STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES

IN THE MATTER OF L. 2018, c. 16 REGARDING THE ESTABLISHMENT OF A ZERO EMISSION CERTIFICATE PROGRAM FOR ELIGIBLE NUCLEAR POWER PLANTS	**Docket Nos. EO18080899 and EO18091004**

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
AND
PSEG POWER LLC

COMMENTS

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I. Introduction

Public Service Electric and Gas Company and PSEG Power LLC (collectively PSEG) hereby submit these comments in response to comments made at public hearings in these matters, as well as to the specific questions posed in the New Jersey Board of Public Utilities' ("BPU" or "Board") September 11, 2018 Notice in this matter. PSEG Nuclear LLC, a subsidiary of PSEG Power LLC, is the license holder and operator of the three nuclear power plants located in Salem County, New Jersey: the Hope Creek, Salem 1, and Salem 2 nuclear power plants.[1] All three of these plants have for many years provided reliable and carbon free electricity to New Jersey residents. PSEG Nuclear LLC intends to file applications for the receipt of Zero Emission Certificates ("ZECs") provided under L. 2018, c. 16 ("the ZEC Act") as to all three plants.[2]

The ZEC Act provides for a two-phased process for selecting plants to be ZEC recipients. An initial phase determines which plants are eligible under the ZEC Act; then in a second phase, those plants that have established eligibility are ranked. We encourage the Board to look to two sources for primary guidance in implementing the ZEC Act. First, the ZEC Act itself provides clear directives and criteria for building the selection process and awarding the ZECs. Second, to the extent the statute provides the Board with administrative latitude, the Board can look to the selection processes and approaches successfully used in other states for guidance. In particular, for the financial needs test and emissions scoring, the programs in New York and Illinois will be instructive.[3]

The legislature established straightforward requirements for determining eligibility under

[1] PSEG Nuclear LLC owns the entirety of the Hope Creek plant and is the majority co-owner of Salem 1 and Salem 2, with Exelon Generation Company as the minority co-owner.

[2] The ZEC Act has been codified at N.J.S.A. 48:3-87.3-7.

[3] See: *Zero Emission Standard Procurement Plan*, Illinois Power Agency, October 31, 2017: (https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/Zero-Emission-Standard-Procurement-Plan-Approved.PDF)

the ZEC Act which constitutes the first phase of the selection process. For example, the ZEC Act provides the Board with clear guidance on how to evaluate a plant's submittals regarding its intention to retire in the absence of a material financial change, providing that an applicant must submit detailed financial information, plus any other financial information that the Board deems necessary. Specific information required under the ZEC Act includes operation and maintenance expenses, fuel expenses (inclusive of spent fuel), non-fuel capital expenses, fully allocated overhead costs, and the cost of operational and market risks.[4] The various types of cost information to be submitted by an applicant pursuant to the ZEC Act similarly were considered for this purpose in New York and Illinois. The New Jersey ZEC Act also provides the Board with another tool to test this eligibility requirement, by requiring that the applicant plant certify that it will retire within three years absent material financial changes and specify the necessary steps required to be completed to cease operations.

The ZEC Act requires that applicants demonstrate a significant and material contribution to New Jersey's air quality. This demonstration should consist of studies showing how the loss of the applicant's plant would change the generation supply portfolio serving New Jersey residents, and the extent to which those changes would adversely affect New Jersey's air quality. We suggest that these studies employ widely-used modeling tools, and be supported and explained by competent experts to allow for transparent review by Board staff and its consultants.

As another element of eligibility, the ZEC Act requires a demonstration that the loss of the plant would have a material adverse effect on fuel diversity and resiliency of the grid. This

[4] *See* N.J.S.A. 48:3-87.5(a). An illustrative template for the financial submission is included as Attachment A hereto.

demonstration should focus on the extent to which the retirement of the applicant would cause New Jersey to become more reliant on gas-fired generation during times of system stress and, in particular, during the winter when gas is in high demand as a residential heating source. This demonstration should be done through modeling or other analysis.

The second phase of the selection process required by the ZEC Act is a ranking of eligible plants based on their relative impact on New Jersey. The ZEC Act provides specific guidance as to the mechanics of the ranking:

> In ranking eligible nuclear power plants from first to last, the board shall consider how well the nuclear power plants satisfy the criteria set forth under the provisions of this act, and shall also consider other relevant factors such as sustainability or long-term commitment to nuclear energy production, in a manner that supports New Jersey's cost-effective transition to a zero carbon energy supply.[5]

As the ZEC Act makes clear, the primary focus of the metrics should be on the comparative impact of a plant's retirement on New Jersey's air quality. However, the ZEC Act also calls for consideration of the sustainability of the plant's operations and the impact that the loss of the plant would have on energy supply. Our responses to the Board's questions below include specific suggestions that the Board could use to rank applicants, which pass the eligibility requirements. Importantly, this approach would be administratively feasible for the Board to implement, readily understood by applicants, contains appropriate consumer safeguards, and would fairly measure the impacts on New Jersey of closing eligible nuclear plants.

II. Responsive Comments

PSEG commends the Board for its careful and thoughtful approach in conducting the hearings and soliciting feedback on specific questions. PSEG participated in all three of the public hearings convened by the Board regarding the application process, supplying its own

[5] N.J.S.A. 48:3-87.5 (f).

comments and listening to the comments made by other parties.

Below we address certain comments that either attempted to rehash the merits of the ZEC Act altogether or that appeared to be attempts to interfere with implementation of the ZEC Act rather than to improve the implementation process to fulfill the ZEC Act's statutory objectives. Further, if accepted, many of the suggestions made in these comments would impose substantial administrative burdens on the Board without satisfying any legitimate purpose connected to the performance of Board's duties under the ZEC Act. We urge the Board to remain mindful of the ZEC Act's requirements and not to be distracted by the rhetoric of certain detractors from accomplishing the task before it. Below are responses to certain of the comments made by commenters that opposed the ZEC Act although our failure to respond to particular comments should not be taken as acquiescence.

