Western Resource Adequacy

Public Utility Board Briefing

June 8th 2022

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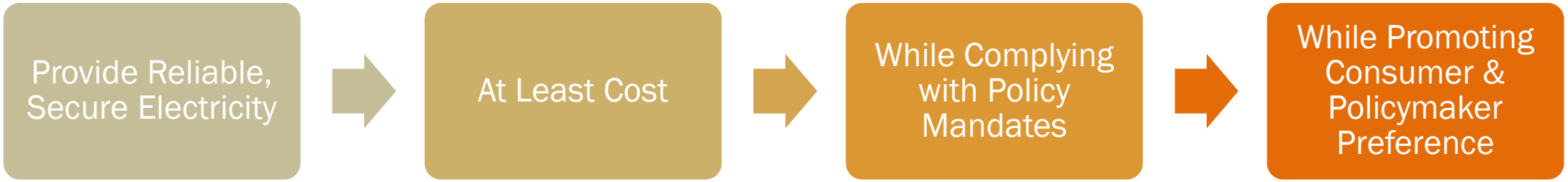
TACOMA POWER
TACOMA PUBLIC UTILITIES

What is the current state of resource adequacy in the West?

A brief environmental scan…

Environmental Scan

Today's Challenge for Utilities

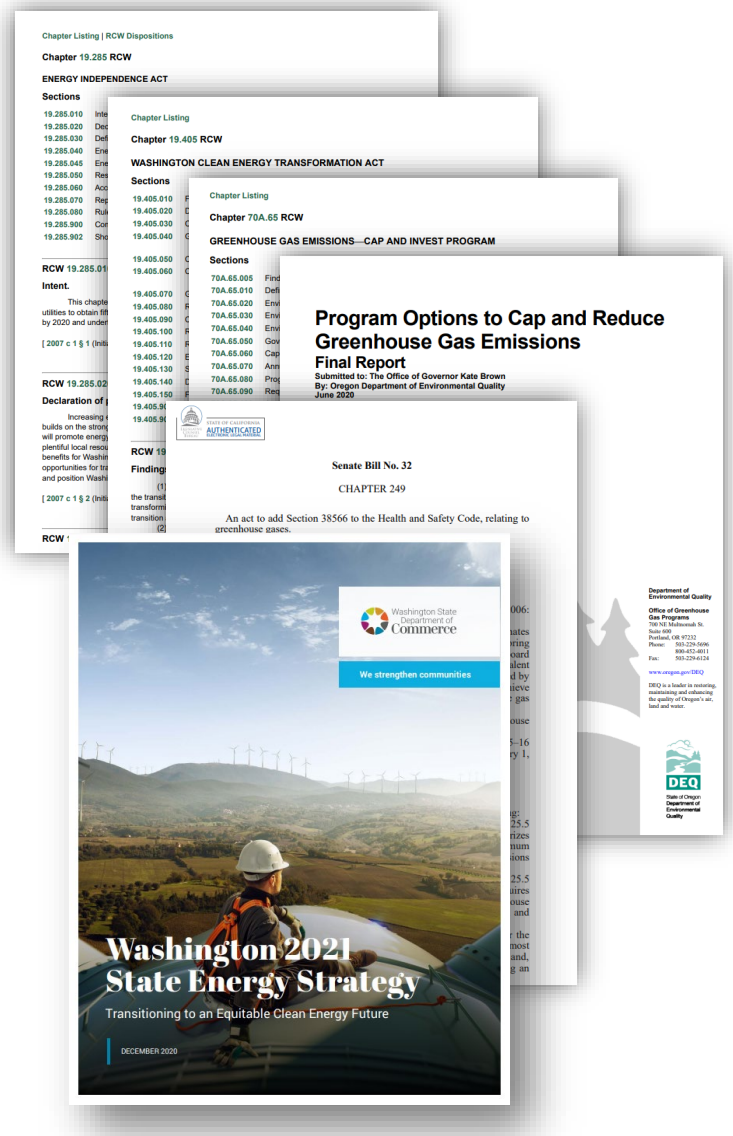


Environmental Scan

State Decarbonization Policies

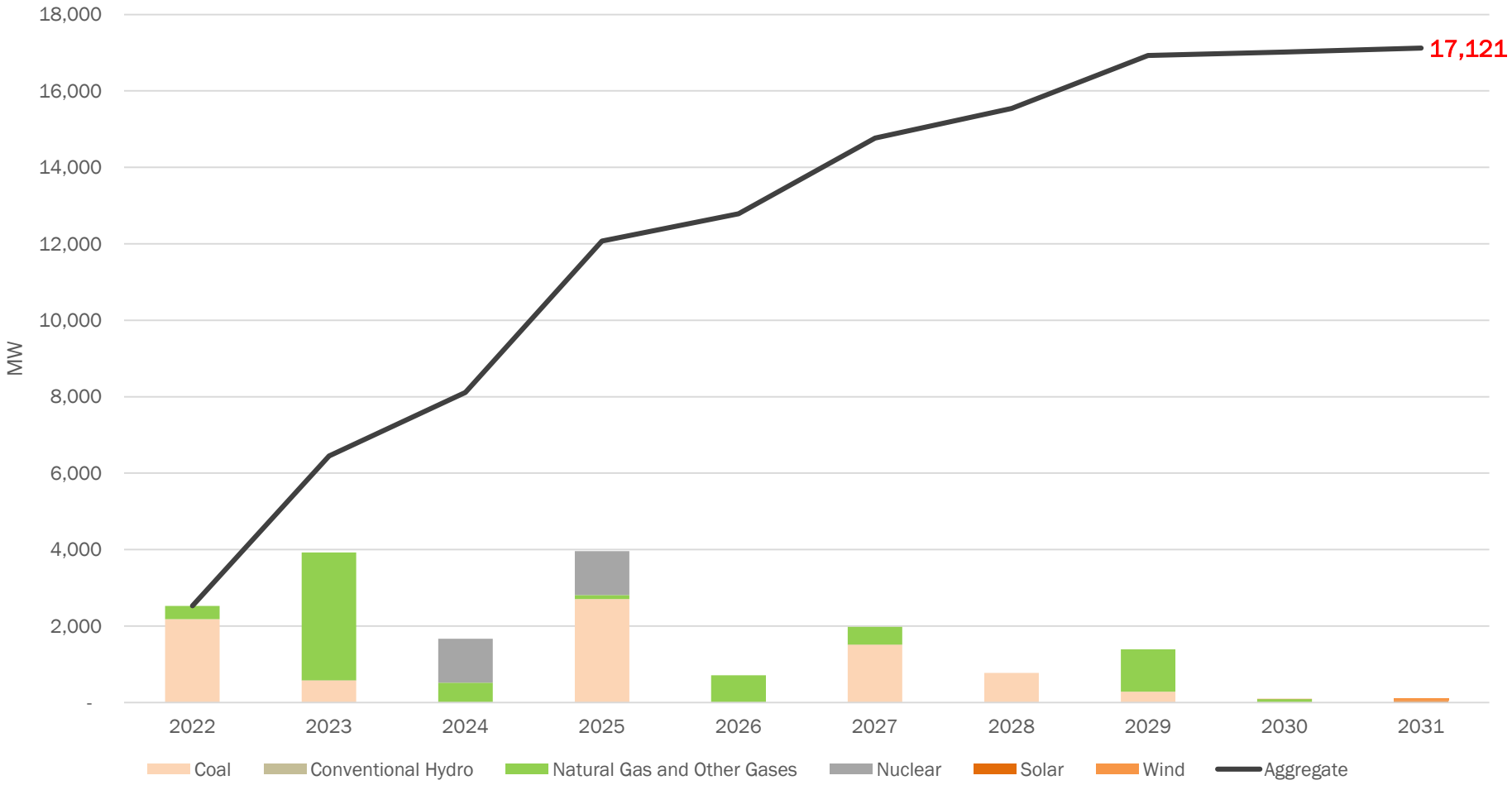
100% Clean Electricity to Meet the Needs of a Decarbonized Economy

