September 10, 2018

VIA ELECTRONIC FILING

Hon. Kathleen H. Burgess
Secretary
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

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

Dear Secretary Burgess,

Please find enclosed Natural Resources Defense Council's comments in the above-captioned proceeding. Thank you for your consideration of these comments.

Respectfully submitted,

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Comments on Valuing Emissions Benefits in the Bridge Incentive, Increasing Incentives for Bulk Standalone Energy Storage, and Pursuing the Peaking Unit Contingency Plans

New York's ambitious energy storage target of 1,500 MW by 2025 will help this resource become an increasingly prominent player in the state's efforts toward a decarbonized future. Done right, the deployment of storage at this scale has the *potential* to: ease renewable energy integration with the grid, improve grid efficiency, reduce costs, and decrease emissions and improve air quality. However, in order to realize this potential, New York must implement carefully designed policies that properly incentivize the development of energy storage to meet health and environmental goals. The Natural Resources Defense Council (NRDC) submits the following comments in order to help achieve this end.

As directed by the governor in his January 2018 announcement of the storage goal, the New York State Department of Public Service (DPS) and the New York State Energy Research and Development Authority (NYSERDA) made an important first step toward energy storage deployment in New York with the release of the New York State Energy Storage Roadmap and Department of Public Service and New York State Energy Research and Development Authority Staff Recommendations ("Roadmap") in June of 2018. The Roadmap does well to identify numerous policy pathways to accelerate storage adoption and move towards more dynamic signals for storage operation. However, the proposed mechanisms should go further to specifically incentivize energy storage resources to provide environmental benefits. The Roadmap should also go further to accelerate the adoption of bulk, standalone storage.

With this in mind, we recommend that NYSERDA and DPS (jointly, "Staff"):

1) Create a tool for evaluating energy storage projects based on a spatially and temporally granular environmental value, and use this tool to allocate the Market Acceleration Bridge Incentive,
2) Dedicate a portion of the Market Acceleration Incentive to bulk energy storage; and
3) Pursue the creation of needed Peaking Unit Contingency Plans in an expedient manner.

These recommendations respond to requests for input in Sections 4.1.4, 4.4 and 4.6. Overall, we recommend that DPS and NYSERDA design and implement an energy storage incentive program based on two principles: (1) the program should incent projects to maximize environmental benefits to the greatest extent feasible; and (2) the incentive should be financeable; 'accuracy' should not be prioritized over the workability of the incentive.

I. Comments on Section 4.1.4: Staff should evaluate the environmental attributes of energy storage resources using a more temporally and spatially granular framework.

Energy storage systems have the potential to support integration of renewable energy and clean up the electricity grid. As the Roadmap correctly recognizes, however, without the proper operating signals energy storage systems may not achieve these goals. The environmental impact of a storage resource depends on how and where it operates on the grid.

The Roadmap takes a good first step towards establishing the right signals for energy storage resources by proposing a shaped "E" value that differentiates between on-peak and off-peak operations. However, the proposed approach does not adequately incentivize emissions reductions because it does not provide sufficient spatial or temporal granularity. The proposed methodology to shape the "E" value uses marginal emission rates (MERs) to calculate on-peak and off-peak values and differentiate between peak and off-peak seasons. However, the methodology relies on *long-term averages* of these MERS for the on- and off-peak values—rather than directly using the hourly MERs to calculate more granular values—and so does not link the incentives directly and specifically to the MERs. Therefore, as proposed the policy would not adequately compensate energy storage resources for the environmental value they provide.

We recommend that Staff develop a framework to assess the environmental value of energy storage resources using granular data, which could be used to choose among projects competing in a solicitation and to inform a performance incentive for those projects. The Roadmap presents hourly MER data that Staff used to shape the "E" Value. We recommend that Staff use these data, at high spatial granularity, to

link the “E” Value to an accurate depiction of emissions impacts. Moreover, we recommend that Staff work to develop sub-hourly MER data to provide a more accurate assessment of environmental value.

Dispatchable distributed energy resources require different price signals and incentive designs than their non-dispatchable counterparts. Our proposal for a more granular approach is meant for energy storage resources and could also be applied to other dispatchable distributed energy resources. However, non-dispatchable resources cannot respond to more granular signals in a meaningful way, so, for these resources, greater temporal granularity may add complexity and uncertainty without much benefit. While a simpler framework is better suited for non-dispatchable distributed energy technologies, dispatchable resources like energy storage add value by responding to granular signals. Hence, more granularity in emissions data will help optimize the environmental value of these resources.

