



June 7, 2023

Mark Holman

Electricity Market Update

Supply. Flexibility. Commitment.

The 2020s – A Decade of Change

What Are The Biggest Trends?

1. Decarbonization
2. Regionalization
3. Load Growth

What Are The Greatest Opportunities?

1. Organized markets can integrate more renewables
2. Changing resource mix is shifting trade opportunities
3. Inter-regional transmission



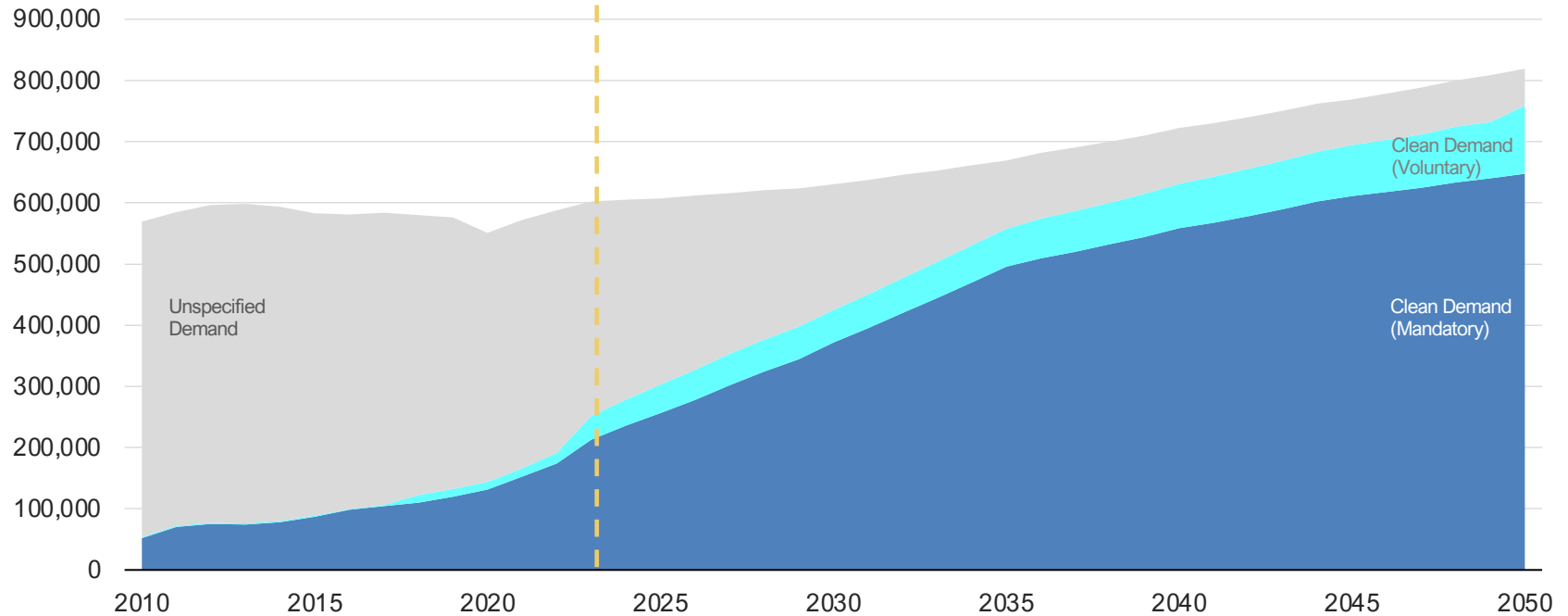
What Are The Biggest Trends?

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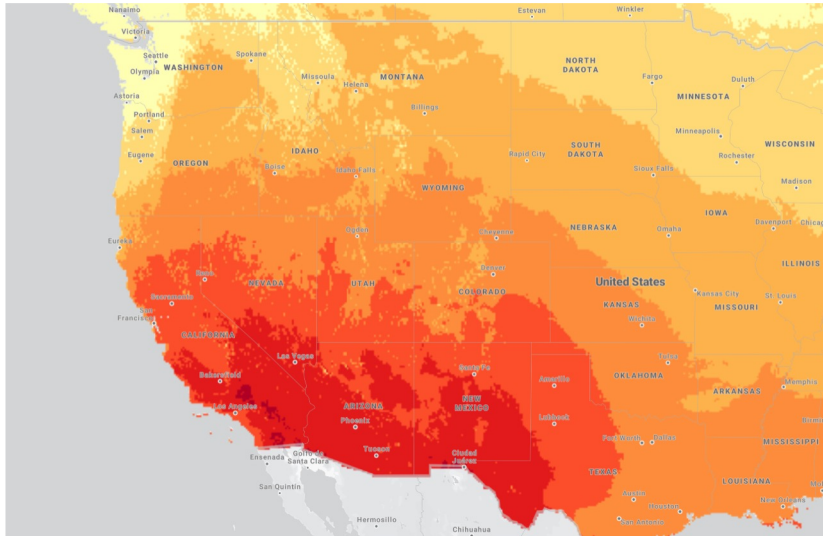
Decarbonization: It Has Only Just Begun

