

**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**

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

BPU DOCKET NOs. ER20080557, ER20080558, ER20080559

**PSEG NUCLEAR LLC (“PSEG”) CROSS EXAMINATION QUESTIONS
TO RATE COUNSEL WITNESS MAXIMILIAN CHANG**

I. CAPACITY REVENUES

ZEC2-Chang-XQ-0001

Please state how, in the opinion of Rate Counsel witness Chang, the BGS capacity price proxy utilizing historical pricing incorporates the following known inputs:

- a. The impact of PJM’s changes to the cost of new resources in EMAAC, manifested through the calculation of Net Cost of New Entry (“CONE”);
- b. The impact of PJM shifting the demand curve lower by 1%;
- c. Increases in import capability for resources into EMAAC, manifested through the calculation of the capacity emergency transfer limit (“CETL”).

ZEC2-Chang-XQ-0002

At page 21, lines 5-19, Rate Counsel witness Chang compares PSEG’s estimated capacity revenues to the capacity proxy values established in the most recent BGS proceeding (BPU Docket ER20030190).

- a. Does witness Chang agree that the capacity proxy prices established in BGS proceedings are subject to true-up once actual capacity prices become known?
- b. Given the true-up mechanism, isn’t it the case that BGS suppliers do not face capacity market risk?
- c. Does witness Chang agree that there is no analogous true-up for capacity proxy prices used to determine eligibility for ZECs?

II. RISKS

ZEC2-Chang-XQ-0003

In Rate Counsel witness Chang's opinion, is a regulated utility ordinarily compensated for risk through a return on invested capital?

ZEC2-Chang-XQ-0004

In Rate Counsel witness Chang's opinion, is there more or less risk associated with an investment in a nuclear plant or an investment in a public utility?

ZEC2-Chang-XQ-0005

In Rate Counsel witness Chang's opinion, would an ROE of approximately [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] be appropriate for a regulated public utility?

- a. List all cases of which Rate Counsel witness Chang is aware where a regulator has approved a ROE of [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] or less for a regulated public utility.

ZEC2-Chang-XQ-0006

In Rate Counsel witness Chang's opinion, would a negative ROE be appropriate for a regulated public utility?

- a. List all cases of which Rate Counsel witness Chang is aware where a regulator has approved a negative ROE for a regulated public utility.

ZEC2-Chang-XQ-0007

The ZEC Act defines "operational risks" to include "the risk that operating costs will be higher than anticipated because of new regulatory mandates or equipment failures."

- a. Does Rate Counsel witness Chang agree that, while a nuclear plant is operating, it faces the risk that costs may increase as a result of new regulatory mandates?
- b. Does Rate Counsel witness Chang agree that a new regulatory mandate that impacts the cost to operate a nuclear plant could be issued at any time?
- c. Does Rate Counsel witness Chang agree that, while a nuclear plant is operating, it faces the risk that costs may increase as a result of equipment failures?
- d. Does Rate Counsel witness Chang agree that a major component of a nuclear plant could unexpectedly require repair or replacement at any time?
- e. Does Rate Counsel witness Chang agree that, after a nuclear plant ceases operation, it no longer faces the risk that costs may increase as a result of equipment failures?

ZEC2-Chang-XQ-0008

The ZEC Act defines "operational risks" to include "the risk that per megawatt-hour costs will be higher than anticipated because of a lower than expected capacity factor."

- a. Does Rate Counsel witness Chang agree that when a nuclear plant is operating it faces the risk of an unanticipated outage?
- b. Does Rate Counsel witness Chang agree that if a nuclear plant experiences an unanticipated outage, its per-MWh costs will be higher than they would have been without the outage?
- c. Does Rate Counsel witness Chang that after a nuclear plant ceases operation, it no longer faces the risk of an unanticipated outage?
- d. Does Rate Counsel witness Chang agree that with nuclear plants generally running at all available hours other than refueling outages, that are unavoidable, with forced outage rates in the single digits, there is more downside risk than upside risk?

ZEC2-Chang-XQ-0009

The ZEC Act defines “market risks” to include “the risk of a forced outage and the associated costs arising from contractual obligations.”

- a. Does Rate Counsel witness Chang agree that, while a nuclear plant is operating, it faces the risk that a forced outage may occur?
- b. Does Rate Counsel witness Chang agree that, all things equal, when a large baseload generating unit experiences a forced outage, prices tend to rise?
- c. Does Rate Counsel witness Chang agree that, after a nuclear plant ceases operation, its owner or operator no longer faces the risk that a forced outage may occur?

ZEC2-Chang-XQ-0010

The ZEC Act defines “market risks” to include “the risk that output from the nuclear power plant may not be able to be sold at projected levels.”

- a. Does Rate Counsel witness Chang agree that, while a nuclear plant is operating, it faces the risk that its output may not be able to be sold at projected levels?
- b. Does Rate Counsel witness Chang agree that forward energy prices in PJM have generally come down over time in the past ten years?
- c. Does Rate Counsel witness Chang agree that, after a nuclear plant ceases operation, it no longer faces the risk that its output may not be able to be sold at projected levels?

