STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

CASE 18-E-0130 - In the Matter of Energy Storage Deployment Program.

ORDER ESTABLISHING UPDATED ENERGY STORAGE GOAL AND DEPLOYMENT POLICY

Issued and Effective: June 20, 2024

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LIST OF ACRONYMS

BTM	-	Behind-the-meter
BTW	-	Bridge-to-Wires
CAF	-	Capacity Accreditation Factors
CES	-	Clean Energy Standard
CLCPA	-	Climate Leadership and Community Protection Act
CRF	-	Cost Recovery Fee
CSR	-	Co-located Storage Resource
DEC	-	Department of Environmental Conservation
DER	-	Distributed Energy Resource
DPS	-	New York State Department of Public Service
EV	-	Electric Vehicle
FDNY	-	Fire Department of New York
FERC	-	Federal Energy Regulatory Commission
GHG	-	Greenhouse gas
GW	-	Gigawatt
HSR	-	Hybrid Storage Resource
ICAP	-	Installed Capacity
IRA	-	Inflation Reduction Act
ISC	-	Index Storage Credit
ISO	-	Independent System Operator
ITC	-	Investment Tax Credit
kW	-	Kilowatt
LDES	-	Long Duration Energy Storage
LIPA	-	Long Island Power Authority
LSE	-	Load Serving Entity
MW	-	Megawatt
MWh	-	Megawatt hour
NNYESP	-	Northern New York Energy Storage Project
NYGB	-	New York Green Bank
NYISO	-	New York Independent System Operator
NYPA	-	New York Power Authority
NYSERDA	-	New York State Energy Research and Development Authority
PSL	-	Public Service Law
PV	-	Photovoltaic
RCP	-	Reference Capacity Price
REAP	-	Reference Energy Arbitrage Price
REC	-	Renewable Energy Credit
RES	-	Renewable Energy Standard
RFP	-	Request for Proposals
RTE	-	Round Trip Efficiency
RTO	-	Regional Transmission Organization
SGEIS	-	Supplemental Generic Environmental Impact Statement
UDR	-	Utility Dispatch Rights
VDER	-	Value of Distributed Energy Resources

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

At a session of the Public Service Commission held in the City of Albany on June 20, 2024

COMMISSIONERS PRESENT:

Rory M. Christian, Chair
James S. Alesi
David J. Valesky
John B. Maggiore, concurring
Uchenna S. Bright
Denise M. Sheehan, recusing

CASE 18-E-0130 - In the Matter of Energy Storage Deployment Program.

ORDER ESTABLISHING UPDATED STORAGE GOAL AND DEPLOYMENT POLICY

(Issued and Effective June 20, 2024)

BY THE COMMISSION:

INTRODUCTION

New York State is committed to developing a zero-emission electric grid. Over the next five to ten years, large, planned increases in the amount of intermittent renewable generation at both the bulk and distribution level, primarily in the form of on- and off-shore wind and photovoltaic (PV) solar, will require new methods and resources to balance supply and demand, including the use of energy storage. As discussed in more detail below, energy storage technologies are a key piece of the solution to ensure the reliability of New York's electric system during this historic transition.

On December 13, 2018, the New York State Public Service Commission (Commission) issued the Order Establishing

Energy Storage Goal and Deployment Policy (Energy Storage Order). The Energy Storage Order, among other things, outlined a framework of programs intended to spur the development and deployment of 3 gigawatts (GW) of energy storage projects in New York through the creation of competitive solicitations by each of the State's investor-owned utilities.[1] Since the issuance of the Energy Storage Order, the Climate Leadership and Community Protection Act (Climate Act or CLCPA) has become law. The CLCPA requires 70 percent of New York's electricity generation to come from renewables by 2030 and 100 percent by 2040.[2] Additionally, in 2022, New York announced a new goal of 6 GW of energy storage by 2030. The enactment of the CLCPA and the new energy storage goal only further accentuate the need for increased development of energy storage in New York.

In compliance with the periodic review requirements of the Energy Storage Order, to update previous analyses, and to respond to New York's expanded 6 GW energy storage target, New York State Department of Public Service Staff (DPS or Staff) and the New York State Energy Research and Development Authority (NYSERDA) jointly filed "New York's 6 GW Energy Storage Roadmap: Policy Options for Continued Growth in Energy Storage" (Roadmap) on December 28, 2022, in this proceeding. The Roadmap makes several recommendations aimed at achieving the 6 GW goal, discussed in detail below. Broadly speaking, the Roadmap proposes general program design considerations, market rule

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[1] New York's investor-owned utilities are: Central Hudson Gas & Electric Corporation (Central Hudson), Consolidated Edison Company of New York, Inc. (Con Edison), New York State Electric & Gas Corporation (NYSEG), Niagara Mohawk Power Corporation d/b/a National Grid (National Grid), Orange and Rockland Utilities, Inc.(O&R), and Rochester Gas and Electric Corporation (R&G) (collectively, the Joint Utilities).

[2] CLCPA §66-p(2).

changes, and procurement strategies, with specific considerations for both bulk and retail/residential storage in order to meet the 6 GW target.

In the Roadmap, Staff indicates that New York will need approximately 12 GW of energy storage by 2040 to support a decarbonized and reliable electric system. The target of 6 GW by 2030 is an important steppingstone to achieve the amount of energy storage that will ultimately be needed, and makes it clear to developers that New York values investments in energy storage. Through the Commission's continued collaboration with NYSERDA, the Long Island Power Authority (LIPA), the New York Independent System Operator, Inc. (NYISO), the New York Power Authority (NYPA), the New York Green Bank (NYGB), the New York State Department of Environmental Conservation (DEC), New York's investor-owned utilities, and other stakeholders, New York is poised to effectively transition to an emissions-free energy future.

By this Order, the Commission adopts an updated statewide deployment goal of 6 GW of energy storage resources by 2030, with an interim goal of 1.5 GW by 2025. As further discussed below, with consideration for the numerous stakeholder comments, the Commission adopts many of the Staff recommendations from the Roadmap. The successful implementation of the programs and recommendations contained herein will move the State closer to reaching its climate goals.[3]

[3] Codified in the Environmental Conservation Law (ECL), the CLCPA established the target of reducing greenhouse gas emissions 40 percent by 2030 and 85 percent by 2050, compared to 1990 levels. ECL §75-0107.

BACKGROUND

Enacted in 2017, Public Service Law (PSL) Section 74 required the Commission to establish a statewide energy storage goal for 2030 alongside a deployment policy to support this goal. In response, DPS Staff and NYSERDA filed the "New York State Energy Storage Roadmap and DPS/NYSERDA Recommendations" (2018 Roadmap) on June 21, 2018, in this proceeding. The 2018 Roadmap made several recommendations for Commission consideration that were intended to help spur the growth of the energy storage market in New York. Those recommendations focused around seven areas: (1) retail rate actions and utility programs; (2) utility roles and business models; (3) direct procurement; (4) market acceleration incentives; (5) soft-cost reductions; (6) clean peak actions; and (7) wholesale market actions. The Energy Storage Order adopted many of the recommendations specified in the 2018 Roadmap.

In the years since the Commission issued the Energy Storage Order, there has been a tremendous effort to effectuate the ambitious energy storage deployment, coordination, and market rule changes needed to successfully build out the robust storage network that is crucial to New York's energy transition. Energy storage procurement programs include a combination of NYSERDA market acceleration incentives and utility dispatch rights (UDR) contract solicitations.

The Energy Storage Order directed NYSERDA to implement an Energy Storage Market Acceleration Bridge Incentive (Bridge Incentive) using uncommitted ratepayer funds capped at $310 million.[4] The purpose of the Bridge Incentive is to provide revenue certainty for a predetermined timeframe, by providing a fixed, upfront incentive rate in dollars per kilowatt hour (kWh)

[4] Energy Storage Order, p. 65.

of energy storage capacity during the nascent stage of energy storage development, to make projects economically viable. As the energy storage market matures and incentives are no longer required, the level of support declines.

The Energy Storage Order also directed the Joint Utilities to issue a Request for Proposals (RFP) in 2019, and subsequent RFPs as-needed on an annual basis, to competitively procure dispatch rights for bulk-level energy storage projects.[5] The selection of projects is intended to address the local needs of the area in which the projects are located, including local reliability needs, load relief, environmental benefits through the reduction of use of peaking plant units and associated emissions, and wholesale market services such as Frequency Regulation, Spinning Reserves, Energy, and Capacity.[6] The Commission directed the Joint Utilities to procure a total of 350 megawatts (MW) of energy storage projects statewide, broken down into utility-specific goals with 300 MW targeted for Con Edison and 10 MW for each of the other five investor-owned utilities.[7] The Energy Storage Order required any projects procured in the RFP to be in-service by December 31, 2022, with a seven-year maximum dispatch rights contract.[8] Subsequent petitions and orders modified the in-service date of contracted projects to December 31, 2028, and increased the maximum dispatch rights contract term length to fifteen years for any future solicitation rounds.[9]

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[5] Energy Storage Order, p. 53.

[6] Energy Storage Order, p. 54.

[7] Energy Storage Order, p. 55.

[8] Energy Storage Order, p. 54.

[9] Case 18-E-0130, Order Directing Further Modifications to Energy Storage Solicitations (issued March 26, 2023) (2023 Modification Order).

In addition to direct storage procurement strategies, the Commission also encouraged actions in the wholesale market to facilitate the integration of storage onto New York's bulk power system.[10] These actions included eliminating the application of buyer-side mitigation rules for public policy resources, including energy storage resources, and development and deployment of a distributed energy resource (DER) aggregation model. Since the issuance of the Energy Storage Order, the NYISO has implemented tariff revisions filed with the Federal Energy Regulatory Commission (FERC) to eliminate buyer-side mitigation for energy storage and other public policy resources, as well as launched its DER Participation Model.[11]

In parallel to the actions taken at the NYISO, Staff has lead the development of distribution and wholesale market coordination protocols for DERs by way of the Market Design and Integration Working Group.[12] The working group efforts will help define the clear delineation and establishment of coordination procedures for the dispatch of DERs, including energy storage resources, which is critical to ensuring both the reliability of the electric system and to maximize the benefits and services that energy storage can provide.

Thereafter, on December 28, 2022, DPS and NYSERDA jointly filed the Roadmap, which recommends updates to the programs established in the Energy Storage Order and examines how to best achieve the increased energy storage goal. The

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[10] Energy Storage Order, p. 94.

[11] On May 10, 2022, FERC issued an Order accepting NYISO's tariff revisions related to the elimination of buyer-side mitigation, New York Independent System Operator, Inc., 179 FERC ¶ 61,102.

On April 15, 2024, FERC issued an Order accepting NYISO's tariff revisions related to DER Participation, New York Independent System Operator, Inc., 187 FERC ¶ 61,022.

[12] Energy Storage Order, pp. 102-103.

Roadmap looks at necessary market reforms, procurement mechanisms, research and development needs for long duration storage, and optimal approaches to energy storage deployment in addition to summarizing progress made since the issuance of the Energy Storage Order. The Roadmap also analyzes the current market for energy storage in New York State, thereby serving as the basis for the Commission's triennial review of storage markets, policies and programs as required in the Energy Storage Order.[13]

The analysis used to inform the recommendations contained within the Roadmap shows a large need for energy storage in the future, with approximately 12 GWs required by 2040 and more than 17 GWs by 2050. The Roadmap concludes that updating the current 3 GW goal to 6 GW is necessary to ensure that the pace of development for energy storage is sufficient to meet the State's future energy needs.

On March 14, 2024, DPS and NYSERDA filed an update to the Roadmap. The update accounts for increased costs related to inflation that were not present at the time the Roadmap was filed in 2022.

NOTICE OF PROPOSED RULE MAKING

Pursuant to the State Administrative Procedure Act (SAPA) §202(1), a Notice of Proposed Rulemaking (Notice) was initially published in the State Register on January 18, 2023 [SAPA No. 18-E-0130SP13]. The time for submission of comments pursuant to the Notice expired on March 20, 2023. Moreover, in the Secretary's Notice Announcing Webinars and Soliciting Comments, issued on February 6, 2023, stakeholders were invited to submit written comments by March 20, 2023, and reply comments by April 3, 2023.

[13] Energy Storage Order, p. 12.

A Notice of Revised Rulemaking (Revised Notice) was published in the State Register on April 3, 2024 [SAPA No. 18-E-0130SP13]. The time for submission of comments pursuant to the Revised Notice expired on May 20, 2024.

In response to the Notice, the Secretary's Notice, and the Revised Notice, numerous comments and reply comments were filed by organizations and individuals. A complete summary of these comments is included in the Appendices, and responses to specific comments are addressed in the relevant sections of the discussion below.

LEGAL AUTHORITY

The Commission has broad jurisdiction, power, and duties over the "[m]anufacture, conveying, transportation, sale, or distribution of ... electricity ...." Furthermore, PSL §5(2) instructs the Commission "[t]o encourage all persons and corporations subject to its jurisdiction to formulate and carry out long-range programs ... with economy, efficiency, and care for the public safety, the preservation of environmental values and the conservation of natural resources." The Commission's supervision of electric corporations includes the responsibility to ensure that all charges made by such corporation for any service rendered shall be just and reasonable. Public Service Law §66 empowers the Commission to "[p]rescribe from time to time the efficiency of the electric supply system." The Commission may exercise this broad authority to direct regulatory standards to execute the provisions contained in the PSL. Additionally, the Commission has the authority to direct the treatment of DERs by electric corporations.

Pursuant to PSL §74, the Commission is required, by December 31, 2018, to establish, in consultation with NYSERDA and LIPA, a statewide energy storage goal for 2030, and a deployment policy to support that goal. As prescribed therein,

the energy storage deployment policy shall address the following:

1) avoided or deferred costs associated with transmission, distribution, or generation capacity;
2) minimization of peak load in constrained areas;
3) systems that are connected to customer facilities and systems that are directly connected to transmission and distribution facilities;
4) cost-effectiveness;
5) the integration of variable-output energy resources;
6) reducing GHG emissions;
7) reducing demand for peak electrical generation;
8) improving the reliable operation of the electrical transmission or distribution systems; and
9) any other issues deemed appropriate.

The Commission is also required to submit annual reports on the achievements and effectiveness of the policy to the Governor, the Temporary President of the Senate, and the Speaker of the Assembly.[14] The actions directed by this Order are within the Commission's regulatory authority indicated above, and fulfill the requirement that the Commission establish a statewide energy storage goal and deployment policy.

STATE ENVIRONMENTAL QUALITY REVIEW ACT

On September 15, 2023, in compliance with the State Environmental Quality Review Act (SEQRA), the Commission accepted, as complete, a Draft Supplemental Generic Environmental Impact Statement (SGEIS) which analyzed the possible environmental impacts related to potential actions

[14] PSL §74(4).

recommended in the Roadmap.[15] A Notice of Completion of the Draft SGEIS was issued by the Secretary on September 15, 2023, the Notice announced that comments on the Draft SGEIS will be accepted until October 27, 2023. Additionally, a Notice was posted in the Environmental Notice Bulletin (ENB) on October 4, 2023. Two parties submitted comments in support of the Draft SGEIS and suggested the Commission consider additional topics in the Final SGEIS. The Final SGEIS expanded upon, and responded to, the topics recommended by the commenters. The Commission accepted the Final SGEIS as complete on December 14, 2023. A Notice of Completion of the Final SGEIS was posted in the ENB on December 27, 2023.

The Commission has considered the information in the Final SGEIS with respect to the decisions made in this Order, and hereby adopts the SEQRA Findings Statement, attached to this Order as Appendix C, prepared in accordance with Article 8 of the Environmental Conservation Law and 6 NYCRR Part 617.

TRIENNIAL REVIEW

The Commission conducts this triennial review to help provide certainty to market participants, as directed in the Energy Storage Order. Based on this review, and the recommendations in the Roadmap, the Commission expands the energy storage goal and policies supporting that goal, as discussed below.

Current Progress and Market Overview

It has been more than five years since the Energy Storage Order was issued. Since that time, New York has made

[15] Case 18-E-0130, Order Accepting Draft Supplemental Generic Environmental Impact Statement as Complete (issued September 15, 2023).

significant strides towards achieving its energy storage targets. The Bridge Incentive, which was created in the Energy Storage Order with the goal of providing revenue certainty to the energy storage market for a defined period and deployment level, accounts for 811 MW of the total energy storage contracted, with the rest coming from a variety of sources including the utility bulk storage dispatch rights procurement process and projects that resulted from the Renewable Energy Standard (RES).

Today there are more than 40 GWs of energy storage projects that are in either wholesale or distribution interconnection queues in New York. Over 38 GWs of these proposed projects seek to interconnect into the bulk power system. Although it is possible that many of these proposed projects will not progress to the construction and operation stage, the large number of projects that developers are seeking to construct signals that New York has established itself as a place where energy storage is highly valued and desired.

The Energy Storage Order established numerous programs, as discussed above, including the Bridge Incentive and RFP process for UDR contracts. Each program came with its share of successes and shortcomings. As of April 24, 2024, the Bridge Incentive has procured 400 MW of bulk storage projects. Revenue certainty on the part of developers remains a critical prerequisite for bulk storage projects to come to fruition. Through this Order, the Commission aims to maintain this certainty in the face of challenges such as supply chain issues and changing market forces.

On the retail side, the Bridge Incentive proved successful with 320 MW procured on the distribution system

statewide using a declining block structure.[16] Even with this success, there remains room for improvement by providing longer-term certainty for funding allotments and block incentive levels, as discussed in the procurement section below.

The Long Island Residential Incentive is a pilot residential energy storage incentive program administered by NYSERDA.[17] This program is intended to spur the deployment of solar PV coupled with energy storage for use in the LIPA's Dynamic Load Management (DLM) program. In addition to the benefits related to load management, the residential energy storage incentive provides direct resiliency benefits for the household during blackout events. After two blocks of incentives, a total of 1,125 residences on Long Island installed 25.3 megawatt hours (MWh) of energy storage projects.[18] Though small on an individual level, continued residential adoption of energy storage on Long Island and all areas of New York will undoubtedly improve resilience for those homes and the grid in general.

LIPA has also been in the process of procuring bulk storage projects. It currently has 10 MW of 8-hour duration battery storage at two installations on the South Fork of Long Island.[19] In addition, LIPA has an active bulk energy storage

[16] Roadmap, p. 14.

[17] NYSERDA, Incentives for Long Island Residents, available at: https://www.nyserda.ny.gov/All-Programs/Energy-Storage-Program/Energy-Storage-for-Your-Home/Incentives-for-Long-Island-Residents.

[18] Roadmap, p. 15.

[19] LIPA, 2023 Integrated Resource Plan, IRP Summary Guide, available at: https://www.lipower.org/irp/.

solicitation for at least 175 MW that was issued in 2021.[20] Currently, contract negotiations are nearing the final stages for three projects (79 MW at Kings Substation, 50 MW at Shoreham Substation, and 50 MW at West Babylon Substation) totaling 179 MW of 4-hour duration energy storage capability. LIPA board consideration of the final contracts is expected in June 2024 for the Kings project, November or December 2024 for the Shoreham project, and March 2025 for the West Babylon project.[21]

As discussed above, the UDR contract procurement process has been refined in order to better attract competitive bids from developers, through subsequent Commission actions, resulting in more contracted energy storage MWs and ultimately built projects.[22] Over time, as the market matures and projects can expect predictable market revenues, the cost of bids from developers will likely decrease, increasing the chances of a successful dispatch rights contract. The dispatch rights contract framework allows for both new bulk-level energy storage projects to be deployed in a timelier manner than otherwise would happen, as well as gives the utility hands-on experience in operating and dispatching the energy storage resource.

The RES established the requirement that NYSERDA administer annual solicitations that allow for the pairing of energy storage resources with large-scale renewable generation

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[20] PSEG Long Island, 2021 Bulk Energy Storage RFP, available at: https://www.psegliny.com/aboutpseglongisland/proposalsandbids/2021bulkenergystoragerfp.

[21] LIPA Board Meeting Presentation, Briefing on Energy Storage RFP, May 22, 2024, available at: https://www.lipower.org/wp-content/uploads/2024/05/4.-Briefing-on-Energy-Storage-RFP-1.pdf.

[22] See Case 18-E-0130, Order Directing Modifications to Energy Storage Solicitations (issued April 16, 2021) (2021 Modification Order); see also 2023 Modification Order.

to increase the value of the proposed project.[23] As of April 1, 2024, the RES awarded a total of 20 MW of energy storage projects, primarily solar and energy storage facilities. The current solicitation seeks proposals for energy storage and offshore wind facilities to help integrate the thousands of megawatts of offshore wind generation that is expected to come online over the next fifteen years.[24]

A New York-sponsored investment fund, the NYGB works to accelerate the deployment of clean energy in the State by working with the private sector to transform energy financing.[25] Through this collaborative effort, the NYGB has invested $25 million of its committed $50 million to support energy storage projects statewide as of December 31, 2023.[26] The primary finance method utilized by developers so far has been a project loan where a lender relies on the revenues of the individual project as the means of repayment and security of the loan. The NYGB offers alternative finance methods depending on which stage of development a storage project is in. Products offered by the NYGB include equipment financing and interconnection loans, tax equity and incentive bridge loans, and senior term loans. Combined, these tools help to spur the energy storage market in New York. This alternative strategy recognizes that a vetted creditworthy developer, with a long-term contracted project that

[23] Case 15-E-0302, et al., Large-Scale Renewable Program and a Clean Energy Standard, Order Adopting a Clean Energy Standard (issued August 1, 2016) (CES Framework Order).

[24] NYSERDA, Solicitations for Large-Scale Renewables, available at: https://www.nyserda.ny.gov/All-Programs/Large-Scale-Renewables/RES-Tier-One-Eligibility/Solicitations-for-Long-term-Contracts.

[25] New York Green Bank, available at: https://greenbank.ny.gov/.

[26] Case 13-M-0412, NY Green Bank, Metrics, Reporting & Evaluation Quarterly Report No. 38 (filed February 29, 2024).

is operational, presents less risk than a proposed project early in its development that will rely primarily on merchant revenues in a market that is not yet well tested.

The FERC issued Order No. 841 in February 2018, requiring Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) to revise their tariffs to enable energy storage resources to participate in the wholesale markets.[27] Later on, as part of the NYISO's effort to reform capacity accreditation values for all resources, FERC approved its capacity accreditation changes which determine the capacity value of 4-hour energy storage resources and other 4-hour duration limited resources based on their marginal capacity contribution. This new capacity accreditation methodology was implemented starting in May 2024. Each resource is assigned its applicable Capacity Accreditation Factor based on its resource classification.

In addition to the actions the NYISO has taken to comply with Order No. 841, the NYISO has also implemented a co-located storage resource (CSR) participation model that allows an energy storage resource to pair with an intermittent solar or wind resource behind a single point of interconnection.[28] Each of the resources operate and are compensated under their respective participation model, but both are allowed to proceed in the interconnection process under a single interconnection request, which saves interconnection costs. The CSR participation model allows storage and renewables to efficiently

[27] Electric Storage Participation in Markets Operated by Regional Transmission Organizations and Independent System Operators, Order No. 841, 162 FERC ¶ 61,127 (2018).

[28] FERC Docket No. ER21-1001, New York Independent System Operator, Inc., Proposed Tariff Revisions to Implement Co-located Storage Resources (filed January 29, 2021).

interconnect and maximizes the benefits of both energy storage resources and renewable generation effectively.

Building off the CSR model, the NYISO developed a hybrid storage resource (HSR) model in its stakeholder process.[29] The HSR model design is intended to allow an energy storage resource and intermittent power resource to participate in the NYISO markets under a single point identifier, bid, schedule, and settlement and effectively act as one single resource. Like the CSR model, the HSR model will allow this combination of resources to share a single interconnection request.

The NYISO further advanced the integration of energy storage resources into the wholesale market through FERC's acceptance of its DER participation model in January 2020. This model enables DER aggregations between 100 kW and 20 MW, including aggregations that contain energy storage, to participate in the market as one resource. The model also specifies that each individual resource within a DER aggregation must be a minimum of 10 kW. FERC also issued Order No. 2222 in 2020, which requires all ISOs and RTOs to revise their tariffs to allow for the full participation of DERs in the wholesale market to the maximum extent of their capabilities.[30] As a result of FERC Order No. 2222, the NYISO was required to revise its already accepted DER model in order to fully comply with FERC's directives. Deployment of the NYISO's DER model occurred

[29] NYISO, Co-located Storage Resource Model Updates (March 20, 2024), available at: https://www.nyiso.com/documents/20142/43713211/4%20Co-located%20Storage%20Resource%20Model%20Updates%20032724%20mc.pdf/f6247348-5c8d-8f90-9691-9aa2ea013ad4.

[30] Participation of Distributed Energy Resource Aggregations in Markets Operated by Regional Transmission Organizations and Independent System Operators, Order No. 2222, 172 FERC ¶ 61,247 (2020).

in April 2024. Full implementation of an aggregation model compliant with Order No. 2222 is estimated in 2026.

On the distribution side of the electric system, the Commission issued the VDER Order in March 2017.[31] The VDER Order created a new compensation structure for DERs 5 MWs or smaller, including energy storage, termed the Value Stack. The Value Stack is comprised of several components which use price and locational signals to incent desired operation of the resource. These components include Energy and Capacity Values based on NYISO pricing, Demand Reduction Value, Environmental Value, and Locational System Relief Value. A Market Transition Credit and Community Credit are also available for Community Distributed Generation (CDG) projects, although at present each utility has fully utilized their respective credits. Energy storage projects benefit from the VDER Order's compensation structure by incenting a shift in their output to higher priced hours.

In August 2022, President Biden signed the Inflation Reduction Act of 2022 (Inflation Reduction Act) into law. Embedded within this wide-ranging piece of legislation is the modification of the existing investment tax credit (ITC) that will help drive development of stand-alone energy storage projects.[32] Previously, only energy storage projects paired with solar were eligible to receive the credit. Now, qualified

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[31] Case 15-E-0751, In the Matter of the Value of Distributed Energy Resources, Order on Net Energy Metering Transition, Phase One of Value of Distributed Energy Resources, and related Matters (issued March 9, 2017) (VDER Order).

[32] "The Investment Tax Credit is a tax credit that reduces the federal income tax liability for a percentage of the cost of a qualified system that is installed during the tax year." Department of Energy, Overview of Inflation Reduction Act Incentives for Federal Decarbonization, available at: https://www.energy.gov/femp/overview-inflation-reduction-act-incentives-federal-decarbonization.

stand-alone residential and commercial storage systems are eligible for the ITC, which is equal to 30 percent of the cost of the installed equipment for the energy storage project. Projects are eligible to receive more than the 30 percent credit under certain circumstances, such as if the project is located near a brownfield site or if the energy storage project is paired with renewable generation and benefits a low-income community or Native American territory. Further guidance from the Department of Treasury is forthcoming regarding the specific use cases where a credit of more than 30 percent is available, which in turn will inform developer investment decisions in New York.

NYPA is responsible for generating and transmitting zero-carbon power to several commercial, industrial, municipal, and governmental customers. To support this effort, NYPA built a 20 MW energy storage project in Chateaugay, New York.[33] The Northern New York Energy Storage Project (NNYESP) takes advantage of the wind energy in the North Country and St. Lawrence hydropower plant and has the capacity to power approximately 3,000 homes. The NNYESP further demonstrates how storage can help maximize the integration of renewable generation into New York's grid. The project became operational in summer 2023.

The Roadmap recognizes the value and importance of long-duration energy storage (LDES) in helping maintain a reliable system. To help spur the development and demonstrate the efficacy of LDES, NYSERDA has made over $33 million

[33] Governor Hochul Announces New York's First State-Owned Utility-Scale Energy Storage System Now Operating in North Country, August 25, 2023, available at: https://www.governor.ny.gov/news/governor-hochul-announces-new-yorks-first-state-owned-utility-scale-energy-storage-system-now.

available in funding for LDES demonstration projects, through its Innovation Program. Currently, four projects that are aimed at renewable integration and emission reductions have received funding.[34] NYSERDA conducted an additional solicitation to contract with LDES projects with the aim to highlight cost, performance, siting, and renewable integration difficulties.[35]

Role of Energy Storage

The development, installation, and operation of energy storage in New York is imperative to meet the emission reduction targets outlined in the CLCPA, and codified in the ECL.[36] As the State's electric grid transitions from one historically dominated by large, fossil-fueled baseload generation to one comprised of DERs and intermittent renewable generation, energy storage is one of the key ingredients to ensure this transition takes place in a reliable manner.

Currently, the peak demand for electricity in New York usually occurs in the summer months on hot and humid days, when consumers are maximizing air conditioning use. Over the next 20 years, as electric heat pumps and electric vehicles (EV) become more prevalent, this historical consumption pattern is expected to shift towards a winter peak. This shift in demand, coupled with the expected retirement of high-emitting peaking power plants downstate, further highlights the need and role for

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[34] NYSERDA, Nearly $15 Million Awarded to Four Demonstration Projects to Advance Long Energy Duration Energy Storage Technology Solutions, August 17, 2023, available at: https://www.nyserda.ny.gov/About/Newsroom/2023-Announcements/2023-08-17-Governor-Hochul-Announces-Nearly-15-Million-in-Long-Duration-Energy-Storage.

[35] NYSERDA Long Duration Energy Storage Technology and Product Development, Product Opportunity notice 5472, available at: https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00P8z0000034APIEA2.

[36] ECL §75-0107.

energy storage.[37] With the retirement of peakers, energy storage will help meet future peak demand statewide, regardless of the season, especially in load pockets in New York City and Long Island.

The transition of the fleet of generation in New York, from one that can be dispatched for long durations to one in which there are large quantities of intermittent renewable generation, requires solutions, such as energy storage, to fill in the generation gaps. Short-duration energy storage can help to manage this intermittency on an hourly basis, as well as store renewable generation and inject it back onto the grid during high demand and priced hours, or the ability of LDES to shift renewable generation across days, weeks, or seasons.

Analysis completed for the Climate Action Council projects that over 60 GWs of solar capacity, 16-19 GWs of offshore wind, and 16-17 GWs of land-based wind could be added onto New York's electric system by 2050.[38] These large, projected increases in renewable generation highlight the need for energy storage deployment in order to keep pace. The analysis completed for the Roadmap indicates that 12 GWs of short-duration energy storage by 2040 and more than 17 GWs by 2050 are needed to decarbonize the grid in a cost effective and reliable way. This projected amount of installed energy storage is a multi-fold increase compared to the current amount of energy storage in the state; as such, a more aggressive goal of

[37] In 2019, DEC established the "Peaker Rule" which requires owners or operators of simple cycle and regenerative combustion turbines that are electric generating units with a nameplate capacity of 15 MW or greater (peaking plants) and that inject power into the transmission or distribution systems to comply with emission limits by either retrofitting controls or shutting down. Six NYCRR Part 227-3.

[38] New York Climate Scoping Plan, Chapter 13, p. 221, available at: https://climate.ny.gov/resources/scoping-plan/.

6 GW by 2030, double the current mandate of 3 GW, is not only prudent but necessary to ensure that sufficient resources are online and available by 2030.

It remains the case that the pattern of energy storage deployment in New York will vary by region, duration, and over time. Downstate, in New York City and Long Island, energy storage will help to integrate offshore wind onto the grid and help solve local reliability needs as decades-old peaking plants retire. In upstate New York, land is cheaper and more plentiful for land-based wind turbine development which will drive the need for energy storage. Through 2030, most energy storage is expected to be installed downstate, with increasing amounts located upstate over time; more than half of the projected needed 17.2 GW of energy storage is expected to be sited upstate by 2050. Over time, the importance of LDES will grow as the ability to discharge stored energy across all peak hours is necessary to help maintain reliability, with the Roadmap's analysis indicating that over 70 percent of energy storage projects will be located in New York City and Long Island.

The size and scope of energy storage projects, associated development lead time, and interconnection complexity vary depending on whether the project is residential, retail, or bulk. Each of these market segments exist at different scales and provide unique benefits to New Yorkers. Residential energy storage is usually small, at an average of less than 10 kW, and can be developed and installed quickly, giving the customer added resiliency during black outs and the ability to participate in utility demand response programs. Retail projects, sized under 5 MWs, have a considerably longer development time, averaging three years; despite the long development time, attrition in retail projects is low. Bulk projects, considered 5 MWs and larger, are expected to make up

the most installations in the state on a capacity basis, highlighting the need for this critical resource, with development and installation timelines of bulk projects taking up to six years; these bulk storage facilities can replace peaking plants and integrate a large amount of renewable generation.

Storage Deployment Barriers

New York made it clear in the CLCPA that encouraging the development and installation of energy storage is paramount to transiting the electric system from one primarily fueled by fossil fuels to one powered by zero-emission resources. In furtherance of the policy goals in the CLCPA, progress towards storage deployment in New York is underway, with a number of energy storage projects coming online and many more in the interconnection queue. Despite this progress, there are certain barriers remaining that prevent energy storage from reaching its full potential.

