

Power Struggles in the Power Industry

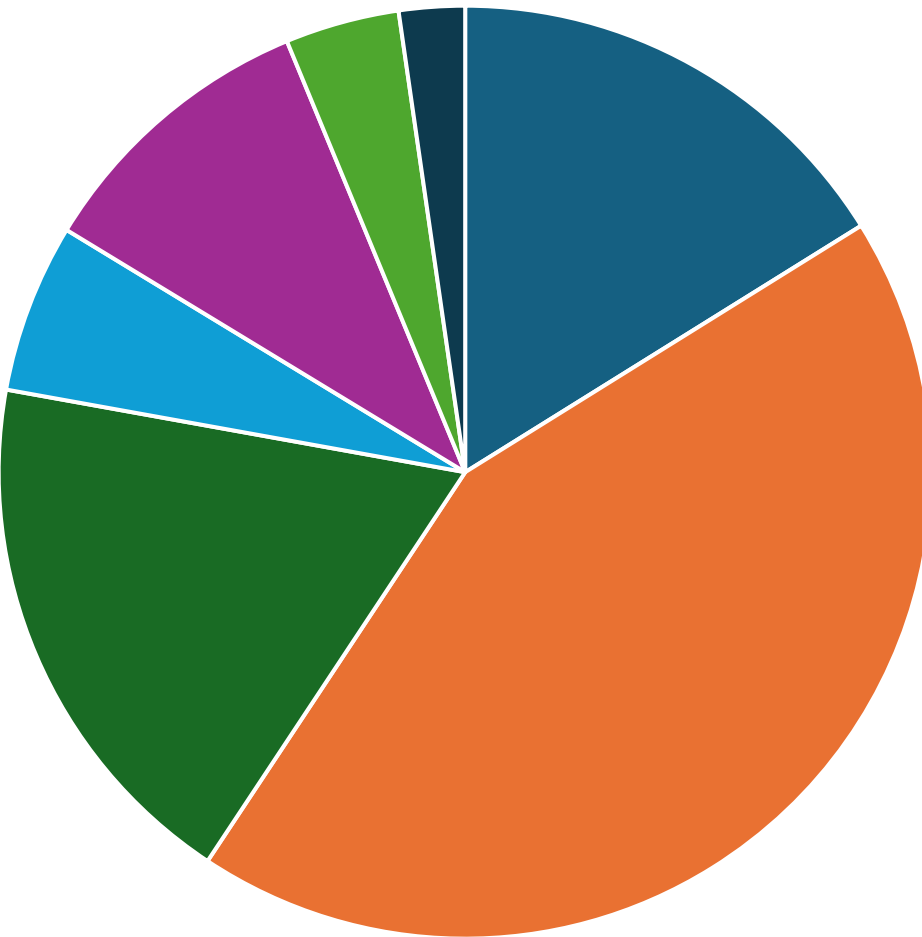
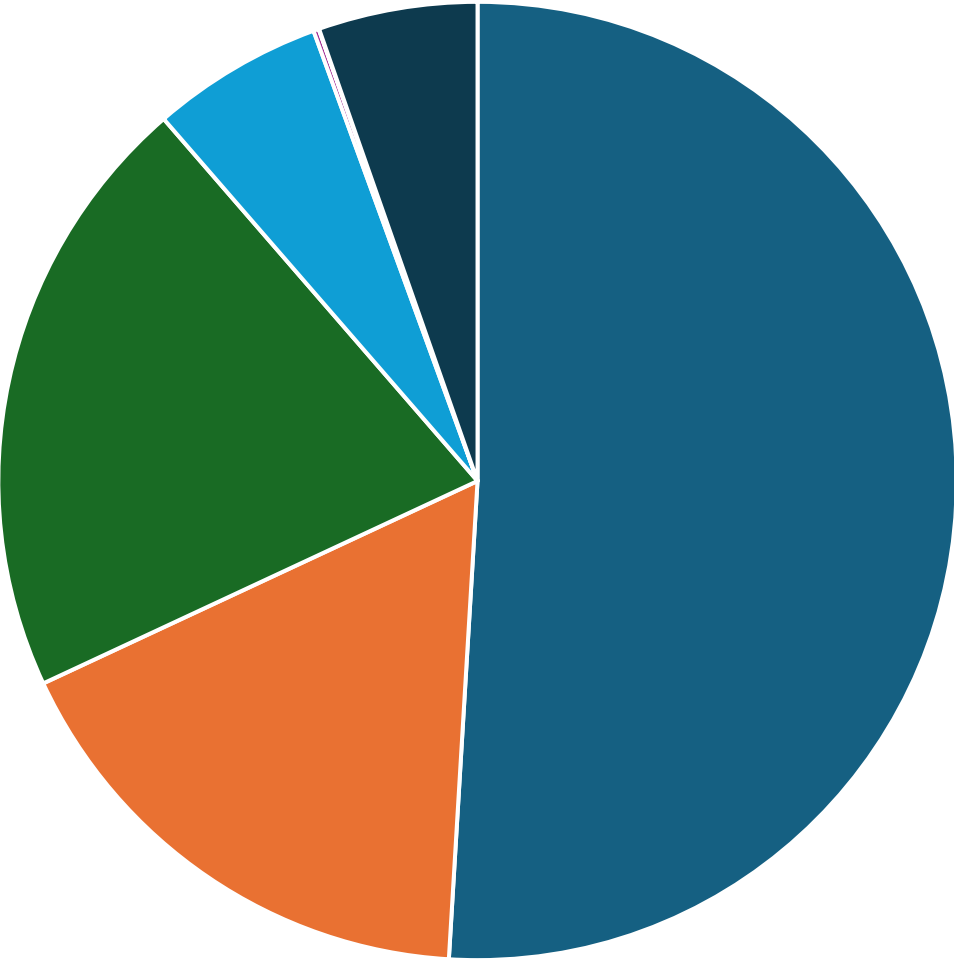
