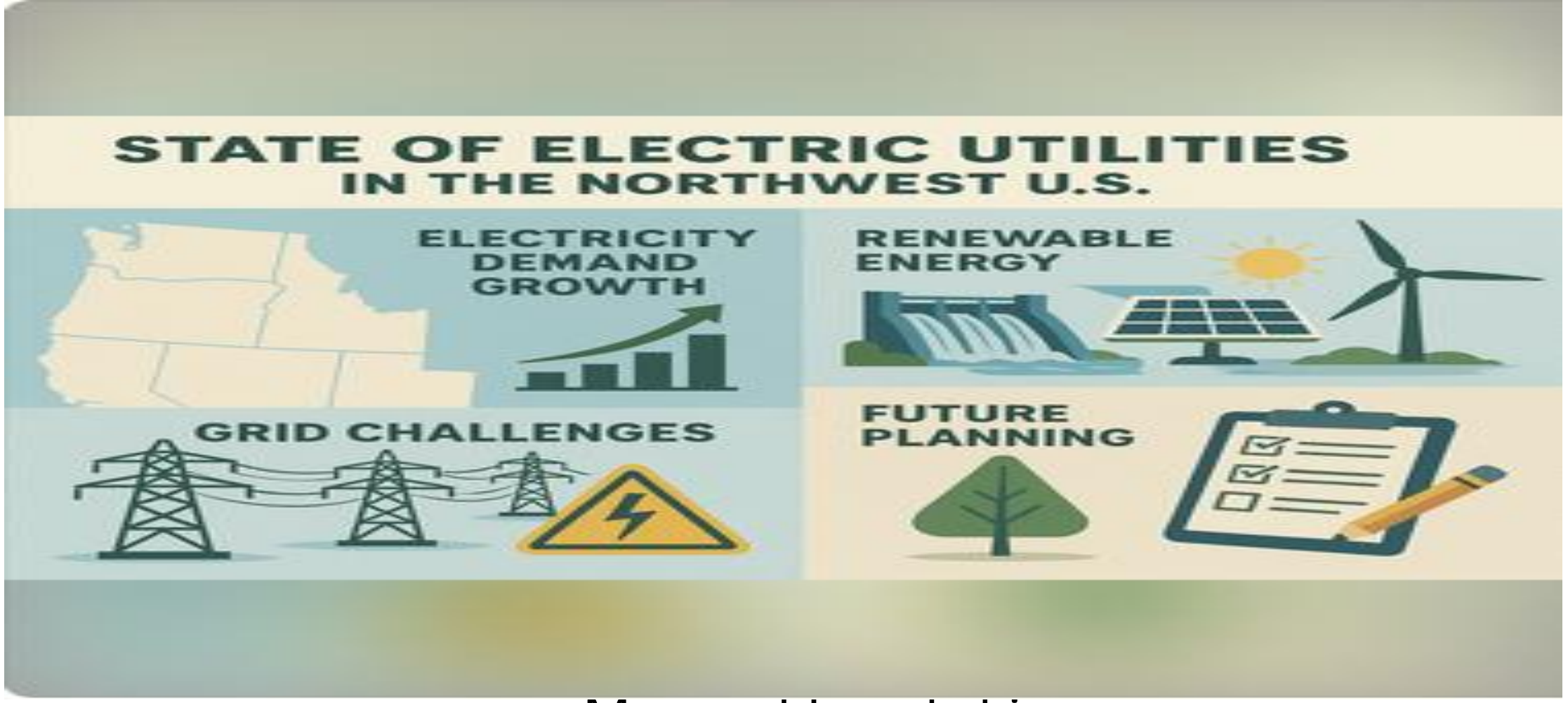


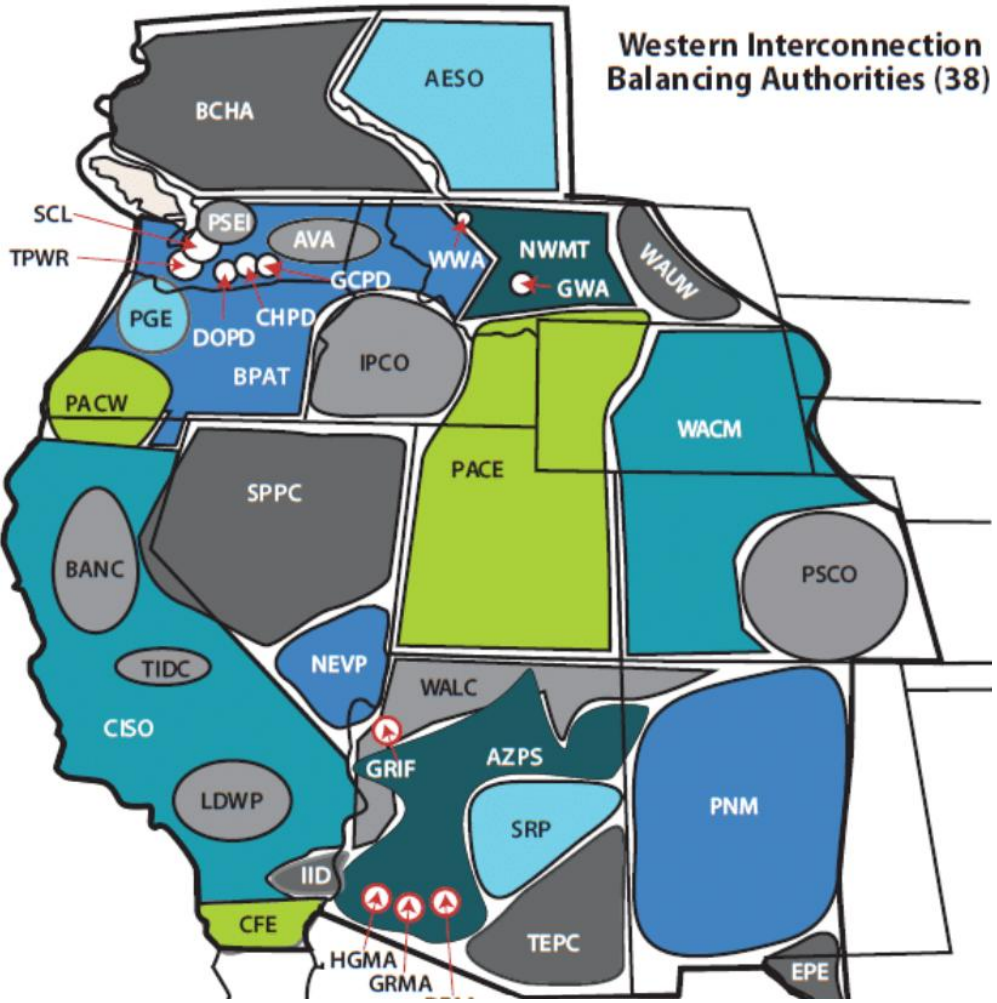
Massoud Jourabchi

Greenway Research Group LLC

Energy 1a

Fairhaven Room

Northwest Power system is part of the Western Electricity Coordinating Council (WECC)



- The Western Interconnection serves a population of over 90 million people. The interconnection spans 1.8 million square miles in all or part of 14 states, the Canadian provinces of British Columbia and Alberta, and the northern part of Baja California in Mexico. 38 balancing Authorities
- Over 400 entities providing power
- Over 156,000 miles of transmission,
- Demand of over 892 million MWH in 2021.
- Summer Peak demand over 167,000 MW
- 295,000 MW of capacity, generating 870,000 GWH

Resource	Capacity GW	Resource	Generation GWh
Battery	4.7		
Coal	24.3	Coal	132,451
Geothermal	4.7	Hydro	219,242
Hydro	74.2	Natural Gas	278,749
Natural Gas	107	Nuclear	59,388
Nuclear	8.3	Other	27,307
Other	4.2	Solar	66,249
Solar	30.8	Wind	85,788
Wind	36.6		

