New York Battery and Energy Storage Technology Consortium, Inc.

Submitted electronically

September 30, 2024

New York Cap and Invest (NYCI): NY-BEST Comments Regarding Climate Investment Account Proceeds

Dear colleagues:

NY-BEST thanks you for your efforts to develop the New York Cap and Invest (NYCI) program. We appreciate the opportunity to provide the following feedback on opportunities to leverage NYCI in support of a 100% zero-emissions grid, with a particular focus on the need to invest in Long-Duration Energy Storage (LDES). Please do not hesitate to reach out with any questions or concerns; we'd be happy to discuss.

Sincerely,

William Acker, Executive Director
NY-BEST

About NY-BEST

The New York Battery and Energy Storage Technology Consortium (NY-BEST) is a not-for-profit industry trade association with a mission to grow the energy storage industry in New York. We act as a voice of the energy storage industry for more than 180 member organizations on matters related to advanced batteries and energy storage technologies. Our membership includes global corporations, start-ups, project developers, leading research institutions and universities, and numerous companies involved in the electricity and transportation sectors.[1]

[1] NY-BEST comments represent the interests of the organization as a whole and not the views of any single member. Our members have diverse interests and the organization's views are intended to be reflective of the energy storage industry collectively.

NY-BEST strongly supports the overall proposed NYCI investment framework.

NY-BEST strongly agrees with dedicating at least one-third of proceeds to directly reducing customer bills, in support of an affordable energy transition for all. We also support dedicating the remaining proceeds to investments that will advance equity and climate justice, improve air quality and health, reduce energy cost burden, and drive benefits to Disadvantaged Communities (DACs).

In support of these goals, NY-BEST urges the State to prioritize investment areas as follows:

1. Investment areas should support New York State in achieving 100% clean electricity, since this is the cornerstone of the energy transition and will enable decarbonization of other sectors through electrification.
2. Investment areas should leverage public dollars to catalyze private investment in New York State's energy transition, cultivating a cutting-edge clean energy market that will help achieve the mandates of the Climate Act.
3. Investment areas should support critical technologies that are not currently being incentivized via other pathways – namely, Long-Duration Energy Storage (LDES), as further detailed below.

Dispatchable Emissions-Free Resources (DEFRs) are key to achieving climate mandates.

Clean electricity is the pillar upon which all our climate and equity goals rest. Electrification of buildings and transportation will only help achieve carbon neutrality if the electricity powering it is zero-emissions.

While the State has demonstrated national leadership in procuring and supporting the deployment of renewable energy and short-duration energy storage, a significant gap remains, namely in developing the Dispatchable Emissions-Free Resources (DEFRs) that the NYISO will rely on to achieve 100% zero-emissions by 2040. DEFRs will play a critical role in maintaining reliability in the event of a multi-day reduction in solar and/or wind output, particularly as electrification drives our grid to become winter-peaking.

Further, **DEFRs can directly support equity and public health goals by facilitating the timely retirement of fossil-based power plants, which are disproportionately sited in Disadvantaged Communities (DACs).** Indeed, in New York City, over 500 MW of fossil-based peaking capacity that was scheduled to retire in 2025 in compliance with the 2019 Peaker Rule will continue to operate due to reliability margin deficits.[2] The PEAK Coalition has noted that these generators are located in areas that already face considerably higher concentrations of air pollution and rates of respiratory

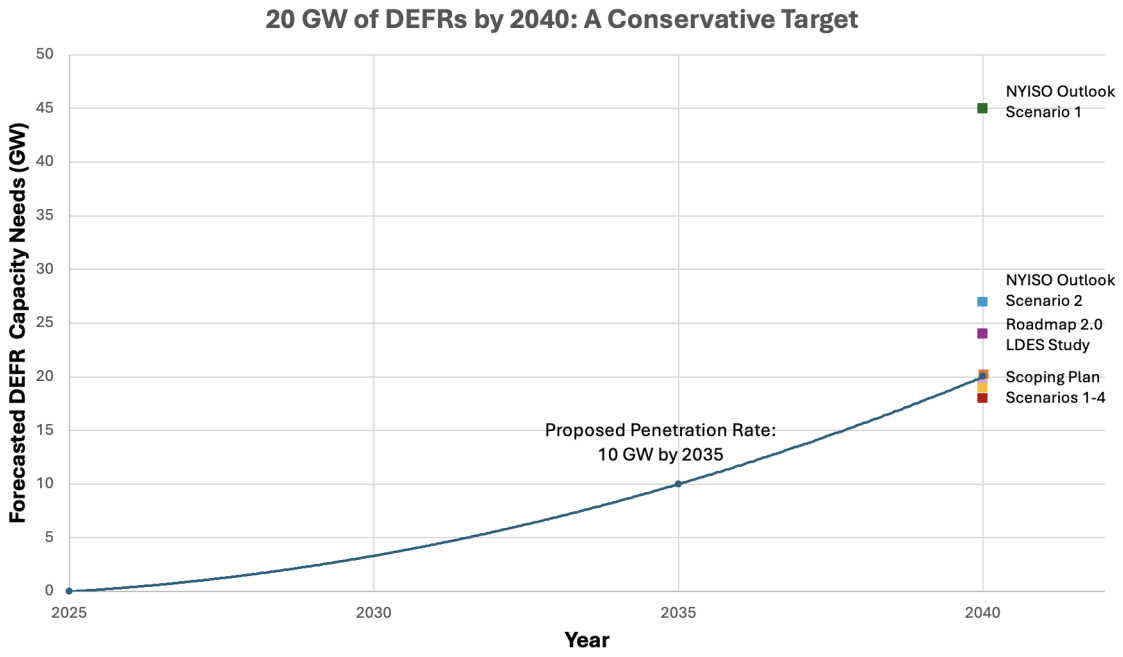
[2] Robert Walton, Utility Dive. *NYISO to keep 4 NYC peakers running past planned 2025 retirement to maintain reliability,* November 2023. Accessed online: https://www.utilitydive.com/news/nyc-peakers-planned-2025-retirement-remain-online-reliability-must-run-nyiso/700417/

