WECC

State of Resource Adequacy in the West

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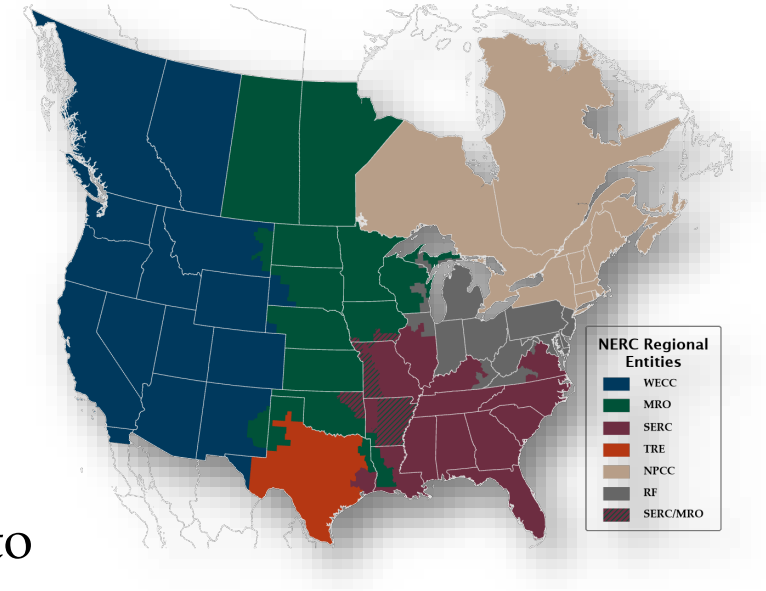
Responsibility for Reliability

§215 Federal Power Act—
FERC certifies an Electric
Reliability Organization (ERO)

NERC
NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

The ERO may
delegate authority to
Regional Entities



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The Regional Entity
carries out delegated
responsibilities

WECC's Reliability Risk Priorities

Western Assessment of Resource Adequacy

- High-level assessment that identifies and characterizes resource adequacy risks
- Assessment footprint
  - Western Interconnection
  - Five subregions
- 10-year, hourly analysis (2023-2032)
- Probabilistic approach
- Energy-based approach
  - Account for variability
  - Complement capacity-based approaches
- Data comes from WECC Balancing Authorities
  - Includes expected demand and resource information

Resource Adequacy Overview

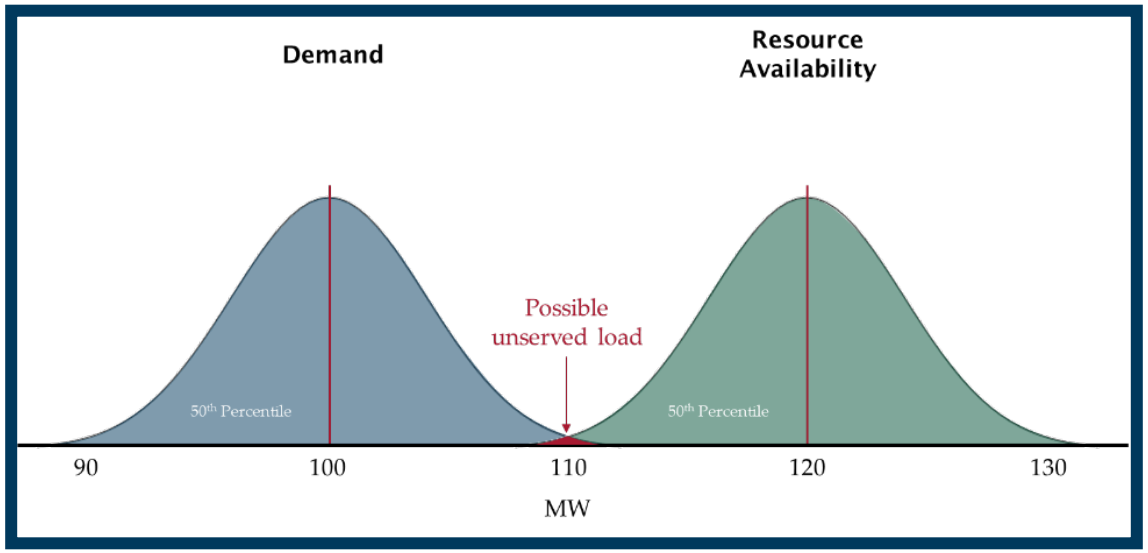
- While there has been some improvement in near-term (2–3 years) resource adequacy risk, it has not been eliminated
  - Actions like retirement delays and expedited building of resources
  - Reduced load forecasts in Pacific Northwest and northern Rocky Mountains
- Likelihood and magnitude of resource adequacy risk has increased compared to previous analyses
- Long-term, the risk increases over the next 10 years
- Variability drives resource adequacy risk, and variability increases over the next decade
  - The Northwest is an exception

