The State of Reliability in MISO

Isaac Orr

Always On Energy Research

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About Me

- Isaac Orr is the Vice President of Research at Always On Energy Research, where he writes about energy and environmental issues, including electricity policy and mining.
- My writings have appeared in The Wall Street Journal, USA Today, the New York Post, and many other publications.
- I grew up on a dairy farm in rural Wisconsin, which is why I am so passionate about standing up for rural America and rural electric co-ops.

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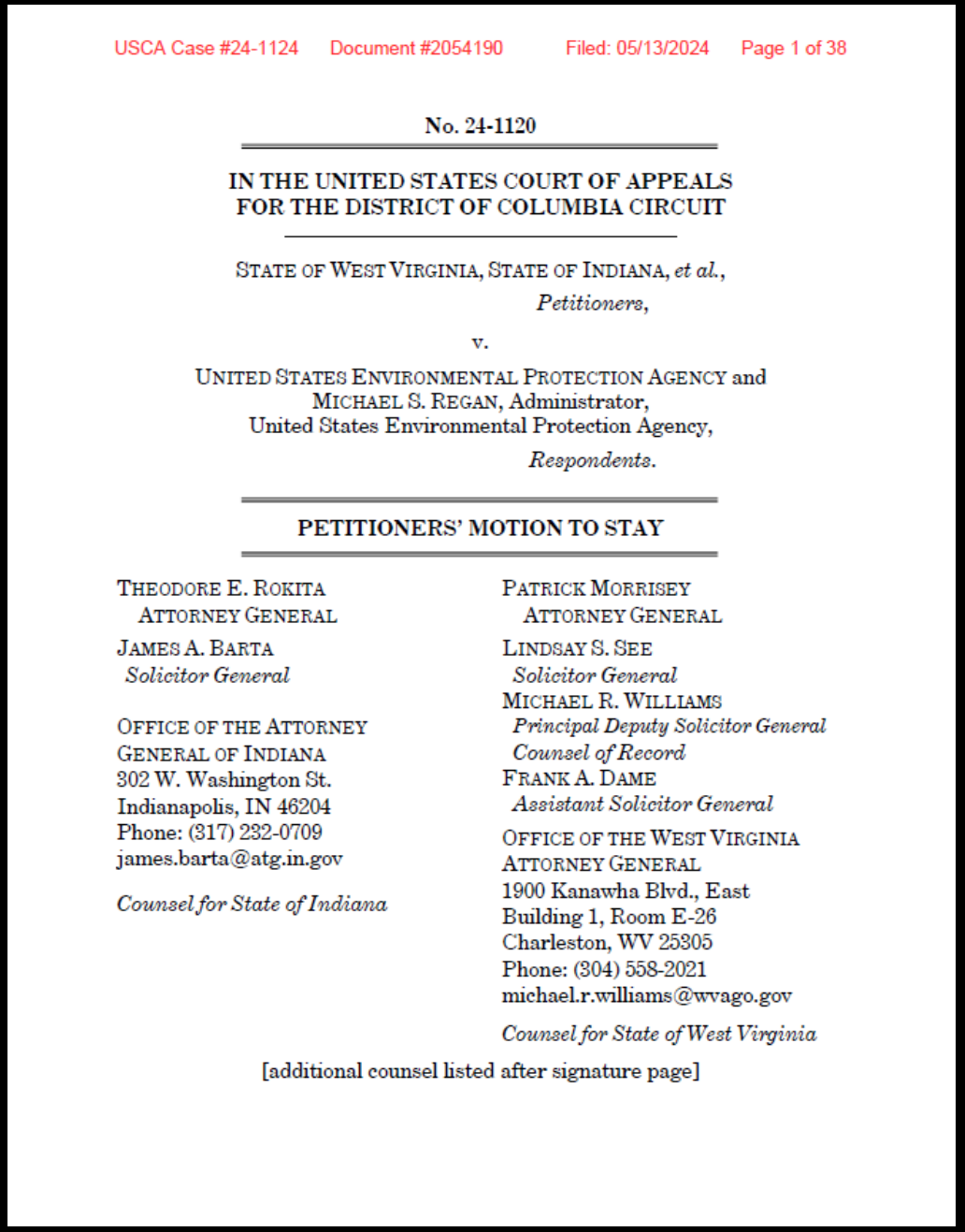
About Always On Energy Research

- Always On Energy Research is dedicated to modeling the reliability and financial implications of federal and state policies to ensure everyone has access to reliable, affordable energy.
- Our clients include state agencies, private companies, and public policy organizations throughout the country.
- Our final carbon rule modeling was included in the Stay Motion filed by West Virginia et al. against the rules.
- We have experience modeling the impact of regulations in more than a dozen states, the Midcontinent Independent Systems Operator, and the Southwest Power Pool.



No. 24-1120

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF WEST VIRGINIA, STATE OF INDIANA, *et al.*,
Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY and
MICHAEL S. REGAN, Administrator,
United States Environmental Protection Agency,
Respondents.

PETITIONERS' MOTION TO STAY

THEODORE E. ROKITA
ATTORNEY GENERAL
JAMES A. BARTA
Solicitor General

OFFICE OF THE ATTORNEY
GENERAL OF INDIANA
302 W. Washington St.
Indianapolis, IN 46204
Phone: (317) 232-0709
james.barta@atg.in.gov

Counsel for State of Indiana

PATRICK MORRISEY
ATTORNEY GENERAL
LINDSAY S. SEE
Solicitor General
MICHAEL R. WILLIAMS
Principal Deputy Solicitor General
Counsel of Record
FRANK A. DAME
Assistant Solicitor General

OFFICE OF THE WEST VIRGINIA
ATTORNEY GENERAL
1900 Kanawha Blvd., East
Building 1, Room E-26
Charleston, WV 25305
Phone: (304) 558-2021
michael.r.williams@wvago.gov

Counsel for State of West Virginia

[additional counsel listed after signature page]

