

# GREEN GUARDRAILS

Guiding New York's Drive to  
Lower Emissions

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by Ken Girardin

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# Green Guardrails

## Guiding New York's Drive to Lower Emissions

### Executive Summary

New York in 2019 adopted a sweeping climate law designed to reduce greenhouse gas emissions through bans, regulations and taxes. The law, the Climate Leadership and Community Protection Act (CLCPA), sets ambitious goals: 70 percent of electricity from renewables and a 40-percent economywide reduction in emissions by 2030, with an electric grid that uses only “zero emission” technology by 2040 and an economy that has effectively zero emissions by 2050.

The state's approach to these goals is, however, deeply flawed. The Climate Act leaves the bulk of the decisions about how emissions will be reduced to state agencies under direct control of the governor, vesting them with policymaking powers that are supposed to be reserved for New York's senators and assemblymembers.

The process that has played out in the five years since the law's passage has been marred by a lack of transparency, with state officials failing to issue legally required cost estimates and crucial studies designed to guide state energy policy.

There is growing evidence that the state will be unable to achieve its goals without

significantly affecting the cost of living and doing business in New York and harming the reliability of its electric grid.

Some major Climate Act costs, such as renewable energy subsidies, are rising, while others, such as the need for transmission upgrades and storage, continue coming into view. In other cases, it remains unclear what it will cost to make economywide changes to home heating, which for many homeowners will involve significant insulation expenses.

The Climate Action Council, the body that developed recommendations for reaching the state's goals, reported “net” costs by 2050 would range from \$270 billion to \$295 billion. These figures, for one thing, used a discount rate making future costs appear smaller. In fact, state data show New Yorkers will incur \$4.9 trillion in Climate Act expenses by mid-century, offset by \$4.3 trillion in “avoided” costs.

The size of these estimates compared to the difference means the gross cost will rise significantly with small variations in the state's estimates. If Climate Act costs are 5 percent higher, and the “avoided”

costs (many of them fossil-fuel commodities) are 5 percent lower, the gross cost to New Yorkers will be over \$1 trillion, more than double.

Meanwhile, unrealistic expectations about the ability to keep older power plants online while reducing the amount of power they generate and exceedingly optimistic assumptions about the energy output of renewables mean the state could be putting the reliability of the electric grid at risk.

This headlong, secretive process – inherited from a governor who resigned in disgrace – runs the risk of saddling New Yorkers with both a less reliable electrical grid and rules across the entire economy that impose enormous expense.

These problems and other challenges have emerged as a chill has swept the state’s energy sector, leaving the people and organizations most knowledgeable about the state’s plans (and its pitfalls) less likely to express concerns openly.

Four years after the Climate Act’s adoption, it is evident that guardrails are necessary. The Legislature must reinvolve itself in New York’s climate policymaking, with ways to not only shield New Yorkers from unaffordable costs or diminished reliability but also to eliminate obstacles that stand between the state and its climate goals.

This report identifies opportunities for state lawmakers to not only shield New Yorkers from undesired outcomes but also to reduce the costs of reaching New York’s emissions-reductions goals.

This begins with demanding updated state energy studies, as required by state law and the development of proper cost estimates.

Other steps include:

- giving the Legislature the final say on any regulation or set of regulations with gross compliance costs of \$100 million or more;
- creating an “off-ramp” in case of recession or other financial emergency;
- setting renewable energy credit (REC) purchase requirements through legislation rather than administrative rulemaking;
- pausing awards for offshore wind developers amid exploding costs and making more technologies eligible for zero-emission subsidies; and
- eliminating obstacles to reducing emissions with steps such as making more types of zero-emission power plants such as nuclear, biogas and hydroelectric eligible for state subsidies and seeking an exemption from the federal Jones Act.



## Background: The Legislature's Lost Decade

New York in 2019 adopted a sweeping climate law designed to reduce greenhouse house emissions through bans, regulations and taxes. The law, the Climate Leadership and Community Protection Act (CLCPA), did not specify how those reductions would be achieved and. For most of the sought reductions, instead left decisions to state agencies under direct control of the governor.

To understand why the Legislature wrote what amounted to a blank check to the executive branch, an appreciation is needed of the diminished status of the New York State Legislature during Andrew Cuomo's decade as governor.

The son of a former governor, Cuomo took office during a crisis with a mandate for change and—given his experience in Albany—knew how to dangle carrots and wield sticks to get his way with the state Legislature.

He created a multi-billion dollar program that steered cash to lawmakers' pet projects outside the budget process and empaneled an anti-corruption commission that provided leverage over legislative leaders. His first budget, adopted as the state was reeling from the effects of the Global Financial Crisis and the Great Recession, addressed a \$10 billion gap between revenues and expenses as Cuomo trimmed politically sensitive programs such as Medicaid and school aid. Cuomo took a hard line with state government's unions, winning contracts that had most state agency employees forgoing what had become routine cost of living adjustments for the four-year life of the agreement.

Cuomo was a veritable maestro of the state's levers of power. He played hardball in the budget process, using his

power to craft appropriations to pressure lawmakers into accepting unrelated policy changes.

The governor built a public perception that he had tamed the unpopular and seemingly dysfunctional and corrupt membership of the Assembly and the Senate. Legislative leaders were reduced to props in Cuomo's State of the State address pageantry.

Lawmakers, ostensibly at the helm of the only branch of government empowered to set policy by passing laws, went beyond approving Cuomo's agenda and began surrendering taxing, oversight and policymaking powers.

Legislative oversight of state agencies diminished as key committees retreated from their oversight functions, lest their duties be interpreted as hostile acts against the governor. (Cuomo's inauguration coincided with the retirement of the late Assemblyman Richard Brodsky, a legislative institutionalist and public policy titan).

Cuomo appointees kept "emergency" regulations on the books, sometimes for years, to bypass normal rulemaking procedures required by the Legislature a generation before.

Agencies were often run by "acting" commissioners who had not received Senate confirmation. The Department of Corrections and Community Supervision (DOCCS), one of state government's largest agencies, was led from 2013 to 2023 by an acting commissioner who never received Senate confirmation. [i] In other cases, the Senate signed off on appointees who seemingly lacked qualifications for their roles.

For anyone who believed lawmakers were on even footing with the state's

executive, there was a bridge to sell them—which the Legislature in 2017 agreed to name after Cuomo’s father. [ii]

Just two months before the Climate Act vote, Cuomo prevailed on lawmakers to grant him a 40 percent raise, even though the state Constitution prohibits midterm salary changes. He also gutted their ability to stop public authorities from awarding large economic development grants—a power that some senators threatened to use as part of successful opposition to Amazon’s planned Queens headquarters.

In the area of energy policy, Cuomo used the Public Service Commission to usurp the taxing and spending powers that are properly reserved for the Legislature.

The PSC, the state’s utility regulator, in 2016 approved more than \$480 million in annual surcharges to subsidize struggling nuclear power plants and a smaller but rising amount to support new solar, wind and other renewable projects. Two years later, the PSC gave the green light for decades-long offshore wind deals committing the state to several billion dollars in payments. None of this was done with explicit permission from the Legislature.

The Climate Act was voted on in June 2019 using a “message of necessity,” meaning it didn’t need to sit on lawmaker’s desks for the three days as otherwise required by the state Constitution.

The bill reflected negotiations with Cuomo, who among other things got lawmakers to eliminate a renewable energy mandate for 2022 that would have caused electric bills to swell, and postponed what could have been politically uncomfortable details about the bill’s scope and costs from becoming public ahead of the 2022 election. As was often the arrangement with Cuomo, lawmakers needed to vote on the deal immediately.

The rushed manner of introduction also bypassed the legislative rule that would have required the sponsors to estimate the fiscal effect on local governments and school districts. Instead, lawmakers voted for a bill [iii] whose fiscal impact was “to be determined.”

The process was so hurried that the final text used meaningless units of measurement for energy storage, dictating the rate at which power would be released (megawatts) but not how



Image Credit: NYS

much would be stored (megawatt-hours). (This was like dictating the type of alkaline battery used by a household appliance but not saying whether it requires one or 100).

No hearings were held regarding the Climate Act's final text. The state Senate took up the bill around 10:40pm on the day the text was finalized. It passed after midnight, after senators were repeatedly chided for the length of their remarks and reminded "the hour is late." The Assembly followed the next day.

Despite the rush, Cuomo waited a month before signing it.

The Climate Act reflected a recurring practice by Cuomo: aiming to be first, or biggest, or boldest in a policy area, even if that presented practical issues. The governor described the Climate Act as "the most aggressive climate change program in the United States of America, period." [iv]

Cuomo's executive power reached new heights amid the pandemic but then began to unravel over scandals: covering up nursing home deaths, seemingly using state resources to write a memoir and facing complaints of harassment from female aides.

The Legislature began reasserting itself, eliminating Cuomo's sweeping emergency pandemic powers [v] in March 2021. [vi] Lawmakers last year reversed their 2011 move stripping the state comptroller's "pre-audit" powers for certain state contracts, a change Cuomo had sought to speed up economic development processes, which surfaced amid a corruption scandal. [vii]

But the blank check lawmakers wrote Cuomo for the Climate Act remains—and state agencies are moving to cash it.

## The Climate Act

The Climate Act, Chapter 106 of the Laws of 2019, sets two major goals for this decade: reducing New York's greenhouse gas emissions by 40 percent from 1990 levels by 2030; and requiring that 70 percent of electricity come from renewable sources by 2030. It also says the statewide electricity supply system must have "zero emissions" by 2040, and requires "net zero" emissions across the economy by 2050.

The round numbers in New York's climate targets reflect their arbitrary nature. The state's baseline emissions calculation and how it counts emissions are similarly arbitrary.

- The Climate Act uses an estimated level of emissions, from 1990, as its baseline. (The state could have, alternatively, indexed its emissions reductions against a more accurate measurement from 2019).
- The state's calculation of emission levels includes activity out of state, such as fossil fuel extraction and processing and the decomposition of New York-sourced waste. This effectively assumes that each unit of oil or gas whose use is prevented by the Climate Act is not consumed anywhere else.
- The Climate Act requires New York to calculate greenhouse gas emissions differently from the federal government and most states, weighting the global warming potential contribution of methane more. This has the effect of requiring New York to reduce emission from 2021 levels by 34 percent, instead of 28 percent, by 2030. The legislative record suggests lawmakers may not have been aware of this distinction. Governor Kathy Hochul last year proposed aligning New York's greenhouse gas calculations with the models used by the federal government, but met resistance from environmental groups.

New York emissions, by the state’s selective measurement, peaked around 2000, and by 2021 had fallen 22 percent from those levels (figure 1). They were also on pace to keep falling without the Climate Act. Even with the closure of Indian Point nuclear power plant in 2020 and 2021, the state’s 2021 emissions were lower than 2019.

In terms of the state’s goals, New York in 2021 was 9 percent below 1990 levels or just under a quarter of the way toward its 2030 target.