Electricity Demand (GWh/year) – Washington, Oregon, California, Idaho, Nevada, Arizona

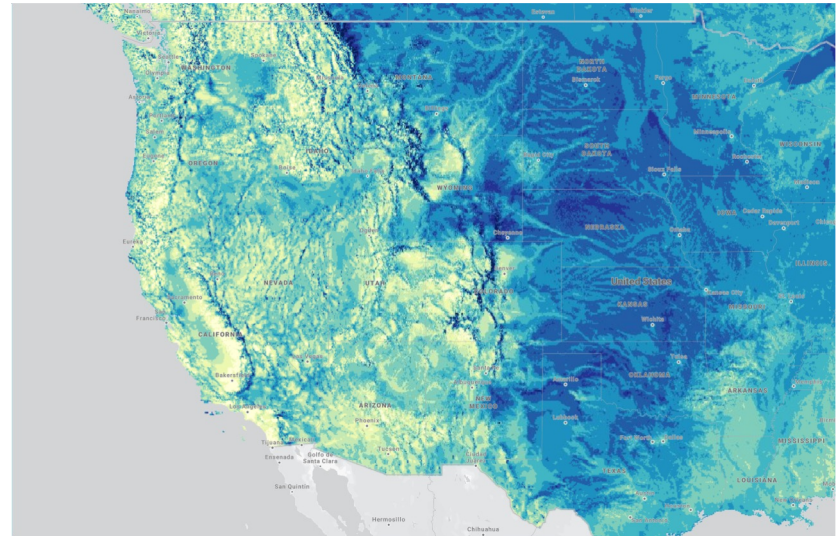


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Decarbonization: Solar and Wind Resources Lead The Way



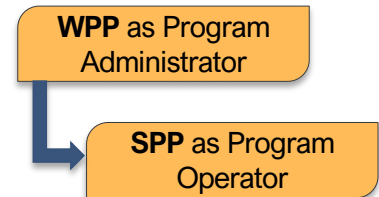
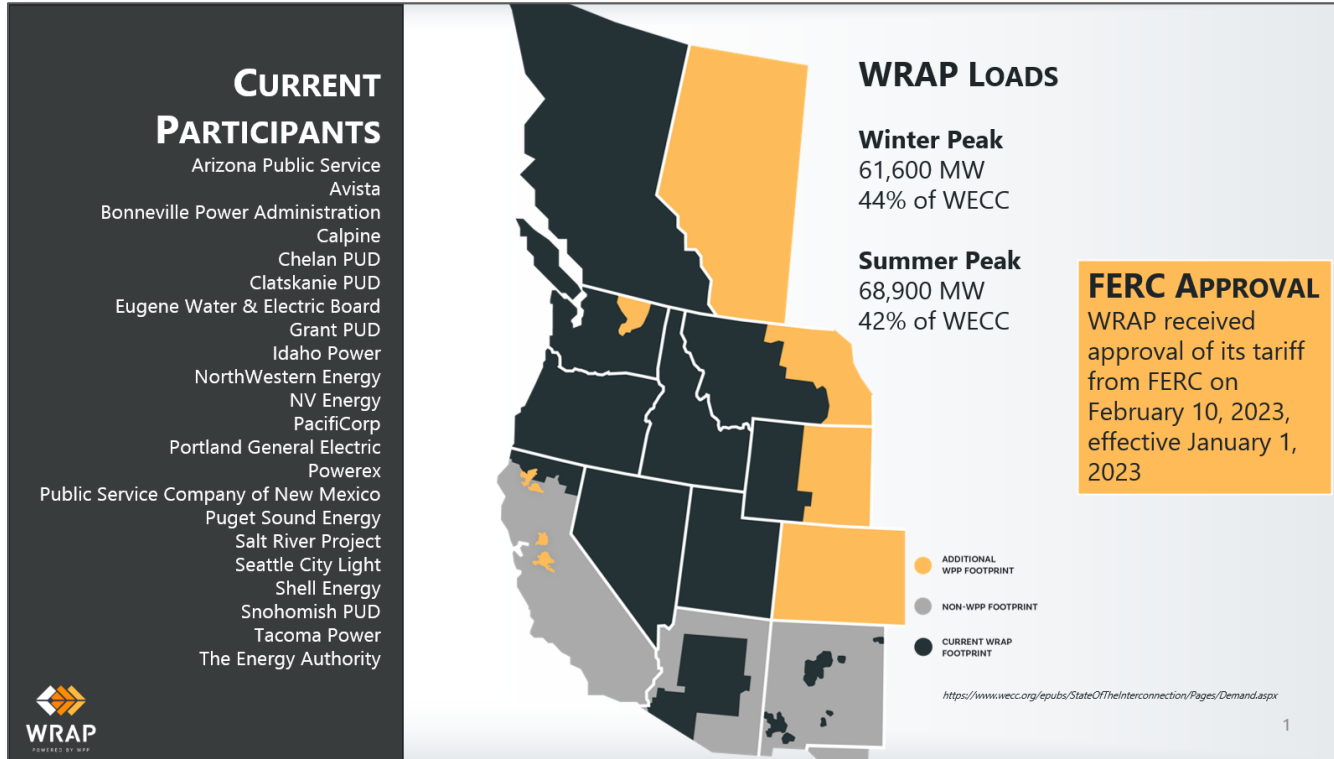
Average Solar Irradiance (kW/m²)



