



# PJM Update

Greater Philadelphia Chapter of the Association of Energy Engineers

***Stephen Bennett***

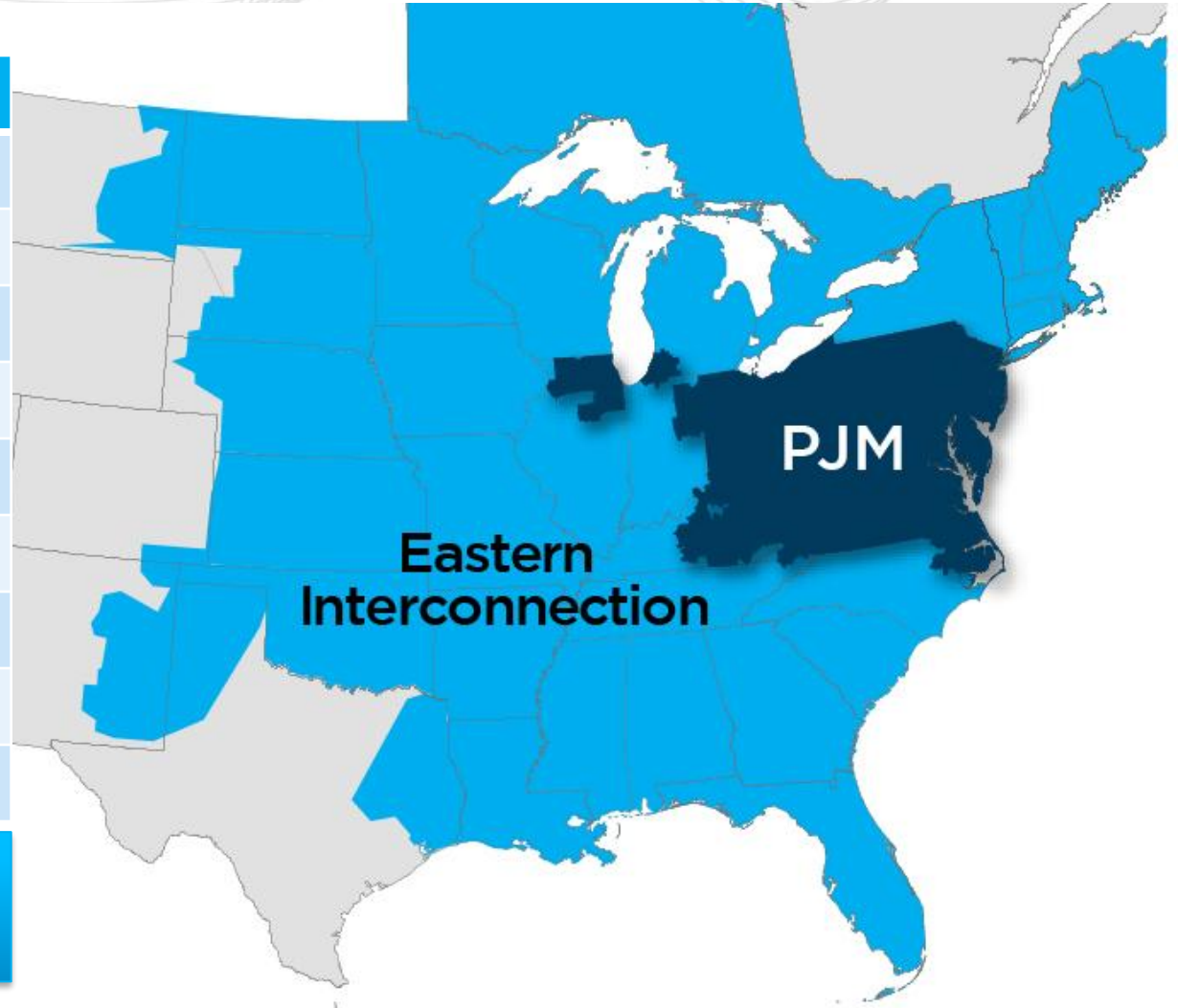
Sr. Manager, Governmental Services

**March 25, 2026**

## Key Statistics

Member companies	1,116
Millions of people served	67+
Peak load in megawatts	165,563
Megawatts of generating capacity	185,989
Miles of transmission lines (Bulk Electric System)	88,417
Gigawatt hours of annual energy	828,161
Generation sources	1,673
Square miles of territory	368,906
States served	13 + DC

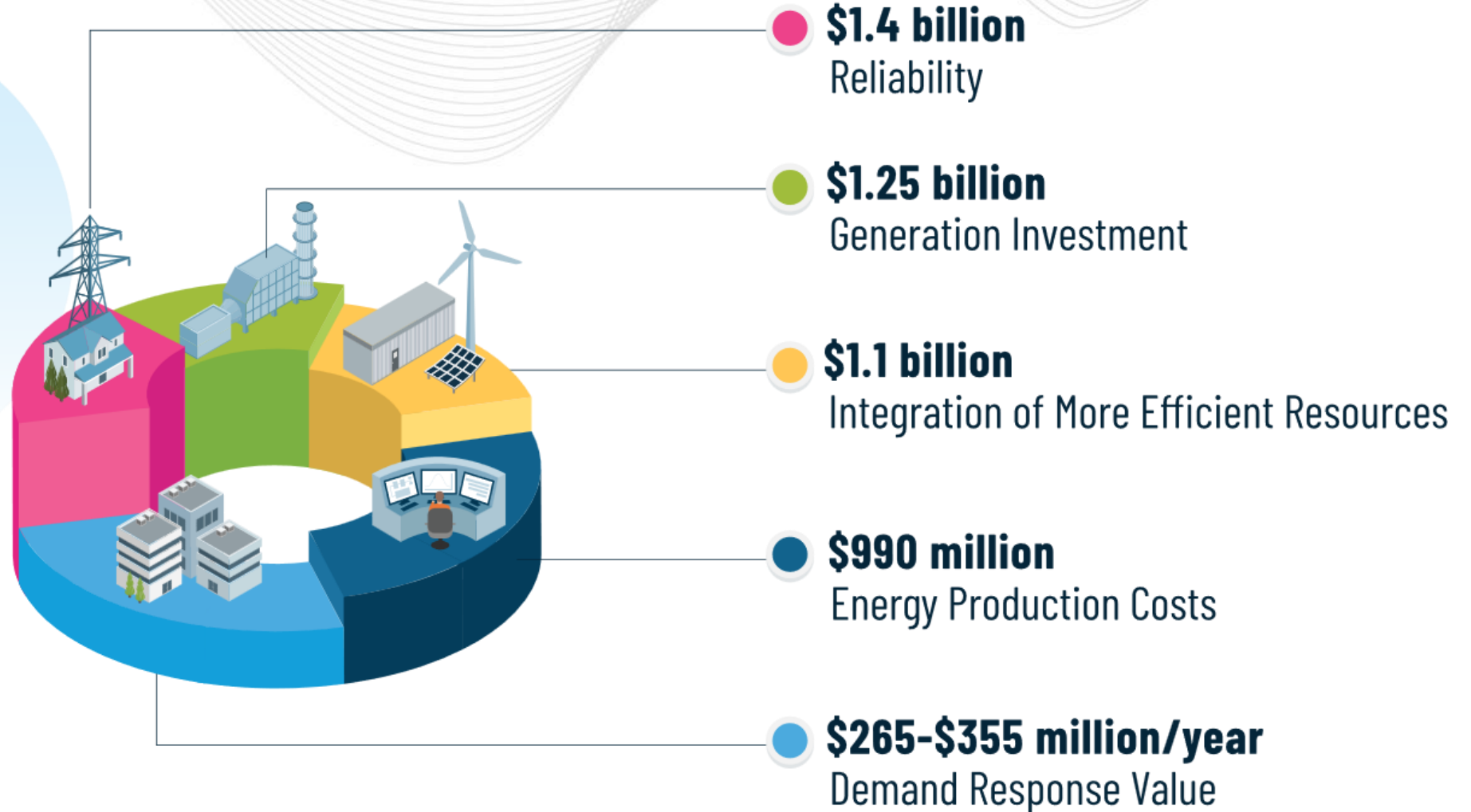
- 25.6% of generation in Eastern Interconnection
- 25.2% of load in Eastern Interconnection



As of 2/2026

Operates As A <u>Non-Profit</u>
No Shareholders or Share Price
Federally Regulated (FERC)
Independent Board
Market Monitor
<b>Mission-Driven</b>

