Issue Brief

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Green Overload

New York State's Ratepayer-Zapping Renewable Energy Mandate

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Following a directive from Governor Andrew Cuomo, the state Public Service Commission (PSC) has adopted a "Clean Energy Standard" that sets an ambitious goal for increased reliance on wind- and solar-generated electricity in New York while mandating large subsidies to money-losing upstate nuclear power plants.

The governor wants to make New York a "national leader" by having renewables provide 50 percent of the state's electricity by 2030—a goal also known as "50 by 30"—while keeping unprofitable nuclear plants running. But as detailed in this report, the Clean Energy Standard has three major shortcomings:

1. **High Cost**—While the governor and the PSC have portrayed the financial impact on ratepayers as minimal, the Clean Energy Standard is likely to add nearly $3.4 billion to New York utility bills in just the next five years.
2. **Questionable Feasibility**—The 50 by 30 mandate will require the expansion of solar- and wind-generated power production on a massive and unprecedented scale—without providing needed improvements to an already strained electric transmission system. The PSC also failed to consider the added conventional generating capacity needed to back up renewables when the sun isn't shining and the wind isn't blowing.
3. **Low Impact**—The overarching goal of the Clean Energy Standard is to fight projected global warming, but the standard will have a barely discernible impact on global greenhouse gas emissions. Indeed, under the Regional Greenhouse Gas Initiative (RGGI), reductions in carbon emissions from New York power generators could be offset by an increase in emissions in eight other RGGI states.

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Given the questions that continue to surround the new renewable mandate, the adoption of the Clean Energy Standard should spark a real debate on the means and ends of energy policy in New York. If the standard is not repealed or at least significantly revised within the next few years, it could wreak havoc on electricity markets in New York while making the state's energy costs even higher and less competitive in comparison with national norms.

1. BACKGROUND

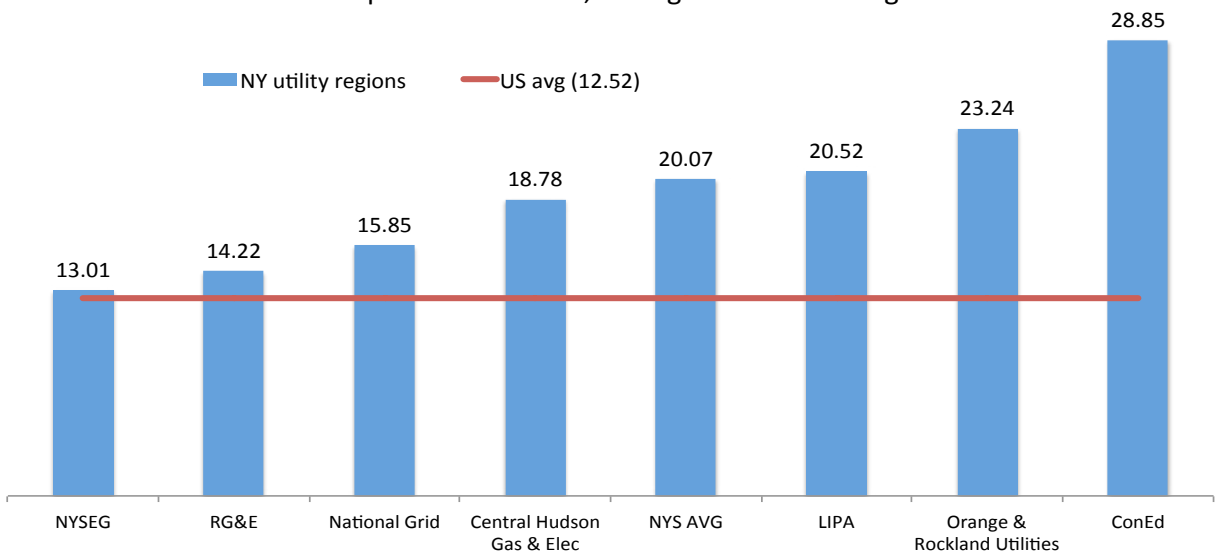
Renewable energy comes from sources such as wind and sunlight, which are not depleted when used but naturally replenished. Because renewable energy for the most part does not generate carbon dioxide, expanded reliance on renewable sources has become a centerpiece of federal and state government strategies for reducing manmade carbon emissions associated with predictions of global warming.

But renewables also come at a price. Except for some hydroelectric power plants, most renewable energy generators need government subsidies to compete with the lower cost of non-renewable power sources in New York.

Solar farms and wind turbines in particular also have the disadvantage of being inconsistent and undependable. To ensure a continuing supply of power when the sun isn't shining and the wind isn't blowing, solar- and wind-powered plants must be backed up by traditional energy generation sources, such as natural gas and nuclear plants.

