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## MEMORANDUM

Date: February 27, 2019  
To: The Ohio Manufacturers' Association  
From: Jordan Nader & John Seryak, PE (RunnerStone, LLC)  
RE: Review of The Brattle Group Report, "Impacts of Announced Nuclear Retirements in Ohio and Pennsylvania"

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In April 2018, The Brattle Group published a report at the request of Nuclear Matters on the impact of announced nuclear retirements in Ohio and Pennsylvania. This report was published after FirstEnergy Solutions made an appeal to the U.S. Department of Energy under Section 202(c) of the Federal Power Act on March 29, 2018<sup>1</sup> and after FirstEnergy Solutions filed for Chapter 11 bankruptcy on March 31, 2018<sup>2</sup>. In this report, the authors outline multiple reasons that they believe justify state and/or federal subsidies to continue operating uneconomic nuclear power plants in Ohio and Pennsylvania.

The plants in question are Davis-Besse, Perry, Beaver Valley, and Three Mile Island, of which FirstEnergy Nuclear Generation, a former subsidiary of FirstEnergy Solutions<sup>3</sup>, owns the first three and Exelon Nuclear owns the fourth. All four plant owners have announced plant retirements within the next three years due to uneconomic operations<sup>4,5</sup>. Indeed, PJM's independent market monitor (IMM), Monitoring Analytics, noted in *2018 Quarterly State of the Market Report for PJM: January through March* that of the 19 nuclear plants within PJM, six to nine "did not recover their avoidable costs in two of the last three years." The IMM went on to indicate that based on known forward-looking pricing, "four nuclear plants would not cover their annual avoidable costs on average over the next three years (2018 through 2020)." Included in that tally were Three Mile Island, Davis-Besse, and Perry<sup>6</sup>. In addition, PJM reiterated after running reliability analyses for the requested deactivation time frames that "the lights aren't going to go out; There's not a reliability problem<sup>7</sup>."

These findings indicate that the market system upon which Ohio relies to procure, supply, and create capacity is functioning for the purpose of providing Ohioans with efficient electricity pricing. In contrast, The Brattle Report claims focus primarily on the value of these four specific nuclear

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<sup>1</sup> <https://www.utilitydive.com/news/firstenergy-asks-doe-for-emergency-action-to-save-pjm-coal-nuke-plants/520280/>

<sup>2</sup> <https://cases.primeclerk.com/FES/Home-Index>

<sup>3</sup> <https://www.bloomberg.com/research/stocks/private/snapshot.asp?privcapid=27084474>

<sup>4</sup> <https://www.prnewswire.com/news-releases/firstenergy-solutions-files-deactivation-notice-for-three-competitive-nuclear-generating-plants-in-ohio-and-pennsylvania-300621346.html>

<sup>5</sup> <http://www.exeloncorp.com/newsroom/exelon-to-retire-three-mile-island-generating-station-in-2019>

<sup>6</sup> [https://www.monitoringanalytics.com/reports/PJM\\_State\\_of\\_the\\_Market/2018/2018q1-som-pjm.pdf](https://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2018/2018q1-som-pjm.pdf)

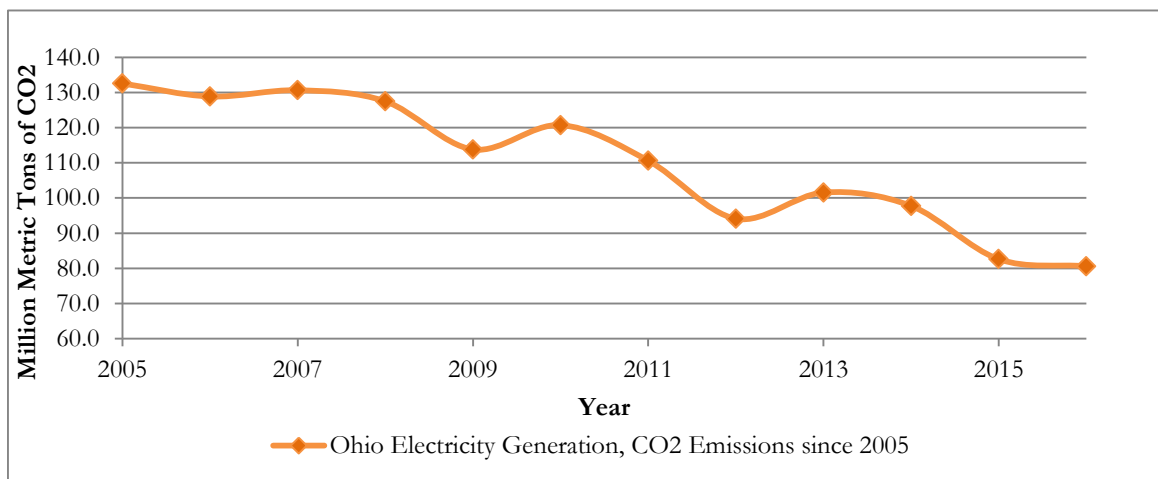
<sup>7</sup> <https://www.craigslist.com/article/20170622/news/170629944/regardless-whether-firstenergy-nuke-plants-receive-subsidies>