**~\$5 billion**  
annual savings  
produced

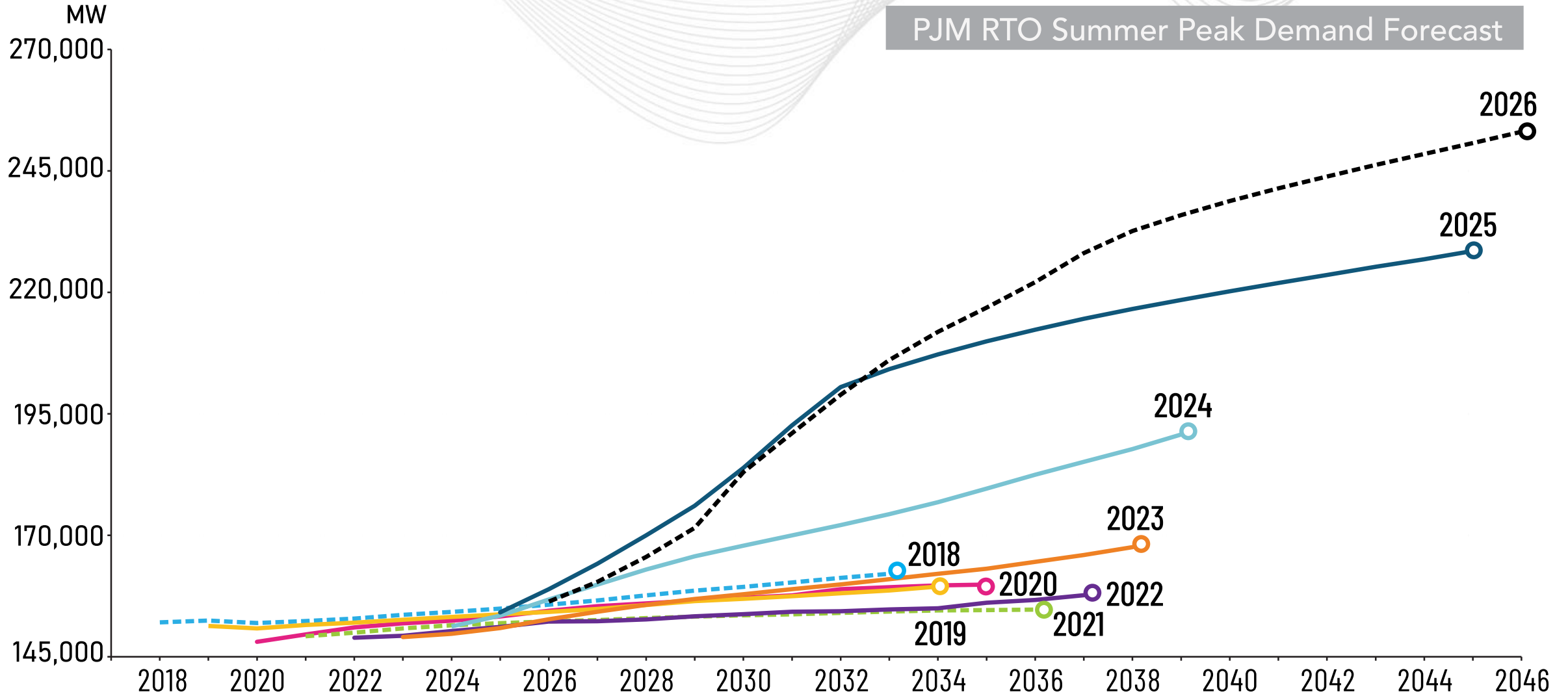


— All numbers are estimates. —



# Electricity Demand Growth

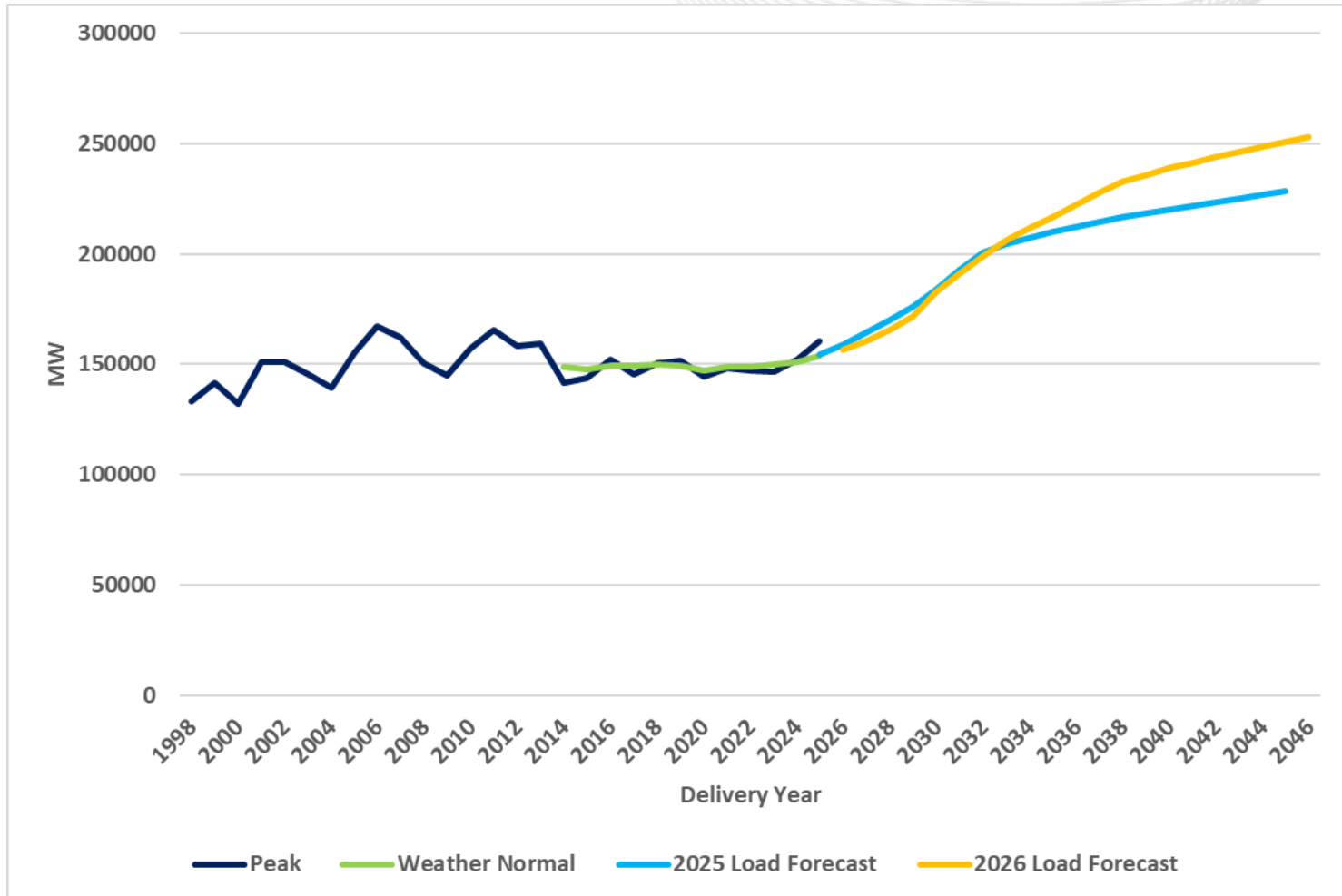
PJM RTO Summer Peak Demand Forecast



- Estimation Period: January 2016 through August 2025
- Weather Simulation: 1994 to 2024 (403 scenarios)
- Sector Models (2015-2024 Monthly from EIA 861 and EIA 861m)
  - End Use Data: Based on Itron's 2025 release
  - Economics: September 2025 vintage from Moody's Analytics
- S&P Global Solar/Battery Forecast (zonal & peak allocation by PJM)
  - Production estimates by UL
- S&P Global - Plug-in Electric Vehicles (PEVs)

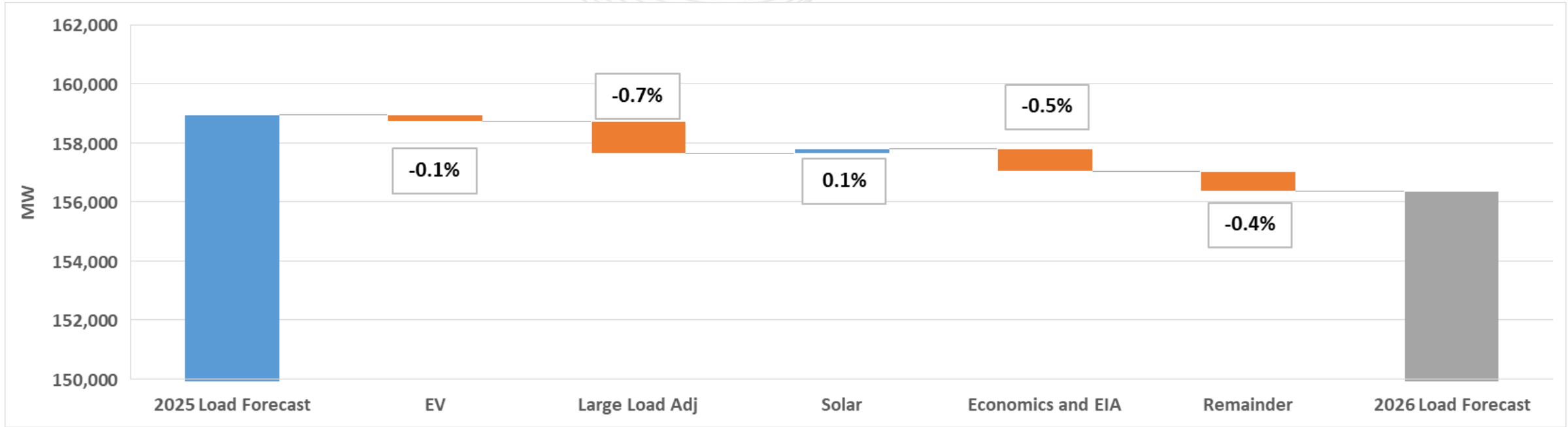
- Load Adjustments:
  - Data Centers (AEP, ATSI, APS, BGE, COMED, DAYTON, DQE, JCPL, METED, PECO, PEPCO, PL, PS and Dominion);
  - Port Electrification (PS);
  - Voltage Optimization (Dominion);
  - Peak Shaving Adjustment (EKPC)

# Summer Forecast Comparison 2025 vs 2026



- 20-year/ Annualized Growth Rate
  - 2025 Forecast: 2.0%
  - 2026 Forecast: 2.4%
  