One barrier that has hindered the timely development of energy storage resources is the rise in supply costs for lithium-ion batteries since 2022. The materials that are used in battery manufacturing are in high demand as battery use in all facets of society has proliferated, such as increased battery demand for EVs. Supply and demand dynamics are impacting the ease and speed with which energy storage developers can move energy storage projects from the design phase to the construction phase. While New York cannot control all the factors that go into construction costs, by remaining technology neutral in energy storage deployment and funding, the State can encourage a variety of technology types to compete for project incentive awards, which may potentially drive down costs.

Currently, the revenues available to energy storage resources in the wholesale electricity markets are not adequate for merchant storage resources to be economic.[39] The continued replacement of retired fossil generation with intermittent, renewable energy on the bulk power system may lead to periods of low or even negative prices, giving energy storage an opportunity to charge cheaply and then discharge into the grid later when energy prices are higher. On the capacity market side, the final values for capacity accreditation will impact how much capacity revenue an energy storage resource can expect to receive. The NYISO's recent implementation of an Operating Reserve requirement in New York City provides energy storage resources with a locationally specific price signal and provides an opportunity for additional market revenue that energy storage resources are well situated to compete for. The NYISO is currently evaluating the need for other geographic specific Operating Reserve requirements for load pockets in the state. The Operating Reserve requirements may provide further wholesale market revenue opportunities to energy storage resources.

Obtaining adequate financing terms for energy storage projects remains a challenge for developers and impacts the viability of those projects. The uncertainty of revenue available under wholesale and distribution tariffs makes incentives and funding programs critical to getting energy storage projects from concept to reality. Over time, as revenue predictions become more accurate due to historical performance and availability of data, the level of incentives required for energy storage resources should decrease.

Based on this triennial review, the Commission finds that while we have made progress, there is a significant amount

[39] Merchant storage resources are those that are developed without receiving subsidies or other outside support.

of work before us. The Roadmap has provided us with many options to consider that will help us to build upon our success and to achieve our clean energy targets. We address those options and next steps forward below.

DISCUSSION

Bulk Energy Storage Procurement Program Design

As the Roadmap notes, bulk scale energy storage is expected to play the largest role in terms of nameplate capacity in New York achieving the 6 GW by 2030 goal. The Roadmap describes six potential paths towards achieving 3 GWs of bulk level energy storage needed by 2030. These six options are summarized below.

Bulk Program Design Summary

Upfront Rebate/Standard Offer Incentive: The Upfront Rebate/Standard Offer Incentive would offer payments to developers on a per kW or kWh of installed capacity basis. Projects would receive a contract for a fixed dollar amount over the contract term length.

Index Storage Credit: The Index Storage Credit (ISC) would function similarly to the Index Renewable Energy Credit (REC) approach used in the large-scale renewable procurements.[40] Storage developers would bid in a "Strike Price" which reflects the developer's assumption of revenue for the energy storage project and compare that to a "Reference Price" which would be calculated based on price indices representing expected revenue from the NYISO's Energy and Capacity Markets. The ISC would be

[40] Case 15-E-0302, supra, Order Adopting a Clean Energy Standard (CES Order) (issued August 1, 2016). More information on RECs can be found at: NYSERDA, FAQs for Load Serving Entities, available at: https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Standard/LSE-Obligations/FAQs-for-Load-Serving-Entities.

equal to the Strike Price minus the Reference Price. If the Strike Price exceeds the Reference Price, then NYSERDA would pay out the difference to the developer. On the other hand, if the Strike Price was lower than the Reference Price, the project would owe NYSERDA a payment.

Preset Hourly Revenue Support/"Clean Peak Credit": This option would give energy storage resources the opportunity to receive additional compensation for discharging during predefined peak hours, determined by NYSERDA, to incent operation during the most critical times for the system.

Utility Ownership with Traditional Market Participation: In this option, the utility would seek contracts for market-based projects where the utility would solicit developers to build the energy storage resource to the utility's requirements, and then transfer the project to the utility to own and operate either immediately or after a period specified in the contract.

Utility Dispatch Rights Contract: This would continue the existing framework approved in the Energy Storage Order for the utilities to enter into contracts for operational control of an energy storage resource developed and owned by a third party.[41]

Utility Ownership for Transmission and Distribution Services: This option recognizes that certain revenue streams, including transmission and distribution services, are not currently available to energy storage resources. This option would give the utilities an opportunity to study their systems and identify where specific transmission and distribution services are needed, with the end result being the ability to develop and provide energy storage resources in appropriately targeted areas.

[41] Energy Storage Order, p. 53.

Roadmap Recommendations

In determining which of the above program designs offers the best path forward, the Roadmap examined implementation feasibility, development effectiveness, efficiency, and compatibility/acceptability. Based on these criteria, the Roadmap recommends pursuing a program design based on the ISC mechanism to procure 3,000 MWs of bulk energy storage through three procurement solicitations, targeting 1,000 MWs in each solicitation.[42]

The proposed ISC mechanism is similar in structure to the already-approved and in-use Index REC structure where NYSERDA purchases RECs created by the generation of each MWh of clean energy by renewable resources. For the proposed ISC program, an ISC would be generated for each MWh of energy storage capacity that is operational and available on a given day (i.e., not during an outage or during maintenance) and not how much the energy storage resource discharges, to incent prudent injections to the grid when needed. The relationship between the Strike Price and Reference Price, as described above, would ensure that energy storage owners remain exposed to market prices and maintain an incentive to inject energy when wholesale prices are high.

Based on historical and previous program data, the Roadmap recommends a contract term of 15 years. The Roadmap reasons that this length of time is long enough to reduce financial risks for the energy storage resource and short enough that the contract would not extend beyond the useful life of the asset.

The Roadmap recommends that any electric, chemical, mechanical, or thermal-electric energy storage technology be

[42] Roadmap, p. 49.

eligible for the bulk program. Additionally, the Roadmap recommends that the Commission require projects to electrically interconnect into New York's transmission and distribution systems.

The Roadmap suggests giving NYSERDA flexibility to determine specific duration requirements for bulk solicitations. In the near term, the solicitations are expected to attract energy storage resources with durations ranging from 4 to 8 hours, with the Roadmap recognizing the value that energy storage with an 8-hour or more duration adds in maintaining reliability and integrating large amounts of renewable energy in later years. Giving flexibility for NYSERDA to determine if specific durations are necessary in a bulk procurement would help drive the investment of the type of required energy storage resource when they are needed.

The Roadmap recommends against applying a payment cap in the ISC program. A payment cap establishes a maximum payment level that can be paid from a project to NYSERDA or vice versa. The Roadmap describes the benefits of the ISC design (e.g., being able to avoid incentive payments when unnecessary and provide ratepayer benefits by reducing financing costs for projects) and therefore a payment cap would interfere with this mechanism.

Similar to NYSERDA's onshore and offshore large-scale renewable procurement program, the Roadmap recommends allowing a one-time inflation adjustment for pre-determined cost indices in the time between the project's bid and when it commences construction. This inflation adjustment would reduce the risk that inflation and cost uncertainties have on bulk energy storage projects that have multi-year development timelines.

The Roadmap recommends that the NYISO zonal locational based marginal pricing (LBMP) day-ahead energy market pricing be

used for the energy price component of the Reference Price calculation, consistent with the Index REC structure, as day-ahead pricing is more stable and easier to implement than real-time pricing.

Energy storage is uniquely situated in that it is not solely a generation resource, as it needs to charge by using grid or other site-generated power. As such, an energy storage resource's ability to earn energy revenue derives from its ability to capitalize on arbitrage opportunities by charging during low energy price periods and discharging when prices are high. The Roadmap recognizes this and recommends establishing a Reference Energy Arbitrage Price (REAP) that calculates the arbitrage opportunity using the difference between the prices in the top and bottom 4 hours in the day-ahead market for a 4-hour duration resource and in the same manner for longer duration resources (e.g., top and bottom 8 hours for an 8-hour energy storage resource). The use of a REAP gives flexibility to allow for more hours for longer duration resources; the average of this daily calculation would apply over the calendar month. The Roadmap notes the presence of round-trip efficiency losses but recommends excluding these losses from the REAP due to the additional complexity of determining roundtrip losses that vary by project and the fact that this incents the most efficient energy storage technology to participate in the bulk procurement program.

The other component of the Reference Price is the Reference Capacity Price (RCP). The Roadmap recommends utilizing the NYISO locational-specific Installed Capacity (ICAP) spot auction prices to calculate the RCP due to its ease of implementation and high level of participation in the auction which results in an optimal hedging structure. The Roadmap further recommends calculating the RCP by adjusting the monthly

spot NYISO ICAP auction locality price according to the relevant Capacity Accreditation Factor for each duration length of energy storage. The Roadmap contemplates that NYSERDA would publish the final RCP formula that will be used in the solicitations after the NYISO's accreditation process concludes. To balance administrative efforts with maintaining sufficient value for selected bulk energy storage projects, the Roadmap recommends monthly settlements, consistent with previous program designs. The Roadmap also recommends that ISC contracts be designed in a way that allows them to be modified if future wholesale market rule changes alter the available revenue streams to energy storage resources.

The Roadmap recommends that NYSERDA evaluate both price and non-price factors when evaluating bulk energy storage solicitation bids. Price factors would include ISC costs based on zonal energy and spot capacity price forecasts, while non-price factors could include the viability of a project, economic and social benefits, or ability of the project to displace peaking plants. The Roadmap contemplates that NYSERDA would describe such qualitative evaluation criteria in each solicitation. The Roadmap also recommends that the ISC procurements apply a maximum bid price evaluation metric, in the form of a maximum levelized ISC cost, to help protect ratepayers and help in the screening of bids, similar to the Clean Energy Standard (CES) large-scale renewable program procurements.

The Roadmap also recognizes the value of energy storage statewide but notes particular importance in the near-term of locating storage assets in New York City and Long Island. These densely populated areas are home to many of the oldest and highest-emitting peaking power plants in the State, presenting an opportunity for energy storage to help replace these high-pollution-emitting resources.

The most valuable attribute for energy storage resources on the electric system is the ability to quickly provide energy to the grid when needed, including for periods over multiple hours. The Roadmap's analysis indicates that over 4 GWs of 8-hour storage will be needed by 2035, with 70 percent of this sited in New York City and Long Island.

Lastly, the Roadmap suggests that the contract terms for bulk energy storage projects can be renegotiated if there are market rule changes that make the existing terms obsolete or unworkable.

Comments

Most stakeholders, representing various sectors including developers, trade organizations, and utilities, expressed support for adoption of the ISC mechanism. Multiple Intervenors (MI), an unincorporated association of over 55 of New York State's industrial, commercial, and institutional energy consumers, opposes the ISC and adoption of the Roadmap in general, stating the Commission needs to take a holistic look at the cost of the proposed energy storage programs and other Commission approved programs and the negative impact this has on large power consumers and businesses in New York. Alliance for Clean Energy New York (ACE NY), AES Clean Energy Development (AES), New York City (City), the investor-owned utilities, Convergent Energy and Power (Convergent Energy), Hydrostor, Key Capture Energy, New York Solar Energy Industry Association (NYSEIA), NY-BEST, and Rise Light & Power all request that the Commission approve the ISC mechanism. New York City recommends that a performance metric that evaluates energy storage operations be implemented as part of the bulk procurement program, as battery performance is more important than installed MWs of energy storage capacity.

Several stakeholders including NY-BEST, ACE NY, Hydrostor, and Alsym Energy disagree with the Roadmap's recommendation to not include Round Trip Efficiency (RTE) as part of the REAP calculation, as RTE can greatly impact an energy storage resource's charging costs and is reflective of how an energy storage resource operates. NY-BEST suggests an assumed 85 percent RTE for 4-hour energy storage.

Commenters note that one of the biggest unknowns in the bulk storage solicitation process is how much of the contracted MWs will actually proceed through the development and interconnection phase and enter commercial operation. Attrition remains a large problem for bulk energy storage.[43] Noting both the need for 3,000 MWs of bulk energy storage and the historically high attrition rates of bulk energy storage projects, several commenters, including ACE NY, Key Capture Energy, and NY-BEST, recommend accounting for potential attrition as part of the solicitation process. Commenters suggest procuring more than the proposed 1,000 MWs in each of the three planned solicitations and in the event that a project is cancelled, the project's expected MW can be re-allocated to a future solicitation. The City recommends yearly assessments of attrition to ensure sufficient bulk energy storage, especially in New York City, is timely developed.

To help better gauge how likely an energy storage project is to advance from concept to development to operation, several commenters including BlueWave, Convergent Energy, ACE NY, Strategic Project Management (SPM), and NY-BEST recommend implementing maturity milestone requirements as part of the bid evaluation process. These milestones could include having the necessary permits to begin construction or making

[43] 100 MWs of bulk energy storage were withdrawn from NYSERDA's bulk energy storage program during the planning stage.

interconnection queue deposits. The idea behind maturity milestone requirements is that less project attrition occurs because projects that are more advanced in their development and have the necessary permits are more likely to continue to construction and eventual operation.

AES recommends location specific carveouts as part of the bulk procurement process to help direct development of energy storage where they are most needed.

Several commenters, including Bloom Energy, Nucor Steel, AES, Form Energy, and NineDot Energy (NineDot) recognize that long duration storage is critical to New York's clean energy transition and recommend special consideration be given to procuring sufficient amounts of these long duration energy storage resources.

Key Capture Energy comments that limiting ISCs to only days when an energy storage resource is operational may result in unwanted market behavior, and suggests that ISCs should be generated each day an energy storage resource is interconnected to the electric system.

The 15-year contract term proposed in the Roadmap for bulk resources is based on best available information for the typical useful lifespans of common energy storage technologies. Clearway Energy Group and Hydrostor recommend increasing the allowable contract length to at least 20 years or longer to reflect that different energy storage technologies have varied lifespans. Clearway Energy Group also notes that the longer contract term allows developers to amortize their costs over a longer period and in turn receive more favorable financing terms.

NY-BEST, ACE NY, the Independent Power Producers of New York (IPPNY), and Key Capture Energy agree that there should be an avenue available to alter contract terms in the event of a

major new market rule change but cautions that only long-term, sustained price changes should trigger a contract renegotiation, rather than the short-term price spikes and falls, for which the ISC is designed to take into account. Commenters state that any change of contract provisions should be structured to minimize adverse financing outcomes.

Commission Determinations

Index Storage Credit

The Commission is persuaded that the ISC mechanism is a viable path forward for the State to meet its bulk energy storage deployment goals. The ISC mechanism balances the need to provide developers with revenue certainty, so that energy storage projects progress from concept to commercial operation, while protecting ratepayers from overspending on this bulk energy storage program if developer revenues from the wholesale market are more than anticipated. The Commission therefore adopts the ISC mechanism for bulk energy storage procurements as described in the Roadmap and directs NYSERDA to conduct a minimum of three bulk energy storage procurements, to be held no less than annually, to procure 3 GW of bulk energy storage. The Commission directs NYSERDA to issue the first RFP no later than June 30, 2025. NYSERDA shall publish the final RCP formula with its bulk energy storage solicitations, using NYISO's capacity accreditation, and describe the qualitative factors it will evaluate when ranking bids.[44]

Inclusion of Round-Trip Efficiency in the Reference Energy Arbitrage Price

The Commission notes multiple parties' comments advocating for the inclusion of RTE as part of the REAP calculation. After consideration of these comments, the

[44] NYISO, Capacity Accreditation, available at: https://www.nyiso.com/accreditation.

Commission declines to adopt RTE as part of the REAP calculation. The inclusion of RTE creates added complexity as each project, depending on technology and individual operation, will have a different RTE. Instead, developers should incorporate RTE losses and associated revenue impacts as part of their Strike Price bid.

Geographic Carveouts

The Roadmap's analysis made clear, and the Commission recognizes, that different areas of New York State vary in terms of timing and quantity of energy storage. Certain regions, such as Long Island and New York City, are especially ripe for the replacement of peaker plants with energy storage resources and the associated emission reduction directly benefiting those communities. The Roadmap acknowledges the need to carve out 35 percent of program funding for regions with peaker plants in accordance with CLCPA guidelines for disadvantaged communities.[45] Therefore, we address specific geographic carveouts later in this Order where we discuss requirements for disadvantaged communities under General Program Design Considerations.

Duration Carveouts

NYSERDA and Staff's analysis in the Roadmap recognizes that longer duration energy storage resources will be needed to help replace retiring fossil-fueled generation, meet peak demand, and maintain reliability. The Roadmap estimates that over 4 GW of 8-hour energy storage will need to be deployed by 2035 and 6.8 GW by 2050. Acknowledging this need for long duration bulk energy storage in New York, and the amount of lead

[45] The CLCPA defines "disadvantaged communities" as communities that bear burdens of negative public health effects, environmental pollution, impacts of climate change, and possess certain socioeconomic criteria, or comprise high-concentrations of low- and moderate-income households. ECL §75-0101(5).

time it takes to develop these types of projects, the Commission directs NYSERDA to include in each bulk procurement a target of 20 percent of long-duration, 8-hour energy storage resources, to move New York towards installing the necessary amount of LDES by the mid-2030s. This 20 percent target is meant to send a clear signal to developers that LDES is needed in the State and to recognize the amount of time needed for these resources to proceed through the planning, development, and interconnection processes. The Commission also recognizes that, presently, LDES may not be as competitive compared to shorter duration energy storage solely based on cost, but that there are attributes and benefits of LDES that are important to New York's energy transition. Therefore, the Commission directs NYSERDA to include how it would procure and account for the additional attributes and benefits of LDES in its Implementation Plan, as discussed in more detail below.

Operational Requirements

The Roadmap contemplates only crediting ISCs on days when the energy storage resource is operational and available for dispatch. The Commission agrees with this approach. The intent of building out energy storage resources statewide is so that they are available to inject power when it makes economic sense to do so, or soak up excess renewable output. Generating ISC credits for energy storage resources on days when there is no chance for them to benefit the electric system runs counter to this goal. Projects are incented to discharge when it makes economic sense due to the Reference Price component of the ISC calculation; if an energy storage resource does not discharge when market prices are high it will lose out on that revenue and potentially be required to make a payment to NYSERDA. The Commission directs NYSERDA to adopt this operational requirement for the ISC mechanism when calculating the ISC payment.

Additionally, NYSERDA shall describe this requirement in its Implementation Plan.

Contract Term

The ISC contract term proposed in the Roadmap is 15 years. In the Roadmap, Staff and NYSERDA reason that the proposed term of 15 years is appropriate given that it matches the typical lifespan of the lithium-ion batteries frequently utilized for bulk energy storage. The Commission acknowledges that lithium-ion batteries are likely to be the most prevalent energy storage technology type at this point in time, but also recognizes the diversity of energy storage technologies that currently exist, including iron-flow batteries and compressed air energy storage, among others, as well as future technologies that do not yet exist.

Technology neutrality is one of the core principles guiding the State's energy storage deployment policy. In this vein, the Commission does not want to artificially limit contract length terms for technologies that have longer lifespans than lithium-ion batteries. Many of these non-lithium-ion technologies are geared towards achieving long duration output which, as discussed above, are critical to reliably transition New York's energy system. Therefore, the Commission directs NYSERDA to ensure that contract terms for lithium-ion batteries be allowed for terms of no more than 15 years, while contract terms for non-lithium-ion storage technologies be allowed for terms of up to 25 years.

Inflation Adjustment

Consistent with the Commission's finding in the onshore and offshore large-scale renewable energy procurement programs, the Commission adopts the Roadmap's recommendation to allow for a one-time inflation adjustment as part of the bulk energy storage program design. This one-time inflation

adjustment, between the time a project developer submits its Strike Price and the commencement of construction, gives developers an opportunity to reflect new cost realities that were not present at the time of submission of their initial Strike Price bid, such as increased material and labor costs. The long development timeframe of bulk scale energy storage resources, similar to that in the large-scale renewables program, makes this one-time inflation adjustment reasonable. The Commission directs NYSERDA to implement the one-time inflation adjustment as it implements the ISC procurement contracts. Additionally, NYSERDA shall include this requirement in its Implementation Plan.

Maturity Requirement

The Commission wants to minimize the risk of project attrition; each project that fails jeopardizes the achievement of the energy storage goal. A maturity requirement is one way to help reduce project attrition and delay of the deployment of energy storage resources. Given the importance of reducing project attrition, the Commission directs NYSERDA to include certain project maturity requirements in its bulk energy storage solicitations and in its Implementation Plan. At a minimum, the maturity requirements shall include that projects must demonstrate: (1) proof of a completed Coordinated Electric System Interconnection Review; (2) a record of making a 25 percent interconnection deposit or have a signed and executed interconnection agreement if there are no network upgrades needed; (3) possession of all non-ministerial permits; and (4) a review of the project pursuant to the State Environmental Quality Review Act, including a full environmental review if the project does not meet the criteria for a negative declaration. NYSERDA may, in consultation with DPS Staff, choose to require additional maturity milestones in later bulk energy storage

solicitations based on attrition rates from contracted projects in earlier solicitations.

Utility Dispatch Rights Request for Proposals

The Energy Storage Order established the utility bulk storage dispatch rights RFP process whereby the State's investor-owned utilities were required to conduct bulk energy storage procurements, with the goal of contracting for a minimum of 350 MWs statewide, under the framework that the cost of the contracted megawatts was less than the utility-specific bid ceiling.[46] The utility would then maintain operational control of the energy storage resource for the duration of the contract term, the maximum length of which was originally established in the Energy Storage Order. At the end of the contract term, the energy storage resource asset owner has the option to continue operating as a merchant resource in the market.[47]

The Joint Utilities state their support for the continuation of the bulk solicitation program as another tool to use to procure bulk energy storage, and notes that solicitations are currently underway. NYSERDA currently has approximately $68 million in incentive funding allocated for this program still available; the Commission directs NYSERDA to continue to use these funds for this purpose. Therefore, while today's Order approves the ISC mechanism described in the Roadmap, the Commission affirms that utilities shall continue the bulk storage dispatch rights RFP process, and that they can utilize the NYSERDA incentives for this purpose if necessary. The Commission directs Staff to continue to monitor the need to make

[46] Energy Storage Order, p. 55.

[47] Since the establishment of this paradigm, the Commission has issued two modifying Orders to alter the maximum allowable contract term length and in-service date requirements. See 2021 Modification Order and 2023 Modification Order.

any additional modifications to the RFP process based on the results of the current and future bulk storage solicitations.

Retail Energy Storage Procurement Program Design Roadmap Recommendations

The Roadmap notes the continued importance of retail energy storage as a contributor to reliability and the management of peak energy demand on the utilities' distribution networks. The region-specific, declining block incentives for retail level storage, established in the Energy Storage Order, for projects sized 5 MWs or less was successful in procuring 279 MWs of energy storage projects as of March 2024. Recognizing this success, the Roadmap recommends continuing funding for the Retail Storage Incentive and utilizing the same regional declining block structure as described in the Energy Storage Order, with the goal of procuring an additional 1,500 MWs of retail energy storage by 2030. The Roadmap recommends maintaining a high project maturity requirement to reduce attrition of contracted projects. As part of program implementation, the Roadmap recommends sizing funding blocks based on the system benefits of projects as well as the funding requirements for each region; the analysis of system benefits includes whether the project benefits disadvantaged communities and alleviates system bottlenecks. The Roadmap notes that a backlog of mature retail energy storage projects has developed since program funding ran out and recommends the regional funding block sizes reflect this reality so that these mature projects can be commissioned expeditiously.

The Roadmap recommends that NYSERDA provide stakeholders with a detailed analysis of its region-specific incentive rate and forecasts of future incentive rates. The Roadmap posits that this transparency would provide certainty into how NYSERDA calculates the incentive rate blocks, and would

allow developers to plan based on the projected future incentive blocks. Communicating any changes to the incentive blocks to developers is important to help guide investment decisions. The Roadmap further recommends that NYSERDA develop a public-facing calculator for VDER storage projects statewide, to give developers and other stakeholders more knowledge on where in New York energy storage is most valuable under the VDER standard.

Comments

Commenters are generally in agreement regarding the continuation of the region-specific declining incentive block structure, noting its popularity and success. ACE NY recommends an initial block size of at least 750 MWs, as well as establishing a separate incentive block for solar-plus-storage projects in NYISO Zones A-G, noting that paired projects are not subject to demand charges and have additional revenue streams available to them compared to standalone storage. BlueWave supports the declining block incentive structure and recommends a per-project incentive capped at 20 MWh, not the proposed 15 MWh cap, noting the maximum size of 5 MWs for a project and a minimum of 4-hour duration, in addition to the need for maturity thresholds such as having all necessary permits and demonstration of site control for 15 years to limit attrition. Convergent Energy also recommends increasing the incentive cap to 20 MWh and establishing a separate upstate solar-plus-storage paired incentive. The Indicated Utilities, consisting of Central Hudson, National Grid, and NYSEG/RG&E, support the proposed retail storage incentive and comment that program designs should consider how disadvantaged communities will benefit. NineDot supports the proposed retail storage incentive as necessary to provide the missing money for developers, and recommends that a working group form to examine retail storage deployment on Long Island. NY-BEST recommends increasing the

incentive cap to 20 MWh and including maturity requirements for projects to receive awards. Sunkeeper Solar recommends a carveout in the retail storage incentive for projects sized between 100 kW and 1 MW located in New York City, reasoning that smaller projects move quicker through the interconnection process than 5 MW projects.

Commission Determinations

Regional Declining Block Structure Incentive Design

The Commission approves the proposed region-specific declining block retail storage incentive structure as discussed in the Roadmap, with the goal of procuring an additional 1,500 MWs of retail energy storage across New York by 2030. The regional declining block retail incentive design has been shown to be effective, as evidenced by the more than 275 MWs of retail energy storage resources that have been procured since the issuance of the Energy Storage Order. There is no new evidence that would suggest that a departure from this structure would result in increased procurements. The Commission directs NYSERDA to implement the region-specific declining block retail storage incentive structure.

The Roadmap recognizes that there are several hundred MWs of mature retail storage projects that were unable to access the funding approved in the Energy Storage Order before it ran out, and recommends that the first incentive block be appropriately sized to accommodate this expected interest. The Commission declines to establish a specific MW amount for the first and subsequent incentive blocks, leaving that flexibility to NYSERDA based on the most current market conditions, but otherwise agrees with the Roadmap's recommendations. The Commission directs NYSERDA to provide a description of how incentive amounts are calculated and forecasts of future incentive blocks in its Implementation Plan. This information

will be critical for developers to make informed investment decisions and propose projects that will provide the most value to the state's electric system. In the event that NYSERDA considers changing the incentive blocks, it shall consult with DPS Staff and seek stakeholder input. NYSERDA shall document these changes in an updated Implementation Plan.

The Commission also agrees that NYSERDA should develop a publicly accessible calculator for VDER storage projects statewide to maximize the amount of information available for interested stakeholders. The Commission directs NYSERDA to develop this statewide storage VDER calculator as part of its Implementation Plan, as further discussed below, for retail energy storage.

Maximum Incentive Cap

The Commission agrees with certain commenters that 20 kWh is an appropriate upper cap for retail energy storage projects. Limiting the incentive cap to 15 MWh precludes 5 MW projects with a 4-hour duration from receiving an incentive that covers their entire output. Projects sized at 5 MW with 4-hour durations are likely to be prevalent, as 5 MW is the maximum size allowable under the retail storage program, and a 4-hour duration is an industry standard. Given that proposed retail energy storage projects are likely to exceed 15 MWh, the Commission directs NYSERDA to increase the cap for project eligibility to 20 MWh and detail this change in its Implementation Plan. This 20 MWh incentive cap is in line with the size and duration of expected retail energy storage energy and will encourage larger retail-sized projects to apply for the incentive because they will have the ability to inject and withdraw energy to their maximum technical capabilities.

Establishment of Solar-Plus Storage Incentive

Several commenters, including ACE NY and Convergent Energy, request that the Commission create a solar-plus-storage incentive for paired projects located in NYISO Zones A-G. These commenters reason that energy storage resources paired with solar are not subject to demand charges, give greater operational flexibility, and allow for more revenue opportunities through load management. Commenters further note that a solar-plus-storage incentive is more appropriate in Upstate New York, where land is more plentiful and affordable, than compared to the metro New York region of the state, where land is at a premium.

The Commission recognizes the value of storage resources paired with solar but declines to establish a separate incentive for this type of resource at this time. The goal of the Energy Storage proceeding is to achieve 6 GW of statewide energy deployment by 2030. There are programs in New York, including the NY-Sun program, that address making solar energy more accessible to homes, businesses, and communities.[48] The programs, incentives, and budget discussed in the Roadmap, including for retail energy storage, can be used towards procuring either standalone storage or storage paired with solar. Establishing a new incentive for storage-plus-solar resources would be duplicative of already-established programs.

Size Carveout

Sunkeeper Solar advocated for a retail energy storage carveout for projects sized between 100 kW and 1 MW in Zone J, explaining that smaller sized projects can proceed through development and interconnection faster than larger projects. Sunkeeper Solar reasoned that a carveout incentive is needed for

[48] NYSERDA, NY-Sun, available at: https://www.nyserda.ny.gov/All-Programs/NY-Sun.

retail energy storage projects of this size in New York City in order to encourage the installation of more projects. They state that the installation of more projects would lead to the Fire Department of New York (FDNY) gaining additional experience with evaluating energy storage safety issues.

The Commission declines to establish a retail energy storage carveout incentive for 100 kW- to 1 MW-sized projects in Zone J at this time. While smaller sized projects historically have had shorter development and interconnection timelines than their larger counterparts, deployment of retail sized energy storage of all sizes, up to the 5 MW limit, is important not only in Zone J but statewide as well. Establishing a carveout incentive for smaller sized retail energy storage would send the signal that this sized project is preferable in New York City, which is not the case. All retail energy storage, regardless of size, will be important in getting the State to meet its energy storage deployment goals. The additional challenges with permit acquisitions and interconnection for larger projects in New York City will need to be worked through with the appropriate stakeholders and will serve as learning opportunities for future retail energy storage deployments. Similarly, FDNY's experience with evaluating energy storage safety is paramount. However, as there are other avenues to address these concerns, these factors do not warrant a carveout incentive for smaller resources.

Residential Energy Storage Procurement Program Design Roadmap Recommendations

The Roadmap notes that, up until this point, the focus on residential energy storage deployment in New York has been on Long Island, where LIPA's tariff allows for residential storage to provide system services such as peak load management. However, demand for residential storage exists across New York. Although its potential contribution to achieving the statewide

storage deployment goal is relatively small, residential storage is important as it can provide local service benefits, including improving resiliency for residential customers in disadvantaged communities. Given the benefits of residential energy storage, the Roadmap recommends launching a statewide residential storage program with a focus on maximizing local benefits, especially for disadvantaged communities, with funding for 200 MWs available through 2030. The Roadmap recognizes that this program would require coordination across existing programs at NYSERDA and the need to design and plan the program specifics with the State's investor-owned utilities.

Long-term visibility of funding will be important for residential energy storage developers to maximize deployment and educate customers on its benefits. The Roadmap therefore recommends the program design allow for the availability of large blocks of funding at stable incentive rates over a minimum of one year. Any changes to the incentive levels should be communicated with plenty of lead time so that developers and homeowners can make informed decisions about whether or when to participate. The Roadmap further recommends that incentives be provided to the project developer upfront, rather than as a rebate, so that homeowners do not have to pay for the full cost of the project before installation.

The Roadmap recommends that program funding come from ratepayers statewide. To that end, the Roadmap recommends exploring how residential energy storage can provide system-wide benefits through aggregations for demand response programs, and that the Joint Utilities should examine opportunities for residential storage in their respective service territories that will maximize the storage resource's value. Participation in the NYISO's wholesale markets in a DER aggregation is an additional potential avenue for residential storage to achieve

statewide system benefits. No operational or aggregation requirements are recommended in the Roadmap. Instead, the focus is on projects that benefit disadvantaged communities and building out the network of residential energy storage as a flexible grid asset.

Comments

Commenters generally support the creation of a statewide residential storage program, with some offering recommendations for changes to specific aspects of the Roadmap's proposal for a residential energy storage program. ACE NY recommends that the initial block size for residential and retail incentives be at least 750 MWs, noting that NYSERDA has discretion to change as needed. It also recommends that 35 percent of the 200 MW residential storage projects be located in disadvantaged communities, consistent with CLCPA directives. DER Parties, composed of Sunrun Inc, PosiGen Inc, SunPower Corp, and Tesla, support the Roadmap recommendation to expand the residential storage program statewide and to provide an upfront incentive for developers to support early adoption, with an added incentive for projects located in disadvantaged communities. DER Parties and the NYSEIA highlight the need for the Joint Utilities to explore programs such as "bring-your-own-device" that would allow customers to participate in utility load reduction programs, like the program that is currently approved in LIPA's service territory. DER Parties agree with NYSEIA that the Roadmap's target of procuring 200 MWs of residential energy storage is too low, and recommend increasing it to 400 MW to reflect the need and demand for this resource more accurately.

Commission Determinations

Installation of residential energy storage provides numerous benefits to New Yorkers, including providing backup

power during power loss events, allowing for participation in utility load management programs, and charging power for electric vehicles. The potential for residential energy storage to positively impact disadvantaged communities further highlights the importance of establishing a statewide residential energy storage program. Therefore, the Commission adopts the Roadmap's recommendation to launch a statewide residential energy storage program, to be administered by NYSERDA. Funding for the program will be available until at least 2030 to support the buildout of 200 MWs of residential energy storage across New York, with a minimum of 35 percent of funding dedicated for projects in disadvantaged communities. NYSERDA shall include the details of this program in its Retail/Residential Implementation Plan.

