

The electricity industry is undergoing significant change that is unprecedented for its transformational nature and rapid pace. New variable resources and the retirement of conventional generation are fundamentally changing how the grid is planned and operated. Managing reliability risks during the transition is the central challenge.

RISK AREAS

On-Peak Resource Adequacy

Sufficient resources are available throughout most of North America; however, additional attention is warranted in certain areas. Planning reserve margins measure the expected resource capability in future years compared to forecasted peak hour demand.

- MISO:** 1,160 MW reserve shortfall beginning in 2025
- Ontario:** 800 MW reserve shortfall beginning 2022

Energy Adequacy

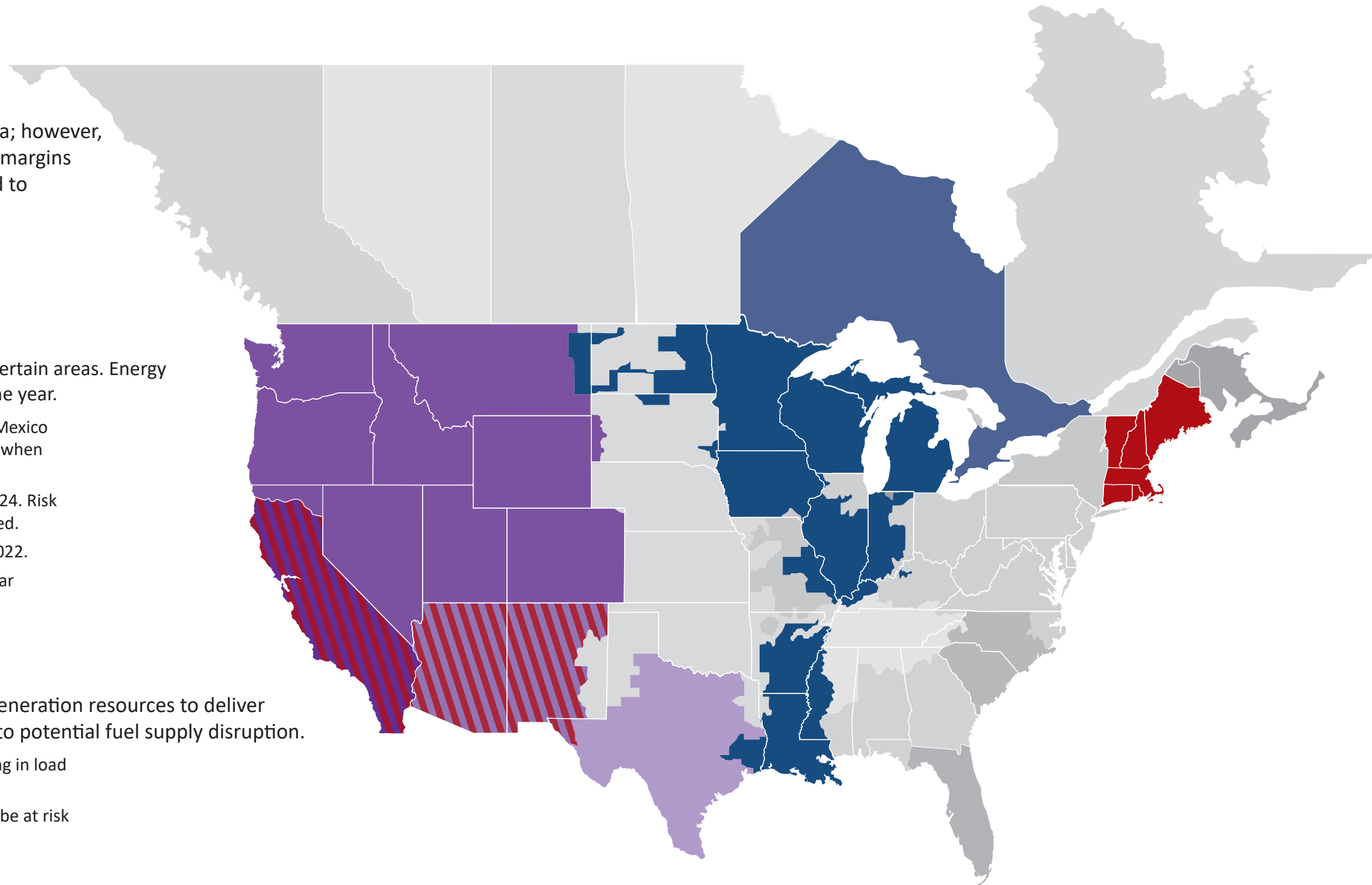
There is increasing risk of resource shortfalls during nonpeak hours in certain areas. Energy adequacy metrics provide insight into energy risks during all hours of the year.

- California/Mexico:** Expected load shed is 22 hours across the California/Mexico assessment area in 2022. Risk is greatest in the hours after peak demand when solar output is diminished.
- Pacific Northwest/Rocky Mountains:** Expected load shed is 4 hours in 2024. Risk is greatest in the hours after peak demand when solar output is diminished.
- Arizona/New Mexico:** Expected load shed risk (<1 hour) is emerging in 2022.
- ERCOT:** Off-Peak operating reserves are reduced as variable wind and solar penetration increases.

Fuel Assurance

Fuel supply and transportation limitations can affect the ability of generation resources to deliver needed electricity. Some areas are at risk of reliability impacts due to potential fuel supply disruption.

- New England:** Extreme winter weather can curtail generator fuel, resulting in load shedding.
- California/Arizona/New Mexico:** Generator natural gas fuel supplies can be at risk from extreme events due to limited storage and supply infrastructure.



2030 SNAPSHOT

- 750% increase in solar capacity (282,626 MW total)
- 120% increase in wind capacity (258,536 MW total)
- 60,000 MW total distributed energy
- 41,800 MW announced conventional retirements
- 15,000 circuit miles of planned new transmission lines