PJM: Managing Resource Adequacy in an Increasing Demand Environment

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Oct. 27, 2025

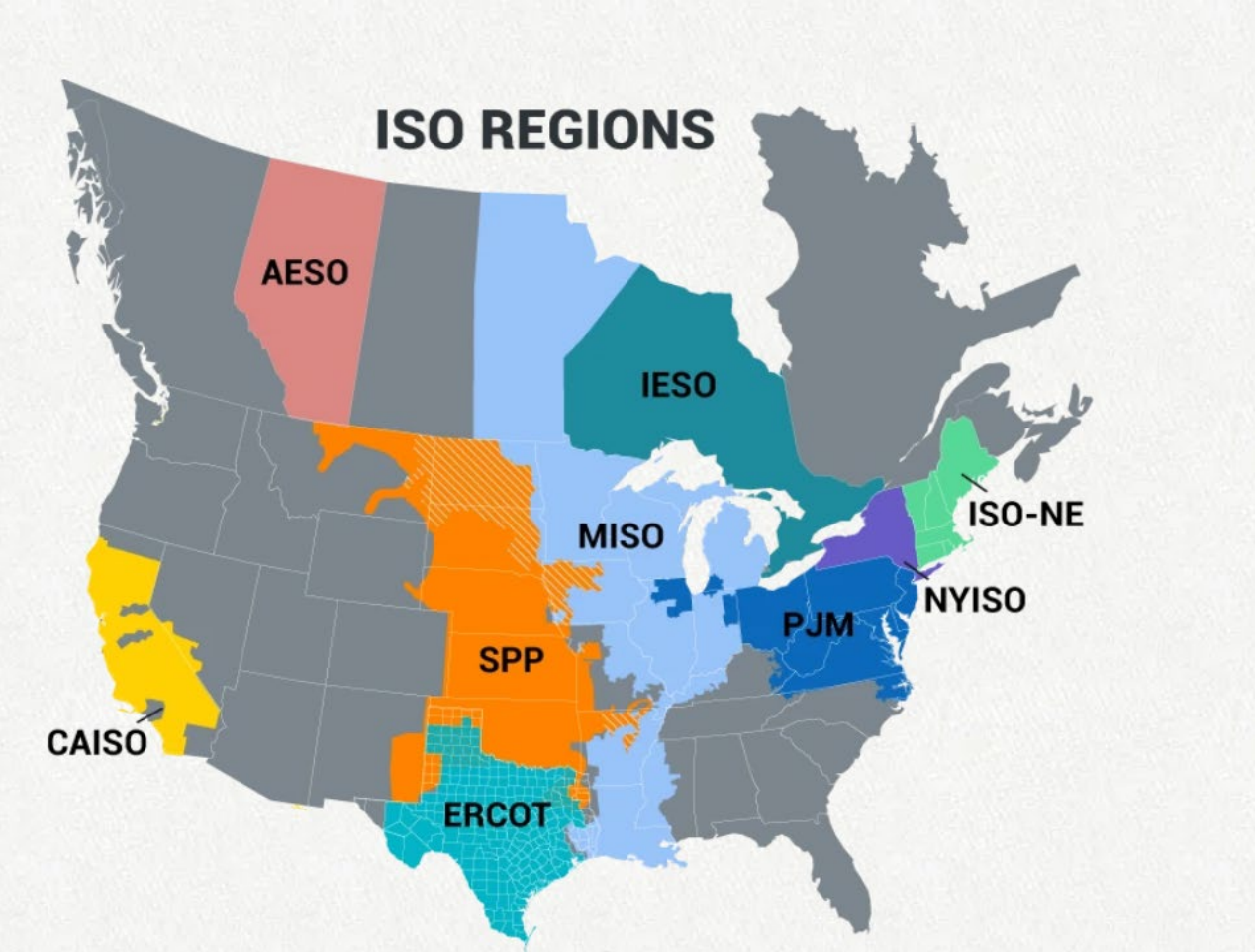
ESIG Fall Technical Workshop

PJM – Primary Focus

RELIABILITY

Visit **Learn.pjm.com > Three Priorities** for fact sheets, videos and more information about PJM Markets, Operations, and Planning functions

RTOs/ISOs in North America



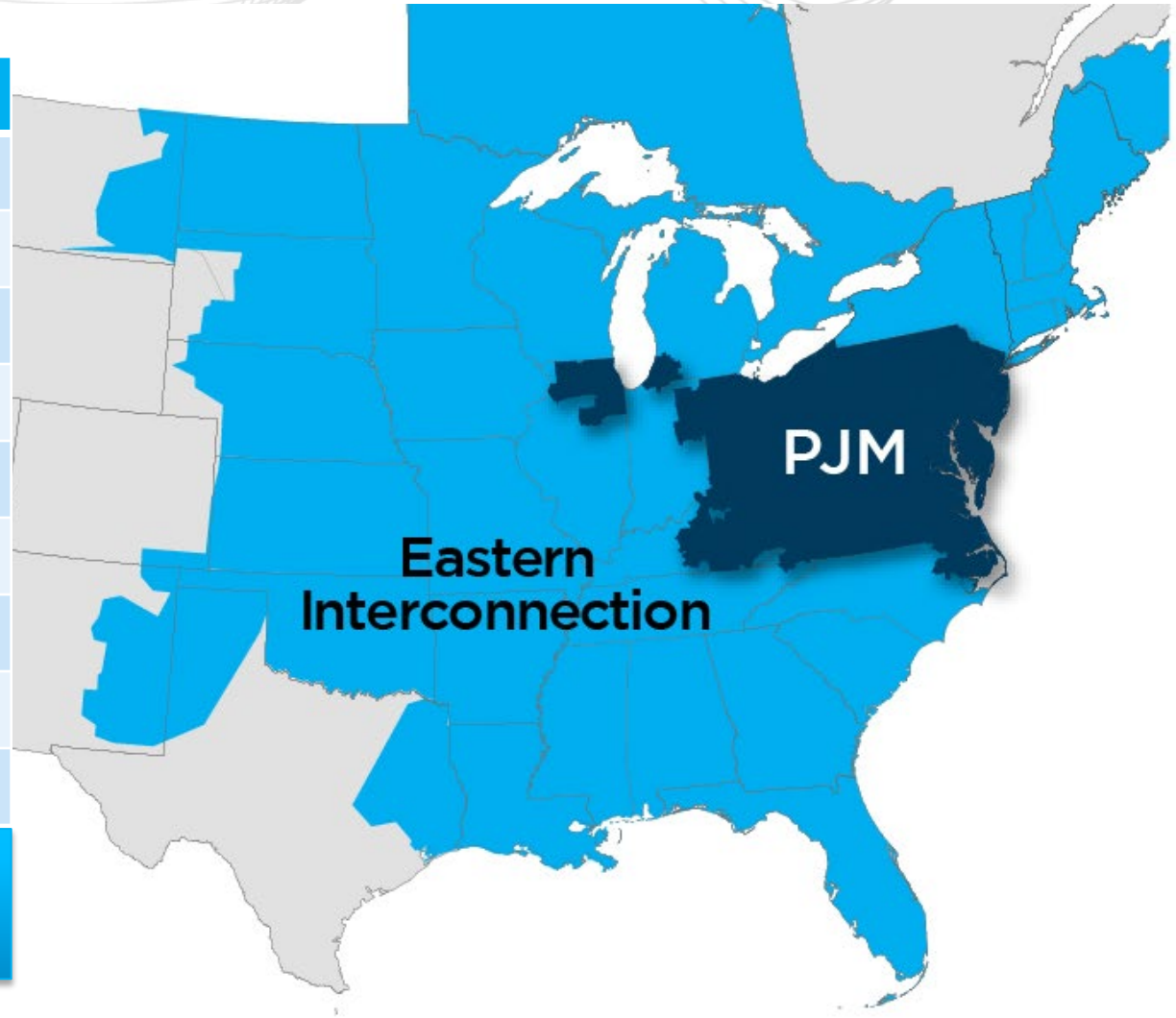
PJM is one of 9 regional transmission organizations and/or independent system operators in North America.