Size of Program

The Commission declines to increase the residential energy storage target to 400 MWs, as was requested by DER Parties and NYSEIA. As described in the Roadmap, 200 MWs is an appropriate statewide target, balancing the need for deploying residential energy storage statewide to maximize benefits for homeowners and disadvantaged communities, with achieving sufficient energy storage buildout to meet the 6 GW goal by 2030. Experience gained through this first iteration of a statewide residential energy storage program will inform any subsequent modifications to size and incentive structure. As such, the adopted 200 MW target should be viewed as an initial goal, and if additional funding allotments for residential energy storage is necessary based on demand and pace of deployment, the Commission may consider such requests and increase the target and funding at that time.

Residential Energy Storage in Disadvantaged Communities

The Commission agrees with the Roadmap's observation, and Commenters' suggestion, that residential energy storage can play a role in maximizing local benefits in disadvantaged communities. The small size of residential energy storage makes it a potential tool for residential customers to participate in utility demand response programs, allowing customers to earn money for shifting their electricity demand to off-peak hours while helping the utility company manage their distribution system. Additionally, the Commission is already considering the participation of residential energy storage in demand response programs.[49] The Commission notes that the Joint Utilities were directed to submit proposals for including energy storage in their Direct Load Control Programs in their 2024 annual report and expects that this process will help to enable a path for residential energy storage to participate in utility demand response programs.

WHOLESALE MARKET ACTIONS
Roadmap Recommendations

It is vital that wholesale market rules and revenue opportunities work in conjunction with retail-level programs and revenue streams to help achieve state policy goals for energy storage at a just and reasonable cost. The Roadmap notes that the ITC, available under the Inflation Reduction Act, will provide significant support for storage projects, but is still insufficient to cover the costs of developing energy storage. The Roadmap further states that wholesale market revenues are currently inadequate to support the energy storage development needed. Wholesale market revenue is a key input into the

[49] Case 14-E-0423, Dynamic Load Management Programs, Order Directing Dynamic Load Management Program Changes (issued March 15, 2024), pp. 18-9.

calculation of the REAP and RCP, highlighting the need to ensure wholesale prices accurately reflect system needs. Working with the wholesale market operator and its stakeholders to close these gaps and align market rules with state policy goals remains a critical part of achieving these goals most efficiently.

The Roadmap states that energy storage projects can increase efficiency on existing transmission lines by injecting and absorbing energy, which could defer the need for system upgrades. Storage resources can also help stabilize power flows, allowing operators to avoid more costly operations. Energy storage can also be incorporated into planning processes to reduce the cost of transmission investment.

The NYISO and its stakeholders are currently working on a project, Storage as Transmission, which was originally proposed by NYSERDA.[50] This project seeks to evaluate potential use cases and market rules for storage to participate and receive compensation for participating as a transmission asset. Current market rules only allow storage to act as a generation asset that can both inject and withdraw energy; there are no wholesale market rules that would facilitate a storage project that wishes to act as, supplement, or replace the need for transmission investment. The Roadmap recommends that any storage as transmission projects deployed in the NYISO transmission planning processes count toward the 6 GW target.

The Roadmap also notes that from 2023 to 2025, significant amounts of fossil fuel plants are likely to retire due to the DEC Peaker Rule. The retirement of these plants will

[50] NYISO, Storage as Transmission, November 2023, available at: https://www.nyiso.com/documents/20142/41393553/Storage%20as%20Transmission%20Report.pdf/5c4d7649-2fb7-e165-2aae-999863f7f9cf.

tighten supply and increase supply scarcity. However, as more renewable resources enter the market, this may also lead to periods of low or negative pricing. These pricing outcomes may provide opportunities for energy storage resources to charge from the grid.

The Roadmap notes that the elimination of buyer-side mitigation for storage resources has been a large step in reducing barriers and providing more certainty to storage projects. However, other considerations in the capacity market remain. For example, the NYISO recently updated its capacity accreditation model for all resources, including storage. The Roadmap states that long-duration storage maintains high value over time with increased penetration on the grid, while the value of short-term storage declines more rapidly with increased penetration on the grid. This increased penetration of renewables on the grid over the course of several years has the opportunity to provide synergistic effects to the value of storage which could be accounted for as part of the accreditation process.

The Roadmap acknowledges that the New York State Reliability Council will have to consider changes to the Installed Reserves Margin process.[51] The current methodology for scaling load shapes and load forecast uncertainty can result in unreasonably high and long peak forecasts, which could lead to undervaluing shorter-duration resources, including storage.

Improvements to NYISO ancillary services market pricing and market products can give opportunities to better compensate storage for the value they can provide to the grid.

[51] The New York State Reliability Council is a not-for-profit that develops rules for participation in the New York State Power System. New York State Reliability Council, available at: https://www.nysrc.org.

The Roadmap notes that the external market monitor for the NYISO has proposed ancillary service market enhancements that would benefit storage.

The Roadmap states that, while the capacity market plays a role in valuing storage, the most significant focus should be on improvements to the energy and ancillary services market. Specifically, as more renewables come online, new market products are likely to be necessary including a ramping product, reactive power, synthetic inertia, and more granular energy or reserve products. The need for these products is already being investigated by the NYISO and its stakeholders in its Balancing Intermittency project, and in other efforts.

Comments

The NYISO supports storage resources participating in its wholesale markets and states that wholesale market signals "provide the foundation for economically efficient storage." However, it cautions that, while storage will play a vital role in the energy transition, long-duration energy needs will materialize that require long-duration solutions. The NYISO also states that deploying energy storage resources in excess before sufficient renewable generation is online could lead to inefficient charging scenarios and ultimately result in higher electric demand and potentially higher prices. The NYISO also requests that Staff and NYSERDA encourage energy storage resources to provide ancillary services to the grid in its markets. Finally, the NYISO encourages Staff and NYSERDA to participate in the stakeholder process in the Storage as Transmission project.

Form Energy notes deficiencies in ability of the NYISO markets to value storage and allow full participation. It states that there is currently no market incentive for multi-day

storage and there is no way for a storage asset to participate as both a transmission and a generation asset.

ACE-NY, EnSynchrony, NY-BEST, and SPM all support allowing storage to participate as a transmission asset, such as in the NYISO's Storage as Transmission project. NY-BEST and SPM do not support the counting of any energy storage resources as transmission projects toward the 6 GW goal. NY-BEST states that such projects are fulfilling needs beyond what originally drove the 6 GW goal and should not be used to reduce storage programs outlined in the Roadmap. If storage as transmission is counted against the goal, NY-BEST asks that reductions in programs be based solely on contracted projects, not just planned projects.

Commission Determinations

The Commission recognizes the importance of aligning incentives and goals with the wholesale markets as well as utilizing all options to enable energy storage to both participate and offer its full value to the grid. Staff and NYSERDA already engage in coordination efforts with the NYISO and participate in NYISO stakeholder meetings. The Commission directs Staff and NYSERDA to continue these efforts; specifically, Staff and NYSERDA shall help facilitate the recommendations and goals described in this Order with focus on the items discussed below.

The Commission recognizes that the NYISO is currently working on projects that will affect energy storage participation in the wholesale markets, including the Storage as Transmission and Balancing Intermittency projects. The Commission supports the NYISO's efforts to evaluate potential new participation options for energy storage resources. For example, the Storage as Transmission project has the potential to provide a new participation option for energy storage resources that will further allow energy storage resources to

provide services to the grid beyond generation. The Commission encourages the NYISO to continue efforts on this project. The Commission directs Staff and NYSERDA to continue their participation and engagement on the NYISO's efforts related to the participation of energy storage as transmission.

The Roadmap recommends that any energy storage projects that are developed and participate as a transmission asset count toward the 6 GW goal. The Commission recognizes that an energy storage project providing a transmission service is helping meet electric system needs in New York. The Commission disagrees with those commenters that characterize storage-as-transmission as fulfilling needs beyond what was originally intended with the 6 GW goal. The Commission believes that we should recognize that energy storage helps to meet New York's renewable and zero-emissions energy goals in ways beyond simply acting as a generation asset. Therefore, any future storage as transmission projects shall be counted toward the 6 GW goal.

The NYISO's Balancing Intermittency project seeks to evaluate the future need for ancillary service products as more intermittent renewable generation connects to the grid.[52] This project has the potential to help New York find further value of energy storage in its ability to meet ancillary service needs. The Commission supports this project and encourages the NYISO to continue work on this effort. The Commission encourages the NYISO to take advantage of the capabilities of energy storage resources to help meet any ancillary service needs of the

[52] NYISO, Balancing Intermittency, January 25, 2024, available at: https://www.nyiso.com/documents/20142/42590322/BI%202024%20MIWG%20Kick%20Off_final.pdf/ac2f0112-f542-f4da-3c9c-f43d0309868f.

system. The Commission directs Staff and NYSERDA to continue their participation and engagement on this project.

GENERAL PROGRAM DESIGN CONSIDERATIONS

The program designs described within this section apply to the bulk, residential, and retail programs discussed above.

Prevailing Wage

Roadmap Recommendations

The Roadmap describes the Inflation Reduction Act and its provision dictating that commercial energy storage systems with a capacity of 1 MW alternating current (AC) or greater are eligible for an up to 30 percent ITC rate if the project complies with federal prevailing wage and apprenticeship requirements; such projects would otherwise only be eligible for a 6 percent ITC rate. Given the substantial financial support offered by the ITC if a project follows federal prevailing wage and apprenticeship requirements, the Roadmap notes the likelihood that a large majority of the energy storage developers, if not all, will adhere to these requirements and obtain the full ITC credit.

Comments

NineDot and NY-BEST support a prevailing wage requirement that aligns with federal standards.

Commission Determination

A requirement for developers to pay the prevailing wage is already in place for NYSERDA's Large-Scale Renewable REC procurements, and for NY-Sun projects 1 MW AC and above. The Commission finds that this requirement is also appropriate for this updated energy storage goal and deployment policy. Therefore, the Commission directs NYSERDA to ensure that developers of any energy storage project with a capacity of 1 MW AC or more that participates in a NYSERDA energy storage

incentive program pay the New York State Prevailing Wage, and that this requirement be explicit in any awarded contract, with quarterly certifications by a New York State-licensed Certified Public Accountant during the construction of the project. NYSERDA shall include details of this requirement as part of its Implementation Plan.

Periodic Review
Roadmap Recommendations

In compliance with PSL §74, the Energy Storage Order established a process by which DPS Staff prepares an annual report and a triennial review for Commission consideration. These processes are intended to provide stakeholders with regular updates on the status of energy storage deployment in New York and potential market and policy changes. The importance of providing periodic reports to stakeholders should continue in the coming years, as federal rules evolve, and the Coordinated Grid Planning Process and Grid of the Future proceedings play out.

Comments

Con Edison and O&R support a periodic review of the energy storage proceeding to keep current with current market trends and energy storage installation progress. NineDot, NY-BEST, and SPM recommend an annual review process to evaluate the progress towards the 6 GW target.

Commission Determination

Recognizing the success of the review process established in the Energy Storage Order and its continued importance in the future, the Commission directs Staff to continue the annual reporting and triennial review requirement. The Commission directs Staff to continue to report on both the successes and barriers to energy storage deployment in New York and offer solutions, as appropriate.

Rollover of Project Funds
Roadmap Recommendations

The Roadmap notes that retail and residential storage projects historically have had low rates of attrition. However, even if a project is cancelled, it is possible that the funds that were allocated to the cancelled project could be reallocated to a different project in a timely manner. The Roadmap therefore recommends that any funding from cancelled retail and residential energy storage projects be made available to new projects. For bulk projects, where there is a longer development time, rolling over funds to a new project may not result in a timely completion of a new bulk energy storage project by the 2030 target; therefore, the Roadmap does not recommend the same reallocation of funds for bulk storage projects.

Comments

NY-BEST and SPM recommend that if any projects that are under contract in the existing energy storage programs drop out, those MWs and funding be rolled into the new program.

Commission Determination

The Commission notes that the goal is to install 6 GW of energy storage statewide by 2030. If projects drop out, leaving unclaimed funding, it is appropriate for other qualified projects to step in and make use of that funding in order to move the State closer to its goal. Considering the recommendations in the Roadmap, and stakeholder comments, the Commission directs that any funding from cancelled retail and residential projects be rolled over to new projects.

Disadvantaged Communities
Roadmap Recommendations

The CLCPA is clear that in determining what path to take to reach its ambitious climate goals, New York must

consider how such actions impact disadvantaged communities.[53] The Roadmap's vision and plan of reaching 6 GW of storage statewide by 2030 aims to benefit disadvantaged communities by bolstering resiliency through local system benefits and help maximize the use of intermittent renewable generation. Bulk and off-site retail energy storage projects will inject energy directly onto the transmission and distribution systems, which provides zonal benefits, including helping reduce the emissions associated with peaker plants. The Roadmap recommends that 35 percent of program funding be used in areas which benefit disadvantaged communities the most and target peaker plant replacement with clean energy alternatives, consistent with the requirements of the CLCPA.[54]

Comments

Multiple parties commented on the importance of designing energy storage programs with explicit attention given to how these projects will improve quality of life in disadvantaged communities. AES supports the Roadmap's proposal to allocate at least 35 percent of program funding to energy storage projects that will benefit disadvantaged communities. BlueWave states the importance of allocating 35 percent of funding for the bulk storage program to disadvantaged communities to achieve equity. DER Parties comment that increased rebates may be necessary for projects located in disadvantaged communities due to higher financing, electrical upgrade, and marketing costs. The Indicated Utilities state their support for retail and residential projects to locate in disadvantaged communities and encourage engaging these communities to receive input, and possibly create additional

[53] ECL §75-0109.

[54] ECL §75-0117.

incentives to encourage development of energy storage in disadvantaged communities. IPPNY supports 35 percent of funding for bulk energy storage projects locate in disadvantaged communities that can help displace fossil-fuel generation. Jupiter Power recommends that any project located in Con Edison's service territory or LIPA be considered as benefiting a disadvantaged community. PowerFlex agrees with the Roadmap's recommendation to allocate 35 percent of program funding for energy storage projects that benefit disadvantaged communities and suggests an appropriate $/kWh adder for these projects to incentivize grid resources in these areas. The PEAK Coalition advocates for at least half of the 6 GW of proposed energy storage, with a minimum of 2 GW of bulk energy storage, to be located in New York City where there is a large portion of the population that live in disadvantaged communities near high polluting peaker plants. The PEAK Coalition also states that this investment of energy storage in New York City will help reduce the amount of pollutants to which residents are exposed.

Commission Determination

The Commission remains committed to transforming New York's energy system in a way that invests in disadvantaged communities to improve air quality in these areas of the State. Consistent with this commitment, the Commission agrees with the Roadmap's recommendation to allocate a minimum of 35 percent of program funding for energy storage projects in areas of the State that will most benefit disadvantaged communities and reduce reliance on high-emitting peaking plants. As broken down below, the Commission expects that these projects will be located within disadvantaged communities themselves, as defined by the Climate Justice Working Group and adopted in March 2023, but recognizes that energy storage projects need not be located directly in a disadvantaged community to provide benefits to

that community. The Commission directs NYSERDA to include details in its Implementation Plans that address disadvantaged community considerations as part of program participation.

Bulk and off-site retail energy storage can help reduce emissions in disadvantaged communities and therefore the Commission directs that a minimum of 35 percent of procurements for bulk and off-site retail energy storage projects be located in NYISO's G-K Capacity Zones, as they are most likely to benefit disadvantaged communities and reduce peaker plant emissions. The Commission expects Zone J to be the largest source of potential peaker plant replacement and disadvantaged community benefits. Therefore, the Commission further specifies that of the minimum of 35 percent of energy storage procurements allocated for bulk and off-site retail energy storage projects in Zones G-K, at least 30 percent of total procurements shall be in Zone J and at least 5 percent shall be in Zones G, H, I, and/or K. These carveouts recognize that the largest potential pool of peaking plant replacement is in New York City, while also acknowledging that other areas of the State are deserving of energy storage investment based on benefits to disadvantaged communities and associated emission reductions.

On-site retail and residential energy storage projects will provide benefits directly where they are installed. The Commission therefore directs that a minimum of 35 percent of procured energy storage for residential and on-site retail energy storage projects be located within disadvantaged community census tracts, consistent with CLCPA requirements and findings from the Climate Justice Working Group.

In-Service Date

Roadmap Recommendations

The Roadmap proposed that any energy storage projects procured through the bulk, retail, and residential programs

discussed above be required to be in-service by December 31, 2030, but noted that projects procured after the three initial bulk energy storage solicitations with an in-service date after 2030 should still be eligible to participate.

Comments

No stakeholders commented on an in-service date requirement.

Commission Determination

The Roadmap was designed with the intent to procure 3 GW of bulk energy storage, 1,500 MWs of retail energy storage, and 200 MWs of residential energy storage by 2030. The remaining 1,700 MWs, as stated in the Roadmap, is already under contract or has been awarded by NYSERDA. The 2030 date originated in the CLCPA which requires that 70 percent of electricity generation come from renewables by 2030, and 100 percent by 2040. This necessitates the interconnection of energy storage resources onto the grid to help meet load when renewable generation is not producing energy. As such, the Commission requires that any bulk, retail, or residential energy storage projects that access funds made available through this Order be in-service by December 31, 2030. This required in-service date is consistent with the State's energy policy and goals and language of the CLCPA. The Commission does recognize the uncertainty inherent with energy storage development at this time, and therefore gives NYSERDA the ability to extend this in-service deadline for projects that have been delayed due to conditions beyond the control of the developer, based on proof that the project construction has commenced on or before December 31, 2030. This flexibility is geared towards achieving an effective buildout of energy storage in New York.

The Commission also recognizes that there may be certain projects that either received or may receive funding as

part of the Energy Storage Order that are not yet in-service. These projects, under the parameters of the Energy Storage Order, are required to be in-service by December 31, 2025. Employing the same rationale as above, the Commission grants NYSERDA the flexibility to allow for an in-service date beyond the December 31, 2025 deadline for energy storage projects receiving funding through the Energy Storage Order that have been delayed due to conditions beyond the control of the developer, based on proof that the project construction has commenced on or before December 31, 2025. The objective of the energy storage programs is to help transition New York to a zero-emissions generation future, and therefore allowing energy storage projects to come in-service beyond prescribed deadlines based on proof of construction progress is consistent with this objective.

The Commission directs NYSERDA to reflect these in-service dates in its Implementation Plan and program manuals.

OTHER ISSUES

The issues discussed in this section are not specific to the bulk, residential, or retail programs but are relevant to the Commission's energy storage policies as a whole. Additionally, several parties raised specific topics and issues that warrant the Commission's consideration.

NYPA and LIPA Participation in Storage Procurement Programs Roadmap Recommendations

The Roadmap recommends that NYPA and LIPA voluntarily participate in the bulk energy storage procurement programs, by accepting ISC allocations in proportion to their share of statewide load in the bulk program. Consistent with the approach in the Offshore Wind Standard, in the event that LIPA or NYPA directly procure or develop bulk energy storage projects outside of the NYSERDA procurement program, NYSERDA would take

such independent storage procurement into account in its assessment of amounts of bulk storage needed through its solicitations. Such projects, subject to meeting the requirements of the storage program, could be credited towards their load share compliance obligation.

For the retail and residential procurement programs, the Roadmap recommends that NYPA and LIPA voluntarily participate in collections on a MWh load share basis as well, consistent with previous programs.[55]

Comments

The City states that if NYPA agrees to voluntarily participate in the energy storage programs, then the Commission should make clear that NYPA customers are eligible to participate in the programs and access the relevant incentives. Convergent Energy, NY-BEST, and FreeWire Technologies (FreeWire) support the inclusion of NYPA in the energy storage programs.

In its comments, NYPA states its opposition to voluntary participation, claiming that it has no way to recover program costs through its existing contracts with customers. Instead, NYPA requests that the Commission consider alternative ways for NYPA to recover the program costs.

LIPA recommends that the bulk energy storage program allow for participation by tax-exempt utilities. LIPA states that, if it decides to participate in the proposed bulk program by purchasing its allocated ISCs, it would enter into a contract with NYSERDA and have its cost share reduced by the amount of bulk energy storage capacity separately procured by LIPA through its own solicitations.

[55] Case 20-M-0082, Proceeding on Motion of the Commission Regarding Strategic Use of Energy Related Data, Order Implementing an Integrated Energy Data Resource (issued February 11, 2021), p. 19.

Commission Determination

The Commission recognizes that NYPA and LIPA are involved in many activities that move New York closer to meeting its CLCPA targets, including the development of energy storage, and notes that NYPA and LIPA are non-jurisdictional Load Serving Entities (LSE). Accordingly, the Commission adopts the Roadmap's recommendation that both NYPA and LIPA voluntarily participate and accept ISC allocations proportional to its share of Statewide load for the bulk program. That said, recognizing that NYPA and LIPA have the demonstrated ability to develop/procure bulk storage projects, NYSERDA shall take such independent storage procurement into account in its assessment of amounts of bulk storage needed through its solicitations. Such projects, subject to meeting the requirements of the bulk storage program, shall be credited towards NYPA and LIPA load share compliance obligation. This process shall be described in NYSERDA's Implementation Plan.

As for the residential and retail programs, the Commission encourages LIPA to voluntarily participate in both by accepting its MWh load share cost allocation as described in more detail later in this Order. Doing so would make LIPA customers eligible for the NYSERDA residential and retail storage program incentives. As for NYPA participation in these programs, the Commission shall allow participation by requiring cost recovery through electric utility delivery rates that NYPA customers are subject to, as described in more detail later in this Order.

New York Municipal Power Association (NYMPA)
Roadmap Recommendations

The Roadmap recommends a funding mechanism for the bulk energy storage procurement program that would impose a

payment obligation for all jurisdictional LSEs proportional to their share of statewide load.

Comments

NYMPA opposes the load-ratio share funding mechanism and claims it would have a disproportionately negative effect on its members, citing the already high costs of Clean Energy Standard compliance on its overall small size of member systems. NYMPA further comments that all of the power its members consume comes from zero-emissions sources, the bulk of which is from renewable energy. NYMPA states that, if the Commission does keep the load-ratio share methodology, only NYMPA load not served by renewables should be counted.

Commission Determination

The Commission disagrees with NYMPA that its members should not be allocated costs based on the load-ratio share methodology discussed in the Roadmap. The benefits of transitioning to an energy system comprised of renewable energy will accrue to all New Yorkers, including the NYMPA's member systems. Because its members will receive the benefits of increased renewable generation output, such as decreased emissions from electric generation, it stands to reason that its members should be allocated costs in the same manner as other Commission-jurisdictional LSEs. The Commission therefore declines to exclude NYMPA load from the cost allocation of the NYSERDA bulk energy storage procurement program.

Utility Ownership of Energy Storage Systems

Roadmap Recommendations

The Energy Storage Order reaffirmed the policy of prohibition against utility ownership, except in limited circumstances, as adopted in the Reforming the Energy Vision

(REV) Framework Order.[56] The Roadmap recommends that the Joint Utilities study the potential of energy storage to provide non-market transmission and distribution services and identify energy storage projects that can provide cost-effective services compared to alternatives. The Roadmap further details how the Advanced Technology Working Group should address this topic, potentially in a newly formed subgroup focused on energy storage's future role in providing grid services.

Comments

IPPNY, NY-BEST, and ACE NY all state their opposition to utility-owned storage, arguing that there is a growing and robust private storage market emerging in New York and that utility-owned storage would negatively impact this burgeoning industry.

The Indicated Utilities propose that utility-owned storage for non-market applications be allowed and count towards the 6 GW goal. The Indicated Utilities highlight the ability of utility-owned storage to lower cost of capital, quickly address system constraints, and bolster reliability and resiliency as reasons why it should be allowed under the energy storage program. The Indicated Utilities reiterate comments they submitted in the CLCPA Proceeding, in which they highlight five utility ownership use cases in support of the transmission and distribution system, including co-locating at utility infrastructure, operationally complex reliability/resiliency projects, real-time operations/controls integration,

[56] Energy Storage Order, p. 43; see also Case 14-M-0101, Reforming the Energy Vision, Order Adopting Regulatory Policy Framework and Implementation Plan (issued February 26, 2015) (REV Framework Order).

transmission applications/system integration, and mobile energy storage systems.[57]

Commission Determination

The Commission agrees with certain commenters that presently there is no reason to reverse precedent on utility-owned storage. The Energy Storage Order examined the issue of utility ownership of energy storage. Referring to the REV Framework Order, the Energy Storage Order confirmed the following four limited situations where utility ownership of energy storage may be considered: (1) Procurement of DER has been solicited to meet a system need, and a utility has demonstrated that competitive alternatives proposed by non-utility parties are clearly inadequate or more costly than a traditional utility infrastructure alternative; (2) a project consists of energy storage integrated into distribution system architecture; (3) a project will enable low or moderate income residential customers to benefit from DERs where markets are not likely to satisfy the need; or (4) a project is being sponsored for demonstration purposes.[58] The rationale in the REV Framework Order and Energy Storage Order continues to hold, and the Commission finds no need to stray from that established precedent.

That notwithstanding, the Commission does recognize the potential of energy storage as a transmission and distribution asset. According, consistent with the Roadmap's recommendation, the Commission directs the Joint Utilities to conduct a study of the non-market transmission and distribution services that energy storage projects can provide. This should include an in-depth engineering and economic review of the

[57] Case 22-M-0149, Proceeding Implementing CLCPA Requirements and Targets, JU Comments (filed August 10, 2022).

[58] Energy Storage Order, p. 43; REV Framework Order, p. 69.

applications that energy storage could provide to the utility as it fulfills is obligations to provide safe and reliable service in the most efficient and effective manner. The results of the study shall be filed with the Commission within 120 days of this Order. The study should include how utilities' system planning and operating procedures would be modified to incorporate energy storage as an alternative tool in the toolbox if applicable. In addition, the filing should include a proposed process for the review and approval for such projects, as well as a cost recovery mechanism, if such a process does not align with the normal rate case schedules.

Vehicle-to-Grid
Roadmap Recommendations

The Roadmap recognizes the potential value of vehicle-to-grid (V2G) services. V2G is the allowance of power stored in EV batteries to discharge back onto the grid and act as a power resource. If there are two million EVs in New York by 2030, there may be up to 14 GW of stored energy, collectively, in the vehicles' batteries. Even on a small scale, the energy from participating EVs could equate to hundreds of MWs of available capacity to inject into the grid when most needed. The Roadmap notes that NYSERDA's Clean Transportation Program, federal initiatives such as the New Electric Vehicle Infrastructure program, and New York's Make-Ready Program are focused on EV infrastructure development and opportunities for V2G integration. The Roadmap suggests that those venues are more appropriate for further work on this topic than the Commission's energy storage proceeding.

Comments

Fermata Energy and Nuvve recommend that the Commission consider adopting a V2G deployment target and incentives for bidirectional charging infrastructure. They explain that

bidirectional charging infrastructure can help increase grid flexibility. NineDot recommends that V2G project charger costs be eligible for incentives through the retail storage program. NY-BEST recommends that DPS and NYSERDA collaborate with the industry to create new programs or develop existing ones, such as those approved in the Make Ready Program, to incentivize bidirectional chargers and update utility tariffs that reflect the value of V2G services. The Indicated Utilities recognize the potential value of V2G but do not recommend establishing a specific V2G target or incentive through this proceeding.

Commission Determination

The Commission recognizes that establishing pathways for V2G services would be an opportunity for New York to harness the full capability of EVs to provide electric capacity to the grid during high stress times. However, the Commission agrees with the Roadmap that there are existing forums that are more appropriate for advancing this technology, including through other proceedings underway at this Commission. Therefore, at this time, the Commission declines to establish a V2G deployment target or incentive for bidirectional charging infrastructure in this proceeding.

Establishment of a BTM Energy Storage Incentive

Roadmap Recommendation

The Roadmap made no recommendation on the establishment of a Behind-the-Meter (BTM) energy storage incentive for the retail energy storage program.

Comments

Con Edison and O&R (collectively, the Companies) recommend that the Commission direct the Companies to develop a BTM energy storage incentive under the retail program, with input from Staff and NYSERDA. The Companies state that the creation of a BTM incentive will benefit disadvantaged

communities by giving customers a better opportunity to manage their electric load, especially when paired with DERs. The Companies state the importance of education and outreach in the communities where these projects may be located, and for developers that are able to implement these projects. The Companies note that BTM installations generally have lower interconnection costs because they are behind an existing meter. The Companies request that the Commission direct them to file a BTM storage incentive implementation plan within 90 days of this Order, and that implementation and incentive costs for the program be recovered over 15 years as a regulatory asset.

FreeWire comments on the importance of BTM storage at commercial and industrial facilities and recommends establishing BTM retail energy storage procurement targets and incentives specific to BTM storage at non-residential sites. FreeWire states that BTM energy storage has a number of benefits including energy use and cost management, increased site resiliency, allowance for load shifting, the ability to aggregate into a Virtual Power Plant, integration of renewable energy output, and helping defer location-specific system upgrades.

Convergent Energy strongly agrees with the Companies' assessment of the value of BTM energy storage and recommends a separate adder for BTM energy storage in the retail program. Convergent Energy also states that retail BTM energy storage larger than 5 MW is beneficial for the local grid and that the Commission should consider incentivizing larger sized BTM projects.

NineDot recognizes the potential value of BTM energy storage but does not recommend a separate incentive be established for this resource class, highlighting that the technology type is still in its nascency and that the market for

this technology is relatively immature. NineDot recommends community-scale front-of-the-meter projects as a better investment of ratepayer funds.

NY-BEST opines on the value of BTM energy storage for ratepayers and the grid. It is supportive of the Companies' proposal to create a new BTM storage incentive, assuming that the program would be funded by the utilities and so long as the program is in addition to the Roadmap's proposal for the retail energy storage program.

Commission Determination

The Commission understands that BTM energy storage can provide reliability and resiliency value to disadvantaged communities and other segments within the proposed retail energy storage program, but declines to establish a BTM energy storage incentive, as requested by the Companies. The proposed retail energy storage program, as described in the Roadmap, provides more direct system benefits than a BTM program would, since the retail projects are expected to be standalone storage projects built in locations that provide the most economic price signals, and therefore system value, via the Value Stack mechanism. Conversely, larger retail customers have customer-specific retail rate options that provide incentives to install BTM storage for peak load management via reduced bills. The Commission believes that the front-of-the-meter retail program will provide system benefits in a more efficient manner as it builds upon the successful CDG model. That said, the Commission directs that Staff, as part of its annual reporting requirement discussed above, capture the status of deployment of retail BTM energy storage to the extent possible, and highlight any challenges, barriers, and successes.

Bridge-to Wires
Roadmap Recommendations

The Companies proposed a Bridge-to-Wires (BTW) mechanism under the existing UDR framework. The proposed BTW mechanism intends to target energy storage development in specific areas of the Companies' service territory, add capacity when and where needed, and relocate the energy storage resource as needed and appropriate to aid in the electrification of other areas of the Companies' service territory. The Roadmap made no recommendation on the establishment of a BTW mechanism under the existing UDR framework.

Comments

The Companies propose the creation of a new BTW mechanism under the UDR framework. The Companies explain that BTW procurements under UDR would add peak capacity at constrained locations on their system, enabling faster end-use electrification compared to building out traditional infrastructure meant to serve increased load. The Companies state that such storage systems could be relocated as necessary to other locations on their system to further enable electrification. The Companies cite increased opportunities for developers to propose projects under their proposed BTW mechanism and request authorization from the Commission to submit an Implementation Plan detailing the BTW proposal.

NY-BEST responds in its reply comments that, while it recognizes that energy storage can play an important role in enabling faster electrification, it remains opposed to utility ownership of storage.

Commission Determination

The Commission sees the potential value of the Companies' proposed BTW mechanism in maximizing the benefits of energy storage by relocating energy storage resources as needed on the Companies' system. However, at this time, the Commission

declines to authorize the Companies' BTW proposal. While the Companies did describe their proposed BTW proposal in their comments, more information is needed before the Commission can approve, modify, or deny such proposal. Instead, the Commission directs the Companies, and invites the other Joint Utilities, to include this as a use case in the study described earlier on utility ownership of energy storage. The use case shall include details such as the criteria used to determine when an energy storage resource would be used as a BTW solution, and how such criteria would be integrated into utility system planning and operating procedures.

Rate Design

Roadmap Recommendations

The Roadmap suggests that the Joint Utilities could examine the need for new tariffs or storage-specific rate structures to incent the development of residential energy storage.

