

Case No. 15-E-0302  
-Via Electronic Filing-  
August 8, 2023

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

**Re: Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard – Zero Emissions Target**

Dear Secretary Phillips,

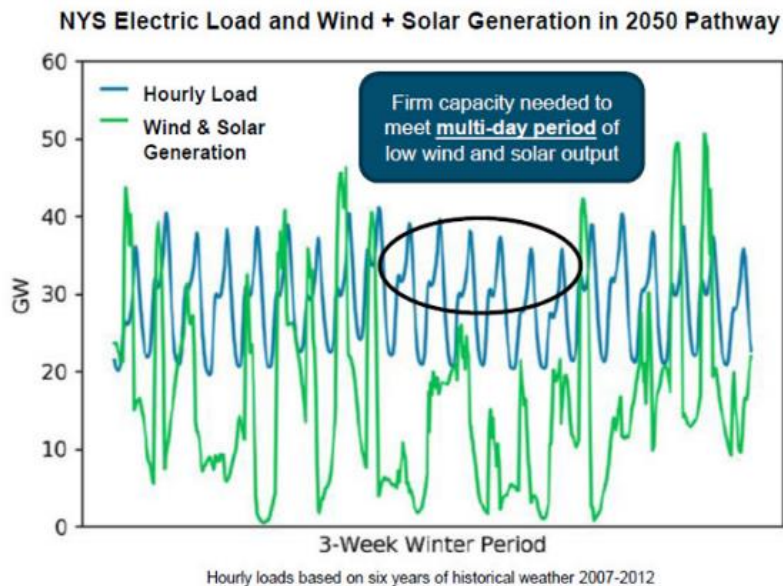
I am writing in response to the notice soliciting public comments for Case 15-E-0302 – Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard, [Order Initiating Process Regarding Zero Emissions Target](#) issued May 18, 2023. I am submitting these comments to highlight a study that the Commission must undertake with respect to the development and deployment of resources capable of achieving a zero emissions grid. In addition, the request for comments inappropriately ignores the need to consider cost and feasibility relative to PSL §66-p(4).

I have been following the [Climate Leadership & Community Protection Act](#) (Climate Act) since it was first proposed, submitted [comments](#) on the Climate Act implementation plan, and have [written](#) over 300 articles about New York’s net-zero transition. I am a meteorologist with over 40 years-experience in the electric generating sector. I represent the Environmental Energy Alliance of New York on the New York State Reliability Council Extreme Weather Working Group. The opinions expressed in this comment do not reflect the position of the Alliance, the Reliability Council, the Extreme Weather Working Group, any of my previous employers or any other company I have been associated with, these comments are mine alone.

**Ultimate Reliability Problem**

The root concern for reliability in an electric system that depends on wind and solar is illustrated in the following figure from a Climate Act Integration Analysis [presentation](#). This graph illustrates the long-duration wind lull problem from the September 16, 2020 presentation to the Climate Action Council Power Generation Advisory Panel. It explicitly points out that a dispatchable emissions-free resource (DEFR) is needed to meet multi-day periods of low wind and solar resource availability. The New York Independent System Operator (NYISO) has also argued that this resource is needed and this Proceeding is recognition that it is necessary.

# Ultimate Reliability Problem



The DEFR resource is required because the level of over-building wind, solar, and energy storage necessary for these relatively rare periods is cost ineffective. In New York, the winter solar resource is poor because the days are short, the irradiance is low because the sun is low in the sky, and clouds and snow-covered panels contribute to low solar resource availability. If there is a period of low winds then this new resource is needed to provide an economically viable resource solution. Note that the magnitude of DEFR needed to address this issue will be a significant percentage of system peak load and that the technology (green hydrogen, long-term battery, etc.) does not presently exist for utility scale application.