RTOs/ISOs now serve approximately two-thirds of the U.S. and 50% of Canada's population.

PJM as Part of the Eastern Interconnection

Key Statistics	
Member companies	1,110
Millions of people served	67+
Peak load in megawatts	165,563
Megawatts of generating capacity	182,036
Miles of transmission lines (BES)	88,333
Gigawatt hours of annual energy	800,004
Generation sources	1,486
Square miles of territory	369,054
States served	13 + DC

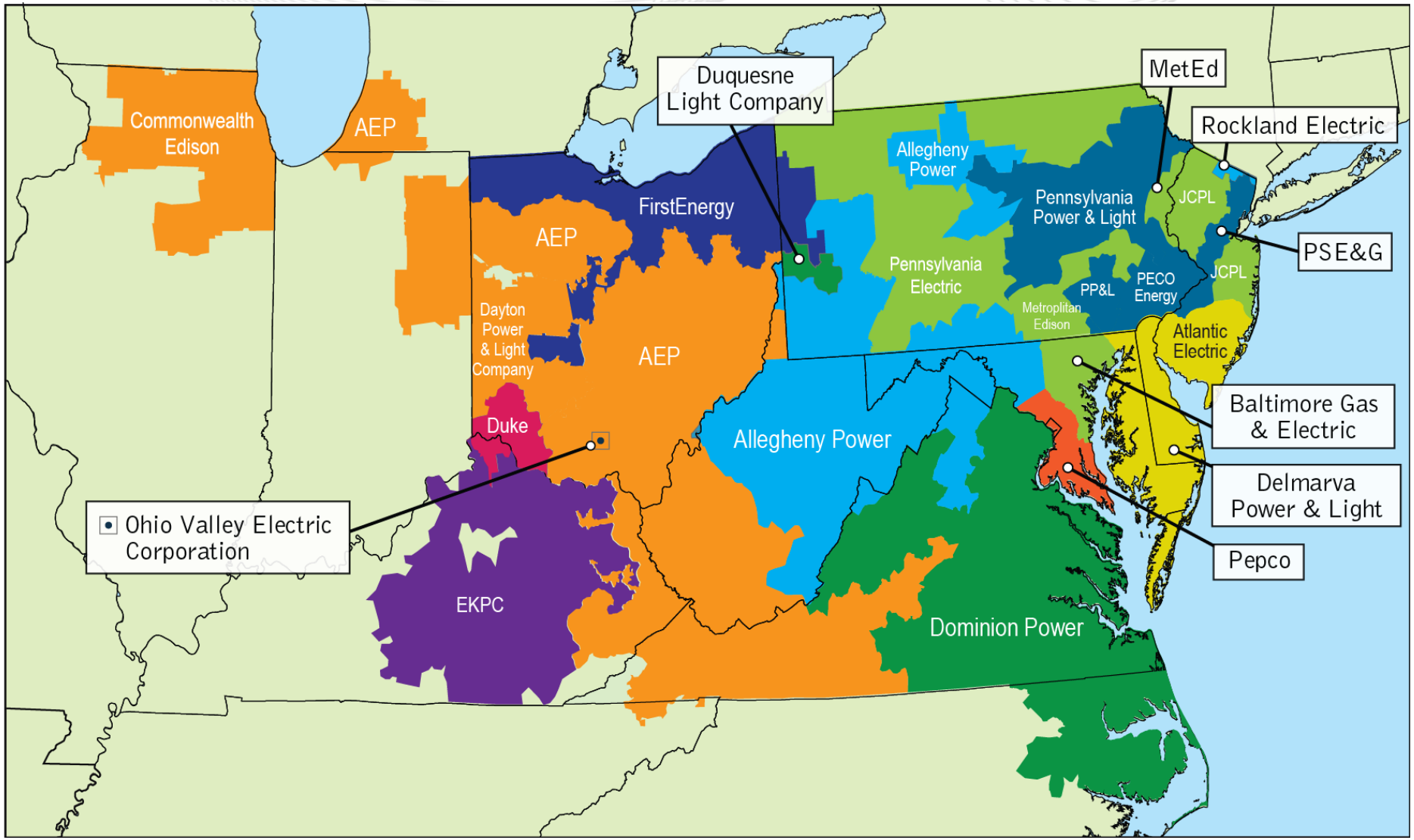
- 27% of generation in Eastern Interconnection
- 24% of load in Eastern Interconnection



As of 2/2025

PJM Evolution

- Joined in 1927
- Joined in 1956
- Joined in 1965
- Joined in 1981
- Joined in 2002
- Joined in 2004
- Joined in 2005
- Joined in 2011
- Joined in 2012
- Joined in 2013
- Joined in 2018



