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Should NYPA increase planned solar and wind installations?

NYPA's draft plan details expanded investment in solar and wind resources, as well as the storage and transmission needed to support renewable buildout. Rather than critiquing the individual details of this draft, I will examine whether any energy plan focused on low-capacity factor, land-hungry assets will prove reliable or affordable. We must also ask whether requiring the upstate region to forfeit land in what will prove a failed effort to power metro New York passes the 'environmental justice' litmus test.

Currently, New York's energy plan requires the sacrifice of up to a million acres of forest and farmland for intermittent resources drafters of the Scoping Plan believed would power downstate.[1] Issues of local consent, property rights, fair tax compensation, and environmental safety have been sidelined by ORES and RAPID. Home-rule is denied and SEQRA is ignored to site solar and wind facilities in rural communities.[2] Of note, these resources, mostly, produce nothing at all. Wind in NYS has a capacity factor under 25%, effectively generating energy less than one day in four. Solar capacity factor is under 13%, providing electricity one hour out of seven. Ironically, upstate has a 90% carbon-free grid while downstate has a 90% fossil-fuel powered grid. The costs and constraints for needed transmission and storage suggest curtailment will continue for years. Intermittency and low capacity factors mean dispatchable backup will be needed forever.

The high costs, low reliability, and questionable carbon-cutting efficacy of solar and wind power have prompted criticism from NERC, Sweden, Harvard, and NYISO among many others. Unpredictable generation has serious impacts on the capacity market unlikely to be mitigated with storage or export. These are discussed below.

[1] https://climate.ny.gov/resources/scoping-plan/
[2] https://nysba.org/preempting-local-zoning-codes-fuels-opposition-to-renewable-energy-in-new-york/

Contents

I. NYS's energy plan assumes markets will be available for our excess wind and solar energy to suggest fiscal efficacy but neighbor states must provide energy to ensure reliability. NERC has issued warnings about these assumptions

The North American Energy Reliability Corporation (NERC) lists five risks to the bulk power system. Risk #1 is a bad energy plan and risk #2 are changes made to the grid to implement a bad plan.[3] A renewable-based grid will need a whole new transmission structure – bigger than the current grid -- which someone will have to pay for. It will need full-capacity dispatchable backup and expensive BESS. Any wind, solar, and BESS resources installed today will need replacement by 2050. New York may not be able to shutter significant fossil-fuel power plants but may, rather, be obliged to build more. California – two decades ahead of New York in pursuit of a grid powered by solar and wind -- has extended the operations of three gas power plants at least until 2026 to maintain reliability and affordable rates.[4] California will add another gigawatt (GW) of gas power this year. [5]

NERC warns that an energy policy that bases fiscal efficacy on sales of excess solar or wind but requires energy imports for reliability is a bad plan.

> **Capability for imports does not necessarily mean that energy from imports is available and these limitations should be included in an energy reliability assessment. The availability of imports is dependent on energy issues or demand requirements in external regions. Coordinated studies would show the assumptions of imports and**

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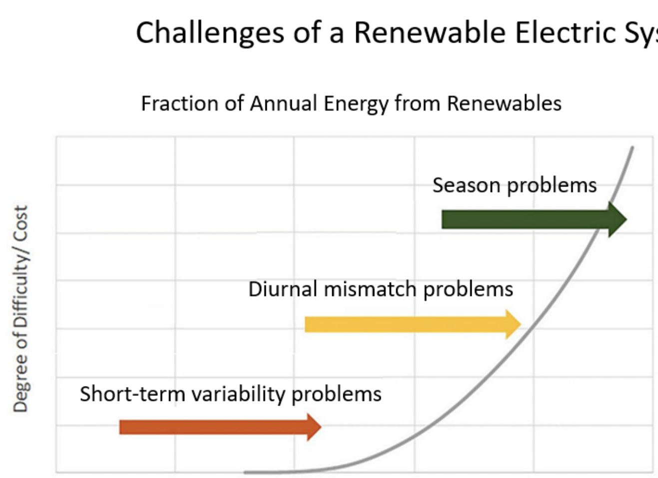
[3] https://www.nerc.com/comm/RISC/Related%20Files%20DL/RISC_ERO_Priorities_Report_2023_Board_Approved_Aug_17_2023.pdf
[4] https://www.energyindepth.org/to-meet-demand-california-delays-closure-of-natural-gas-plants-again/
[5] https://www.powermag.com/hundreds-of-new-gas-fired-power-units-planned-as-u-s-gas-output-soars/

exports at adjoining interfaces, ensuring that energy is available to support exports to an area that is depending on the corresponding imports, and is not counted in multiple energy reliability assessments. Conflicting assumptions could leave operators unexpectedly energy deficient.[6]

II. Neither academic studies nor empirical evidence support New York's renewable push

Academic studies as well as empirical evidence do not support claims that wind and solar will prove economical or reliable. Recent studies suggest wind may raise surface temperatures offsetting any carbon-cutting advantage in the technology.

Below, a National Renewable Energy Laboratory (NREL) chart shows the asymptotic costs of a system as penetration of renewables increases. Expensive BESS can somewhat solve the "sort-term" variability of intermittent resource generation. But there is no day-night or seasonal solution.