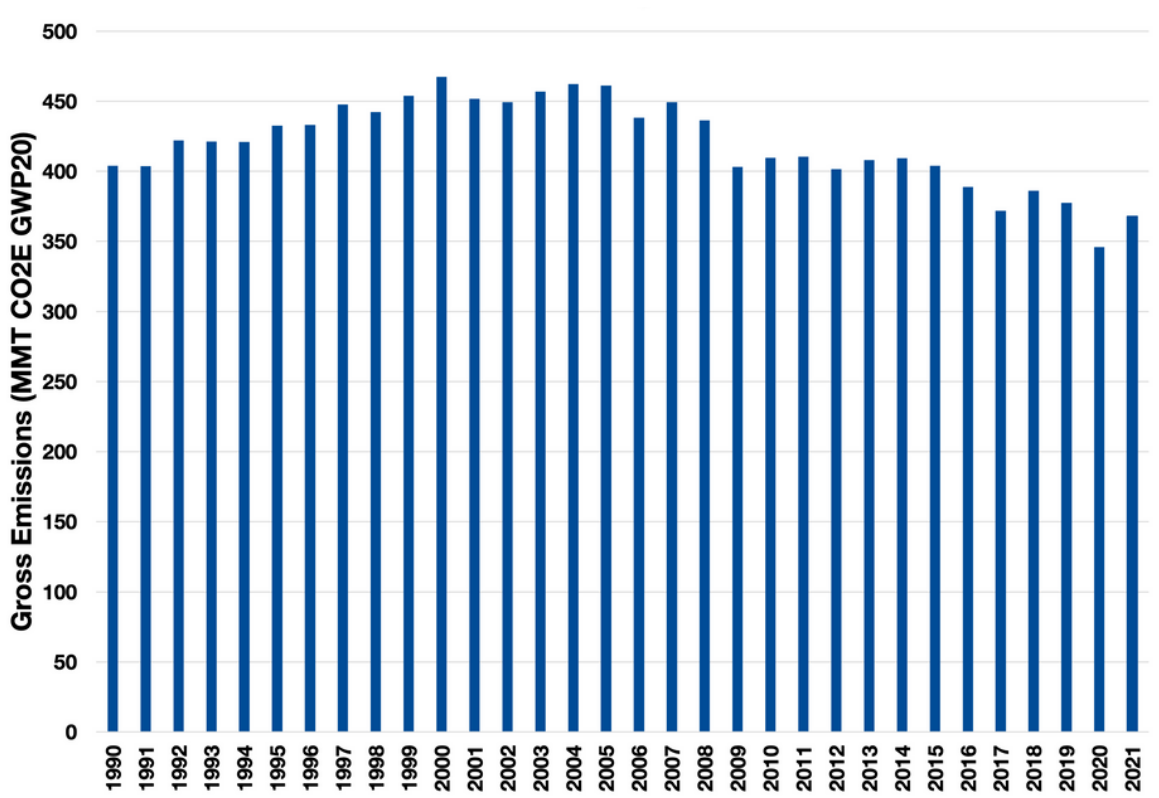
New York’s emissions have come down in the last two decades for several reasons, including natural gas further replacing coal as an electricity source, increased vehicle efficiency, and electricity use decreasing with more efficient lighting and appliances. These changes took place amid a comparatively loose state and federal regulatory regime around which businesses could plan and

find the most cost-effective way to comply.

Yet the Climate Act micromanages how future goals will be met, imposing targets and constraints that add complexity and cost.

- “Disadvantaged communities” must get at least 35 percent of “the overall benefits of spending on clean energy and energy efficiency.”
- The state’s path to a zero-emission electric grid must feature 6,000 megawatts of distributed solar energy capacity (by 2025), 9,000 megawatts of offshore wind (by 2035), and 3,000 megawatts of energy storage (of undetermined duration) by 2030.
- Climate Act-related work is subject to the state’s prevailing wage law, which forces contractors to match construction union compensation levels and work rules. A 2017 Empire Center study found the mandate adds 13 to 25 percent to building construction costs. [viii]

**Figure 1: NY Gross Emissions, 1990 to 2021**



Source: NYS Department of Environmental Conservation

These constraints in the Climate Act all but guarantee that New York will not follow the lowest-cost, or fastest, path to lower emissions.

The law's complexity sets it apart from similar rules in most, if not all, other states. Oregon, for instance, set minimum levels of renewable energy but also created "clean energy targets," allowing utilities to find the most practical, least expensive paths without sacrificing reliability. [ix] North Carolina's emissions targets rest almost exclusively on "carbon plans" developed by their utilities. [x]

To reach the overall goal, the Climate Act authorizes the Department of Environmental Conservation (DEC) to promulgate rules and regulations. Development of those regulations began with the creation of the state Climate Action Council, a 22-member body that issued a "Scoping Plan" in December 2022 which laid out ways to regulate nearly every aspect of the state economy. [1]

The regulations outlined in the Plan would fundamentally change how New Yorkers heat and cool their homes, heat their water, cook their food and dry their clothes, banning new fossil-fuel appliances for all these purposes over the next decade.

The Scoping Plan also called for an economywide "cap and invest" program under which companies would essentially pay a tax to the state based on the amount of greenhouse gas they release.

The issuance of the Plan laid bare a crucial problem with the Climate Act: the Legislature did not set a policy and task

DEC with implementing it, but rather set a series of goals and delegated policymaking powers to agency officials. If challenged in court, regulations could conflict with state Court of Appeals holdings on nondelegation.

The Climate Act required DEC, by January 1, 2024, to "promulgate rules and regulations to ensure compliance with the statewide emissions reduction limits and work with other state agencies and authorities to promulgate regulations required." [xi]

As of February 2024, DEC still has not published these implementing regulations.

Numerous matters are likely giving state officials pause as they weigh various impacts, trends and other considerations—the type of deliberation for which the people of New York elect senators and assemblymembers to conduct in every other major instance.

## CLCPA Year 5: from Green to Blinking Red

The transformation sought under the Climate Act is unprecedented in state history.

State government is attempting to substitute the energy sources for most of the economy with electricity, while also changing, and largely deciding, where and how that electricity is generated, stored, and delivered.

Putting aside the questions of whether the Legislature should (or can) delegate the related policy decisions to the

[1] Certain areas, such as aviation, were omitted because they are pre-empted by federal law.



executive branch, or whether the state's goals are attainable, three major problems have come into view:

- the process has been marred by a lack of transparency, rising at times to deliberate attempts to mislead state lawmakers and the public;
- the costs remain undefined and are rising without any restriction; and
- New York is unlikely to be able to reach its goals without sacrificing the reliability of electricity service.

## ***A Climate of Fog and Chills***

State policy is meant to be made in the Legislature not only because the process involves directly elected legislators but also because the process is designed to happen in public view.

With so much of that process having been moved to administrative decisions, modeling and other determinations, transparency is crucial.

But the state's posture has been the opposite.

In 2017, two years before the Climate Act was adopted, Governor Andrew Cuomo ordered state agencies to find "the most rapid, cost-effective, and responsible pathway to reach 100 percent renewable energy statewide."

The state Department of Environmental Conservation (DEC) and the New York State Energy Research and Development Authority (NYSERDA), the state's energy agency, were tasked with the project. The resulting study, for which state officials paid a vendor nearly \$900,000, was never released. It was unclear whether the vendor was unable to complete the task or whether the Cuomo Administration wished to conceal the cost or time needed to reach its goal.

When the Empire Center in April 2019 sought a copy under the Freedom of Information Law, state officials at first denied the study's existence, then waged a year-long legal battle to prevent its disclosure (and do not appear to have ever shared a copy with state lawmakers). Then-NYSERDA CEO Alicia Barton, in an affidavit, said "I have personal knowledge that no such 'comprehensive study' had been completed."

A state Supreme Court judge in February 2020 ordered NYSERDA to surrender the study (and pay Empire Center's court costs). [xii] The agency appealed, and NYSERDA eventually surrendered a heavily redacted version. The copy omitted any details about costs or specifics about technology (although a timeline out to 2080 remained visible on at least one page) (figure 2).

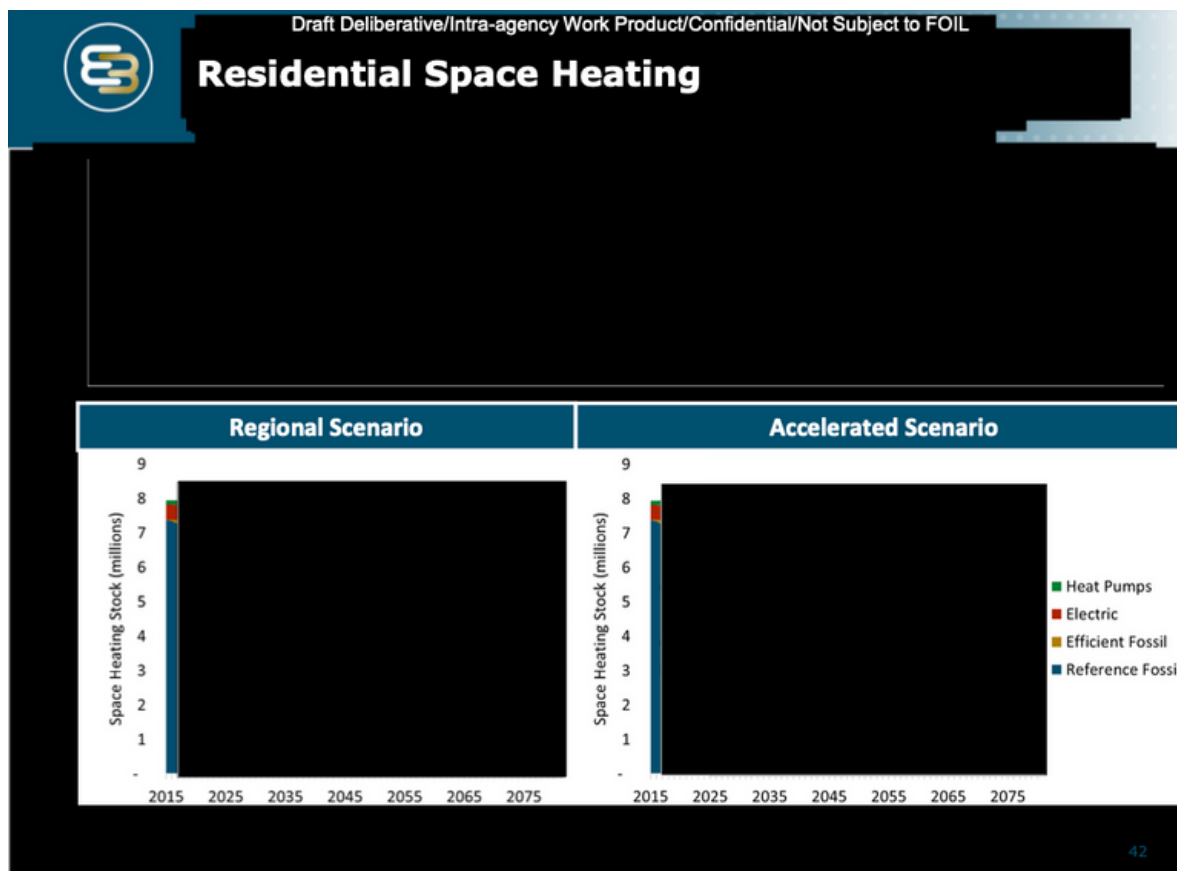
It stands to reason that the findings included significant costs and other concerns that undercut the feasibility of Cuomo's program. Four years later, neither state lawmakers nor the public have been allowed to see it.

NYSERDA has denied several subsequent FOIL requests related to Climate Act costs because its modelling vendor would "suffer a substantial competitive injury" if data are disclosed.

The use of individual proprietary models means lawmakers have no way to verify that measures actually are, as presented by state agencies, the most cost-effective or otherwise most practical. State agencies have also failed to provide lawmakers with the baseline information they would need to understand where state policy is headed.

Under state law, the 13-member Energy Planning Board must periodically issue both a state energy plan and a report on

Figure 2



Source: *Empire Center v. NYSERDA and DEC (2019)*

the overall reliability of the electricity transmission and distribution system. The state energy plan is important because it must include, among other things, a ten-year price forecast for electricity and fuel demand and “identification and analysis of emerging trends related to energy supply, price and demand.”

No plan has been issued since 2015. As was the case with the unreleased “100 percent renewables” study, an updated state energy plan would likely show significant cost increases in the out years as the state pushes up fuel prices to deter their use and creates greater electricity demand to replace it.

The Climate Act required the Energy Planning Board to “incorporate the recommendations” of the Climate Action

Council into its next plan, which the Board still has not issued. Instead, the Board adopted an “amendment” to the 2015 plan, but has not updated it since then or since the December 2022 release of the Scoping Plan.

A forecast of state electricity and other energy costs 10 years into the future would likely prompt intense conversation about the state’s course.

The Energy Planning Board is also required, every four years, to undertake “a study of the overall reliability of the state’s electric transmission and distribution system.” [xiii]

A review of system reliability going forward would also raise questions about the state’s ability to simultaneously

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transform both the generation and use of electricity.

But the Energy Planning Board issued its first and only reliability study in 2012.

While state officials are failing to publish legally required reports, parties that would otherwise be more vocal have incentives to avoid criticizing the state.

The nature of much of the Climate Act's implementation relies on vendors who in turn help guide the state's disbursement of subsidies. These vendors are reluctant to speak out for fear of losing state business. Meanwhile, the renewable energy developers and other contractors physically installing equipment under state contracts have no incentive to object to even the most indefensible costs because they can pass them along. For instance, offshore wind developers accepted, without public complaint, the Cuomo Administration's illegal demand that they use union labor on their projects. [xiv]

Utilities are well-positioned to comment on costs and reliability issues presented by the Climate Act. However, they would risk running afoul of the PSC, which in recent years has been willing to abuse its authority. For instance, amid a labor dispute involving Charter Communications, Governor Cuomo in 2018 waged pretextual accusations about the company's broadband buildout and threatened to use PSC powers to strip the company of its permission to operate in New York.