Average Wind Speed (m/s)

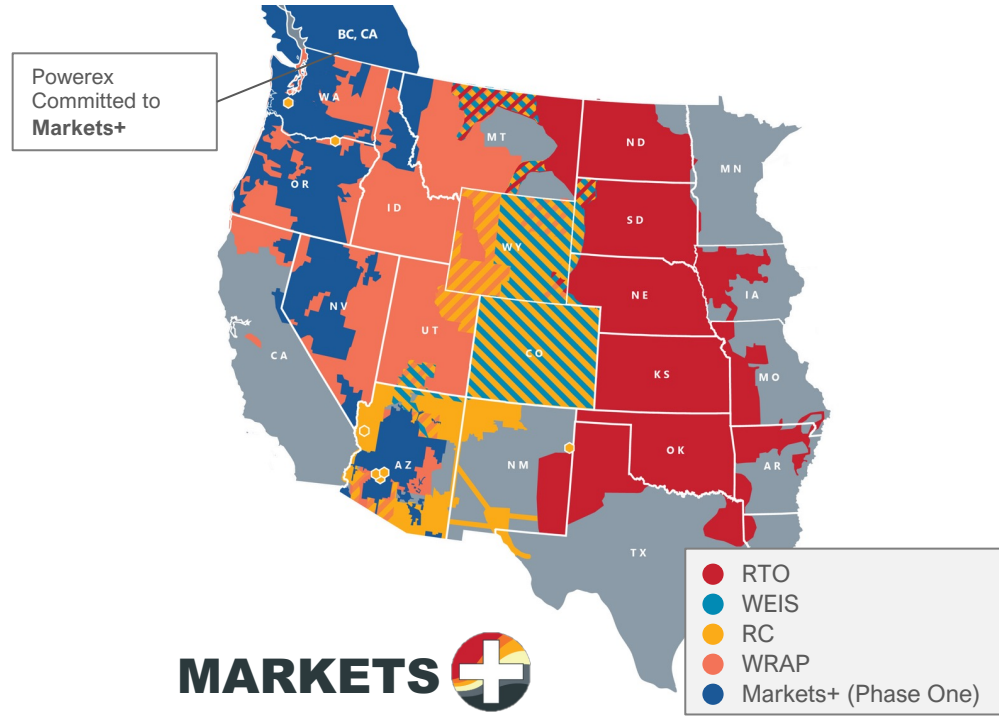
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Western Resource Adequacy Program



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Regionalization



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Regionalization: How Far Will We Go?

	Incremental Regionalization Approach	
	CAISO	SPP
Resource Adequacy		WRAP (WPP)
DA Market	EDAM	Markets +
RT Market	EIM	Markets +
Transmission Planning		
Transmission Service Provider		
Balancing Authority		
RC Services	RC West	SPP RC

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Load Growth in Arizona

SUSTAINABLY SUPPORTING UNPRECEDENTED GROWTH

Economic development brings the need for more power, and current forecasts indicate that **SRP will need to meet expected load growth of approximately 3,400 MW by 2035**. When combined with the planned retirement of 3,000MW of coal generation during that same time period, there is clearly a significant need for new sustainable and flexible energy resources.

SRP 2022 Annual Report

Due to the expected rapid growth of several large data centers and new large manufacturing facilities, **we currently project that annual retail electricity sales in kWh will increase in the range of 3.5% to 5.5% for 2023 and that average annual growth will be in the range of 4.5% to 6.5% through 2025**, including the effects of customer conversation, energy efficiency, and distributed renewable generation initiatives, but excluding the effects of weather variations.

APS 2022 Annual Report

<https://www.srpnet.com/assets/srpnet/pdf/about/2022-annual-report.pdf>

https://s22.q4cdn.com/464697698/files/doc_financials/annual/2023/2022-Annual-Report.pdf

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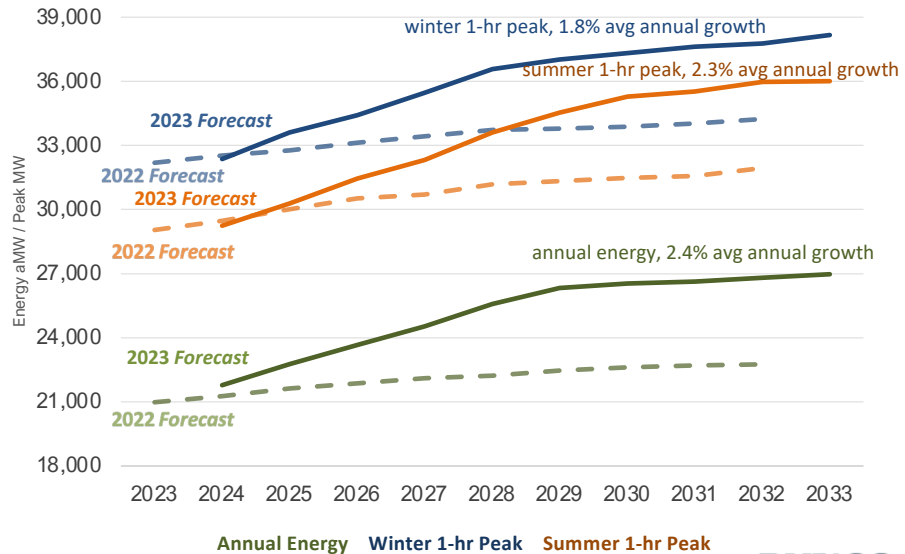
Load Growth in the Northwest