A. The BPU Does Not Have The Authority To Change the $0.004/kWh Charge During the Application Process For The Initial Eligibility Period

In its comments at the public hearing on the ZEC application process, Rate Counsel claimed that the BPU had the authority and the obligation to review the reasonableness of the $0.004/kWh non-bypassable ZEC distribution charge to New Jersey customers. As stated by Rate Counsel:

> The Board must also assess whether the 0.4 cents per kwh surcharge would result in just and reasonable rates. Under settled New Jersey law, utility ratepayers have the right to utility rates that are not excessive. This is a principle grounded in constitutional due process protections. The Board has an overriding obligation to ensure that rates are just and reasonable that was not, and cannot, be superseded by the ZEC statute. If, after examining the revenue requirement needed for the nuclear plant, the Board finds that the subsidy resulting from the charge is substantially in excess of the amount required to keep the unit in operation, then the $.004 rate is not just and reasonable and the Board should reject it.[6]

[6] Comments of Rate Counsel, October 4, 2018 hearing, (Hackensack), Transcript p. 18, l. 24-p. 19, l. 13. (Rate Counsel also made the same statement at the other two hearings.)

Rate Counsel's claims are unfounded as a matter of law. While the BPU does have authority to modify the $0.004/kWh charge under certain circumstances, it does not have the authority to change the rate as part of the application process.

It is undisputable that under New Jersey law, rate-setting is a legislative function[7] and that the BPU's authority to set rates is determined by the scope of the grant made by the legislature.[8] Under the ZEC Act, the BPU has been given authority to change the $0.004/kWh charge but only at specified times and under specified circumstances. Thus, under the ZEC Act:

> [T]he board may, in its discretion, reduce the [$0.004] per kilowatt-hour charge … *starting in the second three year eligibility period* and for each subsequent three year eligibility period thereafter, provided that the board determines that a reduced charge will nonetheless be sufficient to achieve the [goals of the ZEC Act.][9]

Another grant of rate-setting authority under the ZEC Act provides:

> If the board does not certify any nuclear power plants for a *subsequent* eligibility period pursuant to this act [after the first eligibility period], the board may, in its discretion, reduce the [$0.004] per kilowatt-hour charge … to ensure that the ZEC program remains affordable to New Jersey retail distribution customers in the final year of the first eligibility period, provided that the board determines that a reduced charge will nonetheless be sufficient to achieve the [goals of the ZEC Act.][10]

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[7] *See e.g., Alexander v. New Jersey Power & Light Co.*, 122 A.2d 339, 342 (1956) (NJ Supreme Court "[i]nvoking the basic doctrine that rate-making is a legislative . . . function . . . .") (internal quotations omitted); *Atlantic City Sewerage Co. v. Board of Public Utility Com'rs*, 128 N.J.L. 359, 364 (1942) ("Rate making is essentially a legislative function."); *Petition of Public Service Elec. and Gas Co*., 699 A.2d 1224, 1233 (N.J Super. 1997) ("Our Supreme Court has observed that rate making is a legislative . . . function . . .) (internal quotations omitted).

[8] *See e.g, Petition of Public Service Coordinated Transport*, 74 A.2d 580, 589 (1950) ("For the delegation of the legislative function [of rate-making] to be valid under our Constitution it is essential that adequate standards be prescribed by the Legislature and adhered to by its agent, in this instance the Board."); *Atlantic City Sewerage Co. v. Board of Public Utility Com'rs,* 128 N.J.L. 359, 368 (1942) ("Agencies to whom this legislative power [to set rates] has been delegated are free, within the ambit of their statutory authority, to make the pragmatic adjustments which may be called for by particular circumstances.")

[9] N.J.S.A. 48:3-87.5(j)(3)(a) (emphasis added).

[10] N.J.S.A. 48:3-87.5(j)(3)(c) (emphasis added)

Nothing in the ZEC Act, however, provides the BPU with any authority to modify the $0.004/kWh charge at the beginning of the first eligibility period as part of the application process. Because the BPU can have no more authority than that granted by the New Jersey legislature, Rate Counsel's claim is without legal basis.

The ZEC contains more than adequate consumer safeguards to assure satisfaction of any due process constitutional requirements that conceivably might apply. First, the ZEC Act itself demonstrates the reasonableness of the $0.004/kWh rate, which obviates any potential claim that the level of the rate could be deemed to be excessive. Specifically, the ZEC Act specifies that the "retail distribution . . . charge in the amount of $0.004 per kilowatt-hour . . . reflects the emissions avoidance benefits associated with the continued operation of selected nuclear power plants."[11] The legislative findings offer further explanation and justification as follows:

> The zero emission certificate program set forth in this act is structured such that its costs are guaranteed to be significantly less than the social cost of carbon emissions avoided by the continued operation of selected nuclear power plants, ensuring that the program does not place an undue financial burden on retail distribution customers. The social cost of carbon, as calculated by the U.S. Interagency Working Group on the Social Cost of Carbon in its August 2016 Technical Update, is an accepted measure of the cost of carbon emissions. Carbon emissions avoided by selected nuclear power plants are but one component of their emissions avoidance benefits.[12]

The reasonableness of the $0.004/kWh rate thus is not a function of the financial condition of the nuclear plants that receive the payments – as contended by Rate Counsel -- but rather is a function of the social cost of carbon that customers are paying to avoid the degradation of the air they breathe.

