

**STATE OF NEW JERSEY  
BOARD OF PUBLIC UTILITIES**

**IN THE MATTER OF THE APPLICATION OF PSEG NUCLEAR  
LLC FOR THE ZERO EMISSION CERTIFICATE PROGRAM –  
HOPE CREEK**

**IN THE MATTER OF THE APPLICATION OF PSEG NUCLEAR  
LLC AND EXELON GENERATION COMPANY, LLC FOR THE  
ZERO EMISSION CERTIFICATE PROGRAM – SALEM UNIT 1**

**IN THE MATTER OF THE APPLICATION OF PSEG NUCLEAR  
LLC AND EXELON GENERATION COMPANY, LLC FOR THE  
ZERO EMISSION CERTIFICATE PROGRAM – SALEM UNIT 2**

**BPU Docket Nos. ER20080559, ER20080557 and ER20080558**

**INITIAL POST-HEARING BRIEF OF  
PSEG NUCLEAR, LLC**

**March 26, 2021**

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***In the Matter of the Application of PSEG Nuclear LLC for the Zero Emission Certificate Program – Hope Creek, Salem Unit 1, Salem Unit 2  
BPU Docket Nos. ER20080559, ER20080557 and ER20080558***

**PRELIMINARY STATEMENT**

In April 2019, the Board took the critical step of approving the current level of the ZECs for Salem 1, Salem 2, and Hope Creek, because it recognized how critical these plants are to the clean energy goals of the State of New Jersey. These plants generate nearly 40% of the State's electric energy and 90% of the state's carbon free energy. Nuclear generation is also the most cost-effective form of clean energy. The Board's decision regarding the second round of ZECs is the next critical step in New Jersey's journey to protect its citizens from the impacts of climate change and to further its environmental goals, in the most cost effective way possible for New Jersey customers.

The retirement of these plants would dramatically increase carbon emissions and other air emissions, as the plants' output will undoubtedly be replaced, for years to come, by output from fossil-fueled generation plants. Indeed, closure of these plants would result in 90% of in-state generation being fueled by natural gas and coal. New Jersey would spend the next decade dedicating its financial resources to wind and solar development, at a cost much greater than a \$10/MWh ZEC, just to get back to where it is today with respect to carbon emissions. Closure would also result in the dispatch of resources with higher marginal costs than nuclear plants, increasing total costs to customers by more than \$170 million a year as compared to customer costs inclusive of a \$10/MWh ZEC, while New Jersey customers continue to pay \$46/MWh for ORECs and about \$220/MWh for SRECs. The near-term dramatic increase in the share of in-state generation fueled by natural gas could also impact the resiliency of electricity generation supply to New Jersey consumers, by creating a large dependence on a single fuel type and on a handful of interstate natural gas transportation pipelines into New Jersey.

The possibility of premature retirement for nuclear generating plants is very real, as seen across the country in recent years. And the main beneficiaries of the closure of the Salem and Hope Creek plants would be fossil fuel generators who would enjoy higher prices and levels of output, at the expense of customers and the environment.

PSEG has been clear with the Board that its revenues, costs, and risks support a ZEC significantly in excess of \$10/MWh. PSEG has demonstrated that financial need by opening its books. Not only has it provided an extensive set of application materials requested by the Board in its August 12, 2020 Order, PSEG has been transparent and responsive to the questions posed by the Board and other parties throughout the Board's robust procedure which included extensive discovery, written cross-examination and oral cross-examination during an evidentiary hearing.

Although PSEG's need is greater than \$10/MWh, the Company is nevertheless willing to accept a \$10/MWh ZEC, as a bridge to a longer-term solution that will place these plants on a firmer financial footing for the duration of their licenses. PSEG is willing to view the ZEC program as a bridge to a long-term solution, despite its near-term insufficiency, but there is no point in crossing a bridge to nowhere.

PSEG looks forward to working with the Board and with all stakeholders to develop a long-term solution. Until that is accomplished, extension of the current ZEC program at the full statutory amount is necessary and supported by the record.

### **PROCEDURAL HISTORY AND STATEMENT OF FACTS**

On August 29, 2018, the Board approved an Order establishing the ZEC program.<sup>1</sup> On April 18, 2019, the Board concluded that PSEG's Hope Creek, Salem 1, and Salem 2 nuclear

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<sup>1</sup> Order Initiating the Zero Emission Certificate Program, Designating Commissioner, and Setting Manner of Service and Bar Date, BPU Dkt. No. E018080899 (Aug. 29, 2018).

plants were eligible to receive ZECs at the statutory rate of \$10/MWh for the first eligibility period.<sup>2</sup> The Board’s award of ZECs for the first eligibility period was subsequently affirmed by the New Jersey Appellate Division, which stated that the Board’s decision was “adequately supported by the record and consistent with both the ZEC Act’s plain language and the legislative intent.”<sup>3</sup>

On August 12, 2020, the Board issued an order establishing the application process for the second ZEC eligibility period.<sup>4</sup> On September 10, 2020, President Fiordaliso issued a procedural schedule for the second eligibility period, including deadlines for discovery requests.<sup>5</sup> On September 29, 2020, President Fiordaliso issued an order granting IMM and Rate Counsel access to confidential information; granting IMM, NJLEUC, and P3 intervenor status; and granting PSE&G participant status.<sup>6</sup> On October 1, 2020, PSEG submitted timely applications for the Hope Creek, Salem 1, and Salem 2 nuclear plants to receive ZECs during the second eligibility period.<sup>7</sup> In accordance with the Order dated September 10, 2020, PSEG and Exelon Generation received and timely responded to discovery requests from Staff, IMM, and Rate Counsel.

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<sup>2</sup> Order Determining the Eligibility of Hope Creek, Salem 1, and Salem 2 Nuclear Generators to Receive ZECs, BPU Dkt. Nos. E018080899, E018121338, E018121339, and E018121337 (Apr. 18, 2019) (“ZEC1 Order”).

<sup>3</sup> *In the Matter of the Implementation of L. 2018, C. 16 Regarding the Establishment of a Zero Emission Certificate Program for Eligible Nuclear Power Plants*, Dkt. No A-3939-18, slip op. (N.J. App. Div. Mar. 19, 2021) (“ZEC1 Affirmance”).

<sup>4</sup> Order Establishing the Application Process for the Second Eligibility Period and Approving Request for Quotation, BPU Dkt. No. EO18080899 (Aug. 12, 2020).

<sup>5</sup> Order Setting a Procedural Schedule, BPU Dkt. No. ER20080557 (Sept. 10, 2020).

<sup>6</sup> Order Ruling on Motions to Intervene and Participate, Admission Pro Hac Vice, and Access to Confidential Information, BPU Dkt. No. ER20080558 (Sept. 29, 2020).

<sup>7</sup> With respect to Salem 1 and Salem 2, PSEG submitted the Applications on behalf of itself and its minority co-owner, Exelon Generation Company, LLC (“Exelon Generation”). Exelon Generation submitted Supplemental Information in Support of the Salem 1 and Salem 2 Applications on the same day.

On December 18, 2020, President Fiordaliso issued an order providing the operative revised procedural schedule for the second eligibility period.<sup>8</sup> Pursuant to that schedule, the parties submitted direct testimony, cross-examination questions, and responses to cross-examination questions. On March 8, 2021, the Board held the evidentiary hearing in this matter. Now, in accordance with the procedural schedule, PSEG submits this post-hearing initial brief.

## ARGUMENT

### **I. The Salem And Hope Creek Plants Satisfy The Eligibility Requirements Of The ZEC Act, And The Board Should Therefore Extend The Current ZEC Program**

To determine eligibility, the ZEC Act requires the Board to evaluate applicants under five criteria. In addition to demonstrating a license to operate through 2030 and providing an application fee, the applicant must demonstrate that:

- (1) “it makes a significant and material contribution to the air quality in the State by minimizing emissions that result from electricity consumed in New Jersey, it minimizes harmful emissions that adversely affect the citizens of the State, and if the nuclear power plant were to be retired, that that retirement would significantly and negatively impact New Jersey’s ability to comply with State air emissions reduction requirements;”
- (2) based on a specific set of financial information “the nuclear power plant is projected to not fully cover its costs and risks . . . and that the nuclear power plant will cease operations within three years unless the nuclear power plant experiences a material financial change;” and
- (3) it “does not receive any direct or indirect payment . . . for its fuel diversity, resilience, air quality or other environmental attributes that will eliminate the need for the nuclear power plant to retire[.]”<sup>9</sup>

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<sup>8</sup> Pre-Hearing Order on Schedule, Outstanding Issues, and Evidentiary Hearing, BPU Dkt. No. ER20080559 (Dec. 18, 2020).