Load forecast comparison – 2023 vs. 2022

2022 growth rates	5 year	10 year
Winter	1.0%	0.7%
Summer	1.4%	1.0%
Annual Energy	1.2%	0.9%
2023 growth rates	5 year	10 year
Winter	2.7%	1.8%
Summer	3.3%	2.3%
Annual Energy	3.8%	2.4%

10

Rapidly growing load

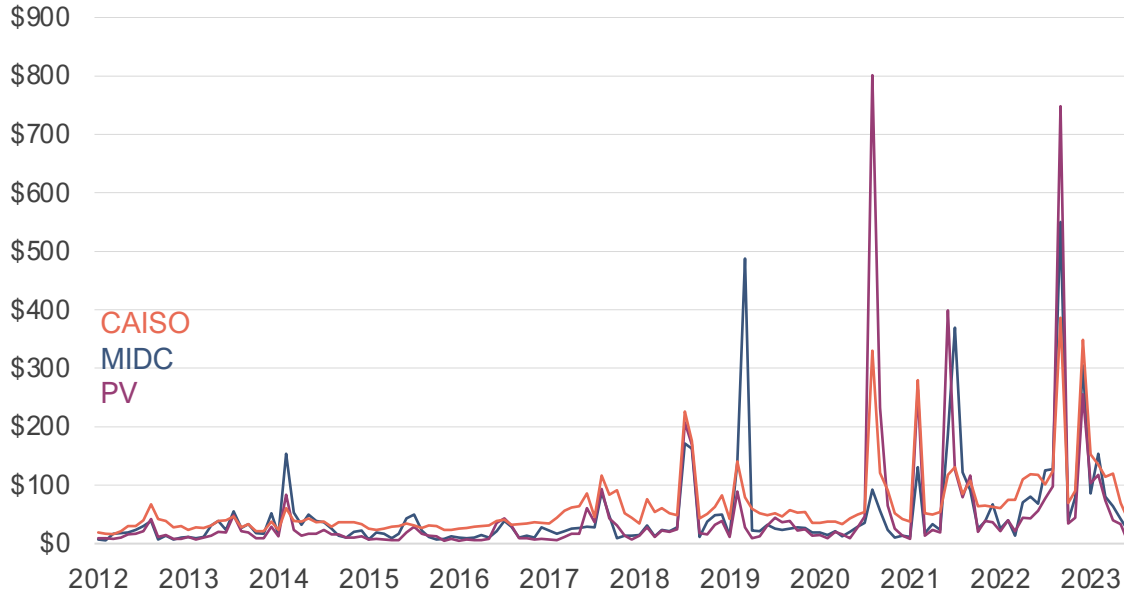


PNUCC

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Price Volatility

Market price in highest 10% of hours vs lowest 10% of hours



Factors that might impact price volatility over the next decade

- Load growth
- Generation retirements
- Renewable additions
- Storage additions
- Natural gas prices
- Carbon pricing
- Organized market development & efficiencies

Where Are The Greatest Opportunities?

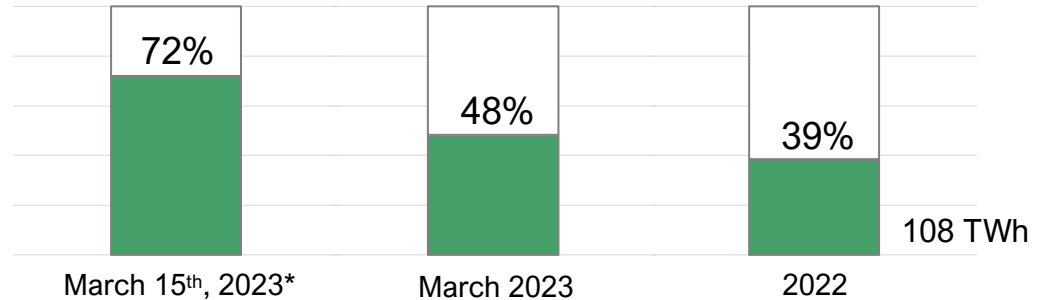
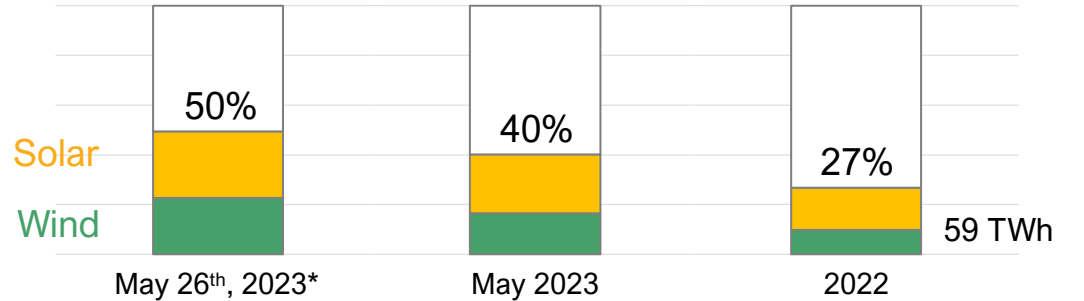
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Organized Market Participation Key To Integrating Renewables