Demand at Risk

Demand-at-Risk Hours

Demand-at-risk hours are hours in which there is a chance for load loss, NOT hours where load loss is expected.

Start with reliability threshold—ODITY

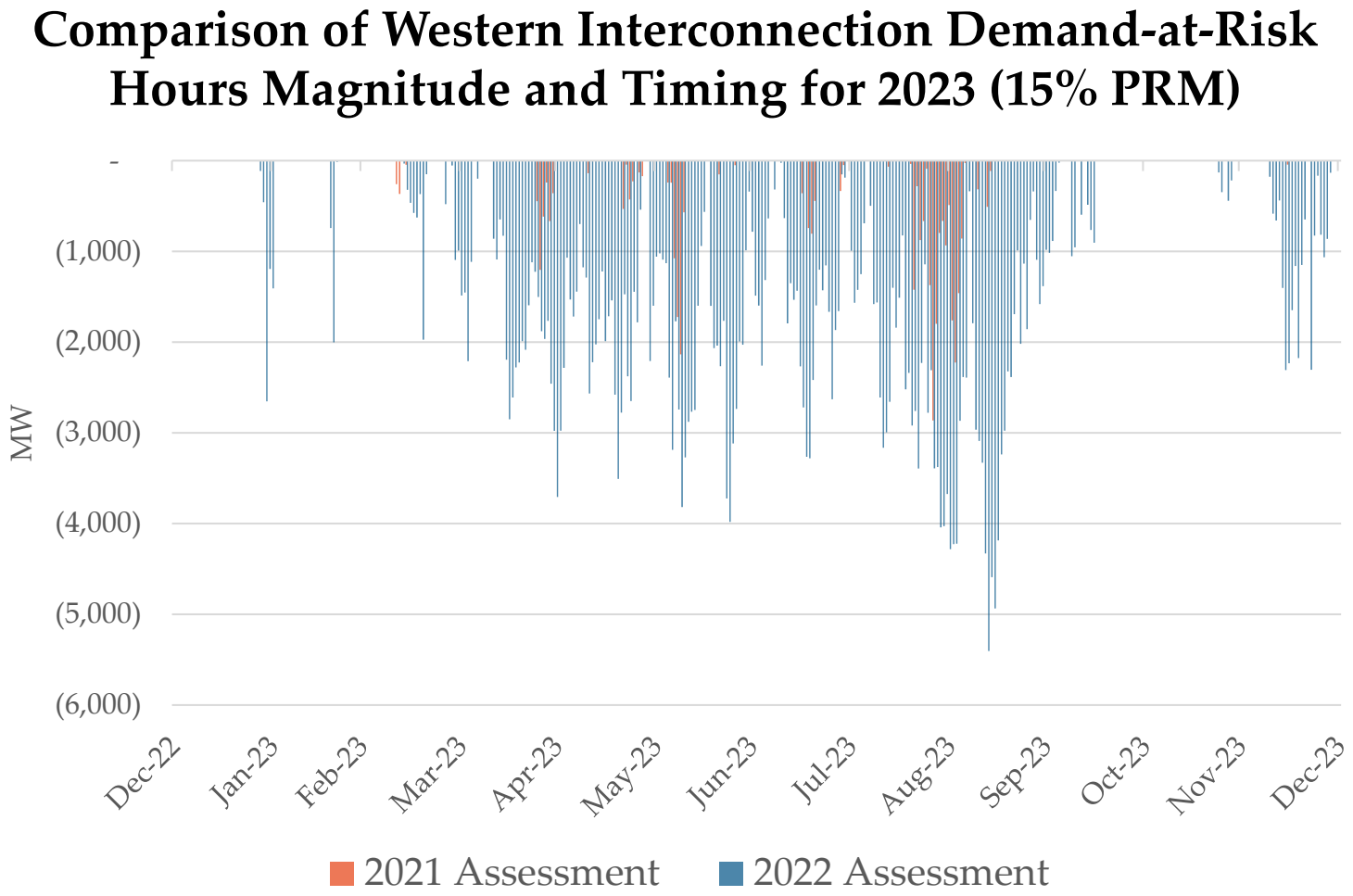


Count the number of hours in which the overlap is too big

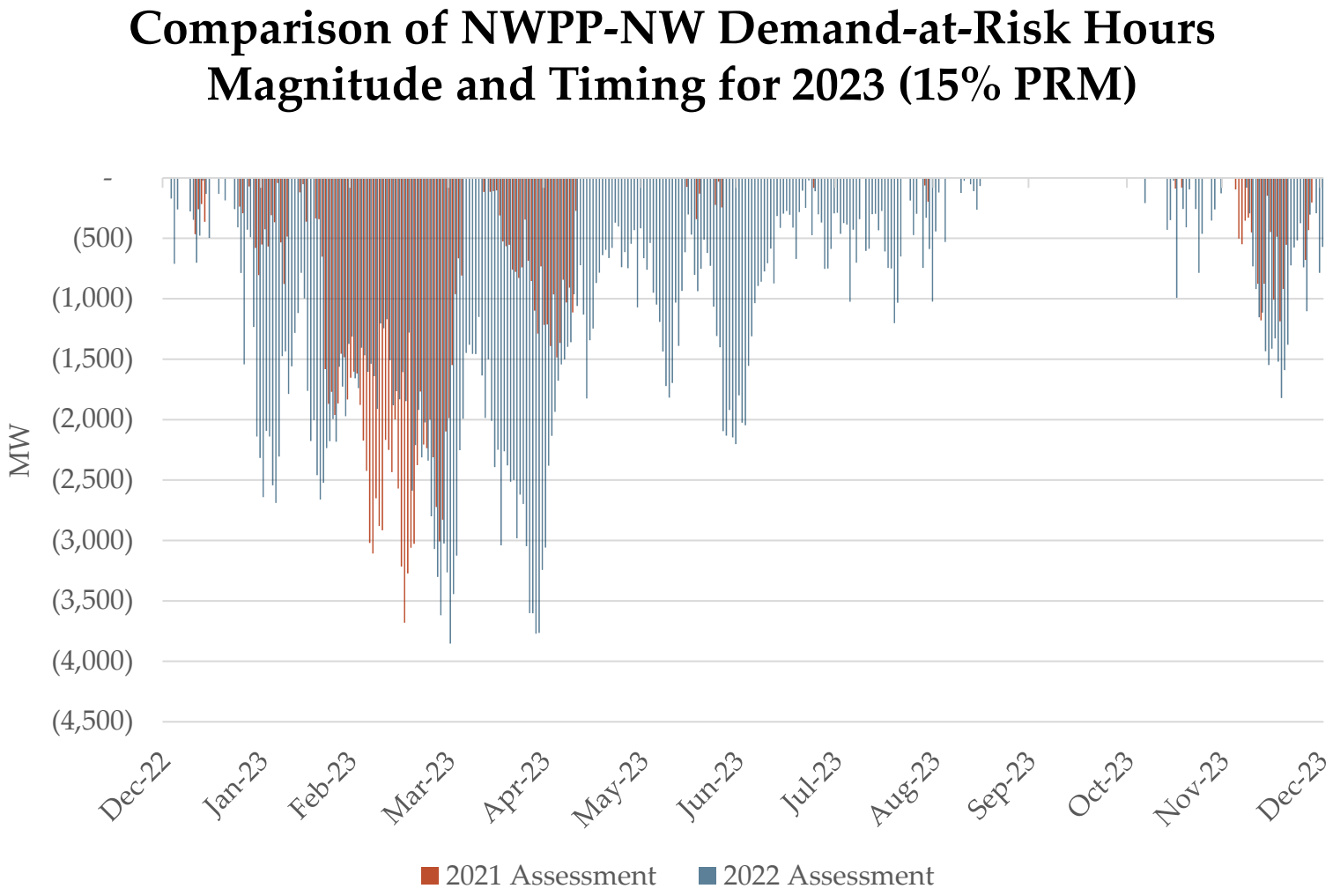
Any hour in which the overlap is too big is counted as a demand-at-risk hour