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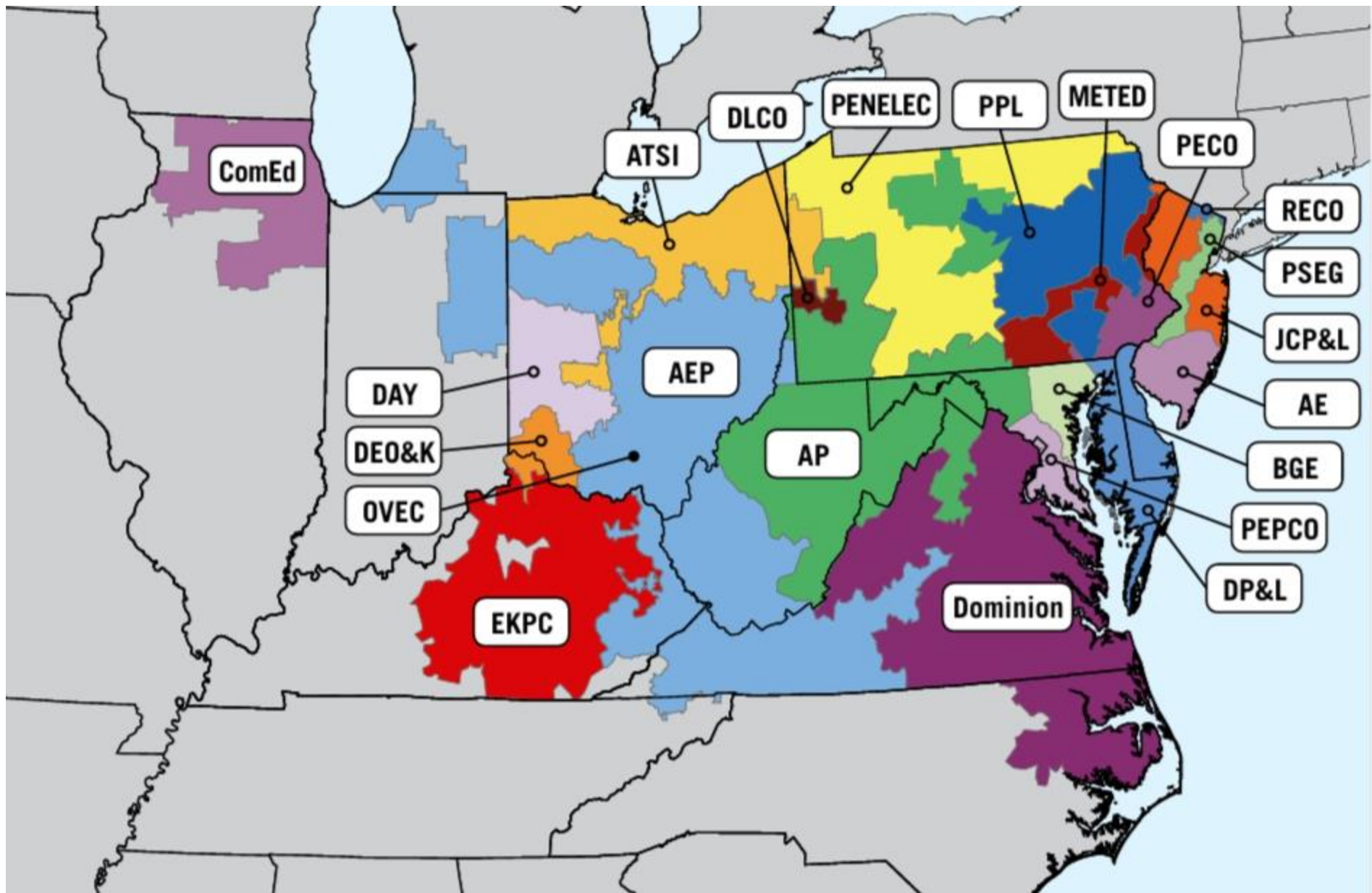
2001 Percent Generation By Fuel Source

