

NERC

NORTH AMERICAN ELECTRIC
RELIABILITY CORPORATION

Assuring a Reliable BPS through the Expansion of Interregional Transfer Capability: NERC ITCS

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Session 8B: Interregional Transmission

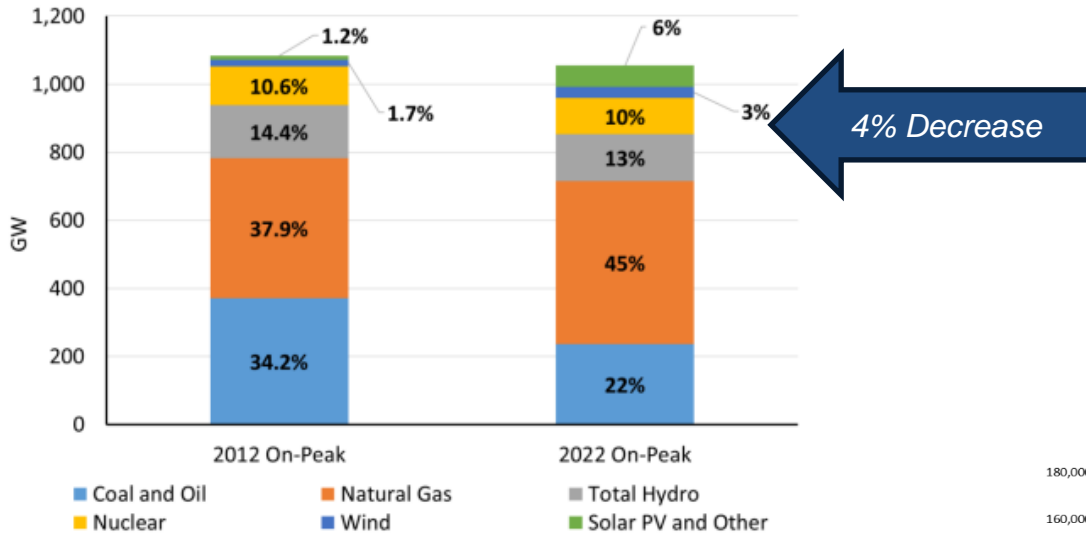
ESIG 2024 Fall Technical Workshop

October 23, 2024

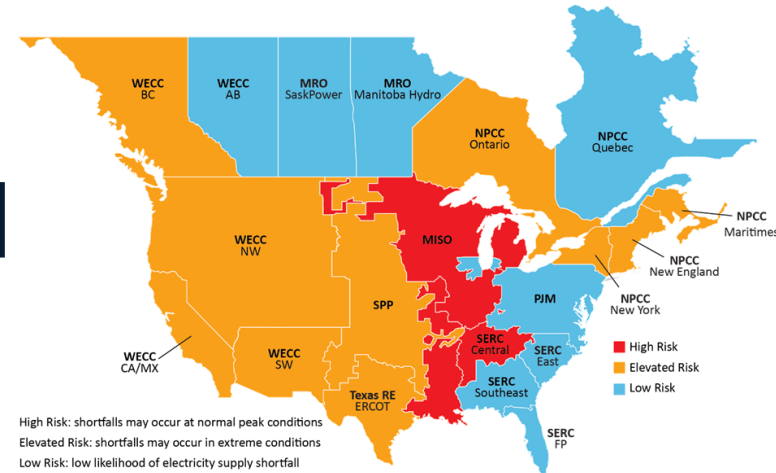
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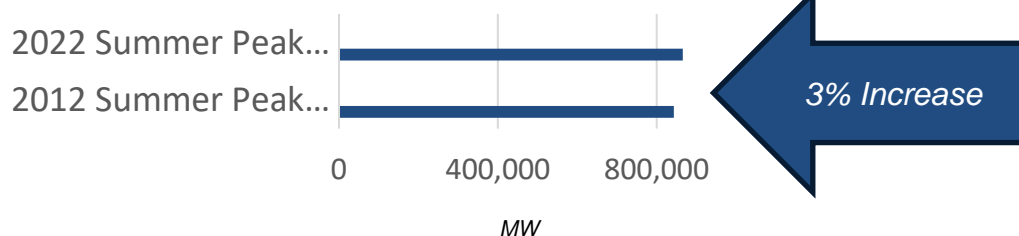
2012 and 2022 Peak Capacity Resource Mix NERC-Wide



