



**New York Energy
and Climate Advocates**

310 W. 86th St. #6B, New York, NY 10024

December 7, 2021

VIA ELECTRONIC MAIL

The Honorable Michelle L. Phillips
Secretary to the Commission
New York State Public Service Commission
Three Empire State Plaza
Albany, NY 12223

RE: Reconciliation of NYSERDA analysis with CES Proceeding

Dear Secretary Phillips,

On October 14, 2021, New York Energy & Climate Advocates (NYECA) submitted the attached set of questions to the New York State Energy Research and Development Authority (NYSERDA) relating to the agency's analysis of steps necessary to meet goals of the Climate Leadership and Protection Act (CLCPA). Our questions address NYSEDA's evaluation of renewables, storage, and firm carbon-free capacity necessary to meet electricity mandates of the CLCPA, including significant differences between the agency's analysis and modeling performed by the New York Independent System Operator (NYISO) in its *Phase II Climate Change and Resilience Study*—a document which has been referenced by several parties to this proceeding. In our view, both analyses reveal an unrealistic buildout of intermittent, low-energy-density, low-capacity factor sources and related infrastructure that warrants the consideration of alternatives if New York hopes to meet its climate goals. We also recommend better coordination between agencies involved in crafting energy policy and entities charged with maintaining the reliability of New York's electric grid.

We do not find discernable answers to the questions we have posed in our review of information at the Climate Action Council website associated with NYSEDA's analysis, <https://climate.ny.gov/Climate-Resources>. Nor do we see evidence that an effort has been made to reconcile NYSEDA's analysis with that of NYISO.

Having not received a response from NYSEDA (Carl Mas)¹, and recognizing the direct relevance of our inquiry to purposes of this proceeding, we respectfully submit the attached questions as interrogatories and request that NYSEDA, also a party, provide substantive answers within timeframes required by proceeding rules.

Sincerely,

/s/

Leonard Rodberg, New York Energy and Climate Advocates
lensqc@infoshare.org

¹ NYECA emailed Mr. Mas on three occasions (Oct 14, Oct 26, and Nov 22, 2021). Correspondences available upon request.



**New York Energy
and Climate Advocates**

310 W. 86th St. #6B, New York, NY 10024

October 14, 2021 (resubmitted Nov 22, 2021)

VIA ELECTRONIC MAIL

Carl Mas
Director, Energy and Environmental Analysis
New York State Energy Research and Development Authority
17 Columbia Circle
Albany, NY 12203-6399

RE: Questions on Initial Results of Integration Analysis, NYSERDA presentation Oct 1, 2021

Dear Mr. Mas,

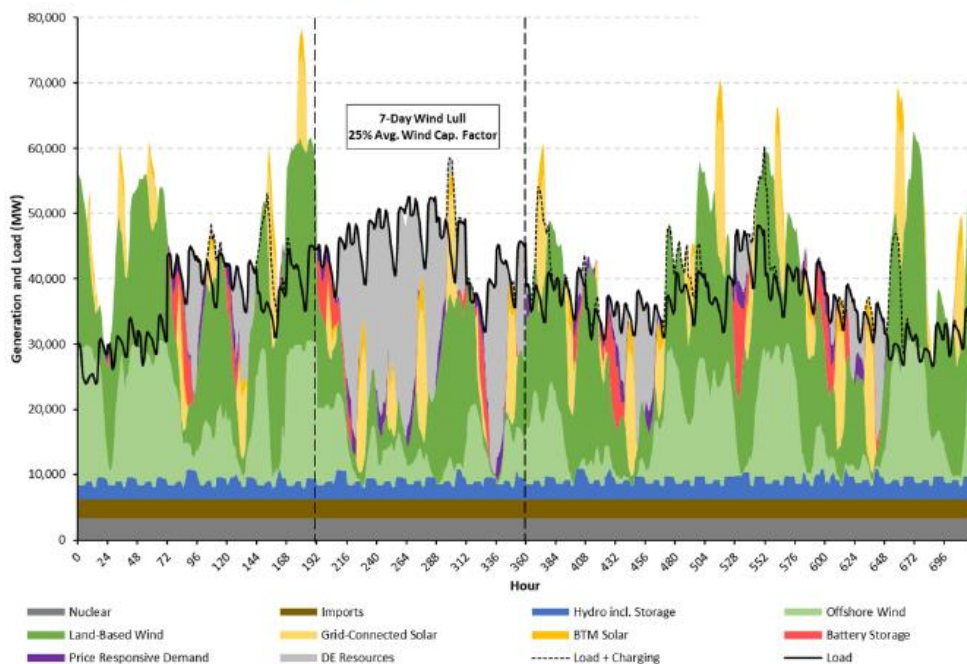
On October 1, 2021, you presented information on behalf the New York State Energy Research and Development Authority (NYSERDA) to the Climate Action Council (CAC) describing various scenarios for meeting objectives of the Climate Leadership and Community Protection Act (CLCPA). We are also familiar with the Phase 2 Climate Impact and Resilience Study prepared by the New York Independent System Operator (NYISO) earlier this year, which differs from NYSERDA's analysis in several ways. As an organization interested in seeing that New York is successful in meeting its energy and climate goals, and as a party to the Clean Energy Standard proceeding, we request that NYSERDA provide answers to the following questions:

1. NYSERDA predicts between 62,691 MW and 66,215 MW of installed solar in 2050, and estimates annual generation 120,056 GWh and 126,047 GWh. This corresponds to a capacity factor of almost 22%. However, the capacity factor of solar PV in New York is poor, only 14% for fixed panel and only 20% for tracking panels. **How does NYSERDA explain this discrepancy?** Most large-scale solar projects are fixed panel installations, not tracking. **Does NYISO believe that all solar panels installed in New York will use mechanically tracking? Did NYSERDA inadvertently use capacity factor data for a different state?**
2. Notwithstanding the above, at a tight packing of 4 acres per MW, 66 GW of solar would consume 264,000 acres of land. (Taking into account access and support infrastructure, 6-7 acres per MW is more realistic.) Still, 264,000 acres is equal to 400 square miles, an area significantly larger than all five boroughs of New York City combined (302 square miles). Accounting for typical configurations and capacity factor, installing enough solar to generate 126,047 GWh of annual electricity generation could require blanketing an area larger than two or three New York Cities in glass, steel, and copper. About 20 square miles of land would have to be converted to electricity production, each and every year, starting immediately to achieve this level of solar production. **Does NYSERDA believe this to be a realistic or environmentally responsible buildout scenario?**

3. Comparing NYSERDA’s four scenarios to the CLCPA case modeled by NYISO in its Phase 2 report, it appears that NYSERDA contemplates less land-based wind in exchange for more solar. However, even on just an annual generation basis, the amount of additional solar (12-15 GW) NYSERDA provides is insufficient to make up for the amount of wind lost (17-22 GW) in NYISO’s model, especially considering that wind has twice the capacity factor of solar in New York, and considering that more generation should be necessary in 2050 than 2040. **How does NYSERDA explain this?** Notably, NYSERDA estimates the need for 149 to 158 GW of total capacity in (production and storage) in 2050, whereas NYISO predicts the need for 163 GW in 2040. **How does NYSERDA explain this?**

4. Examining NYISO’s “CLCPA Winter Wind Lull Case” and considering differences between the two portfolios, it appears that NYSERDA’s portfolio will have significant difficulty meeting demand, especially in the winter. As seen in NYISO’s model below, wind comprises the vast majority of intermittent generation in the winter, and battery storage can do little to extend the usefulness of solar generation. Trading land-based wind capacity (dark green) for more solar would result in each of the solar peaks (yellow) being about 30% higher in magnitude. However, this does little to meet demand for electricity during the more evenly distributed periods of lost generation from wind. NYSERDA predicts the need for 19 GW to 23 GW of batteries, which it describes as providing “4- and 8-hour” storage. But this is only modestly more than the 15.6 GW of battery storage capacity called for by NYISO, and even if this were a full 8 hours of storage, it would do little to shift the delivery of excess solar generation to times where can help meet real-time demand. Solar and wind have very different seasonal characteristics. **Has NYSERDA performed real-time modeling of its proposed portfolio distribution, similar to the robust analysis by NYISO? Modeling scenarios, like the one shown here by NYISO should be made available.**

Figure ES-2: Hourly Load/Generation Balance, CCP2-CLCPA Winter Wind Lull Case



5. NYSERDA predicts between 10,997 MW and 13,239 MW of land-based wind installed within New York by 2050, and estimates annual generation between 31,224 GWh and 37,896 GWh. (This corresponds to a capacity factor of about 33%. This does not reflect typical performance of land-based wind. **How does NYSERDA justify this figure?** NYISO estimates a capacity factor of 26% for land-based wind. Assuming 5MW wind turbines (which are very large for land-based), this would require 2648 individual turbines. Achieving this buildout by 2050 would require installing two large-wind turbines somewhere within upstate New York every week for the next 28 years. **Does NYSERDA believe this to be a realistic or environmentally responsible buildout scenario?** (If needed to meet the state’s 2040 goal of carbon-free electricity, an even faster deployment would be required.) In addition to the above, NYSERDA predicts 6,397 MW of imported electricity from wind. Based on its estimates of annual generation, those turbines would operate at a capacity factor of 44%. **What is the source of this number?**