2023 Percent Generation By Fuel Source

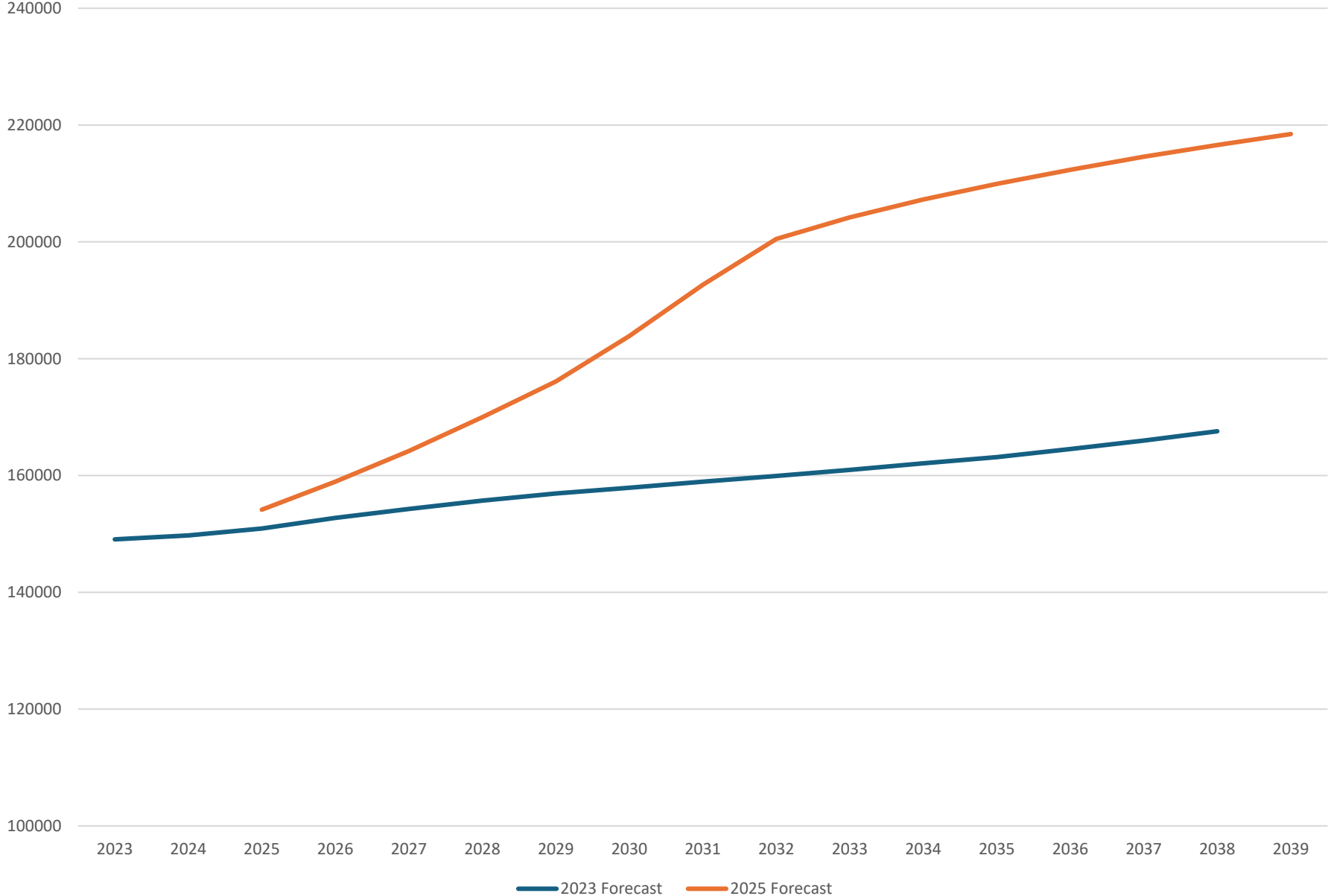


■ Coal ■ Natural Gas ■ Nuclear ■ Hydro ■ Wind ■ Solar ■ Other

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PJM Summer Peak Demand Forecast



Responding to Data Center Load Growth

- Adjusting the PJM Capacity Market to meet the demand
- PJM starts its Critical Issues Fast Path Initiative
- State Commission Work
 - Promoting Economic Growth
 - Protecting Existing Rate Payers

The PJM Capacity Market

- The purpose of the capacity market is to provide an incentive to build new capacity and retain existing capacity.
- The capacity market is needed because the intramarginal rents earned in the energy market fail to cover generator fixed costs.
- PJM constructs the demand curve and controls the supply curve.

Constructing the Demand Curve

- The Demand Curve is a function of the Reliability Requirement
- The Reliability Requirement = the Summer Peak Demand * (1+ the reserve margin)*the capacity factor
- The Reliability Requirement for 25/26 auction increase by only 1.1 percent compared to the Reliability Requirement for 24/25 auction even though the summer peak demand increased by 2.1 percent and the reserve margin increased from 14.7% to 17.8%
- The capacity factor decreased from 94% to 79%.
- A further adjustment actually decreased the demand in the 25/26 auction compared to the 24/25 auction.

Controlling the Supply Curve

- Controlling Grid Interconnection
- Excluding Must Run Units from the Capacity Market
- Determining Unit Reliable Capacity

Controlling Grid Interconnection

- Before building a new generating unit, the owner must apply for the right to interconnect with the PJM
- The new unit must pass a number of PJM qualifying studies in order to obtain the right to interconnect.
- By slow walking the studies, PJM create a back log of 221 GW of requests to connect, including 166 GW were requests from renewable energy units
- If only 7GW had been approved and built, the 2025/26 auction price would have decreased from \$269 to \$98 MW/Day