- Washington, California, Oregon, and other Western States have enacted multiple clean energy and decarbonization regulations.
- For Example, Washington State utilities must meet the Clean Energy Transformation Act's (CETA) requirements for a greenhouse gas neutral electricity supply by 2030 and 100% renewable or non-emitting ("clean") electricity by 2045, while incorporating equity, reliability and resource adequacy principles.
- The State Energy Strategy calls for utilities to fulfill energy and capacity demands created by electrification of transportation, buildings and industry.



Environmental Scan

Projected WECC Resource Retirements



Electrification Impacts: Just Buildings!

Figure 5-3. Tacoma Power Annual energy sales Growth in 2050

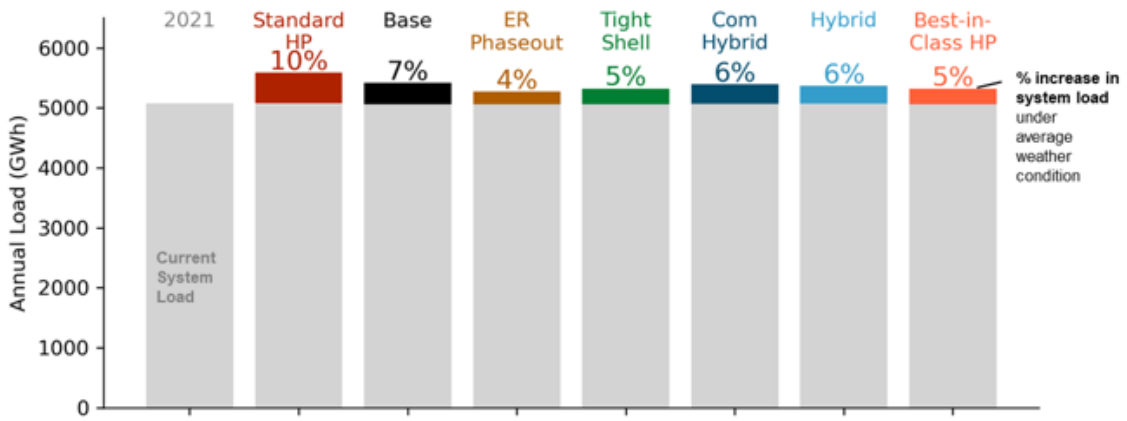
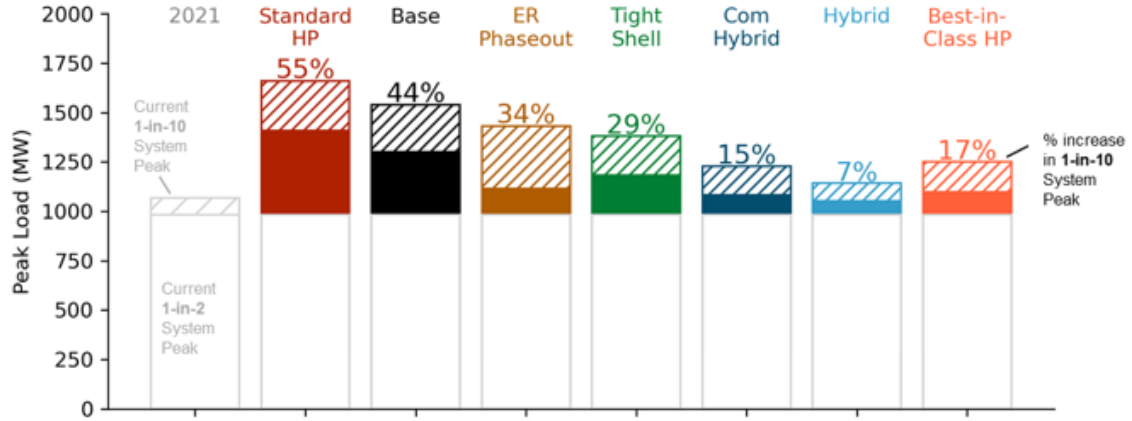


Figure 5-4. Tacoma Power 1-in-2 System Peak Load Growth in 2050



Energy+Environmental Economics

Environmental Scan

Limited Capacity Options

Transmission?

Challenges in building new transmission infrastructure to enable access to higher capacity factor renewables (e.g. Montana wind).

Emerging Solutions?