The ZEC Act includes substantial consumer protections to assure that customers are not burdened with unnecessary ZEC costs. The ZEC Act requires the submittal of detailed financial

[11] N.J.S.A. 48:3-87.5(j)(1).

[12] N.J.S.A. 48:3-87.3(b)(8).

demonstrations regarding the plants at risk of retirement. These demonstrations must show that a potential ZEC recipient will fail to earn sufficient revenues to cover its costs and risks. Further, the plant must certify that, in absence of a material financial change, it will retire within the next three years. The ZEC Act is designed to ensure that ratepayers do not make ZEC payments except when truly needed to retain the environmental and fuel diversity attributes of the generation fleet serving New Jersey identified as essential by the legislature.

The authorization for modifying rates provided to the BPU under the ZEC Act also provides significant consumer protections. As discussed *supra*, the ZEC Act allows the BPU to modify the $0.004/kWh charge as early as during the third year of the first ZEC payment term if the BPU decides not to continue the program. The BPU also has the authority to modify the $0.004/kWh charge at the beginning of the second three-year ZEC payment term and at the beginning of each subsequent three-year ZEC payment term. As provided in the ZEC Act, the initial $0.004/kWh rate is not fixed immutably and can be adjusted in the future so that ZECs "remain affordable to New Jersey retail distribution customers" if the goals of the act can be met with a lower rate.[13]

The BPU has no legal authority to add a rate review process not specified in the law. In sum, Rate Counsel's claims regarding the need (or the ability) of the BPU to change the amounts paid to ZEC recipients beyond the specific grants of authority under the ZEC Act are baseless.

B. The Financial Evaluation Must be Based Solely on the Nuclear Plants of the ZEC Applicants

Certain commenters alleged at the public hearings that an applicant's financial situation – and whether the plant will retire unless there is a material financial change -- should be determined based not only on the finances of the plant itself but also based on the finances of

[13] N.J.S.A. 48:3-87.5(j)(3)(a); N.J.S.A. 48:3-87.5(j)(3)(c).

other affiliates or plants.[14] A similar claim was that the past financial condition of the plant or that past payments received by the plant should be a factor.[15] These assertions not only are inconsistent with the express terms of the ZEC Act but also fly in the face of basic economic principles.

The ZEC Act specifies that the required financial documentation shall include "any financial information required by the board *pertaining to the nuclear power plant*".[16] Similarly, the financial demonstration required under the ZEC Act is that "*the nuclear power plant* is projected to not fully cover *its* costs and risks, or alternatively is projected to not fully cover *its* costs and risks including *its* risk-adjusted cost of capital."[17] Finally, the certification required under the ZEC Act is "that *the nuclear power plant* will cease operations within three years unless *the nuclear power plant experiences a material financial change*, and the certification shall specify the necessary steps required to be completed *to cease the nuclear power plant's operations*."[18] In each of these instances – the documentation, the demonstration and the certification – the requirement pertains to "the nuclear power plant" and not to any other entity. The only case in which financial information other than financial information related to the plant

[14] *See e.g.* Comments of Rate Counsel, October 11, 2018 Hearing (New Brunswick), transcript, p. 16, l. 15-l. 24 ("The increase should take into account, not only the returns that they get, but also . . . earnings that other subsidiaries of the same company may earn if a plant shuts down or if it keeps it open. As you are aware, if PSE&G and Exelon apply for these, both of them also own gas plants so you need to look at the entire picture and not just one unit in isolation.")

[15] *See e.g.* Comments of Rate Counsel, October 11, 2018 Hearing (New Brunswick), transcript, p. 16, l. 6-l. 11 ("The operator should also provide information about what -- about any amounts that it received during restructuring in compensation for stranded cost. We want to ensure that New Jersey ratepayers are not being forced to compensate a nuclear operator for costs that they already recovered through stranded cost payments."); Comments of Jeff Tittle, New Jersey Sierra Club, p. 50, l.3-l.7 ("[W]e should look at the history and how much money we've given them in the past through stranded assets, through the nuclear plant closure fund, and through all those other things that add onto it.")

[16] N.J.S.A. 48:3-87.5(a) (emphasis added).

[17] *Id.*

[18] *Id.*

itself is the inclusion of "fully allocated overhead costs" as a permitted cost category. There is nothing in the ZEC Act that allows the BPU to consider revenues or the financial health of any business entity or plant other than the nuclear power plant that is submitting the application. By the same token, there is no basis to consider past revenues that an applicant may have received.

The contention that revenues from another business or from a past period of the applicant's operation should be considered in determining whether the plant will retire in the future, moreover, is not consistent with standard business practices. It is a basic corporate finance concept that firms should make investments with positive net present value and should not make investments with negative net present value.[19] Continuing to make investments in assets with negative value and funding such investments from assets with positive value clearly violates this basic concept.

An example of the application of this principle is PSEG Power's decision to retire its Hudson and Mercer coal plants in 2016. PSEG evaluated the costs and risks associated with future operations and necessary capital expenditures of those plants and determined that anticipated revenues would not provide a positive net present value. The financial evaluation of the Salem and Hope Creek nuclear plants is subject to the same type of analysis and, if this analysis yields a negative net present value, a decision to retire the plants would be the inescapable outcome.

C. Requiring That Financial Submittals Be Audited Would Not Add Value and Would Disrupt the Application Process

Certain commenters suggested that the financial submittals made by applicants should be audited. PSEG has already agreed to open its books and provide comprehensive financial data certified by a company officer. A formal audit is both infeasible and counter-productive.

[19] *See generally,* Richard Brealey, Stewart Myers, and Franklin Allen, *Principles of Corporate Finance, C*hapters 5-6.