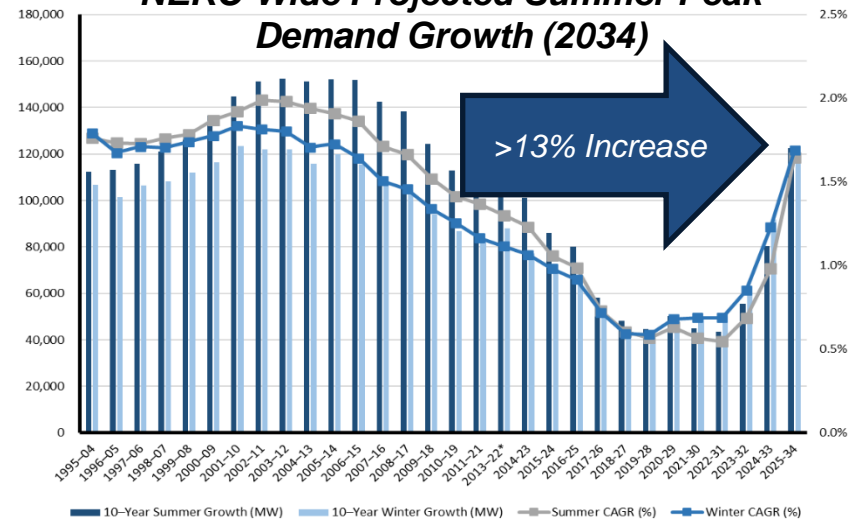
2024-2033 Risk Areas



NERC-Wide Summer Peak Demand Changes 2012 and 2022

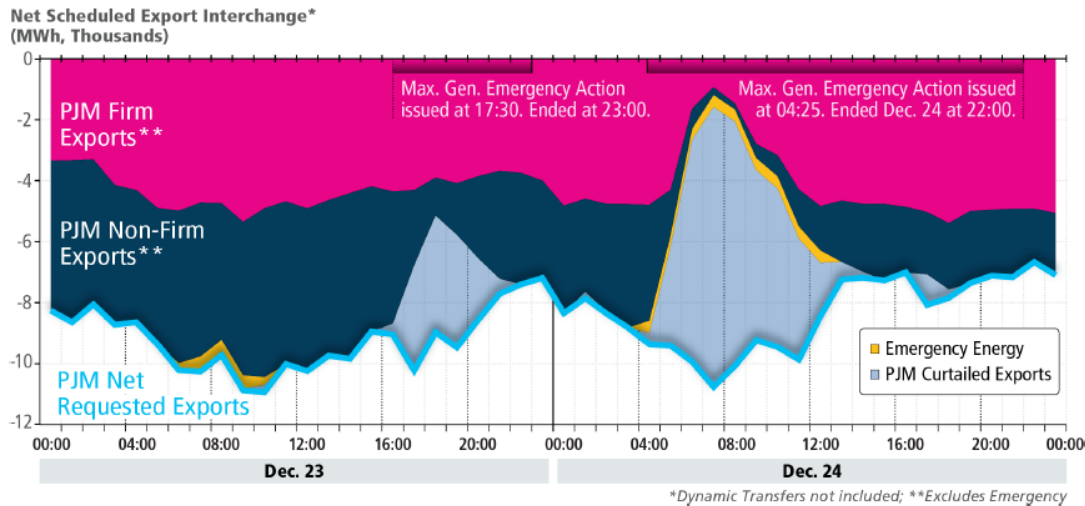
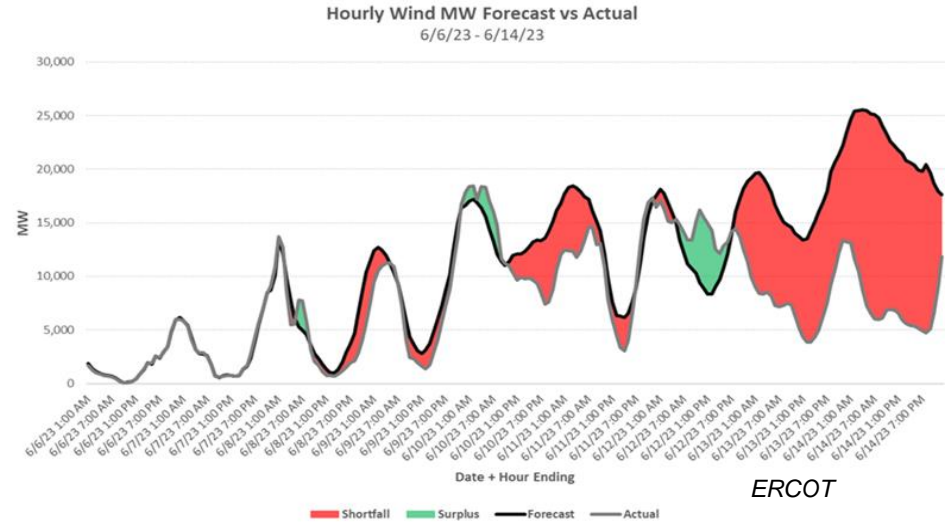


NERC-Wide Projected Summer Peak Demand Growth (2034)



Recent Examples Highlight Need for Wide-Area Energy Assessments

June 6, 2023: ERCOT, SPP, MISO: A “wind drought” caused 60 GW of installed wind capacity to generate 300 MW



December 24, 2022: PJM: Transmission system during extreme cold weather limited the ability to export to support southern neighbors



Fiscal Responsibility Act (FRA), Section 322

In consultation with the Regional Entities and transmitting utilities, NERC shall conduct a study containing three elements:

1. **Current total transfer capability**, between each pair of neighboring transmission planning regions.
2. A recommendation of **prudent additions to total transfer capability** between each pair of neighboring transmission planning regions that would demonstrably strengthen reliability within and among such neighboring transmission planning regions.
3. Recommendations on **how to meet and maintain the identified total transfer capability**, together with the prudent recommended additions in #2.



Varies Widely

- Current transfer capability changes (TTC) as percentage of peak load = 1% to 92% between regions, varying greatly depending on season and online generation dispatch



Transmission May Not Always be a Solution

- New transmission will not always increase transfer capability
- Voltage and dynamic stability limitations will determine how much power can be transferred



