

STAFF'S RESPONSIVE PROPOSAL FOR
PRESERVING ZERO-EMISSIONS ATTRIBUTES
(July 8, 2016)

The Public Service Commission is considering a proposed component of the Clean Energy Standard (CES) to encourage the preservation of the environmental values or attributes of zero-emissions nuclear-powered electric generating facilities for the benefit of the electric system, its customers and the environment. After consideration of the many comments that have been received to date on that issue, the Staff of the Department of Public Service (Staff) has prepared this responsive proposal. This proposal takes the approach of valuing and paying for the zero-emissions attributes based on a formula that starts with published estimates of the social cost of carbon.

The result of this proposal is significant economic and environmental benefits for New York. Staff's analysis shows that due to low natural gas prices, forecasted wholesale market prices are significantly lower than the average operating costs of the upstate nuclear units. This circumstance persists in many parts of the country and there is increasing recognition of the important role of nuclear power in reducing carbon in the generation sector. Upstate New York nuclear-power generating facilities are expected to produce approximately 27.6 million MWh of zero-emission power per year. Given current economic realities, every baseload MWh of zero-emission power from these units that is lost would be replaced with power generated with significant levels of CO₂ and other unwanted air emissions from existing mothballed fossil-fueled units in the State or new gas-fired generation.

Replacement of the zero-emission attributes with equivalent amounts of fossil-fueled attributes would result in an increase of approximately 31 million metric tons of CO₂ emitted into the atmosphere over the next two years, according to a report issued by The Brattle Group. This amount of CO₂ emissions has an estimated societal cost of approximately \$1.4 billion. There are also other air pollutants which are avoided by zero-emission attributes (e.g. nitrogen oxide). Retention of the zero-emission attributes also yields important economic benefits for electric consumers through maintenance of fuel diversity and avoidance of higher energy supply costs. A report by The Brattle Group produced in 2015 found the plants that provide the zero-emission attributes at risk provide direct economic benefits of approximately \$1.7 billion per year. Further, unquestionably the units provide critical local economic and Statewide benefits in the form of property taxes and on average over 2,600 well-paying jobs (as well as secondary employment benefits).

In order to yield these benefits, Staff is proposing to subsidize zero-emissions attributes from Zero Carbon Electric Generating Facilities when there is a public necessity to encourage their preservation. Payments for zero-emissions attributes would be based upon the U.S. Interagency Working Group's (USIWG) projected social cost of carbon (SCC). This approach is consistent with the Commission's approach in setting guidelines for Benefit-Cost Analysis.

The benefits of paying for the zero-emission attributes far exceed the costs. During the first two years of the program, the economic and environmental benefits associated with carbon reductions, supply cost savings and property tax benefits are estimated to be approximately \$5 billion. During this same period, the total attribute payments are calculated to be up to \$965 million, for a net benefit of \$4 billion. Consideration of the carbon benefit alone shows the value of the zero-emission attributes.

Over time, it is expected that rising natural gas prices will lead to higher forecasted energy and capacity prices in New York. Under the approach discussed below this will result in reductions of the attribute payments since the value of the carbon-free generation will be internalized into the forecast of market prices. Under Staff's approach, the zero-emission attribute payments will never exceed the calculated value they produce. Moreover, the benefit of the zero-emission attributes will continue to accrue to New York customers. Staff's proposal attempts to lock-in 12 years of significant carbon emission reductions at a cost that is a fraction of the benefit to be achieved.

DEFINITIONS:

- A. The term "Load Serving Entity" means any entity that secures energy to serve the electrical energy requirements of end-use customers in New York State.
- B. The term "Zero Carbon Electric Generating Facility" means an electric generating facility that uses energy released in the course of nuclear fission to generate electricity.
- C. The term "Zero-Emissions Credit" or "ZEC" means credit for the generation by an eligible Zero Carbon Electric Generating Facility of one megawatt-hour of electricity with zero-emissions attributes that is consumed by a retail consumer in New York State.