Renewable Generation as a Percentage of Load

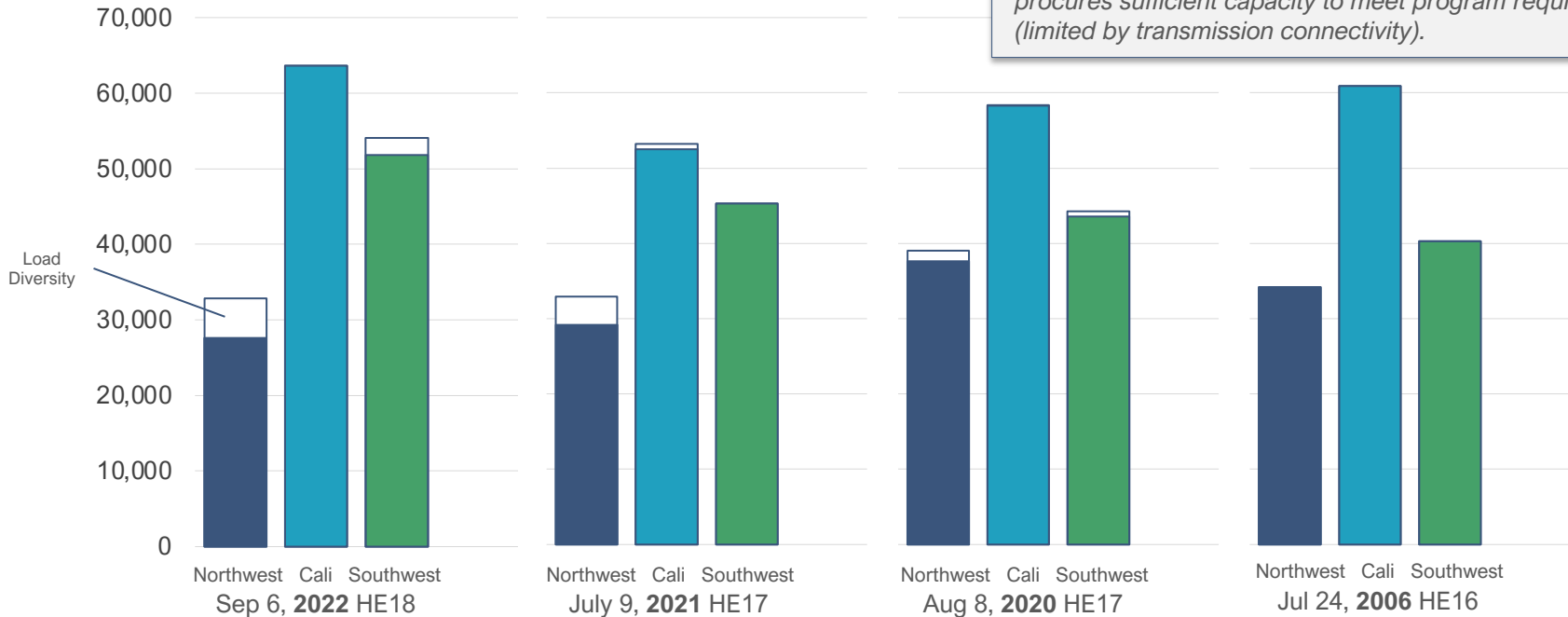


Source: CAISO, SPP
*Day with largest percentage from past 12 months

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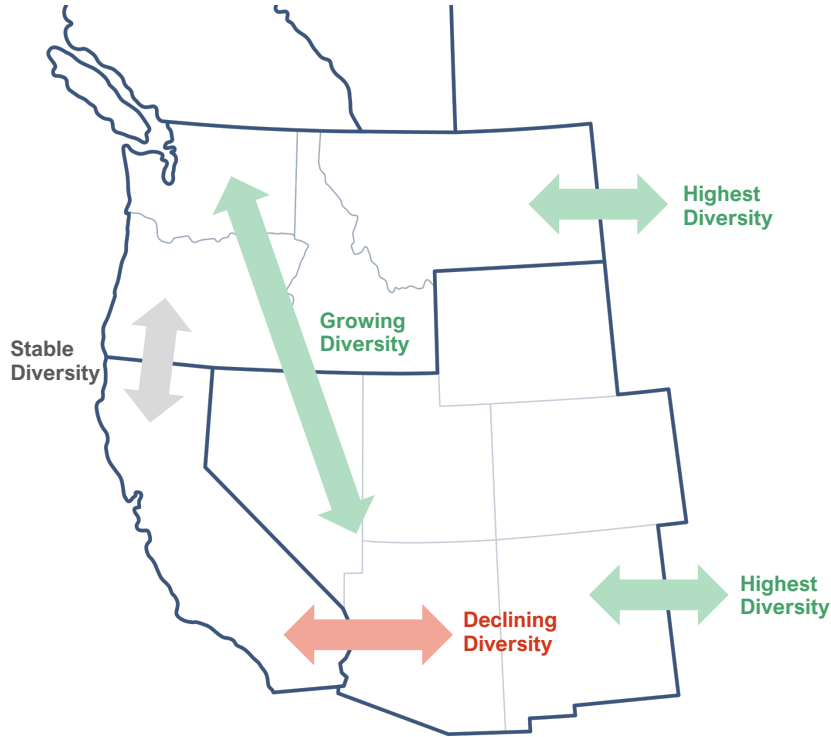
WRAP Participation Key to Unlocking Resource and Load Diversity

Regional Load During Peak WECC Hour (MW)



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Diversity and Trade Opportunities Will Shift



