

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

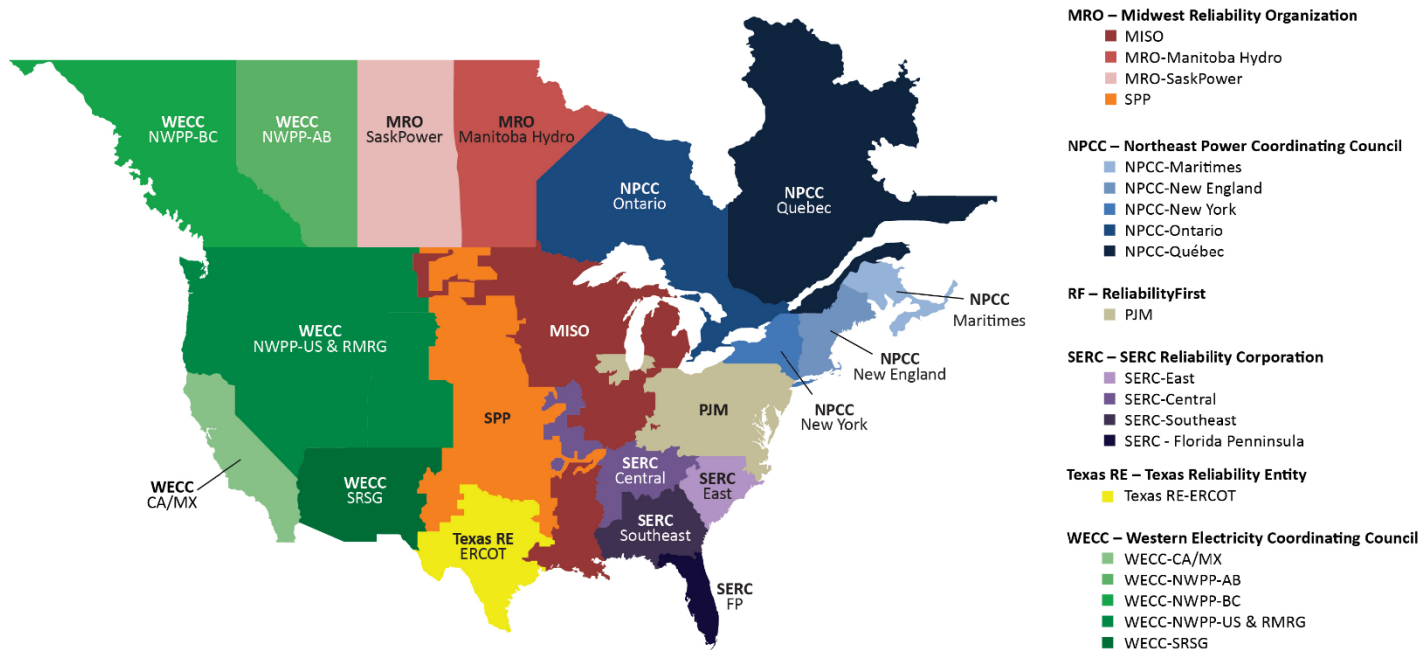
2022 Long-Term Reliability Assessment

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Brief for NARUC Committees
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RELIABILITY | RESILIENCE | SECURITY



- 10-year assessment of resource capacity and energy risks
- Uses industry's demand and generation forecasts and transmission projections
- Coordination and Review with Regions and Stakeholders
- Includes emerging issues which can impact future reliability



California

- New resources and delayed retirements are alleviating near-term capacity shortage
- Energy risks persist from resource and demand variability

MISO

- Generation retirements are projected to outpace new resource additions
- 1,300 MW capacity shortfall next summer grows over the 10-year period