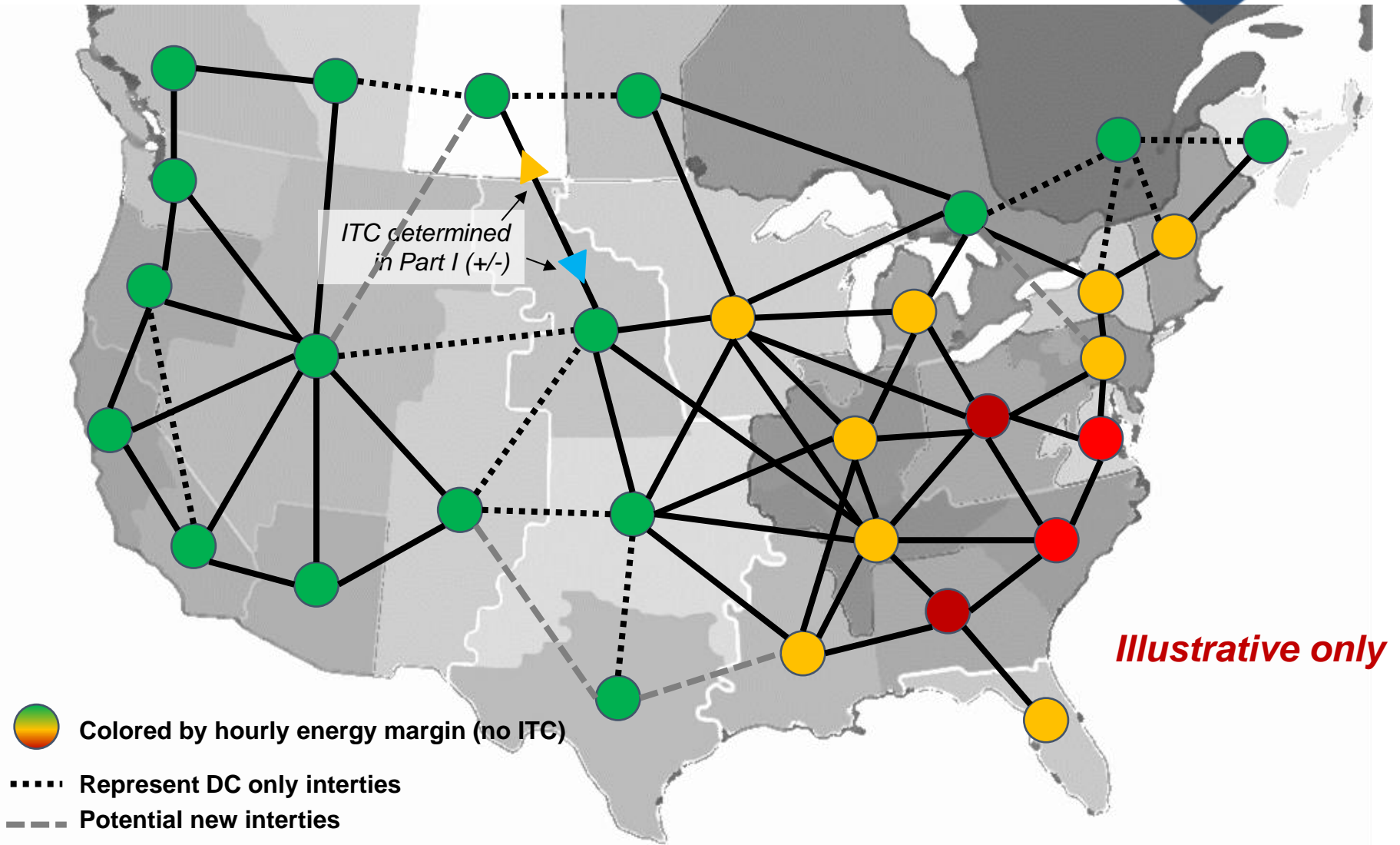
Resource Evaluation Cannot be Overlooked

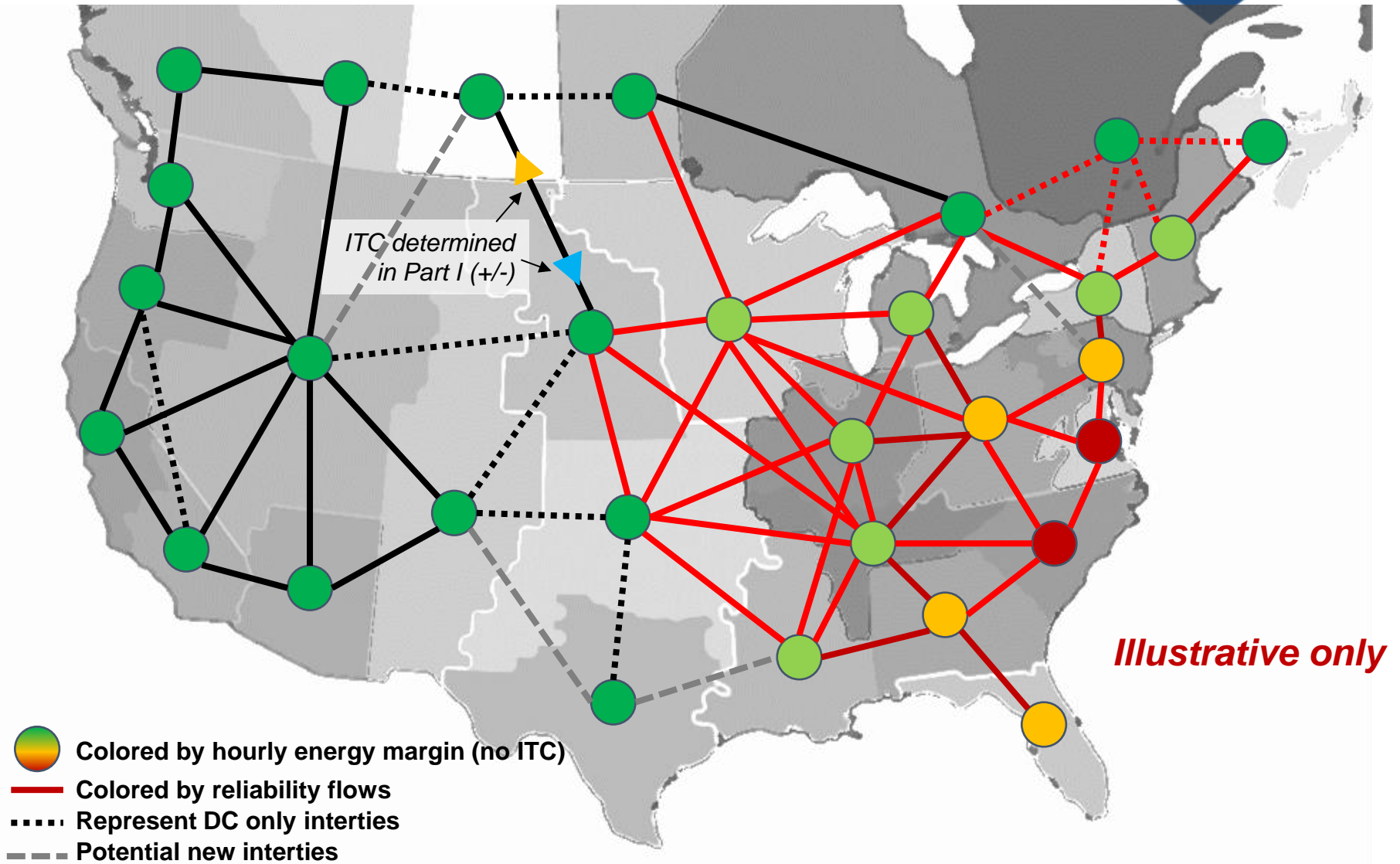
- Many areas do not have sufficient committed generation to meet demand under extreme conditions (2034)
- Canadian system critical to this evaluation