Stakeholder Comments

ACE NY requests that NYSERDA provide more clarity on the path for distribution-connected bulk energy storage projects larger than 5 MWs to enter the market. ACE NY states that these distribution-connected energy storage resources would be subject to distribution charging rates that equivalent transmission-connected energy storage will not and therefore would likely be uncompetitive in the ISC solicitation process. Key Capture Energy also requests the Commission open a new docket to promptly address the application of distribution rates to bulk storage projects and urges the Commission to provide FERC the necessary information to approve a rate that is consistent with state policy. BlueWave agrees with the sentiments of ACE NY and adds that distribution-connected bulk energy storage can be sited closer to load and provide more distribution benefits

compared to transmission-connected bulk energy storage. NY-BEST agrees with ACE NY and further recommends that the Commission direct the Joint Utilities to remove surcharges and riders from delivery rates for charging load of front-of-the-meter energy storage, and in the short-term to exclude these costs from price calculation thresholds and in price comparisons during bid evaluations. The Institute for Policy Integrity states that the Commission needs to develop and deploy more cost-based rate designs to encourage the development of distribution-level energy storage.

NineDot requests that Con Edison restart its Modified High-Tension program, and that the Commission allow Con Edison to work with energy storage host sites to select this service rate. NineDot also urges the Commission to reinstate Con Edison's Rider Q pilot program, which was designed to encourage energy storage to charge during optimal times, while also advocating for Con Edison to adjust the program so that costs align with local grid constraints. NineDot further states that Rider Q should be modified so that the designated "off peak" hours are adjustable based on the results from interconnection studies rather than have a global definition for "off peak hours."

Commission Determination

The Commission recognizes that prudent rate design is necessary to help achieve the 6 GW storage target. The Commission is aware that charging load of energy storage systems connected at the distribution level will generally pay different rates than otherwise equivalent transmission-connected energy storage systems. This issue was raised by ACE NY in its comments. However, we are also aware of the need for distribution costs to be fairly recovered from all users of the system. During charging, energy storage systems will add to

load on the distribution system just like any other load. The FERC determined that the sale of charging energy to an electric storage resource that is then resold into the ISO markets is a sale for resale in interstate commerce and thus subject to FERC jurisdiction.[59] The Commission understands that utilities are filing Wholesale Distribution Service (WDS) rates with the FERC that will be applicable to energy storage projects that are distribution connected that discharge via the wholesale markets. The Commission directs Staff to actively participate in the FERC process to help ensure that the WDS rates are developed appropriately.

In response to NY-BEST's comments related to the removal of surcharges and riders from delivery rates for charging load of front-of-the-meter projects, the Commission notes that these surcharges and riders were developed to recover variable costs or return revenues associated with a variety of distribution functions, including but not limited to reconciliations of storm costs, recovery of payments made through the Value Stack, recovery of Non-Wire Alternative (NWA) and DLM program costs, as well as Clean Energy Fund costs recovered through the System Benefits Charge. The Commission does not find NY-BEST's requests for front-of-the-meter energy storage systems to be exempted from delivery surcharges to be compelling for three reasons. First, many of the project and program costs recovered through delivery surcharges are related to initiatives which benefit all utility customers, such as NWA projects and DLM programs, or are intended to benefit society as a whole, such as the Clean Energy Fund. Application of the "beneficiaries pay" principle – the theory that all customers

[59] FERC Order No. 841, issued on February 15, 2018, in Dockets RM16-23-000 et al., paragraph 300.

that benefit from a project or program should pay for its costs – would require front-of-the-meter storage facilities to help pay for these projects and programs as they benefit from them. For example, NWA projects and DLM programs reduce an electric utility's need to invest in infrastructure, thereby reducing revenue requirement. NY-BEST's comments do not provide sufficiently compelling arguments to reject this principle for front-of-the-meter energy storage customers.

Second, the Commission has a longstanding policy of avoiding technology-specific rate design. Approval of exclusions to certain delivery surcharges solely on the basis of which technology a customer utilizes amounts to, in essence, a technology-specific rate. We are not aware of any instances where the Commission has approved a technology-specific exemption to responsibility for delivery surcharges, and we do not find the information presented in this case to be compelling enough to revise our general policy against technology-specific rate design.[60]

Third, while most of the components of delivery surcharges are designed to recover costs which are not included in base rates, some elements are designed to return revenues to customers, for example, revenues received through the sale of Regional Greenhouse Gas Initiative Allowances and sale of energy and capacity to the wholesale market from utility-owned energy storage facilities. Completely exempting front-of-the-meter energy storage customers from delivery surcharges, as NY-BEST suggests, would unreasonably deprive those customers of their fair share of the revenues collected and returned to customers. For these reasons, NY-BEST's suggestion to exempt front-of-the-

[60] NYPA load is exempt from certain surcharges; however, such exemption is broadly based on all NYPA load and not on the basis of the presence of any particular technology.

meter energy storage customers from delivery surcharge responsibility is rejected.

The Institute for Policy Integrity's recommendation that the Commission develop and deploy more cost-based rate designs to encourage the development of distribution-level energy storage is rejected. Beginning with the REV Track Two Order issued in 2016, the Commission set out on an initiative to improve standby service rates.[61] This initiative culminated with the October 2023 Standby Rates Order.[62] As part of that process, our March 16, 2022 Order addressed the need for a methodology to develop the most cost-based delivery rates possible, as well as thoroughly considered delivery rate exemptions for energy storage projects.[63] The standby rates designed and filed following the guidance of the October 2023 Standby Rates Order reflect the most cost-based rate designs that will encourage the development of distribution-level energy storage, as the Institute for Policy Integrity requests.

In the May 16, 2019 Order, the Commission recognized the importance of Con Edison's Rider Q rate pilot, then the only available option for granular As-Used Daily Demand charges with a less than 10-hour super-peak period, and directed each of the other utilities to develop similarly granular As-Used Daily

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[61] Case 14-M-0101, supra, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework (issued May 19, 2016), pp. 125-132 (REV Track Two Order).

[62] Case 15-E-0751, supra, Order Establishing Updated Standby Service Rates and Implementing Optional Mass Market Demand Rates, (issued October 13, 2023) (October 2023 Standby Rates Order).

[63] Case 15-E-0751, supra, Order Establishing an Allocated Cost of Service Methodology for Standby and Buyback Service Rates and Energy Storage Contract Demand Charge Exemptions, (issued March 16, 2022) (March 16, 2022 Order).

Demand Charges.[64] The Commission later adopted four- and five-hour super-peak periods proposed by Central Hudson, National Grid, NYSEG, and RG&E, and rejected O&R's proposed 10-hour period and directed O&R to develop a meaningfully shorter period to more closely match the applicable period of peak demands.[65] For Con Edison, the Commission accepted the company's proposed 10-hour super-peak period, on the basis that peak demand periods in various areas of the Con Edison service territory range from 11 a.m. to 11 p.m. depending on the characteristics of load in those areas, but identified that "Rider Q remains a viable option for customers to participate in for a more temporally and locationally granular As-Used Daily Demand Charge."[66] While it is true that customers already participating in Rider Q will continue to be able to do so through the end of the remaining pilot period, which includes a customer-specific 10-year period, new customers have been unable to join Rider Q since January 1, 2022.[67] Under present conditions, new energy storage customers in the Con Edison service territory would be the only customers interconnecting to an investor-owned utility in New York State without access to a granular As-Used Daily Demand Charge.

NineDot opined that Con Edison's Rider Q program may be one potential path forward for energy storage resources. The Commission generally agrees that the design of Rider Q provides storage resources a desirable rate option as Option B of Rider Q offers participants a locational based on Daily As-used Demand

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[64] Case 15-E-0751, supra, Order on Standby and Buyback Service Rate Design and Establishing Optional Demand-Based Rates (issued May 16, 2019), p. 33 (May 16, 2019 Order).

[65] October 2023 Standby Rates Order, pp. 70-73.

[66] Id. at 71.

[67] P.S.C. No. 10, Consolidated Edison Company of New York, Inc. Schedule for Electricity Service, Leaf 239 (Con Edison Electric Tariff).

Pricing rate option comprised of both a peak period and a four-hour period applicable during the summer months (Super-Peak Period).[68] However, the Commission acknowledges Rider Q would need to be refined to remain a viable option. First, Rider Q was established as a rate pilot.[69] As such, participation in Rider Q was limited in both duration and size. Regarding duration, Rider Q was opened to new entrants until January 2022, and all participants may remain in the program for up to 10 years. Regarding size, Rider Q was available to 125 MW of nameplate rated capacity.

Assuming Option B of Rider Q were to be re-opened to new participants, the Super-Peak Periods would need to be re-evaluated, since at the time of Rider Q implementation, the periods were directly tied to the applicable Con Edison Commercial System Relief Program (CSRP) demand response event call-windows.[70] However, the call-windows for certain load areas, or Networks, have shifted somewhat in recent years, and are likely to continue shifting as New York undergoes transition in both generation and customer usage patterns.[71] Processes need to be in place to allow for adjustment to CSRP call windows to meet the evolving needs of the grid and the dynamic load management programs for which the call windows are primarily designed, independent of potential adjustments to Rider Q. While the CSRP call window periods may remain a reasonable basis

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[68] Id.

[69] Case 16-E-0060 et al., Con Edison – Electric and Gas Rates, Order Approving Electric and Gas Rate Plans (issued January 25, 2017), p. 7.

[70] Con Edison regularly updates and maintains a list of CSRP call windows by Network and load area on its website.

[71] Leaf 207 of the Con Edison Electric Tariff specifies that "Network" refers to a distribution network or load area designated by the Company.

for setting the geographically varying and temporally granular As-Used Daily Demand Charge under Rider Q, any modification to CSRP call windows should trigger an evaluation of Rider Q Super-Peak Periods.

Therefore, the Commission directs Con Edison to submit, within 60 days of this Order, a draft tariff filing that modifies Option B of Rider Q based on the discussion above. The filing shall include a re-opening of Option B redesigned with appropriate Super-Peak Periods, subject to re-evaluation and potential adjustment based on modification to CSRP call windows. The filing will be subject to a SAPA public notice and comment period, in order to give stakeholders an opportunity to weigh in on Rider Q's applicability and recommend any improvements. This filing, as well as subsequent comments and stakeholder feedback, will assist the Commission in determining under what parameters Con Edison's Rider Q program should be reinstated.

Fire Safety

In response to three fires that originated at energy storage facilities in New York in the summer of 2023, Governor Hochul announced the creation of an Inter-Agency Fire Safety Working Group (Fire Safety Working Group). The purpose of the Fire Safety Working Group is to help ensure the safety of energy storage systems across the state by examining the energy storage fires and reviewing fire safety standards.[72] The Fire Safety Working Group's analysis will include review of emergency

[72] The Fire Safety Working Group consists of the Division of Homeland Security and Emergency Services, Office of Fire Prevention and Control, NYSERDA, DEC, DPS, and Department of State.

NYSERDA, New York's Inter-Agency Fire Safety Working Group, available at: https://www.nyserda.ny.gov/All-Programs/Energy-Storage-Program/New-York-Inter-Agency-Fire-Safety-Working-Group.

response protocols, fire safety standards, and current fire code. The analysis done by the Fire Safety Working Group will culminate in recommendations to help prevent fires at energy storage systems in New York.

On December 21 2023, the Fire Safety Working Group released its initial findings which included that there were no harmful levels of toxins detected in the soil or water at each of the three energy storage locations where fires occurred in 2023.[73] The Fire Safety Working Group is also negotiating to obtain the Root Cause Analyses for the fires; once available, subject matter experts will review and analyze. NYSERDA is also targeting the end of Q2 2024 for site reviews of energy storage sites in New York to improve best practices.

On February 6, 2024, NYSERDA released the draft Fire Code Recommendations Report. Updated recommendations, reflecting comments received in response to the draft, will be issued in June 2024. The Fire Safety Working Group continues to run in parallel with the energy storage proceeding.

One of the core mandates of the Commission is to ensure the safe delivery of energy. As energy storage becomes a more common and critical source of power in New York, the safety of these facilities is paramount. The Commission is committed to fire safety, even if the Fire Safety Working Group recommendations are not adopted at the time of the issuance of this Order. Accordingly, the Commission directs NYSERDA to include which of the applicable recommendations that come out of the Fire Safety Working Group will be included in its Implementation Plan. When considering fire safety requirements,

[73] NYSERDA, Initial Findings Released From Inter-Agency Fire Safety Working Group on Emergency Response, December 21, 2023, available at: https://www.nyserda.ny.gov/About/Newsroom/2023-Announcements/2023-12-21-Governor-Hochul-Announces-Results-of-Fire-Safety-Working-Group.

NYSERDA is not limited to the recommendations issued by the Fire Safety Working Group and may include more stringent requirements. If the Fire Safety Working Group recommendations are adopted in the future, NYSERDA shall file an updated Implementation Plan reflecting those requirements as necessary.

IMPLEMENTATION PLANS

The energy storage programs in the bulk, retail, and residential sectors, as described above, will be administered by NYSERDA. This section discusses the Implementation Plans to be developed by NYSERDA, with consultation from Staff, that will detail the implementation strategies and program goals of the energy storage programs. Due to the differences in structure between the various proposed programs, NYSERDA shall file two Implementation Plans. One Implementation Plan will address the bulk energy storage program (Bulk Storage Implementation Plan) and the other will address the retail and residential programs (Retail/Residential Implementation Plan). The Bulk Storage Implementation Plan shall be filed with the Commission for approval within 120 days of this Order. The Bulk Storage Implementation Plan shall be subject to a public notice and comment period, pursuant to SAPA, and subsequent consideration by the Commission. The Retail/Residential Implementation Plan shall be filed within 60 days of this Order. This Implementation Plan will also be subject to a SAPA public notice and comment period and subsequent consideration by the Commission. The Energy Storage Order required a similar process for NYSERDA to develop an Implementation Plan which detailed program requirements; NYSERDA may use the previously prepared Implementation Plan as a framework, to be updated as appropriate to reflect the new program designs discussed above.

At a minimum, NYSERDA shall include the following topics within the Implementation Plans:

1. Budget details for each of the bulk, retail, and residential programs;
2. Performance metrics;
3. Incentive Structure for each energy storage program;
4. Project Application Submission Process;
5. Quality Assurance;
6. Measurement and Verification;
7. Technical and Other Requirements;
8. Disadvantaged community access considerations; and
9. Any other topics throughout this Order that the Commission has directed to be included.

In addition to the topics discussed above, within the Bulk Storage Implementation Plan, NYSERDA shall detail how duration and geographic considerations will be evaluated, consistent with the Commission directives discussed in the Bulk Energy Storage Program section of this Order. NYSERDA shall also describe in its Implementation Plans how it will incorporate any recommendations that come out of the Fire Safety Working Group. Additionally, as discussed above, NYSERDA shall specify a 20 MWh cap for retail energy storage projects in the Retail Energy Storage Program section.

Following Commission review of the Implementation Plans, NYSERDA shall also develop and file two program manuals, one for the retail/residential programs and one for the bulk storage program, based upon the respective approved Implementation Plan that sets forth specific program provisions and requirements. These manuals may be updated as needed, after consultation with Staff.

LONG DURATION ENERGY STORAGE AND INNOVATION

Roadmap Recommendations

The Roadmap discusses the future importance of LDES. The forecasted peak load period coupled with expected low renewable output highlights the need for LDES resources. The Roadmap's analysis identifies a need for 24 GW of 100-hour battery storage with 50 percent RTE and 13 GW of in-state incremental new renewable resources to provide the necessary energy to charge these energy storage resources. The Roadmap recommends that NYSERDA's Innovation Program prioritize research in LDES that can provide grid value and is likely to be developed due to strong supply-chain dynamics by 2040. The Roadmap further recommends that the Innovation Program examine funding needs within the existing framework with a focus on enabling large scale LDES demonstration projects sized between 50-100 MWs. These projects are intended to provide insight into use cases for LDES and information for the utilities and NYISO to integrate into their planning and operational procedures.

Comments

ACE NY agrees that demonstrating LDES technologies before 2030 is important to gain experience with this resource class and recommends that NYSERDA establish a funded demonstration program to facilitate LDES deployment and develop a program to support commercial deployment of LDES. Convergent Energy supports research and development initiatives to help stimulate LDES development and states that any opportunity to participate in such a program be transparent and competitive. Form Energy recommends that multi-day storage be included in all grid planning processes and be eligible for the ISC, and supports multiple large-scale long duration energy storage projects. Hydrostor supports additional funding for innovative long-term energy storage technologies with a focus on non-lithium-ion 100 MW+ projects. Plug Power advocates for

incentivizing commercially available hydrogen fuel technology for LDES.

Commission Determination

As discussed above, the Commission sees the important role that LDES will have in enabling a reliable energy transition. NYSERDA's Innovation Program has several LDES demonstration and pilot programs currently underway that utilize a variety of technologies including iron-air batteries, zinc alkaline batteries, and hydrogen storage. The Commission directs NYSERDA to continue to work on establishing pilot projects that span a variety of LDES technologies as part of its Innovation Program to best position New York to timely develop and deploy LDES assets when the electric power system requires it.

PROGRAM COSTS AND RECOVERY

Roadmap Recommendations

The Roadmap recognizes the need for new funding to deploy energy storage to achieve the goal of 6 GW by 2030. The Roadmap estimates the cost of deploying 200 MWs of residential energy storage at $75 million on a net present value basis, or $100 million on a nominal basis, and the cost of deploying 1,500 MWs of retail energy storage at $489 million on a net present value basis, or $675 million on a nominal basis. For the bulk program, cost estimates range between $701.5 million and $1.42 billion on a net present value basis or $1.33 billion to $2.94 billion on a nominal basis to procure 3,000 MWs. The large range of estimated costs for the bulk program is primarily due to the uncertainty of future wholesale energy and capacity prices which are used to estimate the future costs of the indexed storage credits.

The Roadmap also recommends separate funding for administrative costs, including costs related to program

administration, implementation support, program evaluation, and the New York State Cost Recovery Fee. The Roadmap notes that most of these costs relate to the residential and retail programs, with a smaller portion going towards startup costs of the bulk program. Therefore, the Roadmap recommends that bulk program start-up costs use legacy funding from storage programs approved in the Energy Storage Order.

The Roadmap estimates total program administration costs to total $29 million, $14.5 million of which is already available through the previously approved Bridge Incentive and the remaining $14.5 million of which is requested from the Commission. Program administration costs include staffing requirements, contract management, policy engagement, analysis to support the energy storage programs, data management and reporting, and various support services including legal, marketing, and information technology.

Implementation support costs for the programs are estimated at $15 million, $1.9 million of which is available through existing uncommitted funds and the remaining $13.1 million of which is requested from the Commission. Implementation support costs include costs for technical support for wholesale and distribution market analysis, interconnection and hosting capacity, power system modeling, as well as quality assurance including field and photo inspections, and measurement/verification.

The Roadmap calls for $3 million in funding for program evaluation activities. Program evaluation activities include impact assessments to verify portfolio performance, market characterization studies needed to uncover market barriers that slow market transformation, and process evaluation activities to help understand customer satisfaction with the program processes.

The New York State Cost Recovery Fee (CRF) is a fee assessed to NYSERDA and other public authorities by New York for an allocable share of state governmental costs attributable to the provision of services to public benefit corporations, pursuant to Public Authorities Law §2975. NYSERDA's CRF for the past six fiscal years averaged 1.1 percent and when applied across their programs weighted by the average program expenditures, the proposed retail and residential energy storage programs account for $8.9 million in new funding related to the CRF.[74] In total, the Roadmap calls for $30.0 million on a net present value basis or $39.6 million on a nominal basis in new funding relating to administration, implementation, program evaluation, and CRF costs.

Total incentives for the residential, retail, and bulk program, inclusive of administrative costs, on a net present value basis, are estimated to cost between $1.29 billion and $2.01 billion, paid out and collected from ratepayers over 21 years. The Roadmap presented electric customer bill impacts for residential customers estimated between 0.38 percent and 0.59 percent on average across the 21-year period, which equates to about $0.40-$0.64 per month for the average residential customer. The range in estimate is attributable to forecast uncertainty in wholesale energy and capacity payments which are used to estimate the future costs of the indexed storage credits.

The analysis performed for the Roadmap estimated that deployment of 6 GW of storage by 2030 will yield an estimated $1.94 billion (net present value) in net societal benefits to New York, due to increased delivery of renewable energy and reduced reliance on other more expensive firm capacity

[74] Roadmap, pp. 66-7.

resources. These benefits reflect the value of avoided electricity system expenditures. Further societal benefits, not quantified here, would include improved air quality in communities impacted by fossil generation.

The Roadmap contemplates two different funding mechanisms for the energy storge programs, one for the bulk program and one for the retail and residential programs. The different funding mechanisms reflect the variance in program structure. For the bulk program, the Roadmap recommends a funding mechanism akin to the one employed for Tiers 2,3, and 4 of the Clean Energy Standard and Offshore Wind Standard, which would require jurisdictional LSEs to pay in proportion to their share of statewide load and be collected from customers through the supply charge over the period 2029 to 2044.[75]

The retail and residential energy storage programs are structured such that payments to awarded projects are made at the time of commissioning using a fixed-rate incentive. The Roadmap recommends using a pay-as-you-go methodology, like what is done in other Clean Energy Fund programs, such as NY-Sun, collected from jurisdictional electric utilities on a statewide MWh load ratio share basis and expected to be collected from customers through the delivery charge over the period 2024 to 2030.[76] As discussed earlier, the Roadmap recommends that NYPA

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[75] See CES Framework Order.

More information on how the Clean Energy Standard has been implemented: NYSERDA, Large-Scale Renewables, available at: https://www.nyserda.ny.gov/All-Programs/Large-Scale-Renewables.

[76] Case 14-M-0094 et al., Clean Energy Fund, Order Authorizing the Clean Energy Fund Framework (issued January 21, 2016), p. 98 (Clean Energy Fund Order). The Clean Energy Fund Order authorized the Bill-As-You-Go approach to better match collections with expenditures. This is the exact methodology referred to in the Roadmap as "pay-as-you-go".

and LIPA, as non-jurisdictional LSEs, voluntarily participate in collections for all three programs.

Comments

NineDot supports the budget proposal described in the Roadmap as a prudent use of ratepayer funds that will provide environmental, financial, and social-equity benefits to New York ratepayers. NYSEIA recommends the Commission approve the budget for the energy storage programs discussed in the Roadmap. MI opposes the total proposed cost of the energy storage programs and urges the Commission to view the proposed energy storage programs in conjunction with other high-cost initiatives the Commission has previously authorized.

In response to the Updated Roadmap, Sierra Club states that the higher cost estimates are modest compared to alternative methods to achieve the State's climate goals. The City explains that the cost estimates in the Updated Roadmap are likely to increase over time, accelerating the need for the Commission to approve the Roadmap so that energy storage procurements can commence. NY-BEST, ACE NY, the Solar Energy Industries Association, and NYSEIA support the Updated Roadmap's revised estimated costs as necessary to build out 6 GW of energy storage statewide by 2030 and assert that the benefits of doing so justify the increased costs.

Commission Determination

Retail and Residential Program Costs

The Commission approves the $814.6 million in funding requested in the Roadmap for the continued expansion of the retail and residential energy storage programs necessary to meet our goals. This includes $775 million in program incentives and $39,648,139 for program administration, implementation support, program evaluation and the CRF expense as detailed in the Roadmap. This funding is critical to successfully implement the

retail and residential energy storage programs and will give developers certainty into what resources are available for the pursuit of energy storage projects. The NYSERDA retail and residential program costs collections undertaken in accordance with this Order shall be allocated across the electric utilities and LIPA based on a MWh load ratio share. This is an equitable approach since the programs are intended to achieve statewide climate goals that will benefit all ratepayers equally. The pro-rata share allocated to each electric utility and LIPA is shown in Appendix F. LIPA is encouraged to voluntarily participate and accept its allocation of the retail and residential program costs. With this approach, both NYPA and LIPA customers are eligible to participate in the programs. The costs for these programs are expected to be incurred over the period 2024 to 2032. Therefore, electric utilities are directed to collect their proportional share of the costs, as identified in Appendix G, annually, over the period 2024 through 2032. For 2024, the amounts shown shall be collected over the remaining months of 2024 once the applicable tariff changes become effective.

To effectuate the cost recovery from NYPA customers as discussed earlier, the electric utilities shall recover NYSERDA's retail and residential program costs from all customers, including NYPA customers that receive delivery service from the electric utility. The delivery surcharge to be used for each electric utility is shown in Appendix E and each has a distinct name, including the System Benefit Charge for NYSEG and RG&E; the Clean Energy Standard Delivery Charge for Con Edison, National Grid, and O&R; and the Clean Energy Standard Surcharge for Central Hudson. Each utility shall file tariff amendments necessary to effectuate the recovery of costs associated with the retail and residential storage programs

through each applicable delivery surcharge. The tariffs are to go into effect on a permanent basis on October 1, 2024, and are to be filed on not less than 30 days' notices.

We authorize the use of the Bill-As-You-Go mechanism to transfer funds for the retail and residential energy storage programs from the utilities to NYSERDA. This mechanism, which the Commission has utilized for the transfer of funds from utilities to NYSERDA for a number of clean energy programs, allows for NYSERDA to bill the utilities for projected expenditures of the program based on maintaining a two-month working capital balance.[77] NYSERDA shall enter into a separate agreement with LIPA to address LIPA's proportional contribution to these programs. NYSERDA is directed to file with the Secretary to the Commission an updated Bill-As-You-Go Summary for the retail and residential energy storage program costs, within 60 days of the issuance of this Order. NYSERDA and the electric utilities are directed to execute any necessary changes to the individual Bill-As-You-Go funding agreements within 90 days of the issuance of this Order.[78] NYSERDA shall file an updated Clean Energy Fund Cash Flow Analysis within 30 days of the issuance of this Order reflecting the collections and projected expenditures associated with the Retail and Residential Energy Storage programs.[79]

While the Roadmap included the levelized bill impacts of the proposed storage programs in total, the Commission also considers the near-term bill impacts on the typical bill of

[77] Clean Energy Fund Order, pp. 96-100.

[78] When filing with the Secretary, the updated Bill-As-You-Go Summary should be filed concurrently within Case-14-M-0094.

[79] When filing with the Secretary, the updated Clean Energy Fund Cash Flow Analysis should be filed concurrently within Case-14-M-0094.

various customer classes of the program being adopted.[80] Table 1 below provides those estimates for the retail and residential storage program, for the expected highest program cost year, 2030.

Table 1

Retail / Residential Storage Program Bill Impacts	2030 Cost: $211 million, or $0.00178/kWh			
	Residential	Commercial	Industrial	Industrial HLF
Increase in Monthly bills	$ 1.07	$ 22.43	$ 1,281.94	$ 2,307.50
Central Hudson	0.7%	1.2%	1.6%	2.0%
Con Ed	0.6%	0.6%	0.8%	1.0%
National Grid	1.0%	1.4%	1.8%	2.4%
NYSEG	1.1%	1.5%	2.0%	2.3%
O&R	0.8%	1.0%	1.5%	1.8%
RG&E	1.1%	1.1%	1.7%	2.2%

Bulk Program Costs

The costs associated with the bulk program are not static due to the nature of the indexed storage mechanism and the fact that the actual results of future competitive procurements are unknown. This results in the need to look at a range of costs associated with the procurement of 3,000 MW of bulk storage projects. The Roadmap presented an estimated

[80] Percentage impacts are based on 2023 typical monthly bills for Residential-600 kWh, Commercial-50 kW; 12,600 kWh, Industrial-2,000 kW; 720,000 kWh, and Industrial High Load Factor (HLF)-2,000 kW; 1,296,000 kWh.

program cost ranging between $701.5 million and $1.42 billion on a net present value basis, which was derived from the range of $1.33 billion to $2.94 billion in program costs on a nominal basis. The forecasted annual amounts expected to be incurred starting in 2028 and continuing through 2044 are shown in Appendix H. Comparing this range of costs, in addition to the fixed costs of the retail and residential program to the expected net benefits, we find it reasonable to approve the 3,000 MW bulk energy storage program. Since the benefits of this program will primarily be to enable the reliable transition to a 100 percent renewable electric system, the proposed cost recovery mechanism described in the Roadmap, which requires jurisdictional LSEs to be allocated costs in proportion to their share of Statewide load, is reasonable and therefore adopted. NYSERDA shall include the processes for calculating and collecting bulk storage program costs from all statewide LSEs and NYPA and LIPA. Each utility shall file tariff amendments necessary to effectuate the recovery of costs associated with the bulk storage program through an applicable supply surcharge.

As described earlier, we recognize that NYPA and LIPA have the demonstrated ability to develop/procure bulk storage projects and therefore NYSERDA shall take such independent storage procurement into account in its assessment of amounts of bulk storage needed through its solicitations. Such projects, subject to meeting the requirements of the bulk storage program, should also be credited towards NYPA and LIPA load share cost allocation. NYSERDA shall propose the details of this crediting process in the bulk storage program implementation plan.

Similar to the bill impact table above, the Commission considered the near-term bill impacts related to the bulk storage program. We provide the high end of the cost range, which we expect customers to experience in 2030 when the program

has achieved the 3,000 MW of procurement. Those bill impacts are shown in Table 2 below.

Table 2

Bulk Storage Program Bill Impacts	2030 Cost: $227 million, or $0.00176/kWh			
	Residential	Commercial	Industrial	Industrial HLF
Increase in Monthly bills	$ 1.05	$ 22.14	$ 1,265.07	$ 2,277.13
Central Hudson	0.7%	1.2%	1.6%	2.0%
Con Ed	0.6%	0.6%	0.8%	1.0%
National Grid	1.0%	1.4%	1.8%	2.4%
NYSEG	1.1%	1.5%	2.0%	2.3%
O&R	0.8%	1.0%	1.4%	1.7%
RG&E	1.1%	1.1%	1.7%	2.1%

CONCLUSION

Today's Order establishes a 6 GW energy storage deployment target in New York by 2030. The programs discussed in the Roadmap and described in this Order will realize a total of 4,700 MWs of incremental installed capacity of energy storage spanning the bulk, retail, and residential sectors and move the State further in its clean energy transition to a reliable electric grid powered by zero-emission resources. The Commission expects that continued collaboration between Staff, NYSERDA, NYPA, LIPA, the NYISO, and other stakeholders in effectuating the energy storage deployment programs will be critical to the success of the New York State energy storage program.

The Commission orders:

1. The New York State Energy Research and Development Authority shall conduct a minimum of three bulk energy storage solicitations, held no less than annually. The New York State Energy Research and Development Authority shall issue the first bulk energy storage Request For Proposals no later than June 30, 2025, meeting the requirements described in the body of this Order.

2. The New York State Energy Research and Development Authority shall apply a procurement target of 20 percent for long duration energy storage projects in each of the bulk energy storage procurement solicitations.

3. The New York State Energy Research and Development Authority shall implement the Index Storage Credit mechanism for bulk storage, as described in the body of this Order.

4. The New York State Energy Research and Development Authority shall allow for a one-time inflation adjustment as it implements the Index Storage Credit mechanism, as directed in the body of this Order.

5. The New York State Energy Research and Development Authority shall adopt the operational requirements for the Index Storage Credit mechanism, as directed in the body of this Order.

6. The New York State Energy Research and Development Authority shall include maturity requirements for its bulk energy storage solicitations as directed in the body of this Order.

7. The New York State Energy Research and Development Authority shall establish a 15-year maximum contract term length for lithium-ion battery bulk energy storage projects and a 25-year maximum contract term length for bulk non-lithium-ion battery energy storage projects.

8. The New York State Energy Research and Development Authority is directed to develop a publicly accessible calculator for Value of Distributed Energy Resources energy storage projects, as directed in the body of this Order.

9. Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., New York State Electric and Gas Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, Orange and Rockland Utilities Inc., and Rochester Gas and Electric Corporation shall continue their bulk storage dispatch rights Request for Proposals process under the previously approved Utility Dispatch Rights framework.

10. The New York State Energy Research and Development Authority shall establish a declining block retail energy storage program to procure 1,500 megawatts of retail energy storage, as discussed in the body of this Order.

11. The New York State Energy Research and Development Authority shall consult with Department of Public Service Staff and conduct stakeholder outreach prior to modifying the incentive blocks for the retail energy storage program, as discussed in the body of this Order.

12. The New York State Energy Research and Development Authority shall establish a 20 megawatt-hour cap for retail energy storage projects.

13. The New York State Energy Research and Development Authority shall establish a residential energy storage program to support the buildout of 200 megawatts of residential energy storage statewide by 2030, as discussed in the body of this Order.

14. The New York State Energy Research and Development Authority shall include language in contracts with energy storage developers that require paying the New York State Prevailing Wage, as discussed in the body of this Order.

15. The Department of Public Service Staff shall prepare an annual report and perform a triennial review for Commission consideration on the status of the energy storage programs and progress to date, as well as barriers to success, consistent with the process initiated in the Energy Storage Order.

16. The New York State Energy Research and Development Authority shall use any funding from cancelled retail and residential projects and apply them to new qualifying projects.

17. The New York State Energy Research and Development Authority shall procure a minimum of 35 percent of bulk and off-site retail energy storage projects in the New York Independent System Operator's G-K Capacity Zones, as discussed in the body of this Order.

18. The New York State Energy Research and Development Authority shall procure energy storage projects in the bulk, residential, and retail programs in disadvantaged communities consistent with the allocations described in the body of this Order.

19. The New York State Energy Research and Development Authority shall ensure that the procurement of energy storage projects is consistent with the in-service date requirements described in the body of this Order.

20. Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., New York State Electric and Gas Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, Orange and Rockland Utilities Inc., and Rochester Gas and Electric Corporation shall study the non-market transmission and distribution services that energy storage can provide, including a bridge to wires use case, as discussed in the body of this Order; the results of this study

shall be filed with the Commission within 120 days of this Order.

21. Consolidated Edison Company of New York, Inc. shall submit a filing within 60 days of this Order detailing the Rider Q Program, including any suggestions for improvement, as described in the body of this Order.

22. The New York State Energy Research and Development Authority shall consider and include fire safety requirements in its Implementation Plans, as discussed in the body of this Order.

23. The New York State Energy Research and Development Authority shall file a bulk storage program Implementation Plan with the Commission within 120 days of this Order, consistent with the requirements outlined in the body of this Order.

24. The New York State Energy Research and Development Authority shall file a retail/residential storage program Implementation Plan with the Commission within 60 days of this Order, consistent with the requirements in the body of this Order.

25. The New York State Energy Research and Development Authority's Innovation Program shall continue efforts to commission Long Duration Storage pilot projects that utilize a variety of technologies spanning of use cases.

26. As discussed in the body of this Order, funding for the Retail and Residential energy storage programs and administrative costs totaling $814.6 million shall be collected in the manner prescribed in the body of this Order and made available to the New York State Energy Research and Development Authority through the Bill-As-You-Go Mechanism.

27. The New York State Energy Research and Development Authority is directed to file an Updated Bill-As-You-Go Summary,

as discussed in the body of this Order, within 60 days of the issuance of this Order, as described in the body of the Order.

28. The New York State Energy Research and Development Authority and Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., New York State Electric and Gas Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, Orange and Rockland Utilities Inc., and Rochester Gas and Electric Corporation are directed to execute any necessary modifications to their individual Bill-As-You-Go Funding Agreements within 90 days of the issuance of this Order.

29. The New York State Energy Research and Development Authority shall file an updated Clean Energy Fund cash flow analysis incorporating the collections and projected expenditures for the Retail and Residential Energy Storage Programs, within 30 days of the issuance of this Order.

30. The New York State Energy Research and Development Authority shall enter into an agreement with the Long Island Power Authority to address its proportional contribution to the Retail and Residential Energy Storage Programs within 90 days of the issuance of this Order.

31. Central Hudson Gas & Electric Corporation, Consolidated Edison Company of New York, Inc., New York State Electric & Gas Corporation, Niagara Mohawk Power Corporation d/b/a National Grid, Orange and Rockland Utilities, Inc., and Rochester Gas & Electric Corporation shall file tariff amendments necessary to effectuate the recovery of costs associated with the New York State Energy Research and Development Authority Bulk, Residential and Retail storage programs, on not less than 30 days' notice, to become effective on a permanent basis on October 1, 2024, as discussed in the body of this Order.

32. Funding for the bulk energy storage program incentives shall be collected by jurisdictional load serving entities in proportion to their share of Statewide load as described in the body of this Order.

33. Bulk, retail, and residential energy storage projects procured under the programs described in this Order shall have an in-service date by December 31, 2030, unless they meet the criteria described in the body of this Order for an extension. Energy storage projects procured under the programs established in the Energy Storage Order may have their in-service date extended after December 31, 2025, if they meet the criteria described in the body of this Order.

34. In the Secretary's sole discretion, the deadlines set forth in this Order may be extended. Any request for an extension must be in writing, must include a justification for the extension, and must be filed at least three days prior to the affected deadline.

35. This proceeding is continued.

By the Commission,

(SIGNED) MICHELLE L. PHILLIPS
Secretary

APPENDIX A- SUMMARY OF STAKEHOLDER COMMENTS

Alliance for Clean Energy New York (ACY NY)

ACY NY recommends that the Commission adopt the ISC for bulk storage procurement. ACY NY agrees with NYSERDA/Staff that the ITC allows for hedging opportunities which will reduce project attrition and reduces financing costs. The similarity of the ITC structure with NYSERDA's Tier 1 structure for the Clean Energy Standard will make it more appealing to developers as well. ACE NY states that NYSERDA should award more than 1,000 MWs per year in procurements, and at least 1500 MWs in the first three procurements, to account for attrition and permitting/interconnection delays, as well as run the procurements throughout the duration of the life of the ITC federal tax credit.

ACY NY recommend that NYSERDA publish procurement goals that detail desired project sizes and locations as a guide but allow NYSERDA to give out awards that do not necessarily align with these goals. ACE NY states that distribution-connected bulk storage will be subject to distribution charging rates that transmission-connected storage will not and highlights the need for a pathway for these types of resources to competitively participate in the ISC procurement process. ACE NY further states that NYSERDA should make awards for projects upstate that help with renewable generation integration.

ACE NY cautions that renegotiating contracts should only occur in the event of significant market changes so that developers remain confident they will meet their bid strike price. They further recommend that NYSERDA incorporate a uniform round-trip efficiency adjustment as part of the ISC calculation for the Reference Energy Arbitrage Price to account for the actual operating characteristics of energy storage systems more accurately. ACE NY opposes utility ownership of bulk storage in competitive markets and states that it will chill private developer investment and create an uneven playing field between a potentially utility-owned rate-based energy storage asset and a privately developed project. Ultimately, this will lead to less investment of storage in New York.

For retail and residential storage, ACE NY recommends that NYSERDA set an initial total block size of at least 750 MWs, noting that NYSERDA can adjust levels as necessary. In Zones A-G ACE NY recommends that NYSERDA consider establishing

separate incentive blocks for solar-plus storage vs. standalone storage as paired solar and storage is not subject to demand charges and has additional revenue streams available. Standalone storage provides benefits such as enabling greater operation flexibility and shifting feeder demand, therefore providing adequate incentives for these sorts of projects is important.

ACY NY supports NYSERDA implementing maturity requirements, such as permitting approvals and interconnection deposits, for projects to reserve incentives. ACE NY cites interconnection challenges and needed reforms as a motive to expediently interconnect retail storage and points to suggestions proffered in the Interconnection Policy Working Group and Interconnection Technical Working Group as suggestions of where improvements can be made. Regarding residential storage, ACE NY states that upfront incentives for residential storage should not be tied to future performance, as this is burdensome to the industry. ACE NY supports SATA and states the need for state and regional transmission planning to incorporate SATA as a potential solution. It further states SATA should be open to independent developers as this will maximize the cost effectiveness of the technology. ACE NY recommend that the Joint Utilities be directed to modify their Coordinated Grid Planning Process to explicitly require soliciting storage as transmission as a non-wires alternative to meet local needs, as well as recommending that the State request the NYISO implement tariff changes to incorporate SATA into their planning processes and adopt cost recovery/allocation methodologies expeditiously.

ACY NY recognizes that benefits of Long Duration Energy Storage (LDES) and recommends that the Commission define LDES as 8+ hour duration and encourage investment in a wide variety of LDES technologies through a NYSERDA funded demonstration project program. ACE NY recommends NYSERDA reach out to municipalities to educate on the purpose and need for energy storage and get ahead of any local permitting issues.

ACE NY recommends NYSERDA conduct separate 4- and 8-hour storage solicitations as the price differences between the two are difficult to compare. Additionally, ACE-NY recommends that NYSERDA include a Disadvantaged Communities incentive adder for retail standalone and solar-plus storage projects upstate, and states that the residential storage program should allocate a minimum of 35 percent of the 200 MWs for projects located in disadvantaged communities.

AES Clean Energy Development

AES supports the adoption of the 6 GW energy storage target and comments that a successful program is not necessarily the least cost option but rather that the program should prioritize peaker replacement and integration of renewables. AES comments that mature storage projects bids are necessary to reduce attrition and recommends bidders offer transparency into their strike price bid and revenue assumptions, have certainty of battery costs, wholesale market participation strategy, and show evidence of progress regarding permitting and outreach to Disadvantaged Communities.

AES states that NYSERDA should continue the bulk storage dispatch rights requirement and consider stringent rules to remove or cancel projects that are not timely progressing. AES further comments that flexibility is important for procurements and that there should be carve outs for specific locations and duration where needed so that storage deployment benefits are maximized by reducing grid operational costs and helping balance supply and demand. AES recommends that projects should be grouped by NYISO Load Zone so that accurate cost comparisons can be done.

AES supports the ISC design as the most feasible procurement option that gives long term certainty to developers. AES comments recommends that NYSERDA include round-trip efficiency when calculating the reference energy arbitrage price to account for the actual operating characteristics of energy storage systems. AES also states that if the targets are not met by 2030 that future procurements specify duration requirements so that the right type of storage resource is installed when and where needed. AES supports the 35 percent target of projects installed in Disadvantaged Communities and recommends that NYSERDA give projects that directly benefit Disadvantaged Communities a higher value when selecting projects to contract.

AES recommends that NYSERDA prioritize demonstration projects for 100-hour storage technologies and make the project smaller than 24 MWh so that reliability or operational issues can be dealt with and to observe market reactions. AES states that multiple long-duration storage pilot projects with multiple technologies, including redox flow batteries, metal-hydrogen storage solution, and iron-air solution should be tested; non-lithium storage proposals should be prioritized to incentivize innovation.

Armada Power

Armada Power supports the goals and intent of the Roadmap, particularly loosening the requirement to pair residential storage with renewable generation. Armada Power urges the Commission to design programs in a technology neutral manner, including the adoption of thermal, mechanical, and battery storage. Armada Power recommends that the Commission and Joint Utilities create opportunities for residential storage systems to be aggregated and used in demand response programs, noting that this will help achieve compliance with FERC Order 2222. Armada Power states that storage programs should consider the needs of different customer types within a customer class, notably multifamily properties that have high rental turnover and therefore low residential storage adoption.

Alsym Energy

Alsym Energy comments that the definition of LDES is too general and that a better definition that delineates specific use cases would result in more effective LDES deployment. Alsym Energy notes that LDES with a range of discharge from 6-100 hours is preferable, as it covers two different technology types and further comments that charging time needs to be accounted for when evaluating solutions.

Alsym Energy states that Round-trip efficiency is important in establishing cost viability and disagrees with the Roadmap to not take it into account as it can greatly impact charging costs. Alsym Energy recommends a minimum AC round-trip efficiency of 70 percent to be considered viable as a grid asset as well as a self-discharge rate of no more than 15% per month, although preferably less than 10% as this will reduce operating costs.

Alsym Energy comments that the installed cost ($/kWh) of an ESS should be considered before subsidies, as the installed costs are an indication of project viability; Alsym Energy recommends a short-term target of $200/kWh and that NYSERDA establish a standard methodology for calculating total installed and operating costs. Alsym Energy also states the importance of taking the cost of land into account when evaluating the strength of a proposed project.

Bloom Energy

Bloom Energy supports the Roadmap's conclusion that both LDES and firm zero-carbon resources are needed to help New

York State reach its climate goals and maintain grid reliability. Bloom Energy recommends that the Commission remain technology neutral when evaluating LDES technologies and consider spearheading efforts to develop in-state hydrogen production and capabilities. Bloom Energy comments that appropriate compensation structures for hydrogen-based technologies should be developed, and that the Commission should consider developing a separate procurement process specifically for LDES.

BlueWave

BlueWave supports the proposed retail storage program and ISC for the bulk storage program. BlueWave recommends that any solicitations not be divided by geography or otherwise to maximize supply. BlueWave states that NYSERDA and DPS need to be quick to make any program modifications to the ISC structure, if necessary, as it is a first of its kind paradigm so there may be kinks that need ironing out. BlueWave further recommends that NYSERDA provide information as to the definition of a peaking plant, and additional guidance as to how benefits to Disadvantaged Communities will be evaluated so that the 35 percent of program funds dedicated to Disadvantaged Community benefits is realized.

Regarding distribution-connected bulk storage, BlueWave states that NYSERDA needs to provide a pathway to the market for these resources, as they will likely remain uncompetitive in the ISC solicitation process compared to transmission-connected bulk storage, as distribution-connected storage is subject to retail charging rates.

BlueWave recommends that ISC solicitations require project maturity milestones so that there is a reasonable expectation that bids are from a developer who has a realistic chance at moving a project forward. To accomplish this, BlueWave suggests that projects be in Stage 9 or later of the NYISO queue or an analogous queue for the distribution system.

For retail storage, BlueWave recommends that per-project incentives should at a minimum be 20 MWh. Similar to their view regarding bulk procurements, BlueWave states the need for maturity thresholds to prevent delays in interconnection and recommends that eligibility for funding allocation be contingent on the project having their coordinated electric system interconnection review and deposit, all necessary municipal and state permits, demonstration of site control for 15-years, and a negative SEQR designation.

BlueWave states their support for storage as a transmission asset and recommends that SATA have the flexibility to provide other services, such as reactive power, if able to maximize the benefits of the resource. BlueWave further comments that funding should be appropriated for projects that demonstrate the ability of storage resources to participate in the wholesale market and simultaneously provide transmission services that can defer costly distribution upgrades.

City of New York (The City)

The City supports the expanded energy storage goals discussed in the Roadmap and provides several recommendations for improvement.

The City comments that the cost of the proposed programs is estimated at $1.0 billion-$1.7 billion and is concerned at the level of uncertainty with these estimates and how any deviations may impact ratepayers. The City notes that the Roadmap only estimated residential customer bill impacts, not major end users and recommends that NYSERDA provide potential bill impacts analyses for all customer service classes in their Implementation Plan. The City further recommends that NYSERDA conduct cost impacts before the first bulk procurement and annually thereafter. The City recognizes the Roadmap's attempt at cost containment but cautions that allowing developers to seek price increase too easily would negate the bid cap's intent. To combat this, the City recommends that the Commission require developers to include a reasonable cost increase component into their bid, and that cost increases only be approved if future prices rise to an unforeseeable amount.

The City shares the concerns outlined in the Roadmap regarding attrition and recommends that yearly reassessments of bulk storage inventories are necessary to ensure that sufficient bulk storage gets built to meet the 6 GW target. This yearly evaluation is needed due to cost and attrition uncertainty.

The City generally agrees with the ISC proposal and recommends that the Commission consider implementing a mechanism to measure battery system performance as part of the bulk storage procurement program. The City notes that the deployment and more importantly the actual use of energy storage in or near New York City is critical in achieving grid decarbonization and retirement of peaking plants that negatively impact Disadvantaged Communities, and it is therefore critical that the Commission direct NYSERDA to include a performance verification

mechanism, potentially through verification testing, as part of their Implementation Plan.

The City comments that it is critical that the Commission ensure sufficient development of downstate energy storage capacity and supports the Roadmap's recommendations to make downstate specific carve-outs for the bulk storage program and to recover costs of the program from each LSE on a load-share basis. The City recommends that NYSERDA assess downstate energy storage rewards before each procurement to ensure sufficient energy storage capacity addition, and if they are not sufficient, give NYSERDA the ability to increase downstate carve outs. The City also recommends that the utilities and NYSERDA work with the City to overcome unique permitting and land use issues to expand the potential number of downstate energy storage projects.

The City states that the Commission needs to make clear that NYPA customers are eligible to participate in the energy storage programs and receive eligible funds if NYPA voluntarily accepts their funding obligations, as recommended in the Roadmap.

The City recommends that Con Ed complete their current solicitation for the current Joint Utilities' bulk storage dispatch rights contracts procurement and report on the results, noting any needed improvements and monitoring for attrition so that any canceled energy storage capacity is added into a subsequent bulk procurement.

Clearway Energy Group

Clearway states that they support the joint comments submitted by the Alliance for Clean Energy New York (ACE-NY), Advanced Energy United, and the Solar Energy Industries Association.

Clearway suggests two modifications to the Bulk Storage Incentive Program. It believes that these changes are necessary in order to enable NYSERDA to achieve its target of procuring 3,000 MW of energy storage.

First, Clearway recommends that NYSERDA should revise its proposal for the Reference Energy Arbitrage Price (REAP) so that the REAP derives from the nodal price at which the project settles in the New York Independent System Operator (NYISO) day-ahead energy market. Clearway states that the proposal does not consider the significant potential for an invisible gap between a zonal REAP and actual energy revenue realized at a project. By tethering the REAP to the nodal price, it ensures that

projects can secure financing by eliminating what they call "basis risk." Clearway points to its own experiences in California and Texas where differences between nodal prices and zonal settlement constrain tax equity appetite for hub-settled offtake agreements.

Second, Clearway recommends reconsidering the employment of a "change of law" provision in Bulk Storage Incentive Program contracts. Clearway states that this provision is inconsistent with the design of an ISC mechanism.

Finally, Clearway suggests that NYSERDA and DPS staff consider program design elements from California's state-led procurements of utility-scale energy storage assets. Clearway states that states that ascribe underlying value to projects for their contribution to system reliability will be most successful in attracting long-term investment in battery storage projects.

Clearway Energy Group submitted supplemental comments on April 3, 2023, regarding the bulk energy storage procurement proposal.

Clearway Energy Group states their concern that the ISC design will not result in bulk storage projects at scale. Clearway Energy Group further comments that developers are not guaranteed any minimum revenue for the contract term and that merchant revenue in the NYISO markets is so uncertain that it is extremely difficult for developers to calculate a competitive Strike Price. It also states that tax equity investors favor stable revenues over merchant revenues for a nascent resource class.

Clearway Energy Group comments that under the current proposal there are not sufficient guardrails to protect against irrational bidding which occurs when developers do not accurately reflect their costs, resulting in a lower Strike Price. NYSERDA could then choose such a project that later withdraws due to poor economics.

Clearway Energy Group recommends that DPS/NYSERDA pursue bulk storage procurements using Utility Dispatch Rights, described in Option #5 in the Roadmap. It states that the long-term fixed-price contract offered under the UDR paradigm reduces cost uncertainty for NYSERDA compared to the ISC proposal.

Clearway Energy Group recommends several changes to the ISC proposal if the proposal moves forward. It comments that the Reference Arbitrage Price should derive from nodal prices to attract for capital. It also recommends offering a fixed-price, long-term credit alongside the ISC so that developers of bulk storage projects see two revenue streams, guaranteeing a minimum payment which would entice developer

participation in the bulk storage program. Clearway Energy Group recommend extending contract lengths up to 20-years so developers can amortize costs over a long period, receive better financing, and aligns more closely with developer costs. It also states that the Roadmap's program cost estimates need to be broader than the proposed +/- 15% of the base estimate to account for forecasting and market revenue uncertainty.

Consolidated Edison Company of New York/Orange and Rockland Utilities (The Companies)

The Companies recognize the ambitious energy storage targets of the Roadmap and comment that any mechanism must have enough flexibility to account for and respond to the quickly changing conditions of the energy storage market and challenges of the downstate grid.

The Companies support the ISC bulk storage proposal and in conjunction recommend The Companies be allowed to continue and improve upon the utility dispatch right (UDR) procurements for third party or utility-owned storage. The Companies propose the creation of a "Bridge-to-Wires" (BTW) mechanism under the UDR intended to enable faster end-use electrification through deferring the building of traditional infrastructure with the idea that these storage projects could be relocated when no longer needed to other areas of the system to further enable end-use electrification. The Companies point out the potential of BTW to procure projects that can provide wholesale services and alleviate distribution needs, increasing projects' estimated revenue leading to lower bids and increased competition. The Companies request Commission approval of the BTW UDR design and authorization for The Companies to submit an Implementation Plan detailing the design.

The Companies recommend the existing UDR energy storage target goals of 300 MWs and 10 MWs for Con Edison and O&R respectively should not decrease, and that the Commission should allow flexibility of the targets between the UDR, BTW, and ISC processes to maximize installed energy storage. The Companies further recommend the removal of a firm commercial operation date and establish project timelines through the contracting process.

The Companies propose to work with Staff to determine how to include the value of enabling faster electrification through the proposed BTW framework in their Implementation Plan. They further recommend that the Commission retain the net benefits incentive described in the Energy Storage Order and

expand it to include transmission and distribution benefits, as well as wholesale revenues. The Companies also propose a 15-year amortization period for UDR payments which is consistent with other programs and moderates bill impacts for customers. The Companies support the continuation of the retail storage program and an expansion to include the creation of a behind-the-meter storage incentive, in consultation with NYSERDA and Staff. They reason that this would enable quicker energy storage deployment in Disadvantaged Communities. The Companies request to develop a BTM implementation plan within 90 days of a Commission Order.

The Companies support the recommendation in the Roadmap to undertake a comprehensive study for utility storage that is integrated into the distribution system. The Companies state that this study may take a while and therefore recommend that the Commission allow the Companies to submit a filing within 90 days of an Order that outlines defined storage use cases with a solicitation and implementation framework that could allow for quicker deployment of individual projects. In general, The Companies support utility-owned storage because of its value in providing grid services and that utility-owned storage should be incorporated into local and transmission planning processes.

Convergent Energy and Power

Convergent Energy and Power (Convergent) supports Staff's analysis and the adoption of an energy storage deployment goal of 6 gigawatts (GW) by 2030. Convergent notes that both the growing sophistication of storage solutions and the concurrent opportunity to leverage the Federal Investment Tax Credit and other sources of financing makes this window of time both a critical but advantageous one to deploy energy storage and create solutions for the State's changing grid.

Convergent supports the proposed funding and capacity allocation framework in the Roadmap. While it appreciates the inclusion of both NYPA and LIPA, it notes that their progress should be regularly reviewed in order to inform adjustments to the size and scope. In addition to regular review of both NYPA and LIPA, Convergent recommends that Staff provide opportunities for public review of the Roadmap and its programs to allow for adjustments to ensure uninhibited progress towards the 2030 goal. Convergent states that potential changes, in categories enumerated in its comment, ensure that the Roadmap's well-founded principles will not conflict with real-world conditions

in the future, and will not impede continued storage development.

Convergent makes a number of recommendations specifically about the Bulk Storage Program. Specifically, Convergent concurs with Staff's selection of the Index Storage Credit as a means to incentivize bulk storage development. However, Convergent notes that differing duration times require the creation of separate Reference Prices to appropriately assess proposals. Additionally, Convergent states that the assumptions and formulas used to craft Reference Prices must be made transparent and subject to stakeholder feedback.

Convergent recommends that the derivation of the Reference Energy Arbitrage Price should include a Round Trip Efficiency (RTE) factor. Convergent goes on to state that Staff should adopt a standard RTE assumption for each duration class.

In order to facilitate financing and mitigate risk, Convergent states that the Commission should create a ceiling value for the differential between Reference Prices exceeding Strike Prices and provides different methods for how this could be enacted. Convergent states that enacting this ceiling value ensures that projects are not punitively subject to situations in which price and operating conditions are both wildly altered, but still incents projects to optimize performance.

Convergent agrees with Staff's recommendation regarding a one-time adjustment to Strike Price for accepted projects to adjust for inflationary changes but cautions that this should be accompanied by clear parameters. Convergent urges staff to take this suggestion a step farther and establish a one-time option for assets to reapply their interconnection agreement in a following Class Year. Convergent states that this would allow developers to avoid scenarios in which cost allocation deviates from initial estimates and impacts project economics.

Convergent also agrees with staff's inclination to include non-price factors in the evaluation of bids and further recommends that projects should be recognized and encouraged to demonstrate advanced maturity, local grid emission reduction, or unique project design and configuration when submitting bids.

Finally, as it relates to bulk storage, Convergent cautions that the design and administration of the Bulk program must be considered to avoid excluding smaller bulk storage in the 5 to 20 MW range. Convergent states that by providing a different incentive level and/or carve-out for this segment, the State could capitalize on the benefits of the smaller bulk storage systems.

Regarding the Retail Storage Program, Convergent supports staff's recommendation and believes that the Retail Storage program should be opened as soon as possible to allow for a strong start to the program.

Convergent recommends increasing the 15 MWh incentive cap to 20 MWh, to encourage longer durations, incentivize efficient project design, and improve economics in a wider geographic reason. Also related to valuations, Convergent supports Staff's recommended public Value of Distributed Energy Resources calculator for storage assets.

Regarding the upstate retail storage market, Convergent recommends that an inventive be provided for upstate solar-paired storage, which would encourage the development of value-accretive solar assets that can bolster storage economics and deliver benefits to the region.

Convergent states that behind the meter non-residential assets must be incentivized and recognized as a subset of the retail program for their unique ability to curb demand, provide resiliency, and support the private sector's commitments to decarbonization.

Convergent supports Staff's assessment of the need for long duration energy storage. Furthermore, Convergent states that long duration R&D initiatives and opportunities be made transparent, competitive, and well-defined in order to encourage innovation.

As it relates to storage as a transmission asset or a non-wires alternative, Convergent commends Staff for acknowledging the value and promise of these systems. Convergent notes the value that storage assets have and the different scenarios in which they can be used. Convergent states that non-wires alternative programs should not be excluded outright from deriving incentives. Despite their enthusiasm for these assets, Convergent cautions including these solutions towards the 6 GW target as it could skew market signals. Convergent instead recommends that non-wire alternatives should be considered under grid planning initiatives.

Convergent highlights the need for alignment and transparency in utility processes. Convergent supports the Roadmap's emphasis on wide participation and encourages Staff to hold stakeholder forums on the dual participation model.

Sunrun Inc, PosiGen Inc, SunPower Corp, Tesla (Collectively, DER Parties)

DER Parties support the recommendation to expand the residential storage program statewide. DER Parties state that an upfront incentive for statewide deployment of residential storage will support early adoption, increase residential storage deployment, and inform best practices for interconnection, siting, and permitting.

DER Parties state that eligibility for an upfront incentive should not require participation in other programs. They believe that storage provides grid benefits on its own, and currently there are limited opportunities for residential storage to participate in other programs. However, DER Parties emphasize that there should also not be a restriction on participation in performance programs that become available. DER Parties request that Staff and NYSERDA expand directives for the Joint Utilities to explore programs that provide benefits like load reduction and energy exports, and specifically, opportunities for "Bring-Your-Own-Device" programs.

DER Parties support the recommendations of NYSEIA to increase the Residential Storage Program's target capacity of 200 MW to at least 400 MW. DER Parties also support increasing the residential storage program initial funding target of $72 million on a $/MW basis stating that the current incentive amount will not be enough to animate the market.

DER Parties recommend that the upfront storage program should provide a clear timeframe for which a project must receive permission to operate after it receives an incentive reservation in order to remain eligible for that incentive. DER Parties also support maintaining the current timeline for solar PV incentives.

DER Parties agree with Staff and NYSERDA that residential storage projects located within disadvantaged communities should be deemed to be providing local benefits. DER Parties asks that Staff and NYSERDA consider providing an increased rebate for projects located in disadvantaged communities.

DER parties note the importance of Authorities Having Jurisdiction fire code issues and ask Staff and NYSERDA to support engagement on these issues where possible.

Council Member Julie Won, Assemblymember Robert Carroll, Senator Kevin Parker, Council Member Rafael Salamanca, Jr. (the Elected Officials)

The Elected Officials strongly urge the Commission to codify a downstate carveout of two-thirds of the energy storage to be procured under the bulk storage program. They reason that this carveout is necessary in order to ensure compliance with the CLCPA directives. The comments express concern that without the carveout, there is a risk that the procurement does not result in a sufficient number of energy storage projects downstate to reduce the usage of fossil-fueled peaker plants in disadvantaged communities.

Elevate Renewables "Elevate"

In its initial comments, Elevate supports the proposed 6GW energy storage deployment target. Elevate recommends that energy storage deployment be paired with fossil generation sites and utilize their existing electrical interconnections to minimize system upgrade costs. Elevate supports locating significant amounts of bulk energy storage sites in Zone J to reduce transmission bottlenecks from upstate to downstate.

Elevate states that energy storage projects should be located within Environmental Justice and Disadvantaged Communities to improve reliability, integrate renewable generation, and reduce the use of high-emitting peaking plants. Elevate further recommends that a portion of the proposed 3GW bulk energy storage program be directed towards the redevelopment and remediation of brownfield sites.

Elevate supports the ISC as the primary financial mechanism of the bulk energy storage program and declining block structure for the retail and residential energy storage programs. Elevate states that NYSERDA procure the full 6GW of energy storage irrespective if other state agencies conduct their own energy storage procurements due to the possibility of canceled projects and supply chain disruptions.

Elevate states that investor-owned utilities should be prohibited from owning and operating energy storage resources due to their disproportionate market power and instead recommends independent and private ownership of energy storage facilities.

Energy Hub

EnergyHub supports the Roadmap's recommendation to adopt an ambitious, but necessary, deployment target of 6 GW of energy storage by 2030.

EnergyHub is encouraged by the proposed continuation and expansion of the retail and residential storage incentive program. Specifically, EnergyHub notes that the 200 MW residential storage target is reasonable and an appropriate approach. EnergyHub supports the use of up-front incentives and incentive blocks. Additionally, EnergyHub is supportive of the procurement schedule, but notes that we may see more significant growth than initially anticipated early in the program lifestyle. EnergyHub recommends that future load management participation mechanisms should include options for both "passive" discharge, as adopted in other jurisdictions, and "active" demand reduction.

EnergyHub supports the Roadmap's encouragement of examining program designs and mechanisms for enabling energy storage owners to participate in demand response programs. Regarding load management participation models, EnergyHub agrees with survey respondents that utility Bring Your Own Device programs have a proven history of success. EnergyHub suggests that grid services participation mechanisms should recognize the full complement of grid benefits, maximize system configurations and hardware eligibility, and allow for flexibility in the administration of incentive payments. Moreover, EnergyHub recommends that load management mechanisms should allow customers and third-party aggregators to be compensated for bulk system services as well as distribution-level services.

Additionally, EnergyHub suggests that various grid service participation models, including utility-managed programs, direct aggregator participation in the NYISO markets, a parallel combination of both, or consolidation of these models, should be considered. EnergyHub also recommends that retail and residential incentive programs should limit incentive eligibility to the battery technologies and vendors that support third-party operational control and integration with modern DERMS platforms.

EnergyHub makes specific recommendations for geographic and demographic considerations. EnergyHub supports the Roadmap's emphasis on deployment of residential storage in disadvantaged communities. While EnergyHub suggests that stakeholders evaluate incentive mechanisms to accelerate program adoption in marginalized customer segments, it notes that

incentives and future load management mechanisms be open to all regions and customer classes in order to reduce complexity and encourage project installers. EnergyHub concurs with the Roadmap's recommendation to design the program to ensure a significant portion of energy storage is deployed downstate. However, EnergyHub notes that the program should not cap deployment in the upstate service areas.

Responding to question 7.5, EnergyHub states that up-front incentive adders for Disadvantaged Community customers should be considered. These incentives must be healthy enough to entice installers to incorporate incentive administration into their customer offering and acquisition process. EnergyHub makes the same recommendation for load management incentives.

EnergyHub suggests that stakeholders should consider a variety of grid and societal benefits in the development of hardware installation incentives and future load management pathways. In addition, EnergyHub suggests that customers "at the edge of the grid" should be eligible for additional up-front hardware incentives. Moreover, the assignment of installation incentives should be allowed in order to increase attractiveness of the programs to home electrification providers.

EnergyHub recommends that simple customer eligibility, technology qualification, program enrollment and data reporting requirements should be development to maximize participation and interest. Additionally, EnergyHub suggests leveraging the IT/OT infrastructure that utilities already have in place in the development of load management program designs. EnergyHub endorses the eligibility of standalone storage for residential block incentives and future load management participation.

EnergyHub further recommends that load management program designs should allow for the use of device-level telemetry for the determination of delivered energy or capacity from participating systems. The load management programs should also permit discharge to the grid. EnergyHub states that programs that prohibit grid export or limit demand response participation to household self-consumption will leave valuable capacity on the table, while struggling to incentivize meaningful levels of customer enrollment. Finally, EnergyHub reasons that as load management participation options for energy storage mature, it will be important to consider mechanisms for combining ongoing performance incentives with up-front residential block incentives as they are a powerful tool for customer acquisition and accelerating the deployment of residential storage on the grid.

EnSynchrony

EnSynchrony recommends broadening the Roadmap to consider energy storage in the transmission environment. It states that "Storage as Transmission" as described in the Roadmap will not provide sufficient revenue and recommend that storage be designated a "Transmission Facility" for purposes of NYISO planning studies; absent this designation EnSynchrony comments that storage as transmission will not come to fruition.

Fermata Energy

Fermata Energy (Fermata) commends NYSERDA and DPS for assembling a visionary and thoughtful straw proposal for the Commission. However, Fermata encourages the Commission to consider mobile energy storage resources enabled by vehicle-to-grid (V2G) charge management of electric vehicles. Fermata proposes a V2G target in addition to the 2030 6 GW stationary storage target based on the inverter capacity of installed bidirectional charging infrastructure. Specifically, Fermata recommends a minimum 1.5 GW V2G target based on existing projection of EV sales and conservative estimates of V2G technology adoption. Fermata notes that its estimates are based on the NYISO Gold Book projections.

Fermata states that New York could be the first state to adopt a V2G deployment target. Fermata recommends the Commission engage a consultant to evaluate the potential capacity and value to the grid and ratepayers. Further, Fermata notes that incentivizing bidirectional infrastructure investment can ensure New York has the grid flexibility resources necessary to achieve its grid decarbonization goals.

Form Energy

Form Energy notes that prior decarbonization studies identified that New York needs more than 20 GW of dispatchable emission-free resources by 2040, which emerging long-duration storage technologies can provide. Relatedly, Form Energy states that the Storage Roadmap analysis does not evaluate needs for emerging long-duration energy storage resources or how they can fulfill needs for dispatchable emission-free resources in spite of the availability of these technologies by 2030.