<sup>9</sup> N.J.S.A. 48:3-87.5(e)(2)-(4) (emphasis added).

The record plainly demonstrates that the Hope Creek and Salem Plants satisfy these financial and environmental requirements and establish eligibility for a ZEC award in excess of \$10/MWh if the statute permitted it.

**A. PSEG Has Satisfied The Financial Need Criteria, Taking Into Account Projected Costs And Revenues And Including, In Accordance With The Statutory Requirement, Operational And Market Risks.**

The ZEC Act provides an applicant with two potential approaches to demonstrate financial need, only one of which must be used. The potential approaches are: (1) demonstrating a plant is “projected to not fully cover its costs and risks,” *or* (2) demonstrating a plant is “projected to not cover its costs including its risk-adjusted cost of capital.”<sup>10</sup>

PSEG has chosen to demonstrate financial need based on the “costs and risks” in the first approach. As detailed extensively in the record for this matter, each plant projects revenues to be significantly less than its projected costs and risks, resulting in a revenue shortfall, which creates a financial need under the ZEC Act. This revenue shortfall is greater than the shortfall demonstrated in the previous “ZEC1” proceeding. This is because forward energy prices have fallen below the levels that were projected during the last ZEC application period.<sup>11</sup>

Projected revenue for a nuclear plant is comprised of three elements: energy revenue, capacity revenue, and ancillary services revenue. Projected revenues were submitted with the application, and were updated in a number of responses in the proceeding. As Mr. Cregg explained in his testimony, PSEG calculated the expected energy revenues for each plant as the product of the expected PJM locational marginal prices (“LMP”) at the unit’s location, taking into account the forward price for zonal LMPs and adjusting for congestion and losses, and the unit’s expected output, taking into account historical unplanned outage rates and forecasted refueling outages.

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<sup>10</sup> N.J.S.A. 48:3-87.5(e)(3).

<sup>11</sup> See Exhibit PS-1 (Direct Testimony of Daniel Cregg (Jan. 29, 2021)) (“Cregg Testimony”), at 3-4.

Because forward energy prices constantly fluctuate, PSEG believes that a reasonable point in time to measure those prices for the purpose of this case is the date of PSEG's application.<sup>12</sup> Expected capacity revenue for each unit is the product of the quantity of unforced capacity the unit is eligible to sell into the PJM capacity auction, and the forecasted auction price. Finally, the expected revenue each plant will receive for providing reactive power voltage support ancillary services is based on tariff rates.<sup>13</sup>

Consistent with the language of the ZEC Act (N.J.S.A. 48:3-87.5(a)), the costs that PSEG set forth in each of the applications include operation and maintenance ("O&M") expenses, which include labor costs; support services and allocated overhead; outside services costs, *i.e.*, contractors; real estate taxes; and other costs, *e.g.*, regulatory fees, facilities and rental costs. PSEG's costs also include fuel expenses, spent fuel costs, and non-fuel capital expenditures associated with long-lived plant equipment required to maintain safe and reliable operations. In addition, PSEG's costs include the cost of working capital.<sup>14</sup>

The ZEC Act also expressly requires the Board to consider the cost of operational and market risks.<sup>15</sup> In operating a business, particularly a complex operation like a nuclear power

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<sup>12</sup> Forward energy prices as of the application date of September 30, 2021 can be found in PSEG's responses to Discovery Request Staff-PS-0009 (filed January 6, 2021) and Discovery Request Staff-PS-0011 (filed January 22, 2021). Response to Staff-PS-0009 provides the projected revenues using calculated forward prices as of September 30, 2020, consistent with the format provided in PSEG ZECJFIN-13, and ZECJFIN-13c. The 2020-2021 energy year calculation total includes actuals for June-October 2020. Response to Staff-PS-0011 provides a similar update to the projected revenues using calculated forward prices as of September 30, 2020 in a refreshed version of the responses to PSEG ZECJFIN-25. While the Independent Market Monitor ("IMM") and Levitan & Associates LLC ("Levitan") submitted updated data as of January 4, 2021, the date just prior to the deadline for submitting evidentiary hearing testimony, forward energy prices have fallen since that point back below their September 30, 2020 level. See Responses to BPU Cross 5, 6, and 13.

<sup>13</sup> Cregg Testimony, at 4.

<sup>14</sup> Cregg Testimony, at 7-8. Projected costs were submitted with the applications and in a number of responses in the proceeding. The most up to date set of projected costs can be found in PSEG's responses to Discovery Request: Staff-PS-0009-Update (filed January 22, 2021) and Discovery Request: Staff-PS-0011 (filed January 22, 2021). The updated response to Staff-PS-0009 provides the updated costs as of October 31, 2020 consistent with the format provided in PSEG ZECJFIN-07. Response to Staff-PS-0011 provides a similar update to the projected costs in a refreshed version of the responses to PSEG ZECJFIN-25.

<sup>15</sup> N.J.S.A. 48:3-87.5(a); *see also* ZEC1 Affirmance, at 34-37.



plant, consideration of operational and market risks are, in addition to revenues and costs, “critical in making the business planning decision whether to cease operations.”<sup>16</sup> Under the ZEC Act, operational risks include, among other things “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.” N.J.S.A. 48:3-87.5(a). The ZEC Act defines “market risks” to include the “risk of forced outages and the associated costs arising from contractual obligations, and the risk that output from the nuclear plant may not be able to be sold at projected levels.” *Id.*

Because operational risk reflects unexpected regulatory developments, equipment failures, and reductions in output, it is impossible to predict the precise costs that will be incurred due to operational risk in a given period. To reflect this uncertainty, PSEG applied a 10% adder to its best estimate of foreseeable future costs. This methodology is appropriate, as it is consistent with how PJM determines a facility’s costs for energy and capacity bids.<sup>17</sup> FERC has found that the 10% adder “account[s] for uncertainty in the values of the costs utilized in computing . . . cost-based offers before all costs are known.”<sup>18</sup> Calculation of PSEG’s cost of operational risk is detailed in the application and summarized in Mr. Cregg’s testimony.<sup>19</sup>

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<sup>16</sup> Cregg Testimony, at 10.

<sup>17</sup> *Id.* at 12 (citing PJM Open Access Transmission Tariff (“PJM Tariff”), Attachment DD, Section 6.8(a) (capacity bids); Attachment K, Appendix, Section 6.4 (energy offer price caps)).

<sup>18</sup> *Id.* (citing *PJM Interconnection, LLC*, 153 FERC 61,289, P 30 (2015)).

<sup>19</sup> See Cregg Testimony, at 15 (reporting the cost of operational risk for each unit and the MWh-weighted average \$/MWh impact of operational risk on the Salem and Hope Creek plants). There is extensive record evidence supporting the cost of operational risks (as well as the other costs) in Mr. Cregg’s testimony. For example, discovery request Staff-PS-0002 sought a “detailed explanation, including supporting workbooks or equivalent documentation as required by the ZEC Act, of the cost of operational risks.” PSEG’s response points to the application materials, and notes that “[i]n its responses to ZECJ-FIN-002, ZECJ-FIN-007, ZECJ-FIN-0022, ZECJ-FIN-0025, PSEG has provided a detailed explanation of operational risks and the basis for 10% of the total costs being applied to calculate operational risk.” The response goes on to detail the unique risks of unexpected equipment failure and nuclear regulatory changes that “have increased . . . costs at New Jersey nuclear plants by hundreds of millions of dollars in the last decade”, including (1) details on the upgrades required for all U.S. nuclear plants in response to the event at the Fukushima Dai-Ichi plant in Japan in 2011 and following the events of September 11, 2001, including citations to several formal NRC directives; (2) on-going NRC activities/investigations on arc fault and uranium issues that could

As for market risk, PSEG is exposed to risk in both the energy market and in the capacity market. To calculate energy market risk, PSEG modeled: (i) forced outage risk, that is, the risk that a facility will experience an unplanned outage requiring that PSEG cover the cost of replacement electricity needed to be secured; including the potential of having to do this at elevated prices; and (ii) energy price volatility risk, that is, the risk that energy prices will decrease prior to when PSEG's forecasted output can be hedged, taking into account the risk-reducing impact of the Company's hedging practices.<sup>20</sup> To calculate capacity market risk, PSEG considered the risk that implementation of PJM's Minimum Offer Price Rule ("MOPR") may cause PSEG units not to clear the capacity auction for one or more energy years, which PSEG estimates is potentially one of the most significant sources of risks associated with capacity revenues.<sup>21</sup> Like operational risk, calculation of PSEG's cost of market risk is detailed in the application and summarized in Mr. Cregg's testimony.<sup>22</sup>