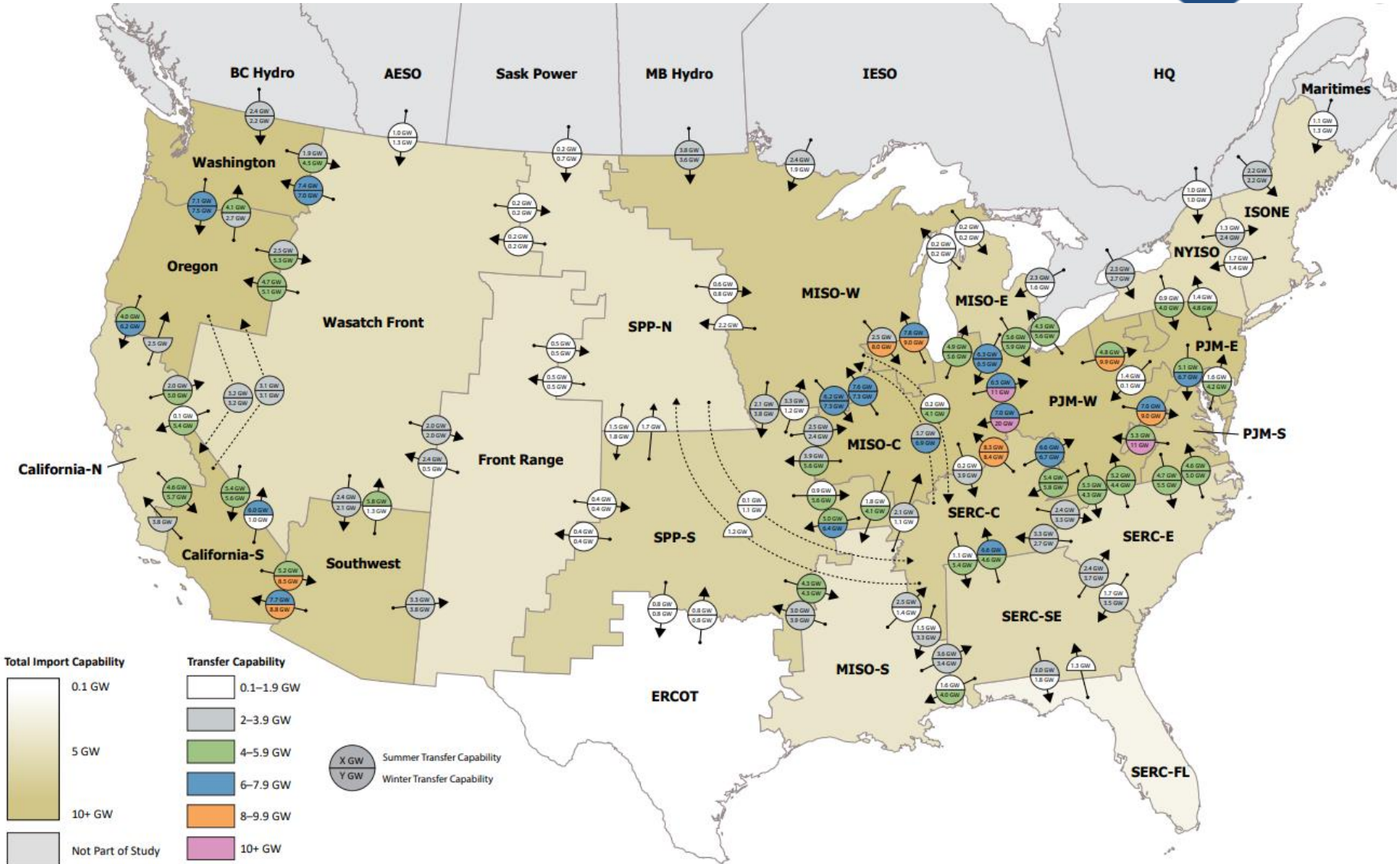
Higher TTCs Will Require Significant Planning and System-Wide Reinforcements

