# NEW YORK STATE RESPONSE TO ECONOMIC CHALLENGES OF THE EXISTING NUCLEAR FLEET

C2ES SOLUTIONS FORUM

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Since late 2012, five power companies retired six nuclear reactors in the United States. Across the country, an additional seven reactors are scheduled to be closed by 2025, including two at the Indian Point Energy Center in Buchanan, New York. If this trend continues or accelerates, there could be serious climate implications. Nuclear power supplies 20 percent of total U.S. electricity production, but it supplies 57 percent of zero-carbon electricity.[1] As all recent U.S. nuclear retirements have led to increased fossil fuel-fired generation, any additional loss of nuclear generating capacity could be expected to increase carbon dioxide emissions.[2] Preserving the existing U.S. nuclear reactor fleet for as long as possible is a critical element in the transition to a low-carbon future.

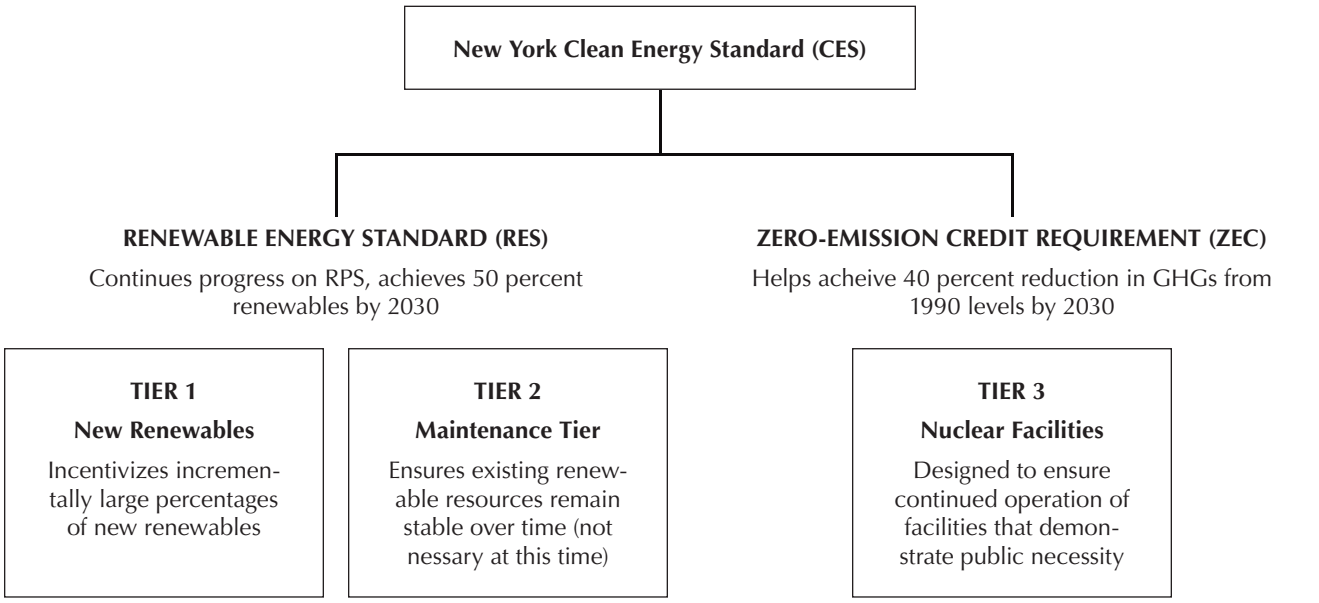
Nuclear power faces many economic challenges, including sustained low natural gas prices, declining renewable energy costs, slower growth in electricity demand, power market structures that do not place a value on zero-carbon baseload power, and the absence of a price on carbon. Additionally, life-extending capital investments, mandated post-Fukushima safety enhancements, and other maintenance activities are adding to plant costs. Though this issue has been prominent for several years, and nuclear power enjoys bipartisan support in Congress, a national response has failed to emerge.

