



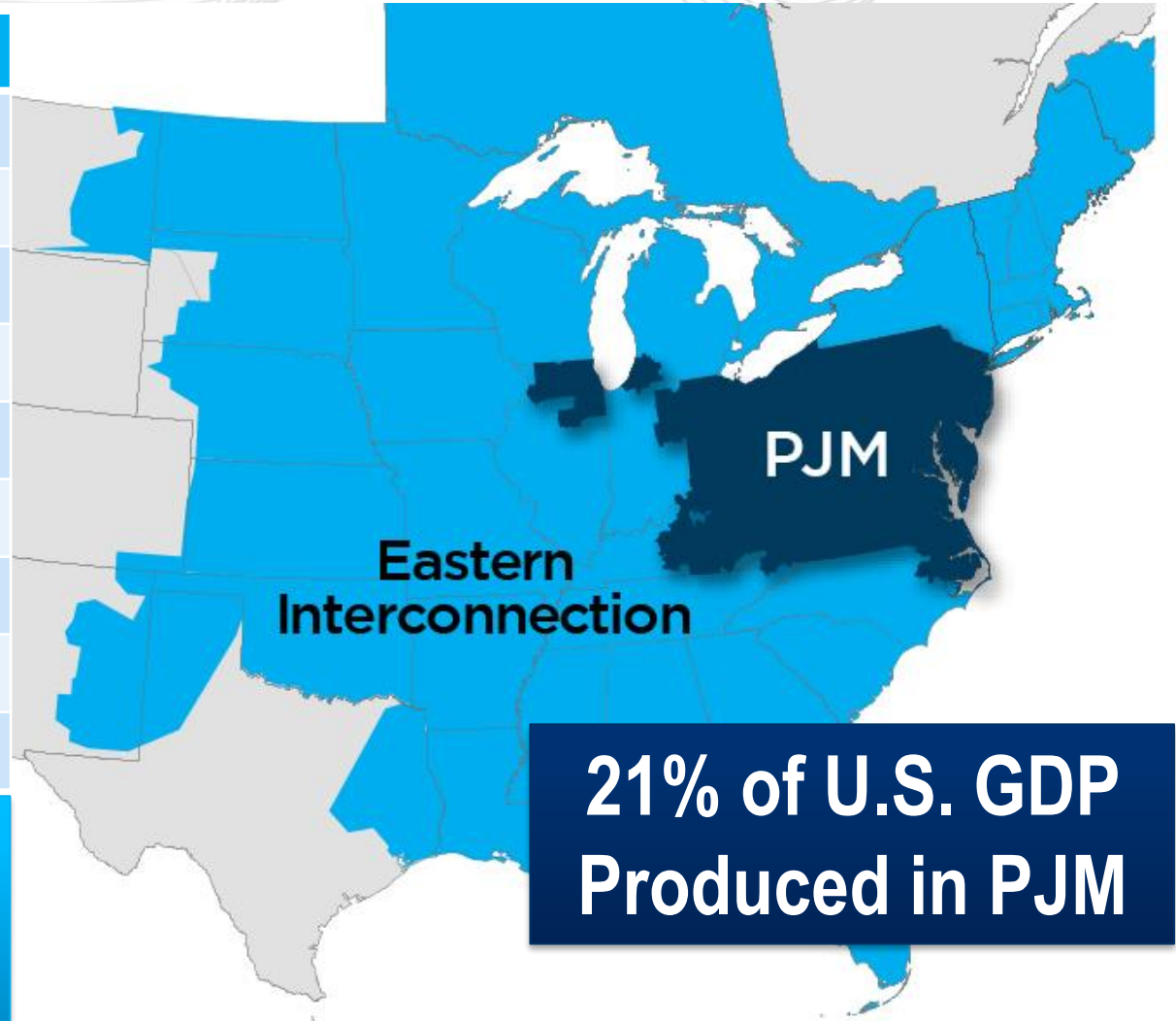
Summer 2023 PJM Reliability Assessment

Pennsylvania Public Utility Commission
June 2023

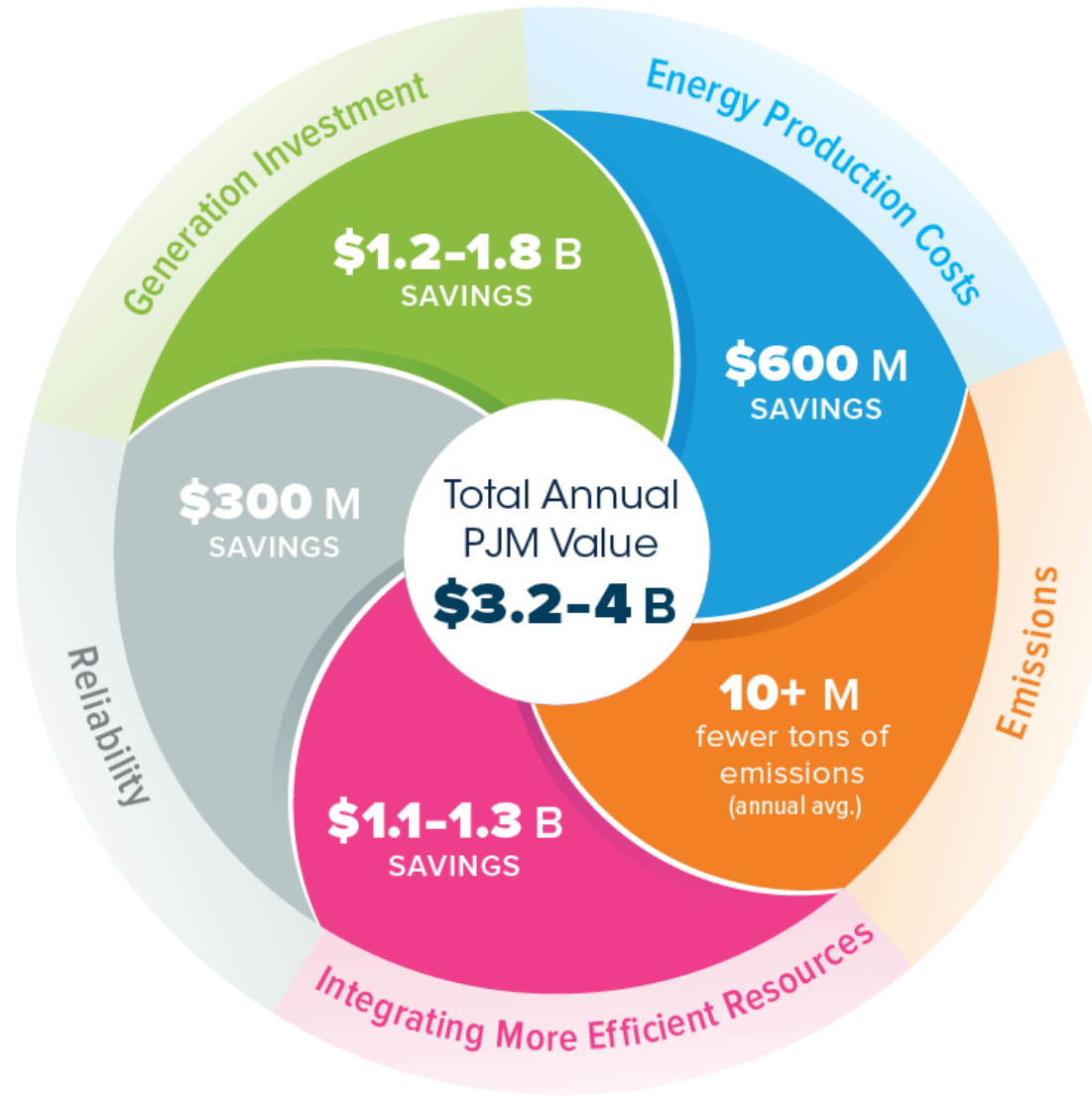
Key Statistics

Member companies	1,110+
Millions of people served	65+
Peak load in megawatts	165,563
Megawatts of generating capacity	183,254
Miles of transmission lines	88,115
Gigawatt hours of annual energy	795
Generation sources	1,419
Square miles of territory	368,906
States served	13 + DC

- 26% of generation in Eastern Interconnection
- 25% of load in Eastern Interconnection
- 20% of transmission assets in Eastern Interconnection



As of 2/2023



— All numbers are estimates. —



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Pennsylvania Overview

Existing Capacity:

Total installed capacity in Pennsylvania:

Natural Gas
49.2%

Coal
20.1%

In the region PJM serves, natural gas is 46.6% of total installed capacity, while coal represents 24.0%.

New Interconnection Requests in Pennsylvania (nameplate):

Solar: 68.3%

Storage: 24.2%

Deactivations:

832 MW in Pennsylvania gave notification of deactivation in 2022.

RTEP 2022:

PA's 2022 RTEP project total represents \$664 million in investment.

Load Forecast:

Summer peak load forecasts vary from a decrease of 0.3% to an increase of 0.8% annually over the next 10 years in PA.

PJM RTO projected load growth rate is **0.8%**.

2023/2024 Capacity Market:

Pennsylvania cleared in the MAAC and Rest-of-RTO regions in the 2023/2024 Base Residual Auction.

2022 Zonal Net Imports/Exports:

Pennsylvania was a net exporting region throughout the year.

Emissions:

Pennsylvania's average CO₂ emissions decreased in 2022 compared to 2021 levels.

Pennsylvania – Net Energy Import/Export Trend

(Jan. 2022 – Dec. 2022)



Positive values represent exports and negative values represent imports.