Ontario

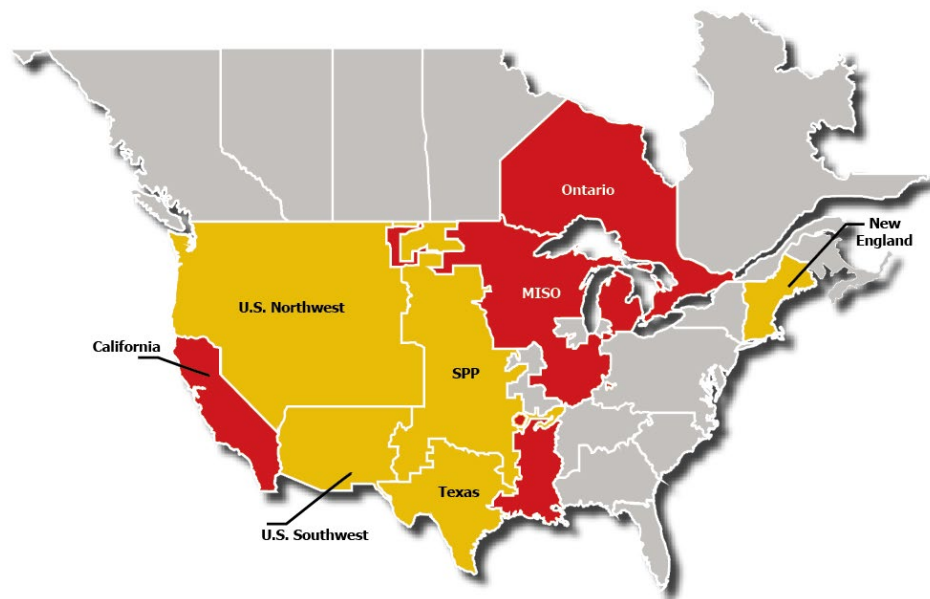
- Planned retirements and nuclear work result in a projected capacity shortfall

U.S. West

- Unserved energy projections are increasing in summer months

New England

- Fuel risk in extended cold weather



- **High Risk** – Shortfalls occurring in normal peak conditions
- **Elevated Risk** – Shortfalls occurring in extreme conditions

ERCOT

- Reliability continues to be at risk in severe winter weather from generator and fuel issues
- Steps taken since 2021 help mitigate impacts

SPP

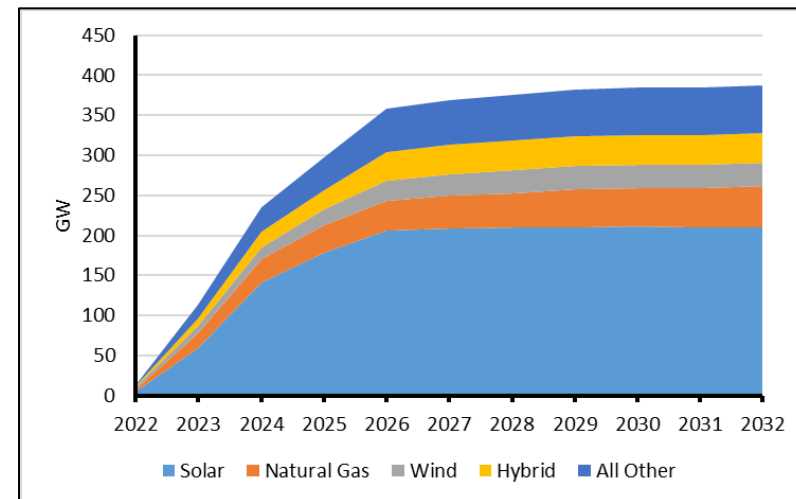
- Energy shortfalls likely during low-wind and high demand periods

- Wind, solar, and hybrid generation leads the continued energy transition as older thermal resources retire
- Implications:
 - Careful attention to the pace of generator retirements is needed to prevent energy risks and loss of essential reliability services
 - Addressing vulnerabilities to natural gas delivery to generators is critical for electric grid reliability
 - Reliably integrating inverter-based resources (IBR) on the grid is paramount