- Select year comparisons (2026 Forecast vs 2025 Forecast)
  - 2027: -2.3% (~3,700 MW)
  - 2029: -2.7% (~4,600 MW)
  - 2031: -0.9% (~1,600 MW)
  - 2040: +7.8% (~18,600 MW)

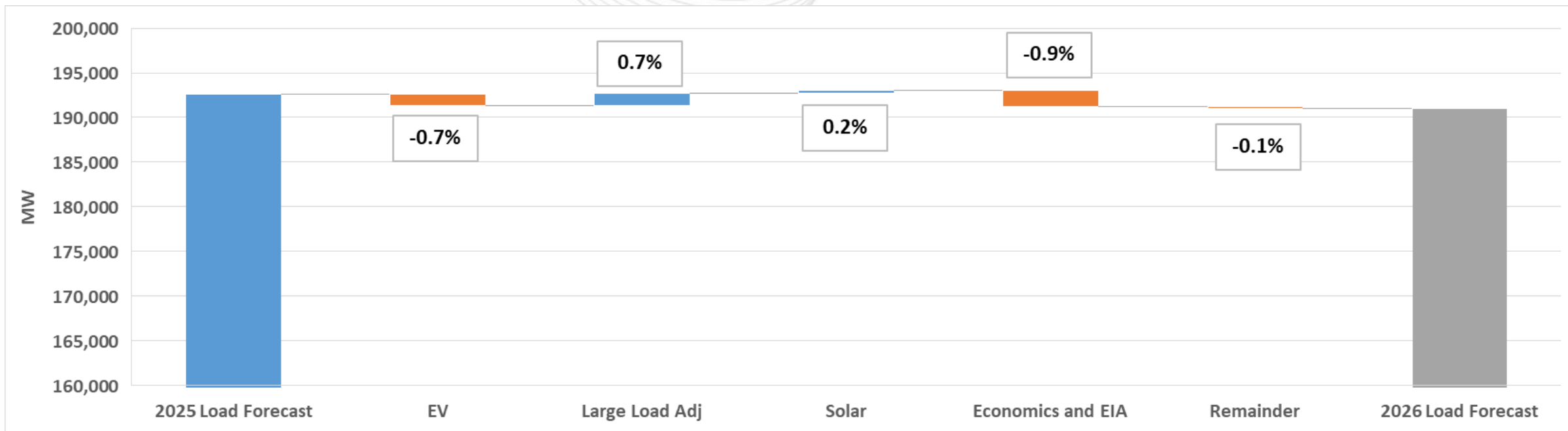
# Summer 2026 Forecast Waterfall Comparison



\*Economics and EIA is the impact of new EIA end use data as well as new economics

\*\*Remainder is the impact of re-estimation of R,C,I models and hourly models

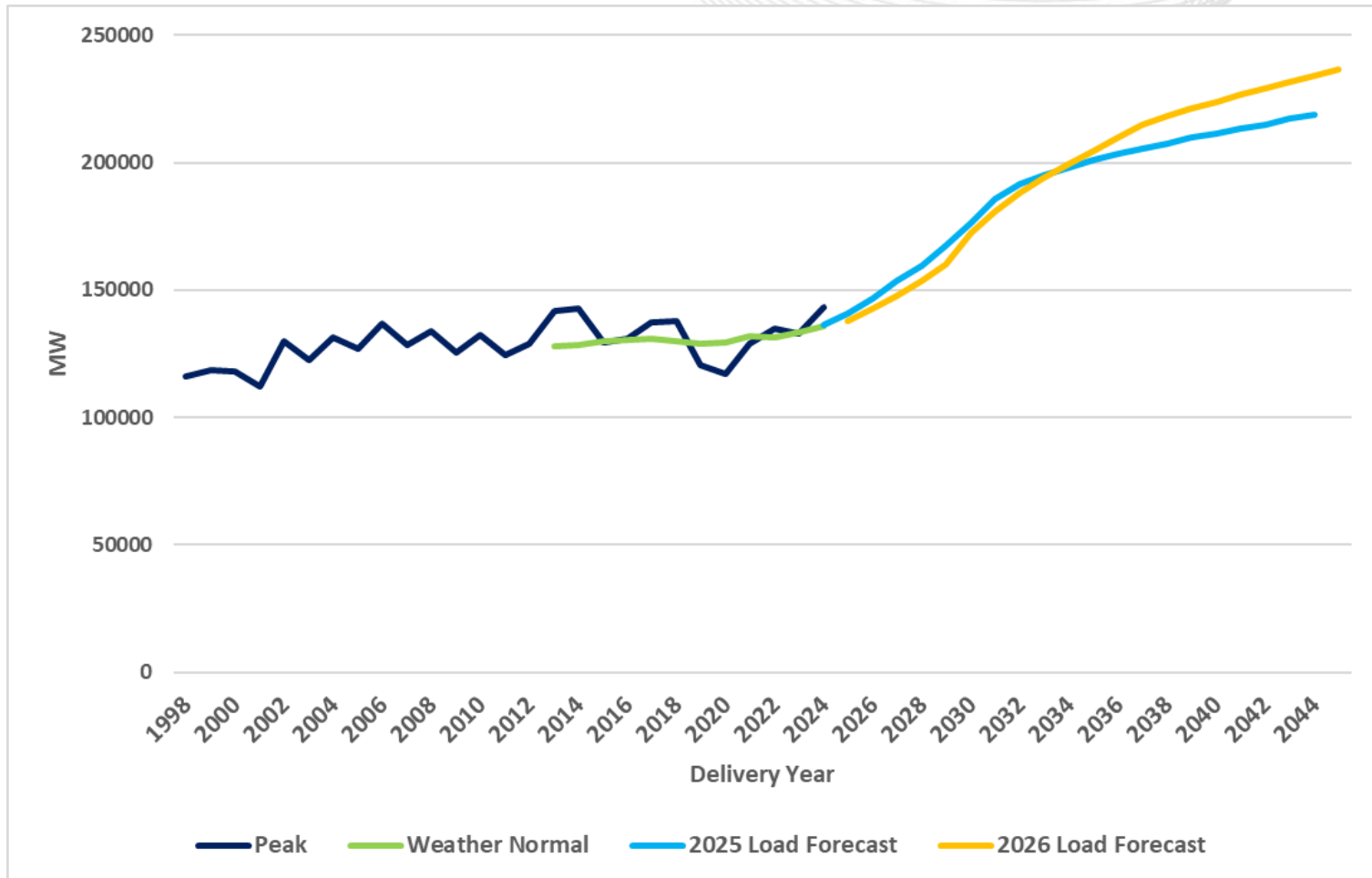
# Summer 2031 Forecast Waterfall Comparison



\*Economics and EIA is the impact of new EIA end use data as well as new economics

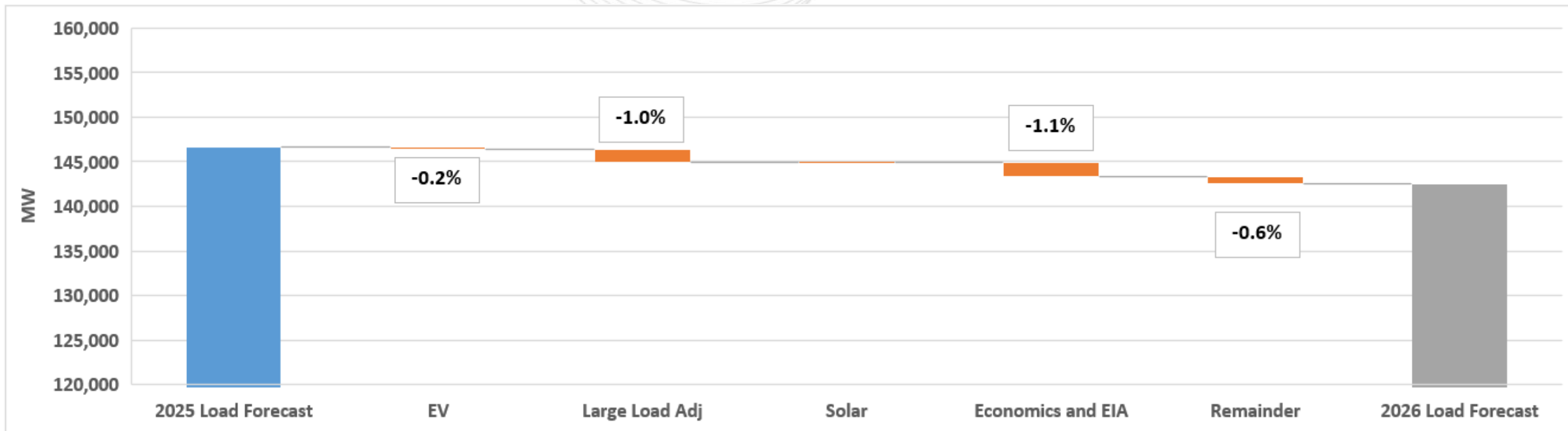
\*\*Remainder is the impact of re-estimation of R,C,I models and hourly models

# Winter Forecast Comparison 2025 vs 2026



- 20-year Annualized Growth Rate
  - 2025 Forecast : 2.4%
  - 2026 Forecast : 2.7%
- Select year comparisons (2026 Forecast vs 2025 Forecast)
  - 2027: -3.9% (~5,800MW)
  - 2029: -4.4% (~7,100MW)
  - 2031: -2.6% (~4,700MW)
  - 2039: +5.2% (~11,500MW)