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plants, while ignoring the value of competitive markets to provide the most efficient price of electricity for consumers. Prior to addressing The Brattle Report’s three primary arguments, it is important to note that the original model of the analysis was based on the “entire Eastern Interconnection” and was not focused on the impacts to Ohio specifically. This suggests a degree of generalization that may overstate or understate the value of results of their model due to its original applicability to a much larger geographic area than PJM. The three primary arguments made in the report are:

- A significant amount of CO<sub>2</sub> emissions are avoided annually due to the operation of nuclear generators;
- Current rates of renewable additions are not high enough to offset the CO<sub>2</sub>-less generation that would fill the hole left by these nuclear plants closing; and
- Electricity prices will rise if these nuclear plants were to retire.

The first point, while true, ignores the fact that Ohio’s electric generation emissions have been falling steadily since 2005, at an annual rate of 4.95 million metric tons of CO<sub>2</sub> for an absolute reduction of 51.98 million metric tons of CO<sub>2</sub><sup>8</sup>, a 39.2% drop. The report asserts that the emissions avoided from these nuclear plants are worth \$921 million per year, based on an approximate output of 39 million MWh. This would equate to approximately \$44/metric ton CO<sub>2</sub> which is a significantly higher valuation than that of a recent auction carried out by the Regional Greenhouse Gas Initiative (RGGI) of \$5.35/ metric ton of CO<sub>2</sub>.



**Figure 1: Ohio Electricity Generation, CO<sub>2</sub> Emissions since 2005**

Secondly, the report makes the assumption that should these plants retire, the markets in which they operate will not respond accordingly. That is, it assumes that no individual power producer would see an opportunity in increased capacity costs to develop new renewable energy products. As a result, the report authors assume that the implementation rate of wind and solar resources in 2018

<sup>8</sup> <https://www.eia.gov/environment/emissions/state/analysis/>



would remain the same in future years. This ignores that PJM markets are designed to encourage investment in future generation and thus would provide an incentive to increase the current rate of renewable energy resource adoption. In contrast to the report's assumptions, it is reasonable to expect that more generation resources, including low- to no-carbon resources, would enter the market, and, the rate of new renewable energy additions has been increasing with time. Moreover, the report authors compare the total CO<sub>2</sub> emissions of wind and solar to nuclear, but do not include hydroelectric plants in their emissions comparison, which they acknowledge would bring the value of 'zero-emissions' generation from existing renewables much closer to nuclear generation.

Finally, the combined sector cost of electricity in Ohio during November 2018 was \$0.0973/kWh according to the EIA<sup>9</sup>. At the same time, the report claims that without these nuclear plants, prices would rise \$0.00243 in Ohio, which represents a less than 2.5% increase assuming that no other generator entered PJM's market in order to take advantage of the exceptionally small increase in wholesale capacity and energy market value. This degree of change in prices presumes a high degree of rigidity within the consumer class and that deployment of distributed generation resources by customer-generators will not accelerate in any way. The report does not in any way address what the potential cost of a state and/or federal nuclear subsidy to ratepayers would be, so that a cost/benefit analysis cannot be made.

The key takeaway is that The Brattle Report supports a technology over a technology-neutral regulatory system that has served Ohioans for nearly a decade. Additionally, the authors rely on previous work and apply it too narrowly to these specific plants. And finally, the evidence that reliability will not be compromised and the lights will still turn on exists and is validated by PJM.

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<sup>9</sup> [https://www.eia.gov/electricity/monthly/epm\\_table\\_grapher.php?t=epmt\\_5\\_6\\_a](https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a)