Despite these disadvantages, New York began a regulatory push for renewables more than a dozen years ago, under Governor George Pataki. In 2004, the Public Service Commission enacted the Renewable Portfolio Standard (RPS) to create incentives for more renewable energy generation in New York. Under the RPS, a surcharge was levied on ratepayers' electricity bills.[1] The New York State Energy Research and Development Authority (NYSERDA) then used the funds to subsidize renewable energy installations. This differed from the approach taken by other states, which required utilities themselves to directly purchase more renewable energy.

Fig. 1: Average Residential Electricity Price, 2014
Cents per kilowatt hour, NY regions vs US average



Energy Information Administration, U.S. Dept. of Energy

The objective behind the RPS was to increase the amount of demand met by renewable energy from a 2003 level of 19 percent, which was almost exclusively hydroelectric power, to 25 percent in 2013. In 2010, the Public Service Commission extended that goal to 30 percent by 2015.[2]

Despite the collection of $1 billion in ratepayer subsidies for renewables, the RPS goal was not achieved.[3] Renewable sources—still mainly hydroelectric power—supply 23 percent of electricity demand in New York as of 2015.[4]

Governor Cuomo's efforts to promote renewable energy began in 2012 with the launch of the NY-Sun program, through which NYSERDA subsidizes residential, commercial and industrial solar installations.[5] NY-Sun was slated to spend about $1 billion toward its goal of installing 3,000 megawatts of solar panel capacity, enough to power 400,000 homes, by 2023.[6]

Hydroelectric power, chiefly from New York Power Authority projects, accounted for most of the 23 percent of total New York electricity generated by renewable sources as of 2015.

In 2014, NY-Sun was incorporated into a broader energy strategy marketed as "Reforming the Energy Vision," which included a goal to reduce greenhouse gas emissions 40 percent (compared to 1990 levels) by 2030, and 80 percent by 2050. As part of this, Cuomo sought to have 50 percent of the electricity used in New York come from renewable energy sources by 2030, a policy also known as "50 by 30."[7] Cuomo's plan also called for collecting $5 billion from ratepayers over 10 years to bankroll a separate Clean Energy Fund.

In December 2015, the governor directed the PSC to develop a Clean Energy Standard combining the 50 by 30 goal with support for continued operation of three money-losing upstate nuclear plants.[8] These plants—James A. FitzPatrick Nuclear Power Plant, R.E. Ginna Nuclear Power Plant, and Nine Mile Point Nuclear Generating Station—provided some of the "zero-emission" energy on which Cuomo's plan relied, but faced closure because they could not sell electricity at competitive rates.

2. THE NEW "STANDARD"

On August 1, 2016, after less than eight months of review and public discussion, the Public Service Commission voted to enact a Clean Energy Standard consistent with the governor's directive.[9] The standard applies to all private and public electric utilities, and to all customers purchasing electricity directly from the New York Independent System Operator (NYISO), the non-profit entity that oversees the state's wholesale electricity market. Starting in 2017, these "load-serving entities" will be required to purchase increasing amounts of "renewable energy credits," or RECs, from NYSERDA, from renewable generators themselves, or from an intermediary.

Utilities will pass added costs to ratepayers—the residential, commercial, and industrial customers to whom they sell electricity. The state will presumably use the proceeds from RECs to directly subsidize renewable energy producers, although the exact mechanism has not yet been determined.

The standard also requires utilities to support, through the purchase of "zero-emission credits," or ZECs, the operation of money-losing upstate nuclear power plants. However, nuclear power will not count toward the governor's 50 by 30 goal.

The cost question

New York residents and businesses, especially downstate, already pay some of the highest electricity rates in the country, as illustrated in Figure 1.[10] These rates reflect the cost of electricity generation ("supply") and transmission ("delivery"), compounded by high local prop-

erty tax rates on power plants, transmission rights-of-ways, and substations.

With the exception of large hydroelectric plants, renewable energy is typically not cost-competitive with energy generated from conventional sources such as natural gas. At current prices, boosting the renewable component to 50 percent would effectively double the cost of generating electricity in New York (see Appendix). That figure does not include the cost of needed additional transmission lines or the backup generating capacity needed to produce electricity when the wind slows or clouds roll in.

Added costs associated with the Clean Energy Standard won't be broken out on utility bills, but will be passed along to consumers as utilities are forced to acquire RECs and ZECs. The significant change in the mix of suppliers also will necessitate upgrades to the electric grid that are likely to further push up costs.

The PSC initially estimated that the new standard would add less than $1 to the average monthly residential electricity bill, while the governor more recently put the figure at less than $2 a month.[11,12] The methodology behind these estimates has never been made public. In fact, as explained below, the actual cost is likely to be higher.

