

PSEG Nuclear, LLC
ZEC – Hope Creek
ZEC – SALEM 1
ZEC – SALEM 2

Docket Nos: EO18121337, EO18121338, and EO18121339

Response to Staff's Discovery Request of March 1, 2019.

Date: 3/6/2019

Question:

Please describe how generators bidding into the PJM Energy and Capacity Markets typically cover their operational and market risks. Specifically, please discuss whether these risks are built into pricing bids (as defined by the PJM market guidelines), or assumed by the bidder?

Attachments Provided Herewith: 0

Response:

As a general matter, generators that participate in the PJM Energy and Capacity Markets cover their operational and market risks through the revenue they earn above their costs. It is also generally true that from a PJM market perspective, the operational and market risks are always borne by the generating unit owner, regardless of how the generator bids the energy and capacity and regardless of clearing prices. However, the risks are very different for each type of generator and are mitigated with many additional revenue sources such as SREC, ORECS and PPA's, and state regulated return on equity.

First, there are different types of generators with varying types of risk profiles and different ownership structures that participate in the PJM markets. These factors have dramatic impacts on the answer to the posed question. For example:

- **Rate Based Generation:** There continue to be many utility owned generators whose facilities are in rate base that participate in PJM markets. These types of market participants recover their costs through state regulated rates including a state regulated return on equity to compensate the utility for the market and operational risks of their plants.
- **Solar Generation:** Solar generation units often participate in the PJM markets as a supplement to the robust revenues they receive under state renewable programs such as New Jersey's Solar Renewable Energy Credit (SREC) program and, given their low cost structure once built, they face minimal risk. In some cases, these solar generators sell power under a Power Purchase Agreement that also mitigates risk.

- **Natural Gas Generation:** Natural gas plants also have a different risk profile. Once built, the majority of their costs is for the fuel that they burn. During an unplanned outage, the plant is shut down and a majority of the costs and risks go away. For example, PSEG's natural gas powered plants have few employees and those employees can be redeployed to other stations when the plant is off line; and, just-in-time fuel will not be purchased.

The levels and consequences of the risks that these generators face differ, as does the way they consider these risks as they participate in the PJM markets, and stand in stark contrast to the experience of our nuclear generation units, as described below. Merchant nuclear units face higher risks and do not have the means to shift risks to captive ratepayers or other buyers. Further, as demonstrated in our applications, Hope Creek, Salem 1, and Salem 2 will not cover their costs and risks without a material financial change.

Second, energy and capacity prices depend on demand and supply, including the bids from all of the generators and demand side resources present in the market, and not just the bids of a particular generator. As a result, whether a particular generator will be able to cover these risks through market revenues will depend on market conditions outside of the generator's control. Nuclear generators are especially vulnerable to this risk in PJM energy markets. The Salem and Hope Creek nuclear generators are limited in their ability to vary output on a routine basis and therefore, typically, self-schedule at their forecast output in the energy market. Accordingly, nuclear energy revenues are entirely unrelated to nuclear energy bids but instead will depend on supply and demand conditions -- including the bids of other generators -- in each hour. Further, to the extent that other generators bid a portion of their risks into the energy or capacity markets, doing so increases the risk that the generator will not clear in that market and that the generator revenues will be lower. As a result, energy prices are set by marginal units that generally do not include risk in their bids and nuclear units do not set prices. The real test for PSEG Nuclear's units is whether projected revenues exceed cost and risks, and as demonstrated in our applications they are not projected to do so.

Third, merchant nuclear power plants face higher risks (both operational and market) than other generators. They are very large units and most of their costs are fixed; therefore, the impact of unplanned outages is more severe. Nuclear units are self-scheduled price takers in the day-ahead energy market, when an unplanned outage occurs, they will need to purchase a large quantity of replacement power on the spot market. Additionally, unlike fossil generators, nuclear units cannot dial down costs when the unit temporarily shut down; they have a large number of employees and the ability for them to be redeployed is very limited, and the nuclear fuel is already purchased and on-site. Additionally, nuclear units have stringent safety standards and are heavily regulated and often have unplanned costs that are outside of their control. As described in our application, increased regulatory requirements have, at times, caused the units to spend hundreds of millions of dollars that were unplanned.