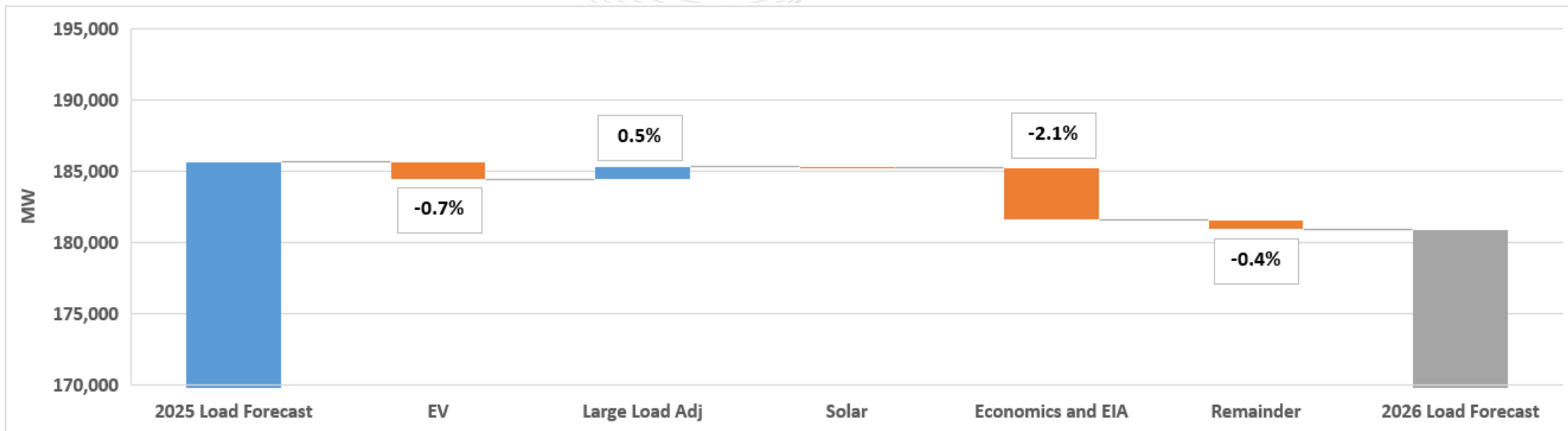
# Winter 2026/2027 Forecast Waterfall Comparison



\*Economics and EIA is the impact of new EIA end use data as well as new economics

\*\*Remainder is the impact of re-estimation of R,C,I models and hourly models

# Winter 2031/2032 Forecast Waterfall Comparison



\*Economics and EIA is the impact of new EIA end use data as well as new economics

\*\*Remainder is the impact of re-estimation of R,C,I models and hourly models

## PJM Region (MW)

**2025 Supply**

**181,533**

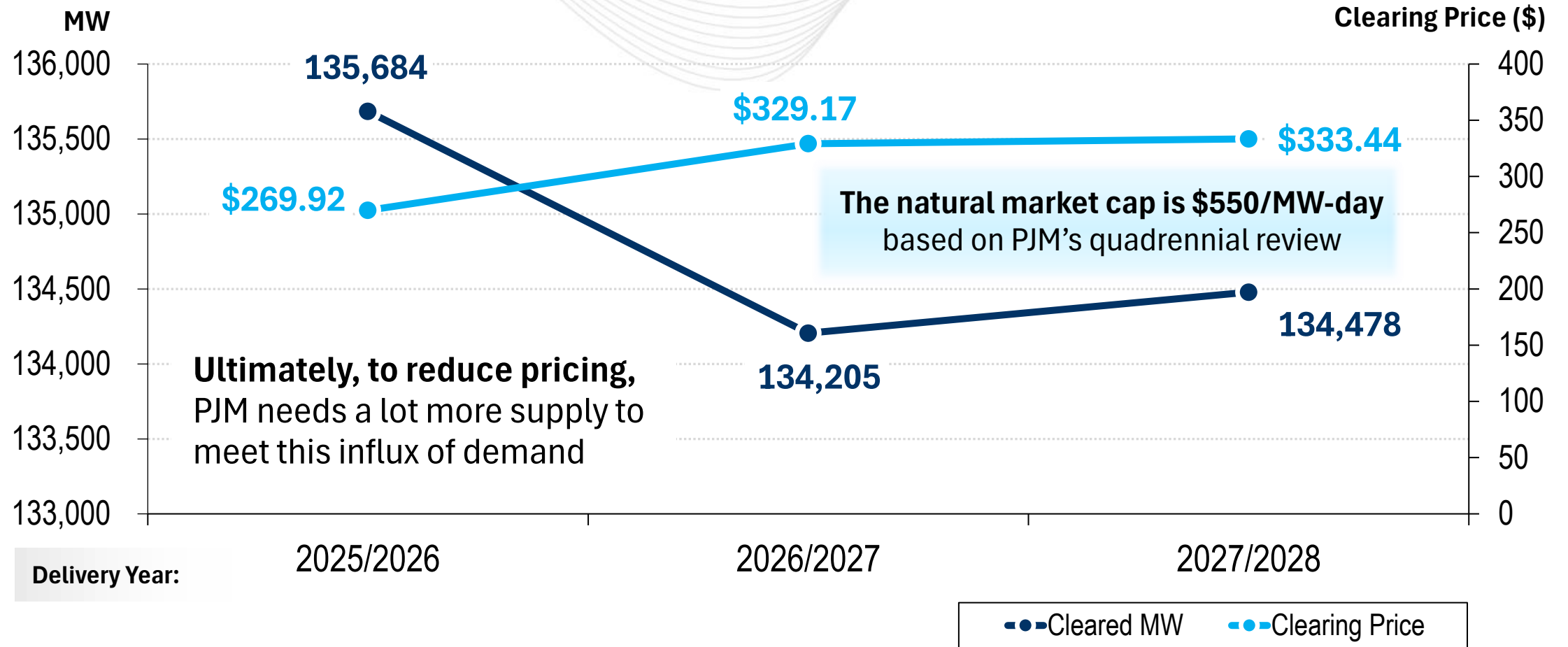
**2025 Demand**  
*(Peak Summer)*

**160,526**

**2041 Demand**  
*(Peak Summer)*

**~241,000**

# Recent Capacity Market Clearing Prices (UCAP)



Note: Cleared MW values include Annual and matched Seasonal Capacity Performance sell offers within the LDA.



Bring Your Own New Generation and Expedited Interconnection Track



Curtailment of Data Centers Not Bringing New Generation



Reliability Backstop Procurement



Significant Load Forecasting Improvements



Study on Market Incentives for New Supply



Feedback Requested re: Price Cap and Floor

## Expedited Interconnection Track

- New generator or existing generator update
- Project must have agreement with large load that has signed an Electric Security Agreement (ESA)
- Project must have commitment from the state to expedite siting
- Generator UCAP must be 250 MW or greater
- 10 projects annually to avoid existing queue disruption



In place by August 2026

## Connect and Manage

- Implement process that identifies pre-emergency demand response requirement in zones where forecasted demand is greater than supply
- Recommends that data centers that fail to procure adequate supply (bring your own new generation – BYONG) receive curtailment directives before other customers.
- Data centers could use backup generators in response to curtailment directive



In place by end of 2026

## Reliability Backstop Procurement

- Immediately initiated a stakeholder process to obtain input and solicit proposals for a backstop procurement.
- Backstop procurement must specify price, term and quantity as core award parameters – all, including cost allocation – are TBD.
- States committed to allocating costs to data centers in White House / Governors' Principles statement.
- Backstop procurement expected to be conducted this year.



PJM developing proposal

- State PSC review opportunity
- Developer identification of duplicative load interconnection project requests
- Additional third-party, industry-specific top-down review of projections
- Require NDAs with utilities to allow for data sharing with PJM.
- Near-term large loads only included if they have a demonstrated financial commitment



In place for 2027 Load Forecast

## Holistic Review of Market Incentives

- Undertake a focused review of the capacity market to ensure it is sufficient for signaling investment needs.
- Continue energy market reform efforts and coordinate outcomes with the capacity market review.
- Ensure that energy, capacity and ancillary markets provide sufficient revenues to maintain investments and incent appropriate performance.



Conduct analysis in first half of 2026.

**Extend** the existing price cap and floor for the next two Base Residual Auctions (2028/2029 and 2029/2030).

Filed with the Federal Energy Regulatory Commission (FERC)