Higher costs & risks for emerging alternatives:

- ✓ Batteries
- ✓ Demand Response
- ✓ Modular Nuclear
- ✓ Pumped Storage Hydro
- ✓ Thermal with CCS
- ✓ Green Hydrogen & Other Electrofuels + Fuel Cell Generator

Environmental Scan

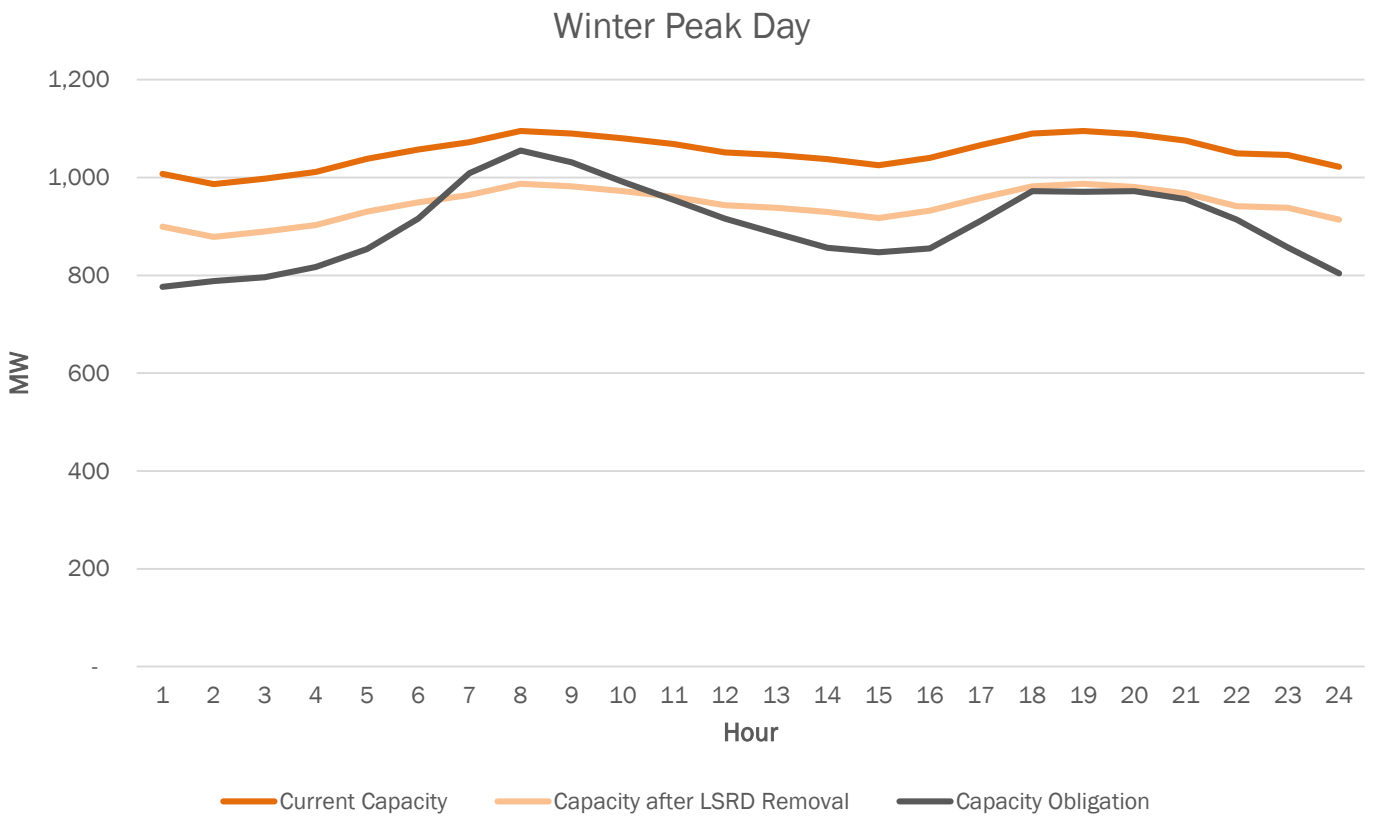
Lower Snake River Dam Removal?

Background

- ✓ On October 22nd, 2021 Governor Jay Inslee and Senator Patty Murray announced a process to restore salmon runs in the state, including a study of potentially replacing the services of four dams on the Lower Snake River in southeastern Washington.

Impact on Tacoma Power Capacity Position

- ✓ If the LSRDs were removed and not replaced, Tacoma Power's winter capacity would drop by about 109 MW.
- ✓ The decrease in winter capacity would cause Tacoma Power to fail its resource adequacy requirements and obligate us to procure a new resource.
- ✓ It is unclear what type of technology could be used to replace LSRD winter capacity.



Taken from current operations capacity planning model

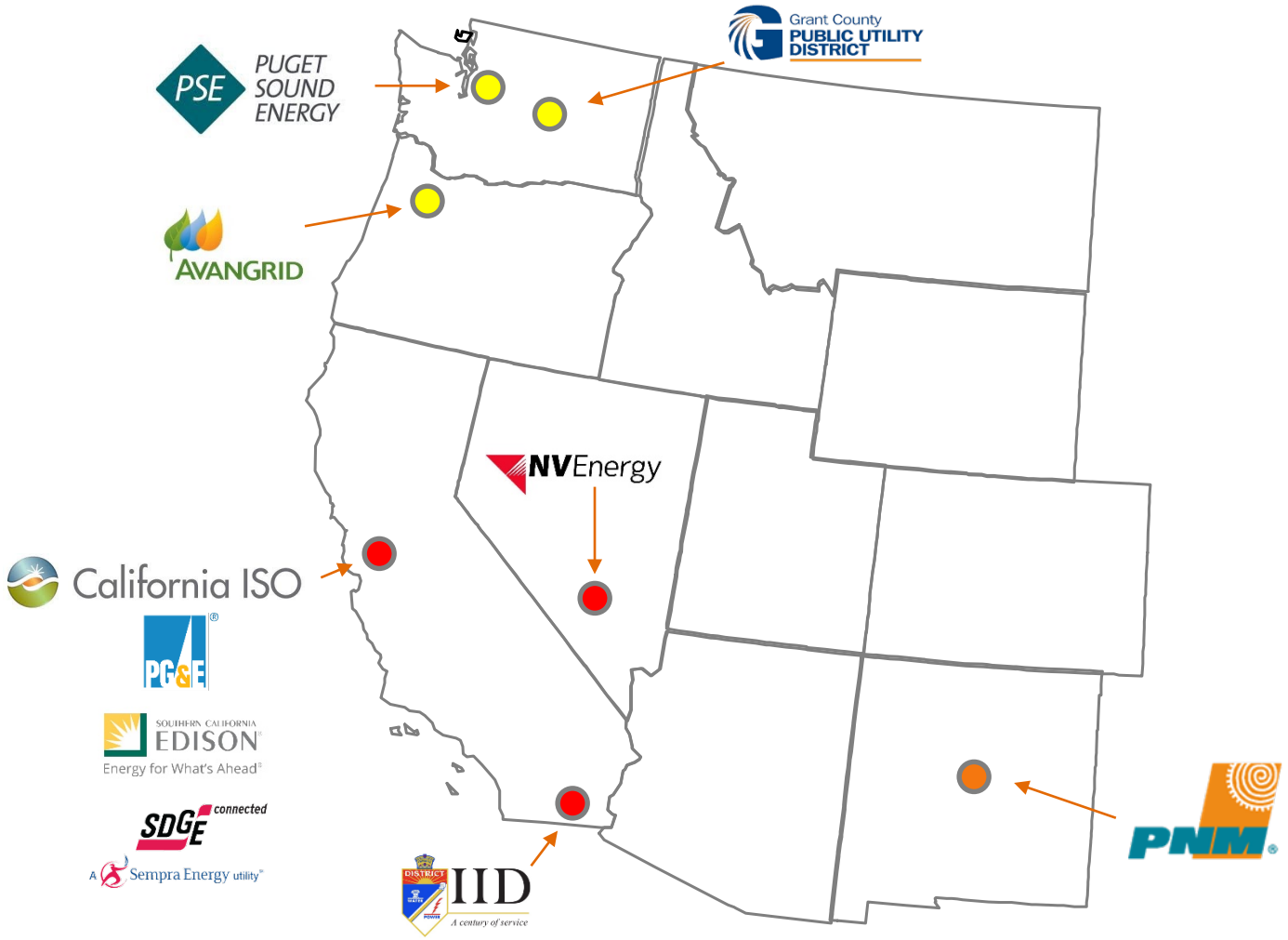
Resource Adequacy Today: Planning in Silos

