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strategic energy solutions

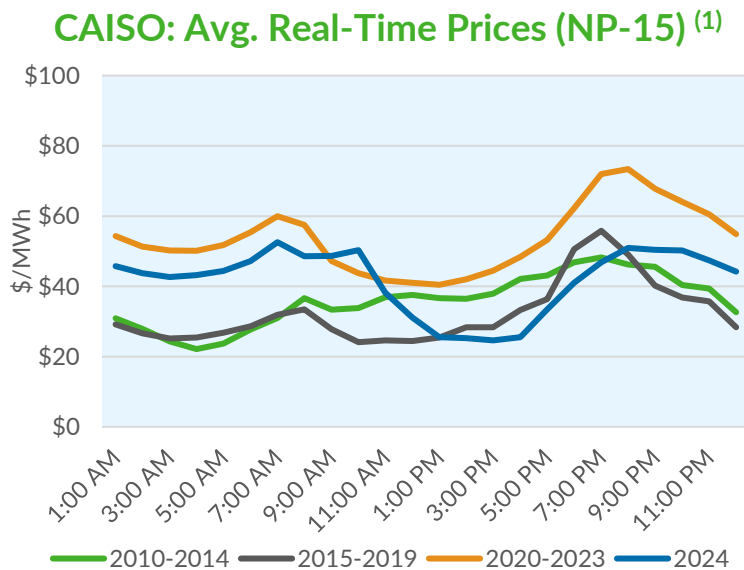
Clean Electricity Discussion

23 October 2024

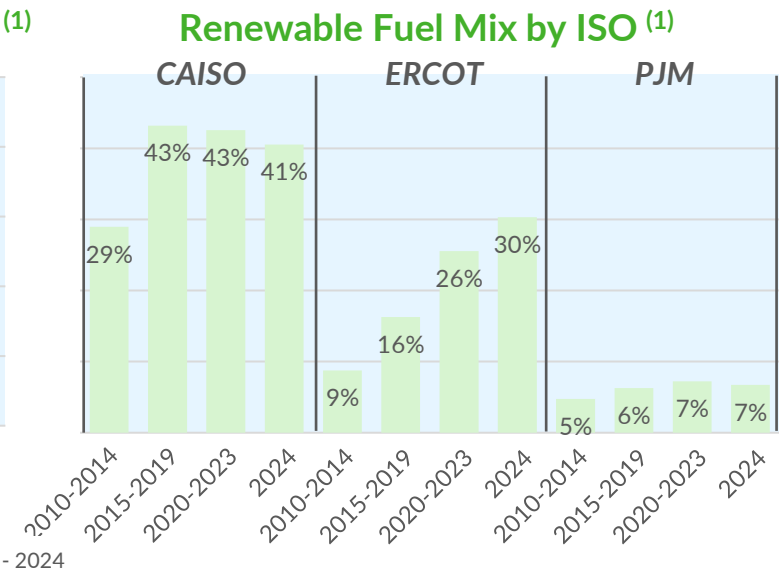
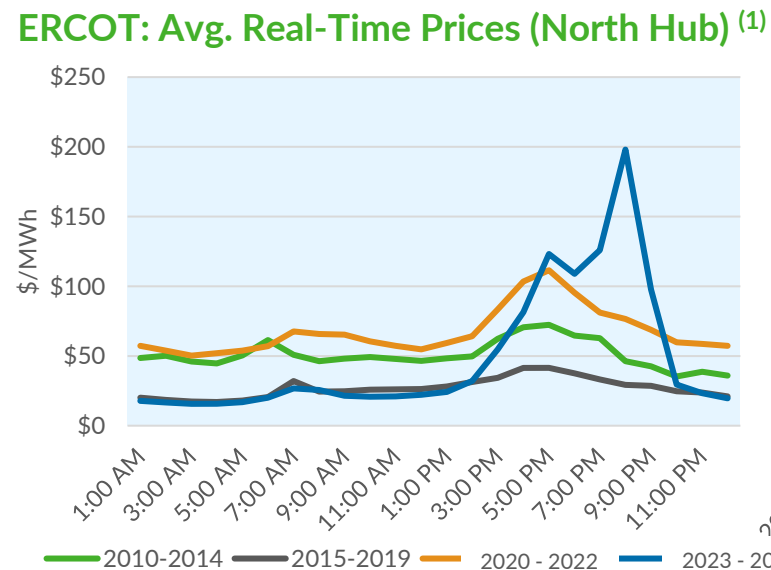


Future Price Volatility and Uncertainty

Key Takeaway: The surge in demand has yet to come, but emerging trends of price volatility and higher reliability risks have begun to materialize in CAISO and ERCOT, where the generation mix has rapidly evolved to include a greater share of renewables. From a generation perspective, PJM is heading in the same direction.