NYSERDA has not yet set a price for RECs, but the renewable standards in place in three New England states give an indication of what New Yorkers can expect to pay. Since 2013, RECs in Connecticut, Massachusetts, and Rhode Island have consistently cost more than $40 per megawatt-hour.[13] Assuming New York's RECs also cost $40, the five-year cost of the Clean Energy Standard will be more than $3 billion, as shown in Table 1.

Using the PSC's math, the impact on the "average residential customer's bill" will exceed $2 a month by the second year of the plan's 13-year implementation period.

50 percent of what?

Demand for electricity across New York State is a crucial variable in the "clean energy" equation. If demand is significantly greater than projected, it will require utilities to rely on renewables to supply half the added power. In the absence of countervailing factors, the PSC-mandated shift to renewable power chasing a limited supply of renewable capacity actually will tend to drive prices higher.

The decision to adopt the standard was based on projections made by the PSC staff, not by the independent NYISO, which actually oper-

Table 1: Added Ratepayer Costs Due to Clean Energy Standard

	# of RECs needed	REC cost	ZEC cost	Total	Cost to avg residential user*
2017	974,000	$38,960,000	$482,762,640	$521,722,640	$1.96
2018	1,741,270	$69,650,800	$482,762,640	$552,413,440	$2.09
2019	3,124,100	$124,964,000	$541,036,620	$666,000,620	$2.52
2020	5,302,371	$212,094,840	$541,036,620	$753,131,460	$2.85
2021	7,530,642	$301,225,680	$590,472,840	$891,698,520	$3.40
			Five-year total	$3,384,966,680	

* Based on PSC assumption of 600 kWh per month for upstate residential users

Source: Public Service Commission, Order Adopting A Clean Energy Standard, Case 15-E-0302; assumes $40 REC price

ates and monitors the power grid. The PSC's projection of statewide demand for electricity in 2030 was a simple linear extension of the latest 10-year NYISO projection, which only runs through 2026.[14] The PSC also made highly optimistic assumptions about the state's ability to reduce electricity demand by promoting efficiency.[15] The efficiency target requires the state to significantly improve on what has been accomplished in eight years of its most recent energy conservation push.[16]

But in basing its model on NYISO calculations, then separately assuming successful energy efficiency programs, the PSC double-counted demand reductions already incorporated in the NYISO's projections.

Meeting the Clean Energy Standard's goals relies more on decreasing demand than on adding renewables.

The PSC's cumulative projected savings from reduced demand through efficiency are actually *larger* than the commission's baseline estimate of the new renewable generation capacity needed to meet the standard.[17] The PSC assumes that, by 2030, the total statewide demand for electricity will be 141 terawatt-hours, 12 percent below the 2015 level.[18] Half of that power—70.5 terawatt-hours—would need to be generated by renewable sources.

By comparison, New Yorkers used 36.8 terawatt-hours of renewable energy during 2015.[19] The 33.7 terawatt-hours of additional renewable energy necessary to meet the 50 by 30 goal is more than double the amount generated in 2015 by the state Power Authority's Niagara hydroelectric plant, the largest U.S. facility of its kind east of the Rockies.[20]

What if the PSC is overly optimistic in its assumptions about energy efficiency? In that case, demand could still be higher, compounding the needed increase in renewable generation. For example, if demand is 5 percent above the projection, utilities will have to purchase an extra 3.6 terawatt-hours of renewable energy, almost 15 percent more than the plan assumes.

The baseline for PSC calculations of existing renewable energy supply capacity is itself unclear. For example, electricity generated "behind" a home or business' electrical meter, such as power from rooftop solar panels, will not count toward the state's 50 percent goal. But the PSC has been inconsistent in the way it counts "behind-the-meter" renewable generation toward the state's total renewable energy production.

The bottom line is that future energy demand is notoriously difficult to predict. Predictions by the authoritative NYISO have been off by 7 to 10 percent.[21,22] If the calculations behind the Clean Energy Standard are off even by a smaller degree, they will fall far short of the 50 by 30 target—and may require an unobtainable amount of renewable energy.

Demand and capacity

Nearly all of the renewable energy currently sold in New York comes from hydropower, which has limited opportunity for growth.[23] As a result, the state will need to rely mainly on building wind turbines and solar panel farms to meet the renewable mandate.