In the absence of a federal remedy, states like Connecticut, Illinois, New Jersey, New York, Pennsylvania, and Ohio are showing leadership through various efforts to preserve the existing nuclear fleet. New York, which gets nearly a third of its electricity from nuclear, has had a mixed response to the economic woes of its existing nuclear fleet. In the past two years, New York crafted a clean energy standard (CES) that included, among other things, compensating its economically challenged reactors specifically for the zero-emission, environmental benefit they provide. On the other hand, in January 2017, Governor Andrew Cuomo finally achieved his long-held ambition of shuttering the Indian Point Energy Center, a nuclear plant 30 miles north of New York City responsible for 11 percent of the state's electricity generation.[3]

## CLEAN ENERGY STANDARD

In August 2016, the New York State Public Service Commission (PSC) adopted a clean energy standard (CES) mandating that 50 percent of New York's electricity come from renewable energy sources, including hydro, wind, and solar by 2030.[4] The CES was developed at the request of the governor to convert a State Energy Plan goal into an enforceable set of requirements.[5] The CES is divided into two separate parts—a renewable energy standard (RES) and a zero-emission credit (ZEC) requirement for existing nuclear power (Figure 1). The RES represents a continuation of the state's renewable portfolio standard (RPS), and is comprised of two tiers. Tier 1 is designed to support the addition of incrementally larger percentages of new renewable electricity resources and Tier 2 is meant to ensure that existing renewable electricity resources would remain stable over time. Finally, Tier 3, or the ZEC requirement, a wholly independent component of the CES, is designed to ensure the continued operation of the state's nuclear facilities by expressly valuing their environmental contribution, an aspect that energy markets currently do not take into consideration. Maintaining the nuclear fleet, in addition to the RES, will help the state achieve its economy-wide goal to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030.

**FIGURE 1: New York's Clean Energy Standard (CES)**




The CES is divided into two parts, a renewable energy standard (RES) and a zero-emission credit (ZEC) requirement, each with its own compliance mechanism. There are no interactions between the two parts.

## HISTORY

New York state has been a leader in setting ambitious climate goals. In 2004, New York's PSC adopted an RPS, which required that 25 percent of the state's electricity come from renewable sources by 2013.[6] In January 2010 (also by order of the New York PSC), the requirement was expanded to 30 percent by 2015—a target that was not met.

In 2005, New York was among several northeastern and mid-Atlantic states that joined the Regional Greenhouse Gas Initiative—a cap-and-trade program to limit carbon dioxide emissions in the electric power sector.[7] Some analysis prior to the launch of program projected that existing and additional nuclear reactors would be necessary to achieve the program's sought-after emissions reductions by 2020.[8] However, most of the reductions to date have resulted from a shift to natural gas from coal and fuel oil, and reduced demand.[9] Existing and new nuclear could play an important role if the RGGI cap is lowered significantly after 2020.

In 2014, as a response to the vulnerability of its aging energy infrastructure to Hurricane Sandy, New York launched Reforming the Energy Vision (REV)—a fundamental shift from the traditional utility model. REV encourages modernization and more efficient use of energy and focuses on delivering environmental goals and more robust service.[10] The following year, a multiagency collaboration developed the State Energy Plan, which serves as a roadmap to realize the REV agenda.[11] The plan's goals include a 40 percent reduction in greenhouse gas emissions from 1990 levels by 2030, an 80 percent reduction by 2050, 50 percent electricity generation from renewable sources by 2030, and a 23 percent decrease in buildings' energy consumption from 2012 levels by 2030.[12]

In 2015, Governor Cuomo directed the Department of Public Service to design and enact a CES.[13] In January 2016, the department released a white paper detailing how the CES would function and help achieve New York state's objectives.[14] The white paper was followed up with a CES cost study and additional details regarding the zero-emission credit program.[15, 16] After receiving numerous comments, the PSC issued an order adopting the CES in August 2016. Importantly, the PSC recognized

the significant value of existing nuclear "as a bridge to a renewable future" and said that maintaining this source of zero-emission generation was key "to avoid backsliding in the State's efforts to reduce carbon emissions" (i.e., prematurely retired nuclear power plants, in the short-term, would be replaced with fossil-fueled electricity, resulting in increased emissions.)[17]

## CLEAN ENERGY STANDARD

The CES is divided into two separate parts—a renewable energy standard (RES) and a zero-emission credit (ZEC) requirement for existing nuclear power (Figure 1).

### *Renewable Energy Standard (RES)*

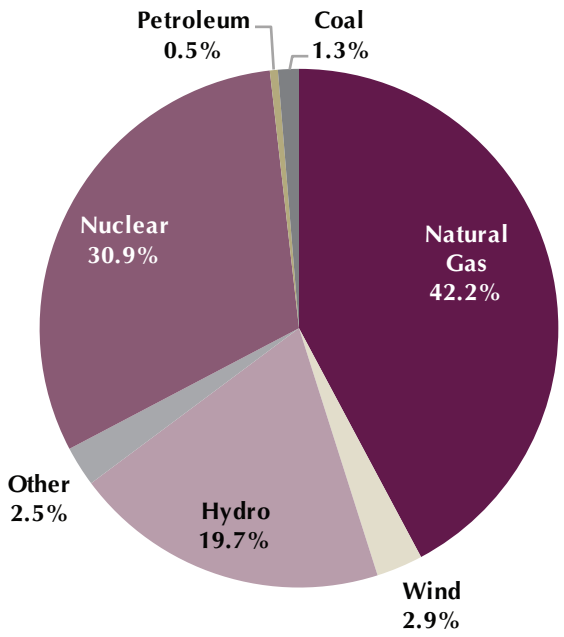
The Renewable Energy Standard (RES) portion of the CES provides a roadmap to achieve the goal of generating 50 percent of New York's electricity from renewable sources like hydro, wind, and solar. In 2016, New York got about one-quarter of its electricity from renewable sources, including 19.7 percent from hydro, 2.9 percent from wind, 1.7 percent from biomass, and 0.1 percent from solar power.[18]