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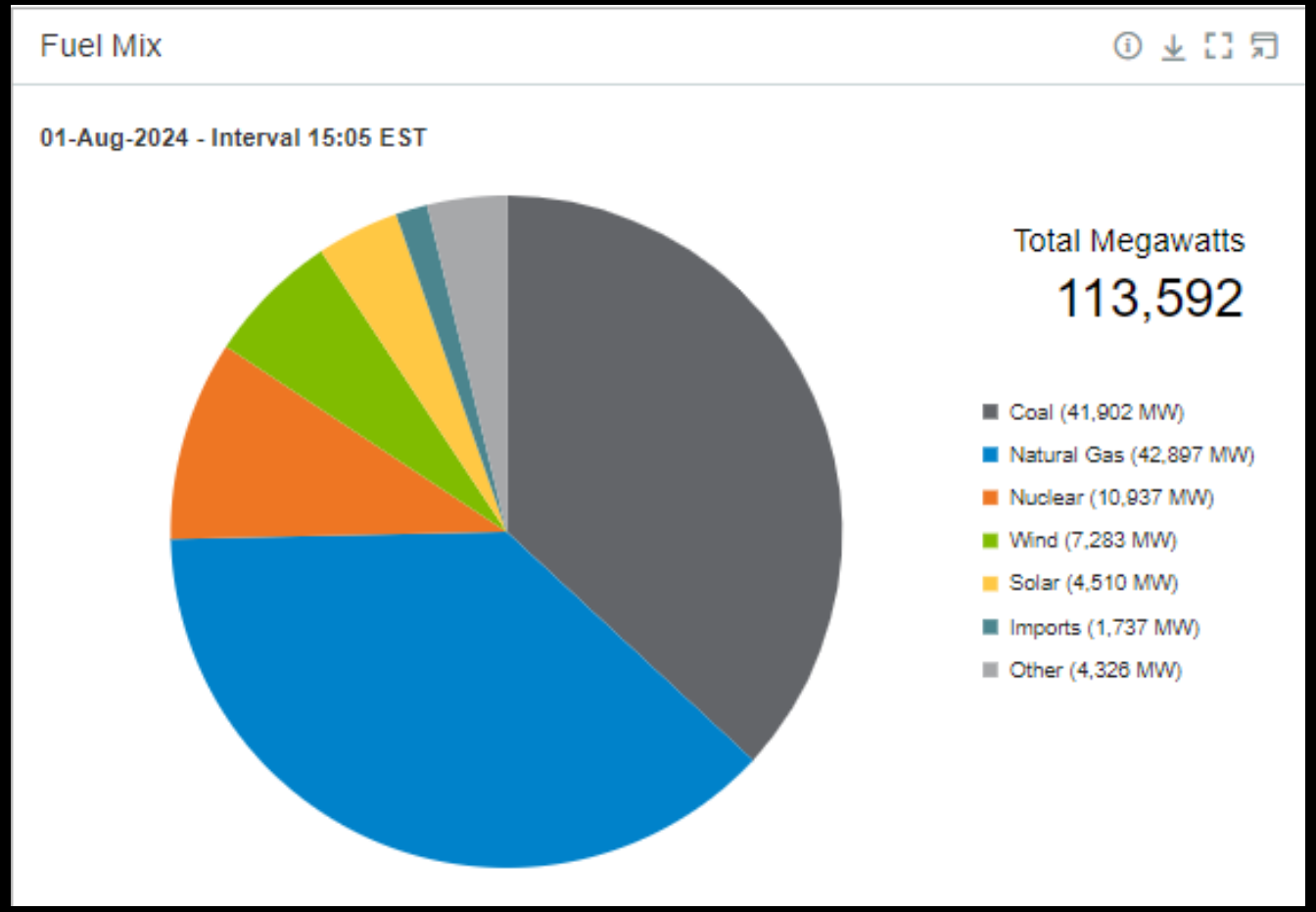
About MISO

- MISO is the electric grid operator for the central United States.
- Controls power dispatch in15 states and the Canadian province of Manitoba.
- Unlike PJM or ISO-NE, utilities within MISO are vertically-integrated monopolies.

MISO Energy Mix

- The primary fuels for electricity generation in MISO are natural gas and coal.
- Nuclear generation is declining.
- Wind can contribute up to 29 GW of power under ideal conditions.
- Solar generation has grown substantially in recent years.
- The region also imports power from PJM and Manitoba Hydro.