Harvard has completed several studies questioning the carbon-cutting value of wind power. "In agreement with observations and prior model-based analyses, US wind power will likely cause non-negligible climate impacts." [7] In brief, Harvard found that wind turbines might increase warming.[8]

"In two papers … Harvard University researchers find that the transition to wind or solar power in the U.S. would require five to 20 times more land than previously thought, and, if such large-

[6] https://www.nerc.com/comm/RSTC_Reliability_Guidelines/CLEAN_ERATF_Vol_1_WhitePaper_17MAY2023.pdf
[7] https://www.cell.com/action/showPdf?pii=S2542-4351%2818%2930446-X
[8] https://www.americanexperiment.org/harvard-study-finds-wind-turbines-will-cause-more-warming-in-minnesota-than-emissions-reductions-would-avert/

scale wind farms were built, would warm average surface temperatures over the continental U.S. by 0.24 degrees Celsius."[9]

"For wind, we found that the average power density — meaning the rate of energy generation divided by the encompassing area of the wind plant — was up to 100 times lower than estimates by some leading energy experts," said Miller, who is the first author of both papers. Noting that s some of New York's wind resources will require 100 square miles: "Most of these estimates failed to consider the turbine-atmosphere interaction. For an isolated wind turbine, interactions are not important at all, but once the wind farms are more than five to 10 kilometers deep, these interactions have a major impact on the power density."

In pursuit of an unproven plan, one that may not reliably affordably power the state, a plan which has never worked anywhere, solar and wind buildout proposed by E3-NYSERDA's Scenario Three[10] (55GW solar and 10GW onshore wind) would gobble up a million acres of farmland and forest.

III. NERC has repeatedly warned that IBRs can undermine grid reliability

It is easy to find instances demonstrating that the increased penetration of inverter-based resources undermines grid reliability. Around noon on a sunny day this past April, much of Spain, Portugal, and even a bit of France went dark, as if someone had switched off the lights. Solar and wind generate direct-current (DC) electricity. But electric grids run on alternating current (AC). Inverters convert power from DC to AC and attempt to regulate voltage and frequency on the grid. Variations in solar or wind output, load imbalances, power demand surges, or frequency fluctuations may cause inverters to disconnect from the grid.

The North American Energy Reliability Corporation (NERC) issued its highest alert to transmission owners, planners, and generator operators, urging an investigation into how deployed IBRs will respond to grid disturbances.

> **Since 2016, NERC has analyzed numerous major events totaling more than 15,000 MW of unexpected generation reduction. These major events were not predicted through current planning processes. Furthermore, NERC studies were not able to replicate the system and resource behavior that occurred during the events, indicating systemic deficiencies in industry's ability to accurately represent the performance of IBRs and study the effects of IBR on the bulk power system (BPS).**[11]

NERC's alert references almost a decade of inverter performance failures. IBRs should continue to operate through a power-line fault or power-plant shutdown but current inverter settings instead may trigger a complete shutdown. As solar and wind resources supply a larger share of electricity, improper inverter settings increasingly risk cascading failures. But those settings may be locked behind manufacturer-issued passwords. Many deployed inverters come from

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[9] https://news.harvard.edu/gazette/story/2018/10/large-scale-wind-power-has-its-down-side/

[10] https://www.ethree.com/e3-develops-decarbonization-pathways-to-meet-new-yorks-emissions-targets/

[11] Ibid NERC Alert on IBR performance https://www.nerc.com/pa/rrm/bpsa/Alerts DL/Level 3 Alert Essential Actions IBR Performance and Modeling.pdf

manufacturers no longer in business, posing a further challenge in reconfiguring settings. Consequently, it may be impossible to predict how IBRs will respond to fluctuations in voltage or frequency.

What happened in Spain was not the first such failure. In Odessa, Texas, in 2021 a combined-cycle power plant went offline, triggering shutdowns of more than one gigawatt of solar generation. Inverters were operating with settings from a decade earlier. However, in Texas, 56% of its electricity came from traditional synchronous generation and a major outage was avoided. At the time of Spain's event, the grid was powered over 70% by solar: a chain reaction of disconnects occurred, blacking out the Iberian Peninsula. This represents a significant alert about New York's own 70-by-30 renewable energy target.

Hydro, nuclear, and fossil-fuel power plants have big spinning generators and do not need inverters. A constant speed produces alternating current (AC) at a controlled frequency. Slight modifications in rotating speed enable generators to adjust to voltage or frequency changes.

Spinning generators have lots of inertia which enables them to power through load changes. Solar and wind resources have no inertia. A synchronous condenser, which looks very much like a rotating generator, uses energy from the grid to keep spinning. As noted in a recent report from Sweden,

> **Synchronous generators in hydro and nuclear power plants, due to their large rotating mass, are proactive, i.e., prevent disturbances from occurring. In contrast, "synthetic" inertia, which is often promoted as a solution for wind power, is reactive and must constantly correct disturbances that have already occurred. This adds both complexity and cost to the system. To assist wind power, large rotary converters are also installed to stabilize the grid and manage reactive power. They basically act as synchronous generators but without producing any electricity; instead, they consume electricity and incur an additional cost.[12]**

Synchronous condensers add inertia to a grid powered by intermittent resources. Their job in averting grid failure is to supply voltage for a very brief period. If a solution to the fluctuations in voltage or frequency can be determined quickly enough—that is, in a matter of seconds -- condensers might help to keep the lights on. Clearly, they do not guarantee the grid won't go down.