Cuomo made the same threat against National Grid in 2019 after the company stopped connecting gas customers amid supply uncertainty. As with renewable developers, the utilities have can recover excess costs from state directives when their rates are next negotiated.

In 2017, the PSC effectively banned utilities from showing mandated renewable energy costs on customer bills. [xv]

The New York Independent System Operator (NYISO, pronounced "nigh-so"), which oversees the wholesale electricity market and ensures the adequacy of electricity supply, has repeatedly been in the state's crosshairs. NYISO is an independent not-for-profit organization, but state officials have in the past decade threatened it with everything from invasive audits to adding political appointees to its board.

The Cuomo Administration repeatedly sniped at NYISO because the organization focused on reliability and a competitive marketplace instead of the administration's environmental concerns. Richard Kauffman, the governor's energy czar, responded to NYISO's 2016 not-unfounded warning about Cuomo's planned renewable energy buildout by essentially accusing NYISO of lying. [xvi] In 2019, the PSC (presumably at Cuomo's behest) raised the specter of replacing NYISO's capacity market—the mechanism by which NYISO ensures adequate generators will be available to meet demand. [xvii]

The Climate Act has separated policymaking from the normal political process while having a chilling effect on the major parties who would otherwise speak openly to state lawmakers about what is happening and what is to come.

Beyond that, officials have withheld key information. The Climate Action Council failed to release detailed cost estimates as required by state law, and as noted above, NYSERDA refuses to release details on how it developed key projections.

Then, there are problems with what state officials themselves are saying:

- The Department of Public Service (DPS) massively overstated the short-term impact of the Climate Act in its first annual report, issued in 2023, counting the continued operations of upstate nuclear plants as “emissions reductions” because the plants received state subsidies. [xviii] This is notable because the Climate Act, as written, doesn’t have a clear place for nuclear power because of its references to “renewable” rather than “zero-emission” power and the Climate Act did not mention the nuclear subsidies.
- NYSERDA routinely frames its analysis in terms of costs to the state vs. “global” benefits, meaning the financial effects of lower greenhouse gas emissions for the world population. The size of these social benefits can sometimes exceed the gross costs, creating the appearance of net benefits, even though only a tiny portion of the benefit would be realized by New Yorkers.
- NYSERDA has sometimes described the “values” or “net present values” of subsidies, rather than actual planned outlays, because they can be made to appear much smaller using a discount rate over their decades-long terms. Using a 6.55 percent discount rate (as NYSERDA did in one episode), \$100 million paid to an offshore wind developer in the final year of a 25-year offshore wind contract would have a NPV of just over \$20 million. [xix]

### ***Albany’s Fuzzy Crystal Ball***

With lawmakers and the public boxed out of so much of the process, it is necessary to examine state government’s record in doing things of this nature. Yet there is no precedent for the transformation sought under the Climate Act, either in the way energy is used or how it’s produced.

State government has undertaken large infrastructure projects, such as the construction of the Thruway or the creation of the State University system, but these were ultimately matters of collecting taxes and spending them on a particular operation.

In this case, the state government is not looking to build a particular thing—it is attempting to transform both the economy and the electric grid that powers it, and more so, making endless determinations that would be made more efficiently by individual actors.

When making bets at the enterprise or technology level, the state’s record is quite poor. Two examples of its larger forays into the energy space are particularly cautionary.

- State government for decades has sought to boost struggling regions by subsidizing large industrial projects. The state’s largest such wager was a nearly \$1 billion contribution [xx] toward building and equipping a solar panel factory in Buffalo for SolarCity. The outcome was not an uncommon one in the energy space: the marketplace did not embrace the technology. The space is now used mainly to house data analysts and much of the state-funded manufacturing equipment is being sold or scrapped. [xxi]
- The New York Power Authority in 2011 underwrote construction of the Hudson Transmission Project (HTP), a high-voltage line between New Jersey and Manhattan. NYPA, however, appeared to misread electricity markets and has consistently failed to find enough buyers for the electricity to cover its costs. The Authority estimates it loses \$100 million annually on its HTP contract. [xxii]

The public funds lost on these two massive projects, totaling close to \$2

billion, is less than one half of one percent of the anticipated costs of implementing the Climate Act.

Such is the nature of the energy economy, a constant churn of technologies, commodities and markets which government agencies are not well suited to predict.

In the energy space, the largest state policy-driven change in recent history was arguably the closure of coal-fired power plants.

Governor Andrew Cuomo in 2016 [xxiii] announced plans to end electricity production from coal, which that year was responsible for 1.4 percent of annual generation in New York. [xxiv] New York had not added new coal plants since 1991 and several plants had converted to burn other fuel.

The state had what amounted to a running head start: advances in natural gas extraction and in power plant efficiency, coupled with acid rain and greenhouse gas mitigation measures, had put coal-fired plants under tremendous pressure in the state's competitive electricity market.

The state energy plan issued in 2002 anticipated New York in 2016 would use almost eight times as much coal (238TBtu) as it ultimately did (30 TBtu) [xxv] and that demand would rise continually after 2006 (figure 3). [xxvi]

That is to say, state projections could not foresee a major looming shift in the energy sector—and the state's ability to predict the future about energy generation, transmission, storage and usage remains limited.

The last coal plant closed in 2020, four years after Cuomo set out to replace less than 2 percent of the state's generation.

[2] See Appendix for renewables-share methodology.

By comparison, the Climate Act is supposed to substitute more than 40 percent of its electricity generation over 11 years, with the added challenge of doing it with intermittent resources far from population centers in a manner that is being guided more by state planners than by market forces (while electrifying a large slice of the economy).

The Climate Act was adopted almost two decades into New York's efforts to promote renewable energy generation. About one-fifth of the state's electricity in 2000 came from pre-existing hydroelectric dams and state officials hoped to boost the amount of renewables.

The PSC in 2004 adopted a Renewable Portfolio Standard which used funds collected from electricity customers to subsidize unprofitable projects, predominantly wind turbines and projects burning landfill gas or refuse.

The state appeared close to hitting its initial goal thanks to the combined effect of more renewables coming online and decreased electricity demand amid the Great Recession. In 2010, when 22.7 percent of electricity [2] came from renewables, the PSC aimed [xxvii] for 30 percent of electricity consumed in New York to come from renewables by 2015. About 24 percent of electricity came from renewables that year. (Figure 4)

Electricity generation from renewables did not exceed 30 percent until 2021, and not without complications. The PSC in 2016 set renewable energy targets for the next five years. The targets were cut a year later. The 2021 target was cut further amid COVID-driven disruptions, and the 2022 and 2023 targets were later trimmed shortly after they were set.

Note that in 2023, most of New York's renewable energy came from two large

generators, a pair of hydroelectric dams at Niagara Falls and Massena, which are both dispatchable resources, meaning they can adjust their outputs to match the grid’s needs.

The remainder of the state’s renewables—responsible for less than 10 percent of the state’s electricity generation—are scattered across the state and generally not dispatchable. That is to say, the state has largely been accommodating new renewables on the margins rather than substantially relying on them.

The challenges posed by directly substituting 40 percent of generation in the next six years from dispatchable fossil-fuel generators to intermittent renewables are on an entirely different scale.

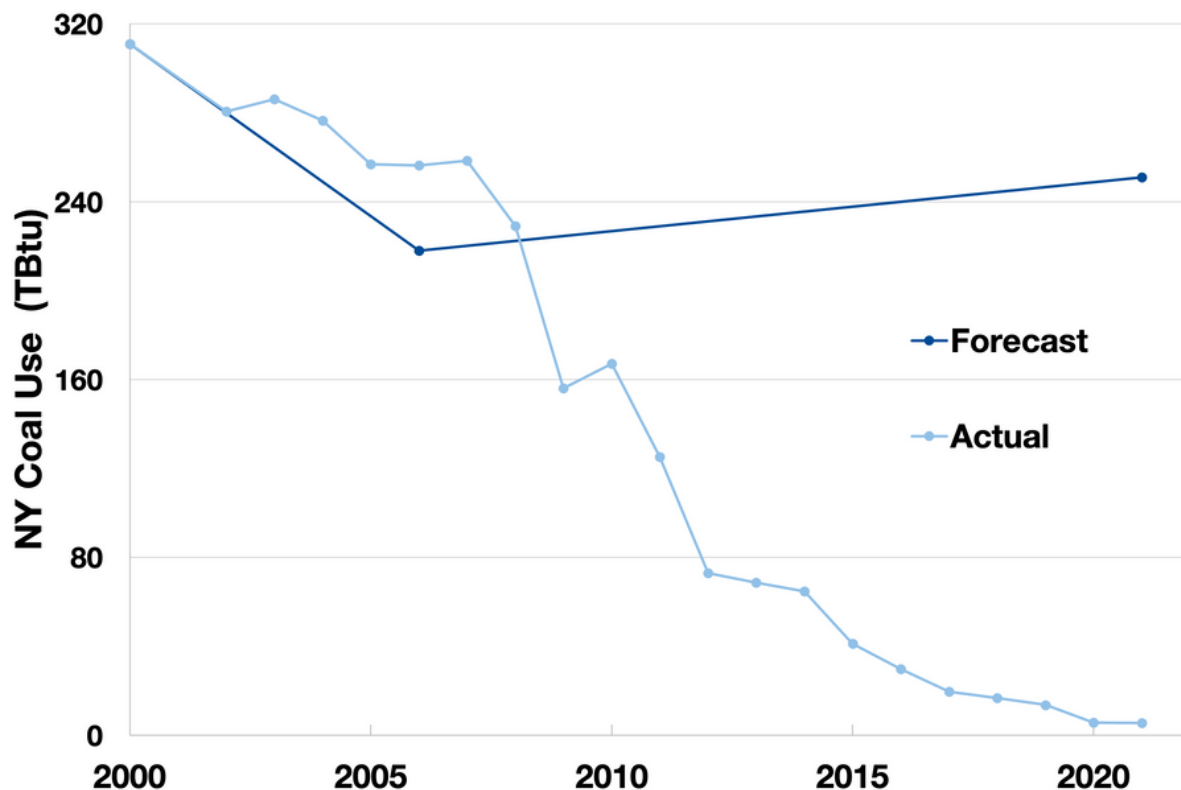
### *It Won’t Be Cheap: The Unknown, And Growing, Cost*

**“We have to put our hands in both pockets—and other pockets—because it won’t be cheap, and who cares.” –PSC Commissioner James Alesi, July 20, 2023**

Such is the nature of the energy economy, a constant churn of technologies, commodities and markets which The overhaul of the economy imagined by the Climate Act results in four primary types of expense increases for New Yorkers:

- higher fuel prices, as the state’s “cap-and-invest” rules increase the cost of automotive, heating, cooking and industrial fuels;

**Figure 3: NY Coal Use (2002 NYSERDA Forecast vs. Actual)**



Source: NYSERDA (2002 State Energy Plan; Patterns and Trends)

- higher electricity supply and delivery rates, due to increased fuel costs plus the cost of local distribution upgrades and additional renewables, storage and transmission;
- new compliance costs, for instance, requiring broken fuel-powered furnaces and boilers to be replaced with higher-price heat pumps, HVAC overhauls and insulation upgrades; and
- higher taxes, particularly school property taxes, as municipalities, school districts, transit agencies and state government must decarbonize vehicle fleets and operations and pay for emissions allowances related to their solid waste.

The state is mitigating some of the cost increases in particular categories by increasing costs in others. The most notable example is cap-and-invest, which will increase costs for activities involving fossil fuels and direct the proceeds to subsidize electrification elsewhere in the economy.

The federal government already subsidizes many of these activities. For instance, federal taxpayers, through tax credits, pay a part of the cost of what often are otherwise money-losing activities such as installing solar panels or operating wind turbines.

In the case of electricity bills, Climate Act costs have just begun to appear. New York electricity bills in 2022 reflected \$1.2 billion in related expenses—most of which utility companies are barred from listing as separate items. [xxviii] These costs will soar by 2026 as utilities incur costs for:

- offshore wind subsidies;
- more renewable subsidies;
- subsidies for transmission lines that benefit New York City and Long Island (“Tier 4” subsidies subsequently created by the PSC);
- additional transmission and distribution upgrades; and
- battery storage subsidies

State officials are relying on higher costs to deter the use of not only fossil fuels but also electricity. As summarized by NYSERDA officials in 2022: “The increasing cost of energy, both gas and electricity in the future...will make reduced energy consumption more valuable.” [xxix]

Some Climate Act costs could eventually produce savings because they replace fuel costs with electricity costs—but it’s unclear what those electricity costs will look like because they too are both being targeted for transformation and being taxed to finance Climate Act programs.