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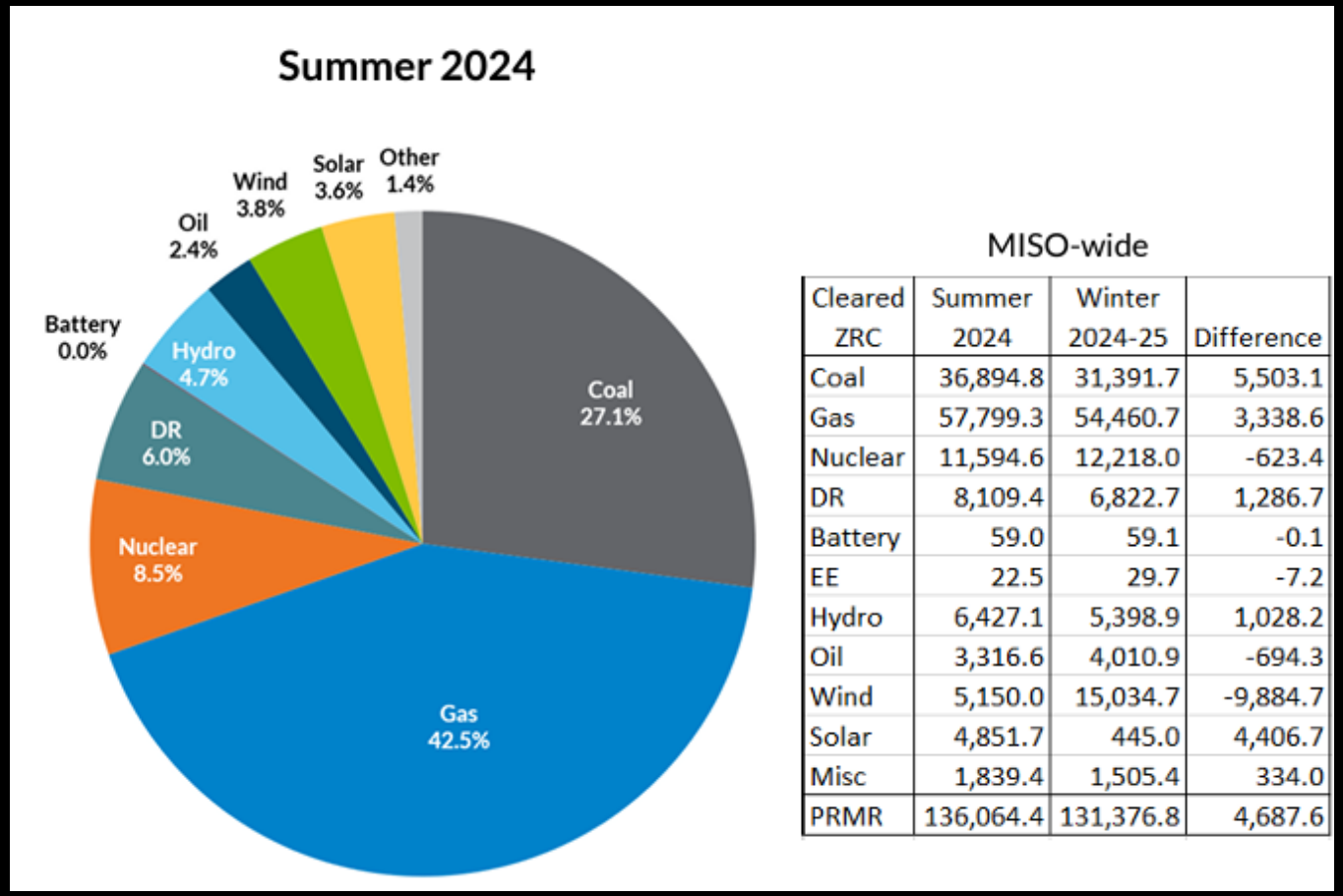
MISO Summer Capacity Mix

- Resources used to meet MISO's peak demand:
- 45% natural gas;
- 27.1% coal;
- 8.5% nuclear;
- 6% demand response;
- 4.7% hydro;
- 2.4% oil;
- 3.8% wind;
- 3.6% solar



MISO-wide

Cleared ZRC	Summer 2024	Winter 2024-25	Difference
Coal	36,894.8	31,391.7	5,503.1
Gas	57,799.3	54,460.7	3,338.6
Nuclear	11,594.6	12,218.0	-623.4
DR	8,109.4	6,822.7	1,286.7
Battery	59.0	59.1	-0.1
EE	22.5	29.7	-7.2
Hydro	6,427.1	5,398.9	1,028.2
Oil	3,316.6	4,010.9	-694.3
Wind	5,150.0	15,034.7	-9,884.7
Solar	4,851.7	445.0	4,406.7
Misc	1,839.4	1,505.4	334.0
PRMR	136,064.4	131,376.8	4,687.6

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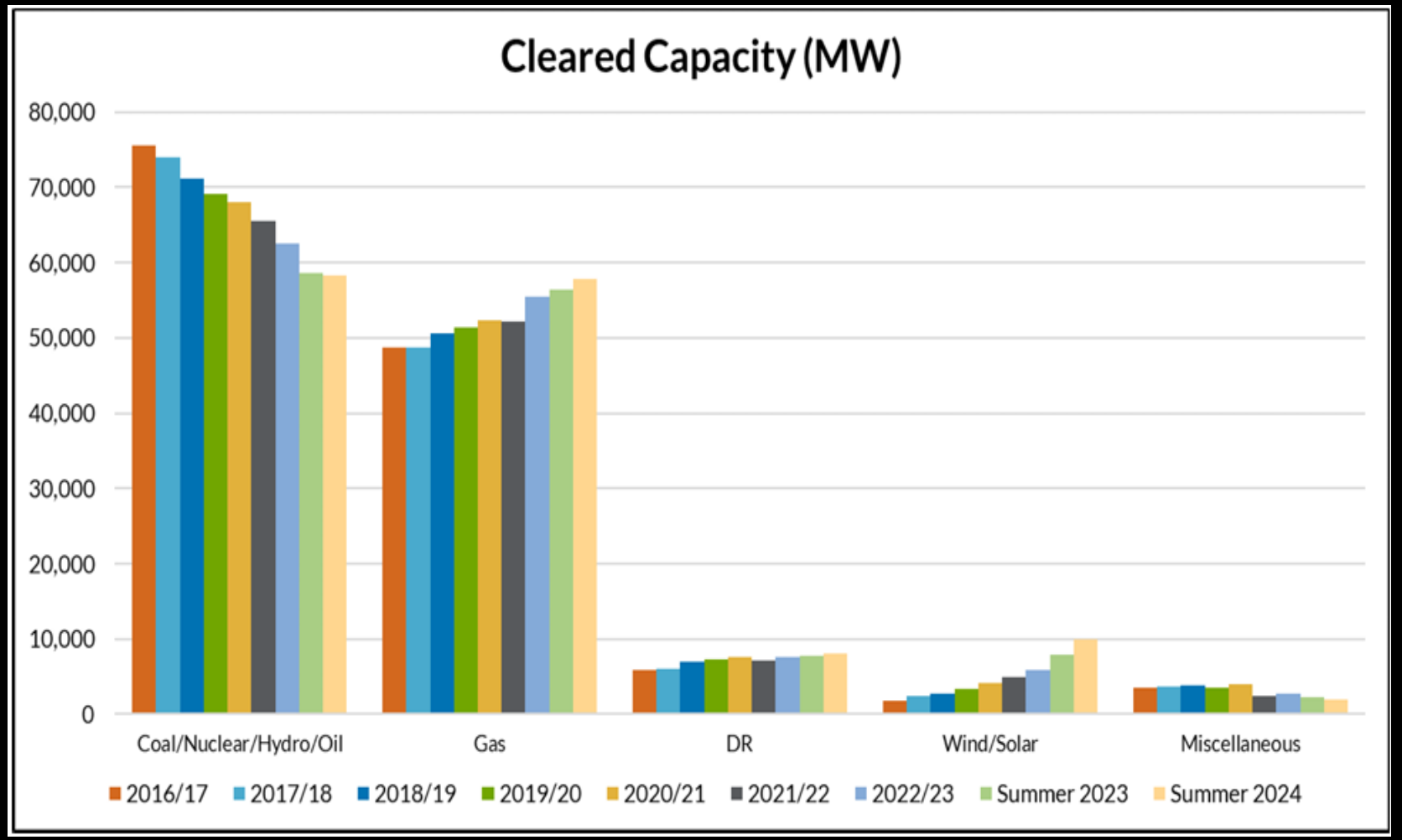
The Capacity Mix is Expected to Change Dramatically