IV. Solar and wind undermine capacity markets and so, directly and indirectly, threaten reliabilty. As California has discovered, the increased need for peaker plants means you keep burning lots of gas

Renewables will impact capacity markets in terms of displacement, costs, and prices, ultimately threatening reliability and affordability.

> **In comparison to conventional fossil-fired generation, renewables are likely**

[12] Swedish-policy-institure-Electricity-at-Any-Price-upd.-250613.pdf

> **to have a lower running cost. Consequently, renewable generators can often bid much lower than conventional generation. This will lead to renewable generation being dispatched ahead of conventional plants. Thus, renewable generation displaces conventional generation in bid-based markets. This displacement lowers the capacity factor of conventional generators and reduces the time conventional generators are selling in the market. This reduced output reduces energy revenues to conventional generators. Second, more intermittent renewables require greater flexibility on the part of all generation on the system… Significant demands for flexible output, including more starts/stops per day as well as cycling more often from minimum to maximum output, will likely increase the wear and tear on conventional generators and lead to higher operations and maintenance (O&M) costs and the need to schedule more frequent maintenance outages… {C}onventional generation will be operating less often as well as having to operate in a manner that increases operating costs. These factors work to reduce the net energy revenue earned by conventional generators. Third, there is an additional impact of renewable generation on energy prices. In bid-based markets, prices are set by the running costs of the marginal plants. Because renewable generators can have low running costs, prices can be quite low in markets where a renewable generator is marginal. Also, social policies to promote renewable generation often provide non-market incentives that influence market outcomes. For example, a production tax credit can produce positive net revenues to a generator even with negative market revenues. Consequently, renewable generators can be willing to pay other market participants to produce, resulting in negative prices for the entire electricity market. As renewable generation penetration increases, the likelihood that such generation will be on the margin is greater, placing downward pressure on energy market prices. However, conventional generators will still be needed to provide flexibility to address renewable variability.[13]**

Note—this doesn't mean rate payers get a break. We already see transmission buildout, BESS, and high gas prices impacting rates. Loss of reliability means increased cost due to outages as well. Examined empirically, California, with twice the solar capacity factor of New York and the largest li-ion battery in the world, has the second highest electricity costs in the US – behind Hawaii.[14] Germany's decarbonization effort has come to rely heavily on Russian gas, new coal plants, and nuclear electricity imports from France. Thirty years into its Energiewende[15] effort, Germany has the second highest energy costs in the EU[16]. On an ironic note, we get blasts suggesting that Denmark, with the highest energy prices in Europe, has its trains running on solar power.[17]

Lower reliability reduces options.

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[13] International Association for Energy Economics, "Renewable Generation and Capacity Markets," Peter H. Griffes
[14] https://www.capradio.org/articles/2025/01/09/californians-pay-second-highest-electricity-rates-in-the-country-according-to-a-new-report/
[15] https://hir.harvard.edu/germanys-energy-crisis-europes-leading-economy-is-falling-behind/
[16] https://worldpopulationreview.com/country-rankings/cost-of-electricity-by-country
[17] https://www.pveurope.eu/solar-parks/denmark-solar-power-danish-state-railways

Fast ramping peaker plants are typically used to back up solar and wind. A consequence here is combustion: Combined cycle plants have a 60% capacity factor but peakers may only have a 30%-35% CF, so as more solar and wind are added, more peaker use means that little or no reduction in fossil fuels occurs.

Electricity is traded on wholesale markets like oil and gas. But fossil fuels can be stored in tanks until needed. The storage capacity of batteries will never catch up to the excess production from overbuilt solar and wind. Note that in E3-NYSERDA's Scenario Three[18], 55 GW of solar, 10 GW of onshore wind, and 17 GW offshore wind, are proposed along with up to 170 GWh of storage. This would be storage hundreds of times larger than the largest battery on earth, currently at Moss Landing, CA. At $500M/GWh this would cost $100B and provide storage for three hours of excess production. NYC currently uses over 200GWh per day, so we would not be able to keep the lights on there for 24 hours.

> **…the ideal grid is built on a solid foundation of cheap baseload power, supplemented by highly dispatchable sources to manage fluctuations in demand. Second, a grid composed solely of solar, wind, and batteries is preposterous on its face—the volume of batteries required to provide baseload power for days or weeks at a time borders on the absurd. This is why no such system has ever been piloted at a reasonable scale: the moment it is, the flaws would become immediately and fatally obvious.[19]**

If energy from solar or wind resources can't be stored, energy must be dumped, or prices may drop below zero with producers paying consumers to take the surplus energy. As NY tries to reduce carbon emissions with renewable generation, power supplies become more volatile. Electricity production from wind turbines surges and slumps in the space of a few hours. And over-built solar makes oversupply a big problem during daylight hours, particularly in the summer when generation peaks. (In the next section, the California duck curve is discussed.)

> **The introduction of intermittent renewable generation into bid-based restructured markets, especially as these resources achieve higher penetrations, can have a profound impact on the energy revenues to conventional generation, and consequently increase the necessity of capacity payments. As intermittent renewable generation penetration increases in restructured markets, there needs to be a greater reliance on capacity market compensation to ensure viability of conventional generation, needed to maintain reliability. [20]**

While overbuilt capacity has a negative impact on the energy market, it does not ensure reliable electricity.

