



## An Analysis of Ohio Nuclear Plant Profitability Under House Bill 6

The Ohio House of Representatives recently passed House Bill 6 (H.B. 6), a major rework of Ohio's electricity policy. H.B. 6 would significantly affect customer costs and how electricity markets function in Ohio. Energy counsel for The Ohio Manufacturers' Association (OMA), Kim Bojko of Carpenter Lipps & Leland, has separately provided a [legal analysis](#) on what H.B. 6 does and how it works.

In summary, H.B. 6 creates excessive profit for Ohio's nuclear plants of up to \$330 million per year over the six-year term of the Clean Air Program. In this memo we examine the nuclear plants' profitability, multiple compensation mechanisms for nuclear power plants in H.B. 6, how the bill would trigger special treatment of the nuclear plants' capacity revenue, and forthcoming changes in wholesale electricity markets that create additional revenue for nuclear plants.

### Nuclear Plant Profitability

H.B. 6 was passed with the purported intent to keep Ohio's two nuclear power plants, Davis-Besse and Perry, up and running. The owner of these two nuclear plants, FirstEnergy Solutions (FES), is currently going through bankruptcy proceedings. However, FES is expected to emerge from bankruptcy financially solvent. And the financial well-being of FES is not necessarily reflective of the financial viability of its nuclear power plants. Thus, questions remain:

- How financially viable are the nuclear power plants presently?
- And will the nuclear power plants emerge from bankruptcy in a better financial position?

### Ohio's Nuclear Plants' Excessive Profit Under House Bill 6

- Currently plants may not need financial support.
  - Dr. Paul Sotkiewicz estimates \$72 million annual profit presently.
- H.B. 6 may contribute to excessive profits of an estimated \$330 million a year.
  - Of that, \$150 million a year from Clean Air Credits.
- H.B.6 triggers changes in capacity auctions.
  - Plants removed from capacity auction - \$82 million a year.
  - Possible \$157 million a year in State of Ohio capacity revenue envisioned by FES.
- Other changes to PJM electricity market include energy market rule changes - \$33 million a year.

Two authoritative sources have addressed the nuclear power plants' profitability. PJM's Independent Market Monitor releases an annual "State of the Market" report, which includes financial surplus or shortfall of PJM's 18 nuclear power plants.

We have reproduced the Independent Market Monitor's estimates in the table below. The Monitor estimates that three of PJM's 18 nuclear plants are losing money, while the other 15 are profitable.

**Table 7-42 Nuclear unit forward annual surplus (shortfall) (\$ in millions)<sup>56</sup>**

	Surplus (Shortfall) (\$ in millions)		
	2019	2020	2021
Beaver Valley	\$134.3	\$93.5	\$84.7
Braidwood	\$106.4	\$80.3	\$51.7
Byron	\$104.3	\$78.6	\$50.6
Calvert Cliffs	\$131.0	\$99.0	\$89.3
Cook	\$95.8	\$48.4	\$41.9
Davis Besse	(\$26.9)	(\$47.8)	(\$45.6)
Dresden	\$97.3	\$76.4	\$53.8
Hope Creek	\$57.9	\$52.0	\$43.3
LaSalle	\$103.5	\$78.0	\$50.2
Limerick	\$112.2	\$100.5	\$83.8
North Anna	\$138.6	\$99.3	\$90.0
Peach Bottom	\$113.4	\$101.5	\$84.1
Perry	(\$22.6)	(\$49.6)	(\$47.8)
Quad Cities	\$61.3	\$42.2	\$20.9
Salem	\$114.6	\$102.8	\$85.5
Surry	\$120.5	\$85.6	\$77.6
Susquehanna	\$77.7	\$37.4	\$28.2
Three Mile Island	(\$56.9)	(\$69.6)	(\$72.3)

*Table 1: Independent Market Monitor Estimates of Nuclear Power Plant Annual Financial Surplus or Shortfall.*

There are several insights to glean from this analysis. First, Ohio participates in the regional PJM electricity market, and most nuclear power resources in this market will continue to operate and be profitable. In other words, Ohio's access to low-carbon nuclear power is not significantly at risk.