METHODOLOGY:

1. As a component of the Clean Energy Standard (CES), New York State shall provide a subsidy for zero-emissions attributes to Zero Carbon Electric Generating Facilities when there is a public necessity to encourage the preservation of their zero-emission environmental values or attributes for the benefit of the electric system, its customers and the environment.
2. Public necessity shall be determined on a plant-specific basis in the discretion of the Public Service Commission (Commission) considering (a) the verifiable historic contribution the facility has made to the clean energy resource mix consumed by retail consumers in New York State regardless of the location of the facility; (b) 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-emission environmental values or attributes historically provided by the facility; (c) the costs and benefits of such a subsidy 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; (d) the impacts of such costs on ratepayers; and (e) the public interest. Units in single ownership located in the same NYISO Zone and that share costs at the same site will be treated as a single facility for the determination. Therefore, Nine Mile Units 1 & 2 will be treated as a single facility, and Indian Point Units 2 and 3 will be treated as a single facility.
3. An initial determination of facility-specific public necessity shall be made upon inception of the program. Subsequent determinations of facility-specific public necessity may be made at every two-year interval after inception for Zero Carbon Electric Generating Facilities that were not qualified upon inception of the program.
4. Staff is projecting that at the time of inception of the program there is a public necessity for subsidies for zero-emissions attributes for the Fitzpatrick, Ginna and Nine Mile facilities, but that there is no current public necessity for subsidies for zero-emissions attributes for any other Zero Carbon Electric Generating Facility.¹

¹ Staff notes that the owner has not claimed that the zero-emissions attributes of the Indian Point facility are currently at risk.

5. The ZEC contracts will be administered in six 2-year tranches, as follows:
 - Tranche 1: April 1, 2017 - March 31, 2019
 - Tranche 2: April 1, 2019 - March 31, 2021
 - Tranche 3: April 1, 2021 - March 31, 2023
 - Tranche 4: April 1, 2023 - March 31, 2025
 - Tranche 5: April 1, 2025 - March 31, 2027
 - Tranche 6: April 1, 2027 - March 31, 2029

6. Upon a determination of facility-specific public necessity, the owner of the facility will be offered a multi-year contract administered by the New York State Energy Research and Development Authority (NYSERDA) to purchase ZECs from the period beginning on the first day of the eligibility tranche through March 31, 2029. The facility will have an obligation to produce the ZECs and to sell them to NYSERDA through March 31, 2029, except during periods when the calculated ZEC price pursuant to the contract is \$0. The obligation to produce will be enforced by appropriate financial consequences for failure to produce.

7. The price to be paid for ZECs would be determined administratively by the Commission as there are too few owners of the affected generation facilities for there to be a valid competitive process to determine the prices as the owners would have too much market power for effective competition.

8. For the contract period of Tranche 1, the price of the ZEC would be based upon the average April 2017 through March 2019 projected SCC as published by the USIWG in July 2015 (nominal \$42.87/short ton), less a fixed baseline portion of that cost already captured in the market revenues received by the eligible facilities due to the Regional Greenhouse Gas Initiative (RGGI) program based upon the average of the April 2017 through March 2019 forecast RGGI prices embedded in the Congestion Assessment and Resource Integration Study (CARIS) Phase 1 report (nominal \$10.41/short ton). Staff's formula yields a net cost of carbon of \$32.47 (nominal \$/short ton), and a ZEC price of \$17.48 per MWh for the contract period of Tranche 1 [see Attachment 1 for the detailed calculations behind this price].

9. Staff notes that this proposed approach to administratively establishing the ZEC price makes sense for the upstate Fitzpatrick, Ginna and Nine Mile facilities in the aggregate because it yields a result that Staff would expect to be similar to the average pay-as-bid price for these facilities that would result from a competitively bid solicitation conducted in the manner that is currently done for Renewable Energy Credits (RECs) assuming these facilities did not have market power. Staff further notes that this approach may not make sense for establishing a ZEC price for the downstate Indian Point facility that because of its location in an area of higher electric system constraints enjoys a much higher level of market revenues. Therefore, if Indian Point becomes eligible, Staff recommends that the ZEC price be calculated to reflect the difference between upstate and downstate market revenues in order to put downstate facilities on an equal footing with upstate facilities. A methodology to calculate the upstate/downstate price differential would be developed if its use becomes necessary.
10. For the contract periods of Tranche 2 through Tranch 6, the ZEC prices would be calculated pursuant to a formula by tranche. In general concept, the formula is as follows:

$$\begin{array}{rcccl}
 \text{Social} & & & & \\
 \text{Cost of} & & & & \\
 \text{Carbon} & \text{---} & \text{Baseline} & \text{---} & \text{Amount} \\
 & & \text{RGGI} & & \text{Zone A Forecast} \\
 & & \text{Effect} & & \text{Energy Price} \\
 & & & & \text{and} \\
 & & & & \text{ROS Forecast} \\
 & & & & \text{Capacity Price} \\
 & & & & \text{combined} \\
 & & & & \text{exceeds } \$39/\text{MWh} \\
 & & & \text{=} & \text{Upstate} \\
 & & & & \text{ZEC} \\
 & & & & \text{Price}
 \end{array}$$

11. The formula components are described more specifically, as follows:

(a) The Social Cost of Carbon (SCC) component (nominal \$\$ per short ton of CO₂) would be as follows:

Tranche 2	\$46.79	Average of April 2019 - March 2021 USIWG on SCC estimates (July 2015)
Tranche 3	\$50.11	Average of April 2021 - March 2023 USIWG on SCC estimates (July 2015)
Tranche 4	\$54.66	Average of April 2023 - March 2025 USIWG on SCC estimates (July 2015)
Tranche 5	\$59.54	Average of April 2015 - March 2027 USIWG on SCC estimates (July 2015)
Tranche 6	\$64.54	Average of April 2027 - March 2029 USIWG on SCC estimates (July 2015)

(b) The Baseline RGGI Effect component would remain fixed for all tranches at a nominal \$10.41/short ton. [Note: The energy price forecast part of the adjustment described below will capture forward-going changes due to RGGI].

(c) The Forecast Energy & Capacity Price Change Adjustment component uses changes in independently published forecasts of going-forward energy and capacity prices to adjust the ZEC price (downward only so as not to exceed the Social Cost of Carbon) by the amount that future forecasts predict that NYISO Zone A energy prices combined with the Rest of State (ROS) capacity prices will exceed \$39/MWh. NYISO Zone A and ROS were chosen as relevant proxies. These components measure only the change in forecasts over time; they do not establish energy or capacity prices. The \$39/MWh baseline figure approximates a recent period average of the forecasts of Intercontinental Exchange (ICE) of the NYISO Zone A energy prices projected by ICE for the period April 2017 through March 2019 combined with the per MWh equivalent of a recent period average of the forecasts of New York Mercantile Exchange (NYMEX) NYISO Rest of State Capacity Calendar Month Futures projected by NYMEX for the period April 2017 through March 2018. The adjustment would be calculated as follows:

Tranche 2	Price adjustment in \$\$/MWh equals the sum of ICE's Calendar Year 2018 NYISO Zone A price forecasts for April 2019 through March 2021 ² and the per MWh equivalent of the average of NYMEX's July through December 2018 NYISO Rest of State capacity price forecasts for April 2019 through March 2020, less \$39/MWh.	If the combined forecasted prices are \$39/MWh or less, the adjustment would be zero (there would be no adjustment).
Tranche 3	Price adjustment in \$\$/MWh equals the sum of ICE's Calendar Year 2020 NYISO Zone A price forecasts for April 2021 through March 2023 and the per MWh equivalent of the average of NYMEX's July through December 2020 NYISO Rest of State capacity price forecasts for April 2021 through March 2022, less \$39/MWh.	If the combined forecasted prices are \$39/MWh or less, the adjustment would be zero (there would be no adjustment).
Tranche 4	Price adjustment in \$\$/MWh equals the sum of ICE's Calendar Year 2022 NYISO Zone A price forecasts for April 2023 through March 2025 and the per MWh equivalent of the average of NYMEX's July through December 2022 NYISO Rest of State capacity price forecasts for April 2023 through March 2024, less \$39/MWh.	If the combined forecasted prices are \$39/MWh or less, the adjustment would be zero (there would be no adjustment).
Tranche 5	Price adjustment in \$\$/MWh equals the sum of ICE's Calendar Year 2024 NYISO Zone A price forecasts for April 2025 through March 2027 and the per MWh equivalent of the average of NYMEX's July through December 2024 NYISO Rest of State capacity price forecasts for April 2025 through March 2026, less \$39/MWh.	If the combined forecasted prices are \$39/MWh or less, the adjustment would be zero (there would be no adjustment).