Based on the above-described elements, PSEG calculated the level of attribute payment required to cover PSEG's costs, including the cost of operational risks and market risks. The attribute payment required for each plant, and for each year of the three-year eligibility period

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result in costly new regulation; and (3) the example, very close to home, of the approximately \$266 million unexpected cost to address steam generator issues at Salem Unit 1 in 2008. PSEG then explains that its estimate that the cost of these operational risks is 10% of its projected costs in fact "corresponds to the approach taken by PJM and FERC in determining a facility's avoidable costs for energy and capacity bids" and is, if anything, reasonable. *See also* FINJ-25; PSEG response to Staff-PS-0011 (submitted Jan. 22, 2021) (refreshed version of PSEG-ZECJFIN-25) (all-in calculation of subsidy requirement, including operating and market risk); and ZECJFIN-7 (calculation of operational risk as O&M, fuel and non-fuel capital expense).

<sup>20</sup> Cregg Testimony, at 16-17, 20-24.

<sup>21</sup> As noted on pages 19 and 25 of Mr. Cregg's testimony, PSEG bears other risks related to capacity, including price forecast risk and capacity performance risk.

<sup>22</sup> *See* Cregg Testimony, at 19-25; ZECJ-FIN-0018 (including (1) confidential attachment, Cost of Market Risk Methodology, describing in detail the methodology used to calculate the cost of market risks, along with a summary of the input assumptions and results for the three-year eligibility period; and (2) confidential supporting workbook attachment, Hedging Percentages, providing PSEG's hedging percentages as of May 29, 2020, based on the estimated hedge proration). ZECJ-FIN-0018 also states that the market risk of each of the three units has increased, in varying amounts, since the first ZEC eligibility period, and states further that "[t]he energy component of the cost of market risks is of a similar magnitude to that of the first ZEC period. The key difference is the additional market risk associated with capacity revenues, given that capacity auctions for the term of second ZEC eligibility period have not yet occurred."

under consideration, is set forth in Mr. Cregg’s testimony, at page 26, and for each plant is significantly in excess of \$10/MWh over the three-year eligibility period.<sup>23</sup>

**B. It Is Undisputed That PSEG Has Again Satisfied The Environmental Impact Demonstration Of The ZEC Act, And That Continued Operation Of The Plants Will Satisfy The Legislature’s Concerns Regarding Fuel Diversity.**

As described succinctly in the unchallenged testimony of Carl Fricker, PSEG Power’s Vice President – Power Operations Support, PSEG has easily satisfied the environmental criteria of the ZEC Act:

PSEG’s applications, including in particular PSEG’s responses to ENV-1 and ENV-2, demonstrate the significant negative impact that the retirement of one or more of the Hope Creek and Salem Plants would have on the ability of the State to achieve emissions reductions. PSEG’s applications include detailed studies conducted by recognized industry experts – PA Consulting and ERM Consulting (“ERM”) – showing impacts on fuel diversity, resilience, air quality, or other environmental benefits that would result from the retirement of the Hope Creek and Salem Plants. These studies demonstrate that the retirement of any one of the three Hope Creek and Salem Plants (and especially all three) would result in significant increases in greenhouse gas emissions and ozone levels.<sup>24</sup>

Further, the record demonstrates that the negative public health impacts caused by the increase in pollutants that would result from closure of the plants would fall most heavily on minority and low income populations within the State. As Mr. Norman from PA Consulting stated:

[I]t is also important to recognize that NO<sub>x</sub> is one of the main precursors of ozone formation, and that SO<sub>2</sub> and NO<sub>x</sub> are precursors of fine particulate formation. Like other air pollutants, both ozone and fine particulate matter are known to have significant negative health impacts, and studies demonstrate these negative health

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<sup>23</sup> When PSEG filed its October 1, 2020 applications for Hope Creek, Salem I, and Salem II, it based the energy revenues on forward prices as of May 29, 2020. In responses to discovery questions (PS-9 and PS-11), adjustments were made to reflect energy pricing as of September 30, 2020 and PSEG’s forecasted costs as of the end of October 2020. Those adjustments are reflected in the table on page 26 of Mr. Cregg’s testimony.

<sup>24</sup> See Exhibit PS-4 (Direct Testimony of Carl Fricker (Jan. 29, 2021)) (“Fricker Testimony”), at 12-13.

impacts are particularly acute in lower income and minority populations.<sup>25</sup>

The closure of the nuclear plants thus would have negative consequences from the standpoint of social justice impacts.

There was no testimony or evidence of any kind challenging the premises or conclusions of the PA Consulting and ERM studies and comments submitted into the record, or questioning any of Mr. Fricker's statements in his written direct testimony or his responses to written cross-examination questions.<sup>26</sup> On the environmental criteria, as on the financial ones, the Board can, and undoubtedly should, extend the existing ZEC program and preserve the Salem and Hope Creek plants at the full rate permitted under the law.

Doing so would also be highly cost-effective for New Jersey. A \$10/MWh ZEC is only a fraction of the amount paid for environmental attributes procured from offshore wind (\$46/MWh) or solar (about \$220/MWh). And because the retirement of nuclear plants would lead to the procurement of more expensive capacity resources and result in the dispatch of higher marginal cost resources, customers would end up paying higher capacity and energy prices.

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<sup>25</sup> Comments of Ron Norman, BPU Docket Nos. ER20080557, ER20080558, & ER20080559, at 2 (Feb. 12, 2021). Mr. Norman's written comments include a number of references to scholarly articles supporting the proposition that the health impacts associated with air pollution fall more heavily on minority and lower income populations. One study that focused on New Jersey concluded that "[b]y analyzing the population of an entire state, [i.e., New Jersey] we had sufficient power to test interaction and found that the effects of PM<sub>2.5</sub> were greater in census tracts with a higher percentage of black residents, lower median home value, or lower median home income." *Id.* at n.2 (citing Wang, Kloog, *et al.*, *Estimating Causal Effects of Long-Term PM<sub>2.5</sub> Exposure on Mortality in New Jersey*, *Environmental Health Perspectives*, vol. 124, no.8 (2016), p. 1187 (<https://doi.org/10.1289/ehp.1409671>)).

<sup>26</sup> Rate Counsel witness Mr. Chang invites the Board to redesign the ZEC award amount to align with his flawed understanding of greenhouse gases as an "in-state only" pollutant. *See* Testimony of Maximillian Chang ("Chang Testimony"), at 33. But the ZEC Act is concerned with carbon emissions resulting from nuclear retirements regardless of whether that increase occurs in NJ or another PJM state. *See* N.J.S.A. 48:3-87.5(e)(2) (to qualify for ZECs a plant show that it makes a "significant and material contribution to the air quality in the State by minimizing emissions that result from electricity consumed in New Jersey") (emphasis added). That is for good reason; carbon emissions will cause climate change affecting New Jersey regardless of where they occur. *See also* TR 146, l. 6 – 147, l.23, 150, l.15-24, 154, l.2-14 (Mr. Chang's acknowledgement on cross-examination that the ZEC Act is concerned with increased emissions both inside and outside of New Jersey, and that if the plants close imports may be necessary). Citations to the transcript are to the official transcript received on March 22, 2021. PSEG also received a revised transcript on this date, March 26, 2021, with the confidential portion of the transcript separated out, causing a change in pagination after that point.

Before even factoring in the higher attribute costs of offshore wind and solar, customers would pay \$170 million more each year if the plants retired than they would pay if they kept the plants in operation with a \$10/MWh ZEC. It is also clear that if PSEG ceases operation of any of the nuclear power plants during an eligibility period, except in specified and limited circumstances under which a plant is excused from performance, PSEG will be obligated by law to refund ZEC payments received by that plant since the Board’s last determination of eligibility.<sup>27</sup>

Finally, the Legislature also specifically acknowledged New Jersey’s historical reliance on “a diverse mix of energy supply sources, including nuclear power, to meet [its] needs.” In light of “the primacy of natural gas use for heating in New Jersey,” the Legislature found that the increased reliance on natural gas-fired generation that would accompany the shut-down of the Salem and Hope Creek plants “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.”<sup>28</sup> The record in this case confirms the Legislature’s findings. PA Consulting’s analysis shows that in the “[f]ull Retirement case, natural gas-fired generation would comprise about 87% of generation in New Jersey during the 2022 through 2025 time period, an increase of over 35% as compared to a ‘Base Case’ reflecting the continued operation of the New Jersey nuclear units.<sup>29</sup> The retirement of the Salem and Hope Creek nuclear plants would similarly result in increased reliance on natural gas-fired generation imported from other states.<sup>30</sup>

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<sup>27</sup> See N.J.S.A. 48:3-87.5(k)(2).