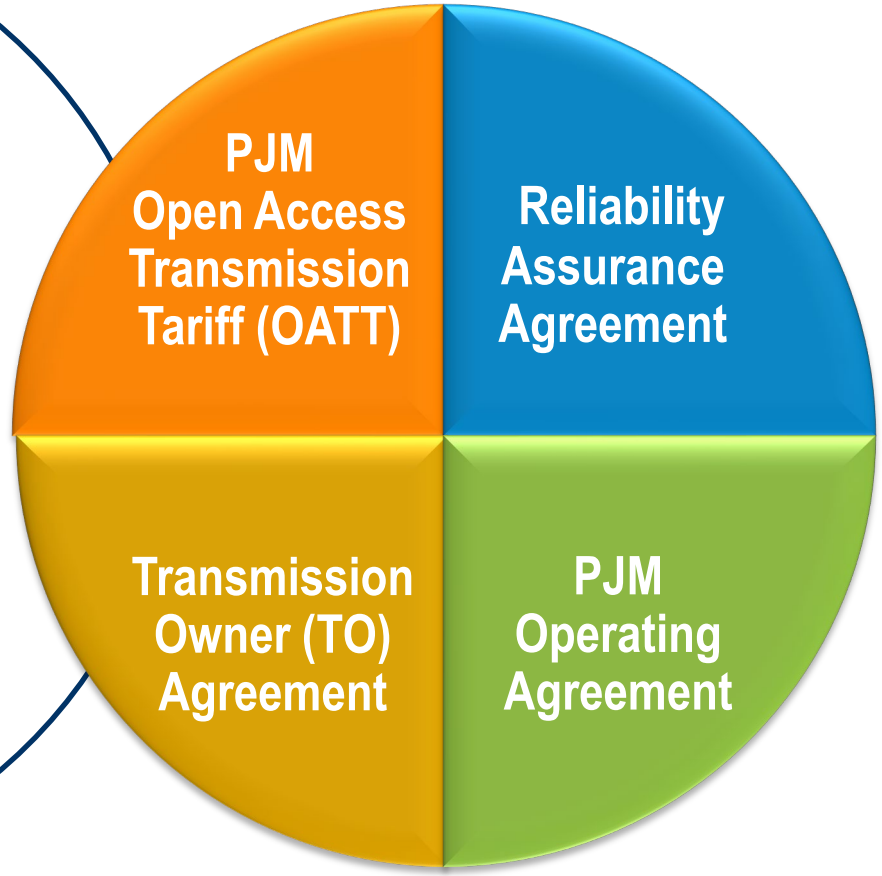
How Is PJM Different from Other Utility Companies?

PJM Does:

- Direct operation of the transmission system
- Remain profit-neutral
- Maintain independence from PJM members
- Coordinate maintenance of grid facilities

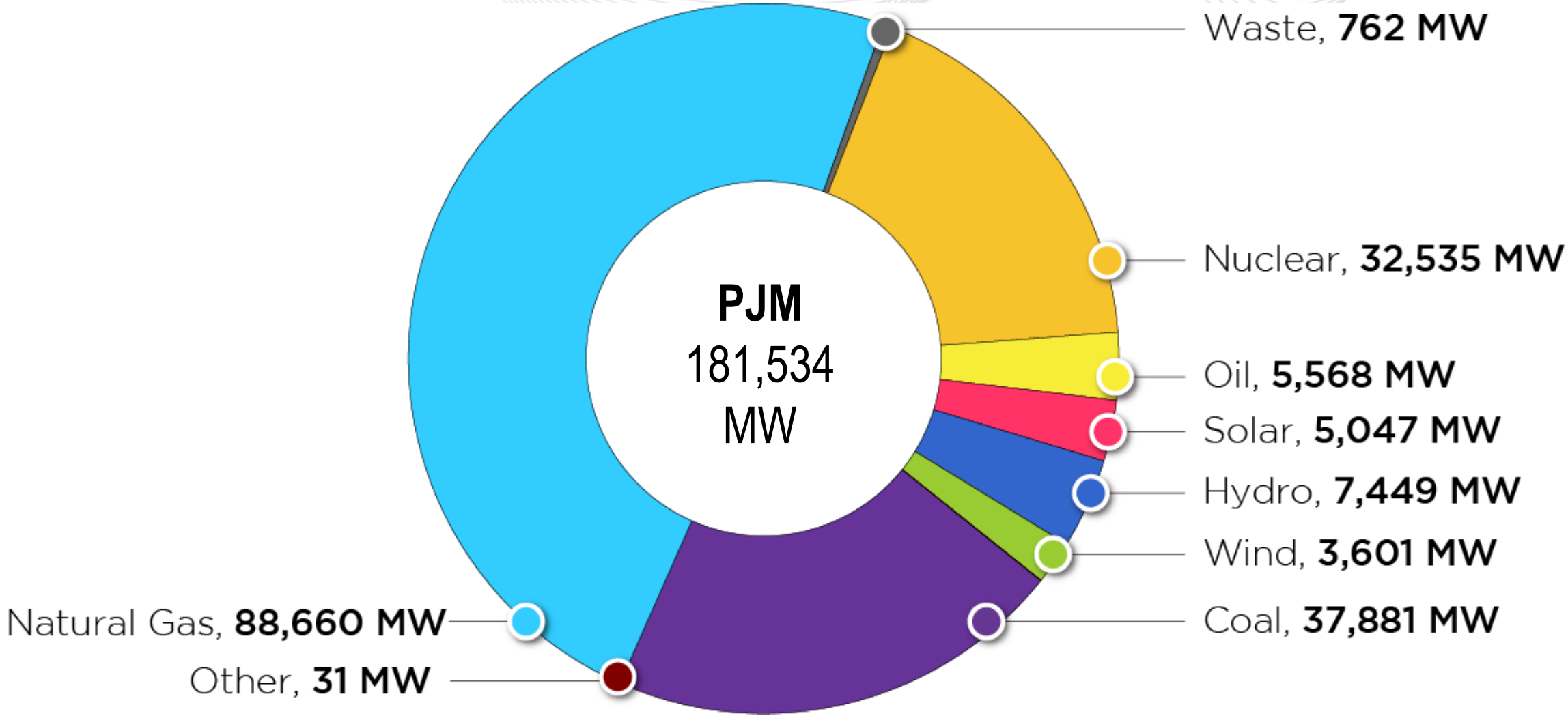
PJM Does *NOT:*

- Own any transmission or generation assets
- Function as a publicly traded company with shareholders and concerns around "earnings"
- Perform maintenance on generators or transmission systems (e.g., repair power lines)
- Serve or direct any end-use customers (retail)