² NYISO Zone A energy price forecasts for each 24-month tranche will be determined as follows: 1) for each trading day during the calendar year preceding each tranche, ICE NYISO Zone A Day-Ahead Peak Fixed Price Future (ICE code NAY) and NYISO Zone A Day-Ahead Off-Peak Fixed Price Future (ICE code AOP) settled futures prices for the 24 months of the tranche will be separately averaged, yielding separate average on-peak and off-peak tranche energy prices for each trading day; 2) each trading day's average on-peak and off-peak energy prices (developed in step 1) will be time-weight averaged based on the number of on-peak and off peak hours in the tranche, yielding an single average energy price for the tranche for each trading day; 3) the average energy prices for each of the trading days during the calendar year preceding each tranche (developed in step 2) will be averaged, yielding the NYISO Zone A energy price forecast for the tranche.

Tranche 6	Price adjustment in \$\$/MWh equals the sum of ICE's Calendar Year 2026 NYISO Zone A price forecasts for April 2027 through March 2029 and the per MWh equivalent of the average of NYMEX's July through December 2026 NYISO Rest of State capacity price forecasts for April 2027 through March 2028, less \$39/MWh.	If the combined forecasted prices are \$39/MWh or less, the adjustment would be zero (there would be no adjustment).
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12. The amount of ZECs to be purchased on an annual basis will be capped at a MWh amount that represents the verifiable historic contribution the facility has made to the clean energy resource mix consumed by retail consumers in New York State; the program is not intended to encourage incremental generation from the nuclear sector. Verification may be by NYSERDA, the Department of Public Service, or the Commission, as determined by the Commission.
13. If the Commission determines there is a public necessity to subsidize zero-emissions attributes for a facility, it shall make its determination subject to the execution of an appropriate contract between NYSERDA and the owner of the facility.
14. The Commission may establish such other review and contract requirements as it shall deem, in its discretion, to be in the public interest.
15. Each Load Serving Entity would be required to encourage the preservation of the environmental values or attributes of zero-emissions nuclear-powered electric generating facilities for the benefit of the electric system, its customers and the environment by purchasing an amount of ZECs per year of the total amount of ZECs purchased by NYSERDA in proportion to the electric energy load served by the Load Serving Entity in relation to the total electric energy load served by all load serving entities in the New York Control Area. The ZECs obligation is separate from any obligation on Load Serving Entities to encourage generation utilizing renewable resources.
16. Each Load Serving Entity would enter into a contractual relationship with NYSERDA to periodically purchase ZECs during a program year based on initial forecasts of load and a balancing reconciliation at the end of each program year so that after the reconciliation process, each Load Serving Entity will have purchased the correct proportion of ZECs on an annual basis.

17. The price charged by NYSERDA per ZEC shall be at the price established administratively by the Commission as described above, plus an adder to cover NYSERDA's incremental administrative costs and fees associated with the ZEC program and ZEC revenues.
18. Cost recovery from ratepayers shall be incorporated into the commodity charges on customer bills. Utilities will charge their commodity customers on a volumetric basis.
19. ZECs will not be tradable except between NYSERDA and the Load Serving Entities in the balancing process.
20. The Commission will entertain proposals by Load Serving Entities and perhaps self-supply customers to alternatively meet their ZECs obligations by entering into combined energy and/or capacity and ZEC contracts with the nuclear facilities if such contracts are structured in a way as to not unfairly shift ZECs costs onto other ratepayers.