First, most of the financial materials that would be included in the application are not susceptible to audit. Formal audits are typically conducted based on historical revenues and costs and well-developed accounting guidelines. The financial submissions included as part of the application will be forward-looking projections. For example, the operational and market risks can be quantified and compared to New York and Illinois approaches, but are not auditable as there are no fixed accounting standards for these calculations. Similarly, the revenue calculations are forward-looking and cannot be determined from the historical books and records of an applicant. Rather, a useful benchmark for this kind of information should be market data to the extent it is available.

Second, the time line for submittal of an application from the date upon which the BPU will issue the order describing the application process would not permit an audit firm to assess the submittal in a meaningful manner. It would not be realistic to compile the materials requested by the BPU and to have them be audited within the 30 day period allowed for submittal of an application. Imposing an audit obligation would just disrupt the submittal process.

Finally, nothing in the ZEC Act suggests that the legislature authorized or contemplated conducting a formal audit of submitted data. The legislature could have required an audit if it believed one was needed.

D. Claims that Retiring Nuclear Plants Will Be Replaced by Renewables During the Application Study Period Are Not Supportable

Certain commenters alleged that the output of retiring nuclear plants could be replaced largely or entirely by new renewable energy resources. In particular, Rate Counsel contended as follows:

> For the last four or five years, renewables have accounted for at least half of the new generation built in this country. According to the U.S. Energy Information Administration, in 2017, renewables accounted for 55% of the 21 GW of U.S. capacity additions. So an assumption cannot be made that if a nuclear plant shuts down it will be replaced by a natural gas or coal plant. It is just as likely that the lost capacity will be replaced by a renewable resource. To the extent that energy from the nuclear facility is replaced with renewable resources, the loss of the nuclear plant may have no adverse impact on air quality or other environmental benefits in New Jersey. In fact, the impact may be positive.[20]

Rate Counsel's contentions, however, are not supportable.

First, the ZEC Act itself refutes Rate Counsel's claims. The legislative findings are replete with statements recognizing that the retirement of nuclear plants serving New Jersey will result in increased reliance on gas-fired and coal-burning resources:

> The retirement of nuclear power generation will inevitably result in an immediate increase in air emissions within New Jersey due to increased reliance on natural gas-fired generation and coal-fired generation.[21]

> The abrupt retirement of existing, licensed, and operating nuclear power plants within and outside the State that provide electricity to customers in New Jersey, and any concomitant increase in the proportion of New Jersey's electricity demand met by natural gas and coal, will result in a substantial increase in emissions of several serious pollutants, and associated adverse public health and environmental impacts.[22]

> [T]he abrupt retirement of nuclear power plants that serve New Jersey combined with increased reliance on natural gas-fired and coal-fired generation will substantially impede the State's ability to meet . . . federal and State air quality standards and emissions level requirements.[23]

Second, the statistics supplied by Rate Counsel are misleading. EIA did report that over the past several years that about 55% of capacity additions in the United States did come from

[20] Comments of Rate Counsel, October 4, 2018 hearing, (Hackensack), Transcript p. 20, l. 9-p. 21 l.1. (Rate Counsel also made the same statement at the other two ZEC appliction hearings.)

[21] N.J.S.A. 48:3-87.3(a)(9).

[22] N.J.S.A. 48:3-87.3(b)(1).

[23] N.J.S.A. 48:3-87.3(b)(2).

renewable resources.[24] But Rate Counsel failed to mention that most of those renewables were in other parts of the country. Thus, as noted in the same EIA report apparently relied upon by Rate Counsel, "[m]ost of the 1,196 MW of new wind capacity that came online in January and February 2018 was added in states that already have significant wind capacity such as Texas, Oklahoma, and Iowa" -- areas that are remote from New Jersey.[25] Similarly, "[m]ore than half of the 2018 solar PV additions will be added in California, North Carolina, and Texas" – also remote from New Jersey.[26] In fact, in 2017, only 0.8% of utility scale solar development in the United States occurred in New Jersey. Finally, the statistics supplied by Rate Counsel relate to "capacity" not energy output. Wind and solar operate at much lower production levels than nuclear plants and, of course, solar does not operate at all at night.

While PSEG strongly supports greater use of solar power to help meet New Jersey's energy needs, it is not practical to suggest that the State can now replace its nuclear plants with solar energy. The nuclear plants presently account for about 35% percent of the state's generation, while solar accounts for approximately 5 percent.[27] In addition to having to install many more solar panels, replacing the zero carbon energy supplied by nuclear generation with solar generation would require wholesale use of energy storage technologies that are not yet commercially available at competitive prices, so the energy produced while the sun shines could be saved and used at night, during stormy or cloudy days, and after large snowfalls when solar panels are covered. The cost of installing solar on that scale and extensive deployment of energy storage would far exceed the cost of the ZEC program.

[24] *See* "Today In Energy", May 7, 2018 (available at https://www.eia.gov/todayinenergy/detail.php?id=36092).

[25] *Id.*

[26] *Id.*

[27] *See* Comments of Dr. Dean Murphy, October 17, 2017, 3:30 PM Hearing (Freehold), p. 19, l. 7 – l. 11.