Under its optimistic "base case" scenario, as shown in Table 2, the PSC suggests the plan will require 4,188 megawatts of land-based wind turbines, 1,000 megawatts of offshore wind turbines and 3,855 megawatts of utility-grade solar panels.[24]

Table 2: Additional Capacity Needs

	Needed Additional MWs	
	Base Case	High Load
Land-based wind turbines	4,188	5,738
Offshore wind turbines	1,000	1,554
Utility-grade solar panels	3,855	6,032

Source: Dept. of Public Service, Final Supplemental Environmental Impact Statement, Case 15-E-0302

To meet the first goal, the state's land-based wind power capacity would have to more than triple.[25] Assuming each new wind turbine could generate 2 megawatts, this would require building 2,094 wind turbines. The amount of land needed for additional wind turbines depends on local conditions, such as terrain and average wind speed. According to U.S. Department of Energy (DOE) calculations, New York's additional wind turbines would require between 196 and 922 square miles.[26]

Alternatively, based on land use at the state's largest existing wind farm, these added wind turbines would require 428 square miles, an area almost the size of Nassau County.[27] The PSC identified 370 prospective land-based wind turbine locations, but each would need to be approved by state and local authorities before construction could begin.[28]

The PSC's best case scenario would require added solar-power generating capacity equal to 200 times New York's largest existing solar panel farm.

New York utilities do not currently purchase electricity from offshore wind turbines—because there are none in the Northeast region.[29] The PSC has highlighted five areas in the Atlantic Ocean ideal for offshore sites, and a 15-turbine, 90-megawatt wind farm is now proposed 30 miles off the coast of Montauk within the easternmost zone.[30]

Meeting the 1,000-megawatt target would require construction of another 152 wind turbines of the same type off the coast of Long Island and New Jersey. (Offshore wind turbines can also be built on Lake Ontario; however, the PSC anticipates offshore wind development only in the Atlantic Ocean.[31])

To reach 3,855 megawatts of solar-energy capacity, New York would need nearly 200 times the capacity of its sole existing utility-grade solar power plant, which is located at Brookhaven National Laboratory on Long Island.[32] Based on that facility's size and production, and assuming it could be replicated elsewhere, these added solar farms would together cover 38 square miles—an area almost twice the size of Manhattan.

Such wind- and solar-power expansions obviously would require substantial new private-sector investments in an uncertain economic and regulatory climate. The willingness to make such investments has been limited: Even with extensive state and federal incentives, New York's grid effectively added no wind power capacity in 2015.[33]

Given the highly optimistic assumptions behind the best-case scenario, it's more likely that the commission's "high load" scenario will have to be met. That would require New York to add enough solar panels to cover an area larger than most upstate towns, 244 offshore wind turbines, and a total of 2,869 new land-based wind turbines.[34] Using the federal DOE estimate, these land-based wind turbines would cover an area between 277 square miles, the size of Putnam County, and 1,377 square miles—an area larger than all of Long Island.

Nonetheless, the PSC expects to double the rate at which new renewable capacity is added to the grid between 2017 through 2021, increasing renewable generation each year by 1,869,400 megawatt hours—about half of *all* the power generated from wind in New York in 2015.[35,36] And even if these individual renewable energy generators can be brought online to meet the PSC's arbitrary mandate, the power still needs to reach the customers.

3. TESTING THE GRID

Any major changes to the manner in which power is generated in New York must answer two important questions:

1. Can enough power be generated, when and where it's needed, to meet fluctuating demand?
2. Can the state's existing transmission network deliver that generated power?

In adopting the Clean Energy Standard, the PSC could not assure New Yorkers of an affirmative answer to either question.

Reliability

The operation of the electrical grid separately requires that a certain amount of generating capacity be available, but not in use, when demand reaches its daily peak. The size of this extra power margin depends on the reliability of generators at the time; because wind turbines and solar panels don't continuously produce power, the margin needed to back up renewables will be substantially higher than the reserve now needed to back up the state's current mix of generators.

The PSC has failed to provide for the standby power sources the electric grid will need to tap during periods when the wind is not blowing or the sun is not shining.

The margin, which has ranged from 15 to 18 percent for all New York power producers in recent years, will need to climb to between 40 and 45 percent to accommodate the Clean Energy Standard.[37] By the most conservative estimate—assuming the state actually meets its ambitious energy efficiency targets, and thus requires a margin of 40 percent—New York will still need to keep the equivalent of several upstate nuclear reactors available, but not necessarily in use, to back up new solar panels, wind turbines and other renewables. The standard has no provision to address this increased need—meaning the PSC has failed to plan for what happens when the wind is not blowing or the sun is not shining.

Daily demand on the electrical grid peaks each afternoon at about 175 percent of the normal load.[38] During those peak-demand periods, land-based wind turbines are expected to be operational only 14 percent of the time and solar farms only 45 percent of the time, according to the NYISO.[39]

In an ideal situation, energy could be stored when the sun is brightest and when wind conditions are optimal. However, the technology to do this remains limited. New York has a small amount of storage ability, such as the state Power Authority's hydroelectric facilities at Gilboa and Niagara Falls, which use surplus electricity to pump water to higher elevations, then allow it to flow back and turn turbines when electricity is needed.