II. Comments on Section 4.4: Staff should incorporate environmental value into the Market Acceleration Bridge Incentive for bulk storage.

The Roadmap rightly notes the need to bring down the soft costs of energy storage to accelerate deployment and recognizes the opportunity to provide incentives to do so. We support the implementation of incentives to break down market barriers for energy storage resources, especially bulk energy storage, and to accelerate deployment.

It is important, however, that the incentives be designed to maximize the emissions reduction potential of storage resources and compensate energy storage systems for their environmental value. Several recent studies have shown that cost-optimized storage operation can potentially cause emissions *increases*, depending on system resource mix and resource operating incentives.[1] Environmental benefits are not currently valued in the market for energy storage resources; while the Value of Distributed Energy

[1]Eric S. Hittinger & Ines M. L. Azevedo, *Bulk Energy Storage Increases United States Electricity System Emissions*, 49 Envtl. Sci. & Tech. 3203-3210 (2015); Eric S. Hittinger & Ines M. L. Azevedo, *Estimating the Quantity of Wind and Solar Required To Displace Storage-Induced Emissions*, 51 Envtl. Sci.& Tech. 12988-12997 (2017); Laura M. Arciniegas & Eric Hittinger, *Tradeoffs Between Revenue and Emissions in Energy Storage Operation*, 143 Energy 1-11 (2018).

Resources (VDER) Value Stack may provide market signals for the environmental value of distributed storage resources, bulk resources do not currently have an incentive to be located and operate in a manner that maximizes environmental benefits. The proposed Bridge Incentive offers a great opportunity to provide signals for environmentally beneficial energy storage operation by compensating bulk storage resources for their environmental benefit.

We strongly recommend that Staff incorporate emissions impacts into the framework for allocating the Bridge Incentives. Below we outline a method for doing so, but we also recognize that there may be other frameworks that are better suited for this purpose. With that in mind, our central recommendation for the Bridge Incentive directed to bulk systems is that it incorporates emissions impact and does so in a way that both accelerates adoption and incentivizes the desired performance to meet emissions reduction goals. Importantly, as described below, the incentive need not be based *entirely* on measured emissions impact. Rather, it could include a combination of an upfront payment and an environmental performance payment so as to provide workable financing while also incenting optimal resource location and operation.

We recommend a partial upfront payment because it is important that the incentive provide a financial boost to help storage resources overcome initial barriers and reduce uncertainty for developers when financing the project. In addition, it is important that energy storage resources are incentivized to operate to realize and increase environmental benefit. Accordingly, we propose that part of the incentive be delayed and allocated based on the measured performance of the storage resource. We propose one potential design for such a performance-based incentive.

Tool to estimate storage emissions impact

First, we recommend that Staff design a tool to estimate the impact of energy storage resources on carbon and criteria pollutant emissions. The tool would serve to estimate the emissions impact of a given energy storage resource based on features of the resource and historical data for the resource's location.

We propose that Staff provide, as a component of the tool, historical MER data at the highest available granularity for each subzone or zone. Ideally, the tool would use 5-minute or 15-minute data at the subzonal level, and we encourage Staff to develop the ability to estimate or measure MERs at this level of granularity. Even with current data limitations, it may be feasible to use hourly data with subzonal or zonal granularity. We also encourage Staff to provide similar data on marginal emissions of criteria pollutants and incorporate these pollutants into the incentive framework, as the inclusion of local pollutants will help to address public health and environmental justice concerns.

In addition to historical MER data, the tool itself would need to include an equation to represent storage operation. The tool would need to include the other inputs (like pricing) that would be needed to represent storage operation. One way to structure the tool (as the Roadmap does in Section 4.1.4) is to assume that storage resources will buy electricity at the lowest prices of the day and sell it at the peak prices. While this method ignores other factors that impact storage operation (like lack of foresight and bids into ancillary services markets), it would still likely provide a sufficient estimate of emissions impact for comparison purposes. Another option is to allow storage resources to input their own equation to model dispatch and estimate their emissions impact—giving the owners the flexibility to factor in their operation regime and letting them set their own target for the performance-based incentive described below.