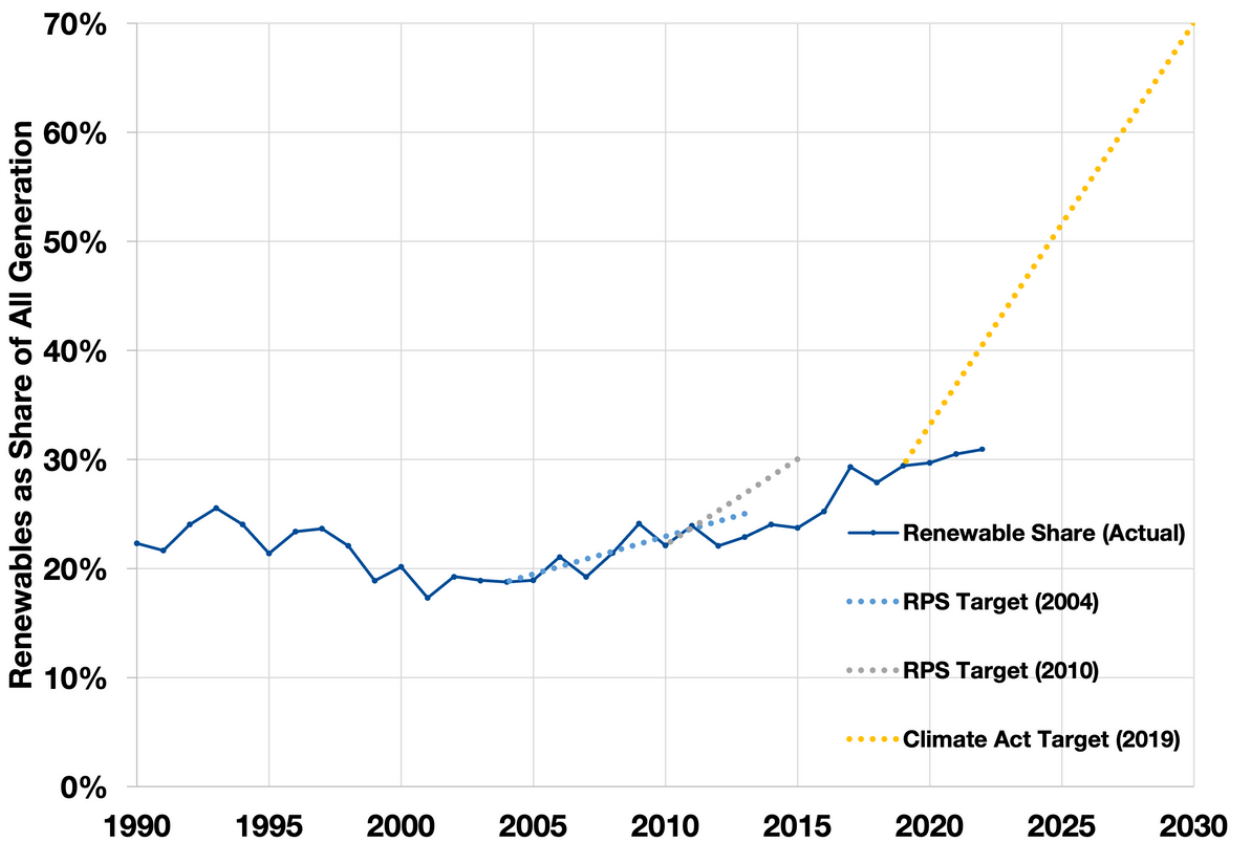
Even before the Climate Act, New Yorkers have paid some of the nation’s highest energy costs, in part due to state policy choices. The most recent federal Residential Energy Consumption Survey (RECS) by the U.S. Department of Energy found New York households paid an average of \$2,319 annually for electricity, heating and other home fuel needs, 23 percent above the national average.

Energy costs differ significantly by housing type, with detached single-family homes in the Northeast paying about double the costs faced by households in multi-family buildings with five or more units. The age of a house, its heating source and its location in New York also affect energy costs.

Household energy costs do not include transportation-related costs, which are separately targeted by the Climate Act. But New Yorkers with long commutes from older single-family houses in parts of the state with cooler climates will experience the Climate Act differently from downstate apartment-dwellers who use public transit.

For businesses, exposure varies widely depending on the nature of their operations.

Figure 4: New York Electricity Generation (Renewable) (%)



Source: EIA, PSC, Empire Center Calculations

This is all to say that Climate Act costs will hit some households and businesses harder than others.

State officials have sometimes said they consider affordability to be a priority. But in the case of fossil fuels, higher costs are a feature of the policy, not a bug. The success of the Climate Act hinges on people using less gasoline, diesel, heating oil, natural gas and propane because their costs will be artificially increased and economies of scale will be diminished. Describing residential gas use in future decades, Climate Action Council member Robert Howarth put it this way: "It's not going to be economical. You're not going to be able to run your gas stove." [xxx]

The Climate Action Council, by law, was supposed to reveal "the costs of implementing proposed emissions reduction measures, and the emissions reductions that the council anticipates achieving..." [xxxi]

Instead, the Council released less-detailed supplemental cost data, showing the sector in which costs would be incurred or realized, but not the cost of specific "measures" as the law required. For instance, one data set shows about \$20 billion in additional annual "electricity" costs related to capital, maintenance and operation expenses but does not distinguish between specific Climate Act programs such as offshore wind turbines, transmission upgrades or land-based renewables.





In its Scoping Plan, the Council said the costs of implementing its recommendations (the difference between new expenses and savings) would be between \$270 billion and \$295 billion.

First, these figures were net present values, using a discount rate to shrink future costs.

Detailed tables released by the Council tell a more complete, and more costly, story.

Three scenarios for Climate Act implementation each have total costs around \$4.9 trillion, offset by \$4.3 trillion in “avoided” costs, spending that would have occurred were it not for the Climate Act.

This translates into the Climate Act adding \$558 billion to \$611 billion to costs for New York residents and businesses, twice the values shared by the Climate Action Council.

But the size of the costs and “avoided” costs makes the gross cost highly sensitive to variation. If, for instance, actual costs are just 5 percent larger and avoided costs are 5 percent smaller, the gross cost rises to more than \$1 trillion.

With so much of program assuming decreases in the future price of things like battery storage, the risk of underestimated costs is significant. There is growing evidence that some costs are already out of control.

### ***Rising Offshore Wind Costs***

Nowhere is the over-constrained nature of the Climate Act more visible than with offshore wind, where the law requires the Public Service Commission to procure 9 gigawatts of capacity by 2035.

Offshore wind has long been fetishized in American environmental circles, with proponents pointing to its adoption in northern Europe amid very different market—and wind—conditions.

State officials in 2016 highlighted offshore wind as a way of reaching its goal at that time, which was for half of the state’s electricity to come from renewables by 2030. The technology was mentioned as an answer to concerns about the intermittent nature of renewables: offshore wind turbines over the course of a year generate more electricity as a percentage of their maximum capacity than land-based turbines or solar panels.

The technology is still less reliable than other zero-emission technologies, such as hydroelectric power, because output is directly linked to wind conditions (and can go to zero as turbines are stopped during extreme wind conditions).

Considerable amounts of battery storage will be needed before offshore wind can displace fossil fuel plants on which New York City and Long Island rely.

Still, New York's foray into offshore wind was needlessly made more costly than necessary:

- Placing the use of a specific technology in statute prevented other technologies with similar attributes, from competing. For instance, existing or new nuclear power plants in Connecticut or New Jersey, coupled with new underwater transmission lines, would likely have been cost-competitive sources of electricity compared to the combined price of offshore wind and necessary battery backups.
- New York began soliciting proposals for offshore wind before the Legislature had explicitly authorized the program—and at a time when only one company, Statoil, possessed a lease in New York waters.
- New York officials successfully lobbied the federal government to prevent turbines from being built off the Hamptons, leaving developers to work in deeper water further from population centers (in some cases, closer to Massachusetts or Rhode Island than to New York).
- Offshore wind developers remain subject to federal restrictions, such as the Merchant Marine Act of 1920 (also known as the Jones Act), that prevent foreign ships and foreign crews from operating out of U.S. ports. That kept New York from using existing European and Asian ships with seasoned crews and forced developers to buy or lease new ships from less-efficient American shipyards. One purpose-built ship is on track to cost double (\$625 million) the price of a similar South Korean-built vessel (\$330 million). [xxxii] A small

offshore wind development for the Long Island Power Authority (outside the Climate Act) addressed Jones Act obstacles by building the massive turbine foundations in Germany instead of the U.S. [xxxiii]

- Developers faced various requirements, ranging from minimum amounts of project spending needing to take place in New York to an unlawful requirement that developers hire unionized workers, which drives up costs.
- Because New York was seeking development so far from its shoreline, it faced competition from New Jersey, Connecticut, Rhode Island and Massachusetts for some of the same projects. After developers withdrew from offshore wind agreements, Massachusetts, Connecticut and Rhode Island entered into a collaboration to avoid competing against each other on future projects. [xxxiv]

The extent to which costs have been inflated, however, essentially did not matter because the Climate Act required offshore wind procurements without tying it to a cost. In normal matters of state spending, a program is limited by the appropriation lawmakers approve for it, but with this type of spending, that restraint did not apply. The Legislature never got to vote on the final amounts awarded and did not place cost limits or any other safeguards against runaway prices.

As of September 2023, NYSERDA reported it was prepared to spend up to \$30.5 billion for the first half of its offshore wind procurements (4,640 megawatts). [xxxv] The money will come from requiring utilities and large electric customers to buy offshore renewable energy credits, or ORECS, from NYSERDA.

The PSC has determined the costs for offshore wind will be distributed statewide, meaning more than half of the burden will fall on ratepayers living north of New York City. Customers in Western and Central New York—where more than 80 percent of electricity already comes from zero-emission sources—will pay not only to build the turbines but also the considerable battery storage necessary to back them up.

On top of costing more than they should, offshore wind projects are on track to cost more than expected.

Developers last year sought additional subsidies valued at more than \$37 billion for four projects—on top of their current awards which NYSERDA had valued at \$30.5 billion. [xxxvi]

The PSC denied the request in October. Chairman Rory Christian warned in a statement that approving the added subsidies, including a smaller request from land-based renewable developers, would have hiked residential electricity costs as much as 6.7 percent more than the offshore wind subsidies already had, and pushed commercial rates even higher. [xxxvii]

Even so, NYSERDA allowed (at least) two offshore wind developers to withdraw from state contracts, seemingly without penalty, and in at least one case to rebid the same project at a higher cost.

Back in shallower waters, construction costs for a state-financed port facility in Albany to support offshore wind turbine installation exploded from \$309 million estimated at the end of 2021 to \$604 million a year later. [xxxviii]

New York's offshore wind experience illustrates the financial danger of picking a particular technology—and of being early adopters to boot.