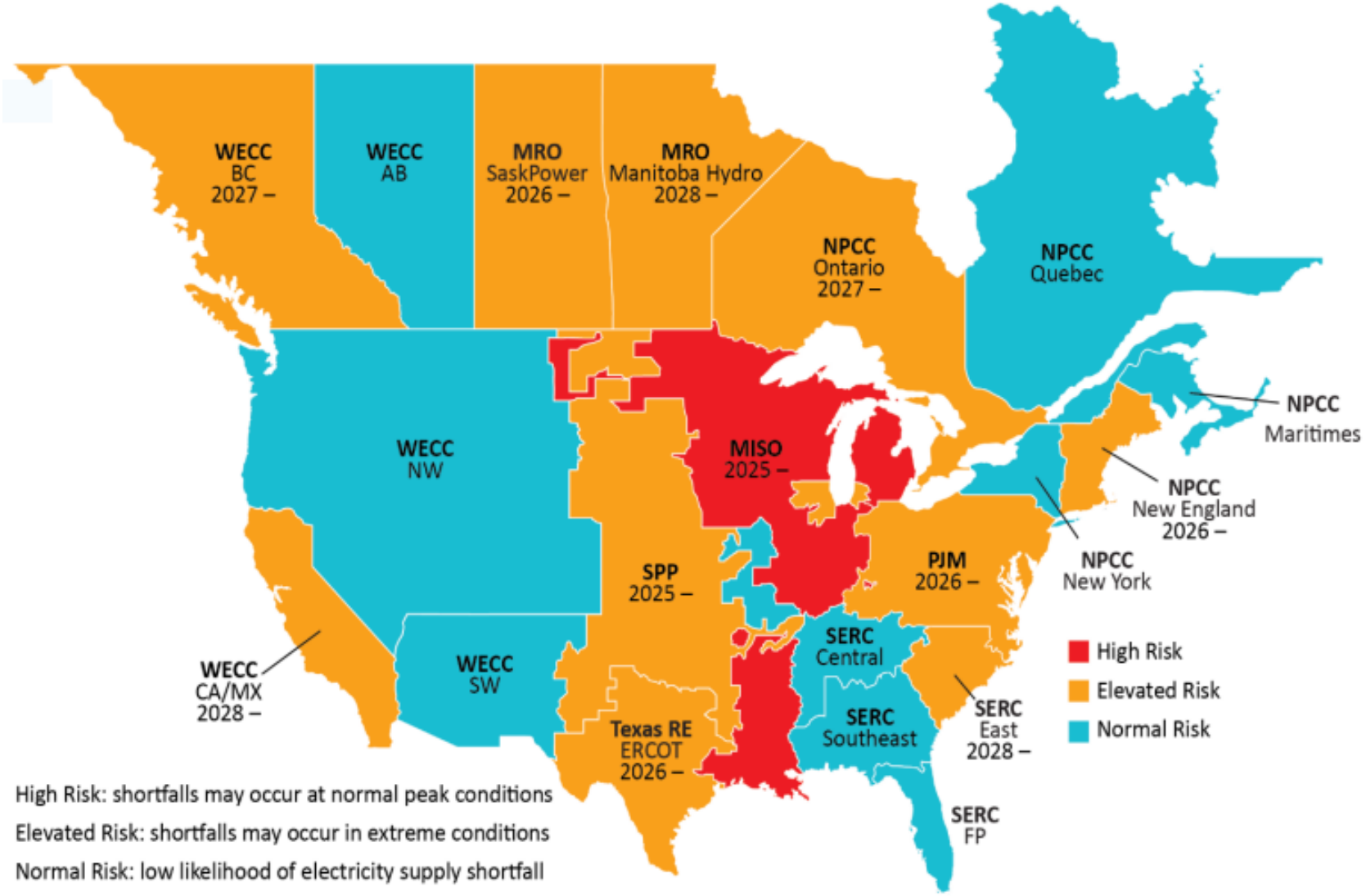


PJM Existing Installed Capacity Mix

(CIRs – as of Dec. 31, 2024)