Using these datasets, the tool could then take in information from the energy storage resource (equation to model dispatch or parameters to inform dispatch, efficiency, location, power capacity, and duration) and output an estimated impact on emissions over a given time period.

Once developed, the tool should be provided to developers to aid them in forecasting anticipated emissions benefits.

Choosing bulk energy storage projects to receive the incentive

We recommend that Staff incorporate environmental impact into the process for deciding which bulk energy storage resources would receive the Bridge Incentive. One potential way to do so would be to use a tool like the one outlined above to estimate the emissions impact of the energy storage resources in question and devise a system to compare the resources based on emissions impact in combination with other important factors identified in the Roadmap. Storage resources would have some control over the estimation of the resource's emissions impact if the tool allows the project owners to input a dispatch regime of their choosing. Importantly, while this structure would incentivize storage resources to set ambitious estimates to appear favorably in the competitive solicitation, the performance-based incentive proposed below would hold the storage operators accountable to their estimates.

We recommend that Staff use the incentive to compensate the emissions benefits of energy storage projects because among energy storage resources' many benefits, environmental benefits are not fully compensated by current market structures. A program based on environmental value of avoided emissions would incent storage resources that are most beneficial to society.

Upfront incentive

We propose that Staff design an upfront incentive that is linked to the estimated emissions impact of each energy storage resource. Storage resources that are expected to result in a greater emissions reduction should receive a greater incentive. The percentage of the total incentive that is allocated upfront should be sufficient to overcome initial costs and avoid uncertainty but not so high in relation to the performance incentive (the delayed portion of the incentive) such that the performance incentive is too small to drive improved operation.

Performance incentive

We propose one potential design for a performance payment to incent storage resources to decrease emissions.

Importantly, the success of any performance-based incentive would be greatly enhanced by access to real-time MER data at high spatial and temporal granularity to give storage resources the information they need to operate for environmental value. We believe it is feasible in the near future for NYSERDA to provide real-time marginal emissions signals in 5-minute or other sub-hourly intervals, and we recommend that Staff work to build the ability to provide these data, in addition to 72-hour-ahead, month-ahead, and year-ahead forecasts for marginal emissions.[2] In the interim, NYSERDA could provide the best available MER data to storage operators to inform dispatch decisions.

We propose a performance-based bonus (and perhaps parallel penalty) that is periodically disbursed, similar to the Earnings Adjustment Mechanism that utility shareholders receive for successfully implementing energy efficiency portfolios or achieving other beneficial outcomes.

In this scenario, storage resources would receive the second part of their incentive for achieving their estimated emissions reductions and then would receive additional incentives for exceeding the target. The storage resource would periodically (perhaps once a year) report its achieved value and provide evidence to support this value. The storage resource would then receive a payout linked to its performance. Importantly, the amount of the bonus or penalty would be a function of the storage resource's actual achieved emissions reductions.

Use of a performance-based incentive will require Staff to provide a high level of clarity to storage developers. We recommend that Staff explore a range of financial options for designing a performance-

[2] WattTime, a subsidiary organization of Rocky Mountain Institute, has developed a methodology to estimate 5-minute marginal emissions rates in real time.

based incentive that is disbursed if storage resources meet specified targets. We suggest that Staff conduct analysis and consult relevant stakeholders to determine the most appropriate financial mechanism to use here.

Implementing this recommendation

We recognize that the proposed modification to the Bridge Incentive would require extensive analysis and tool development. We recommend that Staff work with consultants to develop the recommended tools and frameworks, building off the analysis that has already been done for the Roadmap, and then allow for review and input from relevant stakeholders. Moreover, if the process for developing these tools and the appropriate granularity of data will be lengthy, we encourage Staff to use a simpler approach to consider environmental benefits in the Bridge Incentive in the interim and update to a more well-developed and accurate approach when possible.

III. Comments on Section 4.4: Staff should adopt more policies to incentivize standalone, bulk energy storage.

Bulk and distributed storage will both play important but different roles in achieving the state's 1,500 MW goal. Bulk, standalone storage, however, provides certain benefits that may not be realized as efficiently by customer-sited and distribution system storage because of siting constraints, operational constraints, and scale or by bulk storage paired with renewable energy because of siting constraints.