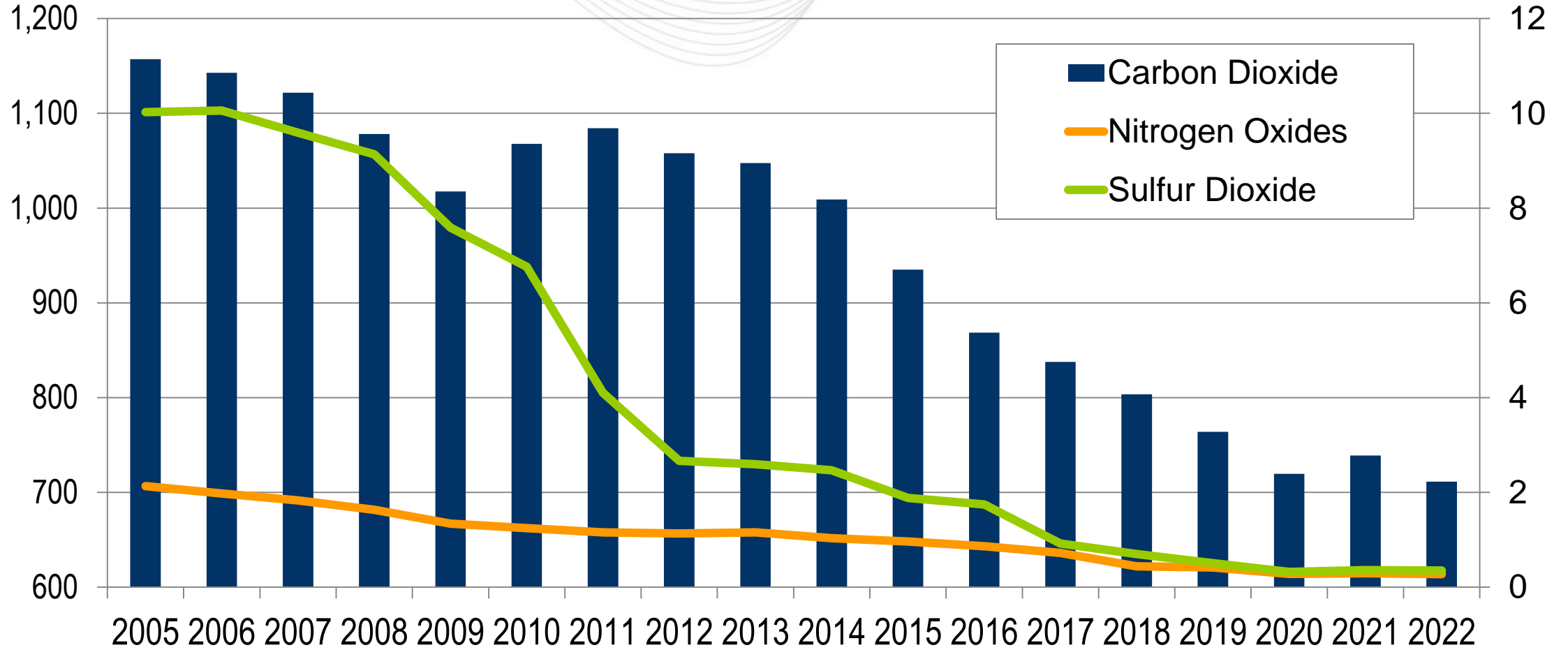


Pennsylvania – Average Emissions (lbs/MWh)

(March 2023)

CO₂
(lbs/MWh)

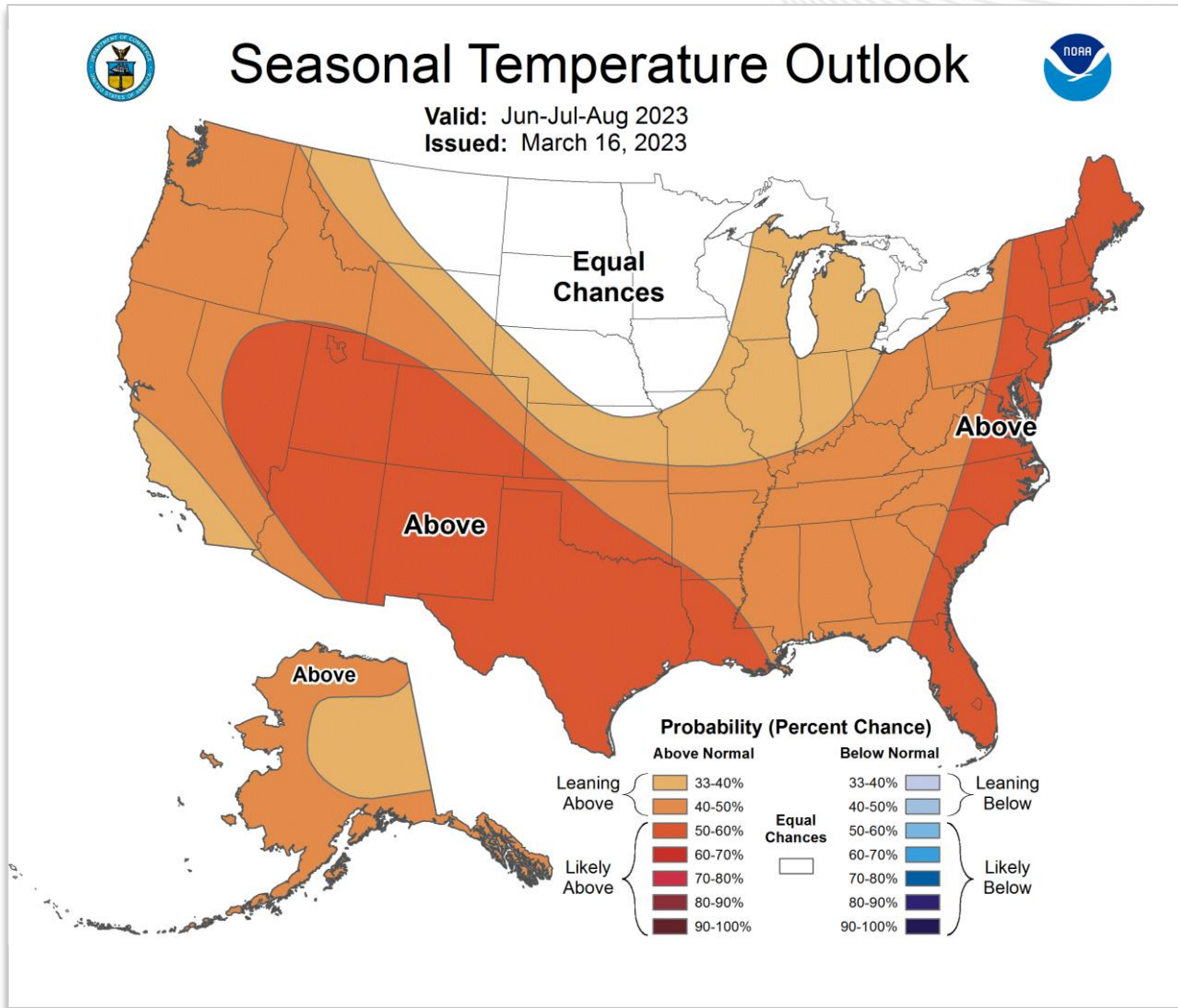
SO₂ and NO_x
(lbs/MWh)





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2023 Weather Outlook



Nationally, temperatures are likely to be above the 30-year normal.