Another insight is that FES's two Ohio nuclear plants are estimated to lose \$93 million in 2021. While this is a significant loss, it is substantially less than the \$165 million annual payment expected from the Clean Air Program created under H.B. 6.

### **Estimates of Nuclear Power Plant Annual Financial Surplus or Shortfall**

The Independent Market Monitor cannot disclose specific power plant financial data, and so Table 1 presents estimates. Thus, the Monitor relies on average operating costs data from the Nuclear Energy Institute to estimate operating costs, as well as public data on

energy production and wholesale electricity market prices to estimate revenue. The estimated operating costs reflect typical single unit nuclear plant costs. If FES's nuclear plants are losing more money than this estimate, it would demonstrate that they are not operating their plants as efficiently as the industry average. This means the Clean Air Program would be compensating for below-average operating performance, not just the benefits of nuclear power.

Another separate financial analysis was completed by Dr. Paul Sotkiewicz, former chief economist for PJM. Dr. Sotkiewicz's financial analysis shows that post-bankruptcy, the Davis-Besse and Perry nuclear plants will likely turn an annual profit. Dr. Sotkiewicz estimates the annual profit to be \$28 million for Davis Besse and \$44 million for Perry, for a combined profit of \$72 million annually<sup>1</sup>.

Dr. Sotkiewicz's estimates differ from the Independent Market Monitor's for two main reasons. First, Dr. Sotkiewicz accounts for the nuclear plants' financial situation post-bankruptcy. Second, Dr. Sotkiewicz relies on specific financial filings of these nuclear power plants.

These financial estimates call into question the following:

- Do the Davis-Besse and Perry nuclear power plants need financial assistance?
- Does the Clean Air Program over-compensate the nuclear power plants?
- Is the Clean Air Program compensating poor business decisions, in addition to the environmental benefits of nuclear power?

## **H.B. 6 Revenue Streams for Nuclear Plants**

H.B. 6 creates a Clean Air Program, financed by charges applied to each customer of an Ohio investor-owned utility (AEP Ohio, DP&L, Duke, and the FirstEnergy companies). Each year the Clean Air Program will pay \$9 for each MWh of electricity produced by nuclear power plants. According to the U.S. Energy Information Administration (EIA), over the past three years, Davis-Besse produced 7,216,607 MWh on average, and Perry generated 10,390,121 MWh on average. However, HB 6 provides for total compensation to the nuclear plants at \$150 million per year.

Therefore, it is estimated that under the Clean Air Program, the nuclear plants would be compensated as follows:

*7,216,607 MWh (Davis-Besse) + 10,390,121 MWh (Perry) = 17,606,728 MWh*

*17,606,728 MWh x \$9 /MWh (Clean Air Credit) = \$158,460,552/year*

*Annual compensation = \$150,000,000 /year*

Nuclear power plant output will vary from year to year, depending on the plants' refueling schedule and up-time.

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<sup>1</sup> "The Market and Financial Position of Nuclear Resources in Ohio", Dr. Paul Sotkiewicz, E-Cubed Policy Associations, LLC. Table 12

## H.B. 6 Triggered Capacity Auction Changes

H.B. 6 not only sets into sequence a series of reactions in the wholesale electricity market, which will affect Ohio's electricity prices, but also how the nuclear power plants are compensated for electricity, and the level of that compensation. At the heart of this set of reactions are forthcoming changes to PJM's electric capacity auction. The capacity auction is the mechanism by which PJM assures enough electricity resources are available for the grid system at times of peak demand. Please note that capacity payments are an important part of overall economic viability for a power plant.

However, PJM is also charged with ensuring a fair and level playing field for power plants competing for capacity payments. This is especially true now, as PJM is consistently exceeding its reliability goal and there is an abundance of power plants on the grid, with even more new entrants waiting.

With this abundance of generation, uneconomic power plants may be unable to compete and receive a capacity payment. As a result, some uneconomic power plants are seeking subsidies from their respective states to remain viable. This undermines the integrity of the market. And the Federal Energy Regulatory Commission (FERC) has thus deemed PJM's capacity auction as unjust and unreasonable. FERC has issued guidelines, with time for comment, that essentially will wall-off generating plants that receive materially significant state subsidies from participating the PJM's capacity auction.