Southwest solar buildout will:

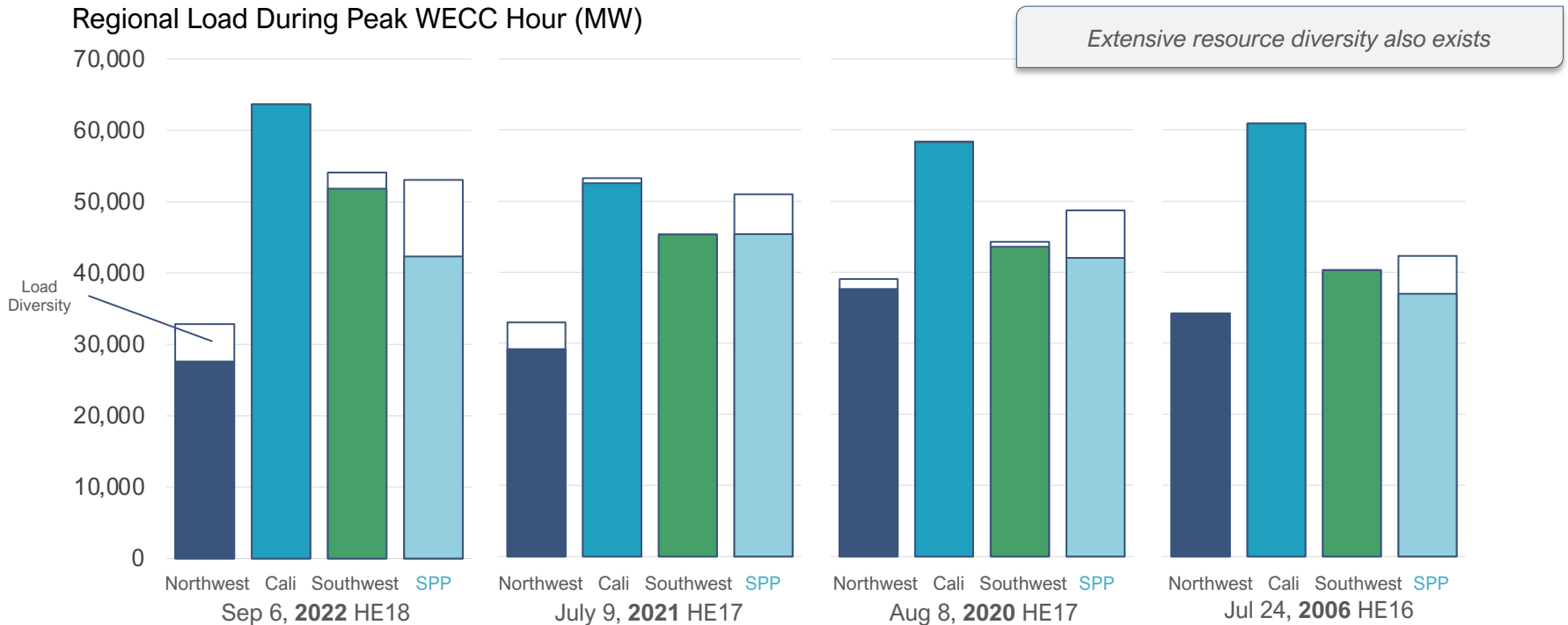
- **Reduce** SW to California diversity and trade opportunities
 - Coincidental solar oversupply, evening ramp, net load peak
- **Increase** NW to SW diversity and trade opportunities
 - Hydro shaping around solar
 - Mitigates SW oversupply, evening ramping, net load peak

Greatest future diversity is with SPP footprint

- SPP wind and solar highly diverse to WECC
- Heat waves and cold snaps are non-coincidental