<sup>28</sup> Fricker Testimony, at 16 (citing N.J.S.A. 48:3-87.1(a)(3), (b)(3)).

<sup>29</sup> *Id.* (citing PSEG Answer to ENV-1, PA Consulting, “The Impact of Nuclear Generation Retirements on Emissions and Fuel Diversity in New Jersey” (“PA Consulting”), at 36).

<sup>30</sup> *Id.* at 17-18 (citing PA Consulting, at 9).

The IMM's testimony on fuel diversity addresses the question across the entire PJM footprint, and thus ignores the Legislature's concern with the "factors affecting the deliverability of natural gas to electric power generating stations in and around the State."<sup>31</sup> The IMM's PJM-wide analysis does not mean there are no potential fuel diversity and resiliency concerns in New Jersey. Moreover, the Legislature's concerns with fuel diversity in electric power production are not satisfied by the IMM's vague assurances regarding the PJM reliability analysis conducted at the time of a unit's closure.<sup>32</sup> PJM and the IMM do not take resiliency of fuel supply, or generation diversity, into account at the time of generation deactivation requests. Rather, PJM focuses on the reliability of the high voltage electric transmission system, while the IMM does an economic screen to insure the retirement request is merited and not an exercise of market power.<sup>33</sup> PJM's approval of a generator deactivation request does not mean there are no potential fuel diversity and resiliency concerns in New Jersey.<sup>34</sup>

## **II. Disagreement Between The Applicants And The Board's Consultant Is Essentially Limited To Three Issues, And Levitan Is Incorrect On Each Issue As A Matter Of Fact, Law, Or Both.**

There is substantial agreement among the applicants and the Board's consultant Levitan & Associates LLC ("Levitan") on many aspects of the plants' finances. Levitan agrees that PSEG's "cost categories are supported by historical data and would be avoided" if the plants retired.

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<sup>31</sup> N.J.S.A. 48:3-87.3(b)(3). See IMM Report, at 30-32, including Figure 1 (showing "the fuel diversity index (FDIe) for all PJM energy generation") (emphasis added).

<sup>32</sup> See TR at 80, 1.7-19; 82, 1.12-14; and 93, 1.1-17.

<sup>33</sup> See PJM Manual 14D: Generator Operational Requirements, at 82 (<https://www.pjm.com/~media/documents/manuals/m14d.ashx>); see also PJM Learning Center, Explaining Power Plant Retirements in PJM (<https://learn.pjm.com/three-priorities/planning-for-the-future/explaining-power-plant-retirements.aspx>).

<sup>34</sup> See IMM's 2020 State of the Market Report (Vol. 1, page 3) ("PJM's capacity market rules, including the resultant capacity reserve margin, contribute to but do not guarantee reliability under extreme weather conditions. The capacity market rules do not require that all resources have firm fuel supplies. Gas pipeline tariffs do not require that pipelines have the ability to serve all firm fuel customers simultaneously in an extreme weather event.").

Levitan also found the plants' projected output to be reasonable.<sup>35</sup> Both PSEG and Levitan have modeled energy revenues based on forward energy prices as of the end of September 2020, when PSEG filed its applications. We note that forward energy prices today are slightly lower than reflected on the September 30, 2020 curves that PSEG used in its updated calculations; nevertheless we agree that it is reasonable to measure energy forward prices as of the date of the applications.

However, there are essentially three areas of disagreement between PSEG and Levitan. The first is projected capacity revenues: Levitan has improperly ignored known changes to auction parameters that will push prices downward, and has relied solely on now-three-year-old historical prices that do not reflect the current market parameters, implementation of rules determining those parameters or transmission capabilities of the system. The second is whether to include the cost of risks: Levitan has again concluded, improperly in light of the statutory language, that the Board should simply not consider operational and market risk because risks are prospective possibilities rather than line-item costs. The Board already rejected this identical advice as inconsistent with the law in the first ZEC proceeding, and the Appellate Division recently upheld the Board's decision based on the statute's plain language.<sup>36</sup> The third area of disagreement concerns spent fuel costs: Levitan again ignores the plain language of the statute, which requires consideration of spent fuel costs, as the Appellate Division recently confirmed.<sup>37</sup> That is for good reason: the longer the plants operate, the more spent fuel will be created and ultimately will have to be disposed.

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<sup>35</sup> Levitan & Associates LLC, [Salem 1/Salem 2/Hope Creek] Application, Preliminary Report on Eligibility and Finances, at 3 (Jan. 19, 2021). For convenience, the three preliminary reports submitted by Levitan on January 19, 2021 will be referred to collectively as "Levitan PR." Because the three reports are largely identical, we will generally cite to the page numbers for the Salem 1 report and, where necessary, we will identify individual Levitan PRs.

<sup>36</sup> ZEC1 Affirmance, at 35-36.

<sup>37</sup> *Id.* at 36.

## **A. Capacity Revenue Projections**

In making its planning decisions regarding the nuclear plants and its other assets, PSEG creates a detailed model to project future capacity prices. While historical prices inform this model, the model also takes account of changes in the market and the market rules that have taken place since 2018, when the last BRA was conducted. It is especially critical to consider these rule changes for the upcoming BRAs because they are so significant.

Capacity prices in the PJM market are determined through the intersection of the supply curve and the demand curve. Notably, the demand curve is an administrative construct, and its shape and height are determined through PJM tariff rules and PJM calculations. Since the last BRA was held in May 2018, the rules for calculating the administratively determined demand curve have changed significantly. First, the downward sloping demand curve used in the May 2018 auction included a 1% shift to the right, for the purposing of enhancing reliability during a period when coal plant retirements were occurring rapidly due to more stringent environmental standards. This 1% shift has now been eliminated. Effectively, this means that PJM's demand curve for the 2022/2023 auction was reduced by 1% from the previous base residual auction, and that prices will clear lower on the supply curve as a result. Second, the "reference unit," whose "cost of new entry" ("CONE") is used to set the height of the demand curve, was changed. The larger, more efficient combustion turbine generator selected by PJM for the next auctions results in a "CONE" value below the CONE used to set the demand curve in the 2018 BRA. As a result, the entire demand curve is shifted downward, which will result in lower prices at any given procurement quantity. These two fundamental changes are anticipated to reduce expected clearing prices by about \$5-10/MW-day. Third, transmission upgrades since the 2018 BRA enable higher levels of import capacity into the Eastern MAAC capacity zone (where the plants are located), which will lower the Eastern MAAC clearing price. This is anticipated to reduce expected clearing



prices by \$5 to \$15 per MW-Day. Finally, the reduction in Net CONE also impacts penalty levels, which drives expected bidding behavior. The result of a lower penalty structure is expected to reduce clearing prices by \$10 to \$15 per MW-Day. The sum of these impacts results in an expected downward change in EMAAC prices of \$25 to \$40 per MW-Day.<sup>38</sup>

Ignoring these changes and projecting capacity prices based solely on out-of-date historical prices would be arbitrary and capricious. Indeed, at the evidentiary hearing, Levitan's witness, Mr. Parker, admitted that Levitan did not evaluate the impact of a lower Net CONE, notwithstanding his admission that it "may well be the case" that market prices will come down as a result. Similarly, in response to a question about whether the 1% shift of the demand curve would tend to lower prices he stated "[i]n and of itself, it would."<sup>39</sup>

Further, a recent decision by FERC can also be expected to place downward pressure on capacity prices. On March 18, 2021, FERC granted complaints filed by the IMM and several state commissions contending that the default offer caps applied in the PJM BRAs, i.e., the maximum price that may offered by a bidder that does not receive a unit-specific price cap, were too high.<sup>40</sup> Although FERC has not yet set a replacement rate and has delayed applying its findings until the BRA for 2023/2024, it is reasonable to expect lower clearing prices due to the changed rate in at least two of the three delivery years covered by these applications. In fact, in its complaint, the IMM contended that clearing prices in the BRA for 2021/2022 would have been 13.2% lower if the default offer cap had not been overstated.<sup>41</sup>

PSEG's model yielded capacity price projections of **[BEGIN CONFIDENTIAL]**

**[END CONFIDENTIAL]** When PSEG makes its decision whether to cease

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<sup>38</sup> Cregg Testimony, at 5-6; *see also* Cregg Testimony, Attachment A for details.