Finally, the statement supplied at the New Brunswick hearings regarding the application process by Dr. Dean Murphy, a principal at the Brattle Group and an expert in electricity markets, further repudiates Rate Counsel's claim. As Dr. Murphy stated, if the New Jersey nuclear plants were to retire, the electricity they would produce, during the three-year period covered by the ZEC application process, would be produced almost entirely by existing gas-fired and coal-fired generation units. He pointed out that New Jersey recently increased its Renewable Portfolio Standard, targeting 50 percent from renewables by 2030, which will require a tenfold increase in renewable energy production. Even if that ambitious rate of renewable growth were achieved, it would take 10 years, until 2028, to add enough new renewables to compensate for the lost nuclear generation. And after 10 years of extraordinary renewables buildout, New Jersey would be back where it started. All of that renewable generation would not yield a reduction in emissions – in fact, emissions would increase significantly during the intervening 10 years. Forward progress to achieve actual reductions would be delayed for a decade. The loss of New Jersey's nuclear plants would mean that, even if the state's new renewables targets ultimately were realized, the State would experience a great increase in emissions rather than achieve substantial progress toward de-carbonization.[28]

III. Responses to Specific Questions Posed in the BPU Notice

1.) What specific metrics should the Board utilize to determine if a nuclear power Unit ("Unit") should be deemed eligible for ZEC credits?

Referencing N.J.S.A. 48:3-87.5(a) and (e), the Board should use the specific criteria and requirements identified in the statute to determine if a unit should be deemed eligible. The statutory language includes five criteria that must be fulfilled by an eligible nuclear power plant,

[28] *See* Comments of Dr. Dean Murphy, Brattle Group, October 11, 2018 Hearing (New Brunswick), p. 68, l. 23 – p. 69, l. 1.

as well as additional requirements that must be included as part of an application submitted to the board by a unit seeking to participate in the ZEC program. Any applicant that fulfills these criteria and requirements should be deemed eligible. The five basic criteria are the following:

- First, the plant must demonstrate that it is licensed to operate through at least the year 2030;
- Second, the plant must demonstrate that it makes a significant and material contribution to New Jersey's air quality;
- Third, the plant must demonstrate a financial need for ZEC payments to prevent retirement;
- Fourth, the plant must certify annually that it does not receive other payments for its fuel diversity, resilience, air quality, or other environmental attributes that eliminate the need to retire the plant; and
- Fifth, the plant must pay an application fee of $250,000.[29]

Several of the eligibility criteria are purely factual, e.g. that the plant is licensed to operate through at least 2030 and that it has paid the necessary application fees. These should be accepted once verified by the Board.

A demonstration that the retirement of the plant will have an adverse impact on fuel diversity and resilience is also an important goal of the ZEC Act and should be considered an eligibility criterion. The definition of ZEC indicates that it represents "the fuel diversity, air quality or other environmental attributes" of a selected nuclear plant.[30] "Fuel diversity" and "resilience" are also mentioned as desirable attributes of nuclear generation in the sections

[29] N.J.S.A.. 48:3-87.5(e).

[30] N.J.S.A.. 48:3-87.4.

describing the required financial demonstrations for an eligible plant,[31] in the section describing the annual certification regarding payments other than ZEC for plant attributes[32] and in the section addressing potential "double-payment."[33]

The focus of this demonstration should be on whether the retirement of the nuclear plant will significantly increase New Jersey's reliance on gas-fired generation as a generation source. The findings of the ZEC Act provide:

> New Jersey has historically relied on a diverse mix of energy supply sources, including nuclear power, to meet the needs of its residents and businesses.[34]
> In light of the primacy of natural gas use for heating in New Jersey, increased reliance on natural gas-fired generation will render the electric generation and delivery systems less resilient and more vulnerable to the impacts of extreme winter weather events, natural gas pipeline accidents, and other factors affecting the deliverability of natural gas to electric power generating stations in and around the State.[35]

A plant's contribution towards fuel diversity/resiliency benefits thus should be a function of the expected likelihood that the retirement of the nuclear plant would cause New Jersey to become more reliant on gas-fired generation.

Some of the statutory criteria require that the applicant make demonstrations to the satisfaction of the board. These include demonstrations related to air quality impacts, fuel diversity/resilience and demonstrations related to financial condition of the unit. Applicants should have the burden to make these demonstrations consistent with any guidance provided by the Board. Applicants should be given a reasonable opportunity to supplement their submittals

[31] N.J.S.A.. 48:3-87.5(a), (e)(3).

[32] N.J.S.A.. 48:3-87.5 (e)(4).

[33] N.J.S.A.. 48:3-87.5 (i)(3).

[34] N.J.S.A.. 48:3-87.3 (a)(3)

[35] N.J.S.A.. 48:3-87.3 (b)(3).

to provide such additional information to the Board as the Board may determine to be appropriate during the review process.

2.) Referencing N.J.S.A.. 48:3-87.5(a) and (e)(3), how should the risk-adjusted cost of capital for a Unit be determined?

Referencing N.J.S.A. 48:3-87.5(e)(3), an applicant must demonstrate "the nuclear power plant is projected to not fully cover its costs and risks, or alternatively is projected to not cover its costs including its risk-adjusted cost of capital." In order to satisfy this criterion, an applicant must make only one of the two demonstrations, not both, and the applicant has the option to choose which demonstration it will make. If an application does choose the option of developing a risk-adjusted cost of capital, the applicant should determine its own methodology, with supporting documentation and industry benchmarks that it deems to be appropriate. PSEG does not anticipate that it will use a risk-adjusted cost of capital in its submittal.

3.) Referencing N.J.S.A.. 48:3-87.5(a), the Act requires the Board to consider the cost of "operational risks" and "market risks" for Units. What information should or should not be included in these two categories?

Referencing N.J.S.A.. 48:3-87.5(a), the information included in these two categories should be consistent with the statutory language: "For purposes of this subsection, 'operational risks' shall include, but need not be limited to, the risk that operating costs will be higher than anticipated because of new regulatory mandates or equipment failures and the risk that per megawatt-hour costs will be higher than anticipated because of a lower than expected capacity factor, and 'market risks' shall include, but need not be limited to, the risk of a forced outage and the associated costs arising from contractual obligations, and the risk that output from the nuclear power plant may not be able to be sold at projected levels." Also, as permitted by the statute, applicants should be allowed to identity other aspects of operational and market risk that can be properly supported and documented.