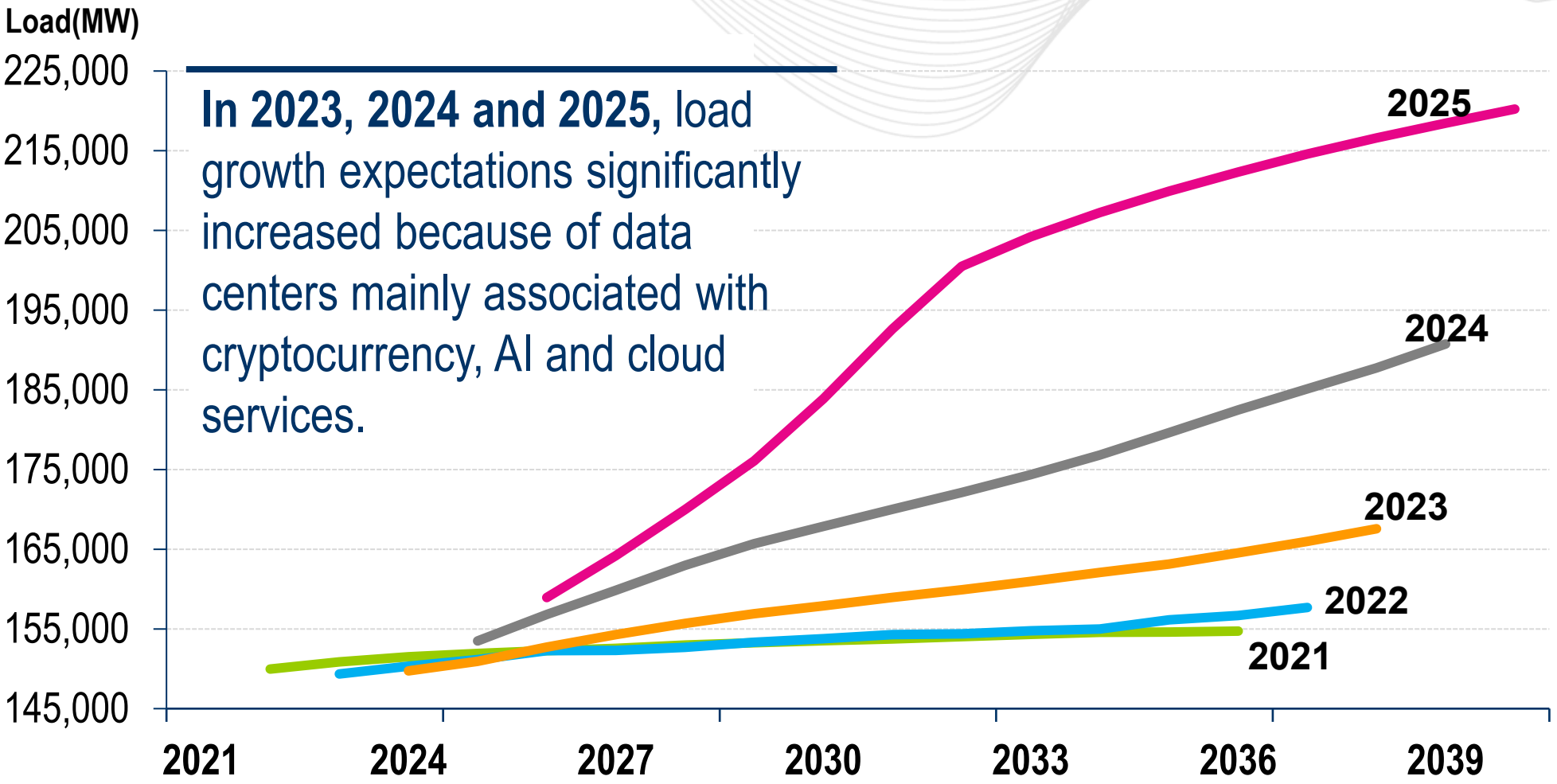


NERC: Long-Term Reliability Assessment

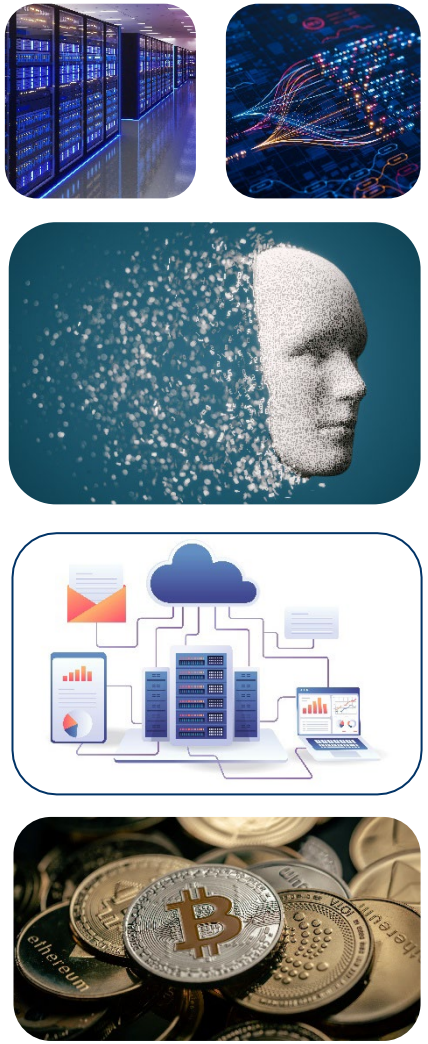


Graphic: NERC

PJM RTO Summer Peak Demand Forecast



In 2023, 2024 and 2025, load growth expectations significantly increased because of data centers mainly associated with cryptocurrency, AI and cloud services.



Data Center Proliferation

Blackstone to Acquire 774-MW Virginia Gas Plant in 'Data Center Alley' in Reported $1B Deal

Chevron to build gas plants to power data centers amid AI boom

By **Reuters**

DIVE BRIEF

PJM expects summer peak load to grow 2% a year on average, driven by data centers

Largest US gas-fired power plant planned for data centers in Pennsylvania

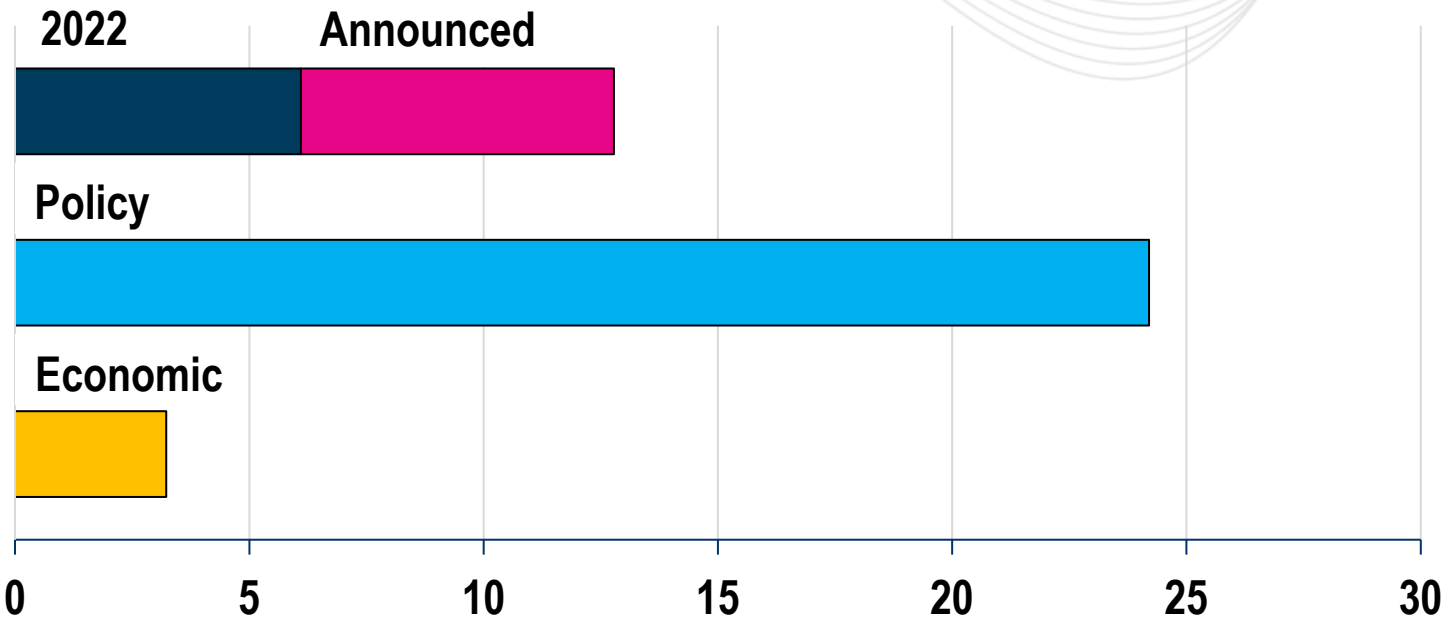
The 4.5-GW, $10 billion project at the former Homer City coal-fired power plant could start operating by 2027, according to the project's developers.

Constellation keeps momentum rolling on nuclear power restart at Three Mile Island

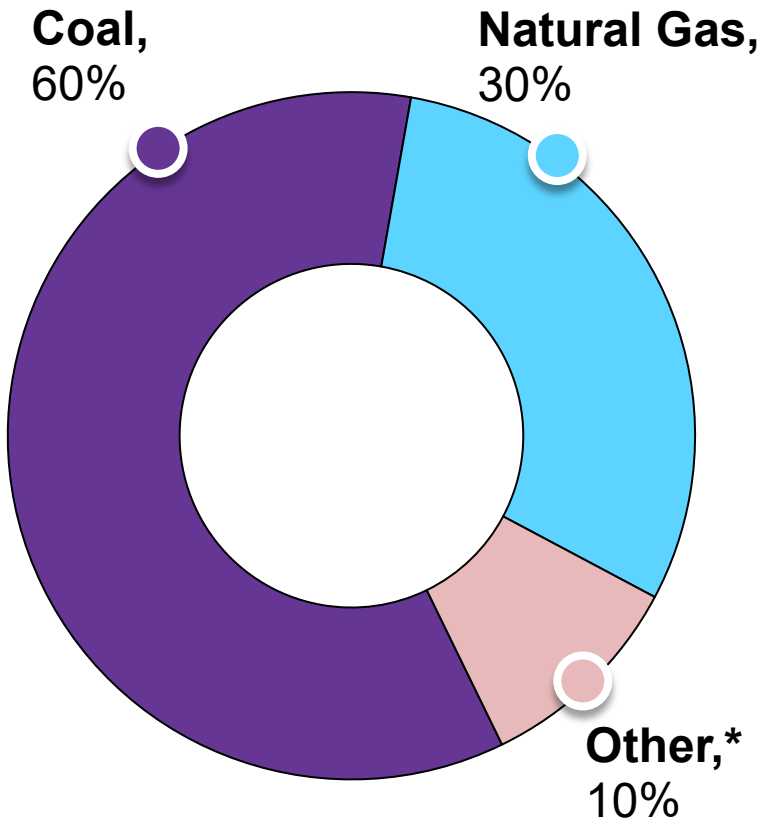
Updated: Jun. 25, 2025, 7:57 p.m. | Published: Jun. 25, 2025, 4:39 p.m.