<sup>39</sup> TR 191, 1.14.

<sup>40</sup> *See Independent Market Monitor for PJM, et al.*, 174 FERC ¶ 61,212 (2021).

<sup>41</sup> *Id.* at P 10.

operations, this is the revenue projection that it will use. Moreover, the Board can verify that this revenue projection is reasonable. [BEGIN CONFIDENTIAL] [REDACTED]

[REDACTED]<sup>42</sup> [END CONFIDENTIAL] Thus, there is independent validation for the reasonableness of PSEG's projections.

The fact that the Board has used historical pricing in other contexts is irrelevant here. PSEG understands that the Board chose to adopt a historically-based approach in the offshore wind proceeding. But in that proceeding, the Board was estimating capacity prices over the next 25 years. Over such a long time period, it may be reasonable to use a linear escalating capacity price based solely on historical prices. This proceeding, on the other hand, involves the next three years only, where more precision is possible—as shown by Levitan's own estimates in the OREC proceeding, which, [BEGIN CONFIDENTIAL] [REDACTED]

[REDACTED] [END CONFIDENTIAL] Additionally, the projection of capacity prices in the OREC proceeding did not have the same financial consequences for the generator as it does here. Because the OREC value is based on an "all-in" price, the selected offshore wind project receives the same compensation regardless of the level of the capacity value actually realized.<sup>43</sup> Thus, the Board's capacity projections were irrelevant to the economic decision facing potential bidders. In this case, where the ZEC Act requires that the Board evaluate costs and revenues to determine ZEC eligibility, capacity price projections that take into account known market parameters are directly relevant to the plants' level of financial need.

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<sup>42</sup> Cregg Testimony, at 5-6.

<sup>43</sup> *In the Matter of the Bd. of Pub. Utilities Offshore Wind Solicitation for 1,100 Mw-Evaluation of the Offshore Wind Applications*, BPU Dkt. No. QO18121289, 2019 WL 2656061, at \*16 (June 21, 2019).

**B. The Statute, The Board’s 2019 Order (Affirmed By The New Jersey Appellate Division), And Prudent Business Planning Require Consideration Of Risk In This Analysis.**

PSEG has identified its operational and market risks in its filing, explained its methodology for valuing the cost of taking on those risks, and has provided examples of how those risks have materialized in the past.<sup>44</sup> Levitan does not critique PSEG’s methodology for valuing those risks;<sup>45</sup> moreover, Levitan acknowledges that consideration of risks is a prudent planning and management practice. Mr. Parker, Levitan’s witness, likewise acknowledged that PSEG should take these risks into account when deciding whether or not to cease operations of the nuclear plants.<sup>46</sup> Nevertheless, Levitan suggests that risks should be disregarded altogether because they are not “out of pocket” costs. Levitan’s approach is both contrary to law and incorrect as a matter of prudent business planning.

**1. Both The Statute And Board Precedent Require Inclusion Of The Cost Of Risk.**

Levitan’s suggestion that the Board exclude the cost of risk from consideration is contrary to the plain language of the statute, which specifically directs applicants to identify not only their “certified cost *projections* over the *next* three energy years,” N.J.S.A. 48:3-87.5(a) (emphasis added), but also “the cost of operational risk and market risks that would be avoided by ceasing operations.” *Id.* The statute provides that these risk categories include “the risk that operating costs *will be* higher than anticipated” for various reasons (*i.e.*, operational risk), and the “risk that output” from the plants “*may not be able to be sold* at projected levels” in the future (*i.e.*, market risk). *Id.* (emphasis added). The statute then instructs the Board to consider both “costs and risks” when determining financial eligibility. *Id.* 48:3-87.5(e)(3).

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<sup>44</sup> See, e.g., Cregg Testimony, at 9-30; Fricker Testimony, at 2-11.

<sup>45</sup> Rate Counsel and the IMM do, as discussed in Argument Section III below.

<sup>46</sup> TR 205, l.10-22.

Thus, the controlling statute is clear that risk—that is, the potential for an adverse outcome—*must* be taken into account in the Board’s evaluation of whether a nuclear power plant will close. In the first ZEC proceeding, the Board applied the statute’s plain language to reject the exact same position concerning risks that Levitan takes in the present proceeding. The Board stated that “the intent of the legislation was for the Board to consider operational risks and market risks in its evaluation,” and that it was “specifically intended that these considerations be accounted for in the Board’s review.”<sup>47</sup>

Just last week, the Appellate Division affirmed the Board’s decision as compelled by the plain statutory text. As the court explained:

The plain language . . . makes clear that the Legislature intended for the Board to consider the applicants’ “costs and risks” when determining eligibility. Had the Legislature intended for the Board to exclude the applicants’ operational and market risks when analyzing financial eligibility under subsection (e)(3) and to instead assess only whether the applicants were “projected to not fully cover [their] costs,” it would not have included the words “and risks” after “costs.” In our view, to adopt Rate Counsel’s position that the Board should have accepted [Levitan’s] methodology would render the Legislature’s use of the words “and risks” in subsection (e)(3) meaningless, contrary to established principles of statutory construction.<sup>48</sup>

As the Board understood in the first ZEC proceeding, by using the term “risks,” the Legislature was identifying inherently forward-looking possible outcomes that would not appear on a financial statement. Thus, by focusing on the fact that these risks do not appear on PSEG’s (historical) financial statements, Levitan misses the point.<sup>49</sup> As the Appellate Division explained, “the experts’

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<sup>47</sup> ZEC1 Order, at 14-15, *aff’d*, ZEC1 Affirmance.

<sup>48</sup> See ZEC1 Affirmance, at 35 (emphasis added).

<sup>49</sup> Of course, if a risk does materialize and result in increased costs or reduced revenues, the consequences are reflected on PSEG’s financial statements, as PSEG’s response to written cross-examination makes clear: “By definition, risk represents the potential for unfavorable future outcomes and is a forward-looking and probabilistic concept. When risks are realized through the occurrence of an unplanned adverse event, the resulting costs are reflected in financial statements.” PSEG response to BPU-Cross-0075.

[i.e., Levitan's] methodology was inconsistent with the ZEC Act's plain language, which does not exclude operational risks, market risks and other non-realized costs from the financial eligibility analysis."<sup>50</sup>

**2. The Statute Properly Takes Into Account Business Realities -- No Business Can Ignore Risk When Making A Decision Whether To Continue The Operation Of Nuclear Power Generation**

The statutory requirement to consider risk in addition to known costs is consistent with business reality. PSEG's responses to one of the BPU's written cross-examination questions explains quite clearly why the Legislature mandated the consideration of risk: "The Legislature recognized the need to include more than operating costs in assessing financial need for the simple reason that a prudent business owner would not run a business, particularly one with significant risks, if, in a year in which all went according to plan, the business owner could expect only to cover its budgeted costs. No business is sustainable unless it generates sufficient revenue not only to cover its costs when all goes according to plan, but also to make it worthwhile for the owner to accept the risk of adverse events that could significantly increase costs or reduce revenues."<sup>51</sup>

As Levitan acknowledged, consideration of risk is a prudent planning parameter that businesses consider when making their planning decisions. That is precisely the kind of decision PSEG must make about the nuclear plants, which the ZEC Act is intended to influence: whether to continue or cease their operation. And Levitan's witness, Mr. Parker, agreed at the evidentiary hearing, an investor will not invest in a risky business unless it can expect a return commensurate with the return that other, similarly risky businesses can earn.<sup>52</sup> Thus, the statute's express

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<sup>50</sup> ZEC1 Affirmance, at 36-37.

<sup>51</sup> PSEG response to BPU-Cross-0058 (emphasis added).