Support for the cost level of the operational risks and market risks identified in an applicant's submittal should include a narrative describing how those values conform to the statutory language or are otherwise appropriate. For operational risk, a reasonable default value of 10% of total costs could be adopted to simplify the application process based on the use of this value as a risk adder in other contexts. In the New York ZEC program, for example, operational risks were estimated to be 10% of total costs.[36] In addition, the Federal Energy Regulatory Commission ("FERC") has approved as just and reasonable a 10% upward adjustment of cost based bids to reflect operational risks associated with unit performance in energy markets. FERC explained that such an adjustment is appropriate to "account for uncertainty in the values of the costs utilized in computing … cost-based offers before all costs are known."[37] Similarly, the calculation of "Avoidable Cost Rates" for the purpose of PJM capacity auctions also allows a 10% adder over the levels of documented costs.[38]

For market risks, plant specific values should be developed. However, benchmarking against the values approved for the ZEC programs in New York and Illinois would also be appropriate. In New York, the market risks were estimated to be $4 per MWh.[39] In Illinois, the value used for market risk is less clear. However, an early draft of the ZEC legislation included

[36] CENG Comments in response to the Notice Soliciting Comments and Providing for Technical Conference and Public Statement Hearings issued by the State of New York Public Service Commission on January 25, 2016 in Case 15-E-0302.

[37] *PJM Interconnection, L.L.C.*, 153 FERC ¶ 61289, P 30 (2015).

[38] PJM Tariff, Attachment DD, Section 6.8 ("Adjustment Factor equals 1.10 (to provide a margin of error for understatement of costs")).

[39] CENG Comments in response to the Notice Soliciting Comments and Providing for Technical Conference and Public Statement Hearings issued by the State of New York Public Service Commission on January 25, 2016 in Case 15-E-0302.

a costs-plus-risks initial value of $42 per MWh.[40] When compared to the NEI average 2016 nuclear cost of $33.93 per MWh, the operational plus market risks have an implied total of roughly $8 per MWh.[41] If a 10% value for operational risk is assumed, this would also result in approximately a $4 per MWh value for market risks.

4.) Referencing N.J.S.A.. 48:3-87.5(a) and (e)(3), what specific financial information should the Board request that Units applying for the ZEC program provide?

Please see Attachment A to this document for an illustrative template for the financial submission.

Referencing N.J.S.A. 48:3-87.5(a) and (e)(3), the ZEC Act requires submission of: "certified cost projections over the next three energy years, including operation and maintenance expenses, fuel expenses, including spent fuel expenses, non-fuel capital expenses, fully allocated overhead costs, the cost of operational risks and market risks that would be avoided by ceasing operations, and any other information, financial or otherwise . . . ." Notably, the final item on the list "any other information," requires that the applicant ensures that all relevant information is included related to the inability of the plant to fully cover its costs and risks or to fully cover its risk-adjusted cost of capital. In addition, the "including but not limited" language that precedes the specifically described information shows that the list is not exclusive or exhaustive. Accordingly, the Board should allow applicants to propose other costs that can be documented.

In addition to cost information, each applicant should provide a revenue projection for energy, capacity, ancillary services, and any other categories that are relevant. The revenue projection is calculated as the product of projected electricity prices and projected output from the plant. The projected prices should be developed according to the following:

[40] See Amendment To Senate Bill 1585 (http://www.ilga.gov/legislation/99/SB/PDF/09900SB1585sam002.pdf (page 82)).

[41] https://www.nei.org/CorporateSite/media/filefolder/resources/statistics/nuclear-costs-context-201708.pdf

- Energy: Projected energy prices should be determined using energy futures prices published by a well-known commodity futures exchange, for example the Intercontinental Exchange,[42] Nodal Exchange,[43] or NYMEX.[44] Futures prices are quoted for delivery at a hub or zonal location, and not for every location on the grid. Futures prices at the appropriate trading hub or zonal location must then be adjusted to reflect the expected future price at the generation bus. This should be estimated as the historical difference between the hub or zone and the generation bus.
- Capacity: Projected capacity prices should be determined using the PJM RPM cleared prices.
- Ancillary Services: Projected ancillary services prices should be determined using best information available

Also, applicants should provide a narrative description of each of the items above with supporting documentation. Finally, a company officer should certify the accuracy of the financial information in the application and "also include a certification that the nuclear power plant will cease operations within three years unless the nuclear power plant experiences a material financial change, and the certification shall specify the necessary steps required to be completed to cease the nuclear power plant's operations".[45]

5.) Referencing N.J.S.A.. 48:3-87.5(e)(2), what information should be provided to the Board to demonstrate that the Unit makes a significant and material contribution to the air quality in the state? What information should be provided to demonstrate that the Unit minimizes harmful emissions that adversely affect the citizens of the state? What information should a Unit provide to demonstrate that, if the Unit were to be retired, the

[42] TheICE.com

[43] cmegroup.com/company/nymex.html

[44] nodalexchange.com

[45] N.J.S.A.. 48:3-87.5(a)

retirement would significantly and negatively impact New Jersey's ability to comply with State air emissions reduction requirements?

Referencing N.J.S.A.. 48:3-87.5(e)(2), each applicant must demonstrate that it makes a "significant and material contribution" and "minimizes harmful emissions" and that its retirement "would negatively impact New Jersey's ability to comply with State air emission reduction requirements." Applicants should have the burden to make these demonstrations. Applicants should be instructed to provide:

- Model results of the re-dispatch and emissions increases for CO_2, NO_X, particulates and SO_2 due to retirement of the unit, based on modeling techniques in common use in the energy industry; as discussed above and because this analysis is limited to a three year horizon into the future which is too short of a time frame for significant new entry, the modeling should assume that no new generation other than currently planned generation is constructed during the study period.
- Model results for ozone air quality impacts that take into consideration prevailing winds and pollution transport, based on modeling techniques in common use in the industry.
- Estimate of the impact on compliance with the NJ Global Warming Response Act.