In the absence of stored energy, utilities will need to rely on oil- or natural gas-fired generators to meet peak demand. These plants can't simply be turned on and off as needed: sudden starts cause considerable wear and tear, and it takes time to "ramp" them up to the needed power level—meaning they may end up operating, and emitting carbon dioxide, needlessly. Even when they aren't operating, these stand-by plants will have maintenance and upkeep costs—which ratepayers must cover in addition to the cost of added renewable generators.

After concerns about the intermittent nature of solar and wind power were raised by the NYISO, the PSC criticized the independent grid operator for having a "status quo outlook," writing in its final Clean Energy Standard order that concern about reserve margin and increased capacity requirements "seems misplaced."[40,41] However, the mechanisms cited by the commission as improving dependability, such as expanded power storage capacity, are not subsidized or encouraged by the standard.

The PSC has failed to heed lessons learned by other regulators who have steered electricity generation specifically toward renewables with unintended consequences. The German government, for example, promoted renewables in tandem with a movement away from nuclear energy, but still remains heavily dependent on coal-fired plants to meet peak demand.[42]

Transmission

The ability to transmit electricity between generators and customers is constrained, first and foremost, by physics: electrical lines can move only so much electricity at a time. What's more, the farther electricity needs to be transmitted, the more electricity is lost in the process.

The Clean Energy Standard will add to the existing challenge of moving power from distant generation sites to customers in the densely populated areas that can't or won't accommodate new plants. Downstate homes and businesses account for 65 percent of New York's peak demand, but downstate power plants are capable of providing only 52 percent of that demand.[43,44]

Governor Cuomo's 2012 proposal for an expanded "energy highway" seems to be going nowhere, although the 50 by 30 goal will add to transmission needs.

In 2010, when the NYISO studied the expansion of wind power, it raised concerns about transmission upgrades that would be necessary, and said significant changes to transmission lines would be necessary to "unbottle" the electricity generated by new wind turbines.[45]

Governor Cuomo's 2012 State of the State message proposed creation of an "Energy Highway," consisting of additional transmission lines from the Mohawk Valley through the Hudson Valley to the New York City suburbs.[46] At the time, Cuomo cited "an excess of generation capacity and tremendous wind power potential in Upstate and Western New York and north of the border in Quebec" coupled with "tremendous energy needs Downstate."[47] He cited this challenge again in his 2014 State of the State message, estimating ratepayers were overpaying $600 million a year because the power couldn't be moved downstate.[48]

In a December 2015 order designed to promote the building of new power lines, the PSC said existing lines across eastern New York were "persistently congested, and such congestion contributes significantly to higher energy costs and reliability concerns."[49]

However, local opposition has derailed proposals to expand power lines linking upstate New York power supplies to New York City customers. Also stalled is the proposed Champlain-Hudson Power Express line, which would transmit up to 1,000 megawatts of Canadian hydroelectric power to the New York City area.[50]

The PSC's increased focus on high-cost offshore wind turbines closer to the New York City metro area appears to acknowledge the continuing challenge of transmitting power from upstate to downstate New York. At the same time, however, the Clean Energy Standard would require even more upstate generation, including 70 to 84 percent of the solar capacity that would count toward the standard, according to a PSC estimate.[51]

All of New York's existing and proposed land-based wind turbines are located in rural Northern and Western New York.[52] All but three of 370 PSC-proposed sites for added land-based wind power are north of the Tappan Zee Bridge.[53]

The NYISO notes that, according to the PSC's projections, about 90 percent of New York's added renewable generation will be in upstate New York. NYISO estimated that the Clean Energy Standard would require 1,000 miles of additional high-voltage transmission lines on top of what is already planned.[54]

Even before the Clean Energy Standard, the 2015 State Energy Plan estimated that, over the next 10 years, New York utilities would need to invest more than $30 billion to replace aging transmission and distribution infrastructure. The push for renewables, entailing more generating plants in upstate New York, could increase these transmission costs.

4. MIXED PRIORITIES

Making utilities purchase renewable energy has the indirect effect of curbing carbon outputs, but the standard would have been more effective and less complicated if it had regulated these outputs directly.

The Clean Energy Standard is needed, Cuomo has said, to "combat climate change and the resulting extreme weather events" by reducing carbon dioxide emissions.[55] The PSC has focused on combatting the "global problem" of climate change while giving short shrift to dependability and transmission issues.[56]

The Clean Energy Standard could raise costs and reduce reliability while producing little or no change in emissions.

Yet even taken on its own terms, the new policy's impact will be microscopic in global terms. When fully implemented, the Clean Energy Standard is expected to reduce carbon dioxide emissions in 2030 by 23.6 million metric tons—an amount that, while seemingly impressive, equates to less than 0.3 percent of CO_2 emissions in China alone as of 2014.[57,58]

Further doubts about the potential net impact of the Clean Energy Standard have been raised by the so-called Multiple Intervenors, a group of high-volume power users in New York State. In comments to the PSC, the Multiple Intervenors noted that New York already participates in a multi-state carbon-limiting program, the Regional Greenhouse Gas Initiative (RGGI).

