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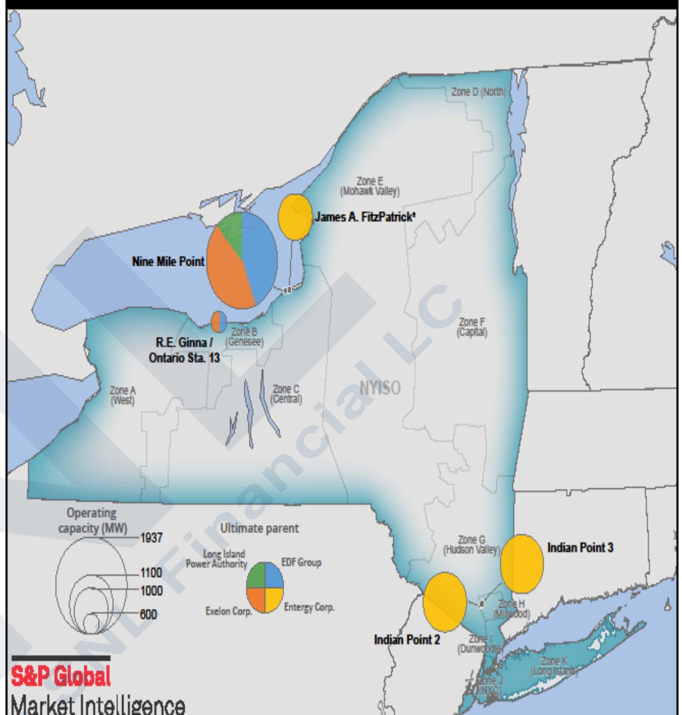
The New York Clean Energy Standard—A 360 View

Overview

The New York Public Service Commission's recently approved Clean Energy Standard, or CES, calls for 50% of New York's electricity to be procured from renewable energy sources by 2030, and creates a zero-emissions credit, or ZEC, framework. The objective of this framework is to preserve the environmental attributes of zero-emission nuclear-powered generating facilities operating within the state. But this step may have broader implications for energy markets, and regulatory constructs nationwide.

Owned capacity of operating NY nuclear plants (MW)



As of Aug. 3, 2016.
* This plant is the target of a potential acquisition by Exelon Corp.
Source: SNL Energy, an offering of S&P Global Market Intelligence
Map credit: Elizabeth Thomas

Weak demand and abundant natural gas reserves due largely to the shale gas boom have driven down wholesale power market prices, thereby pressuring the economic viability of nuclear plants. Passage of the ZEC framework marks the first time that a state commission has recognized the zero-carbon-emitting attributes of nuclear facilities by adopting a policy to ensure the continued operation of the facilities.

The ZEC framework is expected to have a significant impact on the energy landscape in New York, and once the dust settles from any legal challenges that may ensue, could, further serve as a model for other states with nuclear facilities that are at risk of closing due to cost challenges.

Radically Reshaped Generation Market

The CES will have profound effects on the current and future installed generation base within the New York ISO, or NYISO, region. The order lays out a path for continued operation of the deemed "at-risk" upstate nuclear facilities including the 852 MW James A. FitzPatrick plant, the 582 MW R.E. Ginna plant, and the 1,937 MW Nine Mile Point.

The nuclear plants, in conjunction with Indian Point 2 and Indian Point 3 represent over 5,000 MW of merchant capacity, and generate 34% of the state's electricity. Exelon Corp. subsidiary Exelon Generation owns the Ginna plant in conjunction with EDF Group subsidiary EDF Inc., and Nine Mile Point with both EDF and the Long Island Power Authority. Entergy Corp. is the ultimate owner of the Fitzpatrick and Indian Point facilities. Under the ZEC framework, subsidies are to be offered to nuclear generating facilities that may otherwise be retired.

NY Operating Nuclear Plants

Power Plant	Ultimate Parent(s)	Operating Capacity Ownership (%)	Owned Operating Capacity (%)
Indian Point 2	Entergy Corp.	100.00	1,031
Indian Point 3	Entergy Corp.	100.00	1,047
James A. Fitzpatrick	Entergy Corp.*	100.00	852
Nine Mile Point	Exelon Corp.	43.97	852
	EDF Group	43.95	851
	Long Island Power Authority	12.08	234
R.E. Ginna/Ontario Sta. 13	Exelon Corp.	50.01	291
	EDF Group	49.99	291

* A transaction to sell plant to Exelon Corp. is pending
Source: SNL Energy, an offering of S&P Global Market Intelligence

In addition, the PSC CES order approved a plan to supply 50 percent of retail electric load with renewable energy generation by 2030, called the "50 by 30 mandate". The CES aims to achieve the goal of continued production by nuclear facilities and accelerated renewable energy growth by creating three tiers for compliance.

- Tier 1 creates a system for incremental renewable energy credits, or RECs, from resources that came into operation after January 1, 2015; this represents the basis for implementation of the 50 by 30 mandate.

- Tier 2, which was deemed not necessary at this time and thus has no proposed payment system, was intended as a maintenance tier for support to existing renewable energy generation.