Table 1: 2022 Capacity at Peak Demand

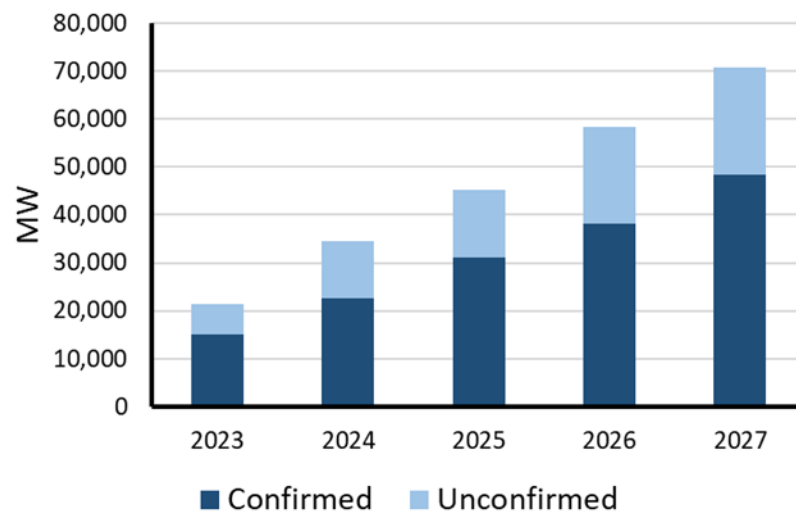
Type	Capacity (GW)	Change since 2021 (GW)
Natural Gas	477	+14
Coal	202	-18
Nuclear	106	-2
Solar and Wind	70	+19
All others	189	+2

Contributions at hour of peak demand. VER (solar, wind, and some hydro) typically count less than installed nameplate capacity.



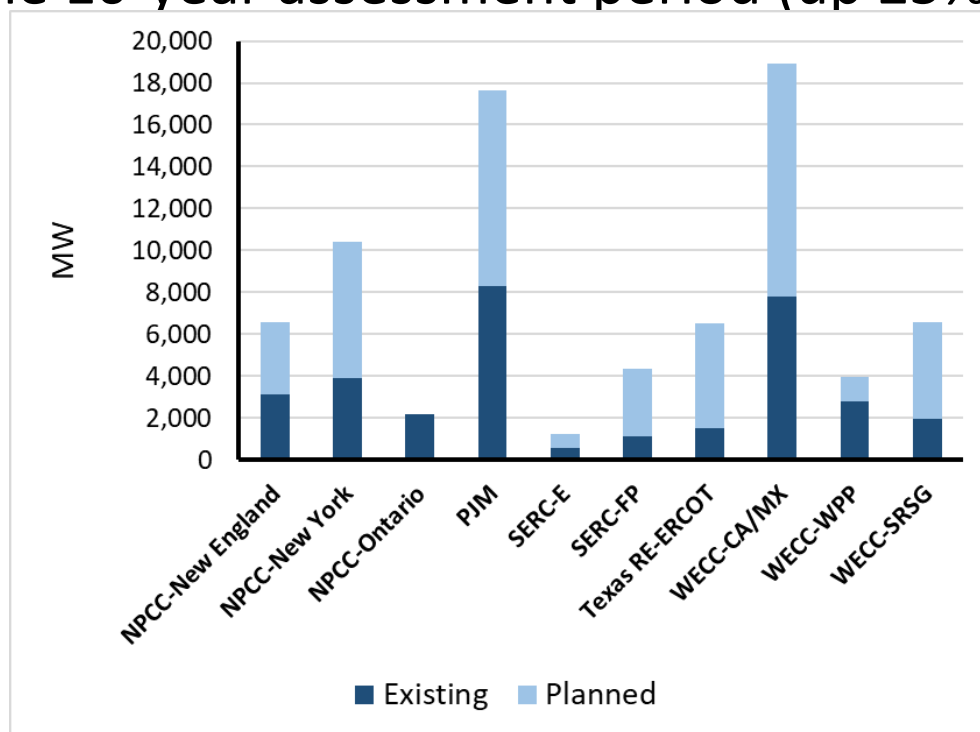
Resource Capacity in Development (Tier 1 and 2)