Unless changes are made to the RGGI, the group said:

> "[The Clean Energy Standard] likely would result in zero or an immaterial amount of net emission reductions because reductions achieved in New York simply would increase the number of available allowances in the other RGGI states. Were that to occur, there would be little to no net carbon reductions encompassing the RGGI states, and the benefits claimed in the Cost Study would be entirely or largely illusory."[59]

In sum, the Clean Energy Standard could raise electricity costs and reduce the grid's dependability while producing little or no change in the amount of carbon dioxide going into the atmosphere. Even accepting the premise that forced renewable usage is justified, it would have made more sense to steer utilities toward a fixed amount of renewable capacity or generation, rather than an arbitrary fraction of an unknown future demand.

The standard also drew an arbitrary line among renewables: only facilities that came online on or after January 1, 2015 are eligible to produce RECs that will count toward utilities' obligations.

At the same time, the State has a financial interest in giving preference to solar generation. It has invested $750 million in a Buffalo factory that will begin producing up to 1 gigawatt of solar panels annually, as federal incentives for residential solar installations continue to decrease.[60,61]

Furthermore, non-renewable plants will still be able to run and export their power—incentivizing *non*-renewable use in other states.

The standard was enacted in a rushed, opaque process. When the state's previous renewable policy was adopted in 2004, it followed 19 months of analysis and public discussion.[62] The Clean Energy Standard was enacted just eight months after proceedings began, and substantial changes were being made to the document in the days leading up to the August 1 vote to adopt it.[63] The public did not see the final adopted Clean Energy Standard until after the commission had voted to enact it.

Even as the process was unfolding, operators of upstate nuclear plants had begun threatening to shut down the plants unless a comprehensive subsidy structure was included.[64] Threats aside, though, the PSC was under no obligation to tackle the upstate nuclear plants concurrent-

ly with the governor's renewable energy goal.

The PSC's vote also came before the end of a two-year long review of the electrical grid by the NYISO that would have addressed the practicality of the standard itself.[65]

Several details of the standard remain undetermined—specifically, compliance costs. In its order, the PSC repeatedly acknowledged the need to revisit elements of the standard in the future, saying it "may decide to adjust near-term targets downward, increase obligations in later years, or focus on actions that can facilitate development."[66]

While the PSC has established procedures and conditions under which it will revisit the standard, the renewable requirements will remain in force until at least 2020, absent further action by the Commission.[67]

Going nuclear—and not

Governor Cuomo's carbon reduction goals were jeopardized when market conditions—particularly the plummeting cost of natural gas—made the operation of three upstate nuclear power plants unprofitable.

Entergy, the owner of the James A. FitzPatrick Nuclear Power Plant in Oswego County, unveiled plans in November 2015 to close the plant. Exelon, the operator of upstate's two other nuclear plants, R.E. Ginna and Nine Mile Point, had also signaled earlier in the year that it was considering mothballing the plants' three reactors. Beginning in January 2016, the PSC subsidized the operation of Ginna by levying a surcharge on Rochester Gas & Electric ratepayer bills, which was expected to collect over $100 million and keep the plant open through March 2017.[68]

The PSC plans to support the three upstate plants with up to $480 million in subsidies from New York ratepayers each year during 2017 and 2018, rising higher in 2019 and 2020 and reaching as much as $590 million per year for operations during 2021 and 2022.[69] To fund these subsidies, utilities across the state will need to purchase "zero-emission credits" from NYSERDA, effectively allowing the plants to continue selling electricity at a loss.

But if the standard were purely motivated by

lowering emissions, it would have unambiguously included other struggling nuclear plants, such as Millstone Nuclear Power Plant in Waterford, Connecticut, which are closer to New York City and Long Island than the upstate sites. In fact, it may have been more logistically and politically feasible for the PSC to seek to increase transmission capacity to Long Island from New Jersey and Connecticut via underwater cables than to build new power lines down the Hudson Valley.

Environmental considerations aside, the decision to subsidize the upstate nuclear plants amounts to a job-security program for the plants' 2,105 employees—at a cost to ratepayers of up to $229,000 per job per year.

Subsidies for money-losing nuclear plants also amount to a job-security program for the plants' employees—costing ratepayers statewide up to $229,000 per job, per year.