- Tier 3 creates support payment mechanisms based on zero emission credits (ZECs) for existing nuclear facilities that demonstrate "public necessity" This currently only applies to the three upstate nuclear facilities. Load Serving Entities, or LSEs, are required to purchase ZECs in proportion to load served and pass through costs to ratepayers using a commodity charge. The ZEC obligation is separate from the Tier 1 REC obligation. The Tier 3 ZEC payments to nuclear generating facilities provide a payment of \$17.48/MWh for Tranche 1, 2017 through 2019, based upon the following formula:

$$\text{Upstate ZEC Price Tranche 1}\left(\frac{\$}{\text{MWh}}\right)$$
$$= \text{Social Cost of Carbon}\left(\frac{\$42.87}{\text{short ton}}\right) - \text{Baseline RGGI Effect}\left(\frac{\$10.41}{\text{short ton}}\right)$$
$$- \text{Amount by which Zone A Forecast Energy Price and ROS Forecast Capacity Price exceeds } \$39/\text{MWh}$$

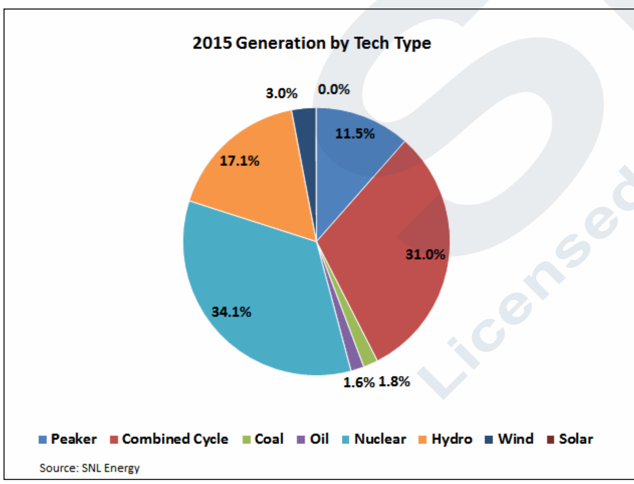
Source: NYPSC, *Order Adopting a Clean Energy Standard*

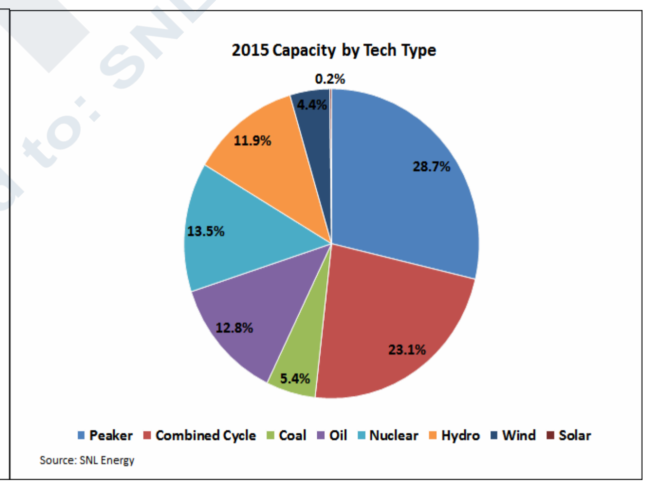
The factor to convert \$/short ton to \$/MWh is 0.53846 per the PSC.

Nuclear generation market impacts

Exelon and Entergy announced their intention late last year to retire the combined 3,370 MW of nuclear capacity by the end of 2017, based on refueling schedules, if no financial support was provided. They contended that the plants could not cover total O&M costs through the revenues provided by the current wholesale power and capacity markets alone.

Nuclear capacity makes up 13.5% of capacity within New York, accounting for 34.1% of energy generation. If 62% of the nuclear capacity retired by year-end 2017, the consequences for NYISO would be significant.





Without these plants, SNL Energy estimates that wholesale around-the-clock prices within NYISO would increase an average of 7% from 2017 to 2019 over the baseline Q2-2016 SNL Power Forecast. Furthermore, the region's reserve margin would drop to 6% absent replacement capacity. The NYISO installed capacity margin requirement is 17.5%, so this shortfall would have created immediate reliability concerns.

With the ZEC providing enough financial support to keep the upstate nuclear plants online, the resulting generation mix represents a more business-as-usual case, exclusive of the Tier 3 program, with regard to operation of the nuclear plants. It also stabilizes energy prices in the near term, and keeps system reliability metrics with NYISO limits.