Referencing N.J.S.A.. 48:3-87.5(e)(2), one of the criteria includes the concept of "minimizing emissions that result from electricity consumed in New Jersey." A similar phrase is included in the Illinois ZEC statute. In Illinois, this phrase was implemented by identifying a proxy for power flows into and out of the state to represent electricity consumed in the state. The proxy used was the ratio of the installed capacity located in the state compared to the total capacity required to reliably serve load in the state.[46] PSEG recommends that the Board interprets this

[46] https://www2.illinois.gov/sites/ipa/Documents/2018ProcurementPlan/Zero-Emission-Standard-Procurement-Plan-Approved.PDF (Page 42)

phrase in a similar manner to the Illinois ZEC program. Electricity consumed in New Jersey from an eligible plant located in New Jersey would be the ratio of the total installed capacity located in New Jersey (from the PJM Resource Model) to the sum of the RPM load obligations for the New Jersey delivery zones. Electricity consumed in New Jersey from an eligible plant located outside of New Jersey would be one minus the ratio calculated for a New Jersey plant.

6.) Referencing N.J.S.A.. 48:3-87.5(e)(4), the Act requires that eligible Units certify that they do not receive any direct or indirect payment or credit under a law, rule, regulation, order, tariff, or other action of this State or any other state, or a federal law, rule, regulation, order, tariff, or other action, or a regional compact, despite its reasonable best efforts to obtain any such payment or credit, for its fuel diversity, resilience, air quality, or other environmental attributes that will eliminate the need for the Unit to be retired. What should the Board interpret fuel diversity, resilience, air quality, and other environmental attributes to include?

The payment categories identified in N.J.S.A.. 48:3-87.5(e)(4) should be interpreted as including the revenue impacts of carbon cap-and-trade and carbon tax programs incremental to the impacts reflected in forward markets at the time of the ZEC application, as well as any other emission credit program or fuel diversity/resiliency program that is expressly described in its enabling provisions as designed or intended to promote fuel diversity, resilience, air quality, or any other environmental goal. Other types of payments should not be included. In particular, revenue impacts related to changes in energy and capacity market design that are intended to improve price formation generally for the whole market – without regard to the fuel diversity, resilience, air quality or other environmental characteristics of affected plants – should not be included.

7.) What information about other benefits, subsidies, or tax implications should be provided to the Board as part of a ZEC application?

As shown in Attachment A, taxes other than income (e.g., property taxes) should be included in the cost forecast.

8.) What forecasts, projections, or estimates should be included, or disallowed, as part of a ZEC application process?

See response to questions 2, 3, 4 and 5 above. The forecasts, projections, or estimates should also include supporting documentation and should be based on publicly available information to the extent feasible. Unsubstantiated forecasts should not be allowed.

9.) What other information, confidential or not, should the Board request to fully evaluate whether or not a Unit is at risk of closure due to financial hardship?

The ZEC Act requires an applicant to certify that the plant will close within three years absent a material financial change. The certification that the plant will close is significant and will not be made lightly. Applicants will recognize that there will be substantial negative personnel impacts should the plants not be selected to receive ZECs after making this certification. If a decision to permanently shut down a nuclear plant is made, the first consideration is to ensure the continued safe operation through the date of closure. Maintaining qualified personnel is paramount and would require large employee retention costs. It would create great uncertainty to the many dedicated employees and their families. Other factors that could arise include unit capacity market obligations, forward energy sales contract obligations, long term nuclear fuel procurement decisions and other large plant support contracts, and coordination with Federal, State, and Local agencies. Providing the certification thus should give the Board a high degree of assurance that the plant will retire absent a material financial change.

10.) What other relevant factors, such as sustainability or long-term commitment to nuclear energy production, should the Board consider and evaluate?

The Board should pay particular attention to the impact of the retirement of the applicant plant on compliance with the NJ Global Warming Response Act based on the focus in the

legislative findings on CO_2 emissions and climate change. In addition, New Jersey recently increased its interim clean energy goal by setting a target of obtaining 50% of its electric energy from clean energy resources by 2030. Without the retention of nuclear power serving the State, achieving this goal will be much more difficult. Further, the remaining life of a unit is an objective measure of sustainability and long-term commitment. As discussed in response to Question no. 13, both of these measures can be utilized in the ranking formula. Finally, fuel diversity/resilience as a function of the extent to which retirement of the nuclear plant results in increased reliance by New Jersey residents on gas-fired generation should be considered.

11.) What factors and expenses should the Board consider in analyzing a Unit's avoided costs if the Unit retires?

The costs and risks that should be included in analyzing unit retirement are specified in Attachment A and as discussed in the answer to Question No. 4. These costs are consistent with the costs and risks specified in N.J.S.A. 48:3-87.5 (a) and (e)(3).

12.) What information about parent or affiliate companies of the nuclear power plant should be requested for the Board to holistically consider the Unit's financial condition?

Plant economics will dictate the retirement decision. As discussed above, consideration of the health of the parent or affiliates is not pertinent under the ZEC Act itself or as a matter of finance theory. However, because "fully allocated corporate overheads" are a specifically identified cost category under the ZEC Act, the level of those costs assigned to the nuclear unit applying for ZEC payments should be evaluated to ensure the allocation among the parent, affiliates, and the nuclear power plant is reasonable.