> **Amidst the push for more low-carbon energy, we see the demolishing of one of the pillars of electric grids: that of a careful balancing between supply and demand. This is not just a short-term affair. It also affects the construction of new power**

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[18] https://www.ethree.com/e3-develops-decarbonization-pathways-to-meet-new-yorks-emissions-targets/
[19] https://newsletter.doomberg.com/p/the-exception-that-proves-the-rule-7fb
[20] https://www.iaee.org › en › publications › newsletterdl.aspx

plants, investments in transmission capacity, and so on. The problem with having too much capacity is that it effectively destroys the electricity market, as suppliers need to make a profit to sustain and build generators and invest in transmission capacity. This is now the problem that Germany finds itself struggling with due to an overcapacity of variable renewable power sources (VRE) like solar and wind. One suggested solution is to add more transmission capacity and more grid-level storage, but these scale poorly and are an economically dubious solution.

The New York State capacity market faces challenges with renewable energy, particularly due to negative prices. These negative prices are observed more frequently during spring and autumn, driven by the increasing capacity of photovoltaic power plants. The Short-Term Electricity Market Organizer (OKTE) reported 91 hours of negative prices in 2023, with the number exceeding 288 hours in 2024. This trend is a result of insufficient energy planning and the need to increase storage capacities to effectively utilize energy surpluses. The energy crisis of 2022 further accelerated this issue, leading to an increase in negative prices due to insufficient demand during surpluses. [21]

V. Sweden, and others, do not see intermittent resources reducing costs or adding reliability

Costs do not fall but rather, rise, as intermittent resources are added to the grid.

Countries with a high share of solar and wind power have major system problems and are partly forced to ensure the functioning of the system by means of fossil fuel power plants. To manage the intermittency of wind and solar power, there must be other power sources that can be switched on and off whenever needed to balance supply and demand. The more wind and solar power in the system, the more capacity must be available in balancing power plants to replace solar and wind power when the sun is not shining and/or there is insufficient or no wind. The capacity utilization of this balancing power will be lower the more wind and solar power is installed, which means that its revenue will be lower. To compensate for this fact, either the balancing power prices have to be higher, or the owners of the balancing power have to get paid for their availability. Therefore, even if intermittent power were cheaper than traditional baseload power, it will not only lead to more volatile prices but also to higher electricity prices overall. Average household electricity prices have therefore increased in countries with high shares of wind and solar power.[22]

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[21] https://www.habitatmag.com/Publication-Content/Green-Ideas/2025/April-2025/new-york-renewable-energy-challenges

[22] See e.g. Hannesson, Rögnvaldur (2025). "An electricity market model with intermittent power". Energies vol. 18, no. 6, p. 1435. Also Karlsson, Svenolof (2025), "Enormous costs for renewables in Germany". Second Opinion, January 2. The installed capacity of solar power in Germany now exceeds the maximum power requirement by a wide margin.

Sweden provides a cautionary tale of what reliance on, and accommodations for, wind power can mean. In New York, as in Sweden, hydro and nuclear are already fully "booked." If California and Germany have not provided sufficient reason to eschew an intermittent-powered grid, maybe Sweden's example will provide a further admonition.

> **With continued expansion of wind power in Sweden, the country cannot rely on hydropower as balancing power; hydropower is already largely more or less fully booked as balancing and regulating power. From 2020 to 2022, balancing costs increased by more than SEK 5 billion as wind power increased by 4.6 billion kWh. Although not all of the increase is linked to wind power, it is the main cause, and it corresponds to a balancing cost on the margin that exceeds the value of the LCOE adopted by the Council.[23]**

In fact, over a megawatt of dispatchable generation is necessary for every megawatt of renewable added to the grid:

> **Controlling for country fixed effects and the rich dynamics of RE capacity, we show that, all other things equal, a 1% percent increase in the share of fast reacting fossil technologies is associated with a 0.88% percent increase in renewable generation capacity in the long term**.[24]

To put this in other words, a 340 MW project like Alle-Catt wind[25] will need almost 400 MW of dispatchable backup. We will be building, not shutting down, fossil-fuel power plants. California and Germany found that dependence on solar and wind meant building more gas and coal power plants and relying, increasingly, on energy imports.