While supporting big subsidies for upstate nuclear plants in the name of promoting zero-emission electricity, the Cuomo administration has shown no sign of dropping its opposition to federal relicensing of Entergy's profitable Indian Point Energy Center, which operates two nuclear reactors in Westchester County—where retail electricity prices and demand already are much higher. In pushing for Indian Point's closure, Cuomo has cited "deep concerns about the management, maintenance, and equipment standards at this plant."

The governor hasn't always applied the same standard of concern to upstate and downstate nuclear plants. In June, for example, an Indian Point reactor was temporarily shut down after a water pipe began leaking. Cuomo immediately issued a statement describing Indian Point situation as a reminder of that plant's "direct and unacceptable impact on safety." The governor issued no statement when, on the same day as the Indian Point closure, the Fitzpatrick plant in Oswego had to shut down after losing power to some cooling systems and leaking oil into Lake Ontario.

Good carbon? Bad hydro?

Wind turbines and solar panels aside, some of the other renewable sources explicitly promoted by the Clean Energy Standard would actually generate greater carbon emissions. For example, "biogas" captured from decaying organic matter in landfills or produced in bioreactors from plant or animal waste is primarily composed of methane—the same compound that makes up natural gas. Electricity generated from burning biogas will count toward the standard, while natural gas will not.

Another PSC-approved renewable energy source is biomass, which effectively sanctions the practice of raising crops such as timber, grasses, and soybeans exclusively to burn them or their byproducts.

A 1998 report prepared for the U.S. Department of Energy cited numerous opportunities for New York to construct more hydroelectric dams, including one site on the Niagara River that would generate more electricity than 100 land-based wind turbines.[70] However, the Clean Energy Standard rejects additional hydroelectric production from new dams out of concern for methane emissions caused by flooding, offering no criteria to weigh that against potential benefits.[71]

These contradictions are indicative of a fundamental flaw in the policy: despite the governor's professed desire to help address global climate change, the Clean Energy Standard is designed primarily to promote renewables rather than reduce carbon emissions.

5. A BETTER WAY

The PSC called the 50 by 30 goal "a component of a larger statewide greenhouse gas goal … the product of a lengthy State Energy Planning process."[72] Audrey Zibelman, chairwoman of

the PSC, described the Clean Energy Standard as "an example of government recognizing that proposed actions to prevent climate change [are] now both a moral imperative, no longer a choice but a necessity, and an economic one."[73]

But as detailed in this paper, the standard does not directly address carbon emissions.

Instead, it mandates a significant expansion of renewable energy purchases by New York utilities, coupled with subsidies for upstate nuclear power plants. It effectively treats all conventional fossil fuel power sources as equally undesirable—missing an opportunity to promote the use of cleaner-burning natural gas, a goal previously reflected in both federal and state energy policies. It will, at best, have an insignificant impact on global carbon emissions—and might have no impact at all, since any emissions reduction achieved in New York may simply be displaced by an increase in allowable emissions in other states.

If the goal is to reduce carbon emissions, the Clean Energy Standard is not the right approach for getting there.

By focusing on an arbitrary percentage target for expanded renewable energy supplies, instead of a fixed amount of capacity or generation, the Clean Energy Standard has created a moving target that will be much more expensive and difficult to achieve.

By failing to address the need for upgrades to the statewide grid, especially between downstate and upstate, the PSC has failed to ensure that electricity generated by renewable sources will actually be able to reach places where demand is highest.

If reducing carbon emissions is truly the overarching goal of state policy, the PSC could better achieve it by making two fundamental changes to the standard:

1. Target carbon emissions rather than renewables. Give electric utilities leeway to determine how to reach emissions targets while minimizing the negative impact on ratepayers. They could achieve this not only by promoting renewable generation, but also by encouraging energy efficiency and equipment upgrades. Emission allowances, such as those established under RGGI, would have harnessed market forces to achieve both efficiency and lower emission goals. The PSC also needs to recognize that any effort to reduce emissions may be futile unless RGGI is modified to prevent other states from generating more carbon dioxide even as New York strives to reduce emissions.

2. Move electrons, not cash. New York's energy policies already have distorted the market in which upstate nuclear plants, and even certain renewable generators, are struggling to compete. The state's ReCharge NY program, for example, is providing some businesses with subsidized electricity through the state Power Authority in greater amounts than the struggling R.E. Ginna Nuclear Power Plant is generating.[74,75]

Subsidies scheduled to flow to Exelon for upstate nuclear plants in just the first six years of the standard far exceed the cost of major transmission upgrades that would deliver upstate nuclear power to downstate New York. These upgrades are also needed to move electricity from existing upstate-based renewable generators to downstate customers.

Regulatory overreach

The manner in which the Clean Energy Standard was conceived, developed and adopted also raises a fundamental question about democratic control and governance in New York State.