The reliability concern is exacerbated for several reasons. The future peak load will be in winter because the primary decarbonization strategy is electrification. During extreme cold weather periods, natural gas used at power plants is diverted to other users and power plants must switch to oil. There are fewer plants that have dual-fuel capability and over an extended event or a series of events the oil in storage could be depleted. Finally, the coldest periods are also associated with wind lull periods because extreme cold is associated with large high-pressure weather systems.

If the generating resources available are insufficient to serve peak loads, then a disastrous blackout will result. In February 2021, the Texas grid was unable to provide energy to support load and the result was as many as [seven hundred deaths](#) and billions in damages. This proceeding must ensure that this situation does not happen in New York.

## Resource Adequacy Planning

The NYISO resource adequacy planning process has developed over many years and provides reliability planning projections based on the current mix of electric generating resources. One of the important characteristics of the current system is that there is insignificant correlation between the unavailability of generating resources due to diversity of forced outage events. One of the significant areas of investigation of the New York State Reliability Council (NYSRC) Extreme Weather Working Group (EWWG) is to study the correlation of the frequency and duration of the light-wind lull episodes across the entire state, including the offshore wind development areas. The results of the recently completed [offshore wind analysis](#) should be considered in future planning. I expect that NYSRC and NYISO will recommend new analysis techniques to address it and this proceeding must also consider its ramifications.

One of the questions asked for this Proceeding was “What additional studies, if any, should the Commission undertake with respect to the development and deployment of resources capable of achieving a zero emissions grid?” In order to determine how large the DEFR capacity needs to be, the State must know how much energy can be produced during the worst-case correlated low renewable resource period. The EWWG is addressing this issue. However, because of its importance I believe a more extensive analysis and independent analysis by different organizations would be appropriate. It is too important to rely on a single analysis of the expected worst-case availability. Therefore, I recommend the following study be undertaken as part of this Proceeding.

I have previously submitted comments (described [here](#) and [here](#)) as a party to the Department of Public Services (DPS) resource adequacy matters proceeding, docket [Case 19-E-0530](#), arguing that a comprehensive assessment of wind and solar resource availability needs to be completed. I argued that it is imperative to do an analysis of the availability of wind and solar resources in New York based on long-term meteorological data sets. Fortunately, meteorological reanalysis data generated by modern weather forecast models but using original observations from decades ago are available for this application.

The goal of the study would be three-fold:

- Determine historical intensity, frequency, duration and seasonality of wind and solar droughts in New York.
- Identify co-occurrence of wind and solar droughts with high demand periods (heating/cooling degree days)
- Interpret the droughts and high demand periods: seasonal, weather regimes, interannual variability (e.g. El Niño-Southern Oscillation), multi-decadal climate regimes, and trend associated with warming

The actual scope of the project must be determined by New York reliability needs experts. My recommendation would be to do the following to provide New York planners with the worst-case energy availability from wind and solar:

- Use the analyses available today for relatively short periods to refine the conditions associated with extreme low wind and solar resource availability.
- Based on that information, use the complete (1950 to present) ERA5 meteorological database wind, solar radiation, and temperature data from 1950 to present (19-mile horizontal resolution) to find the long-term worst-case.
  - Define relevant thresholds for extreme events: wind - e.g., 2%, 5%, 10% of capacity; 4 m/s cut in speed; above 80<sup>th</sup> percentile for heat/cold events
  - Evaluate intensity, duration (2-14 days), frequency and event seasonality
  - Spatial correlations in the targeted regions for extreme events
- Region: NY ISO plus neighboring control areas that are expected to provide imports during these periods
- Once the worst-case periods are identified then, using the procedures developed for the NYISO by DNV, estimate wind and solar generating resource availability
- Output from the analysis
  - Wind resource availability for worst-case planning
  - Solar resource availability for worst-case planning
  - Frequency and duration of events

The Technical Conference discussed in the body of the order should include information from those entities focused on the reliability of the power system. It would be appropriate to include a discussion to consider how best to provide the resource adequacy planning information recommended here that is necessary to prevent a catastrophic blackout due to insufficient energy resources.