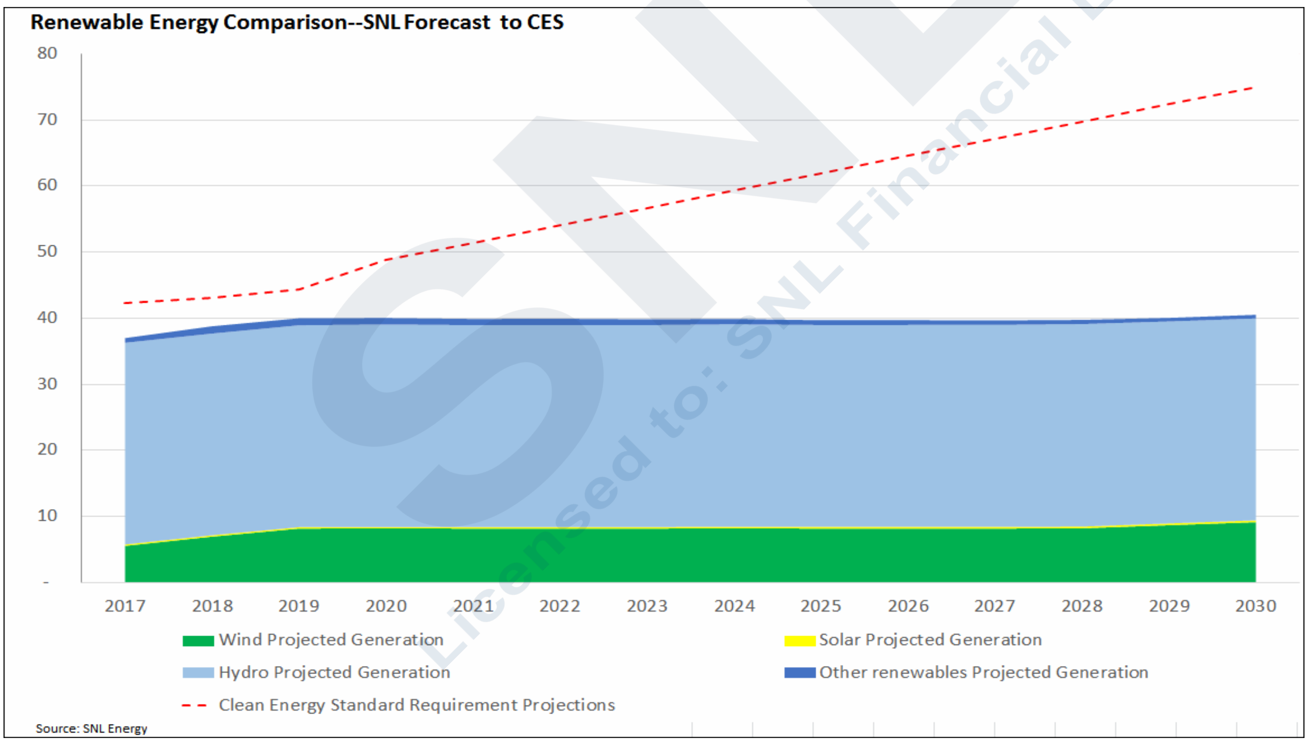
Tranche 1 of the ZEC, which covers April 2017 to March 2019, will pay the at-risk plants a premium of \$17.48/MWh, or over \$490 million, to the three plants based on 2015 generation. The premium has the potential to rise as high as $29.15/MWh in 2028 and 2029 of the program based on benchmark Zone A forecast wholesale prices and forecast NY Rest-of-System, or ROS, capacity prices of $39/MWh.

While a white paper issued by the PSC assumes that the ZEC price will escalate, SNL Energy forecasts that the combined Zone A and NY ROS capacity prices for the Tranche 2 and 3 periods will drop the price of ZECs to $16.5/MWh and $9.72/MWh respectively. This is largely due to the nominal Zone A energy price forecast to increase from $31/MWh to $41/MWh and the nominal ROS capacity price increasing from an equivalent $5.6/MWh to $9.0/MWh by 2023. The near term energy prices are depressed due to low natural gas prices. Given the increase in prices for energy and capacity, the ZEC price decreasing in value over time will still put the plants revenue above projected total O&M costs.

However, these forecast prices could change materially with the inclusion of the large renewable build-out required by the Tier 1 REC program.

Renewable Energy

While the Tier 3 ZEC program keeps the nuclear generation within the state operating, the far greater potential effect to generation mix is due to the Tier 1 program for RECs. The current schedule of REC procurement under the new program will require almost 2.4 times the amount of renewable energy to be procured from 2017 to 2021 than the renewable portfolio standards, or RPS, solicitations from 2011 to 2015. Approximately 15 GW of renewable capacity will have to be built by 2030 to meet the requirements of the Tier 1 REC solicitation schedule. Approximately 35 million more MWh will have to be procured than the SNL Energy's Q2 2016 forecast generation. Based on a NYISO system load of 150 million MWh per year in 2030, as stated by the NY PSC order, this represents a 4.2% average annual growth rate of renewable energy generation, a significant investment. The order highlights the potential for periodic revision of the procurement targets based on projected load change.



Eligible resources for the CES do not include any new impounded hydroelectric plants, so the majority of the generation is expected to come from wind, solar, and biomass/other renewables.

Gas-fired Generation

The combination of the Tier 1 REC and the Tier 3 ZEC programs provide no incentives for gas-fired power generation, which accounted for 42.5 percent of 2015 electricity production in NYISO. Under the business as usual scenario without the CES, no new major combined cycle projects are projected to be built within NYISO through 2030, yet the total energy generation by natural gas was expected to increase by a modest 1 million MWh. Given the requirements under the CES, natural gas-fired generation would have to decrease to approximately 23 million MWh from the 2015 baseline of 55 million MWh to accommodate the Tier 1 renewable generation.

While maintaining the financial viability of upstate New York's nuclear fleet may seem like conservative energy policy, the overall impact of the CES may in fact drastically re-shape the state's generation mix.

Public Policy/Regulatory Impacts and Implications

History

The CES proceeding was initiated on Jan. 21, 2016, when the PSC commenced a review to consider implementation of a state energy mandate by Gov. Andrew Cuomo, a Democrat, that 50% of electricity consumed in New York be derived from renewable energy resources by 2030. The CES builds on the state's renewable portfolio requirement that called for 30% of the state's electric consumption be derived from renewables by 2015.

