Institute *for* Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

April 17, 2023

Hon. Michelle L. Phillips, Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

VIA ELECTRONIC SUBMISSION

Subject: Case 18-E-0130 – In the Matter of Energy Storage Deployment Program

Dear Secretary Phillips:

The Institute for Policy Integrity at New York University School of Law[1] ("Policy Integrity") respectfully submits the following reply comments to the New York State Department of Public Service and New York State Energy Research and Deployment Authority Staff (collectively "Staff") on the New York's 6 GW Energy Storage Roadmap: Policy Options for Continued Growth in Energy Storage[2] (the "6 GW Storage Roadmap"). Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy. Policy Integrity has extensive experience advising stakeholders and government decisionmakers on the rational, balanced use of economic analysis, both in federal practice and at the state level.

We are grateful for your consideration of these comments.

Sincerely,

/s/ Christoph Graf, Ph.D.	/s/ Elizabeth B. Stein	/s/ Burçin Ünel, Ph.D.
Christoph Graf, Ph.D.	Elizabeth B. Stein	Burçin Ünel, Ph.D.
Senior Economist	State Policy Director	Executive Director
Institute for Policy Integrity	Institute for Policy Integrity	Institute for Policy Integrity
christoph.graf@nyu.edu	elizabeth.stein@nyu.edu	burcin.unel@nyu.edu

[1] This document does not purport to present New York University School of Law's views, if any.
[2] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* New York's 6 GW Energy Storage Roadmap: Policy Options for Continued Growth in Energy Storage (Dec. 28, 2022) [hereinafter *6 GW Storage Roadmap*].

I. Introduction

As discussed extensively in the 6 GW Storage Roadmap, energy storage will "play a critical role in supporting New York's decarbonized electric grid by integrating large quantities of variable renewable energy, reducing curtailment, and storing renewable generation for the times it is needed most."[3] Energy storage has the potential to provide services to multiple market segments simultaneously, defer or avoid costly investments, and reduce costs.[4]

Maximizing the societal benefits of energy storage requires that energy storage projects be compensated for all the value they have the technical ability to provide to the electric system at their actual location on the transmission or distribution system, regardless of whether they are in front of or behind the meter.[5] Further, it requires that the price signals that energy storage projects receive reflect the external costs of electricity generation, such as the damages from greenhouse gas emissions as well as local pollutants. Optimally, these myriad values would be monetized based on market mechanisms, which would serve to maximize the economic efficiency of energy storage procurement; where this is infeasible for any reason, ratepayer-backed or publicly funded mechanisms put in place to accelerate energy storage deployment should be designed to limit risks such as excessive costs and failure of benefits to materialize.

Based on our review of the 6 GW Storage Roadmap and other parties' initial comments on the 6 GW Storage Roadmap, we suggest that Staff and the Public Service Commission should:

- For any bulk system program where energy storage owners are compensated for the gap between strike prices and reference prices, ensure that reference prices fully reflect the market-based payments for value that energy storage projects are expected to provide;
- Avoid unnecessary market distortion;
- Recognize and monitor real performance characteristics of energy storage;
- Fully recognize the externalities associated with greenhouse gases, as well as local pollutants; and
- Improve rate design to provide efficient signals for behind-the-meter energy storage deployment.

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[3] 6 GW Storage Roadmap at 6.

[4] Madison Condon, Richard L. Revesz, & Burcin Unel, *Managing the Future of Energy Storage*, INSTITUTE FOR POLICY INTEGRITY at Table 1 [hereinafter *Managing the Future*]; New York State Energy Storage Roadmap and Department of Public Service / New York State Energy Research and Development Authority Staff Recommendations (June 21, 2018), http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={2A1BFBC9-85B4-4DAE-BCAE164B21B0DC3D} [hereinafter Roadmap] at 4-5.

[5] *Managing the Future* at 14; Richard L. Revesz & Burcin Unel, *Managing the Future Of The Electricity Grid: Energy Storage And Greenhouse Gas Emissions*, 42 HARV. ENVTL. L. REV. 139, Part IV (2018).