Today's entity-by-entity planning framework is sufficient to meet regional RA needs if:

But what happens when one or more of these criteria are not met?

Environmental Scan

August 14-15, 2020: BAAs Declaring Energy Emergency Alerts



- **EEA 3:** Firm Load interruption is imminent or in progress
- **EEA 2:** Load management procedures in effect
- **EEA 1:** All available generation resources in use

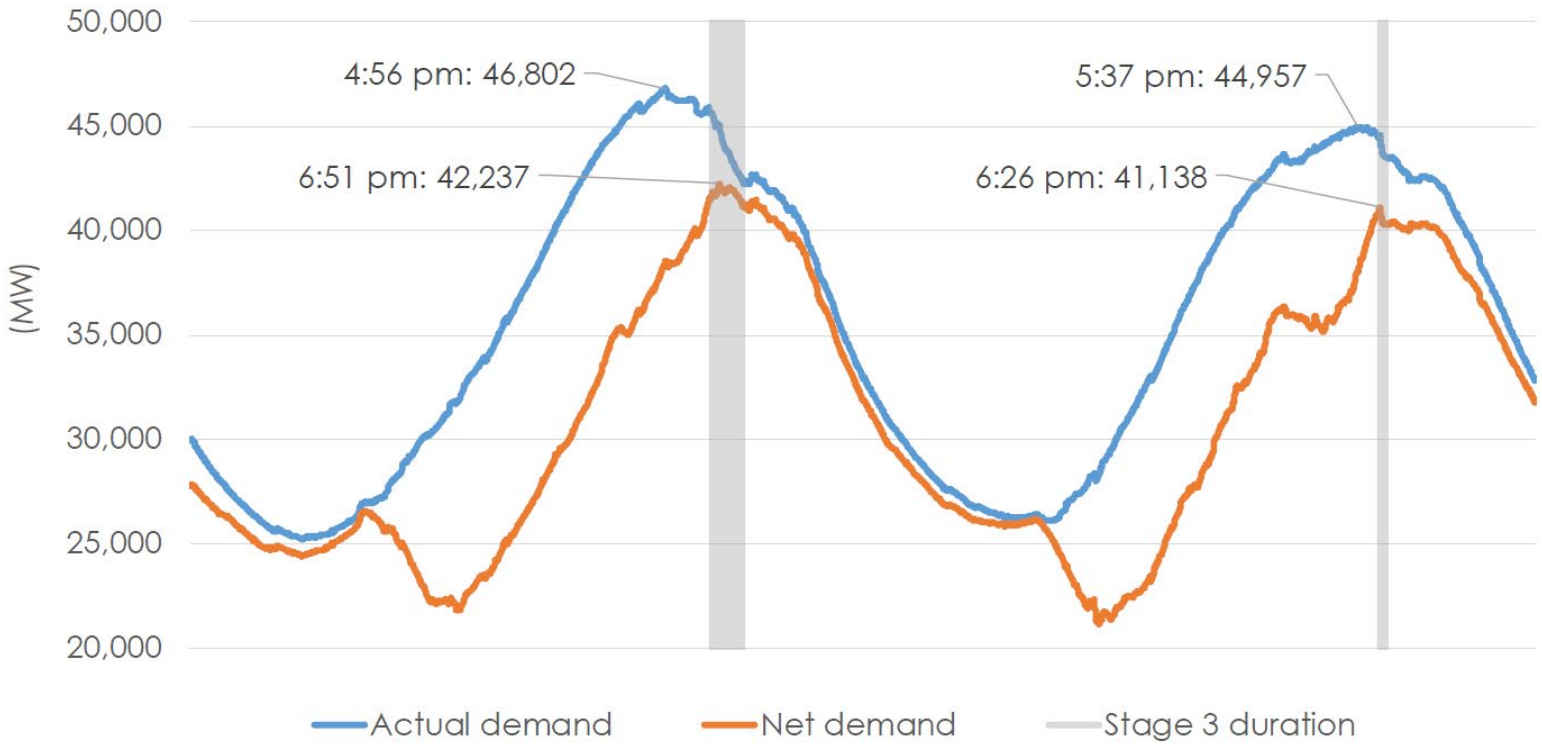
Environmental Scan

August 14-15, 2020: Peak vs. Net Peak

Summary

- The California RA program is designed to meet load during peak load hours.
- The outages occurred in the evening during net peak load
- California capacity critical hours are in the evening net load peak