## ***Rising Renewable Costs***

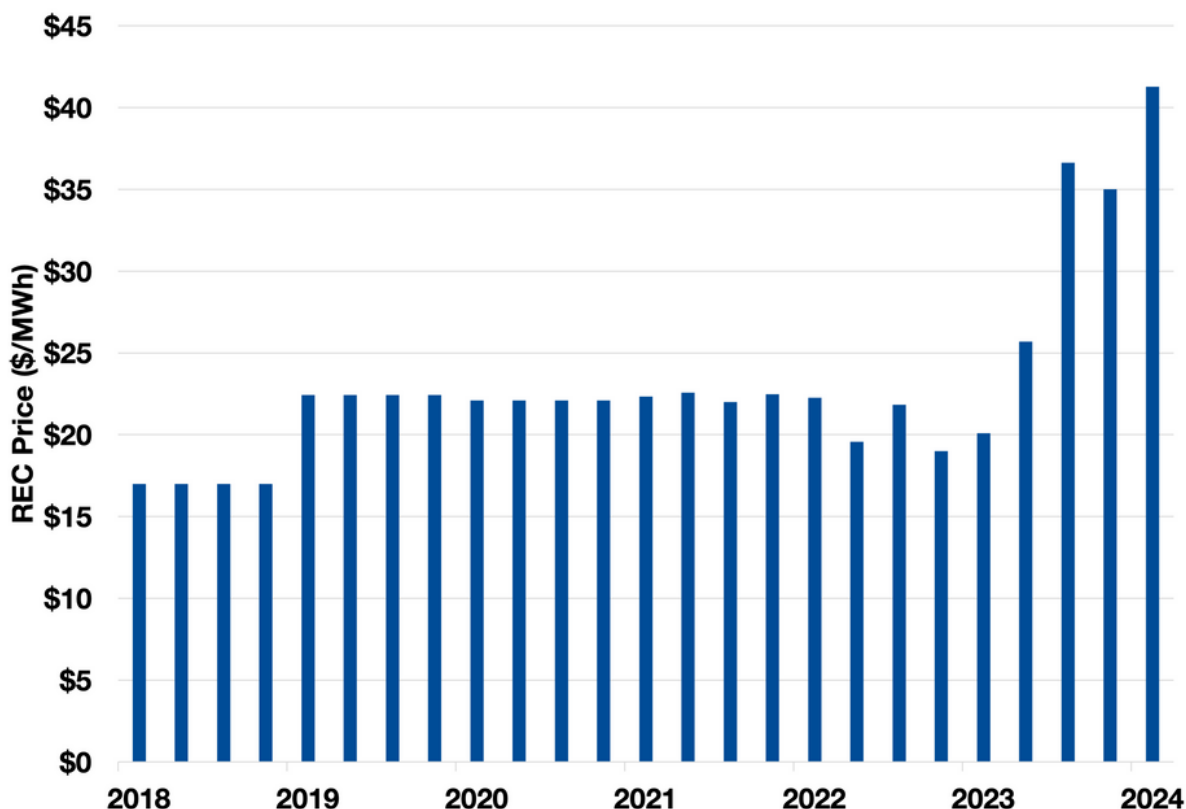
Each megawatt-hour delivered on to the grid by a new wind, solar, or other renewable project (excluding offshore wind) creates one renewable energy certificate, or REC, in the state's accounting system. Developers sell RECs to supplement the electricity sales revenues (and federal tax credits) of otherwise unprofitable projects.

New York's electricity utilities, which operate the distribution system that brings electricity to customers, do not generate electricity themselves. They purchase it in a competitive wholesale marketplace. To support renewables, the PSC in 2016 required them, and large customers that buy electricity on the wholesale market, to also purchase RECs.

The requirement for utilities and others to buy RECs is, in the end, a tax, and tax levels should be determined by the Legislature.

Utilities and large electricity customers are required to buy RECs in amounts proportional to the amount of electricity delivered or used, also known as "load." The level of mandatory purchases has risen from less than 1 percent of load in 2017, 2018 and 2019 to more than 6 percent last year and this year, and it will continue rising as more projects come online and accrue RECs they can sell. [xxxix] While the mandated purchase level has always been intended to rise, and the PSC has restructured sales to help mitigate risk, the cost of the main type of RECs sold by NYSERDA, the primary source for them, has doubled since 2022 (figure 5). At the 2024 REC price NYSERDA conveyed in recent PSC filings (\$41.26), the renewable mandate will add over \$400 million to costs next year, more than triple what it would have cost in 2022.

**Figure 5: NYSDERDA Tier 1 REC Price (Quarterly)**



Source: NYSDERDA; 2024 REC price derived from PSC filings

One notable part about the state’s land-based wind renewables is the extent to which new, additional subsidies are flowing to projects previously built with state subsidies. At least six projects—two in Wyoming County and four in the North Country—are poised for state-backed “repowering,” raising questions about whether the state will be giving additional subsidies to other existing projects. [xl]

### ***The Charge for Storage***

One of the largest long-term costs presented by the Climate Act will be the expense of the electricity storage.

A downside of relying on wind and solar is that they cannot generate power during times when wind is not blowing or the sun is not shining (what Germans call “dunkelflaute”). Assuming that the

state eliminates all fossil-fuel power plants, as the Climate Act requires, the state’s electric grid would require an almost unimaginable amount of battery storage.

New York has stored electricity for decades by pumping water, when demand for electricity is low, into reservoirs above hydroelectric dams. The state’s largest energy storage asset is not a battery but the pumped-storage facility at Gilboa in Schoharie County.

NYSDERDA has floated scenarios in which fossil-fuel plants are converted to burn hydrogen or other non-fossil fuels, technologies that could mature (but would also come with new costs).

Periods in which generation from wind and solar resources is low—described by NYSDERDA as “challenging” weeks—would require as much as 2,400

gigawatt-hours of storage. By comparison, Gilboa stores a maximum of about 12 gigawatt-hours, and it would be unable to dispatch and replenish that much energy daily.

Much of the storage under consideration for construction in the near-term would discharge for 2- to 8-hour periods, charging overnight when demand is low and meet the daily peak need in the late afternoon.

The storage needed to address multi-day “lulls” would need to be different, both financially and physically. Instead buying and selling electricity each day, they would need to remain charged days if not weeks ahead of periods in which renewable generation would sink.

NYSERDA models assume the upfront price of storage will fall by half or two-thirds by 2034. At the average 2030 to 2040 cost of storage in the “low cost” scenario (\$32 per kilowatt-hour), the 2,400 gigawatt-hours of storage would run \$77 billion. Using the same average from the “base case” scenario (\$46 per kilowatt-hour) pushes the price above \$110 billion. Bringing portions of this storage online prior to 2030 further adds to the cost.

The batteries would also need maintenance, and it remains to be seen how much that would cost, and how often they would need to be replaced.

## ***Reshaping the Grid***

Besides paying for the construction and operation of renewable energy projects, and the cost of battery backups, New Yorkers are incurring secondary costs to deliver the power to where it’s needed. Even before the Climate Act was adopted, NYISO had warned the state had “renewable generation pockets,” areas where renewable energy might be generated but which were isolated from population centers. [xli]

A later review of the challenges with pockets north of Syracuse and west of Albany found as much as half of the power produced from expected solar projects couldn’t be handled by existing high-voltage lines. [xlii]

These are not unexpected issues. They could and should have been addressed before the Climate Act was adopted, especially given the long-held understanding that wind and solar projects would be sited across upstate.

In February 2023, the PSC approved \$4.4 billion in transmission upgrades which will be funded through higher home and business electricity rates. [xliii] These higher rates are in addition to years of increased utility rates to cover grid upgrades related to the deployment of rooftop solar and other state energy programs.



The PSC also created a new type of renewable energy credit known as “Tier 4” for projects that deliver large amounts of renewable energy to New York City. As with other renewable energy credits, utilities and large electricity customers will need to purchase Tier 4 RECs, which will come from two specific power line projects: the Champlain Hudson Power Express (CHPE) and Clean Path NY.

Tier 4 was not described or considered in the Climate Act. The program was announced, unexpectedly, on May 26, 2020 during a pandemic briefing, after Governor Cuomo for years had been cool to the concept. It remains unclear what prompted this sudden interest by the governor, especially at a time when the state’s response to the novel coronavirus remained a pressing emergency. What is clear is that the costs of the two Tier 4 projects, estimated between \$5.9 and \$11.6 billion, will be distributed across the entire state and ratepayers will see electricity costs rise 2 to 4 percent because of this project alone. [xliv]

Another emerging cost is the increased need to pay what are essentially backup power plants to be available, also known as a reserve margin, so the grid operator can react to unexpected shutdowns of other power plants, transmission breakdowns, or higher-than-expected demand.

Since wind and solar generators only provide electricity intermittently, more backup capacity is needed as more connect to the grid.

The New York State Reliability Council (NYSRC), which each year calculates the reserve margin needed to minimize blackouts, in December estimated it was 42 percent larger than it would have otherwise needed to be because of intermittent wind. [xlv] The exact

financial impact of the Reliability Council’s finding is outside the scope of this report but warrants further investigation.

### ***Cap and Invest***

NYSERDA in January unveiled preliminary details of the state’s “cap and invest” program, known as NYCI and pronounced “nicky,” a system under which businesses that generate greenhouse gas emissions will need to purchase allowances through an auction system.

DEC is charged with determining what activities will require allowances, the number to be made available and ceiling on the price. Over time, the number of allowances will shrink and the price ceiling will rise.

There is no precedent in state history for this type or level of delegation to a state agency, which is not only collecting a tax but also deciding how much it will cost and to what it will apply.

Unlike nearly every other facet of the Climate Act, the distribution of costs under NYCI will be somewhat uniform and predictable, since higher emission activities would require more allowances. NYCI will immediately increase the cost of gasoline, diesel, natural gas, propane and heating oil. Aviation fuel would be excluded due to federal preemption rules.

Preliminary forecasts have shown “auction revenue” ranging from \$3 billion to \$5.1 billion next year, rising slightly in 2026 before jumping in 2027. Hypothetical auction revenue ranges from \$5.6 billion to \$11.9 billion in 2030 and \$6.1 billion to \$12.6 billion in 2035. NYSERDA’s forecasts show upstate households incurring the most costs when the program is launched next year.

A portion of these revenues will be redistributed to state residents, possibly as an annual tax credit, while the balance will be spent on electrification and other emission-reduction activities.

### ***School Bus Electrification***

Under a separate statute adopted in 2022, New York is requiring school districts and school bus companies to buy only electric buses beginning in 2027 and to stop using gas- and diesel-fueled buses by 2035. This is an interesting example of a climate policy where the costs and practical effects are fully visible.

While state officials hope that the ownership costs of electric bus operation reach “parity” in 2027, bus electrification presents two large upfront costs.

Under the latest state price list, electric buses cost 2.5 to four times more than gasoline or diesel equivalents, adding more than \$180,000 to the price for smaller vehicles and more than \$200,000 for larger ones. At those rates, replacing the state’s existing bus fleet with electric models would add at least \$8 billion to costs.

School districts must also cover the cost of the electrical grid upgrades necessary to charge buses overnight. There has been no statewide assessment of compliance costs, but anecdotes suggest they will be considerable. The pupil transportation director of the Shenendehowa school district estimated earlier this year that the district faces \$50 million in expenses beyond what it pays for the buses themselves.

As with the other major components of state climate policy, the Legislature enacted the bus-electrification mandate without a detailed cost estimate. The

future operational expense of electric bus fleets cannot be meaningfully predicted without multi-year electricity price forecasts that state officials have not provided.

### ***Heating***

Planned bans on replacement oil and gas furnaces mean homes and businesses will switch to electric heating devices known as heat pumps. In many cases, this will also require upgrading a building’s insulation which in some cases will be more costly than the equipment upgrade.

NYSERDA has estimated the cost for older (pre-1980) homes located upstate, replacing oil furnaces with heat pumps could range from \$17,600 to \$48,000, depending on the type of shell improvements needed. [xlvi] It remains to be seen, however, how much of the state’s housing stock would fall on either end of this range and whether anticipated cost reductions materialize.

A portion of these costs can be defrayed by state and federal incentives. Officials expect equipment costs to come down before a planned ban on replacement oil and gas furnaces takes effect in January 2030, at which time people will need both heat pumps and insulation upgrades on an emergency basis.

NYSERDA has also conceded that, due in part to New York’s already-high electricity costs, electric heating does not yet have “parity” with natural gas in many cases. That is, even with incentives, it does not currently make financial sense for most natural gas customers to convert to electric heat.

It remains to be seen how electricity prices and natural gas prices will compare as the state deliberately increases both.

The Climate Act puts New York public policy on a collision course with realities of the electric grid—all while making every corner of the economy reliant on it.

Every corner of the state’s economy would become far more reliant on a system while state regulators simultaneously push that system through an unprecedented transformation.

The extent of that transformation is especially visible in the transformation of the forecast for peak demand, the highest need for electricity during the year and the level around which key decisions are made about the grid.