⁽¹⁾ Source: ISO data



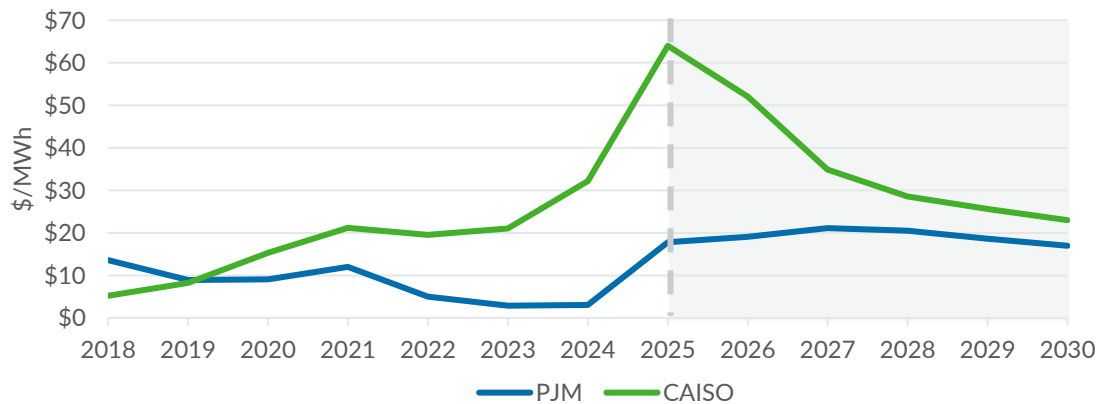
Key Takeaway: Load growth will further stress the grid and ISOs to meet the increased supply requirements, but the generation mix will also be a significant driver of real time price formation, further impacting generator revenues and end user costs.

Cost of Ensuring Grid Reliability is Increasing

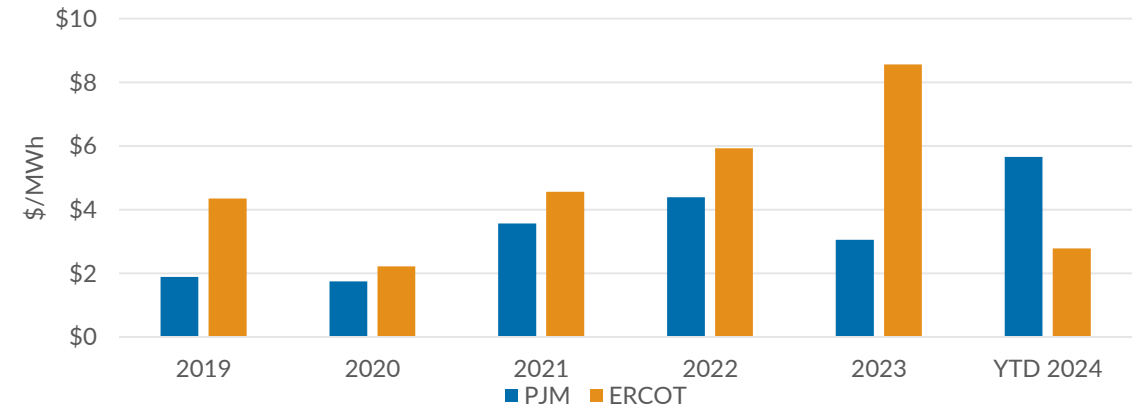
Deregulated ISOs are ramping up existing and implementing new market mechanisms to ensure grid reliability and incentivize new generation. To put this simply, there will be more revenue to attract merchant generation, and as a result, this will increase costs for end consumers of electricity.

- Trend in recent years of significant increase in capacity costs in PJM and CAISO, and this is expected to continue
- In ERCOT, which is an energy-only market, there have been recent legislative reforms that have increased requirements in the volume of traditional reliability products, as well as the addition of new products and the potential for a “capacity-like” mechanism
- PJM has also seen increased reliability costs in the form of traditional reliability products, volumes, and prices

Capacity Costs by Market (1, 2)



Reliability Product Costs by Market (1)



(1) Source: Data includes the most recent capacity auction results from July 2024