Gov. Cuomo's mandate directed the PSC to develop a process to prevent the premature retirement of upstate nuclear power plants. The governor indicated that support for nuclear plants should be "separate and distinct from the renewable energy goal." New York's power market is restructured. Retail access was implemented in 1998. The incumbent power distributors have retained the provider-of-last-resort obligation, and are procuring the power to meet this obligation through bilateral wholesale contracts with competitive suppliers. Several utilities have physical contracts with non-utility generators that provide a portion of their supply needs. Others have physical contracts with nuclear plants. Most of the utilities physically purchase the majority of their required energy on the NYISO day-ahead market.

Plan details

The LSEs subject to the CES include the Consolidated Edison Inc. subsidiaries Consolidated Edison Co. of New York Inc. and Orange and Rockland Utilities Inc., Avangrid subsidiaries New York State Electric & Gas Corp. and Rochester Gas and Electric Corp., Fortis-owned CH Energy Group Inc. subsidiary Central Hudson Gas & Electric Corp., and National Grid USA subsidiary Niagara Mohawk Power Corp, as well as all energy service companies, municipalities, cooperatives, the Long Island Power Authority and the New York Power Authority.

Eligible renewable resources include wind, solar, hydroelectric, biomass, biogas, liquid biofuels, fuel cells and tidal ocean. All eligible resources that came into operation after Jan. 1, 2015 are classified as Tier 1 resources. Under the CES, initially, all LSEs are required to procure and phase in new renewable power resources beginning with 26.32% of the state's total electricity load in 2017, and increasing to 30.54% in 2021. The standards after 2021 are to be determined by the PSC every three years.

Tier 2 serves as a maintenance program to support existing renewable resources. Eligibility for the new Tier 2 is limited to: run-of-river hydroelectric facilities of 5 MW or less; wind facilities; and, biomass direct combustion facilities that were in commercial operation any time prior to Jan. 1, 2003, and were originally included in New York's baseline of renewable resources calculated when the states renewable portfolio program was first adopted.

The obligations to achieve the CES are to be applied statewide. The LSEs will be permitted to meet their obligations by purchasing renewable energy credits, or RECs, from the New York State Energy Research and Development Authority, or NYSERDA, by purchasing qualified RECs from other sources or by making alternative compliance payments to NYSERDA. According to the PSC, the 50% renewable mandate by 2030 will be a critical component in reducing greenhouse gas emissions by 40% from 1990 levels and by 80% by 2050.

Tier 3 allows for the utilization of ZECs to preserve zero-emission attributes called for in the CES. According to the commission, maintaining zero-emission nuclear power is a critical element to achieving New York's ambitious climate goals. Adoption of the ZEC framework is designed to allow financially struggling upstate nuclear power plants to remain in operation during the state's transition to 50% renewables by 2030.

The PSC's order establishes a mechanism and a price for zero emissions attributes of nuclear facilities "where public necessity to encourage the continued creation of the attributes is demonstrated." Under the ZEC framework subsidies are to be offered to nuclear generating facilities that may otherwise be retired. The PSC stated that "this determination of necessity in no way undermines the Commission's commitment to meeting the…goal of having 50% of the State's electricity be generated by renewable resources by 2030….[T]he obligation of LSEs to purchase ZECs will be independent of the obligations imposed herein to encourage generation utilizing renewable resources. Ideally, as markets and technologies develop and more renewable generation becomes

> *"This is not an anti-gas movement, but a pro-diversity movement."*
>
> *Audrey Zibelman, New York PSC*

available, nuclear power could be replaced by those alternatives. In the near-term, however, the Commission is convinced that it is essential to keep these zero-emissions attributes available for New York consumers. "The PSC found that Ginna, Nine Mile Point and Fitzpatrick nuclear plants meet the public interest standard and qualify for the ZEC program at this time. According to the PSC "retention of the upstate nuclear facilities would also help maintain fuel diversity and fuel security. The facilities in question represent significant investment in infrastructure, are operational, and have excellent safety records."

The PSC ruled that the "Indian Point zero-emissions attributes" are not at risk and therefore, would not be considered for such subsidies at this time. According to the PSC, Indian Point is located in an area of higher electric system constraints and has a much higher level of market revenues.

In November 2015, Entergy had announced its plan to close the Fitzpatrick nuclear plant by early 2017; the plant is licensed to operate until October 2034. However, following the approval of the CES and associated ZEC subsidies, Exelon on Aug. 9, 2016, agreed to purchase the plant. Transaction closure is dependent upon review and approval by the U.S. Department of Justice, the Nuclear Regulatory Commission, the Federal Energy Regulatory Commission, and the New York PSC—Exelon/Entergy filed with the New York PSC for approval of the transaction on Aug. 22. Assuming the requisite approvals are received, the transaction is expected to close in the second quarter of 2017. Entergy's sale of Fitzpatrick aligns with its strategy to reduce its merchant power market footprint.

Qualifying nuclear facilities are to be offered multi-year contracts with NYSERDA for the purchase of ZECs. The ZEC price is to be calculated based on a formula that utilizes the federal government's projected societal cost of carbon. The commission ordered that 12-year contracts with the nuclear facilities be administered in six two-year tranches, commencing April 1, 2017. Initially, the ZEC price for these contracts is to be $17.48 per MWh for the first two-year tranche. The ZEC price is to be adjusted every two years for Tranches 2 through 6 in accordance with the commission's adopted methodology.