Forecast influenced by warm ocean waters indicative of recent warm summers the past 10 years.

Five of the Top 10 hottest summers have occurred in the last decade.

Warm risk in central U.S. under drought conditions and cool risk in southeast U.S. with increasing wetness

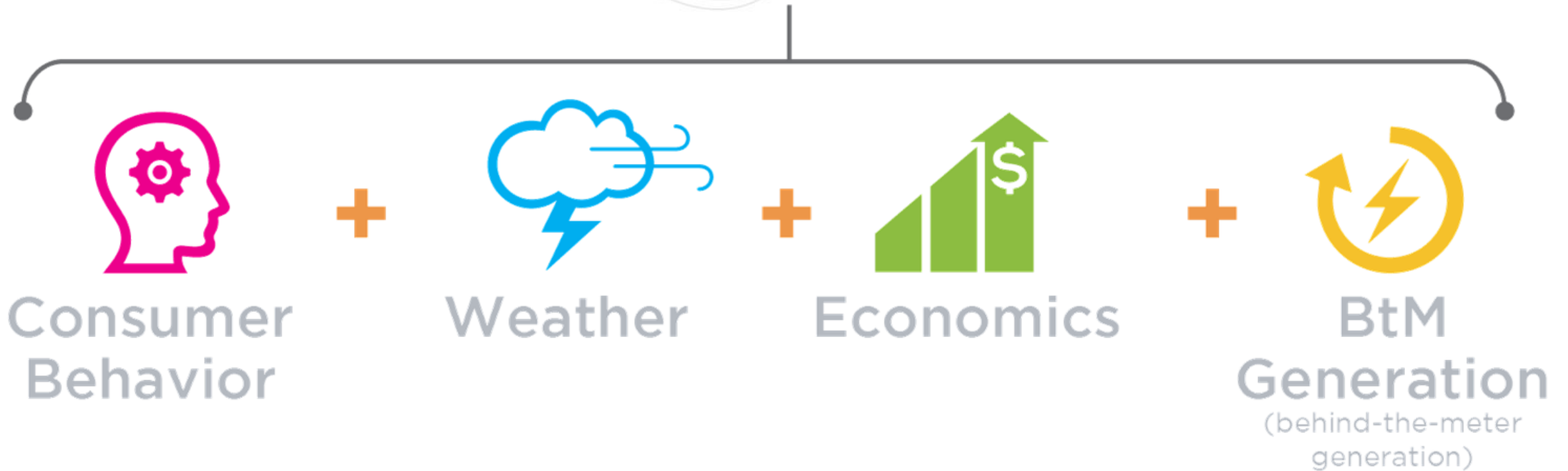
Increased moisture may lead to warmer-than-normal overnight lows in eastern U.S.