Demand and Net Demand for August 14 and 15

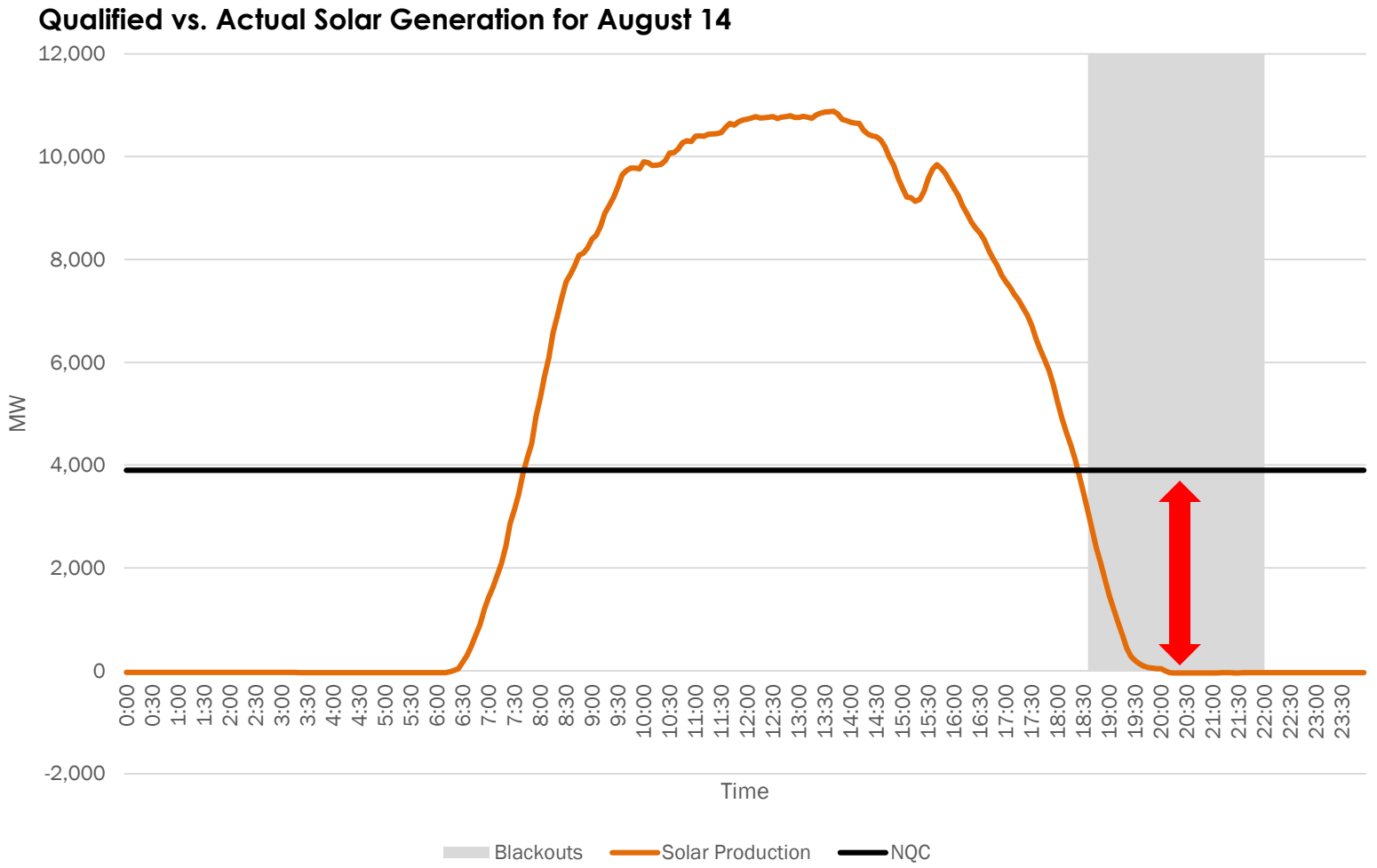


Environmental Scan

August 14, 2020: Solar Over-Qualification

Summary

- Wind and solar generation are qualified based on contribution to peak load
- California capacity critical hours are in the evening net load peak
- Solar resources are overqualified in the RA program