Form Energy expresses concern that the State is at risk of significantly under-investing in emerging long-duration and multi-day energy storage in the near-term because of limitations in Storage Roadmap modeling. Form Energy cites,

what they believe are, three key limitations: 1) limited technology representation; 2) limited grid chronology; and 3) limited evidence of 2030 needs. Despite these limitations, Form Energy acknowledges that Storage Roadmap modeling is directionally correct about long-term needs.

Form Energy conducted analysis to identify the least-cost portfolio of diverse emerging long-duration and multi-day energy storage to meet New York's 2030 and 2040 clean energy goals and fulfill needs for dispatchable emission-free resources. Based on this analysis, Form Energy recommends that NY should establish a minimum deployment target for long-duration energy storage by 2030 that is at least half of the remaining storage target. Form Energy states that this could be done in one of two ways: 1) reserve half of the Roadmap's proposed 3 GW bulk storage target for emerging long-duration and multiday energy storage; or 2) establish a pathway for discussions to advance an additional 3 GW bulk storage target dedicated to non-lithium-ion long-duration and multi-day energy storage resources.

Form Energy supports the proposed Index Storage Credit Program. Form Energy recommends that multi-day energy storage should be explicitly eligible to participate in the Index Storage Credit Program, not solely 4- and 8-hour storage. Form Energy states that actions to exclude long-duration and multi-day energy storage resources from the program would be arbitrarily prejudicial and would harm the ability of those resources to compete in the market. Form Energy also recommends that under the Index Storage Credit Program, NYSERDA should have flexibility to separately procure long and multi-day storage resources if the program preferentially favors short-duration storage.

Form Energy recommends that credits should be awarded for every MWh of rated energy storage capacity available. Taking this approach can help ensure neutrality between storage resources, regardless of storage duration.

Regarding reference price periods, Form Energy agrees that to accommodate energy storage technologies with different durations and efficiencies, it is reasonable for the periods used to evaluate the Reference Energy Arbitrage Price to vary based on the x-hour duration of the resources. Form Energy further agrees that it is administratively efficient to omit round-trip efficiency losses from the Reference Price calculation.

Form Energy notes that there are barriers to multi-day energy storage. Specifically, NYISO's capacity market and

ancillary services markets do not differentially value and compensate multi-day storage or firm zero carbon resources for their reliability services. Form Energy also states that another limitation with the NYISO market is that there is not a means for multi-day storage to directly access both transmission enhancing value and energy value – storage must either participate as transmission or in the energy market. Additionally, Form Energy points out that NYSERDA's clean energy procurement programs currently seek and prioritize the lowest-cost as-available renewable energy on a per REC basis and do not preferentially seek or compensate paired renewable energy and storage resources.

Form Energy recommends that New York lift round-trip efficiency and experience requirements on existing bulk storage procurement and incentive programs, and avoid establishing such eligibility barriers in the future.

Regarding demonstration projects, Form Energy supports large-scale demonstration projects of emerging long-duration and multi-day energy storage resources. Form Energy suggests that NYSERDA and the Commission fund multiple technologies and multiple use cases in multiple locations; prioritize use cases including demonstrating firm dispatchable capacity, optimizing transmission system value, and supporting grid reliability and resilience during atypical weather and grid conditions; and prioritize resources that can deliver firm capacity to meet future DEFR needs.

Form Energy recommends that NYSERDA should support at least three large-scale demonstration projects with commercial online dates before the end of 2028. Form Energy suggests that these projects have a commercial online date no later than the end of 2028 and to contract projects no later than the end of 2025. Additionally, Form Energy proposes that NYSERDA and DPS should ensure that NY pairs demonstration project support with additional procurement opportunities.

Form Energy encourages New York to create a diverse set of procurement and incentive programs for emerging long-duration and multi-day energy storage resources. Regarding the bulk-dispatch rights program, Form Energy recommends removing the program's minimum efficiency and experience requirements. Form Energy recommends that New York create new programs that specifically contract for firm, dispatchable emission-free capacity, and recommends expedited efforts to establish the performance that such resources must deliver.

Form Energy supports NYSERDA's intention to maintain the eligibility of co-located and separately located energy

storage projects in bids submitted to the Tier 1 and OSW solicitations. Further, Form Energy recommends modifications to Tier 1 and OSW procurement to specifically seek firm dispatchable resources enabled by energy storage.

Form Energy suggests that the Commission should allow some limited utility ownership of emerging multi-day storage technologies that act as reliability assets to support system benefits, reliability, innovation, and benefits for disadvantaged communities. Form Energy notes that utility ownership can be more expedient and beneficial in the near-term than the administratively complex Bulk Dispatch Rights procurement program.

Attached to Form Energy's comment is their Analysis of the Value of Multi-Day Energy Storage in New York.

FreeWire

FreeWire asks the Commission to explicitly include storage integrated into charging infrastructure in their programs. FreeWire supports the recommendation of DPS and NYSERDA for NYPA and LIPA to participate in the roadmap. It specifically mentions that LIPA's C&I customers would benefit from the roadmap's retail and residential programs.

FreeWire states that the roadmap fails to distinguish between FTM and BTM storage in the retail segment and suggests that this would lead to non-residential BTM installations competing with larger FTM projects, to their detriment. FreeWire recommends that non-residential BTM storage receive its own procurement target and incentive that is separate from retail FTM installations.

FreeWire states that BTM systems can increase demand flexibility by responding to retail programs and rates, such as charging when prices are low and discharging when prices are high on a time-of-use rate.

FreeWire states that BTM C&I facilities increase resiliency by providing backup power, which can have broader community benefits, such as keeping the power on in a store, community center, or first responder station.

FreeWire states that a Virtual Power Plant which aggregates BTM systems can reduce the need for peaking facilities, which are often located in LMI, disadvantaged, and Tribal communities.

FreeWire notes that BTM storage can help avoid or defer costs of building out the distribution system in constrained areas and suggests that utilities could publish

locations where BTM storage would benefit the system and target incentives toward those areas. FreeWire also supports doing this by further developing the Joint Utilities' hosting capacity maps.

GreenSpark Solar

GreenSpark supports the approval of the Energy Storage Roadmap as an important step in reaching New York State's climate goals. GreenSpark comments that consistent funding is necessary to provide market certainty, and that the proposed retail incentive funding is not enough to make projects economic even after accounting for the federal Investment Tax Credit and VDER revenue. GreenSpark notes that utilizing a variety of storage technologies of different durations will bolster grid reliability and that adequate compensation is needed to support diverse storage technologies. GreenSpark also comments on the importance of local zoning laws to a project's success and the need to develop a battery recycling industry in New York State.

Hydrostor

Hydrostor recommends that the remaining Joint Utilities' Bulk Storage Dispatch Rights procurement should be combined with the bulk storage target and be procured by NYSERDA.

Hydrostor supports the conclusions that there is a clear benefit to storage with durations of 8-hours, and that NYSERDA bulk storage solicitations should explicitly carve out part of each procurement for 8-hour storage resources. Hydrostor recommends that NYSERDA procure 1.5 GW of 8-hour storage in the bulk storage procurements for a number of reasons.

Regarding location, Hydrostor recommends against a mandatory location requirement or specific downstate carveout for NYSERDA's RFPs. Hydrostor cites to the fact that land downstate is either expensive or unavailable, and could limit the MW scale of projects. Instead, Hydrostor recommends that NYSERDA should consider location as just one factor in the evaluation process.

Hydrostor is supportive of the Index Storage Credits (ISC) concept. However, Hydrostor is concerned with the Round-Trip Efficiency (RTE) as it is potentially not technology agnostic, and disadvantage innovative, low-cost non-lithium-ion technologies, causing higher costs and less technology diverse and reliable electricity system. Hydrostor also recommends that

RTE should be used in determining how many hours of arbitrage are economical. While Hydrostor agrees with NYSERDA and Commission staff that accounting for duration and RTE add complexity, in this case, the significant negative impact to development effectiveness for long duration storage outweighs the potential complexity; therefore, Hydrostor recommends that project specific RTE should be used.

Hydrostor recommends contract length terms that can extend to at least 25 years and potentially to 40 years for certain technologies. Hydrostor notes that the 15-year contract term is likely based on program date of lithium-ion based batteries and is not applicable to all storage technologies.

In order to incentivize benefits to disadvantaged communities, Hydrostor recommends additional incentives for development in certain communities of New York. Hydrostor notes that construction of an -CAES and ongoing operation will create many direct and indirect local jobs.

Hydrostor is supportive of additional funding that would be accessible for innovative long duration (8 hours and more, but less than 24 hours). Moreover, Hydrostor states that additional funding should also be available for innovative technologies, no limitation in procurement participation, and that projects should be large-scale.

Hydrostor recommends that NYSERDA and DPS staff should consider the following metrics when evaluating LDES projects: 1) cost; 2) commercial readiness; 3) environmental issues; 4) synchronous inertia; and 5) service life.

Hydrostor highlights what it sees as benefits to A-CAES including that it is emissions free, is lower cost and has a longer life, is able to be sited in more locations, provides ancillary services, and has customized system design.

Central Hudson, National Grid, NYSEG/RG&E (Collectively, Indicated Utilities)

The Indicated Utilities support utility-owned storage to enable a resilient transmission and distribution system. They state that through utility-owned storage the Indicated Utilities can lower the cost of capital and quickly address reliability needs during extreme weather events, optimize storage deployment in high value areas, and help integrate renewable resources onto the grid, all of which is necessary for the reliable operation of the transmission and distribution system. The Indicated Utilities reiterate that utility-owned

storage would complement other storage procurement efforts, would not compete with private developers, and would return any wholesale market revenue as a credit to customers as is consistent with prior Commission rulings regarding utility-owned storage.

The Indicated Utilities comment that utility-owned storage projects need a quick pathway to operation rather than wait for utility investment approval through rate cases and recommend that utilities have the ability to propose projects in other venues, such as through the Accelerated Renewable Energy Growth and Community Benefit Act Proceeding and associated coordinated grid planning processes.

The Indicated Utilities support the ISC proposed in the Roadmap and recommend that the utilities continue to conduct bulk storage dispatch rights procurements. The Indicated Utilities also support the retail and residential incentive programs described in the Roadmap and comment that the utilities work with NYSERDA and Staff to maximize benefits to customers by leveraging utility experience and customer relationships. The Indicated Utilities comment that energy storage program designs should consider how disadvantaged communities will benefit.

The Indicated Utilities comment that long-duration storage demonstration projects should utilize a variety of technology that can store energy for more than ten hours, including over multiple days both in front of and behind-the-meter with the goal to guide the development of cost-effective solutions. These demonstration projects should be a chance for the utility to partner with stakeholders and community. The Indicated Utilities state that the Commission should ultimately encourage market- and utility-driven development of long-duration storage that meet the performance requirements necessary to ensure a reliable system.

New York City Coalition for a Cleaner Grid (NYCCCG) - comprised of Bishop Mitchell Taylor, Urban Upbound, Mr. Chris Hanway, Jacob A. Riis, Neighborhood Settlement, Ms. Carol Wilkins, NYCHA Ravenswood Residents Association, Ms. Corinne Haynes, NYCHA Queensbridge Residents Association, Mr. Costa Constantinides, Variety Boys & Girls Club of Queens, Dr. Anju J Rupchandani ED Zone 126, The Queens Chamber of Commerce, Eolian Energy, Flatiron Energy, Hecate Energy, and Rise Light & Power, LLC (NYCCCG)

NYCCCG states that the Roadmap does an excellent job of detailing the myriad benefits energy storage can provide to the

New York State electricity system. It refers to the CLCPA and its intention to empower the state to fight climate change, protect Disadvantaged Communities (DACs), and prioritize the retirement of fossil-fueled peaking plants. It explains that DACs impacted by fossil-fueled peaking facilities are disproportionately located in New York City and Long Island and an analysis found that 77 percent of the population that met Disadvantaged Community criteria lived in New York City (Zone J) and 12 percent lived in Long Island (Zone K), with the remaining upstate.

NYCCCG explains that the New York transmission system currently suffers a series of binding constraints, most notably between Zones J and I and between Zones J and K and that these constraints mean that generation located outside of Zones J and K cannot serve these zones in a capacity call event. As such, new energy storage generation built upstate, including in Zones G, H, and I, will be insufficient for NYISO to allow retirement of peaking plants in Zones J and K required for reliability. Only clean capacity built within Zones J and K can enable the replacement of those peaking plants consistent with NYISO reliability standards.

Independent Power Producers of New York (IPPNY)

IPPNY supports the 6 GW storage goal and suggests periodic reviews of progress toward the goal. IPPNY supports using an Index Storage Credit over having Investor-Owned Utilities own storage systems and cites the high number of storage systems in the NYISO interconnection queue to show there is no need for utility ownership. If the Commission allows utility ownership for projects to provide transmission and distribution services, IPPNY asks that the Commission prohibit the utilities from bidding these resources into the NYISO markets.

IPPNY supports the Index Storage Credit Option 2. IPPNY recommends that incentives target investment in locations where it would be most beneficial. IPPNY also recommends that Round Trip Efficiency be incorporated in the Reference Energy Arbitrage Price in the monthly index storage credit calculation. Further, it asks that the calculation be open to future amendments should market conditions change and warrant different considerations.

IPPNY requests that the Commission direct NYSERDA to hold separate competitive solicitations for long-duration (10+ hour) storage, including hydrogen-based storage and other

carbon-free technologies that can act as storage. It cites the Roadmap's conclusion that short- and medium-duration storage will not be enough to maintain reliability to emphasize the need for long-duration storage solicitations. Additionally, IPPNY requests that the Commission direct NYSERDA to conduct its first solicitation as soon as possible so that energy storage projects can enter service in 2023.

Finally, IPPNY supports the goal of targeting disadvantaged communities. To achieve that, it recommends that NYSERDA be allowed to award bonus credit to projects that reduce the demand for peaking plants. It states that requiring a project to be located in load pockets with existing fossil generation can help increase the likelihood that the benefits reach disadvantaged communities.

Jupiter Power

Jupiter Power commissioned a study analyzing and comparing the emissions and deliverability/capacity market impacts of a 500 MW, 4-hour duration storage project sited in each of NYSIO zones H, J, and K.

Jupiter Power states that the study compares regional emissions impacts of a 500 MW/4-hour storage project interconnected at Buchanan 345 kV (Zone H) and Gowanus 345 kV (Zone J). According to Jupiter Power, the study indicates that 1) the Buchanan storage project has the same or better New York City power plant NOx reduction benefits as the Gowanus project; and 2) the Buchanan storage project reduces statewide NOx and CO_2 emissions the same or more than the Gowanus project.

Jupiter Power states that the study also analyzed the deliverability and LCR impacts of the 500 MW/4-hour storage project at Buchanan. According to Jupiter Power, the study concluded that 1) at least 500 MW of storage is deliverable from Buchanan to Zone G-J; and 2) LCR requirements may be shifted from Zones J and K to Zone G-J and served by resources in G-J.

Further, Jupiter Power notes that storage at Buchanan can bring economic developments to Buchanan, a disadvantaged community located downstate. Other benefits, according to Jupiter Power, include 1) lower land costs than in New York City; 2) allows for more alternative siting opportunities and ability to find willing host communities; 3) projects connecting at substations like Buchanan do not compete with offshore wind or Tier 4 transmission for limited substation space; and 4) disadvantaged communities would benefit from the development in storage.

In response to Roadmap Question 7.5.1, Jupiter Power recommends incentive programs and procurements designed to ensure that "at least 35% of proposed program funding is utilized to benefit DACs" should include any project sited in the service territories of Con Ed. Additionally, Jupiter Power suggests bid points for locational emissions benefits should be awarded equally between projects within the Con Ed or LIPA service territories, up to at least 500 MW of procurement beyond what is contemplated in the Roadmap.

Key Capture Energy

Key Capture Energy (KCE) enthusiastically supports New York's 6 GW Roadmap: Policy Options for Continued Growth in Energy Storage (Roadmap) and its recommendations.

KCE strongly supports Index Storage Credit procurements as the primary procurement program for bulk energy storage. KCE notes three key benefits of the ISC program design: 1) value; 2) cost-effectiveness; and 3) risk sharing. KCE urges NYSERDA and DPS to swiftly implement a program design and conduct ISC procurements to realize these benefits.

KCE counsels NYSERDA to award bulk storage contracts promptly to achieve the State's energy storage target. KCE supports the procurement timeline proposed in the Roadmap and suggests that the NYSERDA and NYISO Class Year process should align. KCE states that Staff's proposed timeline of procurements is prudent and necessary to ensure that New York meets the target of 6,000 MW by 2030.

KCE recommends that NYSERDA should award more than 3,000 MWs in Index Storage Credit procurements to account for project attrition. Additionally, KCE suggests that NYSERDA should also plan for attrition among projects awarded under existing programs.

KCE suggests that NYPA and LIPA programs should be additive to ISC procurements. KCE posits that if NYSERDA reduces its planned ISC procurements due to procurement announcements from NYPA or LIPA, and the NYPA or LIPA procurements never materialize, New York will miss its 6,000 MW target and fall behind in deploying sufficient energy storage to achieve its renewable energy mandates.

KCE recommends that ISCs be generated by an ESS under contract each day it is interconnected to the NYISO system. KCE notes that limiting ISC production only to operational days may have unintended consequences for ESS market behavior.

Additionally, under a model that provides for ISCs for

all interconnected days, energy storage resources are incentivized to keep uptime high to earn NYISO revenues and to maximize capacity payments. KCE suggests that because limiting ISC generation to operational days is unnecessary and could potentially motivate unintended market behaviors, KCE recommends that ISCs are generated each day the ESS is interconnected, including days on outage.

KCE advises that NYSERDA and DPS should ensure contracts are financeable while accommodating future wholesale market uncertainty. KCE recommends that any "change of law" provision in ISC contracts should be designed to trigger only if necessary and should restrict potential changes to ensure finance-ability of contracted projects. In the event that a change of law is triggered, KCE recommends that any reduction in the price formula must be based on an index of revenues practically available to the ESS from the new ancillary service.

KCE recommends the use of transparent and objective metrics to calculate the price threshold. Subjective complex calculations of expected value to calculate price thresholds should be avoided. KCE also suggests that price thresholds should not include costs from system benefits charges. As an interim solution, KCE recommends excluding these costs from price thresholds and price comparisons in bid evaluation since they are not costs to ratepayers or the state.

KCE recommends that NYSERDA offer ESS projects participating in ISC procurements and interconnection cost sharing mechanism similar to the option offered in the most recent Offshore Wind Solicitation. This proposed cost sharing mechanism will allow projects with high and uncertain interconnection costs to participate in ISC solicitations by allocating a portion of the interconnection cost to a cost-sharing adder paid separately from the ISC.

KCE notes that energy storage will help displace peaker plants in the same NYISO zone. KCE suggests that NYSERDA should consider location in its bid evaluation criteria, and through its bid selection seek to achieve at least 35 percent of the total MWs through projects located in Zones J and K.

Long Duration Energy Storage Industry Coalition (LDES Coalition)

The LDES Coalition recommends that the Commission carve out at least 2GWs of the Roadmap's procurements for long-duration and multi-day energy storage resources and that NYSERDA separately evaluate short, long, and multi-day energy storage bids as part of the bulk energy storage program. The LDES

Coalition states that long- and multi-day energy storage are not as commercially mature as short-term energy storage and face different barriers to entry. The LDES Coalition comments that policy support is needed for developers to receive the private investment necessary to make LDES a reality.

Long Island Power Authority (LIPA)

LIPA supports the Roadmap and the 6 GW energy storage goal. LIPA recommends that the bulk storage program allow participation of tax-exempt utilities that can take advantage of the Investment Tax Credit due to the Inflation Reduction Act. LIPA states that they have already begun discussions with NYSERDA on how they can participate in the bulk storage program.

LIPA recommends that energy storage procurements use a "Top and Bottom X hours" mechanism to determine reference prices. For 8-hour storage, LIPA recommends requiring projects to offer rated capacity with a TB8 mechanism for calculating reference prices. LIPA also recommends that NYSERDA consult the TOs to identify locations with storage needs and establish a carve-out for these locations.

LIPA asks that NYSERDA consider expanding the program's focus to Zone K as a method to further help reduce the need for peaking units and to benefit disadvantaged communities.

Finally, for long-duration storage, LIPA suggests coordination with the NYISO and notes that the NYISO's Security Constrained Unit Commitment model will likely require modification to properly incorporate long-duration storage.

Multiple Intervenors

Multiple Intervenors (MI) is an unincorporated association of over 55 of New York State's industrial, commercial, and institutional energy consumers.

MI states that the proposal to establish a statewide energy storage target of 6 GW by 2030 is unjustified and unduly aggressive. MI posits that the justifications in the Roadmap are insufficient to impose the additional costs to customers. Moreover, MI argues that there is insufficient information regarding the pace of storage deployments that may be needed between 2030 and 2040. MI states that it is impossible to predict the future economics of energy storage.

As it relates to the CLCPA, MI states that paying for the CLCPA is extremely challenging for customers and recommends that the Commission should restrain from adding to customers' financial burdens unnecessarily. Additionally, MI states that

the possibility of potential challenges in the future does not warrant adding to the financial challenges of customers to try to satisfy CLCPA mandates. MI recommends that the Commission should refrain from adopting an energy storage target in excess of the 3 GW mandate enacted in the CLCPA as there is no compelling reason to do so.

MI recommends that the potential costs of the storage roadmap's proposals should be evaluated in the aggregate with all of the other costs being imposed on customers. MI outlines a number of potential negative consequences that may be occur if the cumulative energy and program costs are not considered. MI states that they have serious concerns over whether customers can afford an energy storage target that is double what is mandated by the CLCPA.

MI expresses concern that the statewide procurement approach is unlikely to result in the optimal mix of energy storage projects. MI notes that the benefits, economics, and environmental impacts of energy storage projects are extremely contingent upon the specific facts and circumstances of the installations themselves.

MI states that the Storage Roadmap proposals would result in inequitable costs increases to large energy-intensive customers. MI suggests that the costs of the proposed Storage Roadmap should be allocated and recovered primarily based on demand, not energy.

New York Power Authority (NYPA)

NYPA generally supports the goals of the Roadmap but disagrees with the recommendation that NYPA voluntarily agree to participate in funding storage programs when NYPA cannot recover those costs through their existing contracts with customers. NYPA notes that unlike utilities under the Commission's jurisdiction, NYPA's contracts and tariffs with their customers do not provide a pathway to pass the costs associated with the Roadmap to their customers.

NYPA comments that it has no electric delivery customers or retail tariffs and therefore cannot recover any retail program costs with a delivery bill surcharge and recommends an alternative cost recovery mechanism.

NYPA further states that it lacks a mechanism to recover the ISC costs allocated to NYPA under the Roadmap proposal which would result in NYPA absorbing millions of dollars in bulk program costs without any way to recover them

through their customers, which would cut into other programs NYPA is involved in that further the CLCPA goals.

NYPA urges the Commission to consider alternative means for NYPA to recover energy deployment costs so that it can fruitfully participate in the energy storage programs.

New York Municipal Power Agency (NYMPA)

NYMPA urges the Commission to reject the proposed load ratio share funding mechanism for NYMPA members described in the Roadmap as it would disproportionately negatively impact NYMPA members. NYMPA states that its members' power is already produced from zero emissions resources and that it already complies with the Clean Energy Standard, which is costly, so adding another cost obligation through a load ratio share as proposed in the Roadmap will be especially burdensome. NYMPA notes that its members' rates are generally lower than those of investor-owned utilities, so any increased bill impacts are acutely felt. The small size of NYMPA's members also make it so interconnecting storage at any size is difficult and therefore the members would not be able to realize any benefits from the program while still paying into it. NYMPA states that if the Commission does decide to adopt the load ratio share funding mechanism that only NYMPA members whose load is served by non-renewable resources be counted.

New York Solar Energy Industry Association (NYSEIA)

NYSEIA overall supports the Roadmap and states that the program cost is "modest" while the "environmental, resilience and economic benefits are significant." NYSEIA supports the Index Storage Credit as it will create revenue certainty for developers while sharing risks and revenue benefits between the State and ratepayers. Further, NYSEIA supports the descending block incentive program design and requests that the Commission monitor progress and consider increasing program funding if needed. It believes there should not be a requirement to participate in a grid services program to be eligible for a capacity-based incentive. NYSEIA further states that NYSERDA has ample experience in administering descending-block incentive programs and should launch their program in 2023, rather than wait until 2024.

NYSEIA recommends prioritizing small (below 5 MW) distributed resources at the retail level with an increased capacity allocation. It states that this could incent locating

resources closer to load where it can have direct benefits to consumers, reduce the need for costly transmission upgrades, and where community projects can target disadvantaged communities.

NYSEIA recommends doubling the residential capacity allocation to 400 MW. It forecasts that supply chain and technology improvements, as well as implementation to time-of-use rates will encourage energy storage retrofits to existing PV systems. It also states that residential aggregations can be implemented quickly, increase local resiliency, and avoid transmission upgrades.

NYSEIA supports developing price signals and grid service programs to help incent storage development. It states that currently a residential flat-rate customer has no opportunity to earn a return on investment for a storage system. It supports encouraging time-of-use rates in other regions of NYS.

NYSEIA recommends allowing projects with interconnection approval who are awaiting municipal permits to submit a non-refundable deposit to be eligible for a NYSERDA incentive. It also encourages Staff and NYSERDA to work with stakeholders on permitting and interconnection reform.

Finally, NYSEIA encourages NYSERDA to leverage successes from NY-Sun LMI solar programs to encourage storage development by considering things like, incentives for projects that participate in NY's Community Distributed Generation program, establishing incentive adders for projects owned by multifamily affordable housing, community facilities, and LMI households.

New York State Reliability Council (NYSRC)

The NYSRC stresses the importance of reliability as NY shifts toward a renewable and carbon-free grid and states that reliability rules will need to evolve through the process. It notes that, based on the 2023-24 Installed Reserve Margin Study, potential reliability events range from 1.2 hours to 9.3 hours, with an average of 3.6 hours. It explains that this means 4-hour storage will not be sufficient to cover more than half of the modelled reliability events.

The NYSRC notes that inverter-based resources have operating limitations. Specifically, they lack fault ride-through and voltage recovery capabilities. As a result, the NYSRC has established a goal to consider rules for inverter-based resources.

NineDot

NineDot supports the recommendations outlined in the Roadmap and urges the Commission to approve it and adopt the 6 GW target and proposed budget.

NineDot supports the geographic-specific, upfront declining block incentive for retail storage as proposed in the Roadmap. It states that as the proposed structure is built upon the already authorized Market Acceleration Bridge, it should be implemented as soon as possible with a large early block size.

NineDot further recommends several solutions to address market structure barriers for energy storage, including modifying rate structures, addressing permitting and siting challenges in New York City, and the creation of a working group to examine retail storage deployment on Long Island. NineDot supports the proposed retail incentive budget as necessary to fill in the "missing money" developers need to get retail storage projects into service. It comments that a steady pipeline of projects will be necessary for the State to achieve its storage targets and therefore support a large initial block incentive for retail storage to account for interconnection delays.

NineDot supports a prevailing wage requirement that aligns with Federal regulations and notes the potential of energy storage to improve the quality of life in disadvantaged communities by replacing high-emitting peaking plants, especially downstate. NineDot recommends that the funding for cancelled projects automatically get reallocated within the open funding block. NineDot supports the creation of a Clean Energy For All opt out program for disadvantaged communities designed to pass on benefits to low-income subscribers and that the retail storage incentive should include bidirectional electric vehicle chargers to enable vehicle-to-grid services.

NineDot offers several recommendations to the VDER tariff to better enable the buildout of energy storage systems. The recommendations include introducing a study performed every seven years for energy storage systems greater than 1 MW to update the operating profile of the asset, better aligning the VDER Capacity Component Alternative structure, future-proof and extend the VDER Demand Reduction Value component, and revise the VDER and SIR limits to 10 MWs.

NineDot recommends that Con Ed restart its Modified High-Tension program which would enable energy storage sites to have equitable delivery rates in all neighborhoods in New York City, resulting in increased energy storage deployment across

all boroughs. NineDot also recommends that utility capacity hosting maps get updated frequently so that developers understand the current interconnection landscape and to reinstate and expand network-optimized delivery service rate design.

NineDot states its support for including Dynamic Load Management (DLM) compensation in the VDER framework and dual participation in demand reduction value and DLM. It further comments that DLM contracts should be 15-years to mirror the ISC bulk solicitation process and that the customer baseline methodologies need modification to allow for the optimal use of batteries by measuring the performance of energy storage system exports during DLM events.

NineDot recommends establishing an NYC based NYSERDA siting team to help streamline the permitting process for energy storage projects, which can require obtaining several permits over a multiyear process and standardizing the permitting process in other areas of New York State. It also supports the formation of a working group comprised of NYSERDA, DPS, LIPA, and PSEG-LI to examine rate structures and incentives for retail storage to meet the Roadmap's target of 1.5 GW of energy storage on Long Island by 2030.

Nuvve

Nuvve supports the recommendation to increase the storage deployment goal to 6 GW. Nuvve requests that the State establish a target of 1.5 GW for bidirectional charging infrastructure (Vehicle to Grid, or V2G) deployment by 2030. This target would be in addition to, and not count toward, the 6 GW goal. Nuvve also requests that the State formally investigate the benefits to decarbonization and resiliency of V2G systems and use that to inform an incentive program to meet the above proposed target. Nuvve states that current EV charger incentives are not sufficient to incent buildout of bidirectional charging systems and therefore should provide an additional incentive on a $/kW basis and on the condition that the project participates in VDER or a utility demand response program.

New York State Battery and Energy Storage Technology Consortium (NY-BEST)

NY-BEST supports the 6 GW energy storage goal and the proposed funding allocations. NY-BEST recommends that projects under current contracts that are withdrawn have their MWs and

funding rolled into the proposed programs. Further, it recommends that NYSERDA size their program solicitations with the inclusion of an attrition rate.

NY-BEST supports the proposed Index Storage Credit funded through bill collections from LSEs based on load. NY-BEST also supports participation by NYPA and LIPA in the program. Further, it proposes that NYSERDA annually assess the need for 4-hour, 8-hour, and longer-duration storage.

NY-BEST disagrees with Staff's recommendation not to include Round Trip Efficiency (RTE) in the Reference Energy Arbitrage Price. To address the issue of complexity in calculating RTE, it proposes a uniform RTE factor that is part of the monthly index and specifically recommends an RTE of 85 percent for 4-hour storage.

For 8-hour systems, NY-BEST proposes four potential paths for consideration: 1) Set the reference price based on each individual project's RTE; 2) have a standard RTE in the mid-range (around 70 percent) for anticipated participants; 3) use the 4-hour RTE assumption and accept that a risk premium must be included in the strike price for systems with a lower RTE; or 4) calculate the reference price using only the top 4 hours. NY-BEST suggests the Commission place a limit on what a project could owe NYSERDA if the reference price exceeds the strike price to lower the cost of financing.

NY-BEST agrees with the proposal to allow projects to have a one-time adjustment for inflation. NY-BEST also recommends that contract language be tightly structured to only allow modifications in response to larger and longer changes in compensation levels rather than responding to smaller and shorter-term market changes.

NY-BEST agrees with the proposal to include non-price factors in the bid evaluation. Specifically, it recommends allowing bonus points for projects that have met maturity/viability thresholds, projects in or directly benefitting Zones J and K in a way that would reduce reliance on peaking plants, and selecting a diverse set of projects. In addition, it proposes to allow a developer to exercise a one-time option to not accept NYISO cost allocation and to reapply in the next Class Year.

NY-BEST suggests that the Commission direct the utilities to remove surcharges and riders from delivery rates for charging load of front-of-the-meter storage.

NY-BEST recommends the Joint Utilities' bulk storage dispatch rights procurements are continued and that the utilities be required to meet the targets in the Energy Storage

Order. If any targets are not met, NY-BEST recommends reallocating that funding to the Index Storage Credit program.

NY-BEST supports the recommendation to continue a Retail Storage Incentive targeting 1.5 GW of retail storage by 2030. NY-BEST encourages NYSERDA to implement the storage program as soon as possible, ideally in 2023. Further, it suggests increasing the incentive cap from 15 MWh to 20 MWh. It also supports project maturity requirements but ask that NYSERDA not require FDNY and Department of Buildings approval in NYC.

For Upstate regions, NY-BEST suggests creating distinct incentive blocks for solar-plus-storage and standalone storage or a higher incentive level for standalone storage. NY-BEST also suggests that the incentive program target both FTM and BTM projects.

NY-BEST urges strong support for having LIPA participate in the program. In addition, it recommends that the Commission and NYSERDA explicitly allow storage supporting EV charging in the program.

NY-BEST encourages the Commission to consider a proceeding that would create utility locational value tariffs for energy storage. It also encourages the Commission to initiate a proceeding to create a Clean Energy for All Program. This program would enroll disadvantaged communities as beneficiaries to CDG savings, with the option to opt out.