Forecasted Retirements (2022–2030)

Total Forecasted Retirement Capacity (GW)

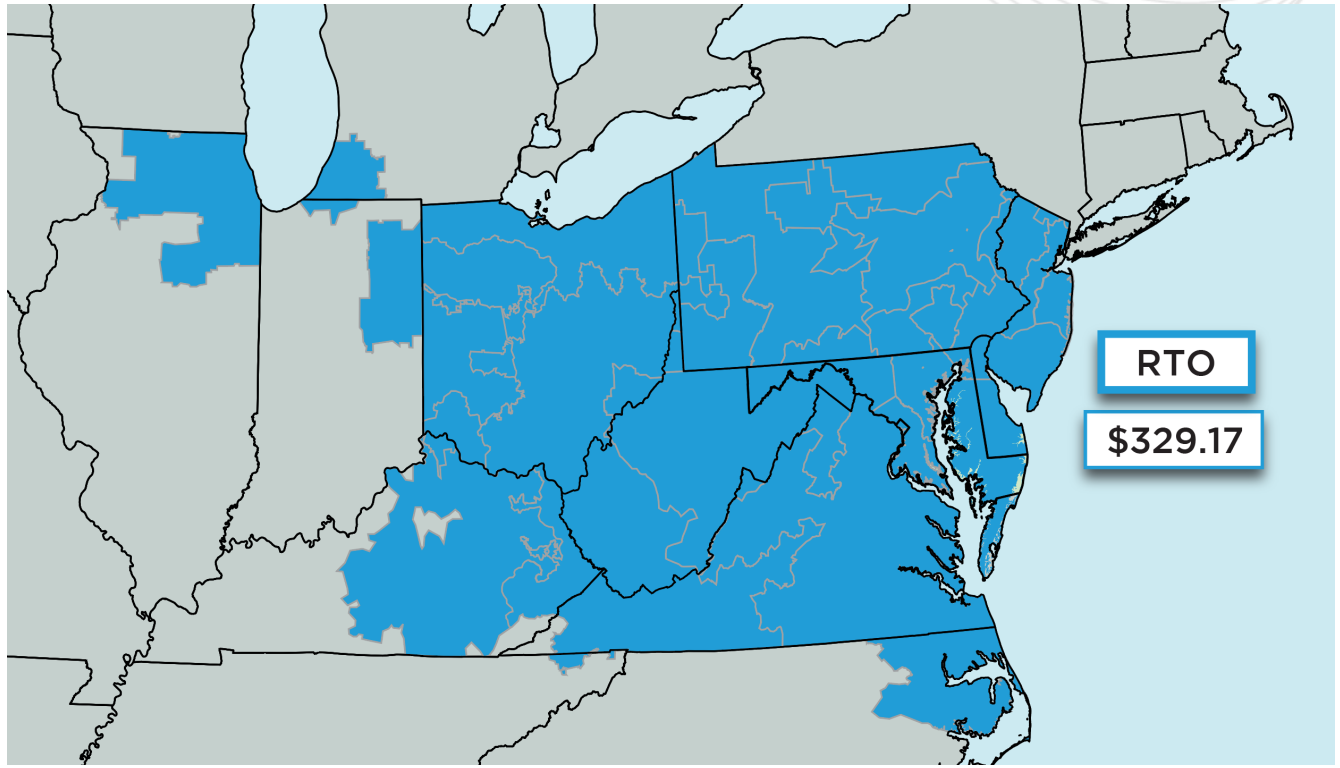


This **40 GW** represents
21% of PJM's current
192 GW of installed generation



*Other includes diesel, etc.

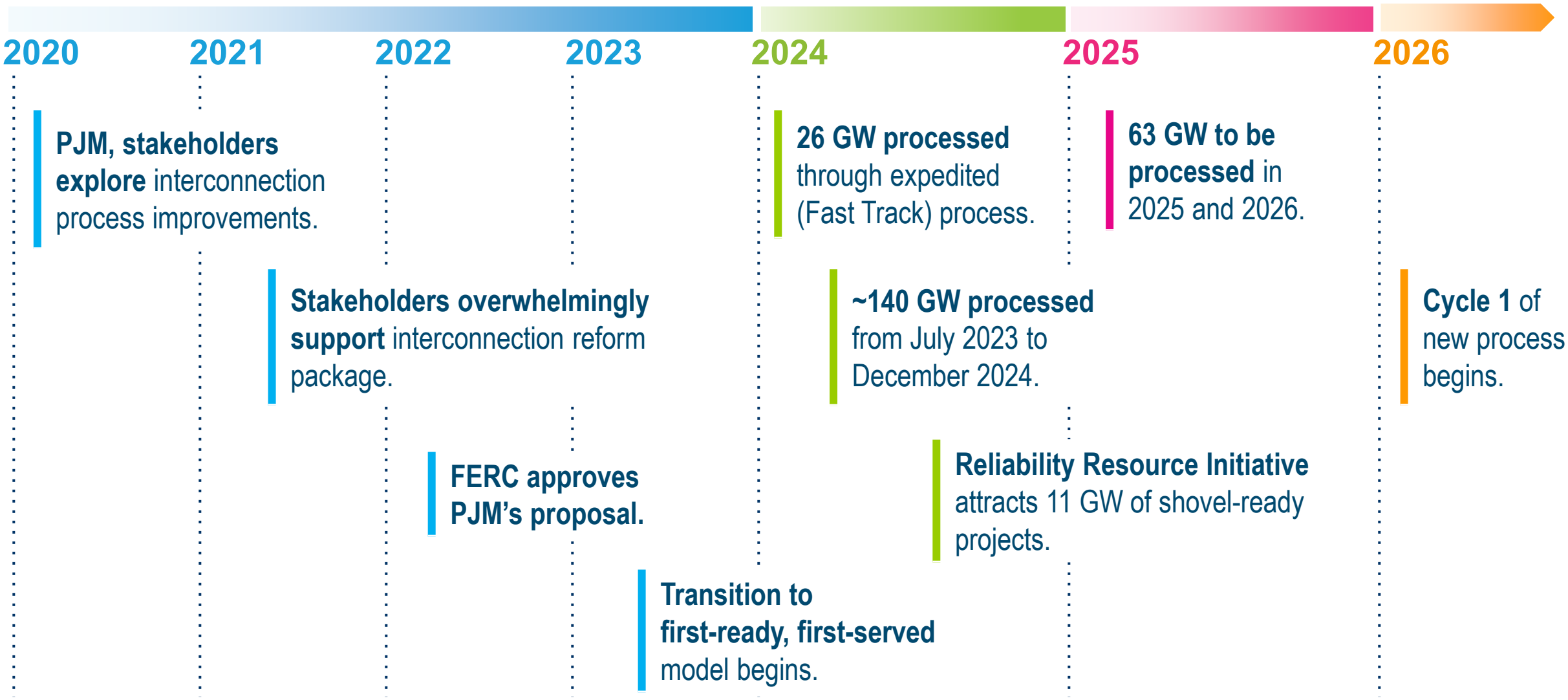
Tightening of Supply and Demand in the Capacity Market



RTO Price Comparison

	2026/ 2027	2025/ 2026	2024/ 2025
RTO Price:	**$329.17/** MW-day	**$269.92/** MW-day	**$29/** MW-day
Reserve Margin	**18.9%**	**18.5%**	**20.5%**
with IRM of:	*19.1%*	*17.8%*	*14.7%*

Interconnection Process Reform



Interconnection Process in Action

PJM's interconnection process reforms are working,
but that can only take us so far. Getting projects built and online requires your support.