Demand-at-Risk Hour Magnitude and Frequency

- Risk is growing in frequency and magnitude compared to the 2021 assessment
  - Demand-at-risk hours span more of the year
  - More megawatts at risk



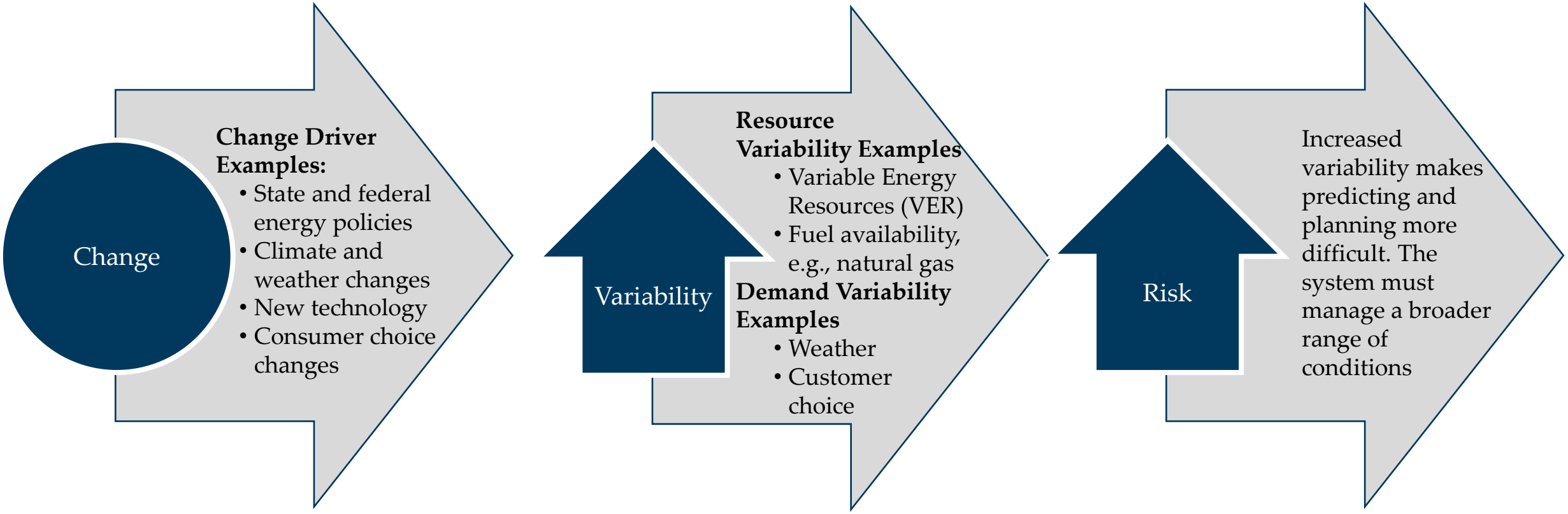
Risk Magnitude and Frequency Takeaway



Demand and Resource Variability

The Changing System

Change is creating more variability; increased variability leads to increased risk