- State mandates for carbon-free electricity are forcing the retirement of coal and natural gas plants.
- Utility companies are enacting carbon-free policies to tear down depreciated assets and build wind and solar.
- EPA regulations will likely shut down coal plants in states without carbon-free mandates.



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MISO is at the Highest Risk of Blackouts

- NERC's Long Term Reliability Assessment shows MISO is at the highest risk of rolling blackouts in the near future due to thermal plant closures, most of which are coal plants.
- Many of the areas on this map that were not highlighted for a summer reliability risk had blackouts during Christmas of 2022, including much of the Southeast.
- MISO is already operating on thin margins, which is a key reason we are interested in examining the impacts of the regulations in this region.

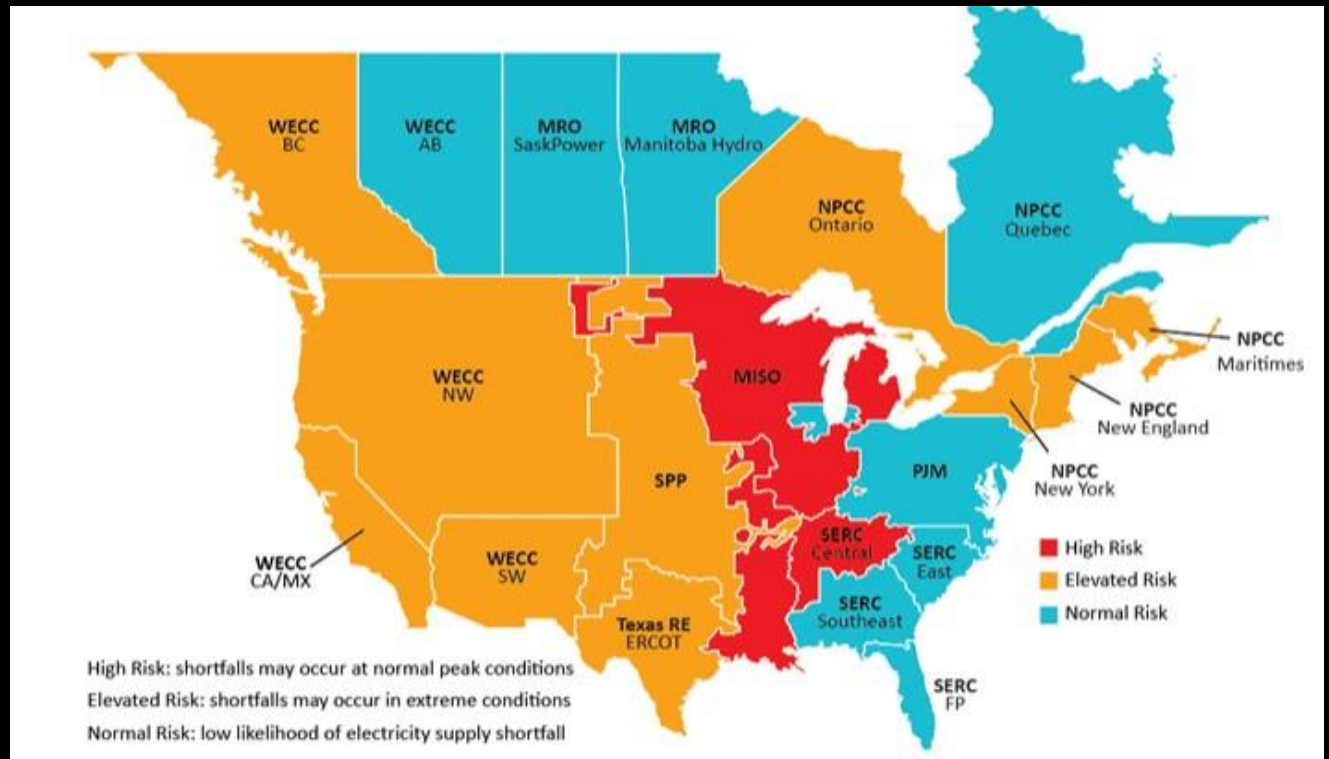

Figure 1: Risk Area Summary 2024–2028[8]

The following pages will provide overviews of each of the risk areas (i.e., high, elevated, and normal).