II. Ensure that Reference Prices Fully Reflect Market Payments for Relevant Values.

Consolidated Edison Company of New York, Inc. ("Con Edison") and Orange and Rockland Utilities, Inc. ("O&R") recognize in initial comments that storage installations "optimally realize wholesale market revenues through participation in the NYISO capacity, energy, and ancillary services markets,"[6] echoing the 6 GW Storage Roadmap's own recognition that ancillary services revenue presents a potent opportunity for storage resources.[7] In the face of this reality, it is worrisome that the 6 GW Storage Roadmap's recommended calculation of the Reference Energy Arbitrage Price ("REAP") would omit any consideration of real-time energy prices (relying instead exclusively on day-ahead)[8] and ancillary services opportunities.[9] New York Independent System Operator ("NYISO"), in its initial comments, points out that "[i]nefficiencies are likely to arise if storage resources are only operated to address a very limited set of system needs."[10] Given that storage is important precisely for the flexibility it will provide in a system that is increasingly reliant on intermittent renewable generation, the complete omission of these factors from calculation of the REAP seems likely to yield higher than necessary positive Index Storage Credit ("ISC") values, a cost that will burden ratepayers even if storage owners in fact participate in the efficient manner that we would hope to see.

Early experience with storage in the wholesale market in California, where storage is beginning to play a significant role in the electric grid, supports the conclusion that the omission of revenue streams that fully leverage the flexibility of storage resources may be material. Significantly, the California Independent System Operator has found that "comparing bid behavior across the day-ahead and real-time markets suggests that bids from batteries are more competitive in the real-time market."[11]

III. Avoid Unnecessary Market Distortion.

NYISO stated in its initial comments that it "continues to believe that competitive wholesale electricity markets should be the primary mechanism to attract electric generators, including [energy storage resources]," and cautions that "[o]ut-of-market payments have the potential to insulate resources from price signals, reduce incentives to follow dispatch instructions, and undermine the efficiencies of the NYISO-administered wholesale electric markets…. Any

[6] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. (Mar. 21, 2023) at 10.
[7] *See* 6 GW Storage Roadmap at 37.
[8] *See* 6 GW Storage Roadmap at 52.
[9] *See* 6 GW Storage Roadmap at 51.
[10] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Independent System Operator (Mar. 20, 2023) at 13.
[11] California Independent System Operator, ANNUAL REPORT ON MARKET ISSUES & PERFORMANCE (July 27, 2022) at 53, *available at* https://perma.cc/5Z26-U3Z6.

incentives or actions to suppress or act contrary to locational marginal prices harm the market as a whole and harm[] resources that depend on the wholesale markets for their compensation."[12] In addition to the market distortion risk that NYISO has identified, resources that are insulated from normal market signals may also present a market power risk, especially if they are not required to perform as anticipated; for example, the absence of any performance requirement may introduce a risk that storage owners whose portfolios include non-storage assets that would benefit from inefficient market operation will be incentivized to refrain from optimally deploying storage assets that are eligible for ISCs.

IV. Recognize and Monitor the Real Performance Characteristics of Energy Storage Projects.

The 6 GW Storage Roadmap proposes that the Index Storage Credit construct would be agnostic to round-trip efficiency ("RTE") "due to the additional complexity of calculating round trip efficiency that may vary across project types, as well as the fact that omitting this measure maintains an incentive to utilize more efficient technologies in the program".[13] Although we appreciate that this design decision appears at first blush to favor more efficient technologies over less efficient ones at any given price point, numerous parties explained why in effect assuming 100% RTE would be a material flaw in the program. Independent Power Producers of New York ("IPPNY") recommends that "to reflect realistic assumptions a well-performing system could earn in the wholesale energy and capacity markets, we recommend at an RTE adjustment be used as part of the monthly ISC calculation of REAP to better represent the operational reality of energy storage systems in the Day-Ahead energy market and more accurately capture energy arbitrage opportunities."[14] The New York Battery and Energy Storage Technology Consortium ("NY-BEST") further explains that "[i]f an RTE factor is not incorporated, the REAP calculation may include hours where the arbitrage spread is only 10-15%. In that case, the REAP will erroneously assume revenue that is unrealizable for most energy storage systems."[15]

While the inaccurate assumption of 100% RTE results in higher REAPs and thus lower ISCs for any given program participant that is selected, and so might appear to save ratepayers money, the failure to distinguish *among* the value of energy storage projects based on their round-trip efficiency appears to limit the ability of more efficient technologies to distinguish themselves prospectively from less efficient technologies, and may undermine the program's ability to choose the most efficient portfolio of capabilities in ways that are not entirely foreseeable. For

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[12] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Independent System Operator (Mar. 20, 2023) at 14.
[13] 6 GW Storage Roadmap at 53.
[14] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of Independent Power Producers of New York (Mar. 20, 2023) at 5.
[15]Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Battery and Energy Storage Technology Consortium (Mar. 20, 2023) at 5.