Planning Reserve Margin Indicator

- There is no Western Interconnection planning reserve margin
- WECC does not prescribe planning reserve margins
- WECC uses the PRMI to measure variability
  - As variability increases, planning reserve margins increase
  - Planning reserve margins can be a proxy for variability
  - Track changes in PRMI over time to see how risk changes

Planning Reserve Margin Indicator

Resource Planning Entities

Planning entities use a planning reserve margin as an input to their resource planning processes

Plan to add resources to cover load plus the planning reserve margin

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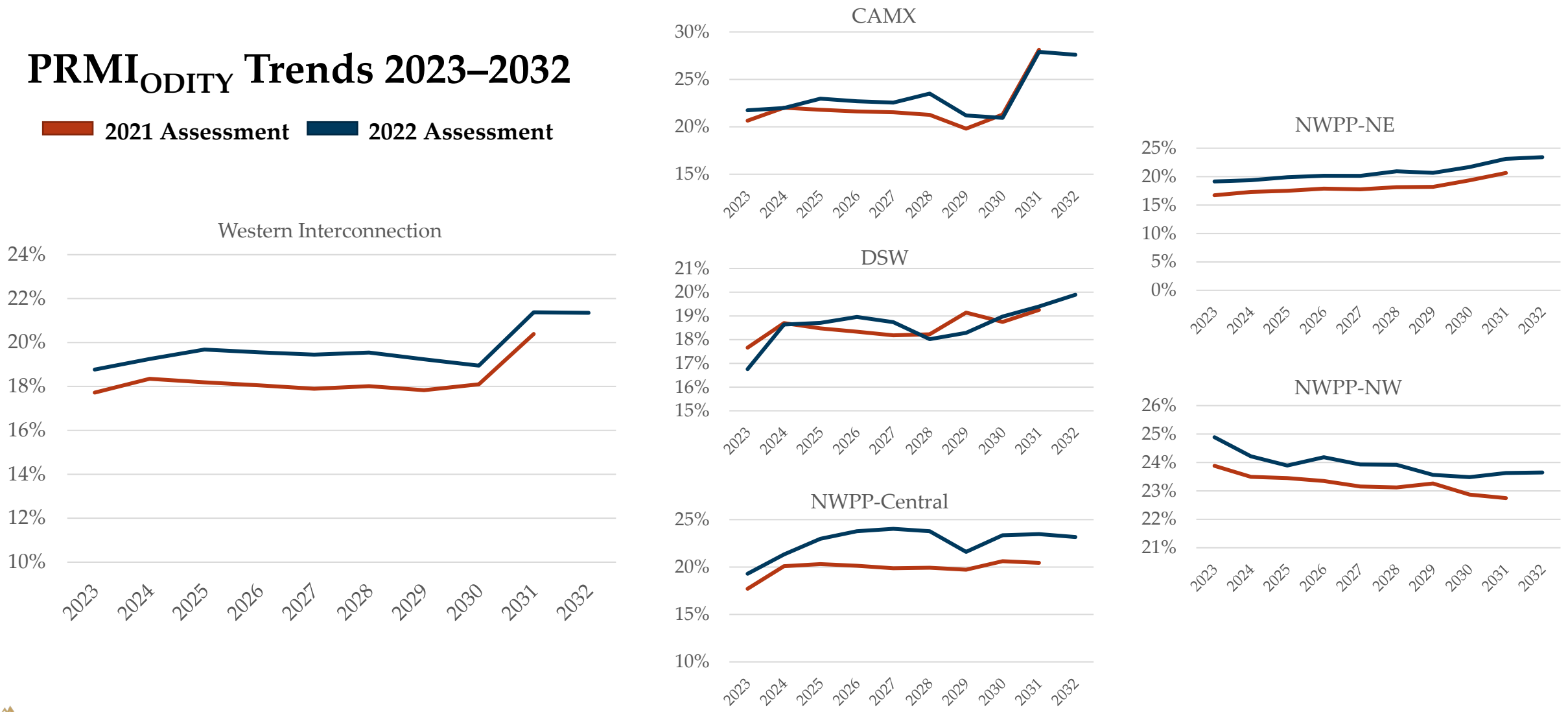
Input assumptions about load and resources