# Take Control of Your Energy Costs

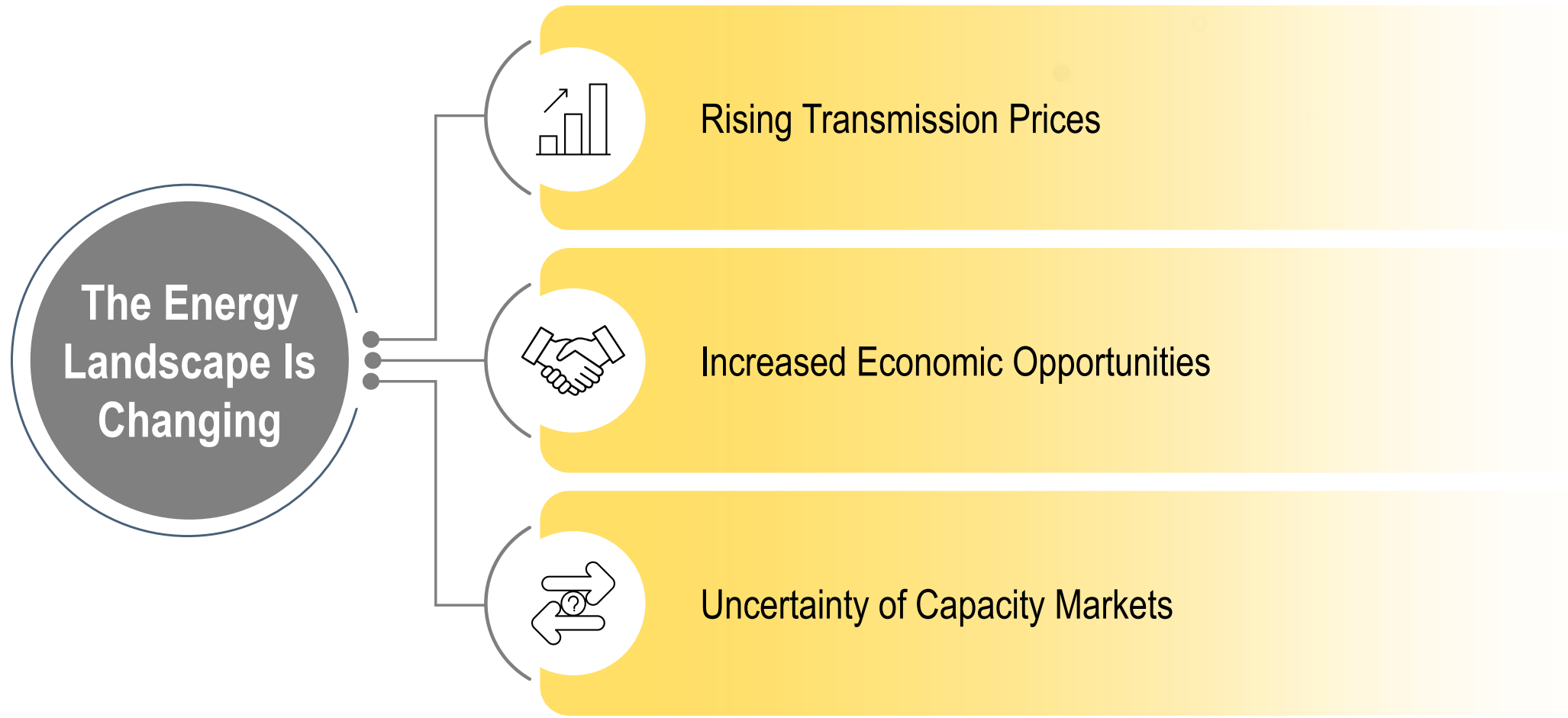
Steve Shearson, CEM

Energy Services/Cat AMP

**ELECTRIC POWER DIVISION**

**CATERPILLAR®**

# Energy Landscape Challenges



# Energy Landscape: Manufacturing



**26.1 QUADRILLION**  
BTU OF ENERGY USE 2023

## TOP CONSUMING SECTORS

Food, Chemicals,  
Metals, Paper,  
Petroleum

## KEY CHALLENGES

- Rising Costs
- Regulatory & Sustainability Hurdles (EPA)
- Grid Reliability

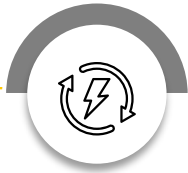
Source: <https://www.eia.gov/energyexplained/us-energy-facts/>

**ELECTRIC POWER DIVISION**

Caterpillar: Confidential Green

**CATERPILLAR®**

# On-site Generation Creates Opportunities and Benefits



**Protect Against Grid Interruptions**



**Lower Overall Energy Costs**



**Generate Additional Revenue**



**Hedge Against Future Costs**

# Why DERMS?



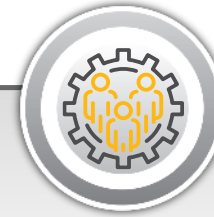
## MONITOR

- View energy use in near real time
- Compare facilities' load curves
- Identify savings opportunities



## MONETIZE

- Identify existing assets that may be available for economic dispatch
- Install hardware to enable participation in power pool programs



## MAXIMIZE

- Model overall project viability of new asset installation with DERMS
- Our experts may be able to lower CapEx

# Case Study – Commercial Bakery

## Project Details:



Located in Massachusetts



Asset Mix: 4MW Lean Burn Natural Gas Gensets



The Solution Provides:

- Asset and Meter Monitoring
- Resiliency
- Savings generated for the municipality and their ratepayers

4MW Gas Generators  
+  
Cat AMP Technology



# Alectra Energy Solutions

## Project Details:



Located in Ontario, Canada



Asset Mix: G3500 Gas Gensets



CAT AMP Provides:





- Asset and Meter Monitoring
- Savings via
  - Peak Shaving
- 30 MW managed by Cat AMP

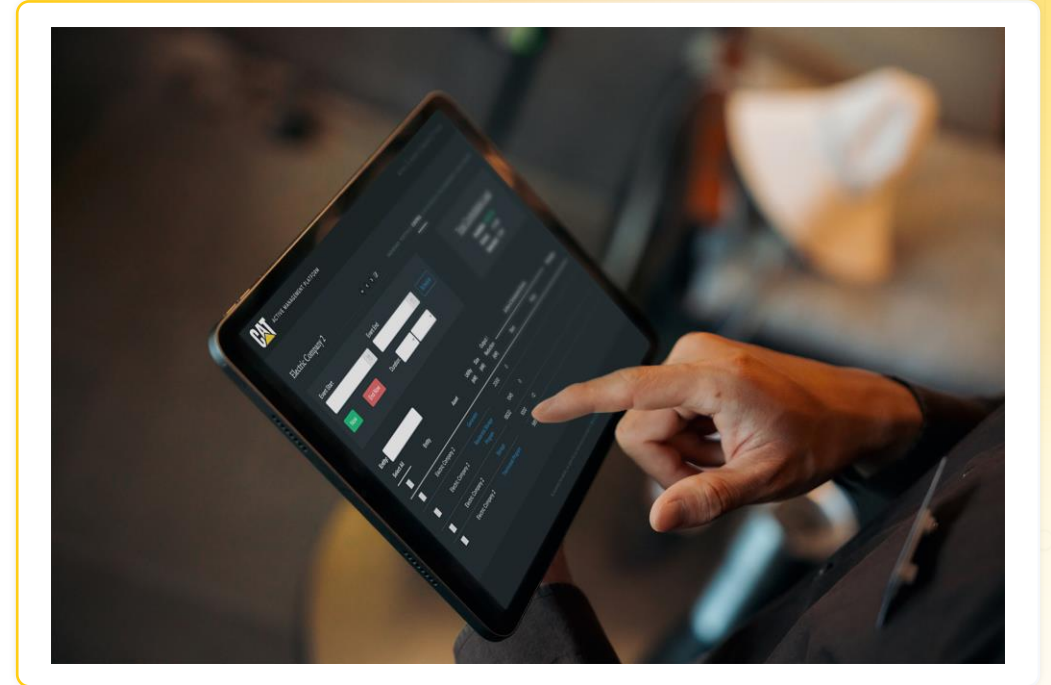
G3500 Series Gas Gensets  
+  
Cat AMP Technology



# Alectra Energy Solutions

Cat® AMP helps Alectra Energy Solutions in a variety of ways, including

-  Internal analysis of meter data
-  Historical analysis
-  Reducing costs
-  Dispatch of peak shaving assets





# 24/7 SUPPORT

WITH CAT AMP AND TANGENT ENERGY SOLUTIONS

- 24/7 Asset Management
- Operations and Maintenance Administration
- Account Management
- Proactive Asset Management
- Ready to Run Assessments

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Caterpillar: Non-Confidential

**CATERPILLAR®**

The background features a dark blue field with several glowing, light blue question marks of varying sizes. A large, semi-transparent yellow bar with a gradient from dark to light yellow spans across the middle of the image. The text "How can I implement this?" is centered within this bar in a bold, white, sans-serif font.

**How can I implement this?**

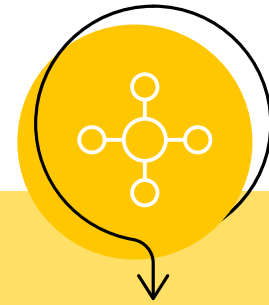
# Conduct Assessment



Map Your Energy Cost  
Profile & Trajectory



Assess Your Energy  
Consumption & Growth  
Goals



Understand Your Site:  
space requirements,  
current assets & regulatory  
requirements.

# Your Solution Fit: Products To Succeed



Microgrids

Gensets

Battery Energy Storage Systems

Renewables

Switchgear/Controls

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# Manage & Optimize with DERMS

**Cat® AMP** is a DERMS solution that monitors energy conditions and accurately predicts opportunities to lower energy costs.



## HOW DOES IT WORK?

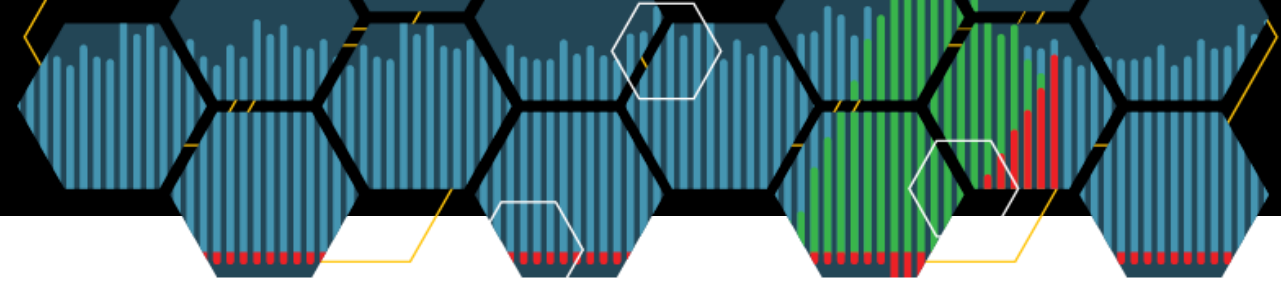
When power consumption is high and energy costs soar, Cat AMP can automatically dispatch onsite assets, so your facility is buying less power from the grid.