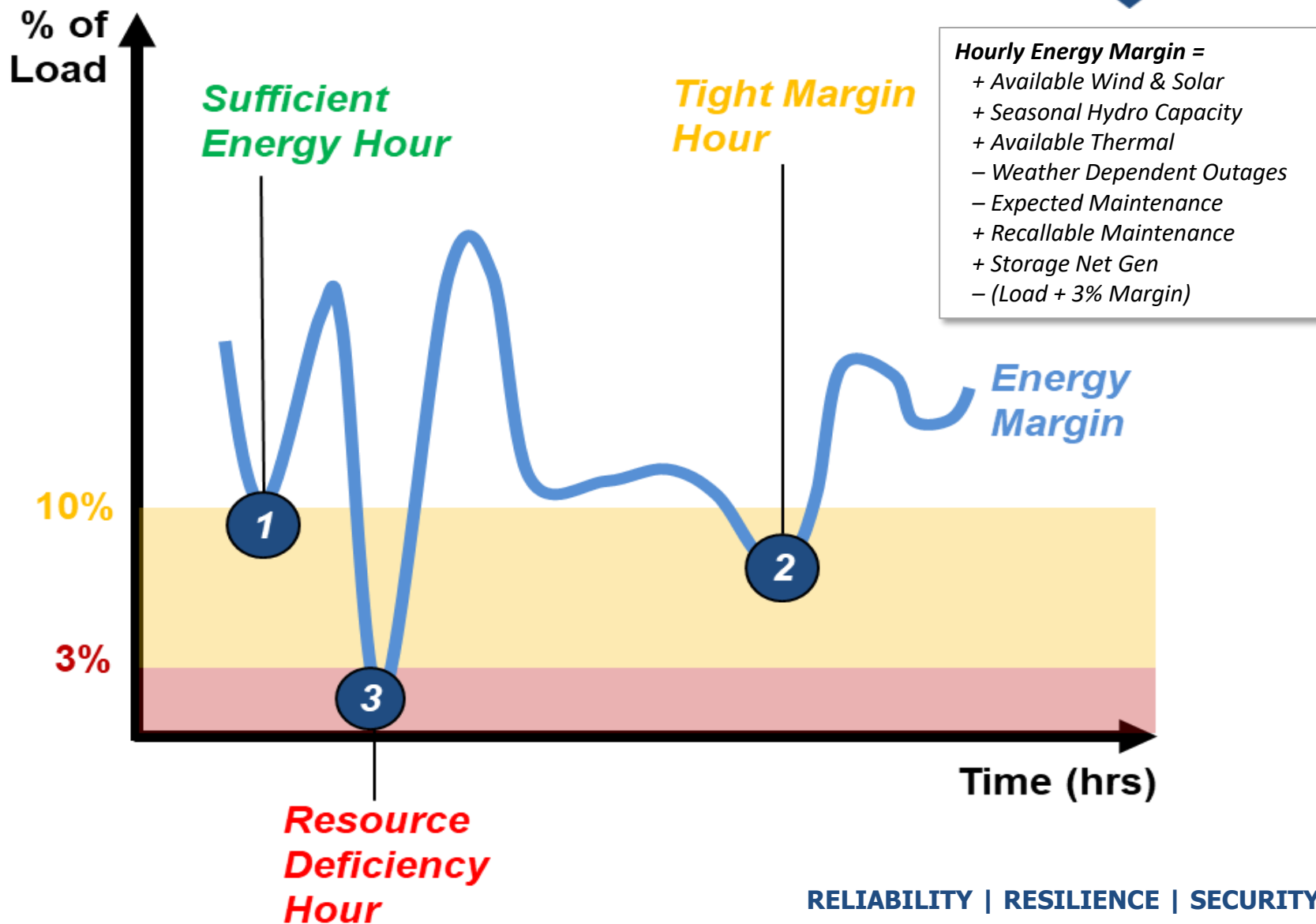
- TTC additions will require more granular stability studies once specific projects are evaluated
- Meaningful TTC additions will not be completed by 2034 without regulatory/legislative changes





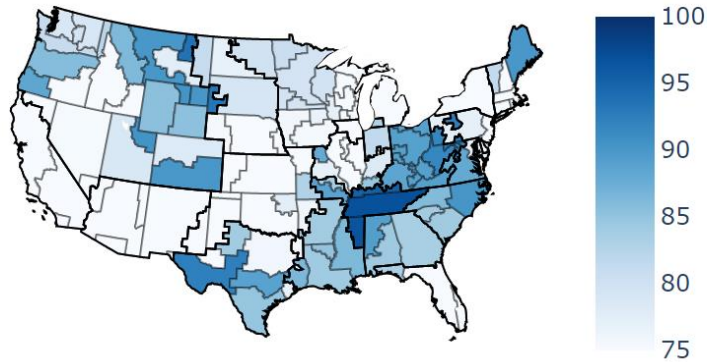
Calculated Transfer Capabilities – 2024/2025 Base Case



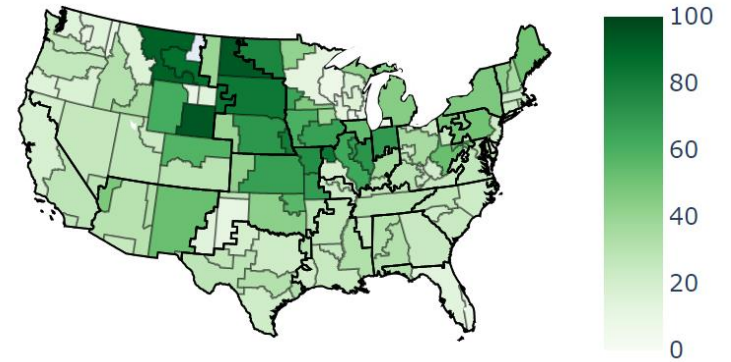


Energy Assessment: Cold Snap Example

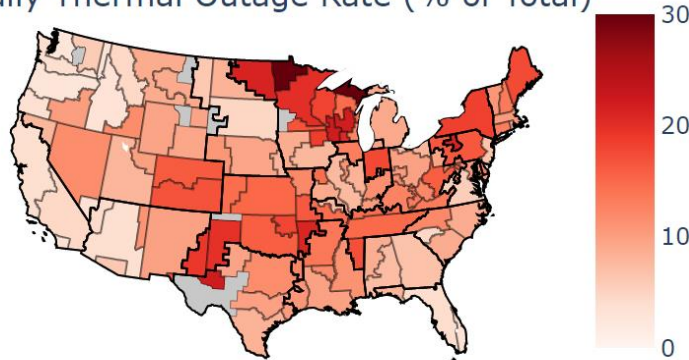
Maximum Daily Load (% of Annual Peak)



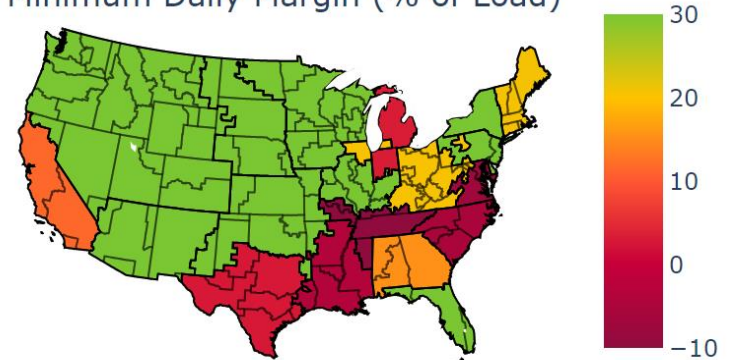
Average Daily Wind & Solar Capacity Factor (%)