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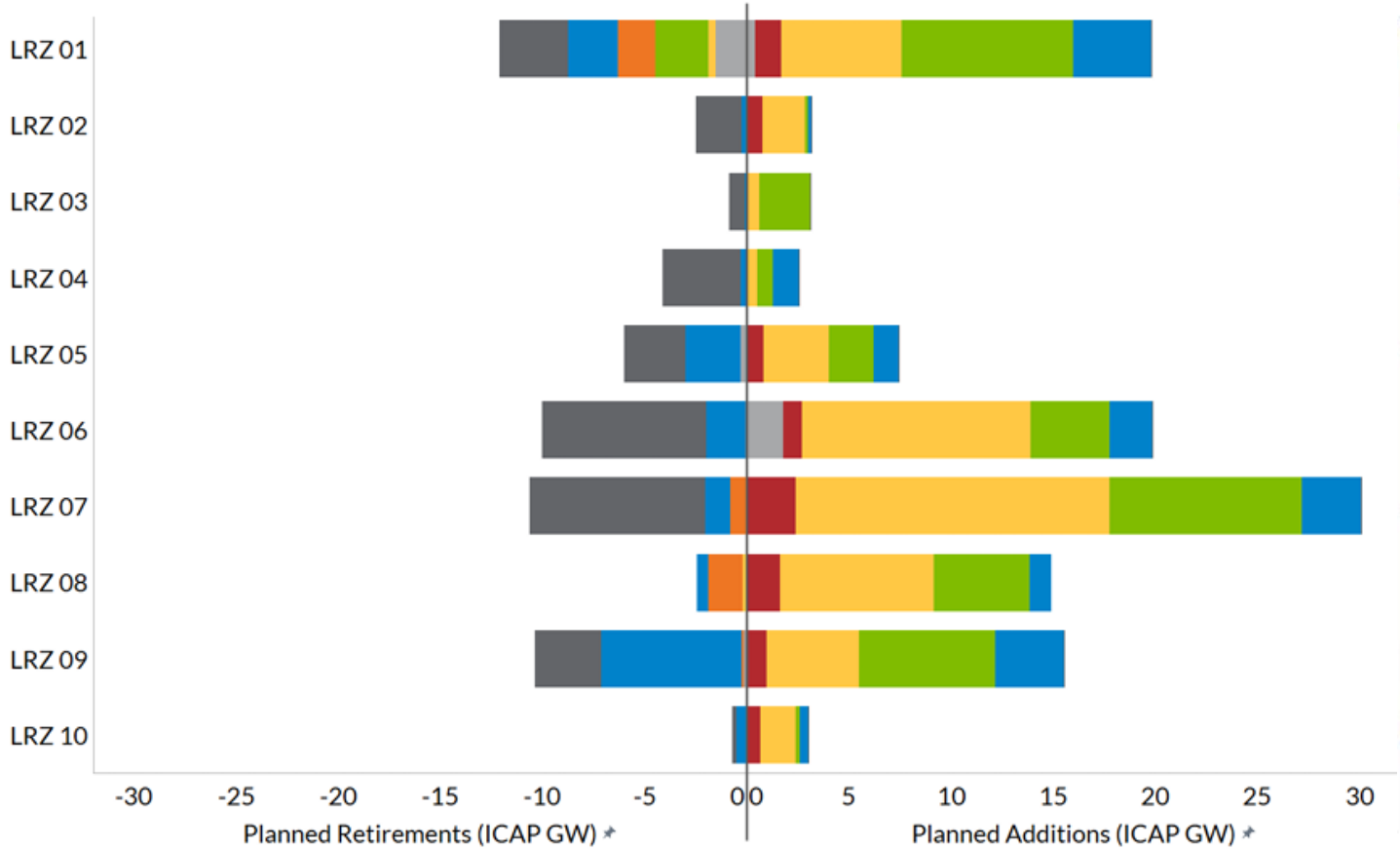
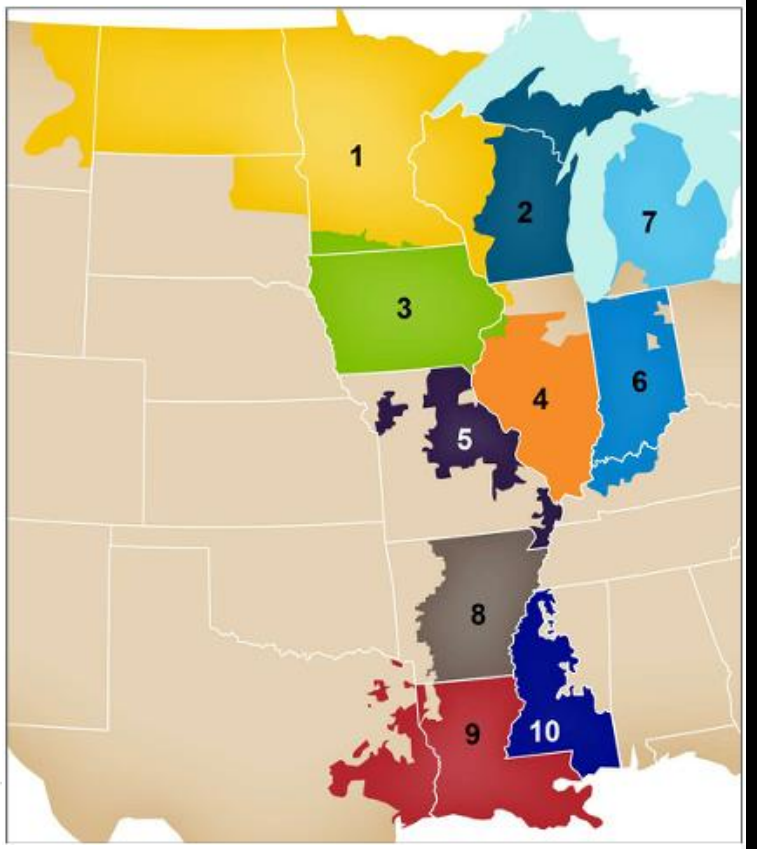
KEY INSIGHT 1: Major trends from MISO members' publicly announced plans remain unchanged compared to past RRAs, with wind and solar driving planned additions and coal comprising the bulk of planned retirements