NY-BEST recommends adopting 8+ hours as the definition of long-duration energy storage. Further, it recommends the State create a program to fund demonstration projects with different long-duration storage technologies.

NY-BEST recommends DPS and NYSERDA request that the NYISO expedite their Storage as Transmission project. It also stresses the importance of coordinating with the Coordinated Grid Planning Process.

NY-BEST supports the idea that Vehicle to Grid technologies will be important in the future and asks DPS and NYSERDA to create and expand programs to enable bi-directional chargers.

New York City Coalition for a Cleaner Grid (NYCCCG) - comprised of Bishop Mitchell Taylor, Urban Upbound, Mr. Chris Hanway, Jacob A. Riis, Neighborhood Settlement, Ms. Carol Wilkins, NYCHA Ravenswood Residents Association, Ms. Corinne Haynes, NYCHA Queensbridge Residents Association, Mr. Costa Constantinides, Variety Boys & Girls Club of Queens, Dr. Anju J Rupchandani ED Zone 126, The Queens Chamber of Commerce, Eolian Energy,

Flatiron Energy, Hecate Energy, and Rise Light & Power, LLC (NYCCCG)

NYCCCG states that the Roadmap does an excellent job of detailing the myriad benefits energy storage can provide to the New York's electric grid. It refers to the CLCPA and its intention to empower the state to fight climate change, protect Disadvantaged Communities (DACs), and prioritize the retirement of fossil-fueled peaking plants. It explains that DACs impacted by fossil-fueled peaking facilities are disproportionately located in New York City and Long Island and an analysis found that 77 percent of the population that met DAC criteria lived in New York City (Zone J) and 12 percent lived in Long Island (Zone K), with the remaining upstate.

NYCCCG explains that the New York transmission system currently suffers a series of binding constraints, most notably between Zones J and I and between Zones J and K and that these constraints mean that generation located outside of Zones J and K cannot serve these zones in a capacity call event. Because of this, new energy storage generation built upstate, including in Zones G, H, and I, will be insufficient for NYISO to allow retirement of peaking plants in Zones J and K required for reliability. Only clean capacity built within Zones J and K can enable the replacement of those peaking plants consistent with NYISO reliability standards.

NYCCCG opines that the language in the upcoming Order must be strengthened compared to that in the Roadmap to ensure sufficient storage is procured downstate. While the Roadmap, recommends that at least 35% of program funding be utilized to support projects in areas of the state with the highest benefits to DACs and peaker reductions, NYCCG believes that stronger language is needed to ensure adequate investment is directed downstate and towards the protection of DACs. More specifically, NYCCCG states that language in the Roadmap is problematically vague in that the term "highest benefits to DACs and peaker reductions" is not further defined. Without further clarification, this language could be interpreted to justify storage procurement almost anywhere in the state. While transmission scale storage does provide a myriad of statewide benefits, only storage located in Zone J and Zone K can provide locational capacity sufficient to enable the replacement of fossil-fueled generation in and around densely populated Disadvantaged Communities

New York Independent System Operator (NYISO)

The NYISO explains that energy storage resources will be important to helping meet demand when renewable energy output is low but stresses that energy storage resource deployment should not outpace renewable deployment. It explains that energy storage resources increase net load because they use more energy to charge than they can later discharge. It states that if renewable development does not keep pace, energy storage resources could end up charging from fossil-based resourced or at prices that are not cost-effective. This could also lead to grid imbalances.

The NYISO states that, while they recognize financial incentives may be necessary to facilitate storage deployment, they believe the price signals from NYISO markets "provide the foundation for economically efficient storage." The NYISO also states that incentives for storage development should encourage resources that are capable of charging from the wholesale grid.

The NYISO notes that storage will play an important role in helping fill short-term needs during the energy transition, but stresses that long-duration needs will become apparent, and current battery storage cannot sufficiently meet those needs.

The NYISO encourages participation by DPS and NYSERDA in their stakeholder meetings regarding the Storage and Transmission project.

The NYISO states that, since energy storage resources both charge and discharge, they have the opportunity to provide services to the grid. It recommends that the Commission and NYSERDA encourage energy storage resources to take advantage of these services in the wholesale markets.

Finally, the NYISO encourages NYSERDA and DPS to closely follow the demand curve reset process, which will consider energy storage resources as a peaking plant technology option.

PEAK Coalition

The PEAK Coalition, which consists of New York City Environmental Justice Alliance, UPROSE, The POINT CDC, New York Lawyers for the Public Interest, Clean Energy Group, as well as Earthjustice and El Puente as signatories, submits comments in support of the Roadmap. PEAK Coalition urges the Commission to explicitly allocate no less than half of the 6 GW target, including at least 2 GW of bulk storage, to Zone J and to prioritize funding projects that relieve the energy burdens of

communities surrounding peaker plants in New York City. In explanation, PEAK Coalition states that the communities overburdened by peaking facilities are disproportionately located in New York City and Long Island; these communities face an increased burden of air pollution. Additionally, as electricity from peaker plants is up to 1,300 percent more expensive than the average cost of electricity, these communities pay higher energy costs. PEAK Coalition comments that although there has been legislation mandating higher standards for generation emissions, there are other hurdles that prevent the retirement of peaker plants. PEAK Coalition recommends that the language of the Order clarify and provide stronger language to ensure that the deployment of energy storage downstate is prioritized; for example, requiring that population density and proximity to peakers be considered. PEAK Coalition also recommends that the Commission require energy storage projects to be located in the same zone as the peaking plants targeted for replacement. Finally, PEAK Coalition recommends a specific carveout for Zone J to ensure that rapid deployment of storage resources occurs as quickly as possible. PEAK Coalition reasons that without this carveout, energy storage developers may be unable to develop projects downstate.

Plug Power

Plug Power requests that hydrogen and hydrogel fuel cells be counted in the Roadmap as both short- and long-duration resource options. It adds that the Roadmap should explicitly target incentives at storage capable of providing for longer than 10 hours and emphasize that NYSERDA should support R&D in technologies that can achieve this. Further, Plug Power requests that NYSERDA's Clean Energy Citing Team work to help remove barriers to transporting and citing hydrogen and hydrogen-resources. Finally, Plug Power recommends supporting off grid EV charging in the short-term.

PowerFlex

PowerFlex supports a region-specific storage incentive in declining blocks. It notes that lithium carbonate prices in China have increased fivefold from 2021 to 2023 and therefore they support a beginning incentive range of $350-550/kWh with higher incentives downstate. It also supports aligning funding levels with solar incentives and increasing funding downstate.

PowerFlex supports the Roadmap's goal to prioritize disadvantaged communities and suggests a $/kWh adder for projects in these communities.

Queens Climate Project

The Queens Climate Project (QCP) submits comments in support of the Roadmap. Specifically, QCP supports the expanded energy storage target, the emphasis on the need for storage downstate as soon as possible, and the future savings and related improved air quality as a result of energy storage deployment. QCP also notes that the Roadmap aligns with the CLCPA, especially the goal of ensuring energy storage projects deliver benefits to disadvantaged communities through the retirement of peaker plants. Additionally, QCP urges the Commission to direct NYSERDA to conduct bulk storage procurements that prioritize Zone J, by allocating funding based on the benefits of replacing peaker plants in disadvantaged communities.

Rise Light & Power, LLC (Rise)

Rise supports the Storage Roadmap and requests that the Commission 1) approve the Roadmap recommendations requiring NYSERDA to adopt criteria in future Index Storage Credit (ISC) solicitations that favor projects that can facilitate the reliable replacement and redevelopment of New York's fossil fueled power generating facilities; and 2) direct NYSERDA to adopt criteria that favors projects that benefit disadvantaged communities.

Rise recommends that NYSERDA and DPS Staff integrate any unutilized capacity and funding from the Joint Utilities Bulk Storage Dispatch Rights procurement into the proposed ISC solicitations.

Rise recommends that requirements based on the likely future-state scenarios under the CLCPA point to location requirements for energy storage to maintain reliability should be reflected in ISC solicitations in order to allow developers to propose projects where they are needed the most to maintain system reliability. However, Rise recommends against specific carve-outs in the ISC solicitations as they may drive up the costs of the proposed solutions. Instead, Rise recommends adjustments to the scoring system to provide additional weighting to favor projects that address location requirements, as this would enable NYSERDA to balance cost against

preferences. Rise also recommends that the ISC solicitation be agnostic on duration. Additionally, Rise recommends that the TB mechanism align with the duration of the storage project.

Rise commends the focus on disadvantaged communities in designing the storage program, but cautions that replacing peakers with energy storage projects may not be sufficient to maintain system reliability. Rise recommends that additional action be taken to diversify renewable energy sources. Rise recommends that NYSERDA and DPS Staff should seek diversity in project sizes, developers, and locations. Additionally, Rise suggests that NYSERDA and DPS Staff should consider incorporating Zonal Net Emissions Reduction in the ISC solicitations.

Serium Energy Storage

Serium is supportive of the Roadmap and states that expanding storage procurement from 3 GW to 6 GW is necessary to achieve the State's renewable energy and carbon reduction goals.

Serium recommends that a procurement of diverse technologies should be considered. Serium suggests that the Commission consider diversification beyond chemical battery storage technologies, such as underground, closed-loop, pumped storage, which can reduce the concentration of technology risk and offer longer duration storage, operational flexibility, and a permanent storage resource based.

Serium suggests that long duration storage should be procured concurrent with short-duration projects. Specifically, Serium suggests that given the use proven technology and environmentally friendly attributes, accelerating the deployment of pumped storage by mitigating the need for small scale demonstration as a prerequisite to building at scale would be a sensible option for bridging the gap between the need for long duration storage, and the time that it will take to complete the robust development process for more nascent storage technologies. Serium also notes that pumped storage also has to go through a FERC licensing process and is currently eligible for investment tax credits, both of which are time sensitive.

Serium proposes that LDES can utilize Index Storage Credits but will require different terms than short-duration battery storage. Serium makes a series of recommendations related to long duration storage procurement including: 1) an express set aside for bulk LDES projects; 2) contract terms from 20 to 30 years; 3) evaluation of the operational benefits of individual LDES projects; 4) evaluation of the unique

environmental impacts and benefits of individual LDES projects; 5) evaluation of the economic development benefits of individual LDES projects; and 6) allowance for creative financing mechanisms.

Serium recognizes that NYPA would be a constrictive participant in facilitating a near-term bulk procurement of LDES storage due to its expertise in hydro, pumped storage, and power system management.

Strategic Project Management (SPM)

SPM strongly supports the Roadmap's analysis and the 6 GW energy storage deployment goal. It also recommends an annual review of progress toward the goal. SPM strongly agrees with the Roadmap's recommendation to use an Index Storage Credit and supports funding the programs through bill collections from LSEs in proportion to load. Additionally, SPM suggests that, if projects are withdrawn, those MWs and their associated funding be reallocated into new programs.

SPM urges NYSERDA to annually look at the need for 4- and 8-hour resources and asks NYSERDA to consider other durations such as 6-hours or 8+ hours.

SPM disagrees with the recommendation to exclude Round Trip Efficiency (RTE) from the REAP calculation and states that failing to account for this "will erroneously assume revenue that is unrealizable for most energy storage systems". To decrease complexity, SPM recommends that the RTE calculation use a uniform assumption that is part of the monthly Index Storage Credit calculation. Specifically, it recommends an 85 percent RTE for 4-hour batteries. It states that the calculation for 8-hour systems is more complex and suggests that the State work with stakeholders to develop the appropriate reference price.

SPM recommends that contract language should be sufficiently tight to only allow responses to market changes that would significantly increase or decrease compensation levels rather than allowing smaller and shorter-term changes.

SPM recommends incorporating non-price factors in the bid evaluation including, awarding bonus points to projects that have achieved maturity/viability thresholds, focusing on projects in (or directly benefitting) Zones J and K in a way that reduces the need for Peakers, and supporting diverse projects (based on size, location, developer, and technology type variation).

SPM asks that the Index Storage Credit program allow a one-time option to not accept cost allocation and reapply in the next NYISO Class Year to allow COD flexibility.

SPM supports NY-BEST's recommendation to continue with the Joint Utilities' bulk storage dispatch rights procurements and asks that the Joint Utilities be required to meet the MW targets in the Energy Storage Order.

SPM requests that Staff and NYSERDA ask the NYISO to move forward with its Storage as a Transmission Asset project. In addition, SPM recommends directing the Joint Utilities to modify the Coordinated Grid Planning Process proposal to allow third party developers to have storage as transmission and NWAs considered to meet local transmission needs. However, SPM does not support allowing storage as transmission to count toward the 6 GW goal.

Sunkeeper Solar

Sunkeeper Solar supports the comments of NYSEIA and in particular recommends an accelerated timeframe for deploying the retail storage program as well as increasing the incentive capacity for this sector, particularly in the Con Ed service territory. Sunkeeper Solar strongly recommends that the retail storage incentive have a carveout for projects sized between 100 kW-1,000 kW, as smaller projects move quicker through the interconnection process as compared to 5 MW projects where costs remain high.

Urban Electric Power (UEP)

UEP noted that NYSERDA has spent $33.6 million through the Renewable Optimization and Energy Storage Initiative Program to support long-duration storage and suggests that NYSERDA scale this up over the next three years, provide additional funding, and include long-duration systems below 5 MW in size. It states that long-duration storage increases on-site usage of renewables while also increasing resiliency, but VDER and other programs have not been adequate to incent investment in longer-duration projects.

UEP agrees with the Roadmap's goal to focus on resources developed in the United States, and locally, where possible. UEP believes an Index Storage Credit would be effective at increasing the development of long-duration storage and specifically supports including "economic and societal benefits" in the Reference Price calculation. It believes that this will best help incent long-duration resources, which have

benefits beyond those that can be more easily quantified. Finally, UEP emphasizes that upfront incentives and rebates should also remain in place as having both rebates and the Index Storage Credit will help decrease financial risk.

Vote Solar & PEAK Coalition

Vote Solar & PEAK Coalition appreciate that NYSERDA and Commission acknowledge that the deployment of energy storage systems will allow New York to meet its peak power needs without relying on peak-generating plants, which negatively impact disadvantaged communities that are disproportionately affected by the increased energy burden.

Vote Solar & PEAK Coalition note that there are economic, environmental, and public health risks of planning for hydrogen-based resources. They state that they do not support prioritizing hydrogen at the expense of known decarbonization pathways as it is a false solution.

However, Vote Solar & Peak Coalition do support long-duration storage and renewable additions to replace hydrogen based firm capacity. They agree that in order to ensure New York's long-term resource adequacy needs are met, efforts should begin as soon as feasibly possible to develop, test, and demonstrate long-duration energy storage technologies that are capable of providing reliable power for extended periods of time with zero emissions.

Zinc8 Energy Solutions (Zinc8)

Zinc8 states the need for LDES to address congestion relief, reducing peak demand which can defer the need for otherwise needed investments, and displace dirty peaking units in Disadvantaged Communities. Zinc8 comments that the Roadmap supports short term lithium-ion batteries but does not describe the competitive landscape for LDES. Zinc8 suggests that incentives be designed based on energy and duration rather than power. Zinc8 recommends that LDES demonstrations showcase the different applications of the technology, with the goal to move high performing LDES to commercialization. Zinc8 also recommends that the bulk storage capacity minimum threshold be reduced from 5 MW to 1 MW with 8+ hours duration and the elimination of duration and energy capacity requirements for retail storage.

APPENDIX B- SUMMARY OF STAKEHOLDER REPLY COMMENTS

AES Clean Energy Development

AES supports carveouts for storage based on location and duration. Specifically, it proposes a locational allotment of 40 percent to NYC, 25 percent to Long Island, and 35 percent spread evenly across the rest of NY in 1 GW/year increments from 2024-2026. However, it also suggests a margin of +/- 10% subject to reliability needs and other analysis. For a duration-based carveout, AES proposes to evaluate same-duration resources against each other.

AES encourages procuring projects of various sizes, based on reliability needs across regions. It also supports the currently established rules for utility ownership. It agrees with the proposal by NY-BEST to direct the Joint Utilities to study the ability for storage to provide non-market transmission and distribution services. However, it doesn't support having these projects be limited to utility ownership.

AES agrees with NY-BEST's comments stating that NYSERDA should consider non-price factors in bid evaluations. AES goes further to state that NYSERDA should have the flexibility to determine which non-price factors should be included in each solicitation.

AES supports the comments of NYC and NY-BEST regarding flexibility for unforeseen price fluctuations. NY-BEST stated that any contract changes should only happen in response to significant market changes and not for short-term issues. AES agrees.

AES expresses support, along with numerous other stakeholders, for using the Index Storage Credit mechanism.

AES states that NYSERDA should direct funding to local and community outreach to increase public awareness of renewables and storage and their benefits.

AES recognizes the need for long-duration storage beyond 2030 and believes NYSERDA should prioritize 100-hour batteries of varying technologies. It further supports the proposal by NY-BEST to first establish a demonstration project program to support earlier adoption of long-duration storage and then use the learnings to later scale up deployment.

Finally, AES agrees with the proposal by NYC to have Staff and NYSERDA monitor project attrition levels and update the bulk procurements accordingly.

Bloom Energy

Bloom Energy supports a technology-neutral approach to all storage development, particularly for long-duration storage. It reiterates its original proposal to consider performance-based criteria for storage that is open to varying technologies.

Bloom Energy agrees with NY-BEST that there is a strong need to focus on long-duration resources. Specifically, it calls out the need to meet intraday, interday, multi-day, and seasonal needs. It emphasizes that, since these technologies are still being developed, it is important to begin looking at solutions sooner than later. It agrees with IPPNY's statement that incentives should be targeted at locations where there is the greatest need.

Lastly, Bloom Energy reiterates that hydrogen-based resources should be eligible for incentives. It also encourages demonstrations projects that are modular as well as prioritizing the development and use of green hydrogen.

Clean Energy Advocates (CEA)

CEA asks the State to implement a community outreach program to help communities understand the benefits of clean energy and to dispel misinformation. It specifically supports community outreach recommendations in the Climate Action Council's Scoping Plan; these include the Scoping Plan's Electricity Chapter 13 strategy E.4, Land Use Chapter 19 strategy LU8, and Local Government Chapter 20 strategy LG 3.

CEA supports NYSERDA's Clean Energy Siting program and suggests integrating this effort into the Roadmap process. It also adds that community outreach should include education on NYSERDA's new IEDR platform.

CEA supports using non-price factors in evaluations in a way that encourages and promotes community acceptance of projects. Further, it states that NYSERDA should consider whether additional siting incentives could be included in the storage program.

Con Edison/Orange & Rockland (Collectively, the Companies)

The Companies note that they are optimistic about procuring substantial quantities of bulk storage in future solicitations. The Companies agree with stakeholders that the Index Storage Credit is not designed in a way that accounts for the distribution value of distribution-connected bulk storage.

As a result, The Companies state that utility procurement should remain the preferred mechanism for targeting distribution-connected bulk storage. They believe that utility procurement can send location-specific price signals for both the transmission and distribution system. The Companies agrees with Clearway Energy's comments on Utility Dispatch Rights (UDRs) where Clearway states that this mechanism provides revenue certainty through tolling agreements.

The Companies reiterate their support for a BTM storage program and noted that Convergent and FreeWire also similarly call out the value BTM storage, including support by FreeWire for a separate carveout for BTM projects.

The Companies support utility ownership of storage and state that utility-owned projects have the opportunity to pioneer new use cases. They also support allowing third parties to participate in utility-owned projects as equipment suppliers, contractors, consultants, etc.

The Companies recognize that many comments on the Roadmap concern related but separate proceedings, like VDER and Demand Response programs. The Companies recommend that storage developers that seek 15 years of revenue certainty bid into future UDR procurements.

Convergent

Convergent reiterates its strong support for the 6 GW storage goal and cites analysis by E3 and the NYISO to show there is great need for storage by 2040 and beyond. Convergent states that the NYISO's comment that storage penetration should not outpace renewable generation fails to account for other benefits of storage. It states that having separate timelines for renewables and storage would hinder the process of planning for the most optimal resource mix. It supports regular review of the storage program, its assumptions, and its goals to adjust for conditions going forward to the 6 GW 2030 goal.

Convergent supports the participation of NYPA and LIPA in the Roadmap.

Convergent notes their concern in their initial comments that the Index Storage Credit program may encourage short-term "flippers" who drive down the bid floor. It asks that Staff keep watch on this and adjust rules as necessary to prevent this. Convergent also emphasizes that an asset class of 5-20 MW should be considered so these medium-sized projects are not left out.

Convergent supports the comments of Con Edison/Orange and Rockland to focus on BTM storage projects and consider a separate adder for these projects. It also asks for BTM projects larger than 5 MW to be considered. In addition, it states that incentives for collocated storage projects may help alleviate the NYISO's concerns about storage outpacing renewables.

Convergent asks that the inclusion of disadvantaged communities "not be treated as an afterthought" and expresses concerns with the Roadmap's implication that the Investment Tax Credit will help incentivize development in these areas since standalone storage does not qualify for the low-moderate income adder.

Convergent agrees with IPPNY's concerns about utility ownership of storage projects and states they do not support utility ownership, including for storage as transmission projects.

Cyprus Creek Renewables (Cyprus Creek)

Cyprus Creek reiterates its strong support for the Roadmap and the 6 GW goal. It cites the NYISO System and Resource Outlook, and the number of Tier 1 projects authorized by NYSERDA show the need for and plans to build large amounts of renewables. It states that this shows the NYISO's concerns about storage outpacing renewables are not sound, and in fact, waiting to develop storage could actually put storage development behind.

Further, Cyprus Creek explains that any delays in storage procurement could cause developers to miss out on federal incentives from the Inflation Reduction Act.

Cyprus Creek supports the Index Storage Credit but shares the concerns raised by Clearway Energy that it can lead to bidders not accounting for uncertainties when bidding their strike price. It agrees with Clearway's proposed solution to change the weighting of consideration of price and non-price factors. Specifically, it recommends a higher weight on project viability criteria.

Cyprus Creek does not support utility ownership of storage. It states that this would expose ratepayers to risk and emphasize that the reason utilities have lower cost of capital is because they are guaranteed to have cost overruns covered by ratepayers. Investors should carry that risk, not ratepayers.

FreeWire Technologies (FreeWire)

FreeWire supports the proposal by Con Edison/Orange and Rockland to establish a BTM storage incentive. Further, it states that they support NY-BEST's statement that BTM projects are "instrumental" to meeting storage goals. It also agrees with NY-BEST's statement that there is demand in the C&I space for TOU rate-based demand management, resiliency/backup power solutions, and greenhouse gas reduction.

FreeWire adds support for NY-BEST's recommendation to initiate a separate proceeding that would create utility programs that compensate storage on its locational value. Finally, FreeWire supports LIPA's participation in the Roadmap process.

Hydrostor

Hydrostor reiterates its support for the Roadmap's conclusion that long duration energy storage of 8+ hours are necessary for system reliability and continue to recommend a 1.5 GW carve out of 8-hour storage through the bulk procurement process, including non-lithium-ion storage technologies. Hydrostor points to potential attrition of LDES and recommends that the long duration energy storage carve out procure 1 GW in 2024, and the balance in 2025 and 2026. Hydrostor comments that long duration energy storage compared to 4-hour storage comes with less risk of cost overruns to ratepayers due to their higher reliability contribution over time and lower likelihood of needing payments from NYSERDA to be made whole. Hydrostor states its support for a project specific RTE for 8-hour projects so that bids received are at the most competitive level. Lastly, Hydrostor again states its support for contract term lengths for a minimum of 25 years and up to 40, as the currently recommended 15-year length is more appropriate for lithium-ion storage technology, not Advanced Compressed Air Energy Storage that Hydrostor develops.

Indicated Utilities

The Indicated Utilities reiterate their support for utility owned energy storage utility-owned storage and oppose parties that are against this approach. The Indicated Utilities note that most parties did not comment on utility-owned storage and several parties recognized the potential reliability and resilience benefits that UOS can provide.

The Indicated Utilities refute parties' claims that utility-owned storage is inconsistent with Commission precedent and point out that the Commission has the discretion to permit utility-owned storage in certain situations, such as where UOS provides benefits to the distribution system. The Indicated Utilities state that UOS would likely not sell into the wholesale market, and if they did those revenues would be returned to customers so the claim that UOS will chill energy storage development and depress market prices is misplaced.

The Indicated Utilities object to parties' claims that services offered by utility-owned storage need to be competitively solicited. They point to the Roadmap's conclusion that certain use cases, including distribution services, are not currently available in the market and that UOS is a way to fill this gap. The Indicated Utilities state that contracting for critical transmission and distribution infrastructure can result in challenges for the utility in ensuring proper operation to maximize the value of the storage asset. The Indicated Utilities comment that there is opportunity for collaboration between third-parties and UOS in the form of competitive procurements with third-parties for the construction and installation of energy storage projects while the utility maintains ownership and operational control.

The Indicated Utilities further comment that while they do support the proposed ISC structure, they urge the Commission to keep the UDR procurement approach as an additional tool available for bulk storage procurements.

The Indicated Utilities reiterate their support for the establishment of retail and residential storage incentive programs and state their willingness to work with DPS and NYSERDA to see how utility relationships with their customers may help advance these initiatives.

The Indicated Utilities support all potential storage technologies to meet the aggressive goals of the State, including hydrogen-based resources that are long duration and have the potential to integrate large amounts of renewables on the electric system.

The Indicated Utilities recognize the importance and value of vehicle-to-grid integration but oppose Nuuve's proposal that the Commission establish a target of 1.5 GW of bidirectional charging infrastructure by 2030.

Institute for Policy Integrity (Policy Integrity)

Policy Integrity recommends that the Reference Price reflect all expected market payments, including real-time energy prices which is currently omitted as part of the REAP. Policy Integrity also recommends minimizing market distortions by prioritizing wholesale market participation and restricting out-of-market payments. Policy Integrity states that by assuming 100 percent RTE as part of the REAP more efficient technologies will not be rewarded sufficiently which may result in a less efficient storage fleet statewide. Policy Integrity further recommends the establishment of a performance requirement for ISC recipients, similar to the comments made by NYC to ensure that resources are operating and providing services as expected and ratepayer money is prudently spent.

Policy Integrity states that all externalities associated with air emissions be fully recognized as part of the procurement procedures and point to Zone J as a location where there is a large opportunity for storage to assist pollution reduction. Policy Integrity recommends improving rate design so that there are strong price signals in place for behind-the-meter resources. Policy Integrity stresses the importance of implementing cost-based rate designs that vary by time and location so that the correct incentive exists to attract distribution-level energy storage.

IPPNY

IPPNY emphasizes that it does not support allowing utility-owned storage or loosening the current restrictions on when utilities can own storage. It states that utilities have no incentive to build in the most effective location as they do not compete with one another or outside their territory. It also states that customers would have to pay for cost overruns on projects that are guaranteed cost recovery.

IPPNY further states that, while it does not oppose looking into the value of storage as a transmission asset, these assets should be divested from the IOUs and participate in the wholesale market if possible.

Key Capture Energy (KCE)

KCE supports the ISC contract proposal because it mitigates significant risks for storage developers in New York, including market risks associated rule design changes, uncertainty of when incumbent generators will retire, and timing and size of new renewable generation. KCE also notes the

operational risks with energy storage resources and highlights the importance of intelligent operation of the asset that considers price uncertainty and states the connection between smart operation of the resource, maximizing revenues, and receiving favorable financing. KCE supports a limitation of liability for the energy storage resource to pay NYSERDA in the case of a negative settlement for "black swan" events such as during a period of multi-day volatile prices and the inability of the energy storage resource to capture wholesale market revenues but cautions any limitation should not protect an energy storage resource operator from ongoing operational mismanagement.

KCE recommends implementing a cost-sharing mechanism for bulk energy storage resources similar to that offered in the offshore wind procurements. KCE specifies that cost-sharing thresholds ($/kW) should be set and published by NYSERDA in the solicitation.

NineDot Energy (NineDot)

NineDot reiterates its support for the Roadmap and the 6 GW storage goal.

NineDot does not support the expansion of utility ownership of storage beyond the very limited use cases that are currently allowed. It states that utility ownership will not be needed to help meet the goal and cite the successes of the NY Sun program as evidence. NineDot recommends focusing on items that would reduce barriers to interconnection. Specifically, it proposes an Interconnection Earnings Adjustment Mechanism that rewards the investor-owned utilities for projects that are timely interconnected.

NineDot states that the current exceptions for utility owned storage were put in place before commercially viable storage systems were available and are no longer necessary due to major developments in the storage landscape since then.

NineDot believes the proposal by Con Edison/Orange and Rockland to incentivize BTM storage projects is premature. It believes a better way to target disadvantaged communities would be to support community-scale FTM projects. It notes that BTM project costs are 3-5x higher than FTM projects on a $/kWh basis due to the differences in scale. NineDot would support incentivizing BTM storage in the future if these conditions change but emphasizes that funding should come out of a separate budget from the Retail Storage Incentive Program and be administered by NYSERDA, not the utilities.

NineDot supports LIPA's comments on how Zone K will be important to the energy transition but states that a working group should be formed to update VDER Value Stack compensation.

Nucor Steel (Nucor)

Nucor states that the proposed ISC procurement mechanism is not suitable for energy storage due to the nature of energy storage performance, the need for storage, and inefficiency of centrally administered storage procurements. Nucor also comments on the importance of maintaining affordable electric service and that the proposals in the Roadmap, as well as other Commission led initiatives, will result in large cost increases for New York consumers, especially for energy intensive businesses.

Nucor offers several recommendations to better focus the Roadmap. It suggests prioritizing storage investments downstate that are needed to meet the needs of New York City, securing energy storage projects through utility planning processes, be agnostic towards utility or third-party energy storage operation and ownership, adopt flexible policies that account for needed pace of deployment, reject statewide cost allocation as upstate customers currently and authorize cost recovery for storage similar to how other utility capital assets are recovered, and reject or substantially modify the proposed ISC compensation method to reflect realistic assumptions and require demonstrated unit performance.

Nucor comments that the proposed ISC mechanism shifts costs to ratepayers and ignores roundtrip efficiency losses, which will result in an inaccurate valuation of an energy storage resource and could especially harm long-duration storage which is critical to New York State reaching its storage goal because long-duration storage takes longer to charge and typically have lower efficiency levels. Nucor further comments that a performance mechanism is necessary to ensure that money paid for an ISC actually goes towards a functioning energy storage system that can deliver actual grid benefits.

NY-BEST

NY-BEST reiterates its support for the adoption of the 6 GW goal by 2030. NY-BEST disagrees with NYISO's comment that storage deployment should align with the pace of the integration of renewable resources, as NY-BEST states that this would limit

New York's ability to successfully integrate this new renewable generation.

NY-BEST continues to support the proposed ISC structure for bulk procurements and urges NYPA and LIPA to participate in the program in the same way as the investor-owned utilities to maximize system benefits. NY-BEST further states that a limitation as to how much money a project owes NYSERDA if the Reference Price exceeds the Strike Price may be necessary to lower the cost of financing for developers of bulk storage projects.

NY-BEST states its strong opposition to LIPA's proposal that they be allowed to compete against private developers with their own bulk storage projects for ISC credits. NY-BEST further states their opposition to LIPA's comments that energy storage on Long Island be required to be located at or near existing generation sites to replace peaking plants and points out that energy storage resources can help displace peakers without being located near the displaced generator. NY-BEST supports LIPA's participation in the storage retail program in the near term and recommends a working group headed by DPS, NYSERDA, LIPA, and PSEG-LI form to examine rate structures and charging tariffs to accelerate this process.

NY-BEST recognizes the important role that the investor-owned utilities will play in enabling storage deployment in New York but reiterates its opposition to utility ownership of storage due to potential harm of the competitive and that utility ownership of storage is counter to Commission precedent. NY-BEST points to the success of the private market in energy storage investment as further rationale as to why utility-owned storage assets are unnecessary. NY-BEST also states that utility owned storage puts ratepayers at risk of cost overruns and that any utility-owned storage used for transmission and distribution services be precluded from participating in the NYISO wholesale markets due to the competitive advantage that regulated utilities have in terms of interconnection costs and charging tariffs over private merchants.

NY-BEST supports comments from Con Edison and Orange and Rockland to establish a new and separate utility BTM incentive, establishing a path to enable large distribution connected storage, storage as a transmission asset, and preference given to proposed projects that use products made in New York.

Solar Energy Industries Association (SEIA)

SEIA supports NYSEIA's comments to increase the residential storage requirement from 200 MWs to a minimum of 400 MWs. SEIA also recommends increasing the proposed funding for residential storage from $72 million as well as on a $/MW basis to further animate the market and points to the important services that residential storage provides, including customer backup power and load management to lower bills. SEIA points to other states' incentive amounts as an example for Staff and NYSERDA consideration.

APPENDIX C- Summary of Stakeholder Comments on Updated Roadmap

AES Clean Energy Development

AES Clean Energy Development (AES) urges that Commission to adopt the 6GW energy storage goal by 2030. AES suggests that NYSERDA review its target for 4- and 8-hour energy storage. AES also requests that NYSERDA share more data on its modeling of storage costs and/or how they will evaluate bids. AES asks that NYSERDA clarify that its capacity assumptions are in line with assumptions about energy, ancillary services, and capital expenditures and provide more information on the blend of independent third-party capacity price forecasts used for the updated Roadmap analysis.