## BENEFITS

- Reduce energy costs by lowering capacity and transmission charges
- Enables participation in power pool programs to earn revenue

# The Process



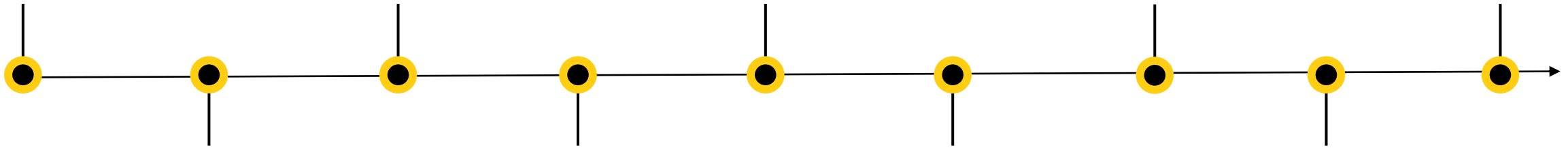
**Understand  
Facility Goals and  
Operations**

**Obtain Interval  
Energy Usage  
Data**

**Assess  
Financial  
Viability**

**Site Visits**

**Solution  
Implementation**



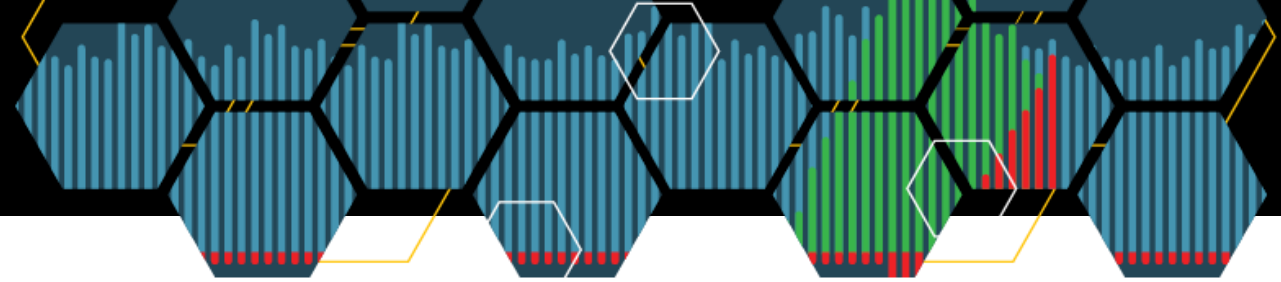
**Review Energy  
Bills and Retail  
Contracting  
Strategy**

**Model the  
Project**

**Solution  
Proposal**

**Finance  
Options &  
Payback Plans**





# Thank You!

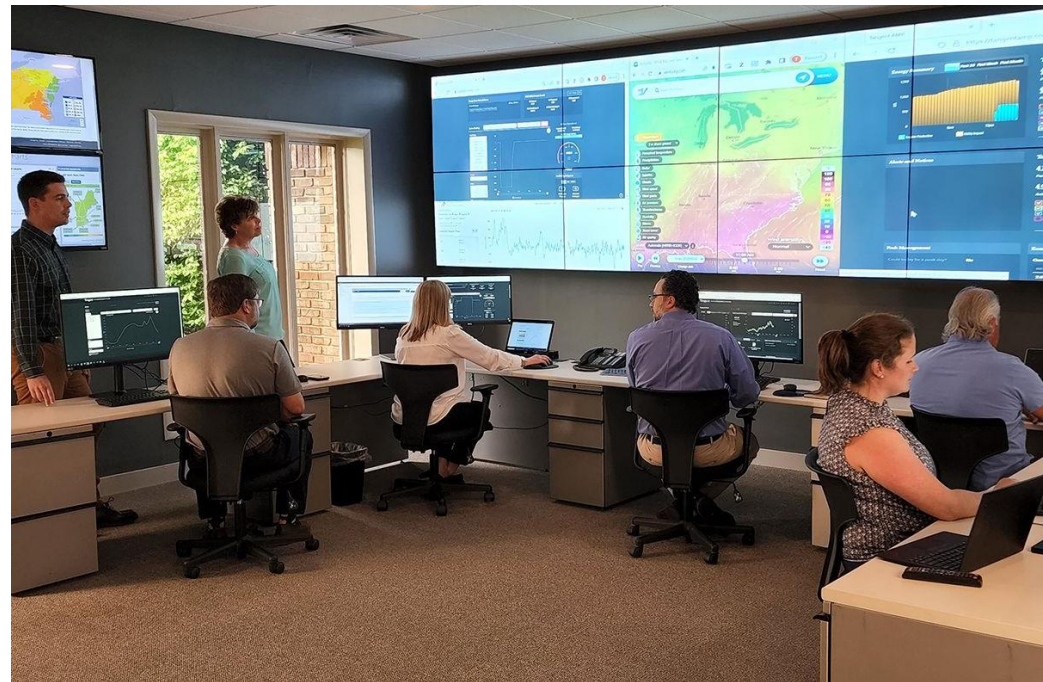
Questions?

More Information:

Steve Shearson

[stephen.shearson@cat.com](mailto:stephen.shearson@cat.com)

724-518-6352



[How to Lower Energy Costs with Cat® AMP](#)  
[Caterpillar and Alectra help reduce Energy Costs for Linamar](#)



# PJM Capacity Update – ISO Solutions and Customer Action Plan

GPAEE Meeting  
March 25, 2026  
Jim Clark

# Introduction

This presentation will fill gaps in the two previous speakers' presentations. As such, it is not a comprehensive presentation on the subject.

The first speaker, from PJM, is addressing the update on PJM programs and procedures to deal with long queue times. Projections and methodology of future capacity needs will be discussed.

The second speaker, from Caterpillar, will discuss customer site generators as a solution to both PJM Capacity and Transmission charges.

This presentation will discuss the causes of high PJM capacity prices and energy prices, as well as both PJM/ISO and customer solutions to reduce energy costs. Customer solutions include Demand Response, Generation, Batteries, and Peak Load Management. The effect of kW Demand on Utility Distribution Billing will be quantified. The concept of Revenue Stacking will be discussed. The speaker will discuss whether Capacity Projections, which are driving PJM Capacity Auction prices higher, are accurate.

# PJM

- PJM (Pennsylvania-New Jersey-Maryland Interconnection) is the RTO (Regional Transmission Organization) that manages the generation and transmission of energy in thirteen states and the District of Columbia.
- PJM provides long term planning of energy, capacity, transmission and reliability.
- They operate Capacity and Energy auctions with a goal to deliver the lowest cost energy reliably.
- They organize ancillary services that ensure minute to minute reliability and stabilization of the grid.

# Components of Electricity Prices

- Capacity (kW) – Peak Load Contribution (PLC)
- Energy (kWh)
- Transmission (PJM NITS)
- Distribution (local utility)
- Ancillary services, balancing, other components

# Energy

- For the energy auctions, in PJM, the last bid (highest) needed to meet Energy (kWh) needs at a given hour determines the cost to all customers and the price paid to the generators.
- In PJM, natural gas generation is typically the last resource in, so people say that “natural gas costs drive the market”.
- Natural gas prices are at historic lows.
- Drilling companies are consolidating, bringing more discipline and response to price and drilling costs
- Increasing liquified natural gas exports
- Remaining shale gas deposits are more expensive to recover
- Tariffs on Canada, Mexico and other countries will raise gas prices

# Recent Capacity Auctions

- Energy prices on the Capacity auctions greatly increasing in the recent auctions from \$28.92 to \$269.92 per MW-day in PJM RTO (\$466.35 in BGE and \$444.26 Dominion) for 2025/2026.
- \$329.17 for 2027/2027 BRA and \$333.44 for 2027/2028 BRA
- PA Governor and PJM agree to lower Capacity cap from \$500/MW-day to \$325 in future auctions (28/29 and 29/30)
  - Note this included a \$175 per MW-day floor

# How Did We Get Here?

- Retirement of large baseload electric power plants due to age and required environmental upgrades.
- Backlog in PJM application queue to increase new Capacity. Many of the applications are small and speculative, increasing the reliability challenge.
- PJM capacity markets going from 3 years forward to one year forward due to many reasons. Going back to 3 years but not good timing.
- After flat growth for 20 years, large increases in generating capacity projected to meet needs of massive new data centers to meet computing needs of data mining (bitcoin and similar companies) and AI (Artificial Intelligence).