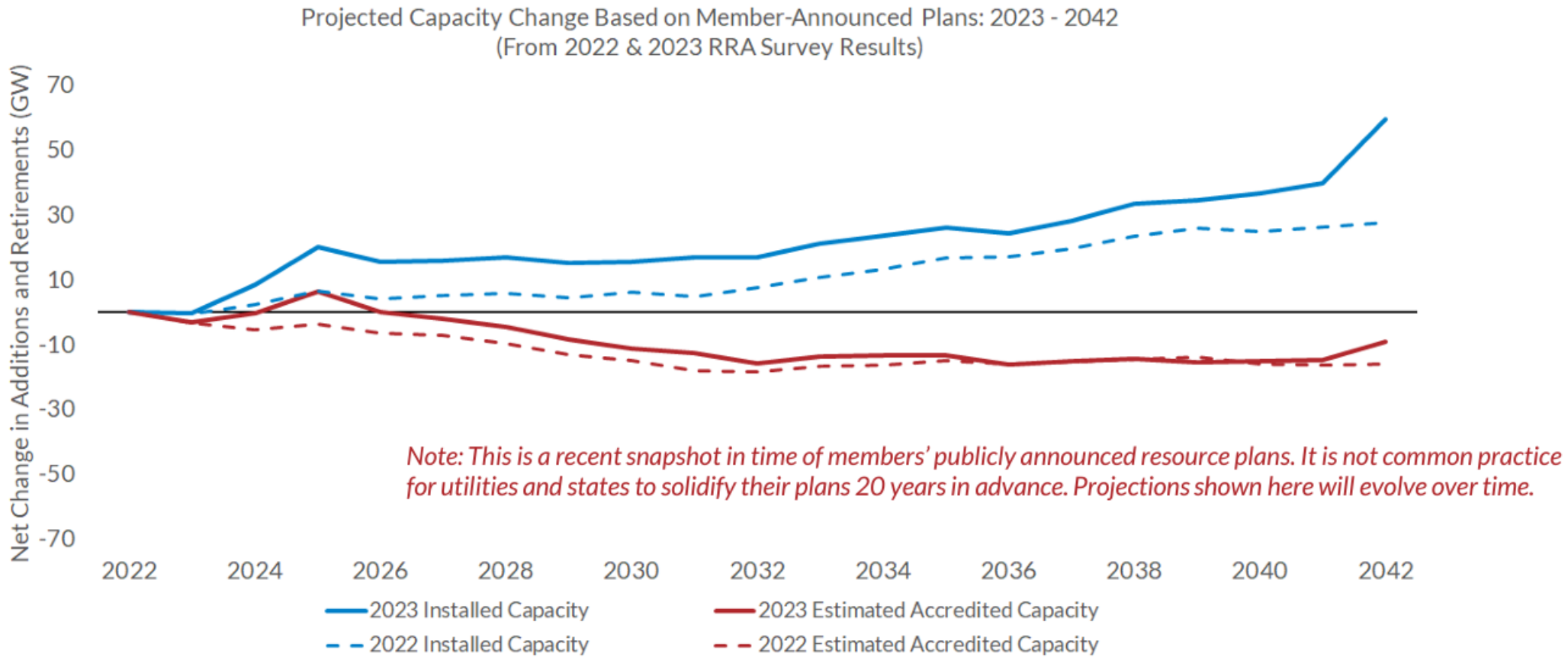
2023 RRA Survey Results Showing Planned Additions and Retirements by Local Resource Zone (LRZ): 2023 - 2042





See Slide 35 for a map of MISO's Local Resource Zones (LRZ)

KEY INSIGHT 2: The MISO region shows year-over-year growth and acceleration in planned additions which coincides with delays to some planned coal and gas retirements, resulting in a slightly improved near-term capacity picture



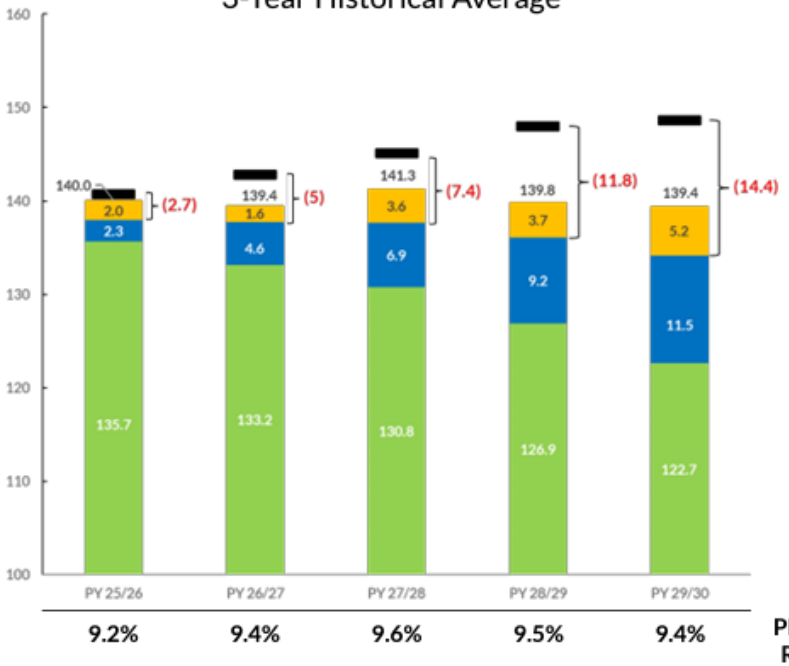
Note: This is a recent snapshot in time of members' publicly announced resource plans. It is not common practice for utilities and states to solidify their plans 20 years in advance. Projections shown here will evolve over time.

This chart depicts summer capacity accreditation estimates. See Slide 24 for yearly accreditation assumptions by fuel type and season.