The RES aims to achieve the 50 percent goal by ratcheting up the percentage of new renewables while maintaining the present level of existing renewables.

Tier 1 is designed to support the addition of incrementally larger percentages of new renewable electricity resources. The obligation to procure the new resources is on entities that serve retail load (e.g. a utility) across the state and on retail customers directly self-supplying (e.g., public power cooperatives or other large customers) through the New York Independent System Operator (NYISO)—the operator of New York's electricity grid and wholesale power market. Beginning in 2017, each designated entity (e.g. utilities, cooperatives, and self-supplying large customers) will be required to procure 0.6 percent of its total load from new renewable resources, increasing to 4.8 percent by 2021. Percentages required for the 2022 through 2030 period will be established at a later date through a triennial review process.

Renewables that began operation on or after January 1, 2015, are eligible for Tier 1 compliance. Eligible resources categories include biogas, biomass, liquid biofuels, fuel cells, hydroelectric, solar, tidal/ocean, and wind.[19] [20] New resources can be developed out of state if they are in an adjacent control area (i.e. geographically contiguous) to the NYISO. Additionally, out-of-state generation must be linked contractually between the generator and in-state purchaser of the electricity.

**FIGURE 2: New York In-State Electricity Generation 2016**




*Source: U.S. Energy Information Administration (2017)*

Tier 2 was proposed in a January 2016 staff white paper to ensure that existing renewable electricity resources would remain stable over time. The order adopting the CES noted that a new maintenance tier (i.e., Tier 2) is not necessary at this time, and that support for resources will continue as it existed under the current RPS.

### *Zero-Emission Credits (ZECs)*

Tier 3, a wholly independent component of the CES, is designed to ensure the continued operation of the state's nuclear facilities. Nuclear power provides about 31 percent of the state's electricity generation.[21] The state's six reactors avoid the emission of more than 15 million metric tons of carbon dioxide per year.[22] Incongruously, in a deal struck earlier in 2017 between the state and the plant operator, the Indian Point Energy Center responsible for 11 percent of the state's electricity generation will be closed prematurely in 2020 and 2021 for economic

## TABLE 1: Nuclear Power in New York State in 2016

| SITE | YEAR OPERATIONAL | CAPACITY (MW) | GENERATION (GWH) | CAPACITY FACTOR (%) | LOCATION |
|---|---|---|---|---|---|
| FitzPatrick | 1975 | 837 | 5,874 | 79.9 | Scriba |
| Ginna | 1970 | 582 | 5,070 | 99.2 | Ontario |
| Indian Point | 1974, 1976 | 2,055 | 15,126 | 83.8 | Buchanan |
| Nine Mile Point | 1970, 1988 | 1,924 | 15,500 | 91.7 | Scriba |

Indian Point and Nine Mile Point each have two reactors, while FitzPatrick and Ginna are single reactor sites.

*Source: U.S. Energy Information Administration (2017)*

reasons.[23] This will make it more challenging for New York to realize its 2030 greenhouse gas reduction target.

In its *Order Adopting a Clean Energy Standard*, the PSC cited the premature closure of nuclear power plants and the subsequent increased reliance on existing and new fossil fuel generation as a key rationale for establishing ZECs.[24] The order also articulates that ZECs are purely a mechanism for compensating nuclear power for its environmental attribute, an aspect that wholesale power markets currently fail to reward.

ZEC payments will be made to qualifying facilities that meet public necessity criteria. Public necessity is determined by the PSC on a plant-by-plant basis, considering the adequacy of the facility's current revenue streams to sustain its zero-emission value, its historic contribution to the state's clean energy mix, and its impact on ratepayers, among other things.[25] Only upstate reactors (i.e., FitzPatrick, Ginna, and Nine Mile Point) were considered for receiving benefits (i.e., ZECs) because the owner of Indian Point did not assert that its facility was at risk.[26] This does not explicitly exclude Indian Point from receiving ZECs in the future, if conditions should change.