disease. Deploying DEFRs to increase firm capacity will ensure polluting power plants can be retired as quickly as possible.

DEFRs can be defined as meeting the following two criteria:

- Dispatchable, meaning that the resource can ramp up from zero discharge to full power output within ten minutes, and similarly reduce from full power to zero output within ten minutes; and
- Fully emissions-free, meaning that no carbon or criteria emissions are emitted from the resource. Technologies relying on combustion of Renewable Natural Gas or hydrogen, which release emissions of greenhouse gases, nitrous oxides, and/or other air pollutants, should not be considered DEFRs. However, fuel cells operating on green hydrogen should qualify.

In New York, modeling conducted for the *Climate Action Council Scoping Plan*, the *6 GW Energy Storage Roadmap*, and the *NYISO System and Resource Outlook* indicates that, to ensure the State is on track to achieve a reliable zero-emissions electric grid by 2040, **we must deploy at least 20 GW of DEFRs by 2040**, as illustrated in the chart below**.** Accounting for faster deployment in 2035-2040 as compared to 2025-2035, it is reasonable to assume **10 GW of DEFRs should be deployed by 2035** to ensure that New York is on track to transition to a reliable, least-cost 100% zero carbon electric grid by 2040. These ambitious but achievable metrics underscore the urgency of the investment needed and the importance of establishing near-term programs to encourage private sector investment.



Based on existing modeling conducted by the State and the NYISO, New York State will need at least 10 GW of DEFRs by 2035 and 20 GW by 2040 to meet climate targets.

NYCI should support Long-Duration Energy Storage (LDES) to ensure New York meets climate and equity mandates.

Long-Duration Energy Storage (LDES) is a critical DEFR technology New York State will rely on to meet its climate mandates. The U.S. Department of Energy defines LDES as storage systems capable of delivering electricity for 10 or more hours in duration. This diverse resource includes energy storage that can provide dispatchable power on intra-day and/or multi-day time-scales, and includes various types of mechanical energy storage, thermal energy storage, electrochemical energy storage, and hydrogen fuel cells paired with electrolyzers.

Nationwide, the U.S. Department of Energy's *Pathways to Commercial Liftoff: Long Duration Energy Storage* report (*DOE Liftoff Study*)[3] found that the U.S. grid may need 225-460 GW of LDES resources by 2050, resulting in $10-$20 in annualized system cost savings compared to portfolios that do not include these dispatchable, firm resources.

In New York, a 2023 study by NY-BEST member company Form Energy similarly found that integrating more LDES would result in considerable annual cost savings. The study, which extended the *6 GW Energy Storage Roadmap* modeling to include a more diverse set of LDES resources, found that as much as 35 GW of LDES by 2040 could result in $8.7 billion per year in cost savings (2020 dollars) by reducing the total amount of new resources needed to meet New York's energy demands.[4]

Many LDES technologies are already mature and ready for deployment, and as the *DOE Liftoff Study* makes clear, a range of emerging technologies will also become available at increasing scale in the coming years. For example, in New York, NYSERDA has recently awarded demonstration funding to three new LDES technologies of 10-100 hour duration that will soon be deployed.[5]

However, despite the clear need to deploy LDES to meet climate mandates, the multifaceted benefits that LDES technologies would bring to New York's grid are not currently fully valued in the NYISO markets, nor fully incentivized by the State. To meet this need**, the New York Cap and Invest program should be leveraged to fund procurement programs for LDES, which will directly displace power plants and support the climate and equity mandates of the Climate Act.**

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[3] U.S. Department of Energy. *Pathways to Commercial Liftoff: Long-Duration Energy Storage,* March 2023. Accessed online: https://liftoff.energy.gov/long-duration-energy-storage/

[4] Form Energy. *Modeling Multi-Day Energy Storage in New York*, 2023. Accessed online: https://formenergy.com/wp-content/uploads/2023/09/Form-Modeling-Multi-Day-Energy-Storage-in-NY-whitepaper-8.8.23.pdf

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

NY-BEST recommends two ways NYCI funds can be leveraged, as further detailed below:

1. Funding procurement programs to catalyze a robust market for mature and commercially-available LDES technologies in New York State.
2. Facilitating the expansion of Research, Development, and Demonstration (RD&D) programs for LDES innovation.