Attachment 1 - DPS ZEC Calculations

	<u>US SCC "Central Value"</u>	<u>RGGI estimate in CARIS LBMP</u>	<u>Net CO₂ Externality</u>
	\$ Nominal /short ton	\$ Nominal /short ton	\$ Nominal /short ton
2017	\$41.40	\$10.12	\$30.99
2018	\$43.36	\$10.48	\$32.95
2019	\$45.36	\$10.99	\$34.95
4/1/2017-3/31/2019	\$42.87	\$10.41	\$32.47

	<u>US SCC "Central Value"</u>	<u>Inflation</u>	<u>US SCC "Central Value"</u>	<u>x 0.907184 (metric to short ton)</u>
	(\$2007)/m- ton	GDP-IPD Base 2007	(\$ Nominal) /m-ton	\$ Nominal /short ton
2017	\$39	117.0197464	\$45.64	\$41.40
2018	\$40	119.485483	\$47.79	\$43.36
2019	\$41	121.9512195	\$50.00	\$45.36
2020	\$42	124.5196951	\$52.30	\$47.44
2021	\$42	127.1909097	\$53.42	\$48.46
2022	\$43	129.8621242	\$55.84	\$50.66
2023	\$44	132.5333388	\$58.31	\$52.90
2024	\$45	135.3072924	\$60.89	\$55.24
2025	\$46	138.183985	\$63.56	\$57.66
2026	\$47	141.0606777	\$66.30	\$60.14
2027	\$48	144.0229519	\$69.13	\$62.71
2028	\$49	147.0474339	\$72.05	\$65.37
2029	\$49	150.13543	\$73.57	\$66.74

		<u>US SCC</u> "Central Value"	<u>Baseline Avg</u> <u>April 2017-</u> <u>March 2019</u> <u>RGGI</u> <u>estimate in</u> <u>CARIS LBMP</u>	<u>Net CO₂</u> <u>Externality</u>	<u>x 0.53846 (short</u> <u>ton to MWh)</u>
		\$ Nominal /short ton	\$ Nominal /short ton	\$ Nominal /short ton	\$ /MWh
Tranche 1	4/1/2017-3/31/2019	\$42.87	\$10.41	\$32.47	\$17.48
Tranche 2	4/1/2019-3/31/2021	\$46.79	\$10.41	\$36.38	\$19.59
Tranche 3	4/1/2021-3/31/2023	\$50.11	\$10.41	\$39.71	\$21.38
Tranche 4	4/1/2023-3/31/2025	\$54.66	\$10.41	\$44.26	\$23.83
Tranche 5	4/1/2025-3/31/2027	\$59.54	\$10.41	\$49.13	\$26.45
Tranche 6	4/1/2027-3/31/2029	\$64.54	\$10.41	\$54.13	\$29.15

		<u>x 0.53846</u> <u>(short ton to</u> <u>MWh)</u>	<u>Energy &</u> <u>Capacity</u> <u>Forecast</u> <u>Adjustment</u>	<u>Upstate</u> <u>ZEC Price</u>	<u>Potential</u> <u>Downstate</u> <u>Price</u> <u>Adjustment</u>	<u>Downstate</u> <u>ZEC Price</u>
		\$ /MWh	\$ /MWh	\$ /MWh	\$ /MWh	\$ /MWh
Tranche 1	4/1/2017-3/31/2019	\$17.48	N/A	\$17.48	N/A	N/A
Tranche 2	4/1/2019-3/31/2021	\$19.59	TBD	TBD	TBD	TBD
Tranche 3	4/1/2021-3/31/2023	\$21.38	TBD	TBD	TBD	TBD
Tranche 4	4/1/2023-3/31/2025	\$23.83	TBD	TBD	TBD	TBD
Tranche 5	4/1/2025-3/31/2027	\$26.45	TBD	TBD	TBD	TBD
Tranche 6	4/1/2027-3/31/2029	\$29.15	TBD	TBD	TBD	TBD