example, Hydrostor Inc. ("Hydrostor") argues that any assumption of uniform efficiency across technologies "would not be technology-agnostic, and [would] disadvantage innovative, low-cost non-lithium-ion technologies, causing higher costs and a less technology diverse and reliable electric system,"[16] and argues that this simplifying assumption is magnified for long-duration resources, for which the calculation of the reference energy arbitrage price ("REAP") based on the top-4 and bottom-4 hours of any day is already problematic.[17] Particularly when coupled with the absence of any performance requirement and the absence of mechanisms for generators to internalize most of the costs of their pollution, the assumption that all storage resources of a given capacity are equal, when some require more potentially emitting supply than others to produce the same system value, appears to risk giving rise to higher-emitting outcomes than necessary. To avoid this outcome, Staff could, if it is not already doing so, consider recognizing RTE as part of its upfront rating of the capacity of any given storage resource, rather than adjusting the REAP (and thus the ISC value) on that basis. In other words, a battery that consumes 400 MWh of grid power at one time in order to provide 360 MWh of energy at a later time could be considered to have an energy storage discharge capacity of 360 MWh. Similarly, Hydrostor correctly points out that NYSERDA's plan not to account for battery degradation over time contradicts the overall intention of awarding ISCs based on energy storage that is in fact operational on a given day and recommends an upfront adjustment of deemed storage capacity in the event of such degradation.[18]

The absence of any performance requirement presents similar risks. By paying for the availability of storage irrespective of whether it is ever in fact dispatched, the ISC as proposed risks inefficiently squandering limited funds to pay for storage that is not in fact available. The City of New York points out in its Initial Comments that "[b]ecause these new bulk storage assets will serve important reliability functions, ratepayers should have confidents that these assets can and will operate when needed," and thus recommends that the Commission "consider some form of performance mechanism in the proposed bulk storage program."[19] The City further notes that while bulk storage resource testing may be required for resources participating in NYISO markets, the Commission may need to consider other mechanisms for those that do not participate in those markets.[20] NYISO also emphasizes that benefits will flow from actual performance, nothing that "[i]n order to realize the benefits of storage resources balancing intermittent resource generation, storage resources must deliver stored energy into the NYCA and have the flexibility to participate in the real-time Energy market, Regulation Service market,

[16] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of Hydrostor, Inc. (Mar. 20, 2023) at 4.
[17] *See* Id. at 4-5.
[18] *See* Id. at 7.
[19] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of the City of New York (Mar. 20, 2023) at 12.
[20] *See* Id. at 12, n.23.

or Operating Reserves market."[21] To improve the efficiency and cost-effectiveness of New York's storage procurements and to reduce the distortion of wholesale capacity procurement, it would be prudent for the ultimate program design to incorporate a requirement that ISC recipients periodically demonstrate their availability and ability to perform.

V. Fully Recognize the Externalities Associated with Air Emissions.

Policy Integrity has analyzed hourly environmental and public health values arising from the avoidance of polluting generation (the "E-Value") of distributed energy resources for the whole United States, broken down into 19 subregions, using an open-source reduced-order dispatch model, and has made some salient findings. Specifically, Policy Integrity has demonstrated that the E-Values depend crucially on the location of the distributed energy resources, as some regions have more pollution-intensive electricity generators than others; that unlike the production cost savings (which are generally greater during periods of high electricity demand), there is no general and consistent pattern that can effectively characterize the E-Value of distributed energy resources throughout the day; and that the E-Values can be large—potentially greater than the benefits of avoided electricity production costs, and generally greater than what commonly used heuristics would suggest.[22]

Likewise, bulk storage will have strikingly different emissions impacts based on its location on the grid; the 6 GW Storage Roadmap itself recognizes this,[23] and several commenters have highlighted this in initial comments. AES Clean Energy Development LLC, for example, states that it agrees with the 6 GW Storage Roadmap that emissions impacts should be a consideration for energy storage location,[24] and Rise Light & Power recommends in initial comments that NYSERDA and DPS Staff consider incorporating "Zonal Net Emissions Reduction" in the ISC solicitations.[25] Ideally, polluters would be required to pay fully for the damage they cause, and avoidance of such payments would provide a strong market signal for emissions avoidance, and in the absence of such fully internalized damage costs, programmatic compensation for emissions avoidance is an important second-best solution. Where costs are not fully internalized and compensation for emissions avoidance is not readily feasible, consideration of emissions reductions in procurement may serve as a third-best solution—and we understand that in the case of this program at this time, a third-best solution may be the only readily available option. A variety of parties point generally to the appropriateness of procuring in a targeted manner for

[21] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Independent System Operator (Mar. 20, 2023) at 13.
[22] Matt Butner, Iliana Paul, and Burcin Unel, *Making the Most of Distributed Energy Resources*, INSTITUTE FOR POLICY INTEGRITY at 1.
[23] *See* 6 GW Energy Storage Roadmap at 61.
[24] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of AES Clean Energy Development, LLC at 3.
[25] *See* Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of Rise Light & Power (Mar. 21, 2023).