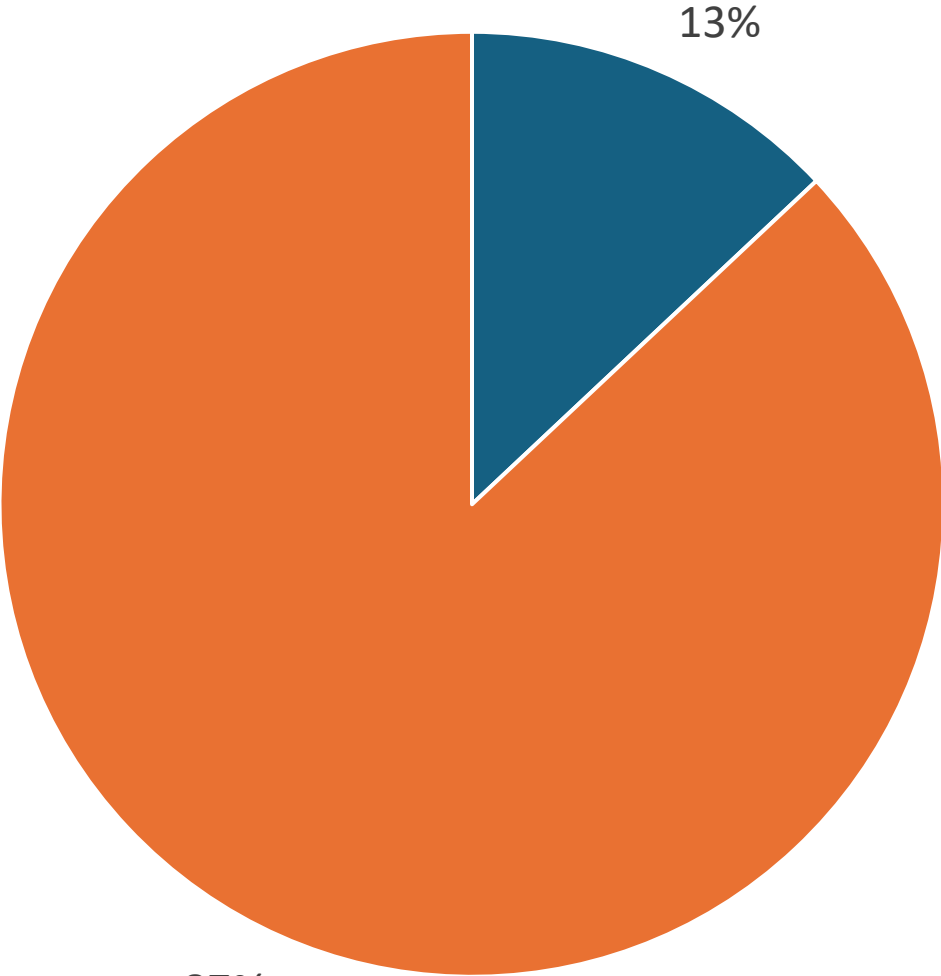
Must Run Unit

- For Reliability Concerns PJM can require a generator to continue to operate even though the owner wishes to retire the unit
- Under those circumstances, customers in the sub-region served by unit are required to support the profitability of the unit
- PJM, however, did not allow the unit to be included in the sub-region supply curve
- This action caused the Baltimore sub-region to pay a capacity cost of \$466.35 MW/Day, an amount greater than the region average of \$269.92 MW/Day.