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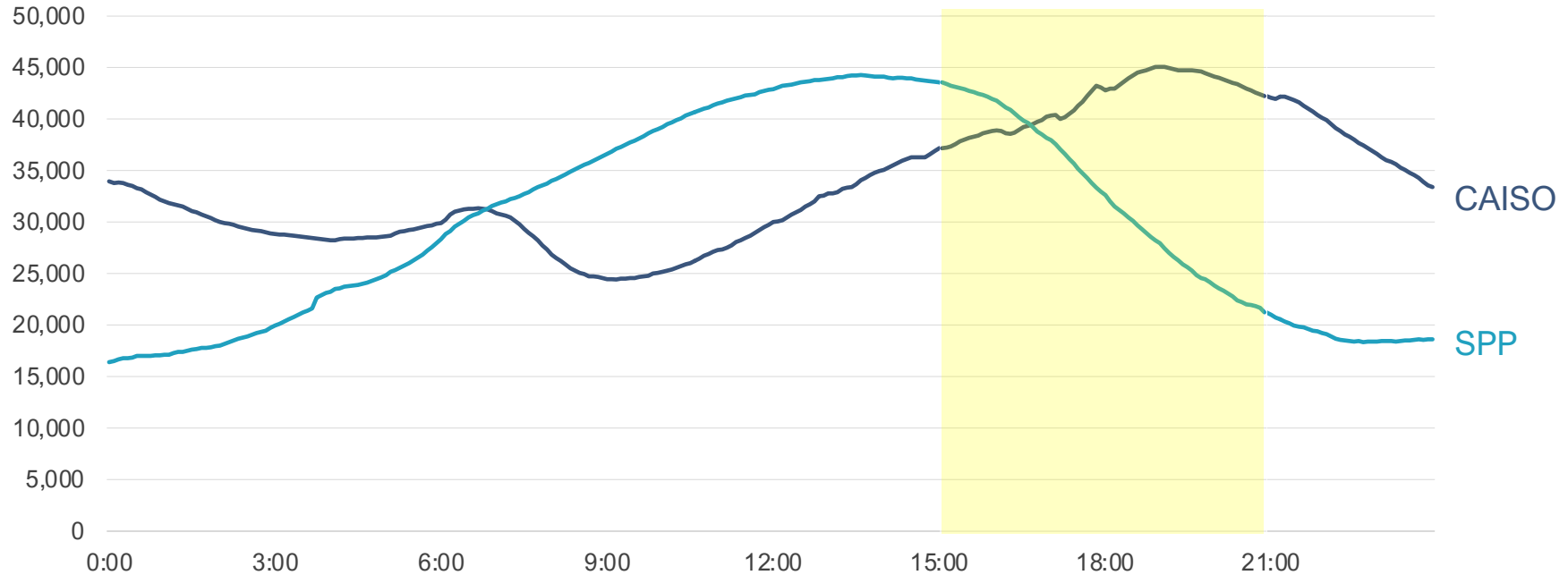
A Resource Adequacy Program Can Unlock Capacity Diversity In Critical Hours



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WECC – SPP Trade Provides the Greatest Opportunity

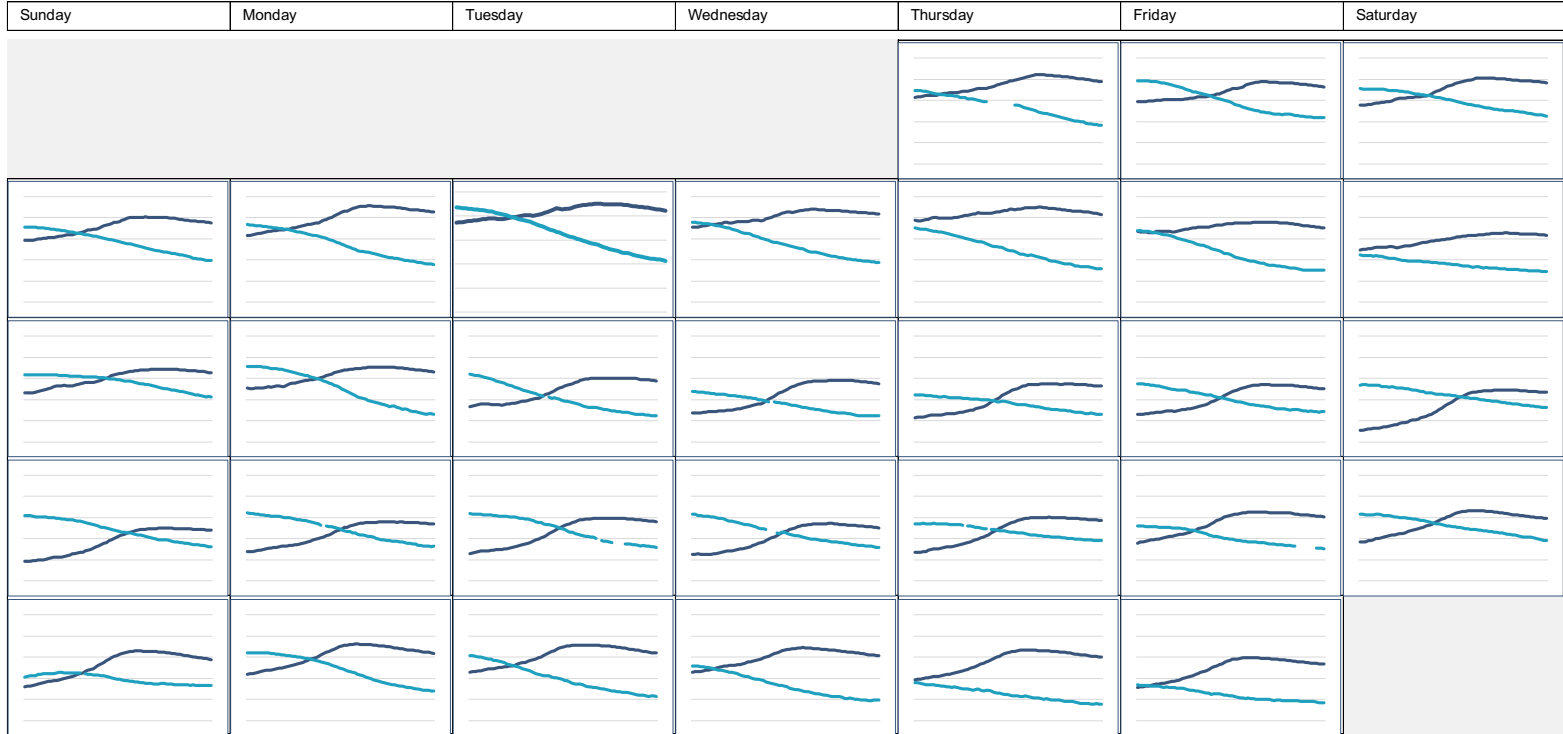
September 6, 2022 – Net Load (MW)