>60% of 200 GW
through the PJM queue process

46 GW
have agreements to begin operation

1–2 year
study process turnaround for new projects

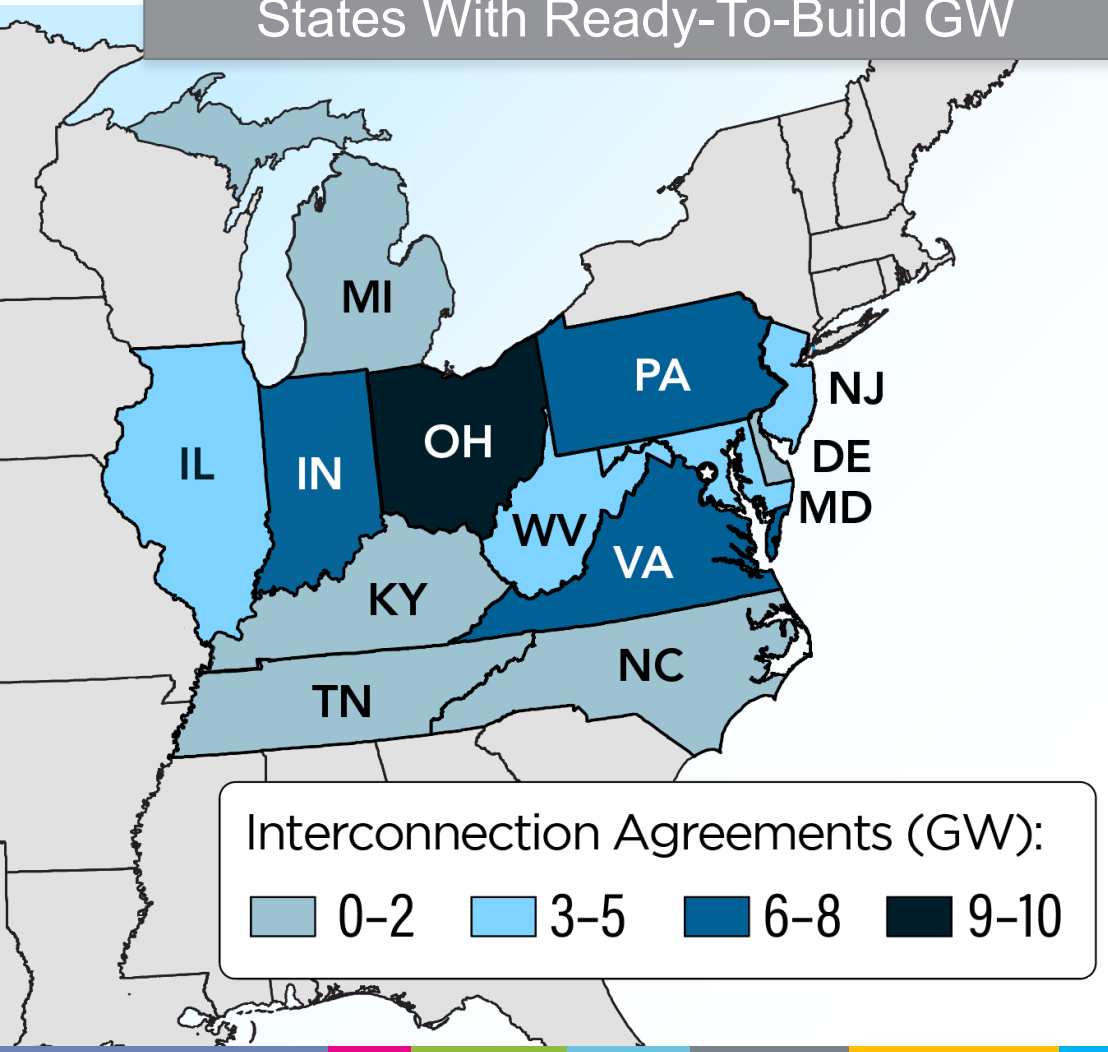
6.7 GW
of solar already connected

63 GW
remaining to be processed in 2025–2026

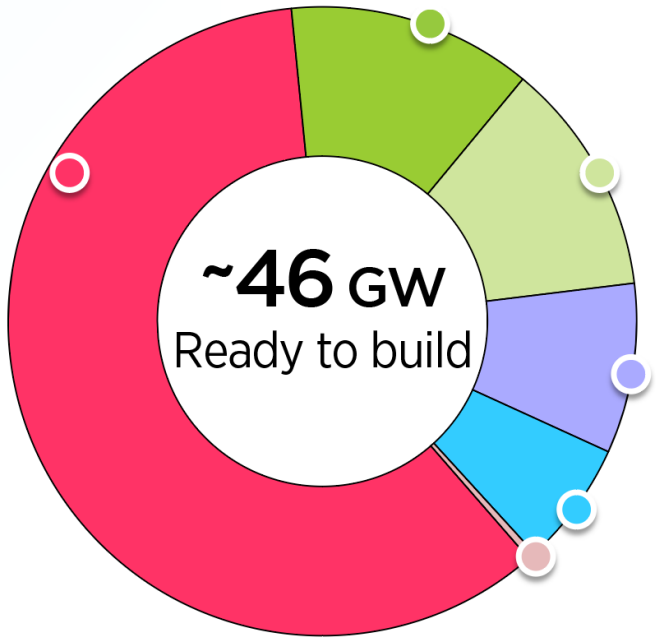
As of June 2025

Through the Queue – A Closer Look

States With Ready-To-Build GW



Interconnection Queue Progress



- **Solar,** 27.81 GW
- **Wind,** 5.61 GW
- **Storage,** 4.07 GW
- **Renewable Hybrid,** 2.98 GW
- **Natural Gas,** 5.85 GW
- **Other,** 0.18 GW