13.) Assuming that any Unit is deemed eligible to receive ZECs by the Board, in ranking eligible Units (N.J.S.A.. 48:3-87.5(d) through (g)), how should the Board factor each Unit's potential to maximize benefits to New Jersey and to minimize the rate impact on the ratepayers of New Jersey's electric distribution companies?

Referencing N.J.S.A.. 48:3-87.5(d) through (g), the Board must rank eligible units from first to last and select eligible units according to their ranking. The Board has broad discretion about how to rank eligible units. The rate impact for the first three year term is set in the statute and therefore is not a factor.

Because ranking is focused on identifying relative impacts, the criteria need not be designed to yield exact values but only need provide a fair basis for comparison among units. In Illinois, a spreadsheet scoring methodology was developed to rank units using simple proxies for the desired comparisons. A similar formula could be developed to rank units in New Jersey based on the distinguishing items in the New Jersey eligibility criteria.

A multi-factor scoring formula could be the following:

- 25% * (Remaining life / 60 year)
- 25% * (Consumption in NJ based on {Installed Capacity / NJ Load Obligations})
- 25% * (Air Quality impact based on 800 miles – {Unit distance to NJ / 800 miles})
- 25% * (GWRA Impact based on GWRA accounting methodology)

The factors above would be summed to determine a score for each eligible plant. Each of the factors is rooted in the statutory language. The first factor reflects the sustainability goals of the program as delayed retirement of longer-lived units may provide more benefits over the long term. The second factor addresses the criterion to minimize emissions that result from electricity consumed in New Jersey. It is also indicative of loss of fuel diversity associated with the retirement of a nuclear unit because it reflects the comparative impact on New Jersey residents of increased reliance on gas-fired generation if the plant were to retire. *See* response to Question No. 5 for additional detail on the second factor. The third factor uses the distances from the eligible plant to New Jersey as a proxy for the intensity of air quality impacts, with 800 miles

being the approximate distance from New Jersey to the farthest point in PJM. The fourth factor relates to the unit's retirement impact on New Jersey's ability to comply with State air emissions reduction requirements. The 2007 New Jersey Global Warming Response Act (GWRA) calls for a reduction in greenhouse gas emissions to 1990 levels by 2020, approximately a 20 percent reduction below estimated 2020 business-as-usual emissions, followed by a further reduction of emissions to 80 percent below 2006 levels by 2050. For its compliance inventory, New Jersey counts all emissions from in-state generation plus estimated emissions from electricity imports based on the PJM average emission rate.[47] Based on this methodology, the retirement of an in-state plant would be replaced one-for-one with imported electricity and increase the emission inventory significantly. On the other hand, the retirement of an out-of-state plant would have minimal impact to the New Jersey emissions inventory because very little imported electricity is reflected in the total inventory.

> 14.) Assuming that any nuclear power plant is deemed eligible to receive ZECs by the Board, in ranking eligible Units (N.J.S.A.. 48:3-87.5(d) through (g)), how should the Board factor the Unit's physical location (in-state, out-of-state, and specific venue) within PJM?

The physical location of the plant is not an eligibility requirement *per se* and should only be considered to the extent that plant location has a demonstrable impact on statutory eligibility and ranking criteria expressly identified in the ZEC Act. Such impacts include resultant air emissions within New Jersey, achievement of New Jersey air emission goals and fuel diversity/resiliency affecting New Jersey's energy supply, caused by the applicant plant being shut down as described in our answer to Question No. 13 above.

[47] *See* NJ DEP, New Jersey Greenhouse Gas Inventory and Reference Case Projections 1990-2020, November 2008. Appendix A, Energy Supply pp. 14-18 (https://www.nj.gov/dep/aqes/docs/Greenhouse%20Gas%20Inventory%201990-2020_2008.pdf).

15.) Referencing N.J.S.A.. 48:3-87.5(i)(3), how should the Board determine the revenue amount received by any selected nuclear power plant in an energy year for its fuel diversity, resilience, air quality, or other environmental attributes from other sources?

See response to Question No. 6 regarding cost category definitions. The plant should provide to the BPU the dollar amounts of any payments falling within these categories but only to the extent that the payments were not previously included in the plant's application seeking ZECs.

16.) Should the application include/allow voluntary commitments as a condition of approval?

No. Only commitments that are required in the legislation should be included as a condition of approval. The Board has no authority to consider "voluntary commitments" not included within the scope of the ZEC Act.

17.) Please discuss how the recently issued FERC Order regarding the PJM Capacity Market, Docket Nos. EL16-49, ER18-1314, and EL18-178, relates to or otherwise impacts the Board's consideration of the ZEC program?

The ZEC program should continue forward according to the statutory schedule. The referenced FERC Order will have no impact on the first three year term of the New Jersey ZEC program, because any changes to the PJM capacity market will take effect beyond that time frame. Future changes should be evaluated by the Board if and when they occur.

Respectfully submitted,

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Attachment A

		June 2019 - May 2022 Total (millions)	$/MWh	Energy Year Data (millions) 2019/20 $	2020/21 $	2021/22 $
	Revenues					
(1)	Energy Revenues					
(2)	Capacity Revenues					
(3)	Ancillary Revenues					
	Total Revenues					
	Costs					
	Operation & Maintenance					
(4)	Labor					
(5)	Materials					
(6)	Outside Services					
(7)	Taxes Other Than Income					
(8)	Fully Allocated Overhead					
(9)	Spent Fuel					
(10)	Cost of Working Capital					
(11)	Other					
	Total Operation & Maintenance					
(12)	**Fuel Capital Expenditures**					
(13)	**Non-Fuel Capital Expenditures**					
	Cost of Risks					
(14)	Cost of Operational Risks					
(15)	Cost of Market Risks					
	Total Cost of Risks					
	Total Costs					
	Total Revenues Less Total Costs					