



A Market Monitor's View of the Economic Challenges Facing the PJM Nuclear Fleet

SUMMARY

The economist who has been serving for two decades as the Independent Market Monitor (IMM) for four regional power markets has determined that the cost to operate nuclear power plants in PJM is greater than projected revenues in the years ahead. **These results paint a dim picture for the financial viability of most of the nuclear resources in the PJM region**, absent an unexpected rise in natural gas prices, a price on carbon, or other clean energy payments that would increase their revenues.

This independent analysis, unlike reports from PJM's own market monitor, accurately evaluates the avoidable "going forward costs" of the PJM nuclear fleet and compares those costs to realistic revenues from PJM's energy, ancillary services, and capacity markets rather than comparing them to an inflated revenue estimate. Importantly, the report recognizes that nuclear plant operators face operational and market risks that must be considered when accurately assessing the costs of continued operation. **The analysis concludes that almost all nuclear plants in PJM will have insufficient revenues to cover costs even before accounting for these risks.** Like any business, power plant owners cease operations when the costs and risks that can be avoided by shutting down (i.e. incremental capital costs, staffing, operations and maintenance costs and avoidable risks) are greater than the revenues they expect to receive from the market.

The report provides state policymakers with a robust examination of the economic challenges facing the nuclear fleet in PJM and the increasing economic pressures to prematurely retire those resources, to the detriment of the environment, the communities, the employees and customers alike.

BACKGROUND

Compared to other types of electricity generators, a much larger share of a nuclear unit's total revenues is derived from the energy market, rather than the capacity market, because of the relatively low variable production costs and consistently high output levels of nuclear power. Therefore, the sharp reductions in energy prices in recent years have disproportionately reduced the revenues of nuclear units and attempts to replace these revenues through capacity payments are often falling short because of the current capacity market design. This has led to retirement announcements from nuclear units and, in some cases, to states taking action to preserve their nuclear resources.

KEY FINDINGS

The analysis evaluates the economic viability of nuclear units based on detailed estimates of future revenues and costs for nuclear plants operating throughout PJM. The report found:

- 1) Declining energy prices and associated revenues in recent years have substantially reduced net revenues received by nuclear units in PJM.**
- 2) With energy prices in 2020 falling to their lowest levels in decades, it is unlikely that any of the nuclear resources in PJM are covering their costs.**

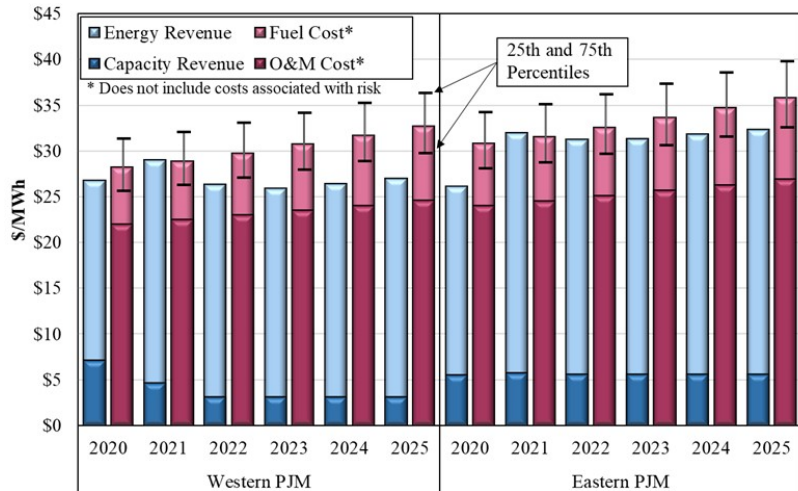
- 3) Although projected energy prices in future years are higher than the prevailing prices in 2020, it is **unlikely that resulting market revenues will be sufficient to allow any of the resources to be viable to remain in operation, with the possible exception of very lowest-cost resources.**
- 4) If the PJM markets evolve to better reflect the value of carbon emissions, the economic outlook for the nuclear resources would improve since they emit no carbon dioxide.

NOTABLE TRENDS

Insufficient revenues at most of the nuclear resources in the PJM region are leading to heightened economic pressure to retire.

- **Both energy and capacity revenues have been falling in recent years and hit new lows in 2020** due to continued low natural gas prices and depressed peak load levels from COVID.
- While estimated energy prices show a rebound in 2021 from 2020 levels,

ultimately cost/revenue trends show that nuclear unit revenues across PJM likely will not exceed average going-forward costs in 2021 and this revenue shortfall will increase over time.



These results and trends are consistent with nuclear retirements and announced retirements across PJM and other competitive regions in recent years. The analysis confirms the economic realities faced by merchant nuclear owners as it correctly includes all going forward costs, appropriately accounts for reduced nuclear capacity revenues, and recognizes a range of market and operational risks related to continued operation. The results demonstrate that it is not viable for most nuclear plants to remain in operation under existing market structures.

This independent analysis is a wakeup call on the dim picture of the financial viability of most of the nuclear resources in the PJM region and calls into serious question the ability of the existing nuclear fleet to continue to produce zero-carbon energy for decades to come.