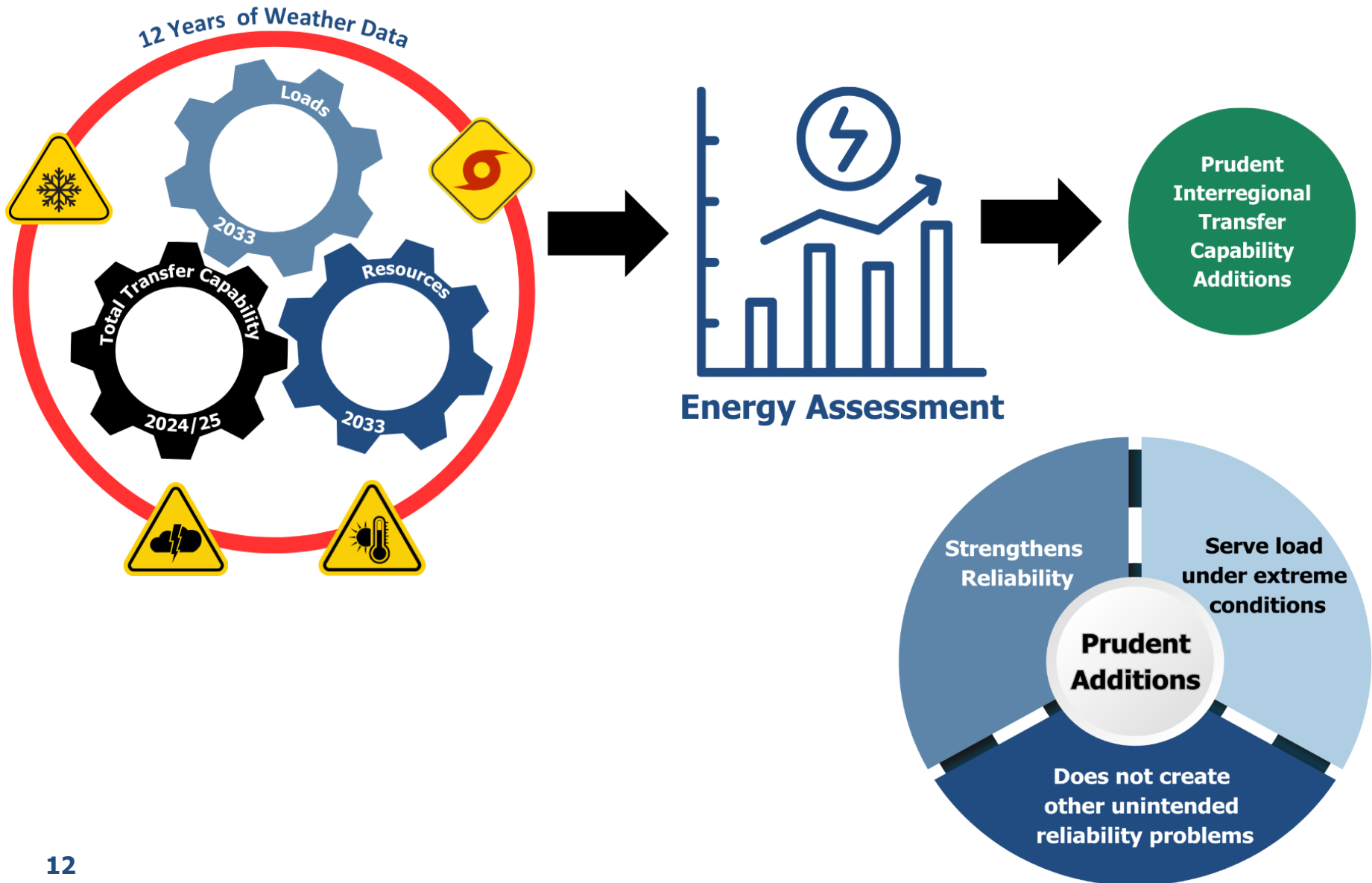
Daily Thermal Outage Rate (% of Total)



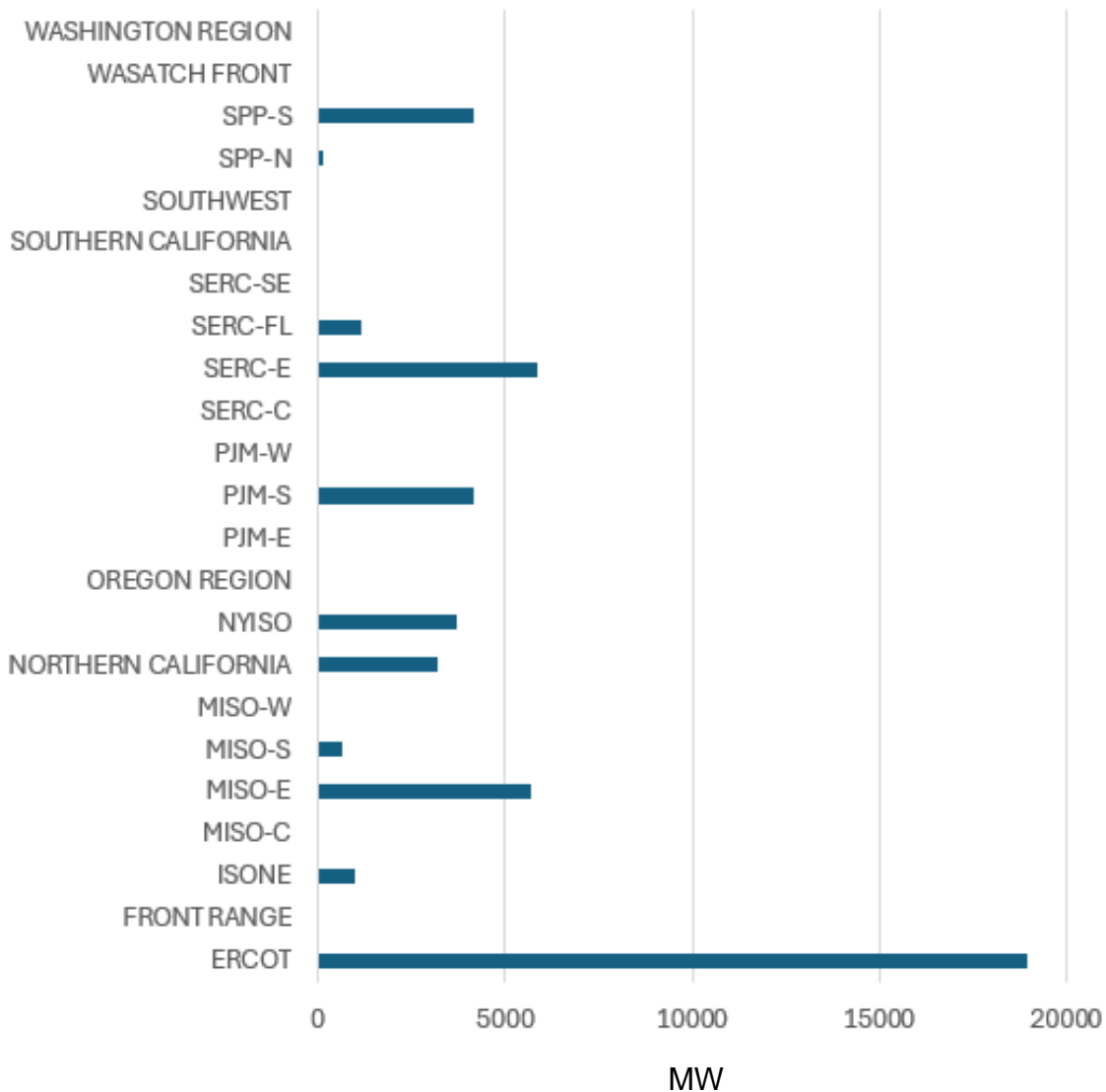
Minimum Daily Margin (% of Load)