Determining Unit Reliable Capacity

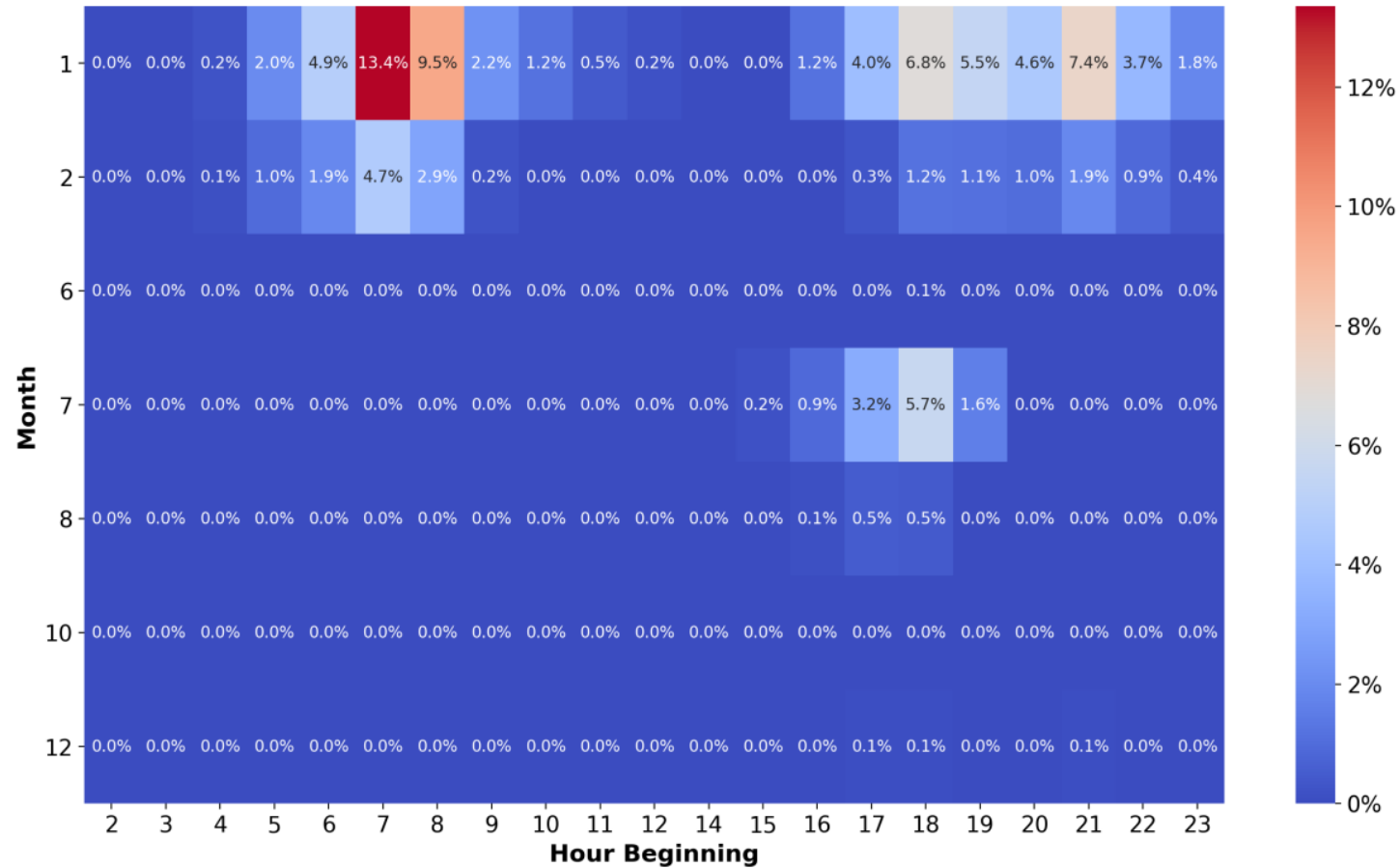
- Unit reliability is based on the equivalent load carrying capacity (ELCC)
- ELCC is based on the reduction in expected unserved energy (EUE) of a particular technology compared to the reduction in EUE of a perfect unit.
- The calculation is dependent on the weather conditions that create the expected unserved energy

Seasonal Expected Unserved Energy Shares



■ summer ■ winter

Month/Hour Expected Unserved Energy



Changes to Equivalent Load Carrying Capacity

ELCC Ratings For the 2024/25 and 2025/26 Auctions			
Technology	Rating		
	2024/5	2025/6	Change
Solar Fixed Panel	33%	9%	-24%
Solar Tracking Panel	50%	14%	-36%
Nuclear	99%	95%	-4%
Coal	88%	84%	-4%
Gas Combined Cycle	96%	79%	-17%
Gas Turbine	90%	62%	-28%

Capacity Market Results

	2024/25 Auction	2025/26 Auction
Price	\$28.92 MW/Day	\$269.92 MW/Day
Quantity	147,478 MW	135,684 MW
Revenue	\$2.2 Billion	\$14.7 Billion

Critical Issues Fast Path

- The initial PJM proposal would exempt data centers from capacity charges and interrupt service to data centers first whenever there are reliability concerns.
- The market monitor proposal would require new data centers to bring their own generation with them.
- The market monitor filed a complaint with FERC to prevent new data centers from connecting to the grid prior to matching generation becoming operational.

State Commissions Decision follow one of two paths

- Path one establishes an economic development rate that equals variable plus a small amount toward the fixed costs of generation. Most of the fixed costs are recovered from all customers during a general rate case.
- Path two establishes a new rate classification for new data centers. The data center is charge in year one as it is being built a demand charge equal to the demand charge associated with its highest forecasted demand. If the demand does not occur as planned, the load center pays an additional charge to cover any stranded cost associated with the load center's application.

Conclusions

- The struggle to provide reliable capacity and to allocate the cost of that capacity continues.
- The PJM capacity market became a mechanism to transfer cash from customers to owners of generation, funneling funds to owners of fossil fuel and nuclear units.
- PJM's new initiative, "the Critical Issues Fast Path," is still being debated.
- State commissions follow one of two paths
 - Establishing economic development rates to attract data centers
 - Establishing new rate classifications to protect existing customers