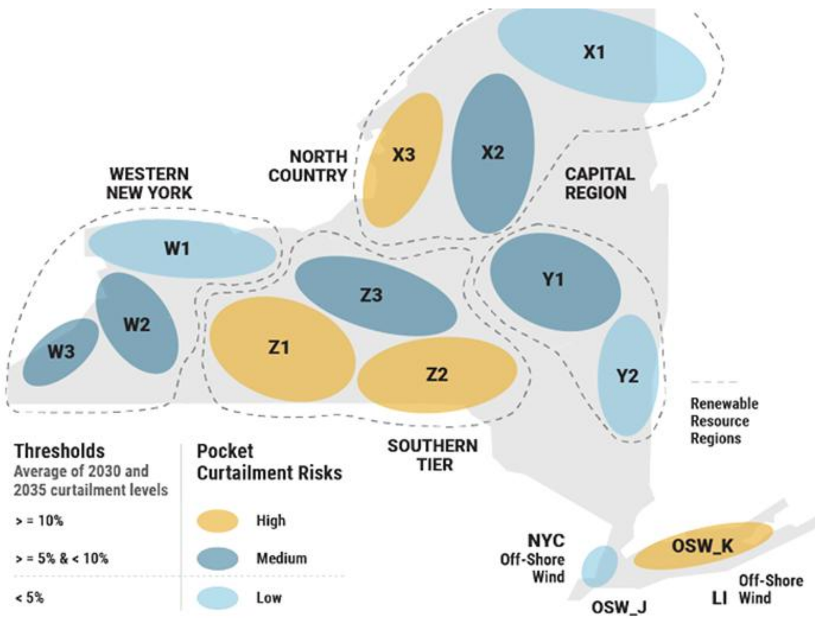
> **A careful consideration of the relationship between renewable capacity and other generation technologies, and especially fast-reacting fossil-based electricity generation, unveils two significant shortcomings of existing empirical and theoretical analyses. First, it highlights that the trade-off between renewable deployment and security of supply is exacerbated as renewable penetration increases. Second, it suggests that unless cheap storage options become widely available in the immediate future, the penetration of renewable energy will increase system costs, as a significant amount of capital-intensive and under-utilized back-up capacity will have to be maintained. Overlooking these two issues leads to an underestimation of the costs of the energy transition. This is particularly troublesome considering that higher renewable penetration rates will further increase system variability and hence require a parallel expansion of back-up resources (NYISO, 2010 and REW 2011).[26]**

Beyond the solar panel or turbine price tag, solar and wind need battery backup. A recent NREL report titled " Cost Projections for Utility-Scale battery Storage:2023 Update" by Wesley Cole

[23] Ibid Swedish-policy-institure-Electricity-at-Any-Price-upd.-250613.pdf
[24] https://www.nber.org/system/files/working_papers/w22454/w22454.pdf
[25] https://allecattwind.invenergy.com/
[26] https://www.nber.org/system/files/working_papers/w22454/w22454.pdf

and Akash Karmakar puts costs at $500/KWh.[27] With transmission constraints, as detailed by NYISO next page, there will be times that Alle-Catt produces at 100% but the energy must be stored: For just one hour, 340,000 KWh of storage at $500 per KWh would cost about $170,000,000 dollars.

Low-capacity-factor solar and wind require overbuilding resulting in a bloated grid. As noted elsewhere, New York's plan will need about a million acres of state farmland and forest. Remote resources must have full nameplate transmission to a three-phase line or substation. RAPID allows developers to take land by eminent domain to run poles and wire. Solar and wind need a whole new fiscal model: We must pretend that we can sell our overbuilt solar in the summer and import energy the rest of the year. As noted earlier, NERC tells us that a grid whose reliability hinges on imported energy will likely mean lights out for residents in summer and perhaps in winter, too. California dumped 3.4 terawatt hours of renewable generation last year[28] and still experiences blackouts when expected imports don't arrive. The NYISO, in its 20-year outlook, indicates that statewide transmission constraints (across Finger Lakes, LI, and Southern Tier, see brown pockets below) could last for years:[29]



Wind curtailments doubled between 2021 and 2023.[30] Wind and solar generation do not track demand – hence California's "duck curve:" a tragic and worsening picture of money wasted on intermittent resources, dumped energy, and the 2 GW of gas backup needed to fill the energy shortfall.[31]

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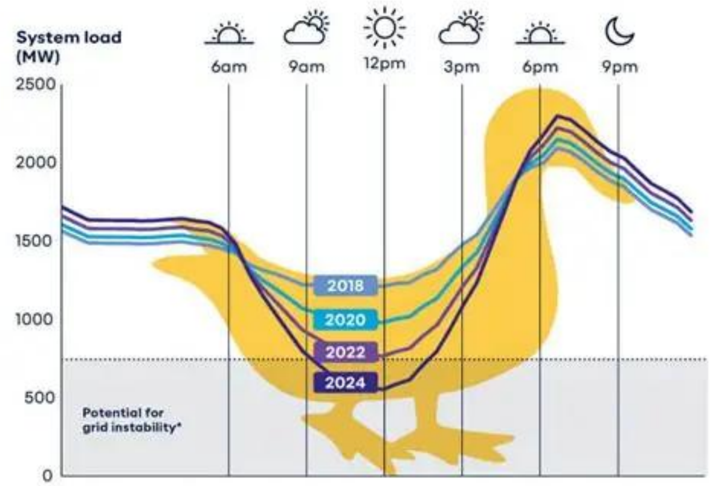
[27] https://research-hub.nrel.gov/en/publications/cost-projections-for-utility-scale-battery-storage-2023-update

[28] https://www.canarymedia.com/articles/solar/california-waste-clean-energy-curtailments

[29] https://www.nyiso.com/documents/20142/33384099/2021-2040-Outlook-Report.pdf

[30] https://www.nyiso.com/documents/20142/2223020/2024-Power-Trends.pdf p. 47

[31] Images of CA duck curve widely available, this one from https://www.barclaypearce.com.au/blog/absi-duttons-energy-plan-is-a-nuclear-duck



As renewable assets are added, but transmission, storage, export, and demand do not align with generation, this will get worse. We may find ourselves dumping solar or wind energy generated in central or western New York – or off Long Island -- even as the metro region experiences outages. And we will want synchronous condensers, bumping initial system costs by 10%.