"The ZEC mechanism is the best way for the State to preserve the nuclear units' environmental attributes while staying within the State's jurisdictional boundaries. ZECs provide a vehicle for monetizing the State's environmental preferences and the program will allow time for new clean energy technologies to mature and take their place in the ultimate generation mix."

Source: New York PSC

Beginning April 1, 2017, each LSE is to be required to purchase an amount of ZECs equivalent to its load ratio share of the total electric energy load in New York. LSEs are permitted to recover costs from ratepayers through the commodity charges on customer bills.

Beginning in 2020, and every three years thereafter, the CES is to be reviewed by the PSC to ensure economic and clean energy goals are being achieved.

Jurisdictional Issues—Can the CES withstand legal challenges?

Challenges to the CES, particularly the ZEC component, are likely. Parties have 30 days to petition the PSC for rehearing and four months to challenge a decision to the New York Supreme Court. However, in RRA's view, the ZEC framework, albeit controversial in certain circles, will likely pass legal muster.

Under the Federal Power Act, or FPA, the FERC has exclusive authority to regulate the sale of electric energy at wholesale in interstate commerce. States, however, have the authority to regulate the retail sale of electricity to end-use consumers.

While passage of the FPA was intended to establish a jurisdictional bright line, uncertainty in applying this division has been the cornerstone

Public Necessity

Public necessity is to be determined on a plant-specific basis at the discretion of the PSC, upon considerations of the following factors:

- the verifiable historic contribution the facility has made to the clean energy resource mix consumed by retail consumers in New York regardless of the location of the facility;
- the degree to which energy, capacity and ancillary services revenues projected to be received by the facility are at a level that is insufficient to provide adequate compensation to preserve the zero-emissions environmental values or attributes historically provided by the facility;
- the costs and benefits of such a payment for zero emissions attributes for the facility in relation to other clean energy alternatives for the benefit of the electric system, its customers and the environment;
- the impacts of such costs on ratepayers; and,
- the public interest'

Source: New York PSC

of recent state and federal energy policy challenges. For example, in April 2016, the U.S. Supreme Court in *Hughes V. Talen Energy Marketing* overturned the Maryland Public Service Commission's 2012 approval of a controversial compensation arrangement for a new in-state power plant. The Court ruled that in approving the plan, and the related purchased power agreements, or PPAs, the PSC had encroached upon the FERC's authority over wholesale power markets. In the order, the Supreme Court held that "Maryland's program is preempted because it disregards the interstate wholesale rate FERC requires. … By adjusting an interstate wholesale rate, Maryland's program contravenes the [Federal Power Act's] FPA's division of authority between state and federal regulators. That Maryland was attempting to encourage construction of new in-state generation does not save its program. States may regulate within their assigned domain even when their laws incidentally affect areas within FERC's domain. But they may not seek to achieve ends, however legitimate, through regulatory means that intrude on FERC's authority over interstate wholesale rates."

An initiative introduced in New Jersey in 2011, the Long-Term Capacity Agreement Pilot, or LCAPP, that was designed to encourage the development of in-state generation facilities, met a similar fate (see the New Jersey Commission Profile), as did the Ohio Public Utility Commission's recent adoption of a purchased power agreement framework to support certain in-state generation facilities (see the Ohio Commission Profile).

According to the New York PSC, the requirement that LSEs purchase RECs and ZECs does not violate the FPA. The PSC stated that "all Commission actions must take place within the 'cooperative federalism' structure of energy regulation and the myriad state and federal court cases each shedding its own light on the jurisdictional boundaries."

As noted by the PSC, the FERC has previously stated that "REC programs, purchasing 'attributes,' are for a commodity created by states that is not within the wholesale sale of electricity jurisdiction of FERC." In addition, the PSC noted that in the Supreme Court decision in Hughes v. Talen Energy Marketing LLC, the Court ruled "that states may encourage production of new or clean generation through measures untethered to a generator's wholesale market participation." According to the PSC, "the directives to LSEs…are only related to retail sales of electricity and carbon-free energy generation attributes (RECs and ZECs), Commission jurisdiction over which is well established and settled."

Exelon recently weighed in on the potential for legal challenges, offering several reasons why the ZEC framework will ultimately pass a legal litmus test. As noted by the company, the ZEC program is, for the most part, indistinguishable from a REC program. The credit is tied to production and not wholesale market participation, and therefore, does not raise wholesale market concerns. In addition, the framework does not alter bidding behavior since the nuclear units are essentially price-takers and there are no affiliate contracts associated with the arrangement. Importantly, as noted by Exelon the framework has the support of the New York ISO and Cuomo.