Source: ESIG Transmission Resilience Task Force (Telos Energy)
<https://www.esig.energy/transmission-resilience/>

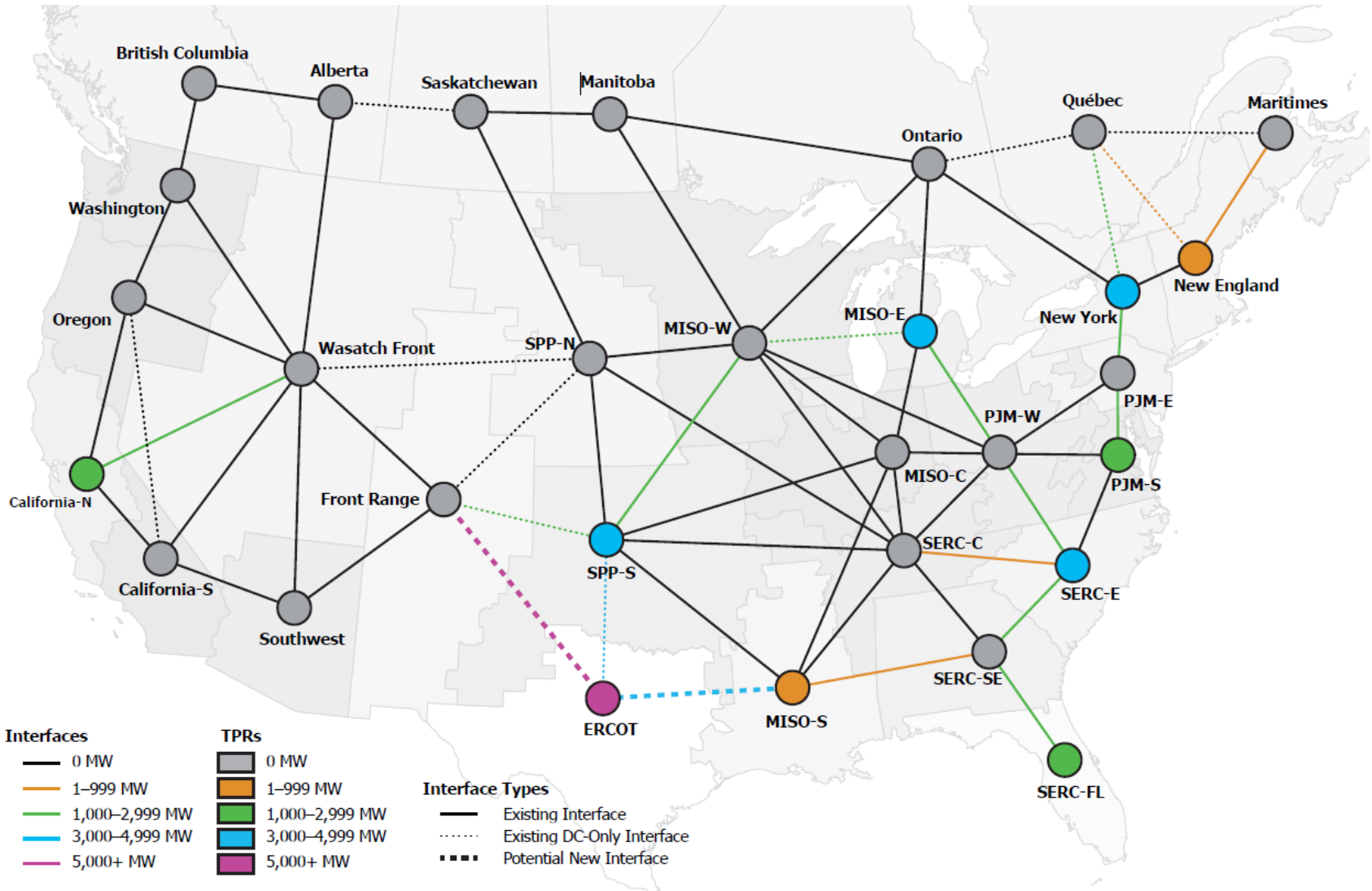


Energy Assessment Maximum Deficiency Identified (Preliminary)



- Capacity expansion determined by projections in Long-Term Reliability Assessment
- Tightening energy margins driven:
 - assumed extreme weather conditions
 - increased load growth
 - on-going retirement of conventional generation
 - shift toward a higher proportion of variable (wind and solar)
 - energy-limited resources (e.g., battery storage).
- Number of hours in these conditions range from 1-20