Following 13 Balancing Authorities operate in the four States (WA,OR, ID, MT). They are responsible for moment-by-moment balance of loads and resources overall regional load growth has been about 1% since 2014

Utilities with high growth have higher share of large Data Centers *

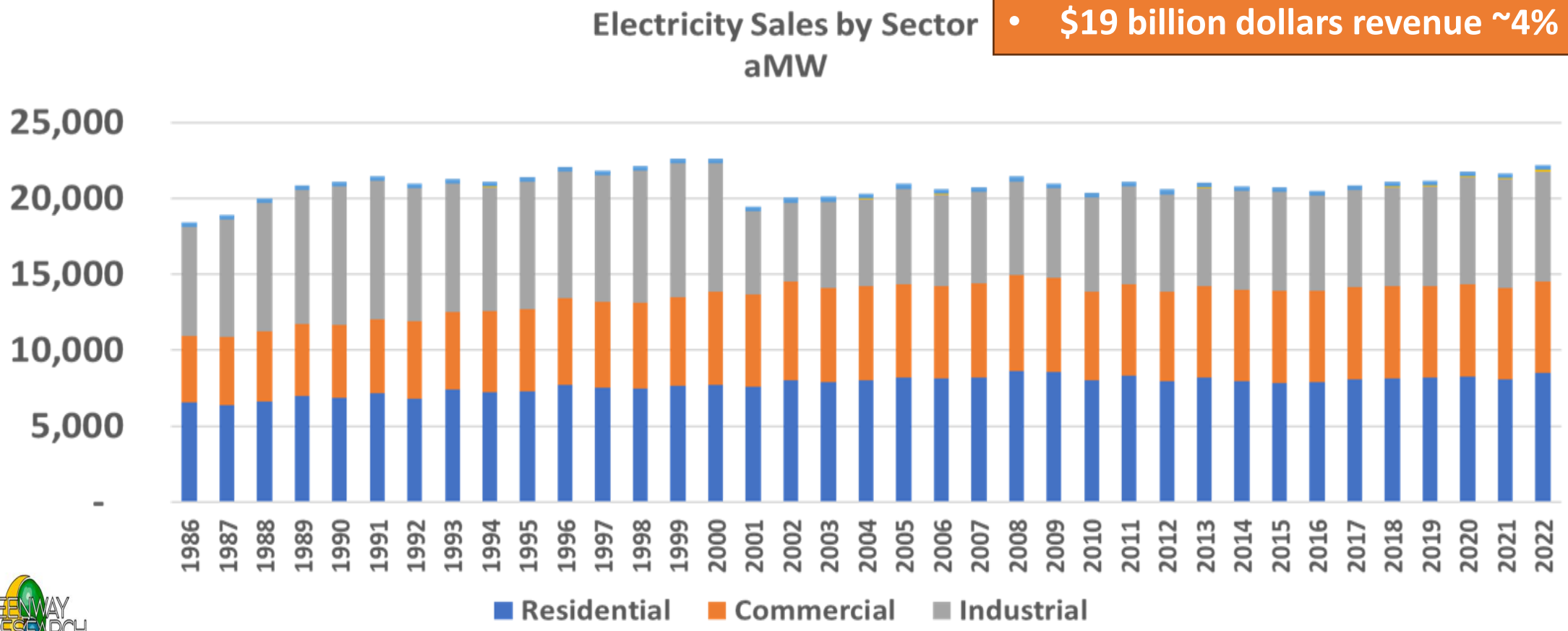
2014-2024 Balancing Area	Average Load	Market Share	Annual Growth
Bonneville	6,337	28%	0.8%
PUD No. 1 of Douglas County	205	1%	4.4%
Idaho Power	2,030	10%	1.0%
Pacificorp West	2,404	11%	0.1%
Chelan County PUD	275	1%	-6.7%
Portland General Electric Co.	2,402	11%	0.9%
Grant County PUD	588	2%	4.4%
Pudget Sound Energy	2,795	13%	0.2%
Seattle City Light	1,106	5%	-0.5%
Tacoma Power	558	3%	-0.8%
Northwestern	1,460	6%	-0.1%
Avista corp	1,300	6%	1.0%
PacifiCorp East (Idaho)	432	2%	-0.1%