Enough To Power ~40 Million Homes

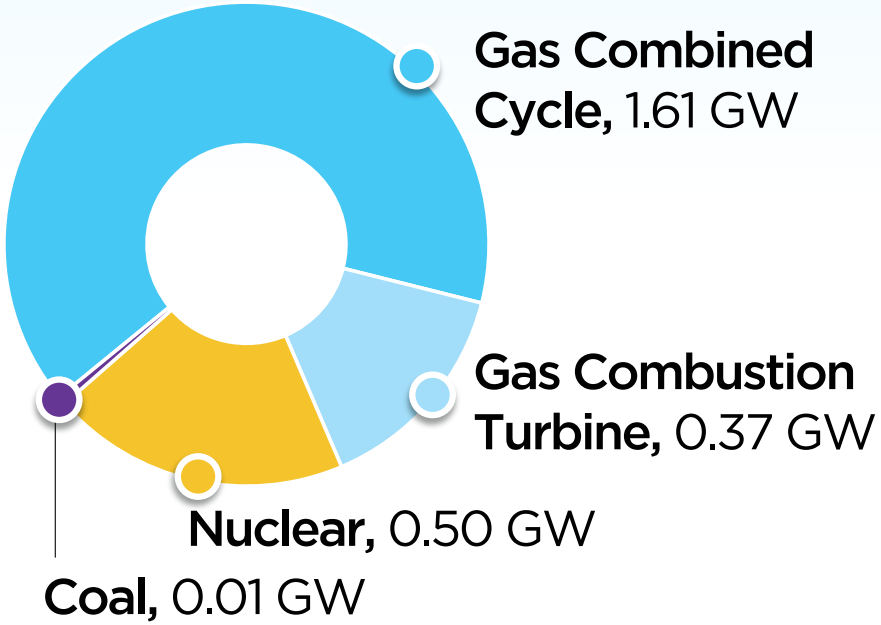
As of June 2025

Jump-Starting Shovel-Ready Projects

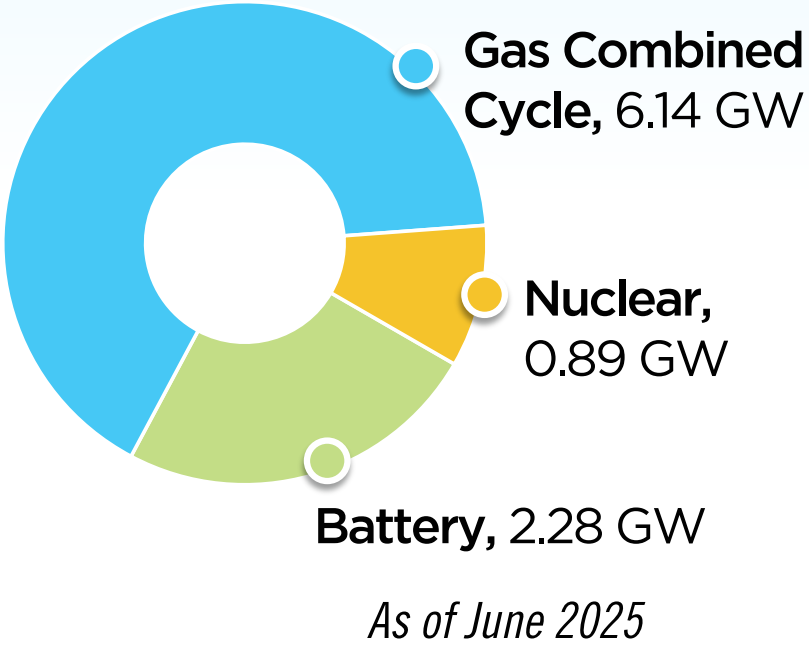
PJM created a one-time opportunity for projects with short turnaround times to join a transition cycle, where they will be studied as much as 18 months faster under the Reliability Resource Initiative.

These upgrades and new construction projects are expected to come online by 2030 and 2031.

Total Upgrades: 2.49 GW

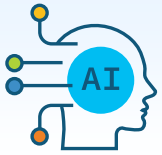


New Construction Total: 9.31 GW



As of June 2025

Additional Measures PJM Is Taking To Advance Grid Connections



Partnered with Google and Tapestry in a multiyear collaboration to deploy AI-enhanced tools to further streamline PJM's planning process for connecting new generation resources

Significantly increased staffing and developed smart tools spanning the entire interconnection process to improve collaboration with project developers and automate internal processes

Pending FERC approval, reforming Capacity Interconnection Rights Transfer to make it faster and easier for a replacement resource to connect to the grid at the site of a retiring facility

Modified our Surplus Interconnection Service to further enable an additional resource (such as battery storage) to plug in to the unused portion of interconnection service for facilities that cannot or do not operate continuously

Impacts of Large Load Growth on PJM

Challenges and Opportunities

Supply: Reduction in reserve margins creates a need for enhanced and expeditated interconnection opportunities.

Markets: RPM and Energy Market can provide proper price signals for investments. This may result in a period of higher prices.

Supporting the Information Economy: Collaboration among PJM, stakeholders and regulatory bodies are necessary to reliably support the integration of data centers.

Advanced Technology Needs: AI loads create resource adequacy challenges but also provide opportunities for advancements in technology.

Higher Curtailment Risk: The increase in curtailment risk creates a need to recognize the different types of loads, priority service levels and area-specific resource adequacy positions.

Demand Flexibility: Flexibility of data centers to utilize backup resources or shift data needs can provide significant reliability and cost savings.

Operations: Power swings can impact the BPS's ability to maintain frequency, regulate transmission voltage and otherwise maintain stability.

Efforts to Reliably Integrate Large Load Additions

Improving Long-term, Large Load Forecast

- Input from states to better inform process
- Financial commitments from data centers
- Reducing duplicative data center interconnection requests (i.e. reduce “double counting”)

Increasing Load Flexibility Options

- Price Response Demand (reduces load obligation)
- Demand Response (offers into PJM capacity auction as supply)

Expediting Generation Interconnection

- 10-month fast track process to expedite study process for select generators needed to meet large load growth

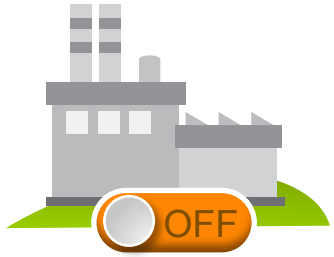
Long-Term Regional Transmission Planning Enhancements Underway

FERC Order 1920 Goals

+ Perform a sufficiently long-term assessment of transmission needs.
+ Adequately account on a forward-looking basis for known determinants.
+ Consider broader set of benefits in meeting longer-term needs.

Key Takeaways

Considerations:



Keep generation resources on the system until an adequate amount of replacement generation is online and operating.

Analyze and understand state/local challenges to the deployment of new generation resources and electricity infrastructure, and understand the interconnection queue challenges and market ramifications.

PJM is adapting its operations, markets and planning functions while prioritizing reliability and affordability for consumers.

Maintaining Reliability in a Challenging Landscape