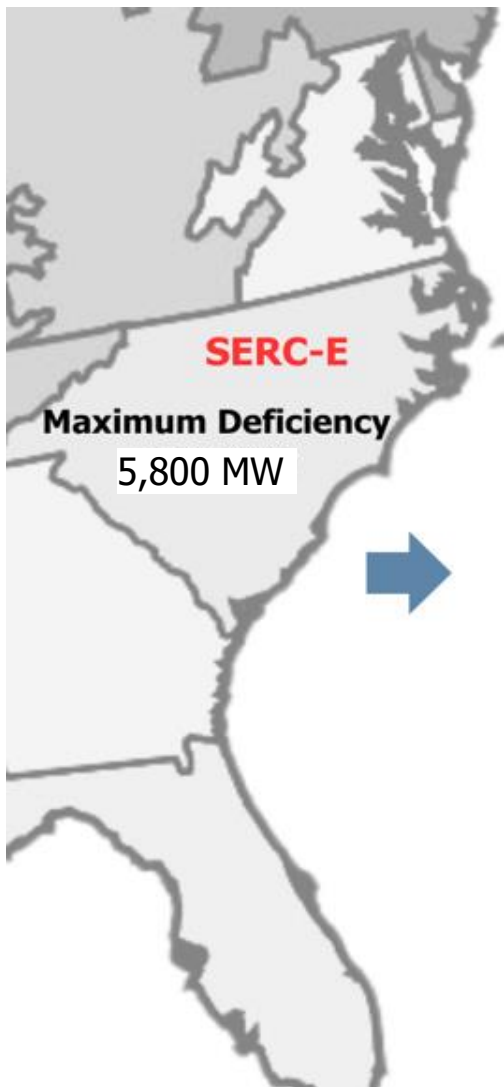
Prudent Addition Recommendations (Preliminary)



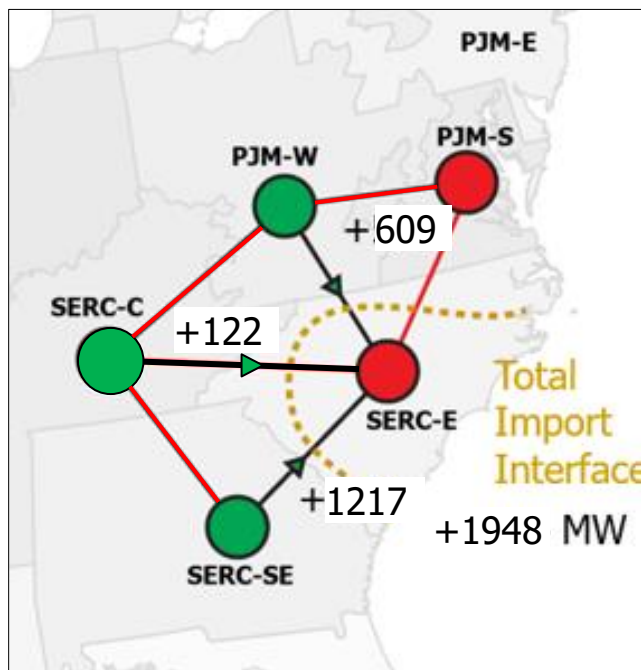
Recommended Prudent Additions

Transmission Planning Region	Events / Drivers	Event Seasons	Interface for Additions	Prudent Addition Recommendation (MW)
Northern California	2022 Heat Wave	Summer	Wasatch Front	1,100
ERCOT	Winter Storm Uri (2021) and four other events	Summer and Winter	Front Range, MISO-S, SPP-S	14,100
SPP-S	Winter Storm Uri (2021)	Winter	ERCOT, Front Range, MISO-W, SERC-C, SPP-N	3,700
MISO-E	2020 and two other events	Summer	MISO-W, PJM-W	3,000
MISO-S	2009 and 2011	Summer	ERCOT, SERC-SE	600
SERC-FL	Summer 2009 and Winter 2010	Summer and Winter	SERC-SE	1,200
SERC-E	Winter Storm Elliott (2022)	Winter	PJM-W, SERC-C, SERC-SE	4,100
PJM-S	Winter Storm Elliott (2022)	Winter	PJM-E	2,800
NYISO	2023 Heat Wave and five other summer events	Summer	PJM-E, Québec	3,700
ISONE	2012 and two other summer events	Summer	Québec, Maritimes	700
Total Prudent Additions Recommendations				35,000

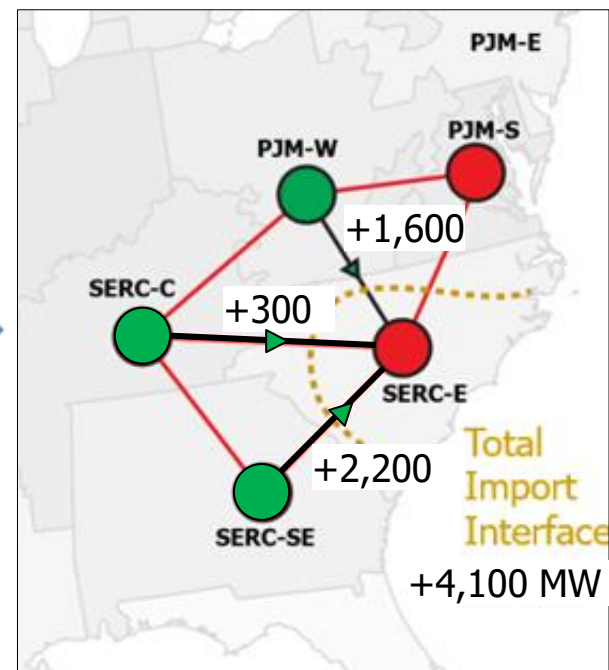
Example of Prudent Addition Analysis: SERC-E (2033)



First Iteration: Utilize Existing Import Capability and Excess Available Generation from Neighbors



Third Iteration: Maximum Support from Neighbors, Prioritized by Excess Available Generation



5,463 MW of Existing Import Capability + 4,100 MW of Prudent Additions =
9,563 MW of Needed Import Capability



Questions and Answers