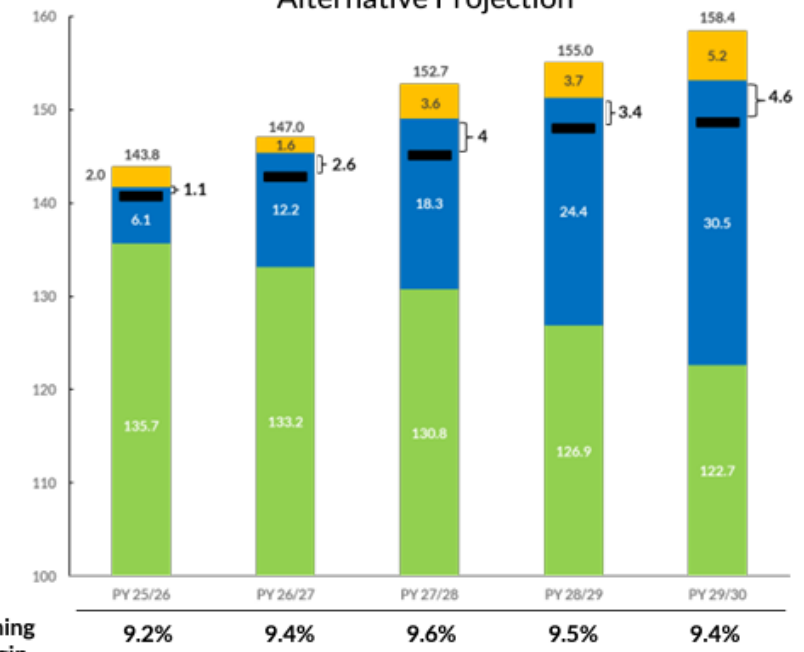
The 2024 OMS-MISO Survey illustrates a strong sensitivity to the pace of new capacity additions, with PY 2025/26 showing a range from a 2.7 GW deficit to a 1.1 GW surplus and widening thereafter

MISO Resource Adequacy Projection – Summer (GW)

Assuming 2.3 GW/yr of Potential New Capacity added
3-Year Historical Average*



Assuming 6.1 GW/yr of Potential New Capacity added
Alternative Projection*



PRM% - Planning Reserve Margin

Projected PRMR with LSE forecast
Potentially Unavailable Resources
Potential New Capacity
Committed Capacity

- Bracketed values indicate difference between Committed + Projected New Capacity and Projected PRMR with LSE forecast
- Capacity accreditation values and PRM projections based on current practices
- Regional Directional Transfer (RDT) limit of 1900 MW is reflected in this chart

Note: Y-axis truncated in all capacity projection charts to accentuate capacity sufficiency/deficiency.
PRMR: Planning Reserve Margin Requirement
**Using methods for potential New Capacity described on Slide 6*

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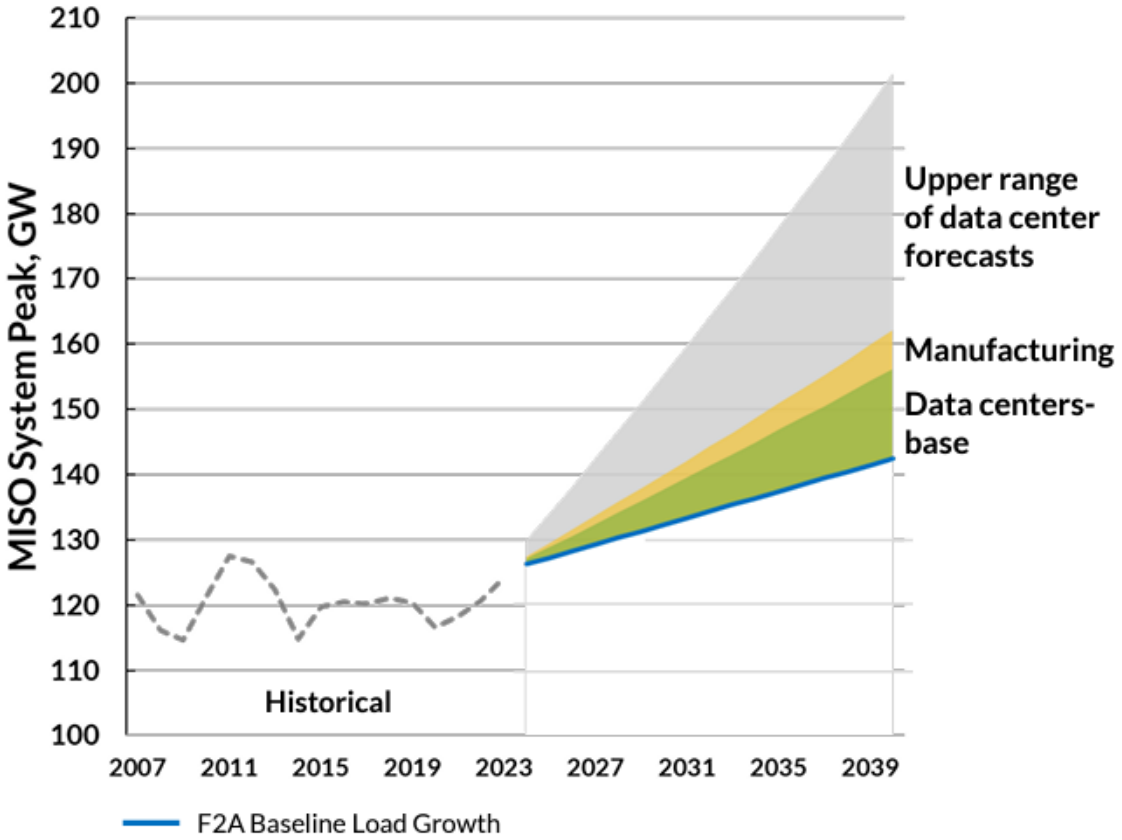
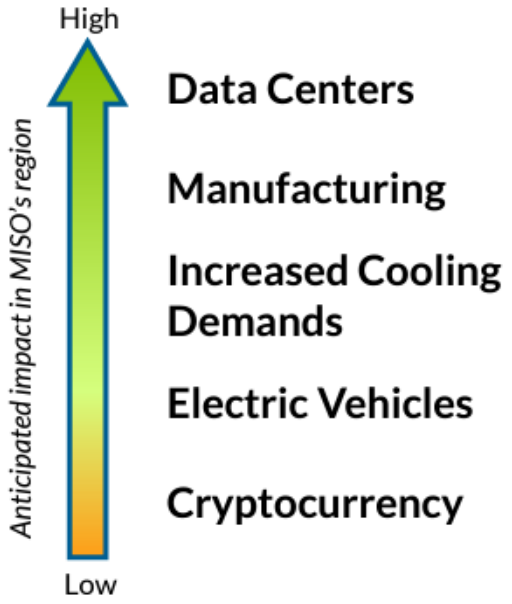
MISO's future long-term load forecasts will account for emerging digital demands, industrial expansion and climate changes