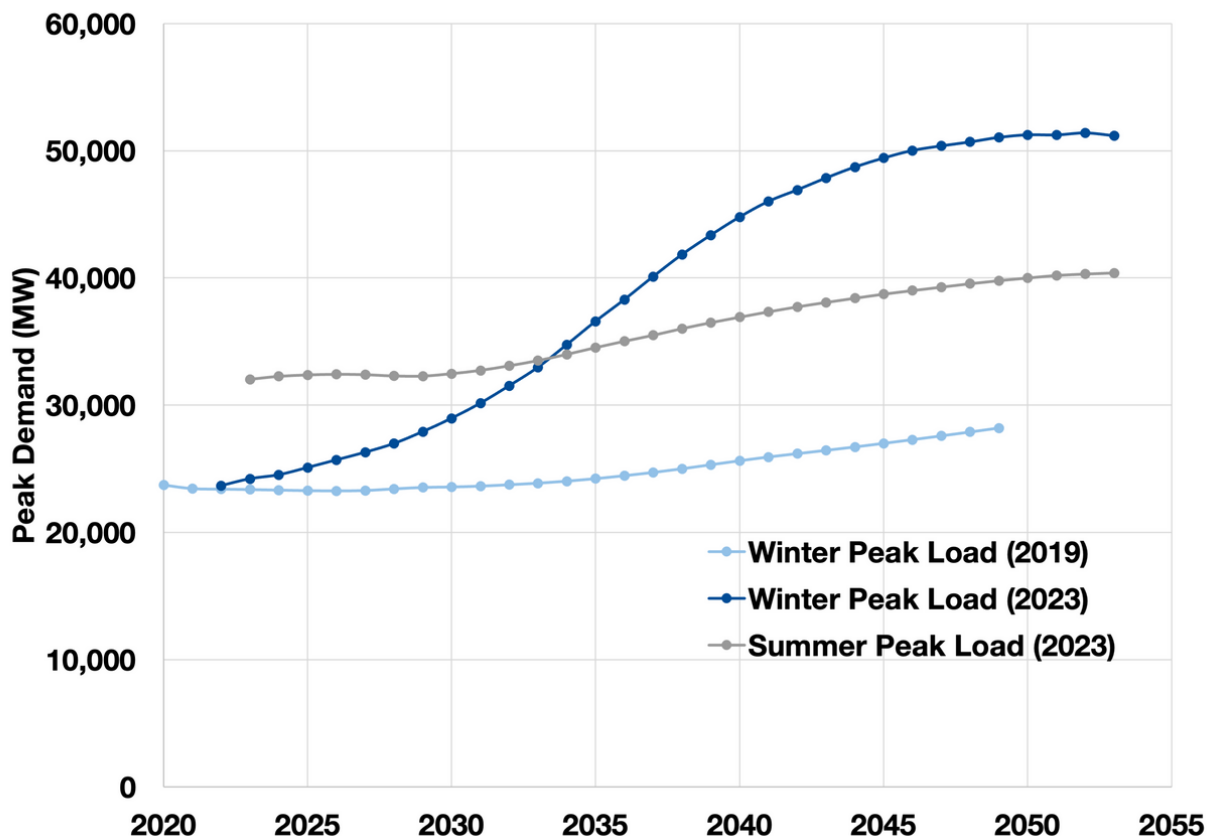
Grid operators must plan for a range of scenarios: an interruption of imports from neighboring grids, the loss of major generators or transmission lines, or higher-than-expected electricity use.

Much of that planning centers on the day and hour when demand will be the highest of the year, since generators must be available to meet it (or electricity customers must be ready to temporarily reduce use). New York has aimed to shrink that peak demand curve through energy efficiency efforts, behind-the-meter solar (such as rooftop) and demand-response programs that pay customers for energy they would otherwise use.

Right now, peak demand occurs in the summer on a hot day when air conditioning use is highest. Demand in winter has historically been smaller.

But since the Climate Act was adopted, NYISO now expects peak winter demand to exceed peak summer demand by 2034, moving from a “summer-peaking” system to a “winter-peaking” system. (Figure 6)

**Figure 6: Peak Demand - NYISO Forecast**



Source: NYISO



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While electricity demand in summer is expected to rise with vehicle and industrial electrification, demand in winter will double by 2040 and climb higher still.

This is noteworthy because public policy for years has focused on meeting summer demand. The value of state's significant investment in solar panels, both on rooftops and at industrial-scale sites, diminishes considerably in the winter when days are shorter and the sun is lower in the sky.

The Climate Act shifts the stakes in grid reliability for the general public from the loss of air conditioning on hot afternoons to the loss of heat on the coldest days of the year, something that poses a greater threat to human health. [xlvii]

NYISO has a strong record of preventing a mismatch between supply and demand. The state has gone more than 20 years without a large-scale supply-driven power outage. The last such event, the August 2003 blackout, was triggered by the errors of out-of-state grid operators that caused hundreds of power plants to disconnect from the grid, overwhelming much of the Northeast and Ontario within seconds. Despite the severity, NYISO managed to preserve service in parts of the state.

Keeping the lights on under scenarios now mapped out by the Climate Act could prove far more difficult.

### ***Beyond Accommodation***

New York's intervention in the electricity market to boost renewable energy was best described, until recently, as "accommodation." Before wind and solar arrive on the scene, the grid was powered by resources that were dispatchable, that is, they could adjust

their output up and down as demand changed.

The grid developed this flexibility over its century-long evolution. It could tolerate the intermittent injections of energy from solar panels or wind turbines far from population centers and make megawatt-for-megawatt substitutions.

In the late 1990s, electricity generation and delivery were separated. Utilities sold off their power plants and a competitive marketplace, overseen by NYISO, was created. The resultant price data and market signals helped attract private investment to the places where new or enhanced generation could bring down prices for customers while improving reliability.

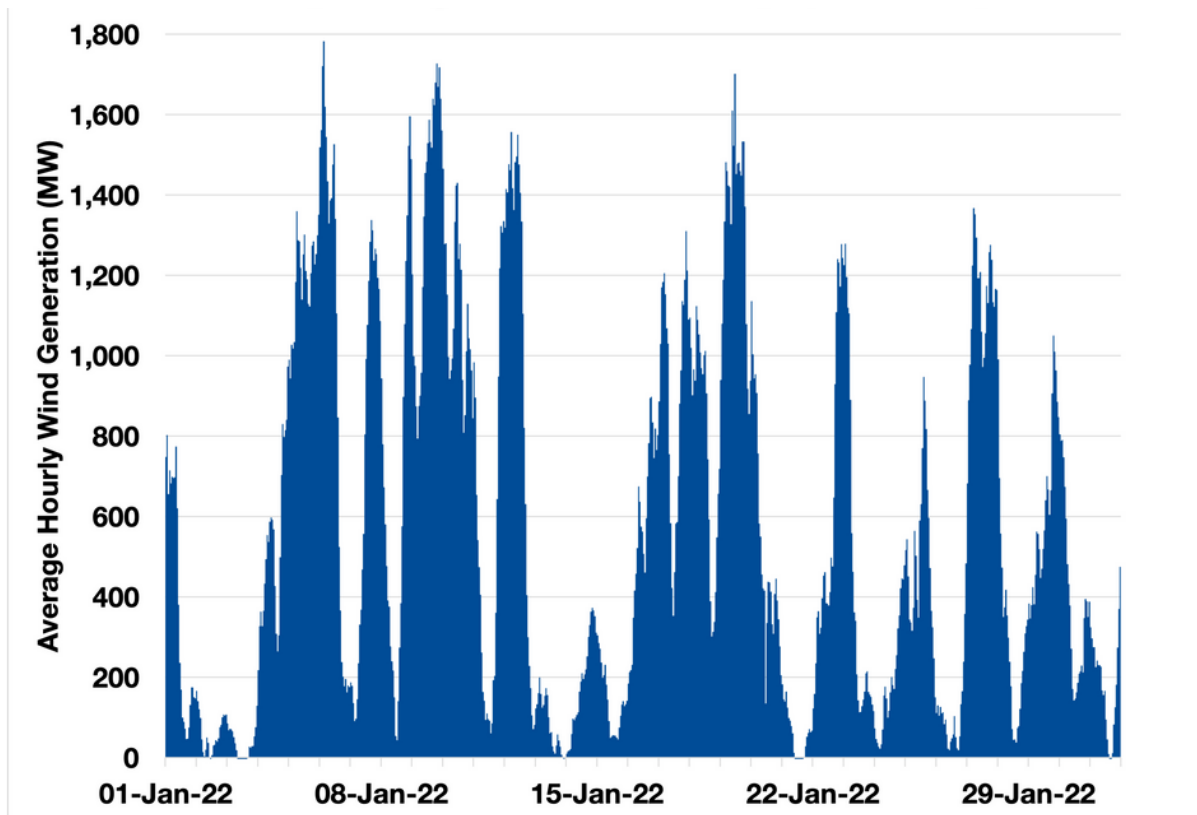
New York's renewables subsidies turned a strength into a weakness: New York's energy market's design reduced inefficiencies. With utilities out of the generating business, it meant new power plants could be built where they were needed most and avoided overbuilding elsewhere.

But developers building renewables have, to an extent, relied on New York always having a dispatchable power plant somewhere else that can increase its output when the wind declines or clouds roll in.

On 79 days in 2022, generation from wind turbines fell by more than 500 megawatts within four hours at least once. In nearly all these cases, dispatchable resources—natural gas and hydroelectric—hiked generation to meet demand.

Over one week in mid-January, output from the state's land-based wind turbines twice fell by more than 1,100 megawatts, equivalent to the output of one of the two nuclear reactors at the former Indian

**Figure 7: Hourly Average Wind Generation in NY**



Source: NYISO

Point power plant, in six hours (figure 7). The swings were the equivalent of almost half of all New York-based wind turbines going from maximum output to zero. (The related sudden increases, while more easily managed, also pose challenges.)

As more wind and solar come online, the swings in the grid will become more severe, and as the state relies more on electricity for winter heating, the stakes will rise.

NYSERDA models also appear to make unrealistic assumptions about renewables' "capacity factors", a percentage measurement of the electricity they can be expected to generate compared to the maximum possible output in the same period.

For instance, the capacity factor for New York land-based wind turbines has averaged between 23 percent and 26 percent since 2019. [xlviii] Yet NYSERDA models assume a capacity factor for upstate wind turbines averaging between 33 and 36 percent, depending on the region. NYSERDA also assumes a capacity factor for offshore wind turbines of 47 percent or more, which is higher than what NYSERDA and its vendors have reported in other venues. [xlix]

If renewables produce less than expected, the state will need means more dispatchable resources, such as the fossil-fuel plants at risk of exiting the market, or storage beyond what is current planned.

## ***The Peaker Predicament***

A preview of the challenge ahead has been playing out on a matter unrelated to the Climate Act: the state's separate attempt to regulate what are known as "peaker plants."

These older fossil-fuel-powered plants typically run for only a few hours each summer when demand is highest. They often emit significant amounts of nitrogen oxides, such as ozone, which harm air quality. But peaker plants pay an important role in making sure supply keeps up with demand by contributing to the reliability margin, the available but unused capacity that the grid needs when a power plant goes offline unexpectedly, or severe weather damages a transmission line, or another unforeseen event requires more generation.

Peakers are also sometimes in areas known as load pockets, places where demand can be greater than the ability of transmission lines to deliver power there. The location of many peaker plants in or near cities is not a coincidence, but it also increases concerns about their effect on air quality and health.

DEC issued regulations in December 2019 meant to push peaker plant owners to either upgrade or close plants with a collective capacity of about 3,300 megawatts, setting two rounds of deadlines in 2023 and 2025. The 2025 deadline came with a condition: NYISO, the grid operator, would need to verify that planned closures would not threaten grid reliability.

State officials at the time had no way of knowing which plants would choose to perform upgrades or shut down entirely. About 1,200 megawatts of peaker capacity went offline ahead of a May 2023 deadline and another 1,600 megawatts of peakers would be

unavailable due to the regulations. [1]

But NYISO found that full enforcement of the rule presented a problem: despite the state as a whole having enough electricity, it would leave New York City 446 megawatts below its reliability margin in 2025.

With two years of lead time, NYISO solicited alternatives, and received two: one for an upgraded transmission line and another for a battery storage project. Neither was found to be adequate, and a handful of peaker plants have been allowed to remain online until 2027.

The episode reveals key points that relate to implementing New York's climate goals:

- state government did not know how peaker plant owners would react to new restrictions;
- storage and transmission upgrades may not solve grid challenges;
- the grid's need for each generator is unique, and their location matters; and
- requiring NYISO signoff likely prevented blackouts in New York City.

Policymakers would do well to study the experience as they evaluate assumptions about how the grid will look in 2030.

## ***The 2030 Catch-22***

The Legislature sent a message to fossil-fuel generators with the passage of the Climate Act: most will be expected to stay open to back up the state's new renewables into 2030, but operating only some of the time, and then be closed in 2040.

The state has significantly complicated the economics around how plants are maintained and upgraded. Officials have not published any assessment indicating which plants it hopes to close by 2030, or which ones it expects to remain available.