<sup>52</sup> See TR 199, 1.2-11, 201, 1.5-24. See also TR 105, 1.7-16 (Rate Counsel witness Andrea Crane's acknowledgment on cross examination that utility ROEs established in the regulated ratemaking process "reflect[ ] the risk of a comparable group of utilities").

directive that the Board account for operational and market risk is consistent with how PSEG evaluates the plants' continued operation.<sup>53</sup>

**C. Levitan's Recommendation To Exclude Spent Fuel Costs Ignores Both The Statute, Which Requires Consideration Of Spent Fuel Costs, And The Plant Owner's Decision-Making Process**

The ZEC Act directs applicants to submit financial information, including “spent fuel expenses.” N.J.S.A. 48:3-87.5(a). The obligation on all U.S. nuclear power plant owner/operators to pay DOE for spent fuel disposal was suspended – not discharged – by court order, because DOE failed to make statutorily required determinations as to the level of the fee after efforts to make Yucca Mountain the site for a permanent federal depository of nuclear waste were abandoned.<sup>54</sup> But DOE has a continuing legal obligation to develop a permanent federal depository site, and, when it begins to fulfill this legal responsibility, the source of funding will be the plants. As stated by the Court, “[o]ur ruling here does not . . . relieve [Petitioner nuclear power plant owners] of their obligation to *ultimately* pay for the cost of their waste disposal.”<sup>55</sup> And, as the quantity of waste grows so will the ultimate cost of disposing of it safely. In fact, there is evidence that disposal costs and associated fees could even be higher than the previous levels given that DOE determined shortly before the fees were suspended that the final balance of the fund to be used to pay the costs of disposal could be as much as \$2 trillion short.<sup>56</sup> As Mr. Cregg explained:

In the meantime, we continue to build up spent fuel inventory for each MWh produced, and because we bear the financial obligation of spent fuel disposal, we

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<sup>53</sup> Note that the risks described in the statute, and that PSEG has included in its applications, have been described in detail to investors. As Mr. Cregg noted during his cross-examination by Commissioner Gordon, “there is tremendous discussion of risk in the 10K with respect to the operations looking forward into the business. It’s a very important element of the disclosure component . . . and risks by their nature are forward looking . . .” TR 29, l.1-8. In PSEG’s most recent 10-K, under “ITEM 1A. RISK FACTORS”, PSEG Enterprise Group detailed numerous factors that “could have a material adverse impact on our business, prospects, financial position, results of operations or cash flows and could cause results to differ materially from those expressed elsewhere in this report.” PSEG 10-K, dated February 26, 2021, at 22.

<sup>54</sup> See *National Ass’n of Regulatory Utility Commissioners v. United States Department of Energy*, 736 F.3d 517 (D.C. Cir. 2013).

<sup>55</sup> *Id.* at 521 (emphasis in original).

<sup>56</sup> *Id.* at 519.

continue to build up costs related to disposal. It is prudent to assume that DOE will perform its legal obligation, and we will incur those costs. Moreover, those costs are avoidable if the plants retire. If PSEG ceases operation, the units would not be generating any additional spent fuel. As a result, this additional spent fuel disposal cost would be avoided.<sup>57</sup>

The Appellate Division has agreed, noting that “had the Legislature intended for the Board to exclude . . . fuel expenses, *including spent fuel expenses*, . . . from the ‘costs’ referenced in subsection (e)(3) when analyzing financial eligibility, there would have been no need for the Legislature to require applicants to provide this information to the Board.”<sup>58</sup>

The cost of ultimate spent fuel disposal is a real consideration in determining whether to continue operations or begin the decommissioning process. In 2008, DOE published an estimate of the costs – including those for transportation and project management – associated with geological disposal of civilian and defense-related nuclear waste.<sup>59</sup> At that time, Yucca Mountain was assumed to be the primary repository. In DOE’s 2008 estimation, the project would have cost about \$96 billion in 2007 dollars, and DOE has not published an updated estimate since then. Through FY 2020, the DOE has spent approximately \$11 billion for licensing Yucca Mountain and other programs, and the DOE NWF’s Fiscal Year Financial Statement Audit, and makes no conclusion that the NWF is sufficient to fulfill DOE’s and ultimately, the industry’s, obligation.<sup>60</sup>

Notwithstanding these important real world considerations, Levitan again puts misplaced reliance on historical financial statements. For example, Levitan notes that the DOE stopped formally collecting spent fuel disposal fees in 2014, and the historical financial data for the plants

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<sup>57</sup> Cregg Testimony, at 8-9. See also TR 30, 1.4 – 32, 1.5 (Cregg cross-examination by Commissioner Gordon).

<sup>58</sup> ZEC1 Affirmance, at 36 (emphasis added).

<sup>59</sup> PSEG Response to BPU-Cross-0046 (citing Department of Energy, Office of Civilian Radioactive Waste Management, Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program, Fiscal Year 2007, DOE/RW-0591 (July 2008), <http://go.usa.gov/cjmtG>).

<sup>60</sup> *Id.* See also PSEG Response to BPU-Cross-0038 (“DOE’s legal obligations to take possession of the SNF and transport it to a licensed storage facility remain in effect. PSEG and other nuclear operators continue to generate spent nuclear fuel and will bear the costs associated with disposition of this spent nuclear fuel.”)

“have not included these costs since 2014.”<sup>61</sup> But the statute calls for “certified *cost projections* over the next three energy years, including operation and maintenance expenses, [and] fuel expenses, *including spent fuel expenses.*”<sup>62</sup> The statute was enacted in 2018, *four years after the DOE stopped collecting spent fuel disposal fees*. The legislature is presumed to have been aware of that fact, and its choice to include “spent fuel expenses” should be presumed to be intentional.<sup>63</sup>

Levitan does not dispute that spent fuel obligations will continue accruing.<sup>64</sup> As Mr. Cregg testified, the federal government has in fact previously retroactively assessed charges for spent fuel.<sup>65</sup> Simply stated, failure to consider these continuing obligations in considering whether a nuclear plant should shut down operations would be inconsistent with the plain language of the ZEC Act and the recent Appellate Division decision.

### **III. The Board Should Not Credit Other Parties’ Unfounded Assertions Regarding The Plants’ Finances.**

PSEG has been open and transparent with the Board throughout this process. That transparency allowed the Board to have the benefit of viewing our business as we do—so that the Board can understand our perspective and the information we will use when we make our business planning decisions, including whether to cease operations of the nuclear plants.<sup>66</sup> Other parties, including the IMM and Rate Counsel, have argued that the Board should not credit PSEG’s own financial projections and should award a ZEC value of less than \$10/MWh, or should not award

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<sup>61</sup> Levitan PR, at 3.

<sup>62</sup> See N.J.S.A. 48:3-87.5(a)(emphasis added), referenced in Cregg Testimony, at 7.

<sup>63</sup> Under New Jersey law, courts “presume that the Legislature is familiar with existing case law.” See *New Jersey v. McCray*, 243 N.J. 196, 217 (2020)(citing *Great Atl. & Pac. Tea Co. v. Borough of Point Pleasant*, 137 N.J. 136, 148, 644 A.2d 598 (1994)).

<sup>64</sup> Levitan PR, at 3, 17 (Salem 1 and 2), 18 (Hope Creek).

<sup>65</sup> TR 31, l.10-19 (Cross Examination of Daniel Cregg by Commissioner Gordon).

<sup>66</sup> TR 178, l.13-20 (Levitan witness Parker’s acknowledgment that PSEG had answered all questions asked); TR 109, l.12-15 (Rate Counsel witness Crane’s acknowledgment that PSEG has provided all information requested in this case).



any ZEC at all. Below, we explain the basis for PSEG’s view of its finances, and why other parties’ views of PSEG’s finances are erroneous.

### **A. IMM And Rate Counsel Are Wrong About Revenues**

Regarding revenues, the IMM and Rate Counsel’s critiques either cover the same ground as the Levitan approach described in Argument Section II, or introduce extraneous issues that are not pertinent to the Board’s decision in this case.

With respect to capacity revenues, the IMM “applies the three year historical average of EMAAC Base Residual Auction (BRA) prices” in its analysis.<sup>67</sup> As explained above in our discussion of Levitan’s calculation of capacity revenues, this approach is inappropriate when known changes to the marketplace will likely result in lower prices.<sup>68</sup> Rate Counsel, meanwhile, calls for the use of BGS auction assumptions in this proceeding. However, Rate Counsel’s expert admitted that he did not provide a capacity price forecast and that the historical prices from the BGS auction did not incorporate known changes in the marketplace.<sup>69</sup> In fact, the BGS auction uses an even cruder method than averaging historical prices – the BGS auction figures are calculated “by applying a factor of 0.9 to the most recent incremental auction results for the 2021/2022 delivery year.”<sup>70</sup> In other words, the BGS Auction Capacity Proxy Prices are neither a historical average nor a multifaceted estimate of potential future prices; they are simply slightly

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<sup>67</sup> See IMM Report, at 16-17.