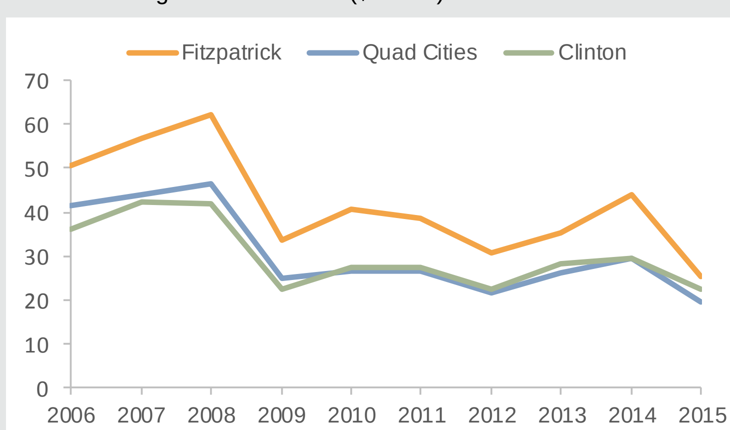
"It is a REC program for nuclear."

Source: Exelon

Business strategy implications—A look at Exelon's proposed purchase of Fitzpatrick

While many utilities are spinning off merchant assets due to high embedded fixed and variable costs, Exelon is bucking the trend by acquiring the FitzPatrick in a $110 million agreement as part of the company's strategic focus on lower-risk merchant operations. The new nuclear subsidy for New York plants fills the gap between low wholesale power prices and the revenue required to bring nuclear operations into economic feasibility. Exelon estimates that the ZEC program will contribute $0.08 to $0.10 to the company's EPS annually and roughly $350 million in additional after-tax cash through 2020.

Annual average real time LMP ($/MWh)

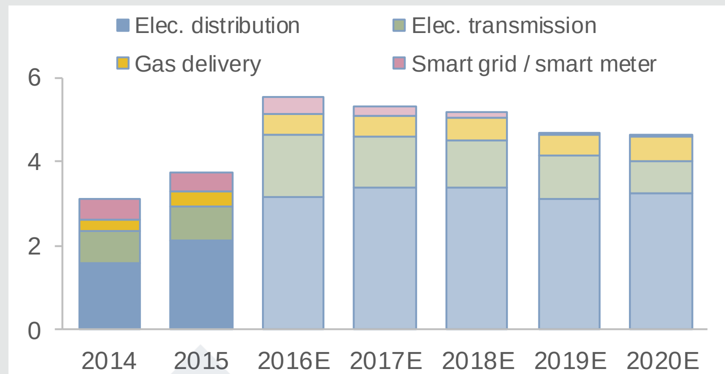


Source: SNL Energy, an offering of S&P Global Market Intelligence

The other side of Exelon's lower-risk merchant generation strategy is the retirement of the 29-year-old, 1,078-MW Clinton and the 44-year-old, 1,819-MW Quad Cities nuclear plants in Illinois, which do not have the benefit of a nuclear subsidy. Management has stated repeatedly that the two plants lost over $800 million in cash flow from 2009 through 2015, and will continue to be uneconomic going forward. Although Clinton cleared the MidContinent Independent System Operator, or MISO, primary reliability auction for 2016-2017, the resulting capacity price was insufficient to cover operating costs and a reasonable return for shareholders. Quad Cities did not clear the PJM Interconnection, or PJM, capacity auction for 2019-2020.

Although detailed financials for the two plants have not been disclosed, making independent analysis of their economic situation challenging, CEO Christopher Crane stated in the company's first-quarter-2015 earnings call that "we are not covering our operating costs or our risks, let alone receiving a return on our invested capital." Clinton will be closed on June 1, 2017, and Quad Cities will be closed on June 1, 2018. Exelon predicts that the plants' retirements will increase regional wholesale energy prices by $439 million to $645 million annually.

Exelon actual and planned utility capital expenditures ($B)



Source: Exelon

Exelon's sizeable merchant segment, Exelon Generation, contributed more than half of the company's adjusted earnings in 2015 and in the first six months of 2016. Going forward, management estimates Exelon Generation will provide $8.2 billion in cumulative free cash flow from 2016 through 2020. The company plans to invest between $2.7 billion and $3.2 billion in its regulated utilities with a similar amount to be used to reduce Exelon Generation's debt. The remainder is targeted for growth capital expenditures at Exelon Generation.

Exelon plans to invest over $25 billion in its regulated utilities from 2016 through 2020, two-thirds of which is slated for electric distribution infrastructure. The company targets annual rate base growth of 6.1% during that same period, roughly 70% of which will be recoverable through existing formula and tracker mechanisms. Management expects that the utilities segment earnings will increase by 7% to 9% annually through 2020.

State of nuclear generation today

According to the U.S. Energy Information Administration, there are 60 commercially operating nuclear power plants with 100 nuclear reactors operating in 30 states in the U.S. Of those plants, 36 have two or more reactors. In 2015, about 20% of the nation's electricity was generated from nuclear.

Recent Nuclear Power Plant Retirements

Power Plant	Ultimate Parent(s)	Operating Capacity Ownership (%)	Owned Operating Capacity (%)	Year Unit Retired from Service	Regulatory Status	State
Crystal River Nuclear	Duke Energy Corp.	98.30	1,034.51	2013	Regulated	FL
	Seminole Electric Cooperative	1.70	17.89			
San Onofre Nuclear Generating Station	Edison International	78.21	1,681.52	2013	Regulated	CA
	Sempra Energy	20.00	430.00			
	Riverside City of	1.79	38.49			
Kewaunee	Dominion Resources	100.00	574.00	2013	Merchant	WI
Vermont Yankee	Entergy Corp.	100.00	619.40	2014	Merchant	VT

Source: SNL Energy, an offering of S&P Global Market Intelligence

In recent years, the nuclear industry has been challenged. Stagnant electricity demand combined with sustained low natural gas prices and abundant natural gas reserves due to the shale gas boom have driven down wholesale power market prices, thereby pressuring the economic viability of nuclear plants. Since 2013, four nuclear facilities have permanently closed — Crystal River, San Onofre, Kewaunee and Vermont Yankee.