### ZEC pricing

Qualifying facilities will receive ZEC payments from April 1, 2017, through March 31, 2029.[27] The ZEC price for the first of six, two-year periods has been set at $17.48/MWh (Table 2). The ZEC price is calculated as: (1) the projected average social cost of carbon (SCC) over the tranche period ($42.87/short ton) minus (2) a fixed baseline portion of that cost that is captured through the Regional Greenhouse Gas Initiative over the same period ($10.41/short ton), which is $42.87 - $10.41 or $32.47/short ton.[28, 29] A conversion factor (i.e., $/short ton to $/MWh) of 0.53846 is applied (i.e., $32.47 times 0.53846) to arrive at the $17.48/MWh ZEC price.[30] The conversion factor is based on the mix of resources avoided (i.e., natural gas, coal and oil on the margin) by preserving nuclear power, and is derived from a 2015 study on net energy metering.[31]

Future ZEC payments for tranche 2 through tranche 6 are to be determined (TBD), but will be based on the same general methodology, (i.e., projected average SCC over the tranche period minus the baseline RGGI effect minus the "amount that the Zone A forecast energy price and rest of state (ROS) forecast capacity price combined exceeds $39/MWh" is equal to the ZEC price.)[32] Estimates of the total cost of the ZECs over the 12-year period depend on future energy prices and range from a high of $7.6 billion to as low as $2.86 billion.[33]

### Other details

- The total amount of ZECs to be purchased on an annual basis is capped at 27,618,000 MWh, which is based on the historical annual output of the upstate nuclear facilities.[34]
- The New York State Energy Research and Development Authority (NYSERDA) will administer ZEC contracts.[35]
- Obligated entities, those that serve retail load (e.g. utilities) across the state and retail customers directly self-supplying (e.g. large customers) through the NYISO, will make ZEC purchases by contract with NYSERDA and recover costs

**TABLE 2: ZEC Periods and Pricing**

| TRANCHE | START DATE | END DATE | PRICE |
|---|---|---|---|
| 1 | April 1, 2017 | March 31, 2019 | $17.48 per MWh |
| 2 | April 1, 2019 | March 31, 2021 | TBD |
| 3 | April 1, 2021 | March 31, 2023 | TBD |
| 4 | April 1, 2023 | March 31, 2025 | TBD |
| 5 | April 1, 2025 | March 31, 2027 | TBD |
| 6 | April 1, 2027 | March 31, 2029 | TBD |

*Source: Order Adopting a Clean Energy Standard (2016)*

through charges on customer bills.[36]

- The SCC is based upon the value determined by the Interagency Working Group on the Social Cost of Carbon.[37] The SCC is an estimate of the damages resulting from incremental increases in carbon dioxide emissions in a given year.

## OTHER STATE ACTIVITY

Other states are following New York's example. Illinois passed a law in December 2016 to support two (i.e., Quad Cities and Clinton) of its six nuclear power plants with ZEC payments in a similar fashion to New York.[38] Connecticut has tried in its past two legislative sessions to provide economic support for its Millstone Nuclear Power Station.[39] Additionally, New Jersey, Ohio and Pennsylvania are exploring options to support their nuclear reactors.

State action to support environmental objectives is not without controversy. Legal challenges are pending in Illinois, New York, and at the Federal Energy Regulatory Commission (FERC), which is responsible for oversight of wholesale power market operations (i.e., NYISO). Some market participants argue that around-market subsidies (e.g., ZECs) are creating unfair price distortions.

## CONCLUSION

Nuclear power, the United States' largest source of zero-emission electricity, must play a role in any long-term, low-carbon climate strategy. In Congress, there's bipartisan support for preserving existing nuclear plants, and spurring the research and development that will lead to the next generation of nuclear energy. Although no national approach to preserving existing nuclear plants has emerged, states like New York are showing leadership. To maintain the low-carbon benefits of its economically troubled upstate reactors and ensure its electricity mix becomes increasingly clean—with no backsliding—New York's PSC approved a CES in August 2016.

While most agree on the importance of signals and goals to support increasing quantities of clean energy, all parties do not agree that New York's approach is the best way to get there. Increasingly, it's becoming clear that state environmental goals, businesses desire for transparent, fair markets, and FERC's mission to ensure just and reasonable electricity rates need to be harmonized.

## ENDNOTES

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The Center for Climate and Energy Solutions (C2ES) is an independent, nonpartisan, nonprofit organization working to forge practical solutions to climate change. Our mission is to advance strong policy and action to reduce greenhouse gas emissions, promote clean energy, and strengthen resilience to climate impacts.

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