EPRI and Grid Strategies[1] anticipate manufacturing growth to favor MISO's service area



***Note:** All figures shown are PRELIMINARY*

- Grid planners nearly *doubled* their 5-year peak load growth forecasts since last year
- MISO anticipates strong *long-term* load growth driven primarily by:



See appendix slide 31 with load forecast updates of other grid operators, potential new data centers in MISO and other commentary

1: https://www.epri.com/research/products/000000003002027930; https://gridstrategiesllc.com/wp-content/uploads/2023/12/National-Load-Growth-Report-2023.pdf

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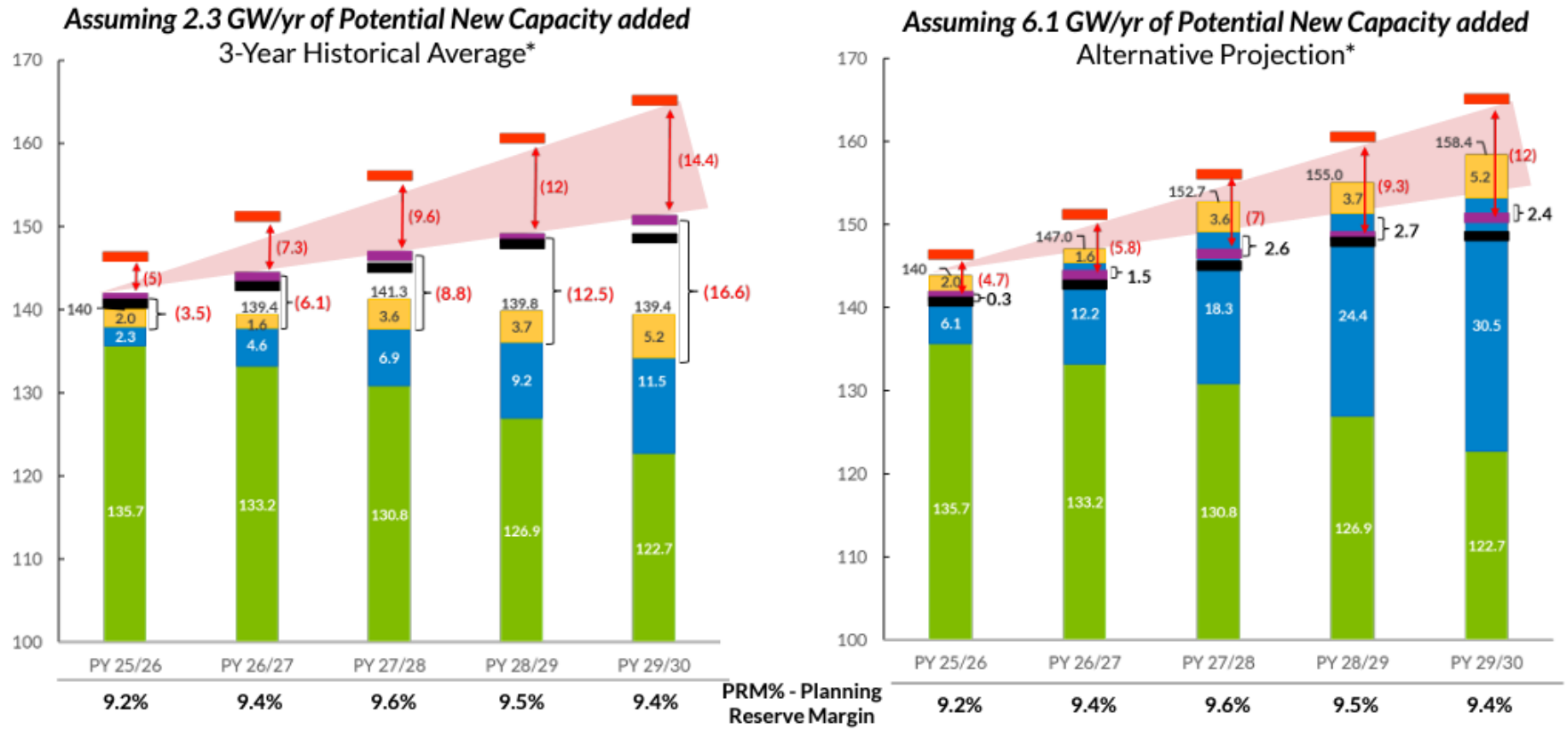
Capacity deficits continue to grow in the near and long term under a large spot-load additions scenario

MISO Resource Adequacy Projection – Summer (GW)



- Bracketed values indicate difference between Committed + Projected New Capacity and Projected PRMR with large spot-load additions
- Red arrow values indicate the additional potential deficit with high-range large load growth case
- Capacity accreditation values and PRM projections based on current practices
- Regional Directional Transfer (RDT) limit of 1900 MW is reflected in this chart

Note: Y-axis truncated in all capacity projection charts to accentuate capacity sufficiency/deficiency.
PRMR: Planning Reserve Margin Requirement
**Using Potential New Capacity as described on slide 6*

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OMS MISO

Assessing the Reliability Impact of EPA's Carbon Dioxide Regulations

- **EPA did not conduct a reliability assessment of its proposals, so we conducted one for NDTA.**
- Every analysis we do compares the assumed future generation to the historical hourly electricity demand and hourly capacity factors for wind and solar in 2019, 2020, 2021, and 2022 to assess whether the installed resources would be able to keep the lights on for all hours of the year.
- Hourly demand and wind and solar capacity factors were adjusted upward to meet EPA's peak load, annual generation, and capacity factor assumptions.
  - This assumption is generous to EPA because it increases the annual output of wind and solar generators to levels that are not generally observed in MISO or SPP.
  - Additionally, other policies pursued by the EPA may increase peak load even further, but this additional load was not studied in this analysis.
- Will EPA's modeled grid be able to meet demand based on these observed, real-life model inputs?

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EPA's Carbon Rules Cause Blackouts in MISO