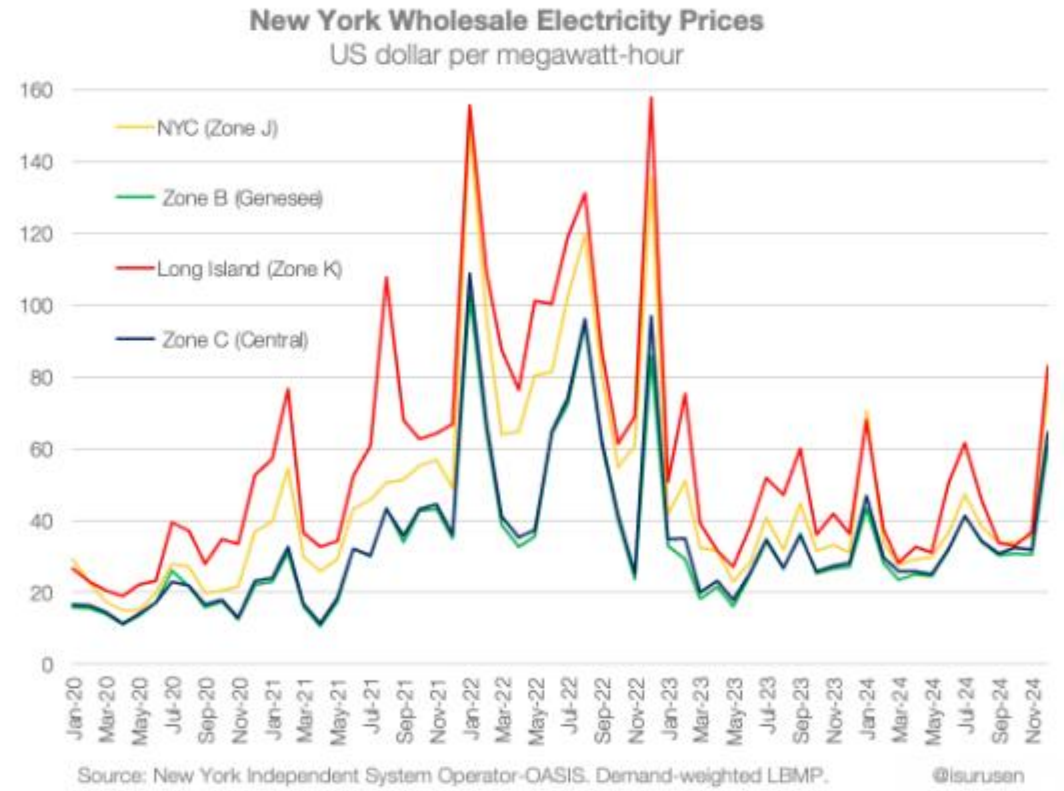
1.2 million rate payers are already in arrears.[32] Electric bills will continue to rise as the state overbuilds solar and wind resources and adds synchronous condensers to supply inertia; and installs thousands of miles of transmission for resources which, mostly, generate nothing at all. We'll pay for electricity to keep condensers spinning but will continue to experience blackouts as reliability declines.

V. The grid operator, NYISO, has repeatedly warned of reliability issues

Starting in 2023, the New York State Independent System Operator (NYISO), has warned of about a ½ gigawatt energy shortfall in metro NY this summer (2025) in normal weather.[33] Sure enough, Queens went black this July. Here's a picture of what shutting down 25% of NYC's energy – baseload carbon-free nuclear – as EU faced an energy crunch, did to fossil-fuel prices downstate:

[32] https://www.wnypapers.com/news/article/current/2022/07/18/151651/dinapoli-number-of-new-yorkers-behind-on-utility-bills-soared-during-pandemic

[33] https://www.tdworld.com/transmission-reliability/article/21269640/nyiso-study-finds-reliability-margin-deficit-of-446-mw-for-new-york-by-summer-2025