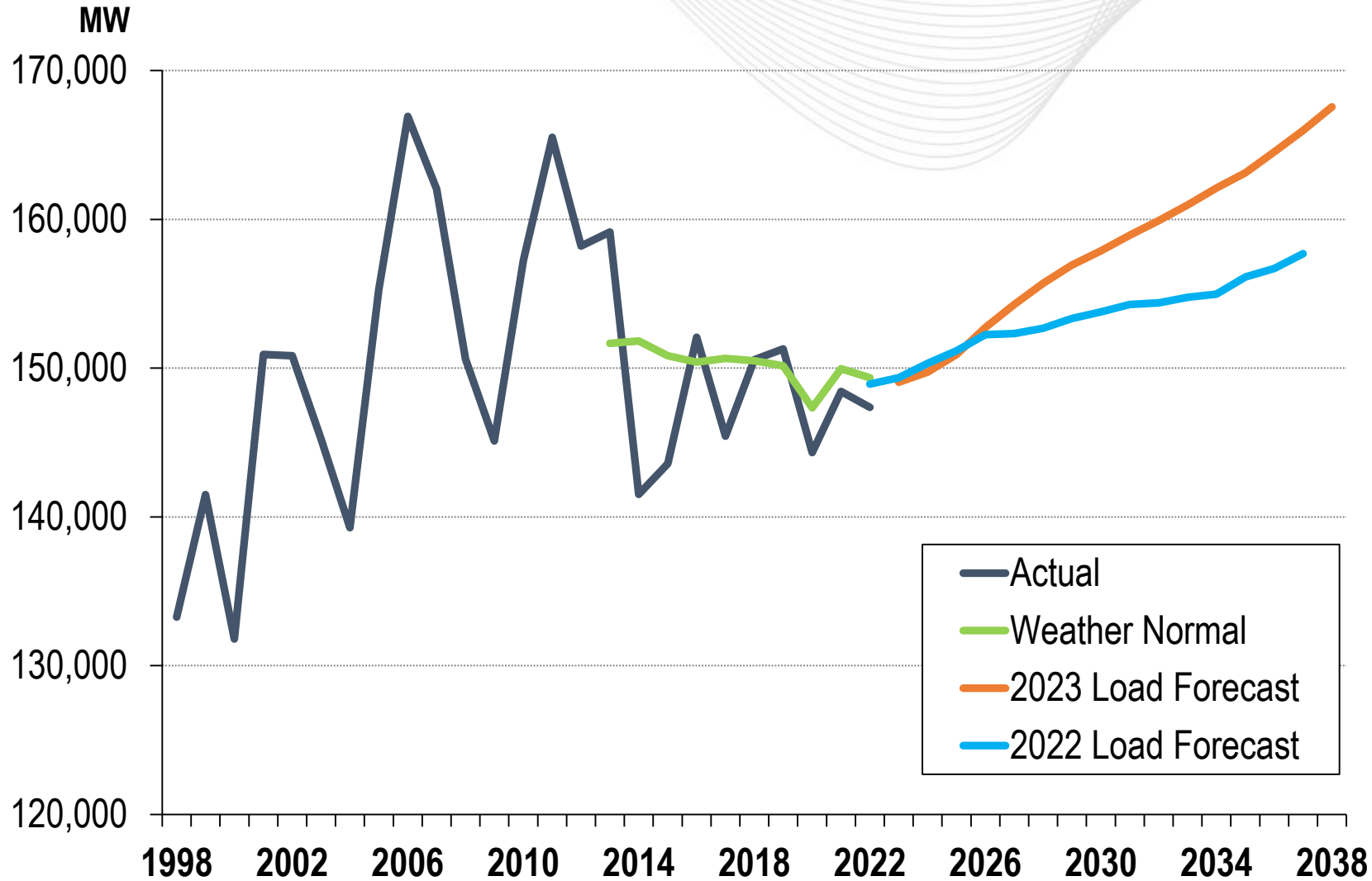


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Load Forecasts

LOAD FORECAST





15-Year Annualized Growth Rate

Load Growth

2022	2023
0.4%	0.8%

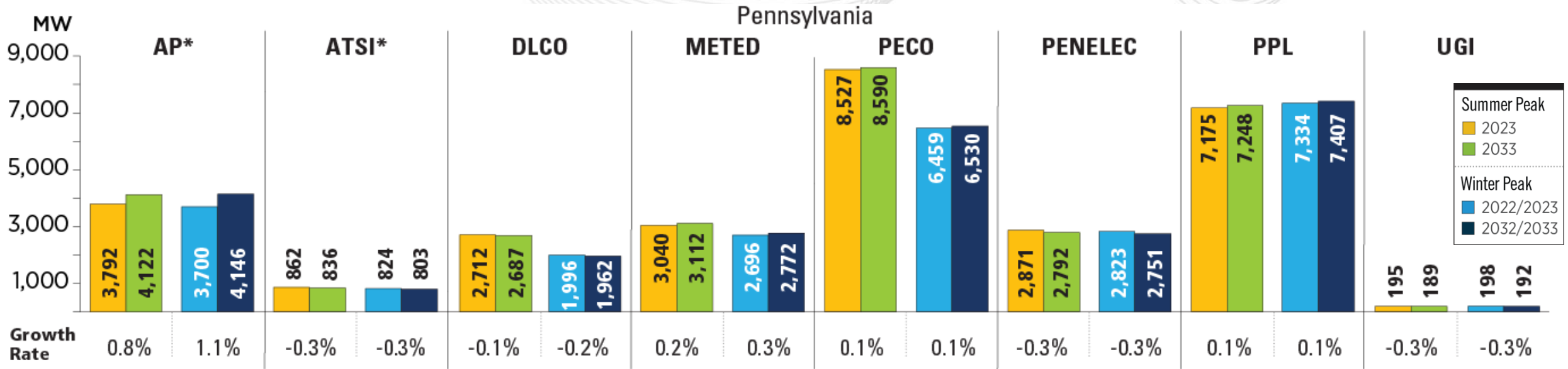
Select Year Comparisons

Load Forecast:
2023 vs. 2022

2025	2027	2037
0.2% ↓	1.3% ↑	5.3% ↑



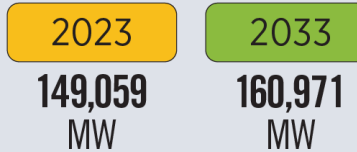
Pennsylvania – 2023 Load Forecast Report



*Serves load outside PA

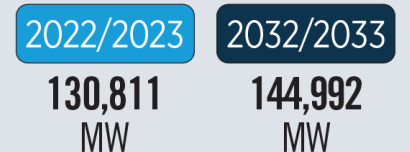
The summer and winter peak megawatt values reflect the estimated amount of forecast load to be served by each transmission owner in the noted state/district. Estimated amounts were calculated based on the average share of each transmission owner's real-time summer and winter peak load in those areas over the past five years.

PJM RTO Summer Peak



Growth Rate 0.8%

PJM RTO Winter Peak



Growth Rate 1.0%



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2023 Operations Summer Assessment


Perform a summer reliability assessment to include any additional sensitivity analysis required.

Coordinate summer assessments with neighboring systems (NYISO, MISO, TVA and VACAR).

Conduct emergency procedures drill to prepare PJM staff and PJM stakeholder staff for any emergency operations.

Request generator fuel inventory and supply data to maintain situational awareness throughout the spring and summer as necessary.