NYSERDA has stated that for the state to meet its 70 percent renewable energy goal, it can generate only 45.5 terawatt-hours of electricity from “non-renewable” sources in 2030, compared to 107.4 terawatt-hours in 2020. [3]

State officials are counting on New York’s three remaining nuclear power plants remaining open, at least through 2030, but the Climate Act does not count them as “renewables.” They generate about 27 terawatt-hours annually.

Subtracting them from both 2020 and 2030 “non-renewable” levels reveals the state hopes to go from about 80 terawatt-hours of fossil-fuel generation in 2020 to about 18 terawatt-hours in 2030, a reduction of more than 75 percent.

Yet Climate Act models expect 80 percent of fossil-fuel generators to remain online until 2030. [li] This assumes generators will remain maintained and staffed while operating (and earning money) only a fraction of the time they do now. Fossil-fuel plants operate by selling power at a higher price than their combined fuel, operating and capital costs. While fuel costs would be lower, fixed costs would remain the same, and operating only a small portion of the time is likely economically unfeasible.

Placing a scenario such as this on the horizon could lead some of the same operators New York is counting on to back up its wind and solar to defer maintenance or retire their plants.

What’s more, power plants aren’t static. They are constantly being built or upgraded—or at least, they were.

The Climate Act has ended that. Instead of companies competing to produce energy more efficiently, New York has

thwarted a market-driven process in which the older, inefficient plants are pushed out of the market.

The change first became visible in 2021, when DEC rejected a pair of applications to for air permits needed for planned power plants in Queens and Orange County, in both cases citing the Climate Act and saying, in the case of the Orange County plant, “the projected displacement of other less-efficient and higher-emitting electric generating units is not a sufficient basis” to show compliance with the Climate Act.

DEC also went into uncharted territory by assessing the overall supply and availability of electricity in each region. Justifying the move based on the lack of a “reliability need,” DEC made a determination the Legislature had never authorized it to make.

Two years later, there are no new major natural gas (or oil) generators in the queue to connect to the state’s grid.

On the grid that serves Pennsylvania, New Jersey and parts of several other states, by comparison, nearly 8,000 megawatts of new natural gas-fired combined-cycle plants were set to come online in the 12 months ending September 2023. [lii]

Meanwhile, older New York plants are retiring. NYISO in November 2023 warned that since the passage of the Climate Act “more than twice the capacity of generation has deactivated than has been added to the system. Should this trend continue, additional reliability needs may be identified, both statewide and for localities.” [liii]

Questions also remain about whether DEC will push more plants toward retirement.

[3] The state’s ability to meet this target has recently been questioned following the cancellation of several renewable energy projects.

Since before the adoption of the Climate Act, DEC has regulated greenhouse gas emissions from power plants under its performance standards for large electricity generators. [liv] Developed in 2018, the regulations put a ceiling on the amount of emissions a plant could generate compared to how much electricity it produced.

DEC's closure of the plants with the highest per-megawatt emissions—coal-fired generators—was only possible because the state's competitive power market had, a decade earlier, attracted more efficient generators.

The Climate Act has flooded the sector on which its entire plan relies with something harder to mitigate than any greenhouse gas: uncertainty.

The challenges of balancing supply and demand will get more complicated yet. The state is on track to add energy-intensive industries such as the Micron and GlobalFoundries semiconductor plants and plans to promote artificial intelligence collaboration, which requires power-hungry data centers, among New York universities.

## *The Last Mile*

Local distribution, as opposed to transmission (the highest-voltage lines) and sub-transmission, involves lower-voltage lines closest to electricity customers. These are the smallest circuits of the grid, on which the state hopes to run new heating systems and charge electric cars.

Discussion about the electrification of New York's economy has focused on the wholesale electricity market, with little attention paid to the question of what this "last mile" of electricity delivery will look like.

Parts of New York, especially in the Adirondacks, already struggle with regular blackouts due to the physical limits on local electrical infrastructure. An area's vulnerability is affected by the number and age of lines serving it and vegetation along those lines. Long Lake, Newcomb, Raquette Lake, and Blue Mountain Lake are each served by a single forest-crossing transmission line and experience frequent outages. [lv]



In the four years since the adoption of the Climate Act, there does not appear to have been granular analysis of how the oldest or most remote parts of the grid will handle the electrification of the economy.

Special attention should be paid to how local distribution networks will perform on the coldest day of the decade, akin to the models now used to measure how the grid will handle 95° F and 99°F weather. This is especially necessary because heat pump efficiency plummets near the record low temperatures on the books in parts of Western New York and the Adirondacks.

## The Need for Guardrails

**“The power system is undergoing unprecedented changes that exponentially compound the complexity of what it takes to keep the lights on every second of the day. These changes are mainly driven by decarbonization efforts and public policies that affect all sectors.”**

—NYISO [lvi]

A fundamental flaw in the Climate Act is that it sets goals without limiting principles.

Governor Hochul has said that she is focused on affordability as she implements the Climate Act, but that is not a priority, or even a consideration, for the law itself—and indeed conflicts with the Act’s implied goal of making certain activities less affordable as a way of promoting electrification and conservation.

The only “guardrail” in the Climate Act relates to the electric grid. The PSC may “temporarily suspend or modify”

obligations under the Climate Act for renewable energy or storage if 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”

This presupposes that the PSC will be able to predict forthcoming cost or reliability issues and be able, and willing, to act to mitigate them.

Since 1907, electricity service has been regulated by the PSC, which describes its mission as being to “ensure access to safe, reliable utility service at just and reasonable rates.”

The PSC, and its staff arm, the Department of Public Service, have been transformed into an implementation mechanism.

The PSC has so far signed off on every component of the Climate Act, making its involvement more pro forma than proactive.

Tension that should exist between environmental goals and a body monomaniacally focused on cost and reliability has been all but eliminated.

In the four years since the Climate Act passed, it has become clear that the Legislature established targets for this program without adequately contemplating its feasibility, its cost, or its effect on reliability.

As the state approaches 2030, advocates will pressure the Executive Branch to take more drastic steps. These steps could range from speeding up the heating and appliance bans and denying

registration renewals for older vehicles to diverting state funds away from general fund programs, such as education, transportation and healthcare, into Climate Act efforts.

The following are steps the Legislature should take to better understand the costs behind Climate Act policies, to reduce those costs and to control where, when and how New Yorkers face them.

## **Recommendation: Demand Updated State Energy Plan & Reliability Studies**

New York state government is not only flying blind: it's also failing to follow the law. The public, and their lawmakers, deserve to see where state policy is taking them.

If the state Energy Planning Board does not convene and set a realistic timeline for issuing an updated State Energy Plan and a reliability study, as required by law, the Legislature or individual legislators should sue to compel the Board to complete those reports.

## **Recommendation: Develop Proper Cost Estimates—And Let the Legislature Decide**

How can the Legislature ensure that executive branch agencies don't take actions that adversely affect affordability or reliability?

The natural starting point for addressing that concern is found in one of the existing structures created by the Legislature to regulate executive branch rulemaking—New York's State Administrative Procedure Act (SAPA).

Adopted in 1975, SAPA was a response to what lawmakers said was rulemaking processes at state agencies that were "inconsistent, lack uniformity and create misunderstanding by the public." [lvii]

The New York Chamber of Commerce & Industry (which became the Partnership for New York City) was among several groups supporting the reform. As chamber officials put it:

"Over the past half century we have been living through a quiet revolution involving the shift of legislative and judicial power to the executive branch of government, largely without any of the public protections afforded when laws are passed and judicial determinations reached by people directly responsible to the electorate. This measure would give us back a major portion of the democratic processes we have lost." [lviii]

The legislation was the culmination of a decade-long effort, and ultimately a confrontation with the executive branch: Governors Nelson Rockefeller and Malcolm Wilson vetoed similar (or, in Wilson's case, identical) versions a total of three times.

With Governor Hugh Carey's signature, New York—over the objection of several Carey administration officials—joined a national trend of states adopting similar laws designed to rein in the administrative state.

New York's SAPA focused on boosting public awareness and involvement in the rulemaking process, requiring, among other things, publication of notice about proposed rulemaking in the State Register, and public access to studies and other analyses used in rulemaking.

Other states took things further: in Connecticut, New Jersey and Illinois, for instance, lawmakers can block rules

through legislative action that does not require the governor’s approval. [lix]

In Florida and Wisconsin, rules that would create compliance costs above a certain level require legislative approval. [lx]

For state lawmakers concerned about the cost of forthcoming climate policies, especially from the Department of Environmental Conservation, SAPA’s cost-estimate requirement can provide an effective guardrail with three small modifications.

- The law should specify that agencies must calculate the “gross cost” of implementation and compliance for affected persons. This is necessary because state officials at times have counted potential future savings or “global benefits” to conceal local upfront costs.
- As the statute reads, agencies appear to have latitude in presenting costs for affected individuals rather than the total cost across the economy. These costs should include the cost of implementation and compliance at both the median and the 95th percentile. Agencies should also need to estimate the number of individuals, households, and businesses who will be affected by those costs in a five-year period, along with the total cost of compliance.
- With meaningful cost estimates in hand, the Legislature should require that any rule with a total compliance cost above \$100 million over five years first require a vote of approval by both houses of the Legislature.

## Recommendation: Create An “Off-Ramp” For Recessions and Emergencies

The Climate Act as written does not consider the state of the economy or employment.

While the PSC can take limited actions to preserve the affordability or reliability of electricity service, nothing in law requires the Department of Environmental Conservation, the Department of Motor Vehicles or any other agency to consider the state’s economic health or residents’ ability to pay in adopting Climate Act regulations.

State labor law, however, provides an instructive example of ways the Legislature can require agencies to factor in the state’s economic condition as it advances a policy change.

Lawmakers and Governor Hochul last year agreed to index the minimum wage to growth in the consumer price index (CPI). The statute includes a measure the governor described as an “off-ramp.” [lxi] It considers three econometric scenarios (see Appendix) in which wage hikes would not automatically take effect:

- rising unemployment (the U-3 unemployment rate at least 0.5 points over the prior 12-month low);
- decreases in the number of jobs compared to both three and six months prior; or
- decreases in the CPI.

For the Climate Act, rising joblessness (measured either in terms of unemployment or the number of jobs) would be an appropriate reason to pause implementation of new regulations, especially considering that the Climate Action Council aims to eliminate 58,200 jobs in high-emissions sectors by 2040, including 21,500 jobs by 2030. [lxii]

The minimum wage law considers the consumer price index because, in periods of negative CPI growth, consumer prices as a whole are not rising. Lawmakers should safeguard against the opposite situation: amid high inflation, state policies that drive up the



cost of energy and other goods and would worsen New Yorkers' personal financial situations and exacerbate inflation.

The Legislature could go further than it did in the minimum wage law and look at regional economic indicators, either in terms of employment or gross domestic product, or average electricity costs.

## **Recommendation: Pause Offshore Wind Awards**

NYSERDA is poised to sign multi-billion-dollar contracts that would bind state electricity customers for a quarter-century or more. In some cases, it is considering projects with subsidy costs that the PSC already rejected as being too high. The Legislature should immediately limit NYSERDA's authority to make awards or to enter into contracts without legislative signoff.

As explained below, the Legislature should also repeal the requirement to procure offshore wind and instead subsidize renewables solely based on desirable attributes, not the technologies they use. [lxiii]

## **Recommendation: Improve Power Plant Emissions Limits**

If DEC had been able to force the closure of every peaker plant it targeted with its 2019 regulations, portions of New York City would have faced rolling blackouts as soon as summer 2025 as a direct result.

Lawmakers should require NYISO review and approval on any future tightening of power plant performance standards. Meanwhile, the Legislature should clarify that any power plant modernization projects that meet those standards and

should not be blocked under the Climate Act nor does DEC have authority to adjudicate the needs of the grid for reliability purposes.

New York since 1990 has achieved more emissions reductions due to new or upgraded electric generators displacing older, less efficient ones than from the addition of renewables. More opportunities exist to reduce emissions by allowing new generators to compete with the state's existing fossil-fuel generator fleet.

Preventing more efficient generators from coming online will keep older, less efficient plants operating longer and leave the state relying on an older generator fleet if (when) the need for gas-fired generators is greater than expected beyond 2030.

## **Recommendation: Eliminate Obstacles to Cutting Emissions**

Some of the largest obstacles to achieving the emissions goals were created by the state itself.

### ***Expand the Definition and Role of "Zero Emission"***

Governor Hochul and the Legislature have left it to the PSC to decide what should count as a "zero-emission" energy source [4] as required by the Climate Act. Past efforts, both by the PSC and the Legislature, have missed the mark.