- Over 88 GW of fossil-fired and nuclear generating capacity is confirmed for retirement during the assessment period
- Additional 22 GW could retire within the next five years and exacerbate capacity and energy shortfalls
- Robust planning processes for managing the pace of generator retirements are needed to prevent energy risks and system reliability issues



Capacity of Retiring Generation through 2027

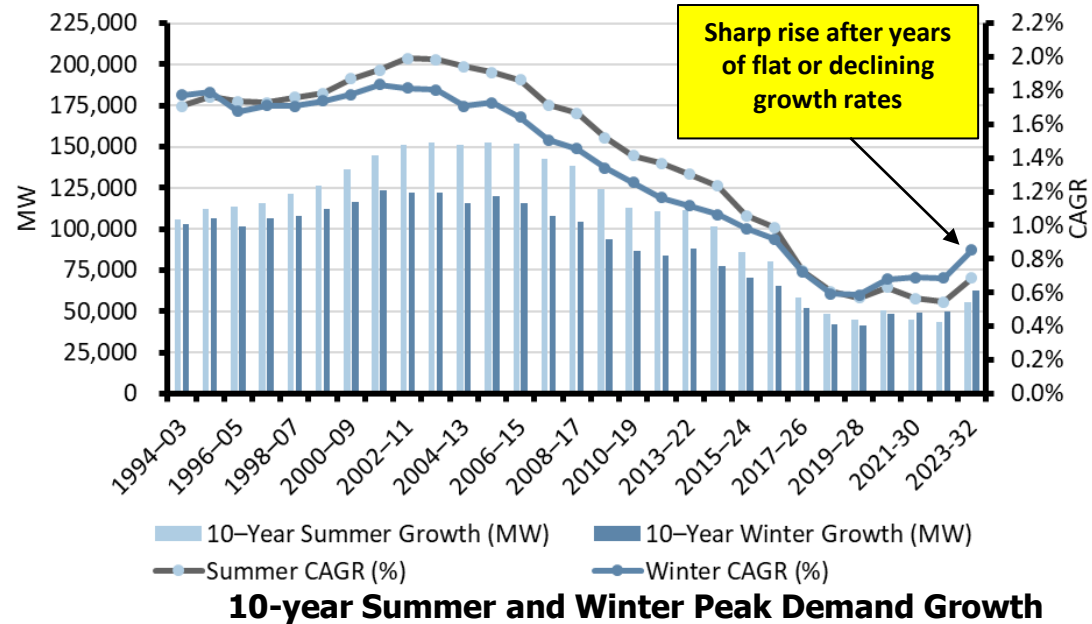
- Preparing the grid to operate with distributed energy resources (DER) is a growing priority
- Cumulative solar PV DER expected to reach over 80,000 MW by the end of the 10-year assessment period (up 25% since 2021)