Summer 2023 	DEMAND			PJM Installed Capacity ~ 187,000 MW
	Forecast Summer ~149,000 MW	Summer Study Average ~156,000 MW	Summer Study High ~163,000 MW	

Relative Peaks 	2022 Summer Peak (July 20) ~147,000 MW	All-Time Summer Peak (2006) 165,563 MW
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50/50 Non-Diversified Peak Load Base Case

Load ¹ Forecast	Preliminary RTO Net Interchange	PJM RTO Installed Capacity	Discrete Generator Outages
156,102 MW	2,969 ² MW <i>(Exporting)</i>	186,540 MW <i>(preliminary)</i>	15,394 MW

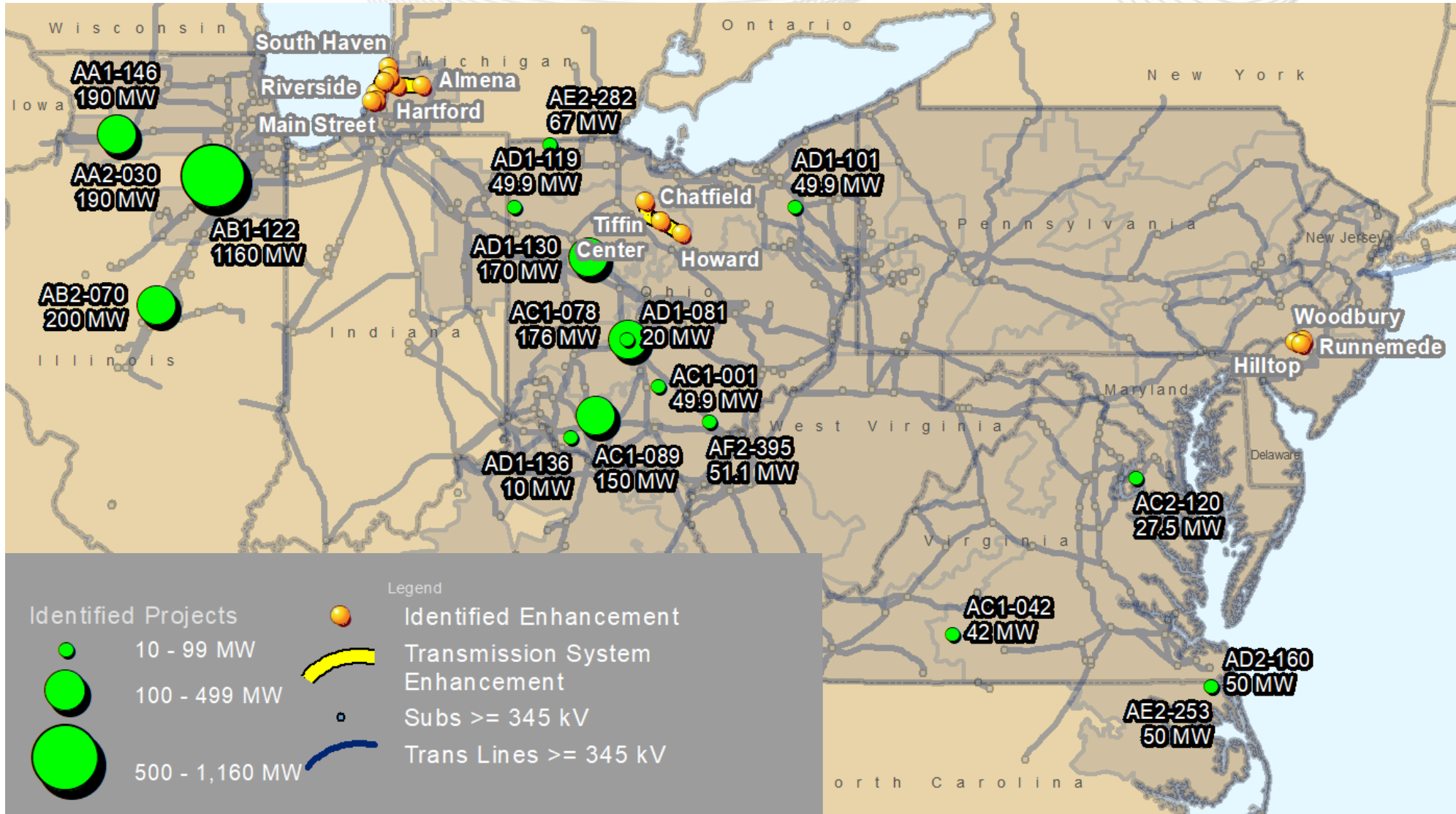
¹LAS – Load Assessment Subcommittee

²Study Case Interchange (-2,969 MW) = Forecast Net Interchange(-4,000 MW) + Pseudo-Tie Adjustment (1,031 MW)

PEAK LOAD ANALYSIS

No reliability issues identified.

- No reliability issues identified for base case and N-1 analysis.
- Redispatch and switching required to control local thermal or voltage violations in some areas.
- All networked transmission voltage violations were controlled by shunt and tap adjustments.