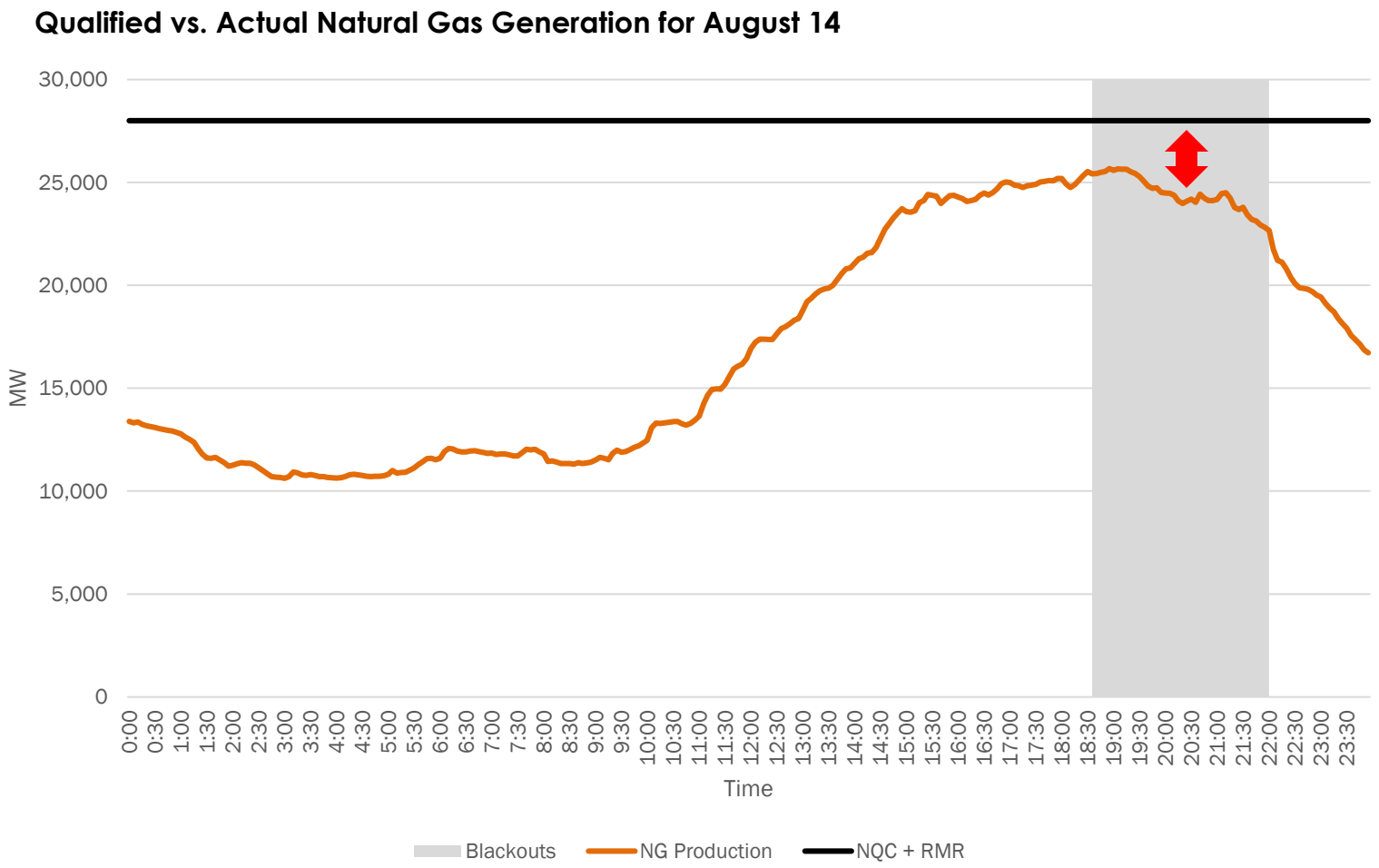


Environmental Scan

August 14, 2020: Natural Gas Gen Over-Qualification

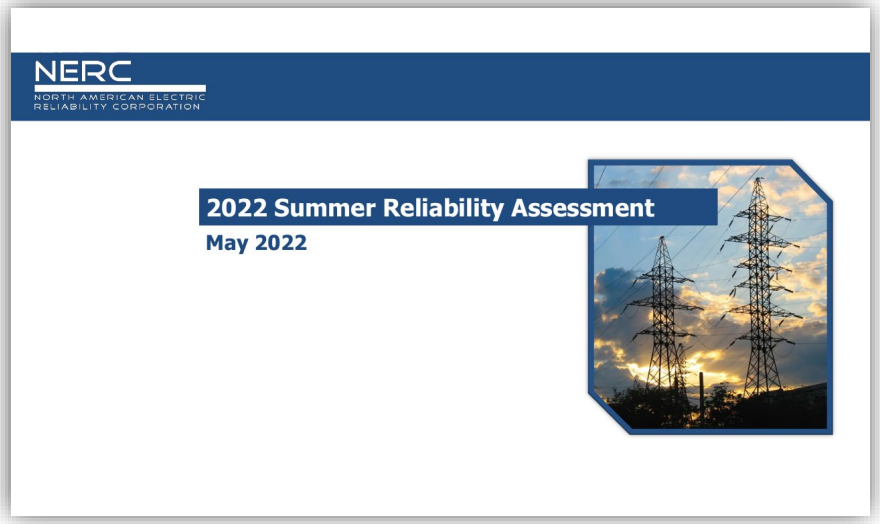
Summary

- The California RA program qualifies thermal power plants using the installed capacity (ICAP) methodology.
- This method fails to incorporate forced outages.
- This method fails to consider capacity degradation due to ambient conditions

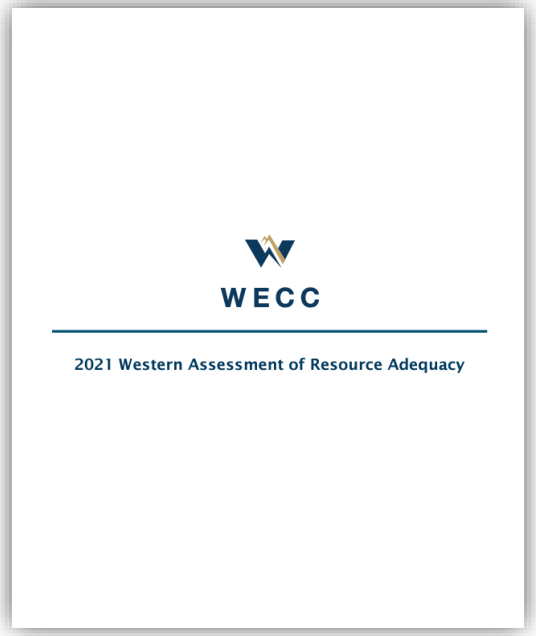


Environmental Scan

NERC & WECC Are Concerned About Resource Adequacy



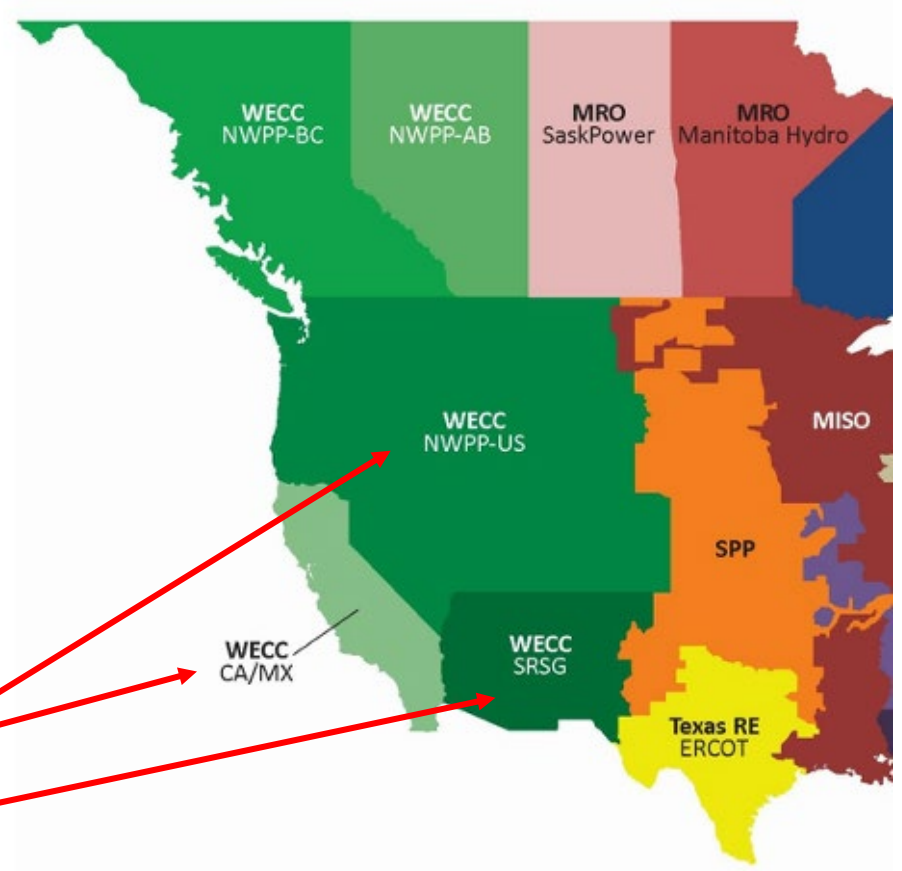
"The growing reliance on transfers within the Western Interconnection and falling resource capacity in many adjacent areas increases the risk that extreme events will lead to load interruption"



"Under current PRMs, all subregions in the West show many hours at risk of load loss over the next 10 years"