III. SOCIAL COST OF CARBON

ZEC2-Chang-XQ-0011

At page 32, lines 10-13, Rate Counsel witness Chang describes a calculation of the “social cost of carbon” that utilizes “incremental in-state carbon emissions taken from the full retirement and the Hope Creek retirement scenarios.”

- a. Confirm that Rate Counsel witness Chang’s calculation incorporates only the increased emissions from plants located in New Jersey and does not incorporate any changes in emissions from plants located outside New Jersey.
- b. Confirm that Rate Counsel witness Chang’s calculation multiplies the increased emissions in New Jersey by \$46.60, then divides the result [BEGIN

CONFIDENTIAL [REDACTED] **[END CONFIDENTIAL]** by the expected output of the nuclear units, to arrive at a social cost of carbon value of **[BEGIN CONFIDENTIAL]** [REDACTED] **[END CONFIDENTIAL]**.

- c. If the retirement of the plants results in increased carbon emissions in Pennsylvania, does witness Chang believe that increase is irrelevant to New Jersey's interests and climate change prevention goals?
- d. Does Rate Counsel witness Chang believe that carbon emissions in other PJM states do not affect New Jersey?

IV. OTHER POLICY ISSUES

ZEC2-Chang-XQ-0012

At page 26, lines 16-17, Rate Counsel witness Chang notes that the Energy Master Plan analyzed a scenario in which the Salem I plant retires in 2036, the Salem II plant retires in 2040, and the Hope Creek plant retires in 2046, and determined, in that scenario, that New Jersey can still achieve its 2050 emissions reduction goals.

- a. Does the Energy Master Plan analyze any scenario in which the three plants retire before 2036, eleven years after the end of the second ZEC eligibility period?
- b. Has witness Chang modeled the emissions that would occur over the 21-year period between 2025 and 2046, assuming the three plants retire before 2025? If so, what were the results?
- c. Does Rate Counsel witness Chang acknowledge the Energy Master Plan on page 277 states "Additional storage increases the costs an additional \$7 billion per year in 2050 compared to the Least Cost scenario."

ZEC2-Chang-XQ-0013

At page 27, lines 12-16, Rate Counsel witness Chang notes that the Energy Master Plan did not model a scenario that reflects Governor Murphy's announcement to double the state's offshore wind target from 3,500 MW in 2035 to 7,500 MW in 2035, and that the additional 3,500 MW is "almost equal" to nameplate capacity of the three nuclear plants.

- a. Has Rate Counsel witness Chang modeled the emissions that would occur over the 10-year period between 2025 and 2035, assuming the three nuclear plants retire before 2025? If so, what were the results?
- b. What is the average capacity factor of an offshore wind facility?
- c. What is the average capacity factor of a nuclear facility?
- d. Do offshore wind facilities have a lower capacity factor than nuclear facilities?

V. ERRORS IN DATA

A. Cross for Rate Counsel Witness Chang

ZEC2-Chang-XQ-0014

Please correct Figure 1 on Page 7, Line 2, to reflect that the values taken from Staff PS-0017 represent PSEG's 57.14% ownership interest in Salem 1 and Salem 2.

ZEC2-Chang-XQ-0015

With respect to Rate Counsel witness Chang's discussion of "net income" at page 7, line 15 through page 8, line 16, please confirm that:

- a. Witness Chang uses the term "net income" to refer to shareholder payout on PSEG's interest in Salem 1 and Salem 2; and
- b. The "net income" includes ZEC revenue for 2019.

ZEC2-Chang-XQ-0016

Please confirm that for the chart on page 10, line 7, of Rate Counsel witness Chang's report, the year 2020 reflects data through May 2020.

ZEC2-Chang-XQ-0017

Please correct Figure 5 on page 18 to:

- a. Reflect data from PSEG's updated response to Staff PS-0017; and
- b. Adjust for 100% ownership interest.

ZEC2-Chang-XQ-0018

At page 14, line 7, Rate Counsel witness Chang states that the total energy revenue projection is approximately [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL]. Please confirm that projected energy revenues are [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] as reflected in Staff PS-0010. If you cannot confirm that value, please state the basis for Mr. Chang's projection that energy revenues will total [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL]

ZEC2-Chang-XQ-0019

At page 14, lines 7 through 11, Rate Counsel witness Chang discusses the "historical annual average" of annual energy revenues. With respect to this testimony:

- a. Please confirm that the values shown in Rate Counsel witness Chang's testimony reflect PSEG's share.
- b. Please confirm that the value of annual energy revenues at page 14, line 4 reflects 100% of the energy revenues, rather than PSEG's share.
- c. Please confirm that the value in line 9 should be [BEGIN CONFIDENTIAL] [REDACTED] [END CONFIDENTIAL] as shown in the updated ZECJFIN-0002.

- d. Please confirm that the value in line 11 should be [BEGIN CONFIDENTIAL] [REDACTED]
[REDACTED] [END CONFIDENTIAL] as shown in the updated ZECJFIN-0002.