The Public Service Commission was created in the early 20th century to oversee the state's nascent electric utilities, which were then monopolies selling power to captive end-users at rates of their choosing. State law gives the PSC the power to oversee the "manufacture, conveying,

transportation, sale, or distribution" of electricity, among other things.[76]

Much has changed, however, since the laws governing New York's electricity market were reformed in the 1990s. Electricity is now sold in a competitive wholesale market overseen by the NYISO. This market connects customers with the lowest available cost while also providing crucial signals to the private sector, spurring investment in response to demand.

While the PSC's regulatory functions are still needed in overseeing the transmission and retail components of electricity delivery, no consumer interest is served by having the PSC interfere with the wholesale market, which is regulated by the federal government.

Decisions as far-reaching as the Clean Energy Standard should be made by the Legislature, not a panel of gubernatorial appointees. To prevent the PSC from imposing other expensive, disruptive, and poorly designed standards, the Legislature should modernize the statutes that outline the commission's authority, and restrict its ability to interfere with the wholesale electricity market.

Separately, the PSC has levied a series of "surcharges"—in effect, taxes—on ratepayers. As documented in this report, through the Clean Energy Fund alone, the PSC is on track to take $500 million per year from ratepayers and spend it without a single vote from the Legislature.

The ability of the PSC to levy such surcharges should be eliminated, and the power should be reserved for the elected representatives in the state Legislature.

CONCLUSION

Energy is the lifeblood of a modern economy. For New Yorkers, in particular, it is also a major component of the cost of living and doing business.

New York residents and businesses are already paying some of the highest electricity prices in the nation. The Clean Energy Standard is likely to drive prices much higher while producing little, if any, progress towards the goal of reducing carbon dioxide emissions.

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APPENDIX:
COST ESTIMATE METHODOLOGY

Costs were calculated for different generation types by determining the premium, or difference, between renewable generation costs and the 2015 average wholesale cost of electricity ($37.41 per megawatt-hour (MWh), or 3.74 cents per kilowatt-hour (kWh)).[1] The amount of electricity from each generating source under the "high load" case described by the PSC was used to weight the impact of these premiums.

For **solar**, the premium was based on the difference between the cost of electricity under the Long Island Solar Farm power purchase agreement and the average wholesale price. The site was the only utility-grade solar generation in operation in New York State during 2015.

The Long Island Solar Farm was paid $13.7 million by the Long Island Power Authority during 2015, when it produced 52,287 MWh of electricity.[2,3] This equates to a price of 26.2 cents per kWh, or a premium of 22.4 cents per kWh. For **wind, biogas, biomass, and hydro**, the premium was the supplemental payment offered by the Renewable Portfolio Standard in order to make these types of generators competitive on the open market.[4] These supplements have varied over time and between different generation types. NYSERDA, which oversees the RPS, does not report the amounts spent on individual projects; instead, a weighted average per-megawatt-hour amount is given for several projects at a time.

There is currently no **offshore wind generation** producing electricity in the U.S. The closest to operation is the Block Island Wind Farm, off Rhode Island, which was in the final phases of construction during the summer of 2016. The operator of the wind farm has signed a power purchase agreement (PPA) for 24 cents per kWh, though the agreement allows that price to rise in the future.[5] This gives a premium of 20.3 cents per kWh.

Nuclear Subsidies

In 2017, the PSC plans to subsidize upstate nuclear plants at a rate of $17.48 for each megawatt-hour generated.[6] During 2015, that was 27.6 million MWh, for a total first-year cost of $482 million.[7] Based on the state's 2015 demand (163 million MWh), this equates to 0.3 cents per kWh.

Using the PSC's model for an average upstate household, using 600 kWh, this would have equated to more than $280 in added annual costs during 2015.

Costing Out Renewables at 2015 Prices

New generation source	*Premium (per kWh)*	*Share of 2015 total generation*
Utility-grade solar	22.4 cents	11.8%
Land-based wind, biogas, biomass, hydro	2.1 cents	7.1%
Offshore wind	20.3 cents	4.1%
Imported	0	1.7%
Impact of renewables	3.6 cents	24.7%
Nuclear subsidies	0.3 cents	n/a
50% Renewables @ 2015 prices		3.9 cents

Other assumptions:

- Imports of renewables from neighboring grids could increase while remaining at the same cost.
- This model uses the PSC's assumption about the profile of renewables that would be used under the "high load" case.
- Statewide average wholesale price of electricity during 2015, as reported by the NYISO; substantial regional differences exist.
- All utilities can purchase RECs without making penalty payments to NYSERDA.

Excluded from assumptions:

- Federal tax credits that also supplemented RPS projects, such as the Renewable Energy Production Tax Credit—which, for example, comes to 2.3 cents per kWh for wind projects.
- The added cost of keeping non-renewable, non-nuclear assets available but not necessarily generating power.
- Added transmission or storage costs, which could be considerable.

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