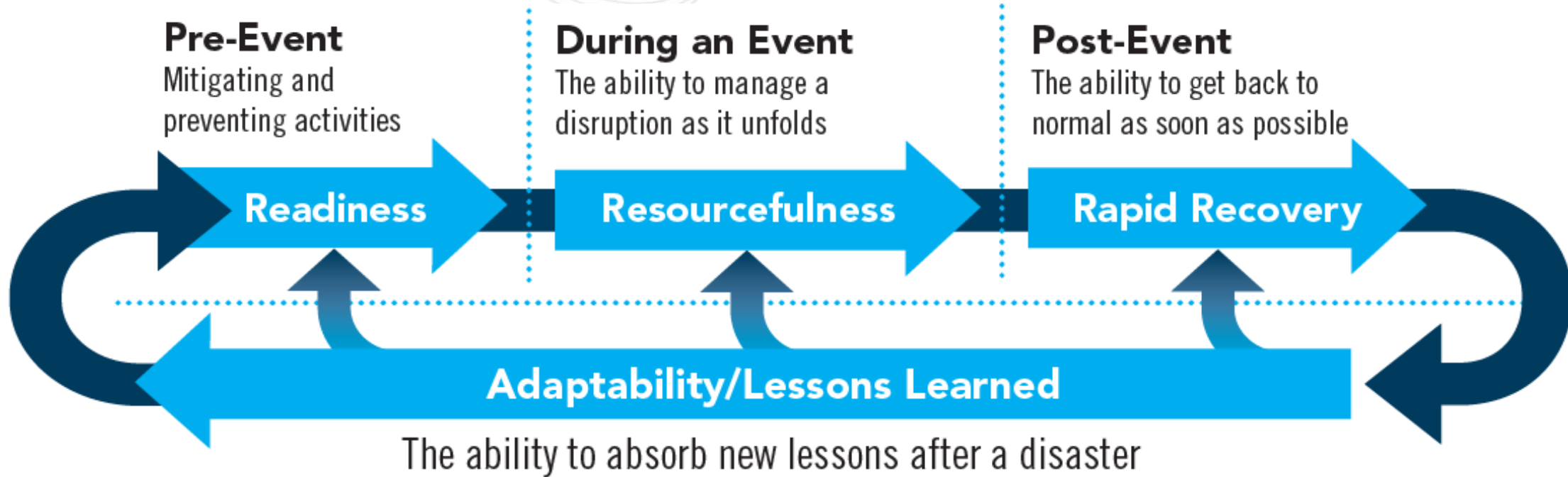
Sensitivity Studies	Impact
<ul style="list-style-type: none"> External Contingencies 	No reliability concerns
<ul style="list-style-type: none"> N-1-1 Relay Trip Conditions 	No cascading outage concerns identified <i>All networked transmission overloads were controlled pre-contingency.</i>
<ul style="list-style-type: none"> Max-Cred Contingency Analysis 	No reliability concerns
<ul style="list-style-type: none"> Transfer Interface Analysis 	No reliability concerns
<ul style="list-style-type: none"> 90/10 Load Forecast Study (162,666 MW) 	No reliability concerns
<ul style="list-style-type: none"> Solar and Wind Generation Sensitivity Study 	No reliability concerns