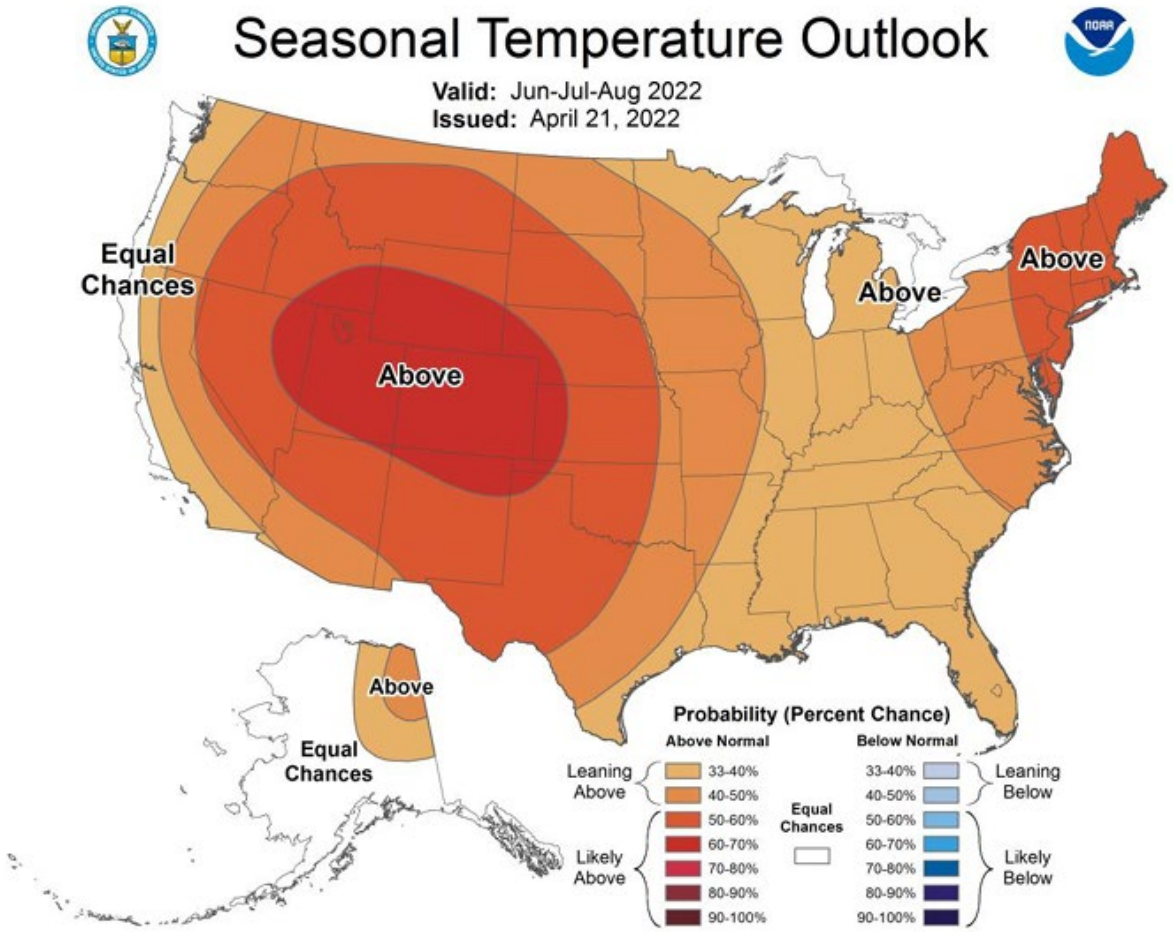
NERC 2022 Summer Reliability Assessment

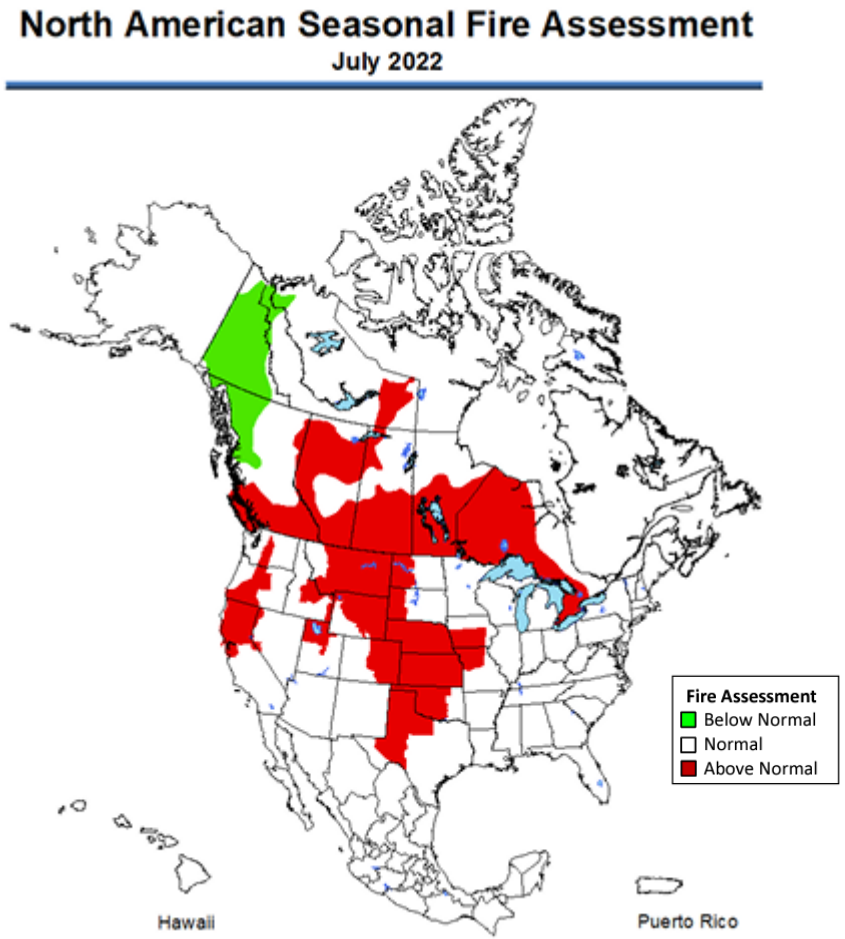
Assessment Area	Anticipated Reserve Margin	Anticipated Reserve Margin with Typical Outages	Anticipated Reserve Margin with Higher Demand, Outages, Derates in Extreme Conditions
MISO	21.1%	3.2%	-8.3%
MRO-Manitoba	27.3%	21.5%	7.8%
MRO-SaskPower	12.2%	2.6%	-5.3%
NPCC-Maritimes	39.2%	28.7%	11.7%
NPCC-New England	20.6%	9.3%	-2.5%[6]
NPCC-New York	30.4%	22.4%	13.5%
NPCC-Ontario	18.0%	18.0%	3.0%
NPCC-Québec	40.3%	40.3%	35.0%
PJM	31.7%	23.9%	16.1%
SERC-Central	18.3%	10.7%	3.3%
SERC-East	21.4%	18.3%	11.3%
SERC-Florida Peninsula	20.7%	17.3%	15.1%
SERC-Southeast	29.8%	25.4%	17.4%
SPP	30.6%	12.3%	-4.7%
Texas RE-ERCOT	22.0%	15.9%	1.1%
WECC-NWPP-AB	19.7%	17.2%	5.3%
WECC-NWPP-BC	39.3%	39.1%	10.4%
WECC-CA/MX	31.5%	25.4%	-13.1%
WECC-NWPP-US	18.3%	16.3%	-13.8%
WECC-SRSG	16.3%	11.8%	-6.8%