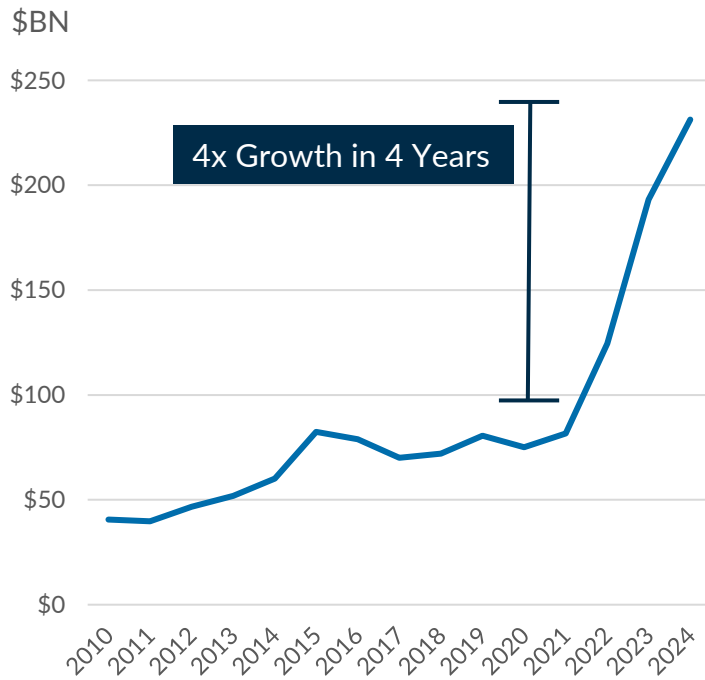
(2) Capacity prices for future years are wholesale indicative quotes and are subject to change

Drivers of Generational Growth in Power Demand

Not one, not two, but three seismic shifts

Inflation Reduction Act, Trade Policy & Reshoring Manufacturing

U.S. Manufacturing Construction Spend ⁽¹⁾



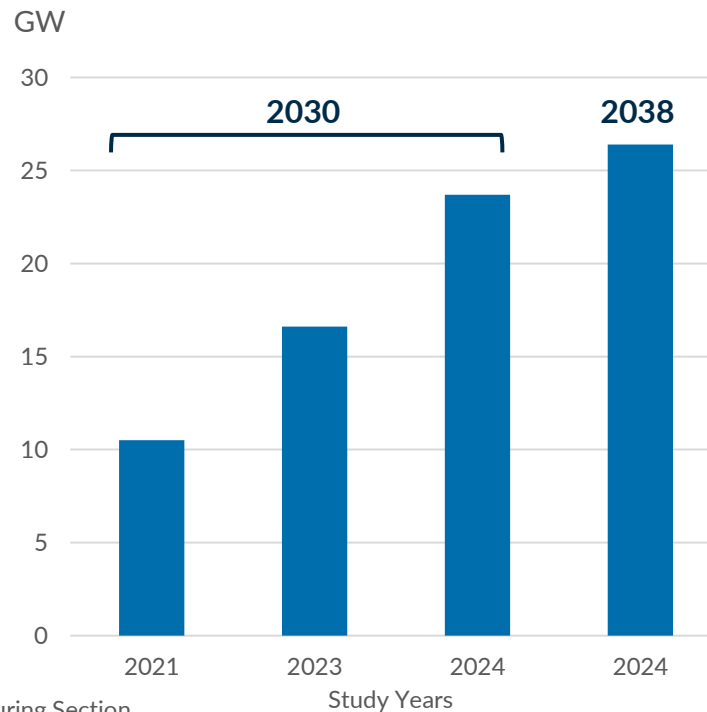
⁽¹⁾ U.S. Census Bureau Data on Construction Spend for Private Manufacturing Section

⁽²⁾ ERCOT Permian Basin Reliability Plan

⁽³⁾ McKinsey & Company, Goldman Sachs, Rhodium Group (U.S. Energy and Emissions Outlook)

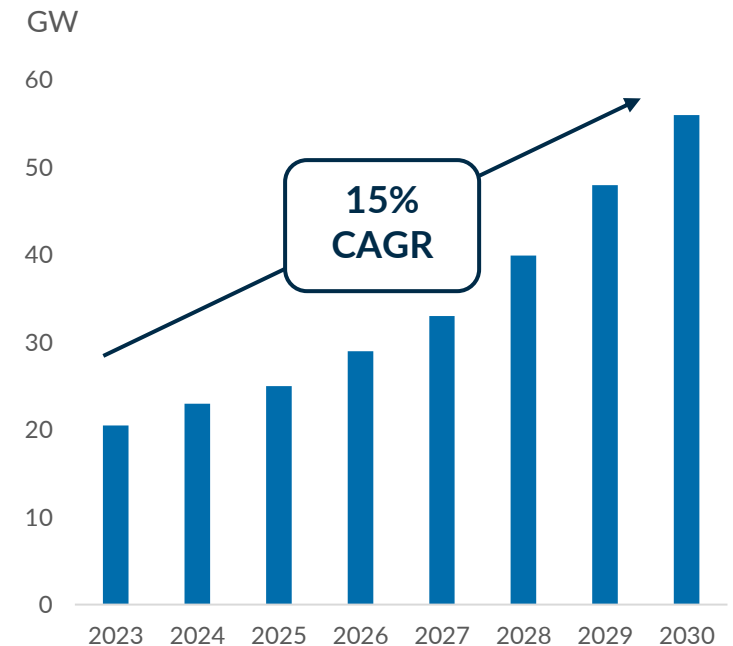
Domestic and Global Energy Demand Oil & Gas