While the Crystal River and San Onofre facilities faced severe structural problems, significant capital costs and current economics commanded that retiring the plants prematurely were the best options. In 2013 and 2014, the Kewaunee and Vermont Yankee plants, which are merchant nuclear plants, were also retired prematurely, largely due to low wholesale electricity prices. Both plants had strong operating records and had approval for 20-year operating license renewals.

Several other merchant nuclear plants are facing the economic squeeze and have announced retirements including, the Oyster Creek and Pilgrim generating stations. In its decision to retire the Pilgrim plant, Entergy cited "low energy prices, little expectation of near term market structure improvements and increased operational costs." In addition, barring any legislative relief in Illinois, the Clinton and Quad Cities are expected to be shut down in 2017 and 2018, respectively.

But, regulated plans are not immune, as in June 2016, PG&E Corp. subsidiary Pacific Gas & Electric, or PG&E, announced that the Diablo Canyon Units 1 and 2 would close in 2024 and 2025, respectively, when their operating licenses expire. In addition, in June 2016, the Omaha Public Power District's board voted to close the Fort Calhoun Power Station by the end of 2016.

Announced Nuclear Plant Retirements

Power Plant	Ultimate Parent(s)	Capacity Ownership (%)	Owned Operating Capacity (%)	Expected Retirement	Regulatory Status	State
Clinton Power Station	Exelon	100.00	1,078.00	2017	Merchant	IL
Quad Cities Units 1 and 2	Exelon	75.00	1,364.25	2018	Merchant	IL
	Berkshire Hathaway Inc.	22.45	408.37			
	Berkshire Hathaway Energy	2.55	46.38			
Oyster Creek	Exelon	100.00	637.00	2019	Merchant	NJ
Pilgrim	Entergy	100.00	683.70	2019	Merchant	MA
Diablo Canyon Units 1 and 2	PG&E Corp.	100.00	2,240.00	2024 (Unit 1) 2025 (Unit 2)	Regulated	CA
Fort Calhoun	Omaha Public Power District	100.00	478.00	2016	Regulated	NE

Source: SNL Energy, an offering of S&P Global Market Intelligence

Other plants such as Three Mile Island in Pennsylvania, Millstone in Connecticut, and Davis Besse in Ohio, are rumored to be the next nukes at risk of closure.

A tale of two strategies – New York and California

While New York is fighting to preserve its nuclear fleet, such is not the case in California, where PG&E has proposed retiring the two-unit, 2,240 MW Diablo Canyon nuclear power plant, the last remaining nuclear plant in the state. Specifically, in June 2016, PG&E entered into a joint proposal, or JP, with various environmental parties to retire Diablo Canyon at the expiration of its current operating licenses in 2024 and 2025 and replace its output with a greenhouse gas-free portfolio of energy efficiency, renewables and energy storage.

As a result, subject to certain regulatory approvals, including the California Public Utilities Commission's approval of the JP, PG&E would not pursue Nuclear Regulatory Commission approval to extend operations at Diablo Canyon for an additional 20 years beyond the expiration of its current operating licenses. PG&E intends to operate Diablo Canyon until the end of its current NRC operating licenses which expire on Nov. 2, 2024, for unit 1 and Aug. 26, 2025, for unit 2. The JP requests PUC confirmation that PG&E's full investment in Diablo Canyon and authorized rate of return would be recovered in rates by the time the facility ceases operations.

Developments in other states and forums

Aside from New York and California, elements of market structure reform to address the current economic challenges of the nuclear industry have been addressed in other states. In addition, calls to action to preserve the nation's existing nuclear generation fleet and the economic, environmental and reliability benefits that they provide have been articulated at many forums including the Edison Electric Institute, the National Association of Regulatory Utility Commissioners and most recently at the Legislative Summit held by the National Conference of State Legislatures.

"For the foreseeable future, the most cost-effective carbon solution for our customers will be the continued operation of our nation's nuclear fleet."

Source: Exelon

Illinois—Policymakers do not appear to be too concerned by Exelon's intention to retire Clinton and Quad Cities by June 1, 2017, and June 1, 2018, respectively, as earlier this year, the Illinois General Assembly adjourned without taking action on S.B. 1585, which called for a "zero emission standard" to be established. Under existing state law nuclear plants are excluded from the RPS standards. The bill had called for the

Illinois Power Agency, which handles the procurement of all electric supply for standard offer service customers of Exelon subsidiary Commonwealth Edison and Ameren Corp. subsidiary Ameren Illinois, beginning June 1, 2017, to obtain "cost-effective" ZECs from generation facilities in the state in an amount equal to at least 16% of the electricity sold by each utility to its retail customers. A formula would have been utilized to determine the revenues the plants participating in the procurement event would have been entitled to. These plants would have been required to supply electricity for the remainder of their useful lives.