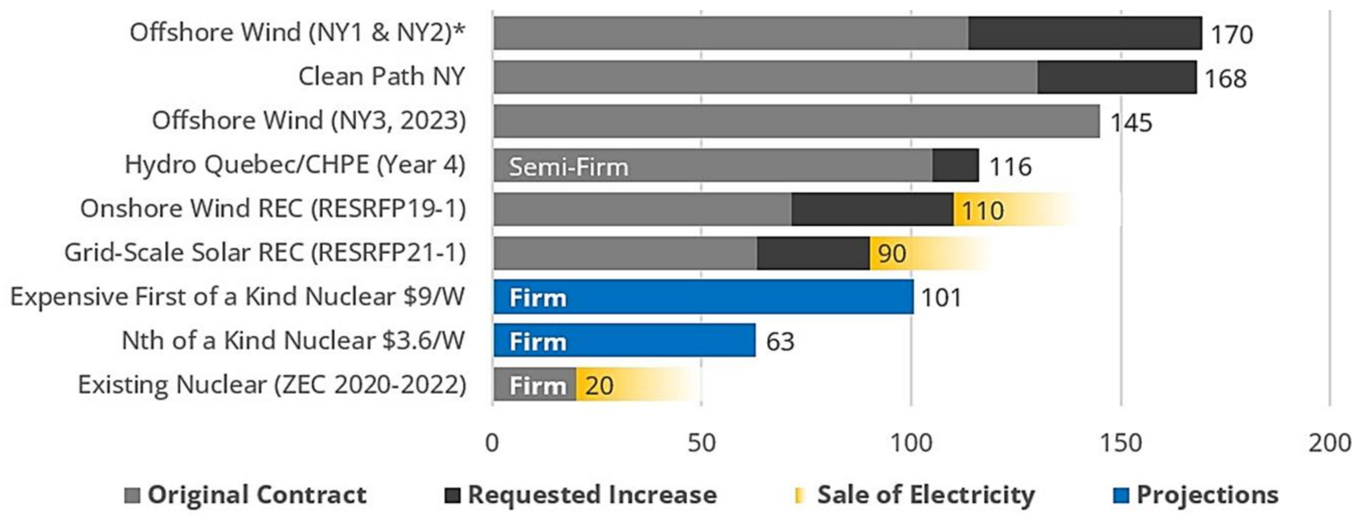


[34]

NYISO recently released its annual Power Trends report. In 2024, the state used about 131 terawatt-hours of electricity. Fossil fuels generated about half. Although hydro and nuclear resources represent about 20% of installed capacity, they produced 42% of the state's energy. The state's 3.3 gigawatts of nuclear generated 27.5 terawatt-hours – representing a capacity factor almost exactly 95% of nameplate. On the flip side, solar and wind produced about 8% of state energy in 2024.

In this context, it is worth pricing New York's energy options:

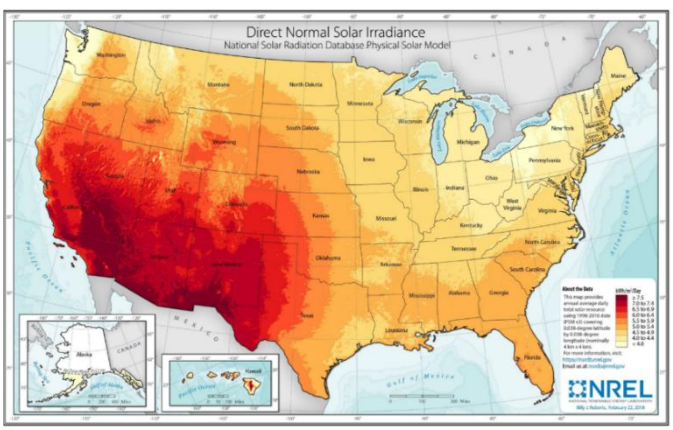
[34] https://mis.nyiso.com/public/



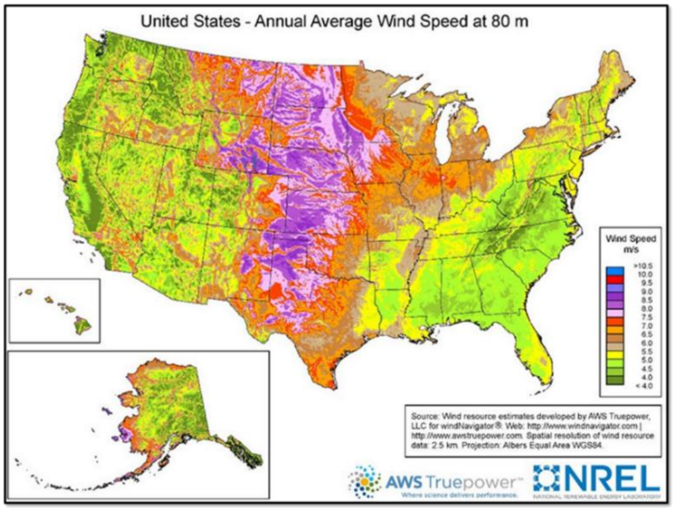
Sources: DOE Advanced Nuclear Liftoff (with ITC, 2023); Jenkins; Hydro Quebec & CPNY contract prices; NYSERDA 2022 Offshore Wind Solicitation; DPS Case 15-E-0302 comments by DPS, MI & MUEA, CHPE & HQ, CPNY. * Blended Empire Wind 1 & 2, Beacon Wind, Sunrise Wind

See Appendix for notes. We see that existing nuclear, Nth of a kind nuclear, and even first of a kind nuclear, are cheaper options than New York is currently prioritizing.

According to NYISO reporting, New York has a wind capacity factor of about 22%. Solar capacity factor in NYS is under 13%. Solar and wind are resources which generate a small fraction of nameplate, not necessarily when it is needed. As the chart from NREL indicates, solar in NYS is about the same as in south-west Alaska:



NREL shows that wind capacity factor in NYS is half of what it is in Nebraska.



According to Power Trends, since 2019, over four gigawatts of dispatchable high-capacity-factor resources were decommissioned while a little more than two GW of intermittent resources were added. NYISO is concerned that policy mandates undermine reliability.

> **As traditional fossil-fueled generation deactivates in response to decarbonization goals and tighter emissions regulations, reliability margins on the grid are eroding. Further, the remaining fossil-fueled generation fleet, which provides many of the essential reliability services to the grid, is increasingly made up of aging resources, raising further concerns about grid reliability. Strong reliability margins enable the grid to meet peak demand, respond to sudden disturbances, and avoid outages. They also support the grid's ability to respond to risks associated with extreme weather conditions. As these margins narrow, consumers face greater risk of outages if the resources needed for reliability are unavailable due to policy mandates or failures associated with aging equipment.**[35]

The "reserve margin," meant to buffer us from outages, has been halved, dropping from over 4,000 MW (2019) to about 2,000 MW (2024). Have we cut fossil-fuel use? No. Since 2019, fossil-fuel use has risen dramatically. Fossil fuels generated 52,300 GWh in 2019. This climbed to 67,298 GWh in 2024, almost a 30% increase. Against this background, NYISO expects power demand to more than double in the next 20 years from about 30,000 MW currently, to over 60,000 MW in 2045.