Solar DER in Assessment Areas by 2032 – Select Areas

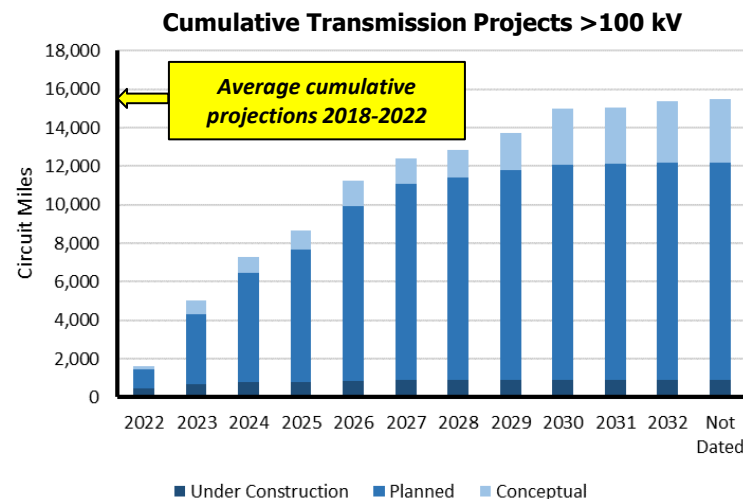
Peak Demand: Growth across the BPS

- 10-year Peak Demand growth showing largest increases in recent years
- **Planning for increases in demand as electrification and EV adoption gain momentum is an area for added focus**
- Dual-peaking or changing from summer to winter peaking anticipated in some parts of the U.S. Southeast and Northeast

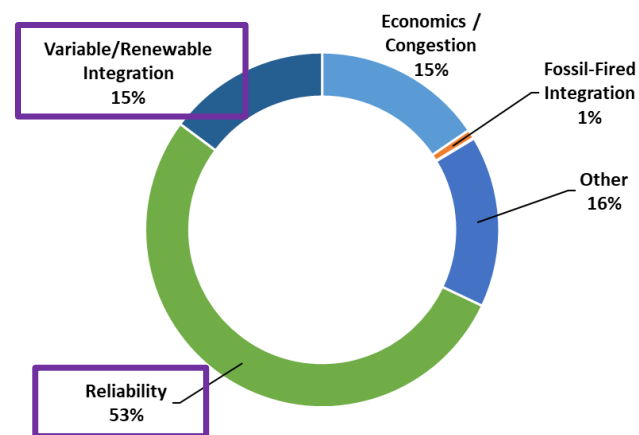


Largest 10-year Winter Peak Demand Growth		Largest 10-year Summer Peak Demand Growth	
Assessment Area	Demand Change	Assessment Area	Demand Change
NPCC-New York	2.36%	WECC-SRSG	1.69%
WECC-SRSG	2.06%	NPCC-Ontario	1.27%
NPCC-New England	1.95%	WECC-CAMX	1.19%
NPCC-Ontario	1.32%	MRO-SaskPower	1.05%
Texas RE-ERCOT	1.30%	NPCC-Maritimes	1.03%

- Little change in transmission miles projections in past five years
 - An indicator of the significant time and challenges needed to build transmission
- Few projects support resource integration, but trend is changing
 - Miles planned or under construction for renewable integration increased from 1,589 miles to 2,376 miles since 2021 LTRA



Transmission Miles in Planning or Construction through 2032			
Area	Miles	Area	Miles
WECC WPP	3,439	SERC SE	629
NPCC New York	1,635	WECC SRSG	581
PJM	983	NPCC Ontario	570
WECC CAMX	902	NPCC New England	506
WECC BC	775	All other areas	<500 mi each



Transmission Project Primary Driver

- Anticipating EV adoption and impacts of energy transition programs on future demand, load shapes, and energy needs is a growing focus for planners and operators
- Cryptocurrency mining is raising policy, market, operational, and planning issues in areas experiencing growth
- Supply chain issues threaten completion timelines for generation and transmission projects in development
- Changes to U.S. communications regulations governing access to the 6 GHz band is raising concerns of harmful interference on circuits used by BPS owners and operators for grid monitoring and control

Objectives of the *LTRA*'s specific recommendations to policymakers and industry:

- Manage the pace of generator retirements to ensure energy and essential reliability services needs are met
- Promote use of extreme weather scenarios in resource planning
- Expand resource adequacy evaluations beyond reserve margins to include energy risks for all hours and seasons
- Mitigate risks from interdependent natural gas infrastructure
- Address performance and integration issues with solar and wind
- Increase focus on operating with more distribution resources
- Consider the impact of electrification on future electricity demand and infrastructure



Questions and Answers