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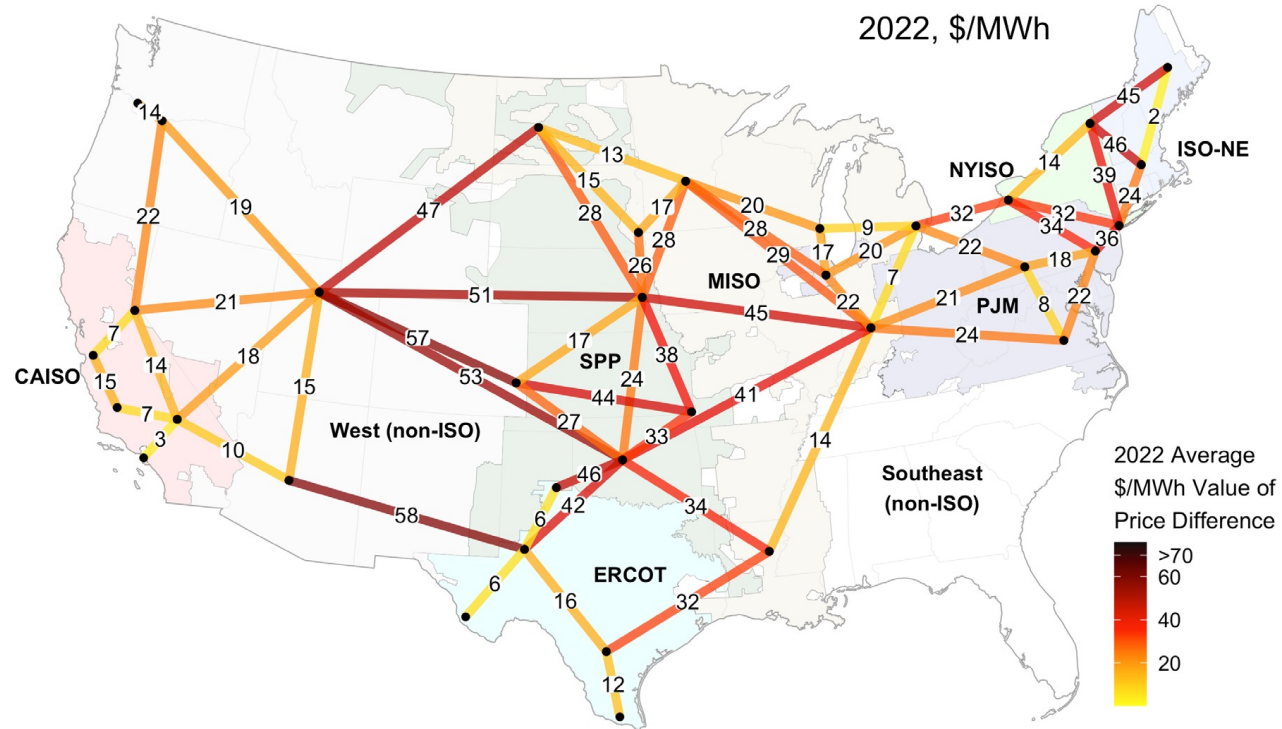
WECC – SPP Trade Provides the Greatest Opportunity

September 2022



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Inter-regional Transmission Value in 2022: Prices Spreads (\$/MWh)





Thank You

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