Zone J due to the opportunity to replace peakers.[26] We concur generally with the recommendation that such geographically disparate emissions impacts should (absent more efficient solutions based on actual emissions) at a minimum be a consideration in awarding contracts, and would note further that distinct local pollution reduction impacts can result not only from storage reducing the need to deploy highly-polluting generators such as peakers, but also from increasing feasibility of electrifying certain highly-polluting activities, such as diesel truck operation or burning certain grades of heating oil.

VI. Improve Rate Design to Provide Efficient Price Signals for Behind-the-Meter Resources.

In Policy Integrity's 2018 comments on the original Storage Roadmap in this proceeding, we stated as follows:[27]

> Staff correctly notes that sending accurate price signals is important for DERs to be "sited and operated in the most efficient manner to maximize benefits to all."[28] Creating a framework for energy storage systems (including those installed behind the meter) to be compensated based on all the values they provide, with the proper locational and temporal granularity, is crucial to efficiency. However, as Staff notes, the current rate designs fall short of achieving this goal.[29]
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> The installation of behind-the-meter systems are driven by the incentives driven by retail electricity rate design. And, these rates do not vary based on time or location. As a result, policies based on these designs cannot provide differential signals for the value that energy storage can provide in different time periods or locations.[30] Therefore, they lack the ability to provide accurate price signals about many of the services energy storage can provide, such as congestion relief at locations where the grid is most congested. When end users cannot see precise signals about what kind of energy storage would be most valuable or where energy storage would be most valuable, the composition of installed energy storage systems will not be economically efficient.

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[26] *See, e.g.,* Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Battery and Energy Storage Technology Consortium (Mar. 20, 2023) at 8; Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of Rise Light & Power (Mar. 21, 2023).
[27] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Comments of Institute for Policy Integrity (Sept. 10, 2018) at 3-4 (*internal citations updated*).
[28] 2018 Roadmap at 32.
[29] 2018 Roadmap at 31-32.
[30] DEVI GLICK ET AL., ROCKY MOUNTAIN INSTITUTE, RATE DESIGN FOR THE DISTRIBUTION EDGE: ELECTRICITY PRICING FOR A DISTRIBUTED RESOURCE FUTURE (Aug. 2014) at 15, 21.

Cost reflective tariffs, including well-designed demand charges, would give incentives to reduce peak demand, and hence avoid costly investments. [31] For example, coincident-peak demand charges would incentivize customers to reduce their peak demand during when the system is most constrained, as well as incentivizing types of energy storage and other DERs that can help customers reduce their demand during these time periods.

In addition, if a proper cost-reflective rate design is implemented, it would alleviate any cost recovery, and, hence, cost-shifting concerns, eliminating the need for an arbitrary enrollment limit in a way recommended by Staff. Such a limit would only hinder efficiency and lead to under-deployment of distributed generation. For all these reasons, we recommend that Staff focus on developing cost reflective rate designs that vary with time and location to provide incentives for deployment of energy storage systems that can reduce demand at times and locations when the grid is most congested.

In its initial comments on the new 6 GW Storage Roadmap, NY-BEST pointed out that issues relating to contract demand charges as a potential barrier to distributed energy resource deployment have been "the subject of discussion and analysis [in the VDER proceeding] for over six years and a decision is still pending from the Commission that could properly align Standby and Buyback rates with cost-based ratemaking principles. Action is needed by the Commission in this pending proceeding to support the recommendations in this Roadmap…."[32]

NY-BEST's concern that the continued lack of progress in this area is likely a material barrier to efficient deployment of storage resources is well founded. To ensure that the distribution-level energy storage is efficient located and deployed, the Commission needs to turn its attention back to the critically important need to develop and deploy more cost-based rate designs that are, to the extent feasible, locationally and temporally granular.

[31] There is indeed a growing evidence that demand charges can lead to gains for utilities and for both DER and non-DER customers. See a recent presentation by Xcel Energy showing a $9.73/kW demand charge in the summer reducing the peak demand by 7%. Scott Brockett, EUCI 2018 Residential Demand Charges Conference, Update On Public Service Company Residential Demand Charges (May 2018) (on file with the authors). See also David P. Brown & David E.M. Sappington, *On the Role of Maximum Demand Charges in the Presence of Distributed Generation Resources*, 69 ENERGY ECONOMICS 237-249 (2018).

[32] Case 18-E-0130, *In the Matter of Energy Storage Deployment Program,* Initial Comments of New York Battery and Energy Storage Technology Consortium (Mar. 20, 2023) at 21.