City of New York

The City of New York (the City) states that the estimated costs in the Roadmap update will likely continue to increase with time due to inflation and uncertainty in wholesale market prices. The City urges the Commission to expeditiously approve the updated Roadmap so that energy storage procurements can begin. The City reiterates the importance of coordination between the State, City, and Joint Utilities to maximize opportunities for bulk energy storage sites, noting that the City is a landowner and potential developer. The City supports the proposed inflation adjustment mechanism due to increases in development costs but cautions that there must be limits to allowing undefined price increases above the accepted winning bid, or else this would erode the competitive bidding process.

The City recommends that NYSERDA and DPS Staff create a community engagement strategy in partnership with the City so that public knowledge on the local reliability and air quality benefits of bulk energy storage increases. The City notes that there have been instances where there has been community pushback against energy storage development.

Elevate Renewables (Elevate)

Elevate responds to the Updated Roadmap by reinforcing that one of the main drivers in the price increases is the new methodologies used to calculate capacity market revenue potential for battery storage, that is the drastic reduction in the anticipated capacity service compensation for BESS due to new accreditation of resources' capacity value.

Elevate explains its support in the Updated Roadmap for the proposed new competitive Index Storage Credit ("ISC") mechanism, similar to other renewable resource incentives in New York. However, Elevate notes that NYSERDA and DPS considered but ultimately declined to include other energy market revenue opportunities, or ancillary services, as part of the calculation, stating that these revenue streams are too unpredictable and dependent on location. Elevate posits that excluding such revenue streams, however, fails to account for the different entrance barriers that resources will experience depending on location and contrasts the more expensive entrance into Zone J (New York City) compared to Zone K (Staten Island). Elevate supports the need for the greater storage resources in Zone J.

Elevate refers to the need to develop storage resources on brownfield sites such as those on previously sited fossil power plants to realize quantifiable health, economic, and societal benefits. Elevate reiterates its support to earmark 35% of program funding to projects that deliver benefits to environmental justice and DACs, including fossil fuel peaker plant emission reductions. It points out that as the planned large scale offshore wind projects are constructed to supply Zone J, they will require substantial storage capacity onshore to firm up and facilitate the integration of these intermittent resources to avoid unnecessary renewable curtailments during periods of oversupply and transmission constraints. Elevate provides a caution regarding expenses of brownfield site development and states that the PSC should appropriately incentivize energy storage development on brownfields and ensure that any approval of the Updated Roadmap considers the cost associated with the liability and risk of taking on environmental burdens, investigation, and remediation to facilitate repurposing and revitalization of these locations.

Energy Dome

Energy Dome encourages the Commission to set aside at least 2 GW of the Energy Storage Roadmap's 6 GW energy target for long-duration energy storage resources (LDES). More specifically, Energy Dome wants to ensure that the Energy Storage Program separately evaluate short duration energy storage (SDES) and LDES resources as distinct resource classes. Energy Dome explains further that the updated costs and timelines provided in the 2024 Roadmap now reflect greater urgency to rapidly procure LDES at sufficient scale meet the

targets of 2030 and the increasing LDES needs in New York throughout the 2030s.

Regarding program timing, Energy Dome posits that by moving the procurement out to 2025, New York only has 5 years to procure and develop 6 GW of storage. To ensure maximum competition and allow for diversity in supply chain for energy storage resources in New York within this short five-year period, Energy Dome requests that clear policy signals be set such that developers can begin work on LDES projects that will benefit the state. It points out that its CO2 Battery LDES projects, which are categorized as "short lead time" resources—require only an 18-month period from notice-to proceed to commercial operation date.

Joint Utilities

The Joint Utilities (JU) recommend that the Utility Dispatch Rights (UDR), Bridge-to-Wires, and a utility-administered Behind-the-Meter retail program, as well as utility paths for ownership of energy storage as valuable methods to help New York achieve its storage targets. The JU also urge the Commission to allow for utility ownership of energy storage for transmission and distribution services and the ability to own and operate energy storage projects built by developers. The JU request that they be able to propose energy storage projects or portfolios and allow for the recovery of costs for projects that are integrated with transmission and distribution services or turnkey projects; they state this will allow for greater project cost certainty.

Con Edison and Orange & Rockland (the Companies) reiterate their previous comments on the Roadmap, including the creation of a Bridge-to-Wires program, continuation of the UDR solicitations, and development of a BTM program. The Companies highlight the specific complexities of downstate energy storage deployment, including land use, interconnection costs, disparate wholesale and local peaks, and combined underground and overground delivery systems.

Key Capture Energy (KCE)

KCE urges the Commission to issue an Order and authorize NYSERDA to issue a solicitation for Index Storage Credit contracts by no later than the end of the current calendar year. KCE states that while the Updated Roadmap amends the proposed Procurement Schedule, the Commission, DPS and NYSERDA should not take this updated timeline to assume any unnecessary program delays, and they should seek to recover some

of the time lost between the issuance of the Proposed Roadmap and the Final Order. KCE adds that the initial Index Storage Credit contract will take time, but that NYSERDA can still issue an RFP before the end of the calendar year and enter into contracts with projects in 2025.

KCE also requests the Commission open a new docket to promptly address the application of distribution rates to bulk storage projects and points to how Central Hudson Gas and Electric assesses exceptionally high distribution charges on bulk storage projects. KCE explains that under the proposed structure of the ISC, and absent any additional mechanism to compensate for these charging costs that are being returned to ratepayers, developers would include the additional cost of charging bulk storage in Central Hudson's territory in the strike price of projects developed in that service territory. In order to help ensure that the ISC costs do not exceed projected costs in the Roadmap Update and to support the Roadmap's goals of deploying bulk storage statewide, KCE urges the Commission to provide FERC the necessary information to approve a rate that is consistent with state policy.

Long Duration Energy Storage Coalition

The Long Duration Energy Storage Coalition (LDES Coalition) urges the Commission to issue an Order approving the Roadmap quickly. The LDES Coalition recommends carving out 2GW out of the proposed 6GW of energy storage for long-duration and multi-day energy storage resources. The LDES Coalition states that LDES takes several years to develop and that policy signals are needed immediately to attract the necessary LDES development acknowledged by the Roadmap to support a zero emissions electric grid.

Long Island Power Authority

LIPA requests that NYSERDA provide additional details used to calculate the updated cost impacts for the energy storage programs proposed in the Roadmap. LIPA states that it is unclear whether NYSERDA used updated cost estimates that considered the NYISO's recently established capacity accreditation factors for the 2024/2025 Capability Year and whether they modeled future projections of capacity accreditation factors, accounting for the planned increase in energy storage resources. LIPA also states that it is unclear if the updated cost impacts reflect interconnection costs. LIPA

comments that these additional details would allow LIPA to assess customer bill impacts more accurately.

Multiple Intervenors

Multiple Intervenors recommends that the Commission not adopt the updated Roadmap in its current form. Multiple Intervenors comments that the proposed method of cost recovery through mandatory obligations on LSEs will be another long-term financial commitment for customers that the Commission requires. Multiple Intervenors notes that energy storage deployment to date has been slow and questions the prudency of doubling the 3GW storage goal. Multiple Intervenors states that speculation on the decline of federal credits in the future for energy storage should not dictate that current customers today should pay more and that proceeding slowly in energy storage deployment is preferable due to technological advancements in the future that can lower energy storage development costs.

Multiple Intervenors reiterates that the Commission should assess the total cost of the proposed energy storage programs in conjunction with other Commission-approved initiatives. Multiple Intervenors states that ignoring the totality of costs across all Commission-approved programs can lead to jobs relocating out of New York and slowdown of electrification efforts in transportation and heating. Multiple Intervenors comments that the central procurement approach proposed in the Roadmap is unlikely to attract energy storage in the locations where it is most needed, at customer's expense. Multiple Intervenors also states that the proposed load ratio cost allocation methodology based solely on energy consumption does not align with cost causation principles and instead the Commission should adopt a cost allocation methodology where costs are recovered based on demand-based factors.

New York Battery and Energy Storage Technology Consortium (NY-BEST), Solar Energy Industry Association (NYSEIA), New York Clean Energy Industry Association and Alliance for Clean Energy New York (ACENY), collectively "Commenters"

In their response to the Updated Roadmap, Commenters support the revised budget allocations provided of between $1,190,004,228 and $1,910,350,431. They point out that the analysis for the Final CLCPA Scoping Plan and the latest NYISO System & Resource Outlook have projected the need for at least

15 GW of energy storage by 2040 to achieve the goals of the CLCPA. However, Commenters state their concern that the update to the Roadmap delayed the release of the bulk program by over a year, resulting in even tighter timelines to meet the 6GW by 2030 goal. Therefore, Commenters encourage the Commission to take swift action to operationalize the program, and recommend the Commission provide ample flexibility to NYSERDA to adjust procurement timelines accordingly to achieve the goals in a timely manner. Commenters explain that if delays continue, the potential financial harm in obtaining Department of Energy (DOE) loan guarantees to support energy storage deployment under their Title 17 Clean Energy Financing Program could be significant. Commenters explain that according to the DOE, agreements on loan applications must be completed by September 2026 and disburse all loans by December 2031. A further delay in the rollout of Roadmap programs could make this timeline difficult to achieve. If developers are unable to access federal financing benefits for energy storage projects, the cost of the projects will increase, resulting in a higher cost to New York State ratepayers to achieve the CLCPA.

Another concern with any delays pertains to the costs of retaining site access for potential development. Storage developers continue to make significant ongoing investments in site access with an understanding that the State is committed to supporting the energy storage market in New York. Given the continued delay in approving the Order, project costs are increasing, particularly as some sites' agreements expire and need to be reacquired, or as agreements are dropped altogether and alternative sites identified.

Commenters explain that retirement of peaker plants in Zone J is being held up by the NYISO reliability concerns and preventing the closure of peaker plants as required by the DEC. It explains that this has delayed the retirement of nearly 600 MW of fossil-based generation capacity in New York City. Commenters posit that faster deployment of energy storage in Zone J could help address this reliability risk, lowering costs to ratepayers and contributing to improved local air quality, particularly for DACs.

Regarding cost containment, Commenters recommend the Commission initiate a parallel action to investigate and improve utility rates for energy storage resources at both the bulk and retail levels and add that energy storage-specific rate designs would benefit the grid and ratepayers by aligning rate structures to encourage optimal charge and discharge of energy storage resources. More specifically, it explains that utility

tariffs have not been designed for energy storage and apply many costs that are inappropriate to resources that are not the end consumer of the energy. These tariffs, with associated riders and surcharges, apply to energy storage both on the distribution system and, in some New York utility territories, on the transmission system as well.

NineDot Energy (NineDot)

NineDot continues to support the work of DPS and NYSERDA in updating the Roadmap to reflect increased costs in New York but also emphasizes the projected net cost savings for the New York electricity system of nearly $2 billion (net present value-NPV) through 2050.

NineDot strongly encourages the Commission to expeditiously issue an Order to adopt a new energy storage goal of 6 GW by 2030, approve the updated Roadmap, and authorize the programs that are necessary to implement it. NineDot points out that over the six-year period since adopting the 2018 Roadmap, New York State has deployed 396 MW of energy storage representing only 6.6% of the 2030 6 GW target. It explains that the long, complex, and costly development cycle for the Retail energy storage market severely delays project and specifically that retail project development can take two to four years to complete due to a variety of factors including siting, design, permitting, interconnection, construction, financing, equipment procurement and customer acquisition. NineDot refers to siting acquisition and control costs (such as rent, insurance, property taxes and site management) that are expensive monthly development costs that need to be financed in this high-rate environment.

NineDot explains that citing of New York City (NYC) energy storage equipment entails long lead times and that NYC has one of the most complicated grids in the world. This equipment includes interconnection hardware such as transformers, switch gears and electrical houses (e-houses) and some may have lead times anywhere from 12-24 months. NineDot posits that a reflection of these NYC issues are energy storage development costs of land, labor, interconnection, etc., and how they are much more expensive compared to other New York regions. NineDot explains that in light of these complex interconnection storage issues, New York City's allocation under the program should have a higher allocation of funding than other jurisdictions.

NineDot proposes that the Commission Order allow for Non-Wires Alternatives (NWA) to receive RSIP funds and recounts that NYSERDA released an updated Energy Storage Market Acceleration Incentives Implementation Plan (the Plan) on May 14, 2024, which stated that "Projects previously selected under an IOU Non-Wires Alternative, and projects that submitted a proposal to an open NWA prior to March 11, 2019 for all Retail incentive Blocks other than NYC Block 5 prior to May 14, 2024 for NYC Block 5 and are pending decision or negotiations." While any project that applied for an NWA award before March 2019 could not apply for RSIP; any project that applied to an NWA after March 2019 could apply.

NineDot recommends that maintaining flexibility to adjust funding allocation between Retail and Bulk markets will be necessary and NYSERDA should base that on observed market activities. As an example, NineDot states that if the community-scale Retail market displays robust, cost-effective growth (as CDG has it points out), NYSERDA should shift funding from the Bulk program to additional Retail Blocks.

NineDot explains that there will be delayed cost savings and benefits for Disadvantaged Communities due to presence of peaker plants as explained throughout this document. However, Battery storage is uniquely suited for displacing peaker plants, which are disproportionately located in downstate DACs. The delayed cost savings will very likely be due to the NYISO's Reliability Plan and its potential decision to maintain peaker units to maintain NYC's grid reliability. This will entail delay.

In regard to the new (January 2024), Statewide Solar for All Program (S-SFA), combining a utility-managed Energy Affordability Program (EAP) and Community Solar program to pass along clean energy benefits to low-income households, NineDot states the hope for the program is that it delivers $40 of annual savings to 800,000 households. However, as NineDot points out the cost-savings benefits of shared, local, clean energy generation that S-SFA produces, will require storage benefits, but with the continued delays of the Roadmap, the community-scale storage projects that could deliver such benefits will also be delayed.

Sierra Club

Sierra Club states the cost increases in the updated Roadmap are modest in comparison to other methods of achieving the State's climate goals. Sierra Club comments that the Commission should collaborate with the NYSDEC to execute a

blueprint for the retirement and redevelopment of fossil-fuel fired electric generation resource which will help guide energy storage siting decisions. Sierra club also stresses the importance of support for LDES as a critical tool to achieve the CLCPA mandates. Sierra Club remarks that the energy storage procurements should begin quickly as to not jeopardize the energy storage deployment goals.

APPENDIX D- Supplemental Generic Environmental Impact Statement Findings Statement

State Environmental Quality Review Act

FINDINGS STATEMENT

June 20, 2024

Pursuant to Article 8 (State Environmental Quality Review Act (SEQRA)) of the Environmental Conservation Law and 6 New York Codes, Rules and Regulations (NYCRR) Part 617, the New York State Public Service Commission (Commission), as Lead Agency, makes the following findings.

Name of Action: 18-E-0130, In the Matter of Energy Storage Deployment Program; Order Establishing Updated Energy Storage Goal and Deployment Policy
SEQRA Classification: Unlisted Action
Location: New York State
Date Final Supplemental Generic Environmental Impact Statement (SGEIS) Filed: December 14, 2023
Final SGEIS Available at: http://www.dps.ny.gov

I. PURPOSE AND DESCRIPTION OF THE ACTION

Public Service Law (PSL) §74 directed the Public Service Commission (Commission)to establish a 2030 goal for the installation of qualified energy storage systems and a deployment policy to support the statewide goal. In response, the Commission issued the Order Establishing Energy Storage Goal and Deployment Policy (Energy Storage Order) on December 13,

2018, in this proceeding.[81] The Energy Storage Order established a goal of 3 gigawatts (GW) of energy storage by 2030, and an interim goal of 1.5 GW by 2025.

In compliance with the State Environmental Quality Review Act (SEQRA), the recommendations contained within the 3 GW Roadmap were analyzed in a Draft Generic Environmental Impact Statement (GEIS). In the Order accepting the Draft GEIS as complete, the Commission stated that "[i]f a capacity target higher than 3,600 MW of incremental energy storage deployment is adopted, additional potential environmental impacts shall be analyzed." The Commission accepted the findings of the Final GEIS as complete on September 12, 2018, and adopted the SEQRA Findings Statement in the Energy Storage Order.

On December 28, 2022, DPS and NYSERDA jointly filed "New York's 6 GW Energy Storage Roadmap: Policy Options for Continued Growth in Energy Storage" (Roadmap), in this proceeding. The Roadmap outlines the market-supported policy, regulatory, and programmatic actions necessary to achieve the State's near-term energy storage goals and recommendations for the Commission to consider when expanding the energy storage deployment policy. Broadly, the recommendations are separated into seven categories: (1) the role of energy storage targets; (2) bulk energy storage procurement program design; (3) retail energy storage procurement program design; (4) residential energy storage procurement program design; (5) wholesale market actions; (6) program design considerations applicable to every market; (7) long duration storage; and (8) program costs. The

[81] The Energy Storage Order was informed by Department of Public Service (DPS) and New York State Energy Research and Development Authority's recommendations in the New York State Energy Storage Roadmap, which was filed on June 21, 2018, in this proceeding (3 GW Roadmap).

Roadmap specifically supports the State's initiative to deploy 6 GW of energy storage by 2030.

The Roadmap is focused on recommendations based on lessons learned since the issuance of the Energy Storage Order. As the Roadmap expands upon the recommendations in the Energy Storage Order and recommends the adoption of a capacity target higher than 3,600 MW of energy storage, a Supplemental Generic Environmental Impact Statement (SGEIS) was prepared, analyzing additional environmental impacts, consistent with 6 NYCRR §617.9(a)(7).[82] Given that the extent to which each type of energy storage technology will be used in response to the Roadmap is uncertain, and consistent with SEQRA §617.10(a), the SGEIS is broader and more general than a site or project-specific environmental impact statement (EIS), and identifies potential areas where environmental impacts may be caused by the construction, operation, and disposal of energy storage facilities. The SGEIS also opines upon the safety of energy storage technologies. By the Order Establishing Updated Energy Storage Goal and Deployment Policy, issued June 20, 2024, the Commission adopted several Roadmap recommendations and updated the statewide deployment policy and an energy storage deployment goal.

II. FACTS AND CONCLUSIONS RELIED UPON

A. Public Need and Benefits

If successfully implemented, the updates to the statewide deployment policy should result in reductions in peak

[82] In the Order Accepting the Draft GEIS as complete, the Commission stated that "[i]f a capacity target higher than 3,600 MW of incremental energy storage deployment is adopted, additional potential environmental impacts shall be analyzed." Case 18-E-0130, Order Accepting Draft Generic Environmental Impact Statement as Complete (issued June 25, 2018), p. 2.

load demand during critical periods, increases in the overall efficiency of the grid, and/or displacement (or accelerated displacement) of fossil fuel-based generation (e.g., by allowing greater integration of renewable energy resources). Such outcomes will lead to an array of public benefits, including economic, health, and environmental benefits. Specifically, these benefits may include:

- **Public health**
  Improvement in public health from avoided emissions of criteria air pollutants, such as carbon dioxide, carbon monoxide, sulfur dioxide, nitrous oxides, and particulate matter. To the extent that these avoided air emissions occur from the displacement of peaker plants located in Disadvantaged Communities, the associated benefits may accrue to these vulnerable communities.
- **Climate change mitigation and adaptation**
  As fossil-fuel based generation decreases, the associated adverse impacts to air, water, land, and ecological resources decrease. Greater energy storage deployment can reduce the State's reliance on fossil fuel energy, and aid in the prevention of climate change-related impacts.
- **Ecosystem services**
  As energy storage resources are developed, land and water resource use could improve. Water use and pollutant releases from fossil fuel generated energy could be avoided.
- **Economic Development**
  There are both direct and indirect economic benefits of energy storage development. Regarding indirect economic benefits, a 2022 study by the National Renewable Energy Labe (NREL) estimates that between 4,700 and 9,000 jobs will be needed for the energy storage industry;

additionally, the build out of energy storage may result in additional spending, increased productivity, reduced physical damage during extreme weather events, and redistributed resources for more productive economic uses. Regarding direct economic benefits, the development of energy storage may create energy cost savings.

- **Technological innovation**

  Investment in the energy storage industry may contribute to significant cost reductions for the underlying technology.

B. Potential Impacts

Overall findings suggest that adverse direct environmental impacts of the actions recommended by the Roadmap are minimal. The SGEIS considers three types of energy storage technologies: batteries, thermal, and mechanical (i.e., flywheels). Risks exist across all three technology types, most notably: fire safety risks related to the use of lithium-ion (Li-ion) batteries, and risk of soil and groundwater contamination due to improper disposal of battery-related waste. A summary of the environmental impacts across the three technology types follows.

Land Use

The energy storage technologies considered in the SGEIS have a relatively small land use footprint that generally increase as the size of a project increases. There may be site-specific impacts related to land use, depending on whether the energy storage is either co-located with existing commercial facilities or constructed on previously undeveloped land.

Water Resources

Surface water resources may potentially be affected by the construction of an energy storage facility through storm water runoff if site-soils are disturbed during construction. The degree to which the energy storage project would impact

water resources depend on the size of the impacted area and the site's proximity to protected waters, as well as other site-specific factors.

Species Biodiversity

Energy storage associated with intermittent generation sources may enable impact-reduction strategies for protection of vulnerable species that are susceptible to operational impacts (e.g., energy storage can enable the curtailment of wind turbine operation to avoid periods of peak wildlife activity in close proximity to wind turbines).

Climate and Air Quality

The climate and air quality impacts of energy storage are influenced by the efficiency of the technology and the original source of electricity being stored. Although a storage device outputs less energy than the charging input, the overall emissions impacts are highly case-dependent. Additionally, as the distance between generation and storage increases, more electricity has to be produced due to energy loss during transmission. Therefore, energy storage devices may result in increased electricity demand from the grid, resulting in greater emissions when considered on a standalone basis. When energy storage technologies complement cleaner generation – as envisioned by the Reforming the Energy Vision (REV) Order – such technologies can contribute to lower levels of both local and global emissions. On a large scale, the use of energy storage as part of a broader strategy to increase the responsiveness of demand will facilitate greater development of low-carbon energy generation.

Community Character

The installation of energy storage systems is not likely to impact the community character of an area. In the

short term, during the construction phase, movement of heavy machinery may create noise pollution. However, the operation of energy storage technologies is generally quiet.

Batteries create minimal noise but there may be some noise pollution from the cooling units that prevent the batteries from overheating, which could have an impact on community character if not mitigated. Thermal storage avoids cooling-related noise, which minimizes daytime noise pollution. Mechanical storage systems generate operational noise, but this is relatively low compared to conventional energy storage technologies.

Socioeconomic

The socioeconomic impacts of energy storage are similar across technologies. The cost of producing and supplying renewable energy may be reduced through battery or flywheel energy storage. Batteries and flywheels can also recycle energy to the grid (i.e., receive excess energy and redistribute it to the grid when needed), leading to reductions in energy costs. Thermal energy storage systems do not supply electricity to the grid, but reduce demand during peak hours; as a result, individuals' energy costs are often reduced.

C. Public Health and Safety

Many types of battery storage technologies contain toxic and hazardous chemicals that can cause damage to humans when exposure occurs. However, exposures generally occur when the battery has been damaged or tampered with and therefore, the risk of harm can be reduced by following instructions from the manufacturer.

Fire risk associated with battery storage is an important safety consideration. With lithium-ion batteries, there is a risk of thermal runaway – a positive-feedback incident where excessive heat released in an exothermic process

triggers other processes that release eve more heat, resulting in an uncontrollable increase in temperature. Adequate preventative measures can decrease the chances of thermal runaway and limit the impacts of such events.

Hazards associated with large-scale lithium-ion batteries can be categorized into electrical, thermal, and mechanical types. Electrical hazards can result from the high voltage or high charge rate of batteries and can lead to hazardous events like fire and explosion. Thermal hazards are related to both high and low temperatures, either of which may result in decomposition of the battery. Mechanical hazards such as vibration, shock, or physical impact can lead to disturbances or create defects which can lead to thermal runaway.

There have been 14 failure events at energy storage facilities in the U.S., three of which were in New York State in 2023. None of these events resulted in fatalities.

Due to the existence of the aforementioned hazards, monitoring and mitigation measures are necessary for safely transporting and operating battery storage systems.

D. Mitigation of Potential Adverse Impacts

Consistent with SEQRA requirements, the SGEIS describes the variety of measures available to minimize or avoid, to the maximum extent practicable (incorporating all practicable mitigation measures), potentially adverse environmental impacts that may result from the energy storage activities that may be implemented under the Roadmap. The SGEIS discusses 1) key federal and state regulations that may apply to energy storage activities during construction, operation, and closure of a specific project; and 2), provides an overview of site-specific project design and planning, which serves as a primary mitigation measure for site-specific issues. Measures to mitigate (i.e., minimize or avoid) the potentially adverse

environmental impacts that may result from greater deployment of energy storage, include:

- Federal and state regulations, including U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR) related to the transportation of lithium-ion batteries, the Clean Air Act (CAA), the Resource Conservation and Recovery Act (RCRA), the Clean Water Act (CWA), the New York State Environmental Conservation Law (ECL), the Public Service Law (PSL), the Climate Leadership and Community Protection Act (CLCPA), the New York State Uniform Fire Prevention and Building Code, and the 2020 Fire Code of New York State;
- Site-specific permitting regimes including Articles 4, 7, and 10 of the PSL, the SEQRA process, and NYSDEC Commissioner Policy on Environmental Justice Permitting (CP-29); and
- Use of best management practices during site-specific design, planning, and siting efforts.

Alternatives Considered

The primary alternative considered in the SGEIS is described as the "no action" scenario. Because the Roadmap expands upon the existing 3 GW Roadmap, the "no action" alternative is defined as no additional action beyond the goals and programs established in the original 3 GW Roadmap.

Unavoidable Adverse Impacts

There are unavoidable adverse impacts that can be avoided, minimized, or mitigated through applicable federal and state laws, regulations, and review processes.

Irreversible and Irretrievable Commitment of Resources

Approval of the Roadmap would not in itself result in irreversible or irretrievable commitment of resources because no particular energy storage project, project site, or regulatory

modification will be approved or endorsed by approval of the action. The construction of new energy storage projects in the future, in response to the Commission's action on the Roadmap, may raise such concerns. However, these concerns will be identified in site-specific environmental analyses and avoided or minimized in accordance with SEQRA and other applicable laws and regulations. Any actual impacts and resources commitments are currently, and will remain, unknown until specific projects are proposed.

Growth-Inducing Aspects and Socioeconomic Impacts

The SGEIS considers overall potential growth-inducing aspects and socioeconomic impacts of energy storage. Project-specific impact analysis may be conducted at the time such projects have commenced.

Energy storage directly provides a number of different benefits at all levels of the electrical system, including meeting capacity and reliability requirements, providing distribution system relief, reducing the cost caused by peak electrical periods, and integrating large-scale wind and solar generating facilities. These energy system benefits in turn generate additional benefits. The development of energy storage systems may result in environmental benefits as part of New York's strategy to shift generation from fossil fuels to low-carbon resources. Similarly, there are public health benefits related to the reduction in criteria air pollutants from the reduction in fossil-fuel based generation. The economic benefits of energy storage include the creation of jobs, additional spending in the economy, increased productivity, reduced physical damage during extreme weather events, and/or redistributed resources for more productive economic uses. The technological benefits associated with energy storage include incentives designed to promote capacity expansion and improve

the cost effectiveness of storage technologies, which can provide a path towards the level of storage needed for the long term.

Costs related to the implementation of the increased storage target and program proposals in the Roadmap are estimates. The procurement of retail and residential programs is estimated to cost $775 million, combined. The procurement of the bulk storage program is estimated to cost between $701.5 million and $1.42 billion. Administrative costs include program administration (approximately $29.0 million), implementation support (approximately $15 million), program evaluation (approximately $3 million), and the New York State Recovery Fee (approximately $8.9 million). The total cost for the three incentive programs, is expected to be between $1.29 billion to $2.01 billion, paid out over 21 years. Electric customers would see an estimated increase of 0.38 to 0.59 percent on average, amounting to $0.40-$0.64 per month for the average residential customer.

Actions taken in response to the Roadmap may occur in environmental justice (EJ) communities and may have the potential to affect low-income and minority populations within these communities. Because the implications of any storage projects will site-specific, further evaluation of EJ impacts should occur during the project review stage.

Effects on Energy Consumption

As discussed throughout the SGEIS, penetration and adoption of energy storage could affect the electrical system in a number of ways at the generation, transmission, and distribution levels. Expansion of energy storage may facilitate the deployment of renewable generation resources and relieve system pressures during peak demand. These potential changes to the structure of the electrical system are not expected to

directly affect the amount of electricity used or the amount of energy conserved in the State; rather, energy storage is expected to change how this demand is met. The programs proposed in the Roadmap are not expected to indirectly affect the amount of energy consumed or conserved in New York State.

III. CONCLUSIONS

Based on the discussion set forth in the Final SGEIS, the Commission makes the findings stated above regarding the potential environmental impacts, as well as benefits, of the Energy Storage Deployment Policy, and certifies that:

1. The requirements of the State Environmental Quality Review Act, as implemented by 6 NYCRR 617, have been met; and
2. Consistent with social, economic, and other essential considerations from among the reasonable alternatives available, the actions being undertaken yield overall positive environmental impacts to the maximum extent practicable.

APPENDIX E- NYSERDA Retail and Residential Energy Storage Program Recovery Mechanisms

Electric Utility	Surcharge Mechanism
Central Hudson Gas & Electric Corporation	Clean Energy Standard Surcharge
Consolidated Edison Company of New York, Inc.	Clean Energy Standard Delivery Surcharge
Niagara Mohawk Power Corporation d/b/a National Grid	Clean Energy Standard Delivery Surcharge
New York State Electric & Gas Corporation	System Benefit Charge
Orange and Rockland Utilities, Inc.	Clean Energy Standard Delivery Surcharge
Rochester Gas and Electric Corporation	System Benefit Charge

APPENDIX F- NYSERDA Retail and Residential Energy Storage Program Cost Allocations

	2023 Annual Delivery Service Load (MWh)	MWh Load Ratio Share
Central Hudson	4,920,811	3.62%
Con Edison	52,901,118	38.87%
NYSEG	16,612,546	12.21%
National Grid	32,356,078	23.78%
O&R	4,096,586	3.01%
RG&E	7,192,770	5.29%
LIPA	18,007,000	13.23%
Total	136,086,909	100.00%

APPENDIX G- Residential and Retail Energy Storage Program Annual Costs
(including Administration, Implementation, Program Evaluation and NYS Cost Recovery Expense)
Allocation and Collection Schedule for Utilities and LIPA

	Program Costs (nominal)	Central Hudson	Con Edison	NYSEG	National Grid	O&R	RG&E	LIPA
2024	$ 6,905,349	$ 249,693	$ 2,684,319	$ 842,957	$ 1,641,818	$ 207,870	$ 364,977	$ 913,715
2025	$ 9,405,349	$ 340,091	$ 3,656,145	$ 1,148,140	$ 2,236,219	$ 283,127	$ 497,113	$ 1,244,514
2026	$ 14,405,349	$ 520,888	$ 5,599,797	$ 1,758,505	$ 3,425,021	$ 433,640	$ 761,384	$ 1,906,114
2027	$154,405,349	$ 5,583,193	$ 60,022,052	$ 18,848,734	$ 36,711,478	$ 4,648,021	$ 8,160,977	$ 20,430,893
2028	$203,155,349	$ 7,345,961	$ 78,972,659	$ 24,799,796	$ 48,302,297	$ 6,115,528	$ 10,737,621	$ 26,881,486
2029	$206,905,349	$ 7,481,558	$ 80,430,398	$ 25,257,570	$ 49,193,899	$ 6,228,414	$ 10,935,825	$ 27,377,686
2030	$210,655,349	$ 7,617,156	$ 81,888,137	$ 25,715,344	$ 50,085,500	$ 6,341,299	$ 11,134,028	$ 27,873,885
2031	$ 4,405,349	$ 159,294	$ 1,712,493	$ 537,774	$ 1,047,417	$ 132,613	$ 232,841	$ 582,915
2032	$ 4,405,349	$ 159,294	$ 1,712,493	$ 537,774	$ 1,047,417	$ 132,613	$ 232,841	$ 582,915
Total:	$814,648,139	$ 29,457,128	$316,678,494	$ 99,446,595	$193,691,068	$ 24,523,124	$ 43,057,607	$107,794,123

APPENDIX H- Bulk Storage Program
Forecasted Annual Costs
($ millions, nominal)

	High Forecast	Low Forecast
2028	$ 35	$ 19
2029	$ 70	$ 40
2030	$ 227	$ 152
2031	$ 228	$ 152
2032	$ 226	$ 146
2033	$ 222	$ 136
2034	$ 209	$ 116
2035	$ 198	$ 97
2036	$ 196	$ 91
2037	$ 181	$ 68
2038	$ 181	$ 64
2039	$ 191	$ 74
2040	$ 181	$ 57
2041	$ 171	$ 39
2042	$ 172	$ 37
2043	$ 140	$ 27
2044	$ 110	$ 19
Total:	$ 2,938	$ 1,334