<sup>68</sup> See Argument, section II.A, supra. See also TR 73, l.11 – 74, l. 19 (IMM Bowring’s admissions on cross-examination that forward energy curves are based on information held by energy traders; that those traders would not ignore new information, and actually weigh more current information more heavily than older information; and that he does not know better than the market regarding capacity prices).

<sup>69</sup> See TR 143, l.17 – 144, l.15 (cross-examination of Rate Counsel witness Chang).

<sup>70</sup> *In the Matter of the Provision of Basic Generation Service (BGS) for the Period Beginning June 1, 2021*, BPU Dkt. No. ER20030190, EDCs’ Joint BGS Proposal for 2021 (July 1, 2020) at 12; BPU Order Approving 2021 Auction Process, at 9 (approving the EDCs’ proposal). See also TR 143, l.17 -144, l.15 (Rate Counsel witness Chang admitting that the BGS price used by Rate Counsel as a proxy for future capacity prices is historical, that the rules and parameters of the auction have changed, and that the BGS auction price does not account for those changes).

reduced 2021/2022 prices. In contrast, “PSEG’s methodology incorporates . . . known changes,” to the BRA, “as well as the fundamentals of the markets, and all variables known at the time.”<sup>71</sup>

As for energy revenues, the IMM asserts that market rule changes regarding reserve pricing and fast start pricing have the potential to raise energy market prices.<sup>72</sup> As PSEG has explained, however, these are changes known to the market, and “it is reasonable to assume they would be reflected in forward prices” used in modeling energy revenues.<sup>73</sup> Further, the IMM made similar arguments at the time of the prior ZEC application, yet forward prices are lower today than they were at that time. In any event, PSEG can only hedge at the forward market price level, not at the higher level at which the IMM says the forward market should be.

#### **B. IMM And Rate Counsel Are Incorrect About Nuclear Costs**

The IMM incorrectly relies on data gathered by the Electric Utility Cost Group (“EUCG”) and published in an annual report by the Nuclear Energy Institute (“NEI”) to “adjust” the cost data submitted by PSEG in this case.<sup>74</sup> In particular, the IMM discounts the costs submitted by PSEG to the EUCG by removing allocated overhead costs from the EUCG data. The IMM’s approach is deeply flawed, as these are real costs, and are part of the “fully allocated overhead costs” that the ZEC Act directs the Board to consider.<sup>75</sup> As the Appellate Division held, “had the Legislature

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<sup>71</sup> See Cregg Testimony, at 6; PSEG Response to BPU-Cross-0009, -0014.

<sup>72</sup> IMM Report, at 14-15.

<sup>73</sup> See Cregg Testimony, at 7. Note also that the IMM has acknowledged that he does not “know better than the market” (see TR 74, 1.17-19), and the IMM’s report filed in this docket states similarly that “[l]iquid forward prices provide the best indication of expected prices because they incorporate the expectations of more market participants.” IMM, Analysis of NJ Zero Emissions Certificate (ZEC) Applications (public version), January 29, 2021 at 13.

<sup>74</sup> IMM Report, at 26-28 (citing NEI, “Nuclear Costs in Context” (October 21, 2020) <https://www.nei.org/CorporateSite/media/filefolder/resources/reports-and-briefs/Nuclear-Costs-in-Context.pdf>).

<sup>75</sup> Furthermore, the IMM made errors in calculating its EUCG adjustments. Specifically, the IMM included in his adjustments the Asset Retirement Obligation (ARO), which is a non-cash item. It appears that the IMM assumed this cost was included in PSEG’s application because when the IMM made the adjustment, it included the amount of the ARO. This is incorrect since the ARO cost was not included in PSEG’s application and therefore should not have been removed. Compare IMM Report, at 29-30 (Tables 32-34 EUCG Adjustments) with PSEG response to IMM-PS-EX-S1-S2-HC-0011.

intended for the Board to exclude . . . fully allocated overhead costs from the ‘costs’ referenced in subsection (e)(3) when analyzing financial eligibility, there would have been no need for the Legislature to require applicants to provide this information to the Board.”<sup>76</sup>

Additionally, the NEI report on which the IMM relies makes clear that the EUCG data does not include risks, as well as significant costs that the ZEC Act directs the Board to consider and that are relevant to PSEG’s retirement decision:

The [EUCG] cost data does not represent the full costs of operations as it does not include market and operational risk management (including but not limited to revenue uncertainty, equipment malfunctions and regulatory changes), property taxes, spent fuel storage costs, or returns on investment that would be key factors in decisions about whether to continue operating a particular station. Also not included in the EUCG data are costs that could be relevant for other considerations such as depreciation or interest costs.<sup>77</sup>

Both the IMM and Rate Counsel also deviate from the plain text of the ZEC Act in arguing that financial eligibility should be based on “net avoidable costs,” which include operation and maintenance expense but do not include the return on and of capital and do not include allocated overhead costs. Yet the statute itself indicates the opposite – “certified cost projections over the next three energy years” include “fully allocated overhead costs,” and those projections specifically include spent fuel costs as well.<sup>78</sup>

The Board previously rejected the IMM’s methodology, and the Appellate Division affirmed the Board’s decision to do so, holding that the IMM’s approach was “inconsistent” with the ZEC Act, precisely because it excludes “operational risks, market risks, and other non-realized costs from the financial eligibility analysis.”<sup>79</sup>

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<sup>76</sup> ZEC1 Affirmance, at 36.

<sup>77</sup> NEI, “Nuclear Costs in Context,” (Oct. 21, 2020), <https://www.nei.org/resources/reports-briefs/nuclear-costs-in-context> (emphasis added).

<sup>78</sup> See N.J.S.A. 48:3-87.5(a).

<sup>79</sup> ZEC1 Affirmance, at 36.

Finally, Rate Counsel challenges PSEG’s cash basis accounting approach, under which capital expenses are recovered annually for purposes of this analysis. The reason for this approach is simple. The statute requires a nuclear plant to provide, under the “cost plus risk” approach to demonstrating financial need, that the applicant submit “certified cost projections over the next three energy years, including . . . non-fuel capital expenses,” indicating a cash-based view.<sup>80</sup> In the absence of a material financial change in the market, or a long-term solution for these plants, our confidence that these plants will remain in operation for longer than the next three-year ZEC period is impacted by the lack of a long term solution. For an investment to be warranted, PSEG needs to have confidence that it can recover the cost of that investment within the timeframe that PSEG can project the plants’ continued operation.

### **C. IMM And Rate Counsel Are Wrong About Nuclear Risks**

Ultimately, the IMM and Rate Counsel’s objections to PSEG’s analysis amount to the claim that if they were owners of the plants, they would not require any compensation for risk. As already described, this view is entirely counter to the plain language of the statute, this Board’s prior decision and the Appellate Division’s affirmance of that decision and its interpretation of the statute.<sup>81</sup> The importance of risk is made stark most recently by the events in Texas, where plant owners suffered extraordinary losses due to unanticipated operational and market conditions.<sup>82</sup>

#### **1. Operational Risk**

There is no doubt that nuclear plants are exposed to operational risk, and to more operational risk than other resource types.<sup>83</sup> As described, the method used in the applications for

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<sup>80</sup> See N.J.S.A. 48:3-87.5(a).

<sup>81</sup> ZEC1 Order, at 14-15; ZEC1 Affirmance, at 34-37.

<sup>82</sup> See TR at 35, 1.3-21 (Mr. Cregg’s discussion of the situation in Texas and the magnitude of, and relationship between, market risk and operational risk in response to questioning from Commissioner Holden).

<sup>83</sup> See note 53, above, discussing detailed disclosures in PSEG’s most recent 10-K filing.

determining operational risk is reasonable and consistent with industry practices. Empirical evidence shows, moreover, that the method used in the application is actually conservative.