Apply ODITY

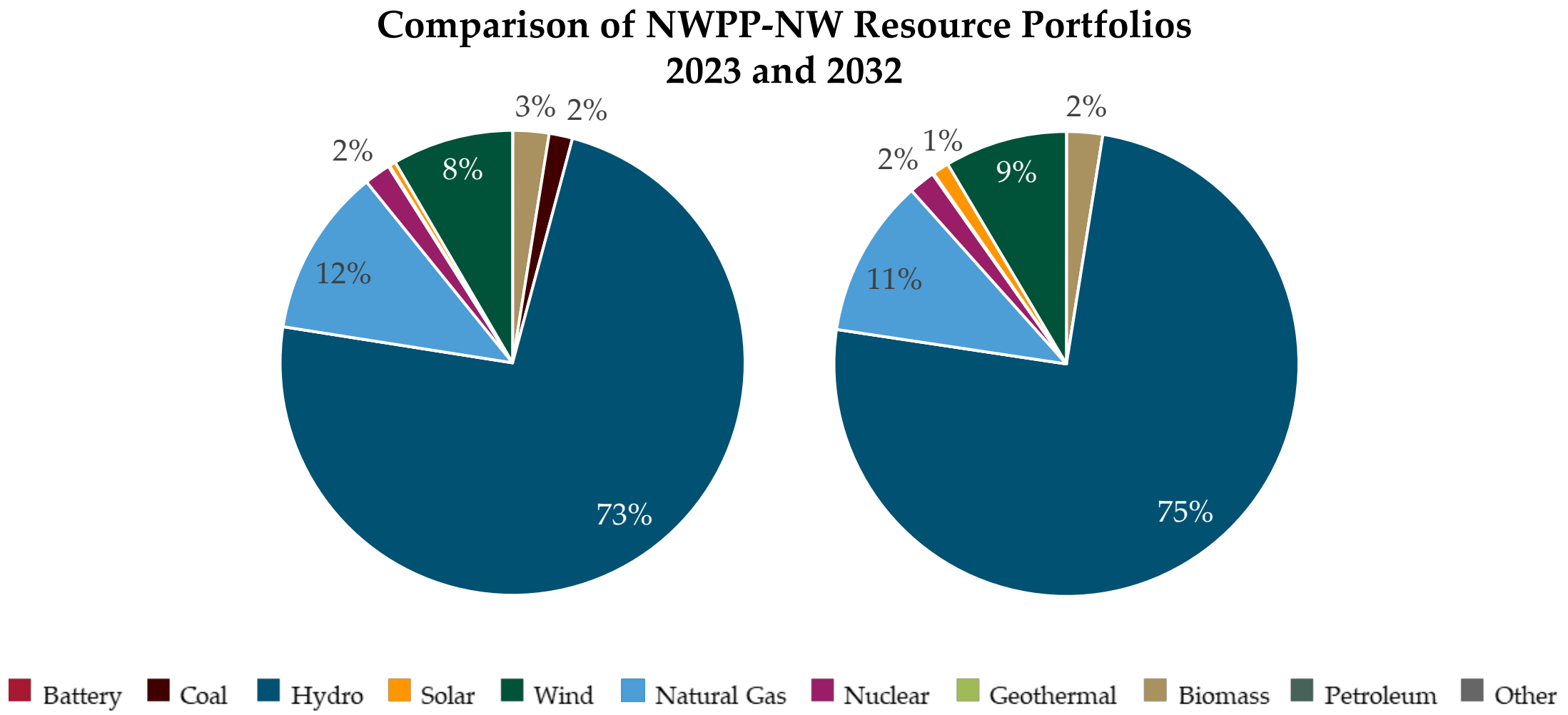
Calculate the PRM necessary to manage the variability demand and resource information from BAs