# Other Capacity Issues

- The Energy Efficiency Program ending soon in the Capacity Market, partially due to alleged manipulation, under performance and non-performance by certain bad actors.
- Demand Response Program modifications to deal with under performance and non-performance by alleged bad actors.
- Long lead times on generators and transformers
- Tariffs on Solar and Wind hardware
- End of subsidies for some Solar and Wind

# PJM Solutions

- New and existing PJM solutions to a backlog in the application queue to streamline new Capacity
  - Fast Track
  - Backstop auction
  - RMR
  - Utilize existing grid capacity
  - Separate Data Center Market/Rules

# ISO Level Solutions

- Battery Storage (and other storage)
- EV bidirectional charging
- Energy Efficiency
- Large load curtailment or “Bring your own generation”
- Demand Response
- Reconductoring wires
- Ambient Adjusted Ratings (AARs)
- Grid Transmission controls

# Customer Solutions - Stacking

Multiple Revenue streams and savings can be stacked:

- Generation reduce capacity, transmission, and energy charges
- Batteries/storage reduce capacity, transmission, and energy charges
- Demand Response (Utility + ISO)
  - Capacity
  - Synchronized Reserve
  - Ancillary/Frequency Regulation
  - Economic Real Time and Day Ahead markets
- Utility bill
  - Monthly demand
  - Ratchets
  - Time of Use and special rates
- Peak Load Management – Capacity and Transmission
  - Scheduling
  - Building Automation System
  - PLC Management Services

# What can I do today for next years bill?

Too late, you are already locked in – plan for one to two years out

- Your PLC and NITS charges are based on last year or a few years ago
- Your Utility Bill could be carrying a monthly demand ratchet from last year
- Demand Response programs for this June had enrollments last month

Start Today:

- Plan today, start in June 2026 to manage your 2027 PLC and NITS impact
- Plan 6 - 24+ months for BAS or controls – design, CAPEX, installation
- Plan 1 - 6 years out for onsite Generation and/or Batteries/Storage
- Plan 6 – 9 months out for Demand Response Programs
- Plan 6 - 12 months due diligence for each of above

# PECO HT Tariff

Supplement No. 21 to  
Tariff Electric Pa. P.U.C. No. 8  
Fifth Revised Page No. 60  
Supersedes Fourth Revised Page No. 60

PECO Energy Company

## RATE-HT HIGH TENSION POWER

### **AVAILABILITY.**

Untransformed service from the Company's standard high tension lines, where the customer installs, owns, and maintains, any transforming, switching and other receiving equipment required.

### **CURRENT CHARACTERISTICS.**

Standard high tension service.

### **MONTHLY RATE TABLE.**

FIXED DISTRIBUTION SERVICE CHARGE: \$371.68

VARIABLE DISTRIBUTION SERVICE CHARGE:

\$7.24 per kW of billing demand  
(\$0.0006) per kWh for all kWh

(1)

HIGH VOLTAGE DISTRIBUTION DISCOUNT:

For customers supplied at 33,000 volts: \$0.24 per kW of measured demand.  
For customers supplied at 69,000 volts: \$1.94 per kW of measured demand.  
For customers supplied over 69,000 volts: \$1.94 per kW of measured demand.

**ENERGY EFFICIENCY CHARGE:** \$1.18 per kW of Peak Load Contribution

**ENERGY SUPPLY CHARGE:** Refer to the Generation Supply Adjustment Procurement Classes 2 and 3/4.

**TRANSMISSION SERVICE FOR CUSTOMERS RECEIVING DEFAULT SERVICE:** The Transmission Service Charge shall apply.

STATE TAX ADJUSTMENT CLAUSE, DISTRIBUTION SYSTEM IMPROVEMENT CHARGE (DSIC), PROVISION FOR THE RECOVERY OF CONSUMER EDUCATION PLAN COSTS, NON-BYPASSABLE TRANSMISSION CHARGE, PROVISION FOR THE RECOVERY OF ENERGY EFFICIENCY, FIBER AFFILIATE REVENUE SURCHARGE, INCREMENTAL COVID-19 RELATED UNCOLLECTIBLE SURCHARGE AND CONSERVATION PROGRAM AND NUCLEAR DECOMMISSIONING COST ADJUSTMENT APPLY TO THIS RATE.

### **DETERMINATION OF BILLING DEMAND.**

The billing demand will be computed to the nearest kilowatt and will never be less than the measured demand, adjusted for power factor in accordance with the Rules and Regulations, nor less than 25 kilowatts. Additionally, the billing demand will not be less than 40% of the maximum demand specified in the contract. The 25 kW minimum shall apply to the Energy Supply Charge and the Transmission Supply Charge.

### **CONJUNCTIVE BILLING OF MULTIPLE DELIVERY POINTS.**

If the load of a customer located at a delivery point becomes greater than the capacity of the standard circuit or circuits established by the Company to supply the customer at that delivery point, upon the written request of the customer, the Company will establish a new delivery point and bill the customer as if it were delivering and metering the two services at a single point, as long as installation of the new service is, in the Company's opinion, less costly for the Company than upgrading the service to the first delivery point and provided that such multi-point delivery is not disadvantageous to the Company.

### **MINIMUM CHARGE.**

The monthly minimum charge shall be the Fixed Distribution Service Charge, plus the charge per kW component of the Variable Distribution Service Charge, and modify less the high voltage discount where applicable plus in the case of Procurement Class 3/4 customers, charges assessed on PJM's reliability pricing model.

### **TERM OF CONTRACT.**

The initial contract term shall be for at least three years.

### **PAYMENT TERMS.**

Standard.

# PECO HT Tariff

## VARIABLE DISTRIBUTION SERVICE CHARGE:

**\$7.24** per kW of **billing demand**  
(\$0.0006) per kWh for all kWh

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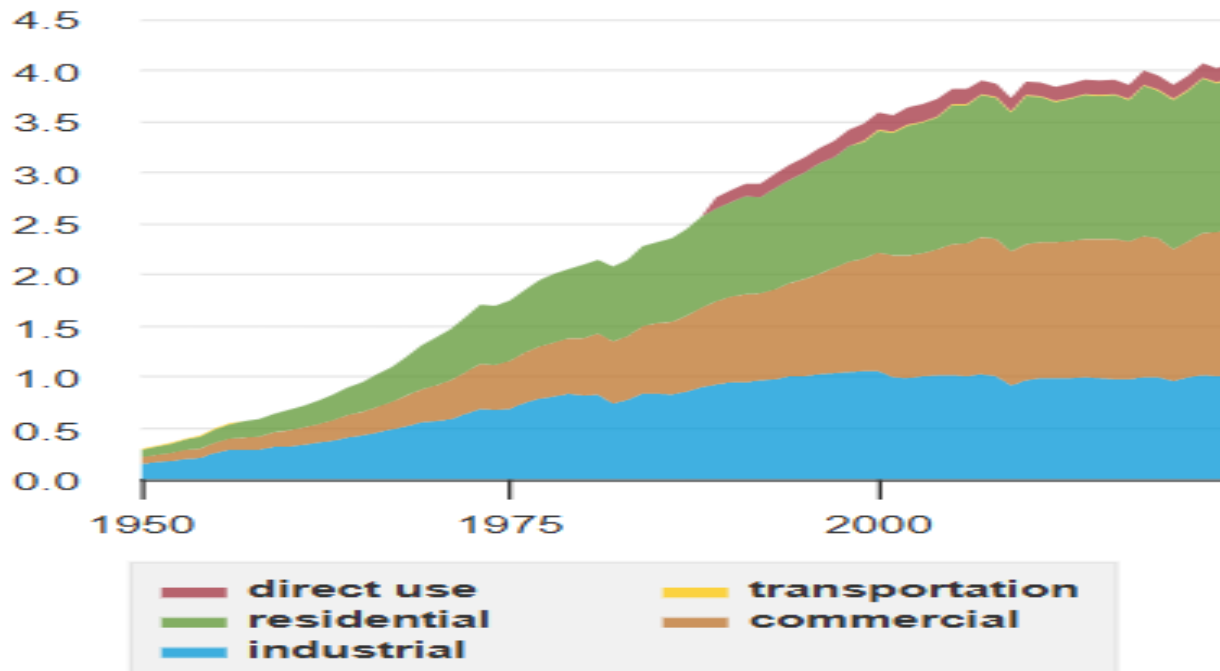
**ENERGY EFFICIENCY CHARGE:** **\$1.18** per kW of **Peak Load Contribution**

Example: 12 months x 1000 kW x \$7.24/kW = \$86,880 per year plus  
12 months x 1500 kW x \$1.18/kW = \$21,240 per year  
Total = \$108,120 per year + Tax

# US Electricity Usage

## U.S. electricity retail sales to major end-use sectors and electricity direct use by all sectors, 1950-2024

trillion kilowatthours



Data source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 7.6, March 2025, preliminary data for 2024



