



## Nuclear New York

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# A New View of New York’s Electric Grid: Hour-by-Hour Analysis Shows Renewable-Focused Climate Plan Is Unworkable Without Extensive Use of Firm Dispatchable Power

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**New York State has seriously underestimated the need for a large firm dispatchable source\* in its future decarbonized grid. The growth in demand from the expected electrification of automobiles and the heating of buildings requires that such a resource operate for more than a third of the year to provide a grid that is reliable and avoids rolling blackouts.**

We have analyzed a Renewable-Focused Plan (RFPlan) with characteristics similar to scenarios describing the state’s future electric grid prepared by the NYS Energy Research and Development Authority (NYSERDA) for the Climate Action Council. (CAC). Using a new modeling tool that allows an hour-by-hour analysis of electric system behavior, we can see details of the hourly operation of each energy source, features not disclosed by existing models, including that used by NYSEDA. We can also estimate the cost to the purchasers of electricity and taxpayers of these scenarios.

The State’s Climate Leadership and Community Protection Act (CLCPA) requires that the electric grid be free of greenhouse gas emissions by 2040. NYSEDA’s scenarios create a plan which depends almost entirely on generating electricity with renewable sources. They retain existing nuclear plants, but no new ones are added.

The Scoping Plan adopted by the CAC declares that “wind, water, and sunlight will power most of New York’s economy.” While its focus is on renewable sources, the CAC does recognize the need for an additional clean source: “plan analysis and current studies show that the 2040 zero-emission goal requires between 15 and 45 gigawatts (GW) of electric power from dispatchable zero-emission resources”. However, NYSEDA finds that little more than 2% of the potential output of such a dispatchable emission-free resource (DEFER) will actually be used.

Simple arithmetic makes this seem highly questionable. By 2040, NYSEDA and NYISO, the grid operator, estimate that building and transportation electrification will have expanded so that the grid will have a peak load in winter of 46-50 GW. Yet, even with land-based and offshore wind blowing at full capacity, no more than 35 GW will be available during winter evenings. Little or no excess capacity exists to charge the

batteries, and, of course, solar won’t be available. Much more than 2% of the dispatchable source’s potential output has to be available to get through the winter without blackouts.

Our hour-by-hour analysis shows that the firm dispatchable source has to run two-thirds of the year. **The attached visualizations tell the story.** The total load has increased from today. The summer peak has been replaced by a much higher winter peak. That greater demand is met by the extended operation of the DEFER which runs during most evenings in the cooler portion of the year. In fact, we find a capacity factor -- the fraction of potential output actually used -- of 14.4%. Our detailed results are shown below.

**In our full paper, we suggest alternatives to NYSEDA’s plan that use baseload nuclear power along with a nuclear-powered firm dispatchable resource (DEFER) to ensure a reliable grid. Our plan costs a third less than the RFPlan.**

2040 Electricity Generation RFPlan				
Source	Capacity MW	Output GWh/yr	Capacity Factor %	% Load
Existing Nuclear	3,355	27,104	92.2%	11.1
Hydro	4,612	28,619	70.8%	11.7
PV BTM	6,009	6,968	13.2%	2.8
PV Grid	34,154	32,100	10.7%	13.1
Onshore Wind	13,017	26,559	23.3%	10.8
Offshore Wind	14,400	56,274	44.6%	23.0
Battery Discharge	20,709	[8,338]	4.6%	[3.4]
DEFER	29,000	36,658	14.4%	15.0
NE/PJM Purchase		9,082		3.7
Canada Purchases		21,080		8.6
Load		245,171		100.0

**A full version of our paper is available at**  
[https://www.nuclearny.org/wp-content/uploads/2023/12/New\\_View\\_of\\_NY\\_Electric\\_Grid-LRodberg\\_RKuhr\\_ANofal.pdf](https://www.nuclearny.org/wp-content/uploads/2023/12/New_View_of_NY_Electric_Grid-LRodberg_RKuhr_ANofal.pdf)

\* A firm dispatchable source is always available and able to supply whatever additional electric output is needed.

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