Bulk standalone storage, in particular, allows for T&D deferral, reduction of the use of highly polluting urban peaker power plants, and electricity congestion reduction. Standalone bulk energy storage is uniquely suited for areas like New York City where large solar arrays and wind farms are not as easy to site and it is more difficult to develop paired systems. In these densely settled areas, the potential environmental value of storage is particularly high because of high concentrations of highly-polluting gas

and dual-fuel peaker plants and high population density.[3] Indeed, if the only incentive provided to bulk storage was for storage that is paired with renewable energy projects, that would exclude much of the energy storage that could be built downstate.

The Roadmap doesn't explicitly include an incentive for bulk standalone storage projects, only noting that standalone storage ought to be considered and that there would also be an incentive for bulk projects. We propose that the standalone bulk storage should be prioritized in the Bridge Incentive and suggest that doing so would be simple under the framework for environmental valuation previously described.

In contrast to standalone bulk storage, the Roadmap outlines several incentives for storage paired with renewables and for distributed storage, including a new NY Sun incentive for paired PV plus storage. We support these incentives, which will help to ensure that such projects move forward at scale. Solar-plus-storage can also take advantage of the federal Investment Tax Credit, while standalone storage cannot (though this incentive is being phased out over the next few years). In addition, NYSERDA and NYPA incentivize paired systems through the Large Scale Renewables procurement program.[4]

Distributed storage, meanwhile, can ultimately be incentivized by the VDER process as long as Staff continues to refine and improve that framework. While the Roadmap recommends expanding VDER to standalone storage, doing so still would not capture bulk systems. It makes sense to incentivize distributed storage and to continue improving VDER, but new and separate incentives aimed at bulk storage would help facilitate growth in this (different) sector.

We support continued and new incentives for paired storage systems and distributed energy storage, but we believe that incentives for bulk, standalone energy storage systems are currently lacking and encourage Staff to develop policies that accelerate deployment of these resources.

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[3] New York Independent System Operator, *Power Trends 2018*, issued May 2, 2018, available at https://home.nyiso.com/wp-content/uploads/2018/05/2018-Power-Trends_050318.pdf.

[4] NYSERDA, Renewable Energy Standard Purchase of New York Tier 1 Eligible Renewable Energy Certificates Request for Proposals (RFP) No. RESRFP18-1, issued April 25, 2018, available at https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00Pt0000005I4LVEA0.

IV. Comments on Section 4.6: Staff should move forward with targeted reliability analyses in order to expedite the transition from retiring power plants.

We commend the State for encouraging Peaking Unit Contingency Plans in anticipation of NOx regulations from the DEC. Such plans can utilize existing NYISO methods to address potential plant closures following the implementation of more strict NOx limits. Typically, where NYISO finds a retiring plant is necessary to the reliability of the system, it will pay that plant via a reliability-must-run ("RMR") contract unless and until market-based alternative(s) can be secured. For this period, the retiring plant is costing customers to stay online but not be used, and solicitation of alternative solutions can be a lengthy process.[5]

We are supportive of Peaking Unit Contingency Plans as a way for the State to smooth this transition process and save customers money by cutting down the time an uncompetitive plant may be supported via RMR contract. These plans can be completed as anticipatory contingency analyses. We recommend that Staff expand upon the E3 analysis presented in the Roadmap to identify where Contingency Plans are likely to be most needed and explore improvements to the alternatives solicitation process to expedite it.

V. Conclusion

In conclusion, NRDC is encouraged by the opportunities and Staff recommendations highlighted in the Roadmap. New York's dedication to creating a robust set of energy storage policies is critical to meeting the State's overall climate and clean energy goals, and we applaud Staff for committing to carefully design incentives that will shape the industry to maximize environmental benefits and allow it to become self-sustaining in the future. As always, it is essential that the PSC ensure proper accountability mechanisms are in place to assure achievement of the 1500 MW by 2025 target, and the future 2030

[5] New York Independent System Operator, *2016 Comprehensive Reliability Plan*, April 11, 2017, https://www.nyiso.com/public/webdocs/markets_operations/services/planning/Planning_Studies/Reliability_Planning_Studies/Reliability_Assessment_Documents/2016CRP_Report_Final_Apr11_2017.pdf.

goal, with ongoing transparency provided through interim consolidated reporting on milestones. As the Roadmap is translated into more concrete policies, we look forward to working with Staff on the ideas proposed within these comments.

Sincerely,

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