2030 Permian & Delaware Basin Power Demand by Study Year ⁽²⁾

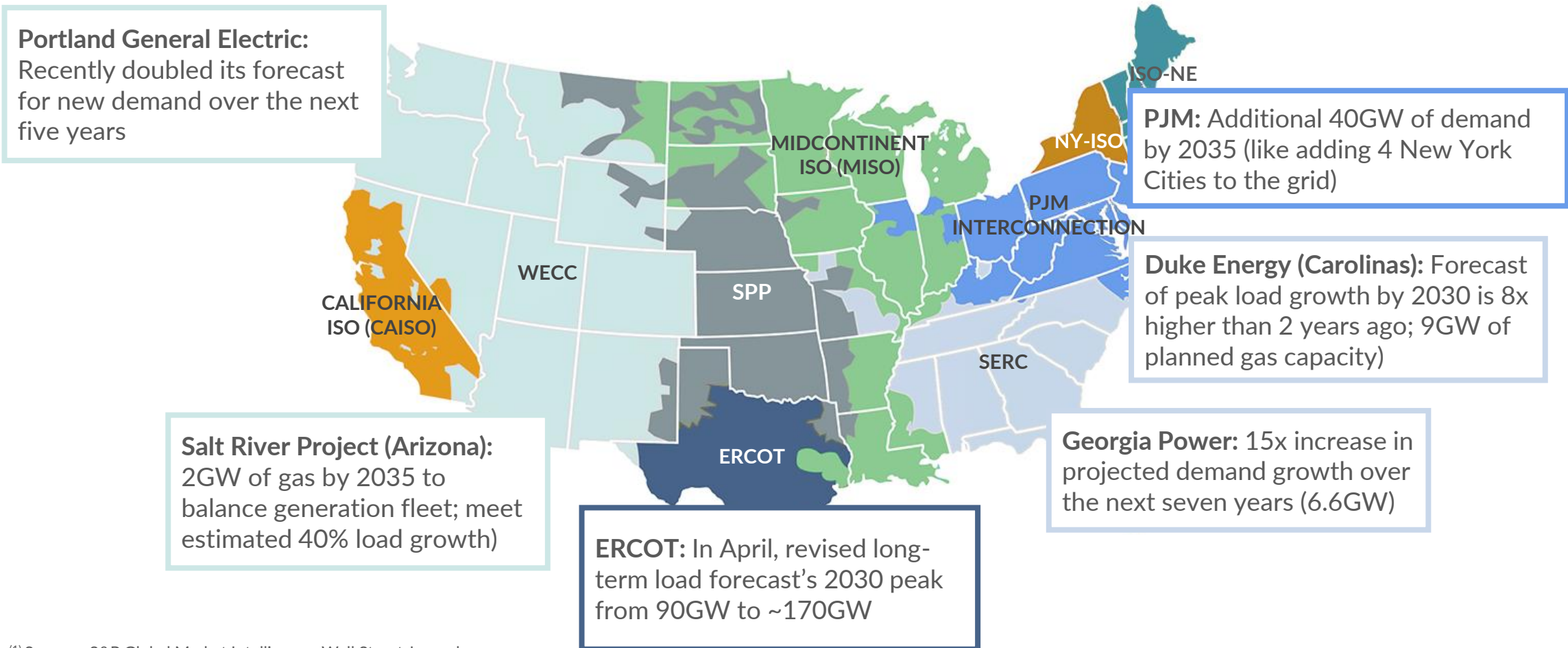


Artificial Intelligence Data Centers

U.S. Data Center Power Demand ⁽³⁾



Load Growth: Markets' Reaction to Forecast of "Once-In-A-Generation" Occurrence ⁽¹⁾



⁽¹⁾ Sources: S&P Global Market Intelligence, Wall Street Journal



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