1. Funding procurement programs to catalyze a robust market for mature and commercially-available LDES technologies in New York State.

Many LDES technologies are mature today and ready for deployment, including but not limited to zinc, iron and other battery chemistries, flow batteries, compressed air, and advanced pumped hydropower. However, the multifaceted benefits that these technologies bring to the grid are not currently fully valued in the NYISO markets, meaning that developers are not incentivized to bring these projects to New York State.

While the NYISO undergoes longer-term processes to reform market rules to better capture and monetize LDES services, the State must launch programs in the near-term to support rapid LDES technology deployment, to ensure climate and equity mandates are achieved.

NYCI funds should be used to develop a procurement program for LDES similar to the Large-Scale Renewable program or the Bulk Storage program, in support of a 10 GW of DEFR by 2035 target. Such a program has a high potential to significantly lower electric system costs over the long-run and to result in net-savings to the State, and should therefore be a high priority.

Given the multi-year time lag that it takes manufacturers and project developers to respond to new policy signals, NY-BEST recommends this procurement program should be launched in 2027 at the latest to ensure that projects are first deployed no later than 2030. Ideally, NYSERDA would establish such a program sooner, with procurement to occur as soon as 2025 or 2026, with the expectation that costs could be recouped from NYCI funding expected in future years.

An LDES procurement program could be modeled after the Bulk Storage procurement program in the Storage Roadmap, as follows:

a. NYSERDA would issue annual LDES solicitations, targeting 1GW per year for three or more years. Eligibility should be limited to LDES technologies that align with the DEFR definition above, namely dispatchable (e.g. can ramp up and down within 10 min) and fully emissions-free.
b. Solicitations could be divided into technology-neutral buckets based on duration (for example, 10-24hr resources; 24-200hr resources; >200hr resources). After an initial round of procurement, the bucket durations and sizes could be adjusted based on additional grid modeling to determine the optimal duration mix required to meet climate targets over time.
c. Developers bid a Strike Price ($/kwh) that reflects anticipated required revenue to justify construction and financing of the project.

d. NYSERDA develops an Index LDES Credit (ILC) equivalent to the difference between the Strike Price and the Reference Price. Unlike the Reference Price used for the Bulk Storage program Index Storage Credit, the ILC would use a Reference Price based on projected Capacity revenue rather than Energy Arbitrage revenue, reflective of the LDES use-case to provide firm capacity.

Although the costs of such a program require further analysis, we preliminarily estimate that the program will need to provide $80-150 per kW-yr in revenue to LDES additional to existing NYISO conditions (equivalent to $80-150M per year to support 1 GW in new LDES). However, such resources will generate at least $200/kW-yr in incremental annual value to the state by 2040 in the form of avoided resource needs to meet New York's zero carbon electricity goals, which resources will not be able to directly capture from the NYISO market, potentially resulting in significant savings to the State.

2. <u>Facilitating the expansion of Research, Development, and Demonstration (RD&D) programs for LDES innovation.</u>

NYSERDA has launched successful LDES demonstration programs, including $15M via PON 5472 in 2023 and $5M via PON 5779 in 2024. However, funding levels have remained too low to catalyze the transformative innovation needed to achieve DEFR and zero-emission grid targets. Additionally, innovation is continuously occurring, with various technologies at different stages of technology readiness, so it is important to have regularly occurring funding solicitations.

NYCI proceeds offer a critical opportunity to exponentially increase investment in RD&D programs for LDES technologies. California has already authorized more than $300M in demonstrating LDES projects.[6] To support both R&D and technology demonstrations in New York at a relevant commercial scale, a minimum $150M program would position NYS as a leader in LDES technologies. Further, it would enable larger and more diverse projects, drastically expanding the pool of mature candidates for future procurement programs.

<u>Conclusion</u>

NY-BEST thanks you for your efforts to develop the NYCI program. Given the urgent need to deploy DEFRs in support of a 100% zero-emissions grid, NYCI proceeds should be leveraged to fund procurement programs for LDES, which will directly displace power plants and support the climate and equity mandates of the Climate Act. We appreciate the opportunity to provide our feedback and input. Please do not hesitate to reach out with any questions or concerns; we'd be happy to discuss.

[6] California Energy Commission. *Long Duration Energy Storage Program.* Accessed online: https://www.energy.ca.gov/programs-and-topics/programs/long-duration-energy-storage-program