It is unclear whether the General Assembly will consider the legislation when it meets later this year. The General Assembly is scheduled to meet for a fall veto session, suggesting that any action on the bill could occur later in the year. However, in the veto session, passage would require a "super majority" in each house (see the Illinois Commerce Commission Profile). For its part Exelon has made clear it that it would not wait to find out, stating: "We have worked for several years to find a sustainable path forward in consultation with federal regulators, market operators, state policymakers, plant community leaders, labor and business leaders, as well as environmental groups and other stakeholders. Unfortunately, legislation was not passed, and now we are forced to retire the plants."

Connecticut--The Energy and Technology Committee held an informational forum in March 2016, on the adequacy of energy supplies including nuclear power in the state. On April 29, the Senate legislation that would have permitted the Connecticut Department of Energy and Environmental Protection, or DEEP, to issue one or more solicitations for certain types of generating facilities including nuclear power plants, to sell power, capacity or environmental attributes. If the DEEP found that a proposal's benefits exceed the costs and is (1) in the ratepayers' best interest, (2) consistent with the state's requirements to reduce greenhouse gas emissions, and (3) in accordance with the state's energy policy goals, the electric distribution companies would be required to enter into a long-term agreement for the associated energy and capacity. However, the bill was not voted on by the House (see the Connecticut Commission Profile).

Massachusetts--Discussions aimed at preventing the premature closure of the Pilgrim nuclear plant never developed. Instead, Republican Gov. Charlie Baker's administration has been focused on renewables and increasing natural gas capacity in the region. However, on Aug. 17, 2016, the Massachusetts Supreme Court vacated a Massachusetts Department of Public Utilities order that would have permitted the Department to review and approve customer-based, long-term contracts by electric companies for natural gas capacity (see the Massachusetts Commission Profile).

New Jersey--Public Service Enterprise Group, or PSEG, which owns the Salem and Hope Creek merchant nuclear plants has indicated that it is engaged in early conversations with policymakers regarding market structure reforms. As acknowledged by PSEG, while these plants "are not at immediate risk of closing, the nationwide trend cannot be ignored. Ideally, New Jersey should be capitalizing on the environmental benefits of nuclear power by expanding its existing nuclear fleet. But with the lack of financial support, expansion isn't an option and the concern shifts to ensuring the future of existing plants. A model that recognizes the environmental benefits of retaining the state's existing nuclear plants, and treats them in a way that is consistent with other clean-energy resources, is a sound policy that will leave a long legacy of safe, reliable and reasonably priced power for future generations of New Jersey residents and businesses. Allowing New Jersey's nuclear plants to close would be a step backward in the climate change fight. Their loss would have significant consequences for the environment, for customers, and for the stability of the energy grid and the state's economy."

Will the Federal Government step in?

There has been no meaningful effort at the federal level to value nuclear for its carbon-free attributes. On June 10, 2016, the House Energy and Commerce Committee sent a letter to the FERC regarding the current and future state of the nations' power markets, citing concerns with the competitiveness of wholesale electricity markets and alleged shortcomings of the FPA. While the committee's concerns do not specifically address the challenges faced by nuclear plant operators, the committee raises questions related to the operation of wholesale markets in general.

The lawmakers make note of the major changes occurring in the electric industry, driven by new regulations on coal-fired power plants, the shale gas revolution, and "generous subsidies and mandates that have decreased the cost of renewables."

In addition, the committee recognizes that energy efficient technologies, distributed generation technologies and changes in consumer expectations are also playing a role. According to the committee, "as these changes occur, the competitive electricity markets — particularly the organized wholesale markets —

"Centralized markets continue to underachieve."

Source: U.S. House Energy and Commerce Committee continue to underachieve, a result of pervasive and persistent problems within their respective regulatory frameworks."

The committee indicated that while it has previously communicated many of these same concerns to the FERC, "continued best efforts by the Commission and among the independent system operations…and regional transmission organizations…to address these issues and adapt to changing market conditions, the restructured wholesale markets have, in many ways, become mere administrative constructs that are continuously 'tweaked' through the regulatory process." According to the committee "such inefficiencies have impeded the efficient deployment of capital and prevented consumers from realizing the potential benefits that competitive markets should yield. With some of the organized markets seemingly ill-equipped, and in the absence of comprehensive reform, it is difficult to see how these markets will be able to adapt to new market forces, technology advances, changing consumer expectations, and shifts in the regulatory and policy landscapes."

The committee posed the following questions to FERC.

> (1) Have the competitive markets fared as expected since restructuring began over 20 years ago, particularly in terms of market efficiency, capital investment, reliability, electricity rates, and consumer impacts?
>
> (2) Are the competitive markets equipped to promote, integrate, and adapt to new technologies, new products and services, and state and federal policy changes?
>
> (3) What is the commission's view as to how non-FERC jurisdictional federal and state actions, such as the federal production tax credit or state renewable energy mandates, impact the operation of wholesale markets generally, and, specifically, in terms of impacts on reliability, resource and technology neutrality, and wholesale power prices?
>
> (4) How do new technologies, programs, incentives, and policy changes at the state and federal levels affect the jurisdictional 'bright line'? Is that line becoming increasingly blurred as a result of such changes?
>
> (5) Does the Federal Power Act continue to be well-suited for today's electricity sector? Is it well-suited for the electricity system of the future?

The answers to these questions will ultimately determine the future structure of electric markets nationwide.

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