> **High-tech manufacturing is expanding in New York. Several projects are underway or on the horizon, promising to create thousands of jobs for New Yorkers while also highlighting the need for large investments in energy infrastructure. The challenge for policymakers and industry stakeholders is how to continue to power our society and economy in a way that is reliable, affordable, and sustainable — even while**

[35] https://www.nyiso.com/documents/20142/2223020/2025-Power-Trends.pdf/

much of the clean generation technologies mandated by state policies are weather-dependent and thus variable in nature.[36]

The Iroquois ExC project was approved by the DEC. That gas is needed to fuel the Cricket Valley (CVE) power plant – one of two gas plants built to replace Indian Point, enabling CVE to run at capacity. We see Williams pursuing NESE[37]. Even the Constitution pipelines' discussion has resurfaced as grid reliability plummets and gas demand grows. Avangrid, EXXON, Dominion – big fossil-fuel corporations – are heavily invested in solar and wind. What do gas company executives know that New York's energy planners don't get?

New York is a "tale of two grids:" 90% of upstate energy is zero emission, running on nuclear and hydro while downstate runs on about 90% fossil-fuels. The Comptroller noted that a million ratepayers are currently in arrears but confronting increasing costs as the state pursues an energy plan focused on renewable buildout requiring hundreds – perhaps thousands – of miles of new transmission. The Business Council wrote Governor Hochul, "While New York can and should take steps to reduce greenhouse gas (GHG) emissions, its goal should be to present a model path forward, not a cautionary tale of unaffordable costs, harmful economic disruptions, and threats to future economic growth."[38] The Public Service Commission admitted in its biennial report that on our current trajectory we will not meet the upcoming (70%-by-2030) decarbonization target and, as the Business Council noted, this puts all the CLCPA goals in jeopardy. Fortunately, the 2040 goal in CLCPA is a carbon-free grid with no renewable quota.

Dozens of countries, and not a few states, realize we will need nuclear power. "Governor Hochul [directed] the New York Power Authority (NYPA), in coordination with the Department of Public Service (DPS), to develop and construct at least one new zero-emission [one gigawatt] advanced nuclear power generation facility in Upstate New York, either alone or in partnership with interested private entities."[39] While this is a move in the right direction, it represents a tiny fraction of the investment in nuclear the state must undertake. An effort to replace today's fossil-fuel capacity and, in 20 years, to provide the 60 gigawatts NYISO believes will be needed, requires a fundamental change in New York's thinking about energy.

NYPA should rethink its emphasis on intermittent buildout. Nuclear generators would require a tiny fraction of the land needed for wind and solar, and can operate on the existing grid. Nuclear installations would provide thousands of high-paying jobs, and emission-free baseload energy at a 95% capacity factor. According to Oxford nuclear is as safe as solar or wind.[40] According to the UNECE, nuclear has the lowest lifecycle environmental impact of any generating source.[41]

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[36] Ibid Power Trends

[37] https://www.ogj.com/pipelines-transportation/pipelines/news/55308086/williams-reaches-commercial-agreements-for-revived-nese-gas-pipeline

[38] https://www.bcnys.org/sites/default/files/2024-07/Final%20CLCPA%20%20sign%20on%20letter%20.pdf

[39] https://www.governor.ny.gov/news/governor-hochul-directs-new-york-power-authority-develop-zero-emission-advanced-nuclear-energy

[40] https://ourworldindata.org/nuclear-energy

[41] https://earth.org/nuclear-energy-carbon-emissions-lowest-among-electricity-sources-un-reports/

An efficient, fiscally sound grid would not rely on intermittent resources and batteries, while full capacity carbon-free baseload backup sat idle. Existing hydro and new nuclear as the backbone of the grid, along with a modest solar and wind component, would prove economical and reliable. These might even enable New York to meet the "100%-carbon-free grid by 2040" state target. The state should reject large-scale wind projects and begin building a carbon-free grid powered by hydro and nuclear.

Appendix

Notes for cost chart

1. Onshore solar / wind RECs are Contract for Difference contracts, meaning NYSERDA pays the full price minus market price (yellow, market driven). The nuclear plants receive ZECs on top of their realized price (yellow, market driven). Not sure how NYSERDA recovers the market price from offshore contracts.

2. This doesn't account for the 45U tax credit that existing nuclear plants will get since the passage of the IRA. I'm not sure exactly where this will settle, but expectations are that about 1/2 of New York's ZEC burden will shift to the Feds. See excepts from this Morgan Lewis write up below.

3. CPNY contract collapsed at that price. I believe they are trying to revive it through NYPA.

4. Offshore wind (NY1&NY2) shows a blended price, but only one project went ahead after the denial of the rate increase request. And even that's dead in the water with Trump.

5. All RECs, ZECs, and NYSERDA fixed-bid contracts are tacked on to electric bills without the volume discounts. So, they are progressive in the sense that large electricity consumers don't get volume discounts.