In simple terms, if H.B. 6 passes, Ohio's nuclear power plants would be removed from PJM's capacity auction, and they would lose the ability to earn this revenue. We estimate this lost revenue potential at around \$82 million a year, as shown in the calculation below:

*894 MW (Davis-Besse) + 1,256 MW (Perry) = 2,150 MW (combined capacity)*  
*2,150 MW x \$105 /MW-day (3-year average capacity price) x 365 days/year = \$82 million/year*

This is a real, probable, and possibly unintended consequence of H.B. 6 – that Ohio's nuclear power plants will be ineligible to compete in wholesale capacity auctions and will likely be further impaired financially by this loss in revenue. This is probably an untenable financial position for the nuclear plants.

Fortunately, there is no need for speculation. FirstEnergy Solutions has already provided comment on these rules, including advice on how Ohio can make up for this unexpected loss of revenue. Specifically, FES states that credits for zero emissions for nuclear plants are “not intended to provide resources with sufficient revenue, in the absence of a capacity payment, to make continued operation viable”<sup>2</sup>.

This is to say, FES intends to ask for capacity payments in addition to Clean Air Credit payments. Because PJM will not provide these capacity payments, the state of Ohio would need to do so, and Ohio ratepayers would need to cover this cost. FES has provided an example of around \$200 /MW-day compensation for capacity. At this rate, Ohio would need to create the following additional revenue for the nuclear power plants:

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<sup>2</sup> FERC Docket EL18-178, Initial Comments of FirstEnergy Solutions Corp., Page 10

*2,150 MW x \$200 /MW-day (3-year average capacity price) x 365 days/year = \$157 million/year*

Note: H.B. 6 does not create a mechanism for Ohio to set capacity prices, collect the costs from ratepayers, or pay the payment to generators.

### **Other Changes in PJM's Electricity Market**

While the nuclear plants will not be eligible for capacity payments from PJM, they will still participate in PJM's energy markets, which compensate generators for the electricity they produce, as opposed to the peak capacity. The energy markets, too, are undergoing rule changes that are expected to create increased revenue for nuclear power plants – specifically, changes to the Operating Reserve Demand Curve included in PJM's Price Formation Filing.

According to the Independent Market Monitor, nuclear power plants will receive an additional \$15,344 /MW-year<sup>3</sup> due to changes in the Operating Reserve Demand Curve. This would create an additional \$33 million/year for Ohio's nuclear power plants:

*2,150 MW x \$15,344 /MW-year = \$33 million/year*

PJM is also investigating carbon pricing for its market. While it is too early to say if a rule would pass, how it would work, and what revenue it would create for Ohio's nuclear plants, one can assume there is the possibility of future payments for carbon-free generation.

### **Excessive Profits Potential**

H.B. 6 thus sets up significant excessive profit potential for Ohio's nuclear plants. For example, should the nuclear power plants be profitable post-bankruptcy, and should Ohio create a capacity payment to replace PJM's for the nuclear plant, Ohio's nuclear plants would have the following annual profits:

*\$72 million/year (post-bankruptcy profit) + \$150 million/year (Clean Air Program revenue) - \$82 million/year (capacity auction lost revenue) + \$157 million/year (Ohio set capacity revenue) + \$33 million/year (PJM price formation changes) = \$330 million/year*

If we use the Independent Market Monitor's estimates of the two nuclear plants' financial losses – and we assume that Ohio does not create a capacity price and payment mechanism for the plants – the net annual profits of the nuclear plants under H.B. 6 are still \$16.5 million.

### **Conclusions and Findings**

Based on the above data, Ohio policymakers should take into consideration the following questions:

- Do the nuclear plants truly need financial support, post-bankruptcy?

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<sup>3</sup> Monitoring Analytics, "ORDC Simulation Results: Version 2", Table 20.

- Does H.B. 6 create excessive profits for the nuclear power plants?
- Can Ohio's payments to the nuclear power plants be lowered if the plants start receiving additional revenue from energy markets?
- Will Ohio be asked, or required, to create a capacity payment mechanism for the nuclear power plants to replace the probable loss of PJM capacity payments to the nuclear power plants?