6. NYSERDA predicts up to 21,063 MW of offshore wind in 2050. This is more than twice the amount of wind that the state has promised to install by 2035. In its Phase 2 model, NYISO also predicts the need for twice as much offshore wind, but NYISO calls for this to achieve carbon-free electricity by 2040. **How much offshore wind does NYSERDA believe must be installed by 2040 to achieve the 2040 goal? If not as much as predicted by NYISO, then please explain why. If NYSERDA estimates that this much offshore wind is needed by 2040, then please explain how 12,000 MW of offshore wind will be installed in the five years between 2035 and 2040.**

7. In its presentation, NYSERDA predicts that “firm, carbon-free resources” would be required to provide 1-2% of annual generation. This is substantially less than predicted by NYISO which estimates that “dispatchable emission-free resources” (DE) would be needed to provide 10% of winter generation and 4% of summer generation. (See figures 46 and 48 of NYISO’s Phase 2 report.) **How does NYSERDA explain this significant difference, especially considering that its portfolio relies much more on solar, which is of little value in the winter?** In terms of capacity, NYSERDA estimates that between 14,603 MW and 23,294 MW of dispatchable firm generation will be needed, which is less than the 32,000 MW identified by NYISO. NYSERDA’s portfolio relies on roughly the same amount of baseload capacity (large hydro + nuclear) as NYISO’s portfolio. **So how does NYSERDA believe that it can suffice with significantly less additional firm dispatchable capacity to backup remaining intermittent generation?** Even at levels estimated by NYSERDA, the amount of firm carbon-free generation identified by NYSERDA corresponds to more than half of the total fossil fuel generation capacity in New York today. Fuel cells cannot be realistically scaled up to many thousands of megawatts. Therefore, without additional carbon-free nuclear power (which would have the additional benefit of serving baseload generation), this means that the state would need to retain most of its existing combustion-based power plants that currently burn gas (or build new ones) in the hope that they will be able to burn “green” hydrogen in the future (while continuing to incur co-pollutants such as NOx in the process). **How does NYSERDA reconcile this with the public’s desire to shut down polluting combustion plants as soon as possible?**

8. NYSERDA states in its presentation that it assumes that 50% of hydrogen demand will be met by in-state electrolysis. **Why only 50%? Since the CLCPA requires attention to upstream greenhouse gas emissions, how does NYSERDA plan to track emissions associated with out-of-state hydrogen production? How much total hydrogen production does NYSERDA estimate will be necessary, and why would NYSERDA assume that other states have a surplus of “green” hydrogen that they do not need for themselves? How much hydrogen compression and storage does NYSERDA anticipate will be needed?** Typical “round-trip” power-to-hydrogen-to-power conversion efficiency is less than 50%. **What conversion efficiency does NYSERDA assume?** NYSERDA states in its presentation that “firm, zero-emission resources, such as green hydrogen or long-duration storage, will play an important role to ensure a reliable electricity system beyond 2040.” **However, why does NYSERDA not view these as vital to meeting the state’s goal of carbon-free electricity by 2040?**

9. NYSERDA’s estimate of 19 GW to 23 GW of “4- and 8-hour” battery storage corresponds to anywhere from 80 GWh to 180 GWh of stored energy. This could be more or less than the 124.8 GWh (15.6 GW x 8 hours) of storage called for by NYISO. **How much total energy storage does NYSERDA actually estimate and what modeling has been performed to support this amount of storage?** The largest battery in the world today is the 1.2 GWh Moss Landing storage plant in California, yet NYSERDA is proposing a battery that may be 150 times bigger than this. **Does NYSERDA believe this to be a realistic or environmentally responsible solution?**

10. In its presentation, NYSERDA depicts nuclear power declining to 16,835 GWh of annual generation in 2050. Renewing the licenses of New York’s nuclear power plants could allow them to operate for an additional 20-years. Furthermore, passively-safe advanced nuclear technologies, including molten salt reactors and small modular reactors with enhanced load-following capability, are under development elsewhere in the country and around the world. **Given its benefits as a provider of reliable carbon-free electricity, why has NYSERDA not included the expansion of nuclear power within its portfolio?**

We believe that answers to the above questions are essential for New York policy makers, including the Climate Action Council, to develop a successful, competent plan for energy in the future. Thank you for your attention to this request for information.

Sincerely,

Leonard Rodberg

Leonard Rodberg, New York Energy and Climate Advocates

lensqc@infoshare.org

CC: Climate Action Council