### **Feasibility and Affordability**

There is no mention in the Order initiating this Proceeding of [New York Public Service Law § 66-p \(4\)](#). “Establishment of a renewable energy program” that includes safety valve conditions for affordability and reliability that are directly related to the zero emissions resource. § 66-p (4) states: “The commission may temporarily suspend or modify the obligations under such program provided that the commission, after conducting a hearing as provided in section twenty of this chapter, makes a finding that the program impedes the provision of safe and adequate electric service; the program is likely to impair existing obligations and agreements; and/or that there is a significant increase in arrears or service disconnections that the commission determines is related to the program”.

I believe that the zero emissions resource could be a primary driver of the reliability and affordability provisions of § 66-p (4) so it is incumbent upon the Commission to address these considerations in this Proceeding. The criteria used to define “safe and adequate electric service” and “significant increase in arrears or service disconnections” should be defined as part of this Proceeding. This is necessary so that there is a clearly defined standard for the zero-emission resources considered. Secondly, a feasibility analysis for the costs and potential reliability risks to electric service must be developed for each zero emissions resource. If a particular zero emission resource cannot meet the criteria, then it should not be included as an acceptable resource.

There also are overarching reliability related concerns. In the current system the loss of individual units can be addressed during the coldest and hottest peak load periods. If a unit goes offline because something breaks at a facility, it can be fixed and the unit returned to service. If fuel runs out, then a delivery can be arranged. Future extreme reliability resource drought episodes will coincide with peak loads. Preliminary work for the EWWG has found that all New York State wind resources can go to low levels at the same time. The future system that relies on wind and solar can do nothing to address the loss of those resources because they are correlated over large distances.

The first overarching concern is what reliability planning horizon should be used? I recommend using over 70 years of data to find the historical worst case. If the zero emission resources necessary to meet the 1 in 70-year worst case, exceed the § 66-p (4) criteria, but do meet a lower threshold, say 1 in 35 years, then what should be done? In my opinion, any observed historical weather event will eventually occur again. Is the Commission willing to risk the safety of the public by considering any threshold lower than the observed worst case?

The second overarching concern is the tradeoff between the resources necessary to make the system reliable for the worst-case extreme in the likely event that those resources will not be affordable. My primary problem with the Climate Act is the mandate to go to zero without consideration of tradeoffs. In this instance that mandate precludes an obvious solution. New York’s oil-fired steam-electric generating stations could be used to provide the dispatchable generation needed for the worst-case extremes. The facilities have on-site storage, significant capacity availability, and experience operating units that run rarely. The units could be kept on-line, used for testing, training, and to be available for use in these extreme events. The extreme events are easily forecasted days in advance so the units can be brought on-line to be available as needed. I suspect that the cost to maintain those facilities will be far less than the cost of any zero-emission resource. Overall, the emissions and air quality impacts will be far less of an issue than the ramifications of a blackout. I recommend that this option be considered as part of this Proceeding.

## Conclusion

In order to prevent a catastrophic blackout, the first consideration for this proceeding should be to determine how much energy will be needed from the zero-emissions resources included in this Proceeding. I recommend a comprehensive analysis of historical meteorological data to define the worst-case renewable resource drought.

There are over-arching concerns related to reliability timing horizons that should also be considered in this proceeding. I recommend that the Proceeding establish links with similar work at the NYSRC and NYISO. There are reliability standard considerations that need to be resolved.

The Proceeding must also consider the § 66-p (4) "Establishment of a renewable energy program" provisions for affordability and reliability. The Proceeding should define acceptable criteria for both. All zero-emissions resources must meet those criteria to be considered acceptable.

Sincerely,

A handwritten signature in black ink that reads "Roger Caiazza". The signature is written in a cursive style with a large, stylized initial 'R'.

Roger Caiazza  
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Liverpool, NY 13090  
[Pragmatic Environmentalist of New York Blog](#)