PRMI
ODITY

Variability Results

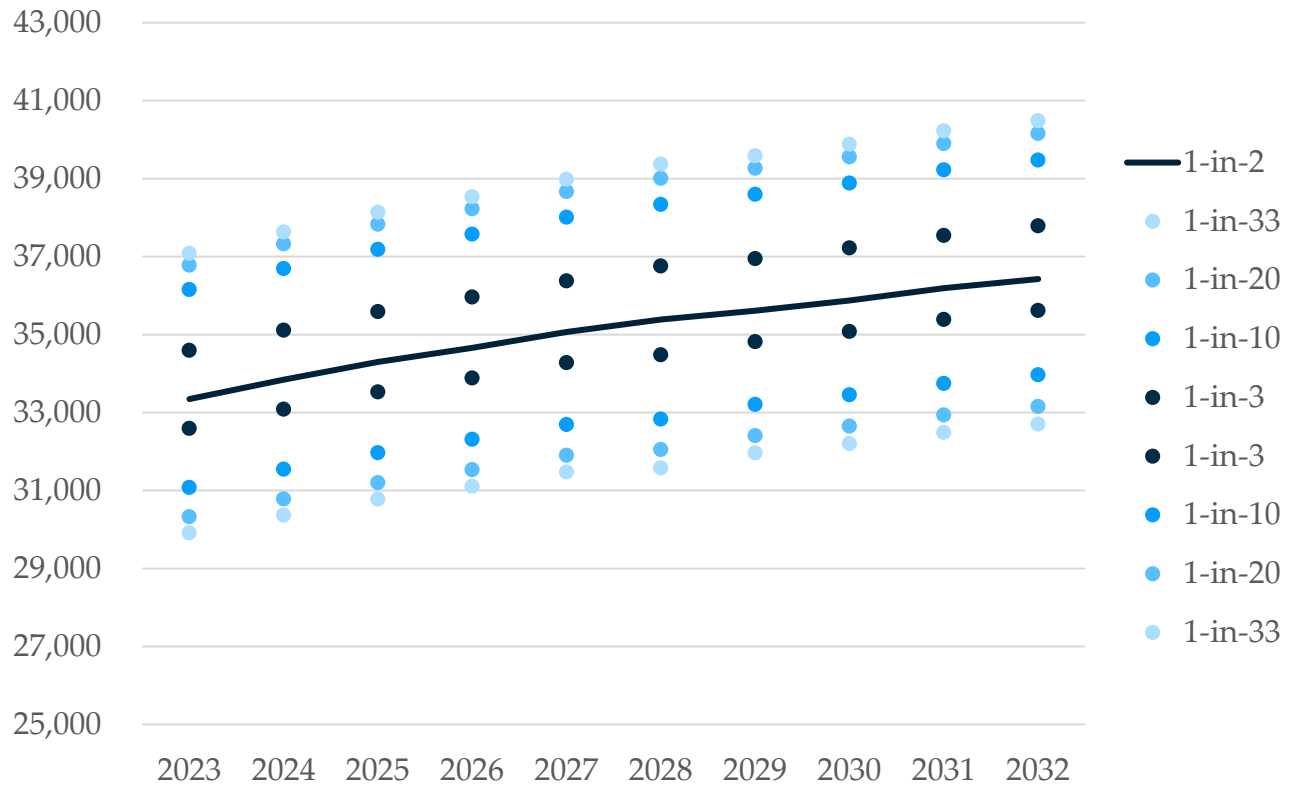


NWPP-NW Resource Mix



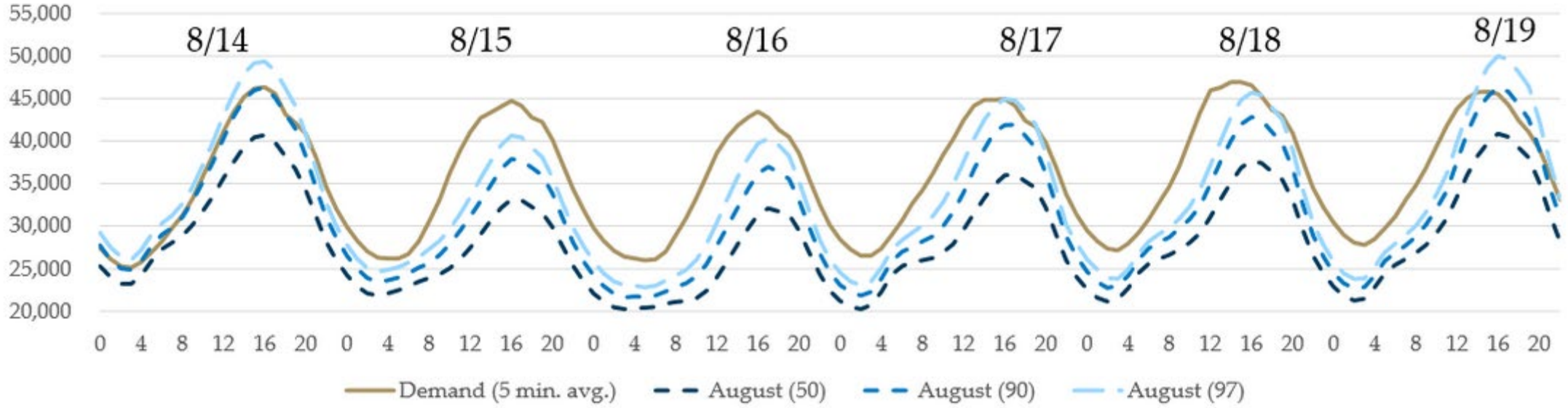
NWPP-NW Resource Mix

NWPP-NW Peak Demand Variability 2023-2032 (MW)



NWPP-NW Resource Mix

Comparison of Actual and Forecast Demand during 2020 Heatwave Event



Additional Takeaways

Additional Takeaway: Resource Growth

- The rate of planned resource growth is comparable to historical resource growth
- Challenges like supply chain disruption, skilled workforce shortages, and siting issues may impede or delay the build-out of new resources
- Even with all planned resources, there are demand-at-risk hours
- Delays in building planned resources could pose serious risks
- Entities and commissions will have to figure out how to plan and recover costs for managing this risk

Additional Takeaway: Transmission

- The reliance on imports increases in many cases over the next decade
  - Indicated by the increase in demand-at-risk hours
- Under certain circumstances, these imports may not be available
  - Resource availability issues
  - Transmission issues

Recommendation

The West should evaluate resource and transmission adequacy in a coordinated fashion through ***comprehensive, wide-area*** *system planning.*

Transmission During Extreme Events

- 2020 Heat Wave Findings
  - Generation availability challenges caused load shed
  - Planned transmission outages limited north-to-south energy transfers
  - Increasing transfer capability led to excessive phase angle differences that could have caused wide-area instability and separation
  - Ultimately, operators reduced north-to-south transfer capability, again limiting the ability to move power from north to south
  - This caused unscheduled flow that led to additional transmission congestion

Summary

Summary of Takeaways

- The frequency and magnitude of demand-at-risk hours has increased over 2021 assessment
- Variability increases over the next decade, except in the NWPP-NW Subregion
  - Load variability is as critical as resource variability
  - The NWPP-NW subregion does not show high resource variability
- Overall, given current plans and trends, resource adequacy risks grow over the next decade
- Obstacles to resource growth my pose bigger risks than they would have in the past
- Transmission can be a limiting factor to resource adequacy during extreme events

Immediate action is necessary to address long-term resource adequacy risks because of long lead times.

Transmission and resource adequacy need to be evaluated together on a wide-area basis.

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Electric Reliability and Security for the West

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