The PSC in May 2023 set out to "identify technologies that can close the gap between the capabilities of existing renewable energy technologies and future system reliability needs, and more broadly identify the actions needed to

[4] The term "zero emission" is used in this report as shorthand for technologies that generate electricity through a process that does not directly involve burning fossil fuel. Virtually every technology, however, involves the use of fossil fuels (often coal) in the manufacturing process.

pursue attainment of the Zero Emission by 2040 Target.” [lxiv]

If greenhouse gases are to be treated as an existential threat, New York should pursue an all-of-the-above strategy for reducing emissions. The Legislature should substitute any mention of “renewable” in the Climate Act with “zero emission” and it should amend the sections of the law that distinguish between renewables and zero-emission technologies, such as nuclear and hydroelectric generation. Broadening this definition will make the state’s goals more attainable and less costly.

Broadly speaking, renewable energy should not be treated as superior to nuclear energy for reducing emissions.

## ***Nuclear***

Nuclear power for many years was a central part of New York’s energy strategy. The 2009 state energy plan urged its expanded use:

“Going forward, nuclear power generation should be encouraged within New York where safety, security, and environmental conditions favor its deployment and operation, and retained where it can be demonstrated that the safety and security of its operation can be maintained and its adverse environmental impacts minimized.”

Yet New York state government has been of two minds about nuclear power, at one point working to simultaneously close Indian Point in Westchester and to prevent the closure of the state’s other three plants along Lake Ontario. Meanwhile the United States Navy has safely operated a nuclear reactor in a suburb outside Albany since 1955. [lxv]

Memories remain of Long Island’s Shoreham nuclear plant, which was built and fueled in the mid-1980s only to be closed amid local opposition. Almost 40 years later, Long Islanders in 2024 continue paying off the debt from the unused plant. [lxvi] State lawmakers even barred the Long Island Power Authority from operating a nuclear power plant on Long Island [lxvii] (though LIPA owns an interest in one of the plants north of Syracuse).

Elsewhere, however, emissions-minded policymakers are less concerned.

Sweden last year changed its longstanding “100 percent renewable” target to “100 percent fossil-free,” allowing the country to pursue nuclear power. [lxviii] French officials in January floated the possibility of moving away from renewable energy targets in favor of nuclear power to lower emissions. [lix] The United Kingdom, despite being a leader in the offshore wind space, has taken initial steps toward quadrupling its nuclear capacity. [lxx]

Illinois, Connecticut [lxxi] and other states have passed laws allowing small modular nuclear reactors.

Nuclear also has the benefit of addressing a density issue: a 924 megawatt array of a dozen small modular reactors, sited on 35 acres, could continuously generate the peak output of a solar panel array covering about nine square miles. What’s more, reactors can operate at the sites of retired fossil-fuel plants, eliminating the need for both transmission upgrades and storage required by the state’s planned renewables.

## ***Hydroelectric***

New York generates more electricity from hydroelectric dams than all but two states, Oregon and Washington, thanks to a pair of dams constructed during the 20th century. [lxxii]

Yet New York, for the entire 21st century, has barred new dams, or “impoundments,” from qualifying for renewable energy subsidies.

Hydroelectric power is preferable to solar and wind because its output can be purposefully varied; it does not require battery backups or other storage (in fact, it can serve as a form of storage). Yet none of the roughly \$400 million set to be paid by ratepayers this year for renewable energy credits can go toward building new dams.

Opponents cite concerns ranging from disrupting fish migration to dislocating indigenous Canadian villages to generating methane from submerged vegetation. Rather than weigh tradeoffs and explore mitigation options, officials have kept new dams off the table—largely because they would outperform the wind and solar favored by state officials in recent years.

Sixteen states, including California, Colorado, Maryland and Minnesota, allow hydroelectric generators using new impoundments to qualify for state subsidies. [lxxiii] Even the New York Power Authority (NYPA) argued for allowing new impoundments as the state developed renewable energy subsidies. [lxxiv]

The State Energy Plan in 2002 suggested that the state by 2022, could have added 1,079 megawatts of capacity from new dams, an amount slightly greater than the state’s second-largest existing hydroelectric dam, located at Massena in

St. Lawrence County. Those new dams could have produced an estimated 5.5 million megawatt-hours of emission-free, dispatchable energy per year. By comparison, New York in 2022 got 4.8 million megawatt-hours total from its land-based wind turbines. [lxxv]

Besides benefiting from small in-state projects, New York could positively influence ongoing capital planning by Hydro-Quebec, which can construct additional large dams. The company has a strong incentive: electricity sales to the United States reduce domestic energy costs.

Finally, it is noteworthy that the PSC will soon require upstate ratepayers to subsidize, through Tier 4 RECs, the delivery of hydroelectric power to New York City when upstate utilities themselves could not count power purchased from those same Canadian dams toward their own renewable energy requirements.

## ***Biogas***

Ten percent of New York’s net emissions come from solid waste disposal, mainly the decomposition of that waste, which produces methane. Yet systems to collect and burn that gas are excluded from the Climate Act’s definition of “renewable.” [lxxvi]

Besides discouraging one of the more cost-effective methods for reducing emissions, it also departs from long-standing state policy: funding from the pre-Climate Act Renewable Portfolio Standard helped at least 10 landfill-gas projects get built (including one in Pennsylvania). [lxxvii]

Burning methane—reducing it to carbon dioxide and water vapor—reduces its warming potency by more than 98 percent, according to New York’s

emissions accounting standards. Every unit of waste-derived methane that is used as fuel will reduce the need for more disruptive reductions elsewhere in the economy. If state-attributable emissions flow from a source, New York incentives should flow toward mitigating that source.

### ***Fix Erroneous Prevailing Wage Determination***

Language in the Climate Act makes any project funded under it subject to New York's "current prevailing wage law," a minimum compensation level on public works projects set in New York City by its comptroller by the state Labor Commissioner everywhere else.

The name is a misnomer: New York's prevailing wage is neither "prevailing" (it is, improperly, based on union contracts often representing less than a quarter of

workers) nor just "wage" (it sets pay and benefit levels as well as work rules).

The Labor Department's deliberate miscalculation of the prevailing wage has the effect of significantly driving up costs of any project to which it applies. For instance, it requires a company installing solar panels in Suffolk County to pay laborers at least \$95 per hour and electricians at least \$102 per hour. [lxxviii]

Prevailing wage frustrates state policy goals in areas ranging from housing to education to transportation to the environment. The Legislature can reduce the cost of most Climate Act-related projects by doing one of two things: exempting Climate Act projects from the law, or correcting the way the prevailing wage is determined. This second option would involve amending Labor Law §220 to require the Labor Department to perform the wage and benefit censuses that DOL once performed routinely.



## ***Ask Congress For A Jones Act Exemption***

As early as 2017, NYSERDA acknowledged “financial considerations” would need to be made for compliance with the Jones Act, which has kept offshore wind developers from using existing ships and crews. Yet New York state officials have not publicly requested any type of temporary or permanent relief.

Besides making offshore wind development slower and more costly, the Jones Act causes harm ranging from increasing the traffic on New York highways to driving up food prices on Puerto Rico. The law should be repealed, but short of that, New York should seek an exemption before more work proceeds.

## ***Don't Prevent Incremental Improvements***

State officials have adopted a posture of largely opposing any activities that use fossil fuels even if they result in a net reduction of greenhouse gas emissions. All things being equal, a home or business can reduce its local carbon emissions by about 27 percent when it switches from No. 2 heating oil to natural gas.

The posture smacks of hypocrisy, given the state's reliance on coal-powered industries in China and elsewhere to build solar panels and other renewable components, and that key state economic development projects, such as Micron, have had their access to natural gas guaranteed.

New York in 2016 began blocking natural gas pipelines meant to serve both the state and New England. That policy had the effect of preventing customers in

the Hudson Valley and Massachusetts from replacing oil furnaces with cleaner-burning natural gas. [lxxix] Merrimack Station, New England's largest coal-fired power plant plant—which is kept in business by New York's pipeline blockade—burned around 147,000 tons of coal in 2022. [lxxx]

More recently, advocates have pushed to prevent houses from connecting—or, in some cases, even re-connecting—to the natural gas grid. That would leave more houses burning fuel oil, which produces not only more carbon dioxide but also more of other avoidable pollutants that directly harm human health such as nitrogen oxides and sulfur oxides.

Marginal, more affordable reductions in emissions can produce immediate air quality improvements and cost benefits.

## **Recommendation: Require Legislative Approval For Climate Act Taxes**

The Climate Act's REC purchase requirements amount to tax on electric utilities which will be passed on to consumers. Similarly, cap-and-invest is a tax on activities that generate emissions. These taxes should not be imposed without specific approval by the Legislature.

The Legislature should reaffirm its prerogative by amending Public Service Law §66-p to set the amounts of any zero-emission credit utilities and large electricity customers must buy.

Similarly, the price ceiling and number of allowances allowed under “cap-and-invest” should be set by the Legislature, just as lawmakers would vote on the rate of and goods and services subject to the sales tax.

## Conclusion

Much has changed since 2019. New Yorkers are facing sweeping and unforeseen consequences from the Climate Act unless the Legislature reasserts its authority.

The rush to be first, the arbitrary nature of the Climate Act's goals and the extent to which the state is relying on opaque modeling has set the state up for costly and economically destructive mistakes.

Returning climate policymaking to the legislative branch, where it belongs, is the only way to prevent them.

This would not mean abandoning the state's climate goals. To the contrary: open discourse, informed by the policy lessons and scientific advances of the past five years, can and will result in better climate policy for New York.

## Appendix: Calculating Renewables

The renewable share of electricity used in New York can be measured several ways. This report uses generation in New York because renewable attributes of imports cannot be readily determined. Despite the Climate Act taking a narrower view, the definition of renewables includes hydroelectric, wood, biomass, wind and solar as renewables.

This report uses EIA data (form EIA-860, table 5, "Electric power industry generation by primary energy source, 1990 through 2022") which are more detailed and begin prior to the creation of the NYISO. Behind-the-meter solar generation (not included in the EIA data) is assumed to be zero in 2011, rising linearly to 2018, the first year of NYISO data.

## Glossary

The rate at which electricity (power) is created or used is expressed in watts. The capacity of power plants is typically rated in megawatts (MW) (1 million watts) or gigawatts (GW) (1 billion watts). For example, the closed Indian Point Energy Center was capable of generating about 2,000 MW or 2 GW during its final decade operation.

A kilowatt-hour is the amount of energy created or used in one hour at the rate of 1,000 watts per hour. This is the standard unit for measuring residential use. New Yorker residential customers paid an average of 22.7 cents per kilowatt-hour in November 2023, compared to 16.2 cents nationally.[lxxxii] New York households used an average of 6,916 kilowatt-hours in 2020.[lxxxii] The generation from power plants over the course of a year is often in gigawatt-hours (1 million kilowatt-hours) or terawatt-hours (1 billion kilowatt-hours).

**Clean Energy Standard:** a 2016 program that set New York’s original “50 by 30” renewable energy target and subsidized financially distressed nuclear plants.

**CLCPA (Climate Leadership and Community Protection Act, or Climate Act):** a 2019 law that set renewable energy and emission reduction targets for New York and empowered state regulators to set policies in support of those goals.

**Climate Action Council:** the 22-member panel created by the Climate Act to develop the policies that will be implemented by state agencies to reach the state’s emission reduction goals.

**DEC (Department of Environmental Conservation):** the state agency tasked with implementing many of the regulations under the Climate Act.

**PSC (Public Service Commission):** the state body which regulates monopoly utilities. Members are appointed by the Governor and confirmed by the Senate.

**NYSERDA (New York State Energy Research & Development Authority):** the state agency that among other things manages state subsidies for renewable energy generators.

**NYISO (New York Independent System Operator):** the independent nonprofit that oversees New York’s competitive energy market and ensures the reliable supply of electricity.

**NYSRC (New York State Reliability Council):** the independent nonprofit responsible for determining the amount of capacity needed to maintain reliability on the New York grid.

**ORECs (Offshore Renewable Energy Certificates):** RECs produced by offshore wind turbines.

**RPS (Renewable Portfolio Standard):** the 2004 state program that subsidized renewable energy projects.

**RECs (Renewable Energy Certificates):** credits reflecting the production of each megawatt-hour of electricity produced as tracked by a state accounting system, allowing developers to sell them.

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