PSEG utilized an objective, industry standard measure for operational risk. In light of the 10% adder to cost-based energy bids of all types of generating plants, and the “1.10” Adjustment Factor used in the capacity market context, PSEG has shown that “PJM (and FERC, which has approved the PJM Tariff) considers a 10% adder for cost uncertainty to be reasonable.”<sup>84</sup> The IMM is incorrect in claiming that the 10% adder is not applicable to nuclear plants. The 10% adder for both energy and capacity apply to nuclear plants under the PJM tariff. Likewise, Levitan is incorrect in claiming that the 10% adder only applies to the cost of gas for gas fired plants. Levitan is focused on a different 10% adder than the one on which PSEG relied. In fact, the 10% adder to gas costs identified by Levitan is *in addition to* the 10% adder for cost-based energy bids applicable to all technology types, including nuclear.<sup>85</sup>

Moreover, the 10% adder actually is a low-end estimate of operational risk. The economic consulting firm Northbridge has analyzed the risk of increased per-MWh costs as a result of forced outages, which is only one component of operational risk, and it estimated the 95th percentile risk (which is the methodology PSEG typically uses in assessing market risk) to be nearly 23%.<sup>86</sup> Thus, PSEG is certainly being reasonable in using a 10% value to capture not only the risk of increased per-MWh cost but also the risk of additional costs associated with equipment failures and new regulatory mandates.

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<sup>84</sup> Cregg Testimony, at 14, l.12-13.

<sup>85</sup> Cregg Testimony, at 13, l.12-15.

<sup>86</sup> See Comments of the Northbridge Group (“NB Comments”) submitted in this proceeding on February 12, 2021, at 7-8.

The IMM argues that “the history of operating costs since 2010” is definitive regarding operational risks,<sup>87</sup> but that is incorrect. Operational risks are not merely a theoretical possibility. In fact, PSEG has provided examples of unexpected regulatory mandates and equipment failures that have resulted in unanticipated costs in the past. Specifically regarding operational risks, the applicants’ presentation details examples of costs imposed by unforeseen regulatory requirements, by equipment failures and sudden events, and by forced outages, all of which are grounded in the statutory definitions of operational risks.<sup>88</sup> In addition, an outage inevitably results in higher-per-MWh costs because nuclear plant costs are largely fixed. Even if the plant is idle, most of the costs continue to accrue. Also, the 10% operational risk adder presented in this second ZEC proceeding is the same as in the first, a figure that the Board accepted.<sup>89</sup> The Board should do so again here.

## 2. **Market Risk**

In general, several categories of market risk exist, including forced outage risk (the cost associated with covering a forward obligation by purchasing from the spot market, including the risk of having to do so at potentially elevated prices), energy price volatility risk (that nuclear facilities cannot always obtain in practice the forward prices assumed by revenue projections and instead are exposed to price volatility on a portion of their expected output), basis risk (the possibility that “energy prices at the particular node where a plant sells its output diverge from the liquid hubs at which forward prices are delivered”), and capacity revenue risk resulting from the

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<sup>87</sup> IMM Report, at 22-23.

<sup>88</sup> See Fricker Testimony, at 2-7 (on unforeseen regulatory requirements), 7-9 (on equipment failures and sudden events), and 9-10 (on forced outages). See also N.J.S.A. 48:3-87.5(a).

<sup>89</sup> Compare the Board Staff Memo (April 17, 2019) attached to the ZEC1 Order at 10-11 (acknowledging, and rejecting, the proposed operational risk of “10% of projected operation and maintenance costs and capital expenditures”) with the ZEC1 Order itself at 14-15 (finding that “[b]ased on the specific language in the Act, . . . the Legislature specifically intended that these considerations be accounted for”). See also ZEC1 Affirmance, at 35-36.

potential for the units not clearing in the PJM capacity auctions as a result of the MOPR, among other capacity related risks.<sup>90</sup>

As the applicants have explained, forward contract hedges are used to mitigate energy and basis volatility risks; however, they do not reduce market risks to zero.<sup>91</sup> In particular, PSEG hedges its output over a three-year period. Although it is 100% hedged by the beginning of the delivery period for a given energy year, it remains exposed to price volatility over the course of its three-year hedging period. Additionally, PSEG remains exposed to both forced outage risk and capacity revenue risk, both of which cannot be hedged.

It is common for market participants to use probabilistic estimates to assess the potential costs of taking on market risks. As noted by Northbridge, “[a] typical risk management practice when pricing risks that produce significant losses at low probabilities . . . is to set the cost of self-insurance at the fifth percentile level of the outcome distribution,” which means “the effective self-insurance premium is set at a level that provides 95% confidence that the unit will not incur a loss due to a risk.”<sup>92</sup> That typical practice is embodied in PSEG’s Financial Risk Management Practice, and has guided the applicants’ projections here. This approach “reflects PSEG’s normal business practice” to assess “downside” risks “at the 95% confidence level, i.e. the 5th percentile downside.” It is also consistent with both SEC instructions, which direct that “absent economic justification for the selection of different confidence intervals, registrants should use intervals that are 95 percent or higher,” as well as the approaches taken by other nuclear operators.<sup>93</sup>

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<sup>90</sup> See NB Comments, at 10-12.

<sup>91</sup> See Cregg Testimony, at 17-18, 21-24. See also NB Comments at 9 (“Nuclear facilities do attempt to hedge market risks using forward markets and other risk management tools, but not all market risks can be hedged and in other cases the cost of hedging itself is high enough that self-insurance is economically preferable”).

<sup>92</sup> NB Comments, at 7.

<sup>93</sup> See Cregg Testimony, at 20-21 and ZECJ-FIN-0018 at 3 & nn.4-5 (citing Securities and Exchange Commission, 17 C.F.R. § 229.305, Instructions to paragraph 305(a), Instruction 4.A, <https://www.gpo.gov/fdsys/pkg/CFR-2010-title17-vol2/pdf/CFR-2010-title17-vol2-sec229-305.pdf>, and Comments of Constellation Energy Nuclear Group, LLC (“CENG”) Concerning [N.Y. P.S.C.] Staff White Paper on Clean Energy Standard at pages 25 and 27

Further, the IMM and Rate Counsel are wrong to argue that PSEG must recognize the artificial notion of “upside” market risk or calculate risks based on the “mean” expected outcome.<sup>94</sup> At bottom, these are just dressed-up ways of saying that PSEG should be oblivious of risks in making decisions whether to continue operations of the nuclear units. But this view defies both the structure of the ZEC Act as well as the way in which a plant owner views the decision to continue operation of a nuclear plant.

First, the plain meaning of the word “risk” is potential exposure to a negative event, and the concept of an “upside risk” is nonsensical. Indeed, the plain language of the ZEC Act speaks solely in terms of exposure to negative outcomes. For example, the statute specifically refers to the “cost of operational risks and market risks,” and the only operational risks identified are “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.” Market risks, the statute states, shall include “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*.”<sup>95</sup> The IMM and Rate Counsel’s novel position flies in the face of the statute that the Board is obligated to enforce in this case and an interpretation of that statute that the Appellate Division has already affirmed.<sup>96</sup>

Second, ignoring risk would be tantamount to a finding that a nuclear plant should be willing to operate indefinitely without any expectation of a reasonable return. The Board knows

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(discussing “the fifth percentile outcome” from CENG’s analysis), <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={805D1362-DE4F-46D6-9BD4-7E0C8C65341E}>).

<sup>94</sup> See Testimony of Andrea Crane (“Crane Testimony”), 18; Report of the Independent Market Monitor (“IMM Report”), at 24-25.

<sup>95</sup> N.J.S.A. 48:3-87.5(a) (emphasis added).

<sup>96</sup> *Id.*; ZEC1 Affirmance, at 34-37.



that utilities earn a return of around 9-10%, and witnesses at the hearing agreed that running a merchant nuclear plant is riskier than running a regulated utility.<sup>97</sup> In the last ZEC proceeding, Levitan recognized that investors in a merchant nuclear plant would typically expect a 12.8% return.<sup>98</sup> Disregarding risks entirely, along with the other adjustments Levitan proposes, would mean that these plants would expect to earn a negative return. Even with a \$10 ZEC, the plants would expect to earn only a [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] return. That is not tenable, except as a bridge to a longer-term solution.

### CONCLUSION

For the reasons discussed, the applications for the Hope Creek and Salem Plants demonstrate that these three generating stations fully satisfy the eligibility criteria to be awarded ZECs and that they are entitled to the full ZEC award of \$10/MWh during this ZEC eligibility period. PSEG respectfully asks that the Board extend the current ZEC charge of \$10/MWh for the second eligibility period for the Hope Creek and Salem Plants.

Respectfully Submitted,



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<sup>97</sup> TR 104, l.19 – 105, l.7 (Ms. Crane regarding the 9.6% ROE for New Jersey energy utilities); TR 106, l.9-15 (Ms. Crane's acknowledgement that merchant nuclear generation is a riskier activity than investing in a regulated public utility).

<sup>98</sup> See Cregg Testimony, at 27-28.