Environmental Scan

Climate Change Will Make The Situation Worse





“We are heading for a reliability crisis”

FERC Commissioner Marc Christie

The Western Resource Adequacy Program (WRAP)

Section 2

What are Western utilities doing to address this challenge?

The Western Resource Adequacy Program (WRAP)

WRAP Objectives

WRAP Aims To Address Shortcomings

Creates Strong Incentives

- WRAP creates strong incentives to add capacity to address resource adequacy deficiencies
- Establishes more transparency/price signals to spur investment in capacity resources where/when needed – by targeting Capacity Critical Hours (CCHs)

Regional Coordination

- WRAP better leverages regional diversity in load and resource capabilities
- Enables wide view into RA needs – facilitates more informed resource planning and procurement decisions

Improved Reliability

- Establishes standardized approach to forecasting, capacity requirements, and accreditation
- Provides region-level monitoring and oversight

Cost Savings

- Unlocks cost savings from overall regional reduction in PRM compared to localized approach, and from helping optimize reliance on existing capacity

The Western Resource Adequacy Program (WRAP)

Who is participating?

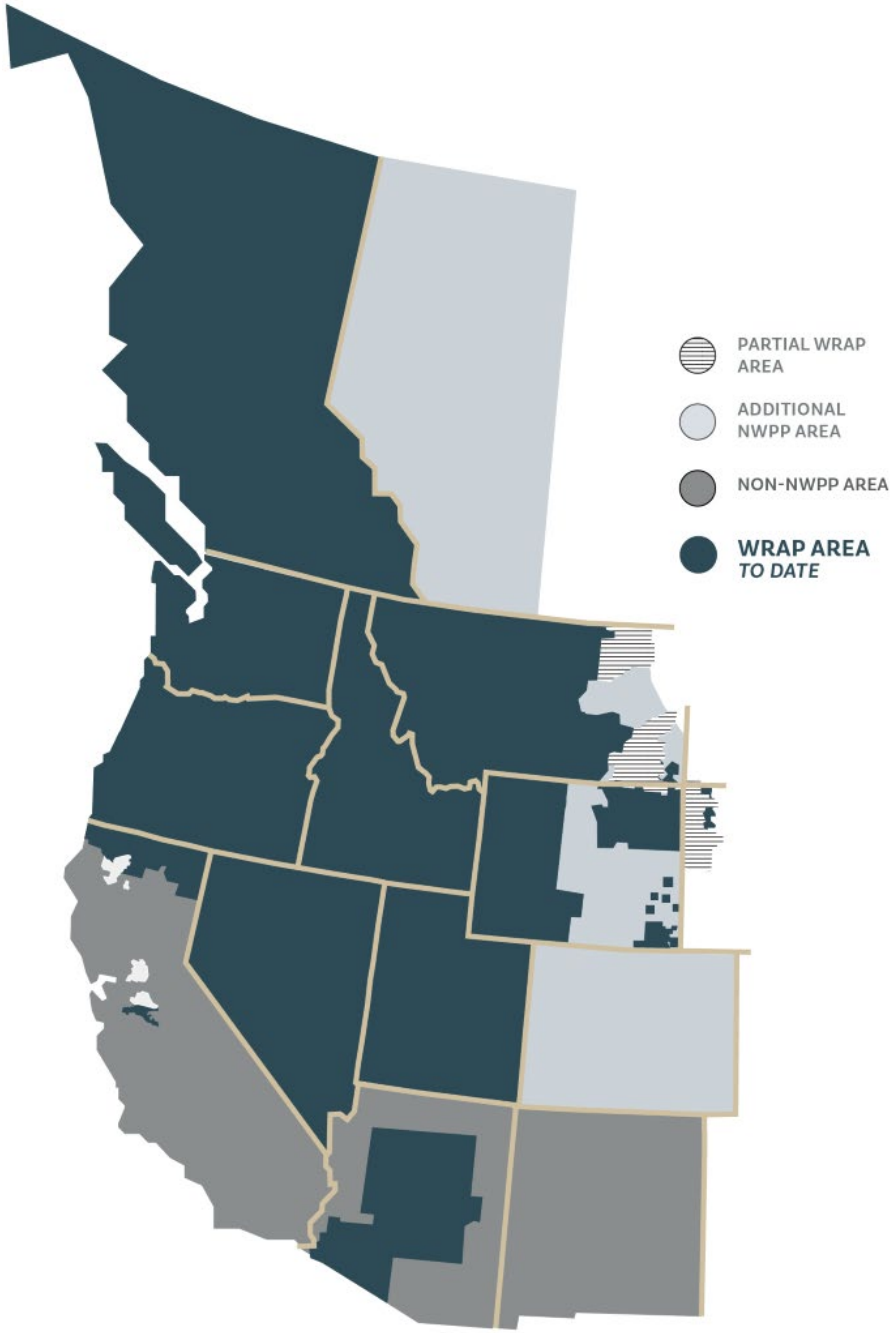
Arizona Public Service	Avangrid	Avista	Basin Electric
Black Hills	Bonneville Power Administration	Calpine	Chelan PUD
Clatskanie PUD	Douglas PUD	EWEB	Grant PUD
Idaho Power	Northwestern Energy	NV Energy	PacifiCorp
Portland General Electric	Powerex	Puget Sound Energy	Seattle City Light
Shell	Snohomish PUD	Salt River Project	Benton PUD (via TEA)
Clark Public Utilities (via TEA)	Cowlitz PUD (via TEA)	Franklin PUD (via TEA)	Lewis PUD (via TEA)
Emerald PUD (via TEA)	Grays Harbor PUD (via TEA)	Tacoma Power	Turlock Irrigation District

WESTERN POWERPOOL

Program Administrator

SPP Southwest Power Pool

Program Operator



The Western Resource Adequacy Program (WRAP)

What are the next steps?