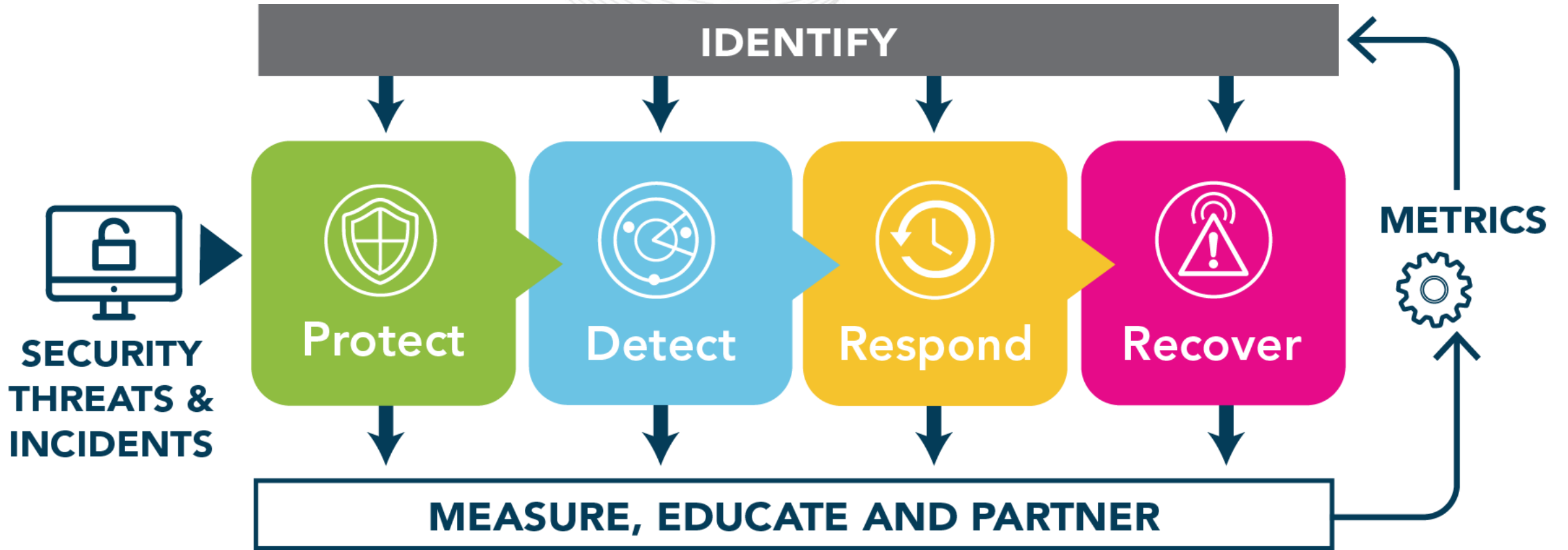


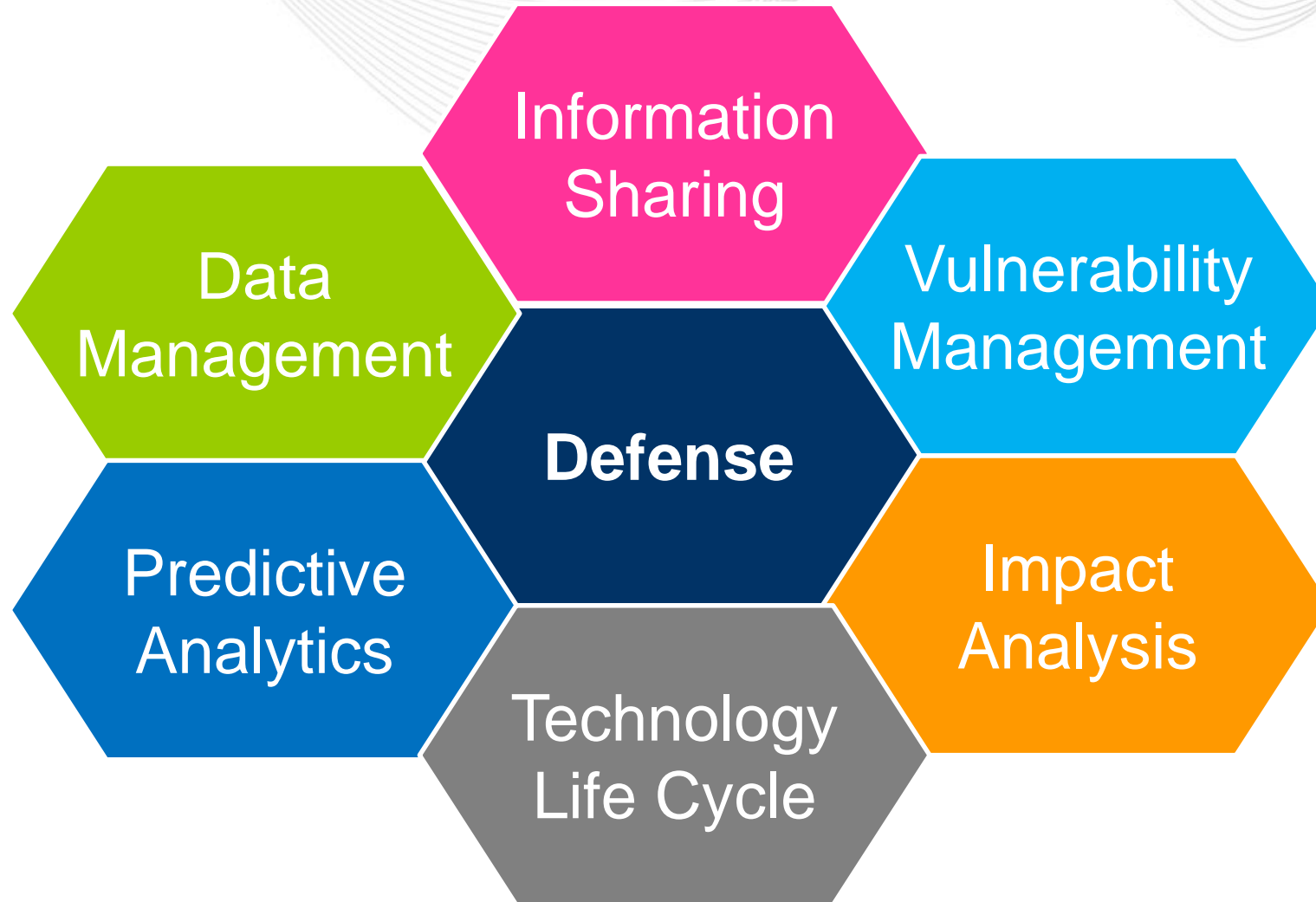
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Resilience and Cybersecurity

Incident Focused
Incident-Driven
Learning







Prevention

- Build security into the design.
- Implement traditional controls.
- Improve security controls.



Resilience

- Focus on incident response.
- Enhance scenario planning.
- Plan and drill restoration scenarios.

Collaboration

- Coordinate response plans.
- Develop and maintain government relationships.
- Leverage industry relationships.
- Share best practices.

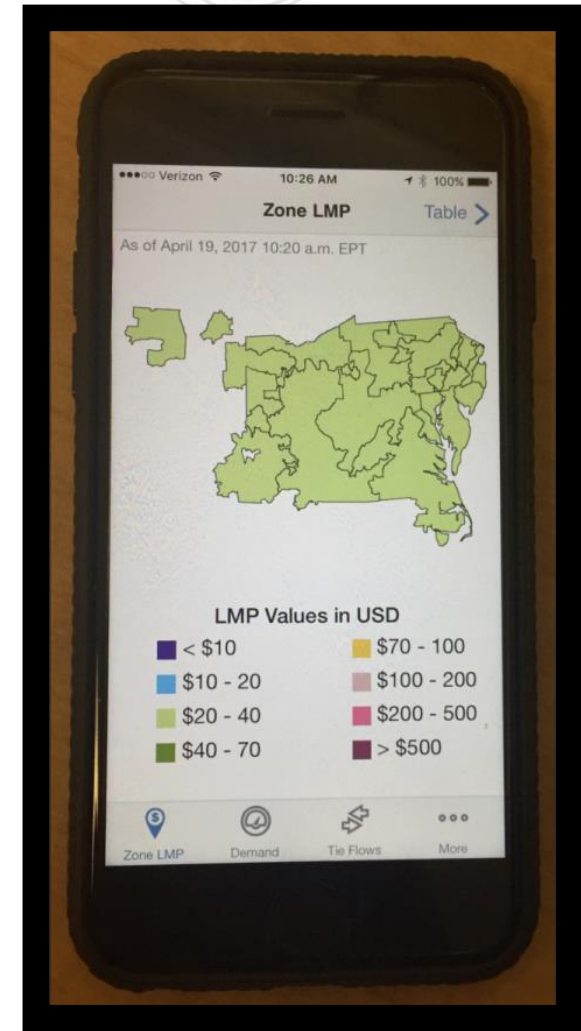


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Additional Information

Power Up with the **PJM Now** App!

- See real-time demand
- Track power prices
- Get notifications



For More Information:

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PJM Summer Reliability Assessment



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