2025

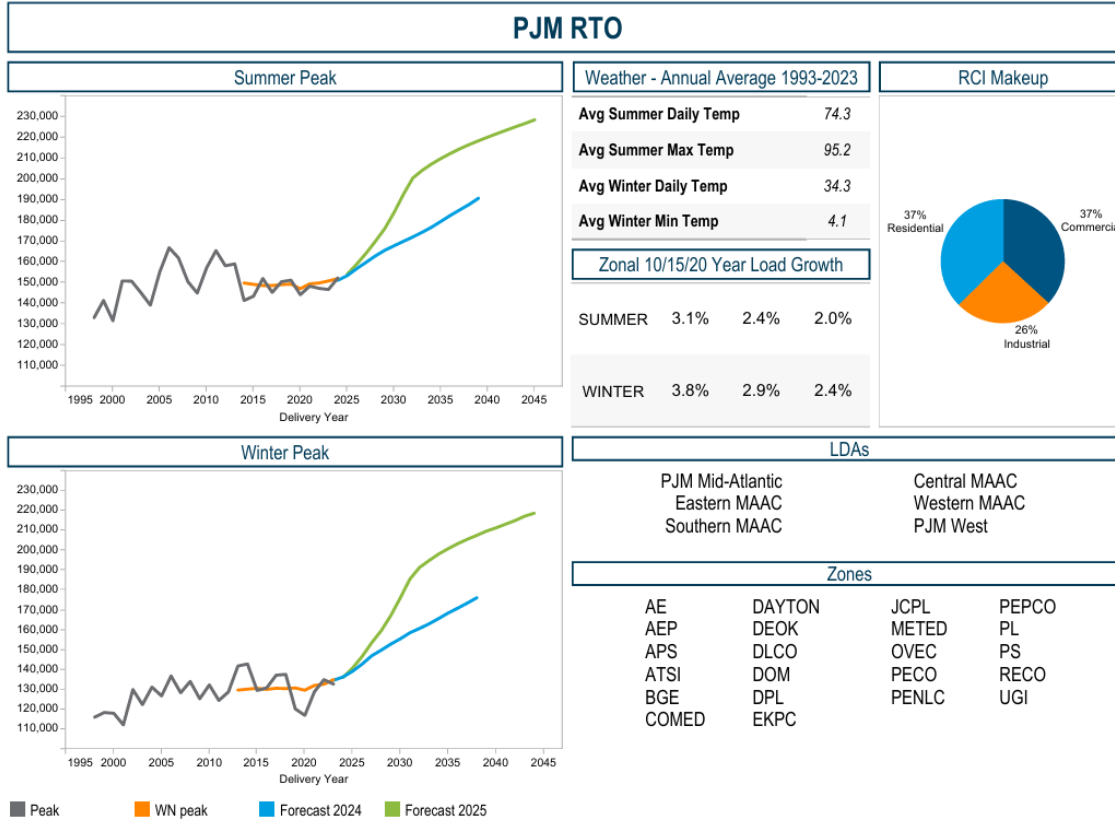
## PJM Long-Term Load Forecast Report

Posted Date: January 24, 2025

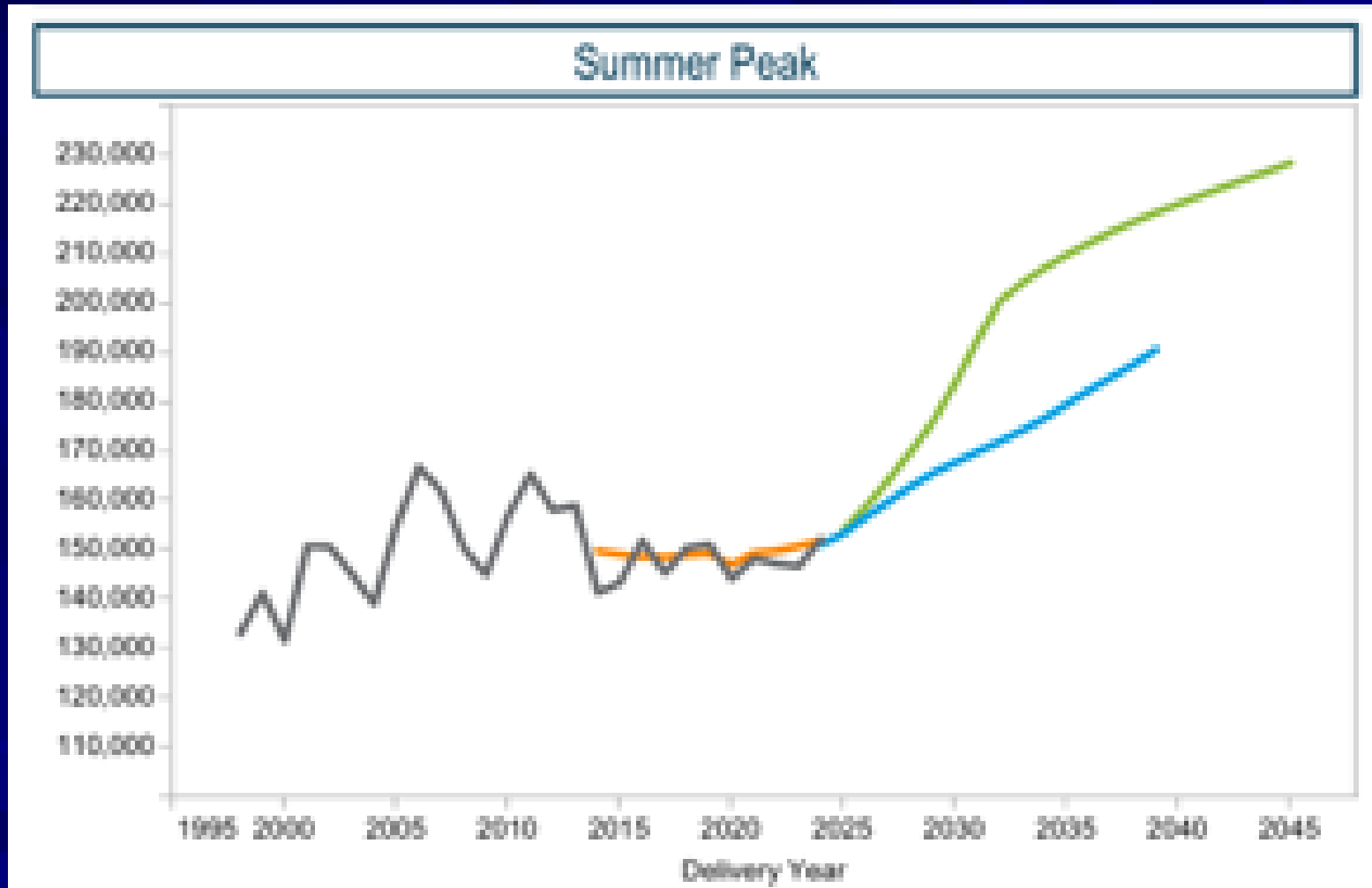
*Prepared by PJM Resource Adequacy Planning Department*

For Public Use

# PJM Load Forecast



# PJM Load Forecast



■ Peak

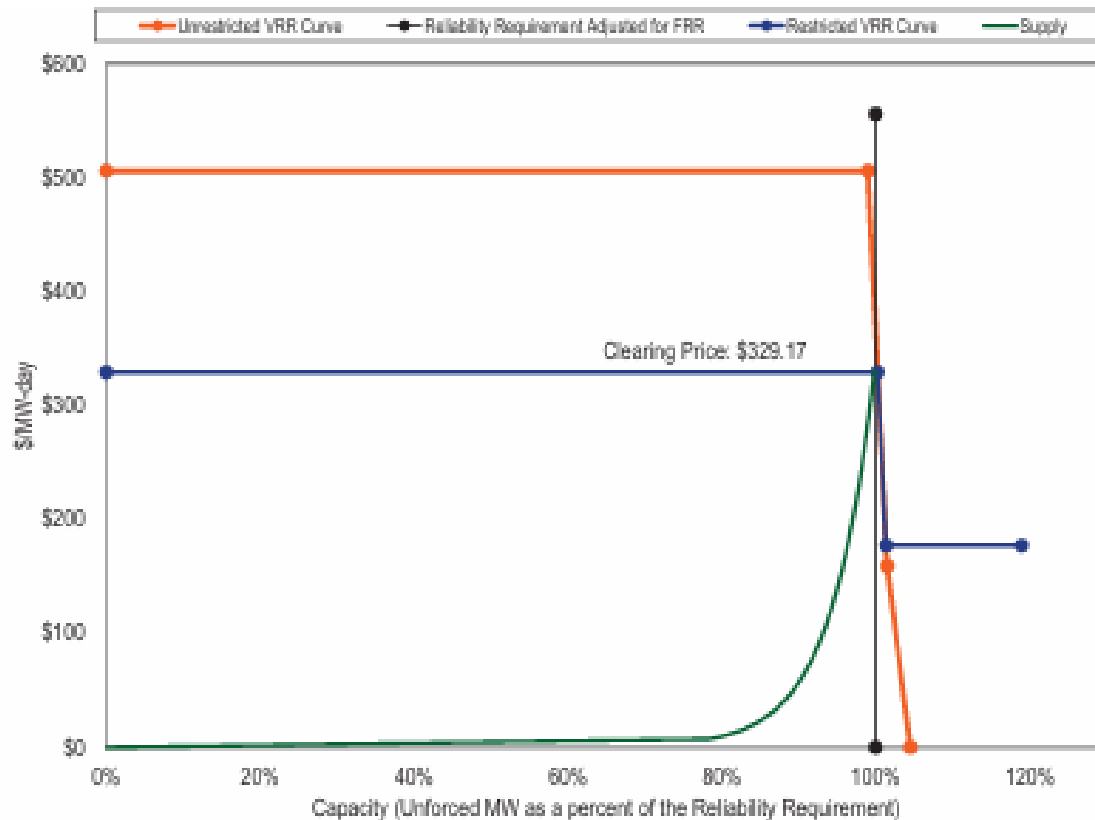
■ WN peak

■ Forecast 2024

■ Forecast 2025

# PJM VRR Curve

Figure 5-4 Shape of the VRR curve relative to the reliability requirement: 2026/2027 Delivery Year



# Final Thoughts and Questions

- If only 10% of projected Data Centers are installed, is there no capacity issue?
- If Data Centers bring their own generation or curtail 100% at peak times, is there no capacity issue?
- Are AI chips using 90% less power than a few years ago?
- Are AI queries using 90% less power than a few years ago?
- Is PJM Peak load actually going to increase from 150 to 225 GW by 2030?
  - Does this look real?
  - If real, is it impossible to bring on this much generation and transmission in time?
- Will battery storage alone solve capacity issues?
- Energy Efficiency and Demand Response will probably help some?
- In one year will we have a battery glut?
- In 3 – 5 years will we have a generator and transformer glut?
- Do we already have a solar power glut?

# Contact Information

Jim Clark

Clark Energy, Inc.

(610) 299-1743 (cell)

[clarkenergy@comcast.net](mailto:clarkenergy@comcast.net)