. We highlight that regulators in the UK introduced the 4-hour requirement after short-duration (<4-hour) storage demonstrated an inability to provide the capacity required to overcome stress events. Other jurisdictions have also required longer-durations for storage to participate in capacity markets in varying forms, including PJM and the Alberta Electricity System Operator.⁹

Hydrostor recommends the Commission take into account the precedent set in other markets with regards to storage duration and ensure that a minimum of a 4-hour duration requirement is maintained, in addition to any other penalties for non-performance during required peak periods. As demand for duration continues to grow over time (e.g. replacing of older capacity, increasing renewable integration), we believe the duration requirement will likely need to increase.

4. The Need for Project Size Neutrality

Some parties suggested imposing a size cap on mandate-eligible projects. For example, Stem notes that “controls need to be in place to prevent a small number of very large projects from dominating the target”¹⁰ regarding how to manage the deployment of storage.

Hydrostor strongly disagrees with implementing restrictions on project size and highlights the following downside impacts of size restrictions.

1. **Reduced Ratepayer Value:** Battery technology like lithium-ion does not benefit from the economics of scale technologies like A-CAES capture. As such, restricting project size would necessarily limit procurements and/or incentive eligibility to a subset of smaller-scale technologies, potentially excluding viable large-scale and geographically-suitable resources like A-CAES from serious consideration. This will inevitably result in higher-cost procurements, reducing the mandate’s ratepayer value, and potentially jeopardizing the feasible and cost-effective achievement of the storage mandate altogether.
2. **Reduced Grid Value:** Smaller-scale storage projects often leverage battery-based technology. Although inverter-based batteries can provide rapid response, they cannot deliver the synchronous inertia required for grid stability and resilience. A mix of large and small-scale technology will maximize grid value by delivering a range of grid services to help manage changes. Furthermore, cost-effective application of longer-duration storage resources is most realistically achieved with large-scale resources, given their overall economies of scale at large-sizes. For example, the marginal cost of additional storage duration for A-CAES is significantly less than \$50/kWh at large system sizes (i.e. at sizes still well within the overall scale of mandate to be put in place for New York). Arbitrary size restrictions for individual projects will simply limit overall value of long duration resources to the New York grid.
3. **Reduced Technology Diversity:** Certain large-scale storage technologies require large-scale deployment due to the fixed costs associated with 30+ year lifespan infrastructure. Restricting project sizes could restrict which technologies can participate, creating a less diverse grid composed primarily of limited lifespan technology.

⁹ See for example, <https://www.pjm.com/-/media/committees-groups/committees/mic/20180803-special-energy/20180803-item-04a-esa-capacity-storage-resource-duration.ashx>; and Section 2.1 of <https://www.aeso.ca/assets/Uploads/Rationale-section-2.pdf>.

¹⁰ Stem comments Pg. 3

Hydrostor, therefore, recommends the Commission remain neutral with regards to project size to ensure the lowest cost blend of resources is procured.

We thank the Commission and DPS staff in their continued efforts to develop and implement an energy storage roadmap in New York and appreciate the opportunity to provide these reply comments. We hope they will receive due consideration in the Commission's decision-making.

Respectfully submitted,

/s/ Stewart Jensen

Associate, Business Development

Hydrostor Inc.

365 Bay St, Suite 300, Toronto, Ontario, M5H 2V1

Tel: (416) 548-7880

E-mail: Stewart.Jensen@hydrostor.ca