* For more on impact of Data Centers/AI on utilities please participate in **Energy Session 3a** - tomorrow morning

Electric Utilities in the Northwest

AAGR	Demand	Retail Price
1970-1982	4.70%	10.40%
1982-2000	1.70%	2.40%
2000-2022	0.12%	3.00%

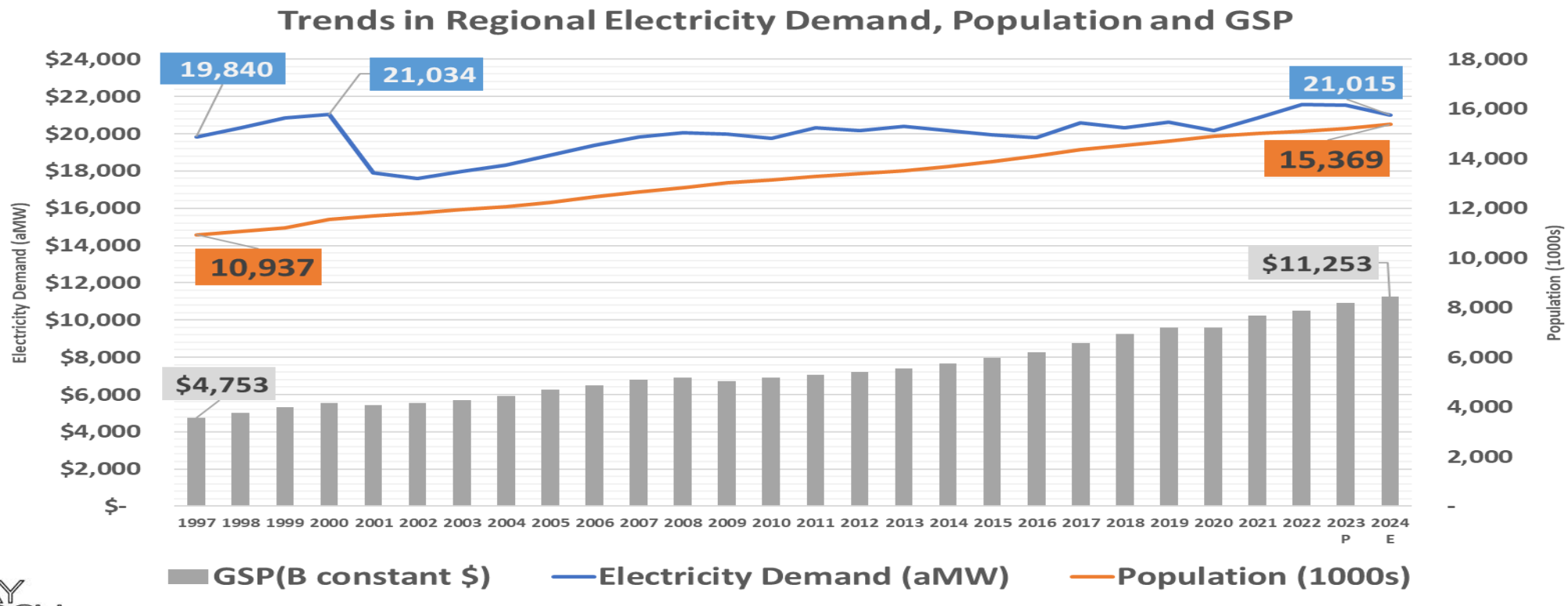
- 8 Investor-Owned Utilities
- 141 Publicly Owned Utilities
- 12 Power marketers
- 3 Behind-the-meter entities
- 7.5 million residential, commercial and industrial customers
- $19 billion dollars revenue ~4% of US



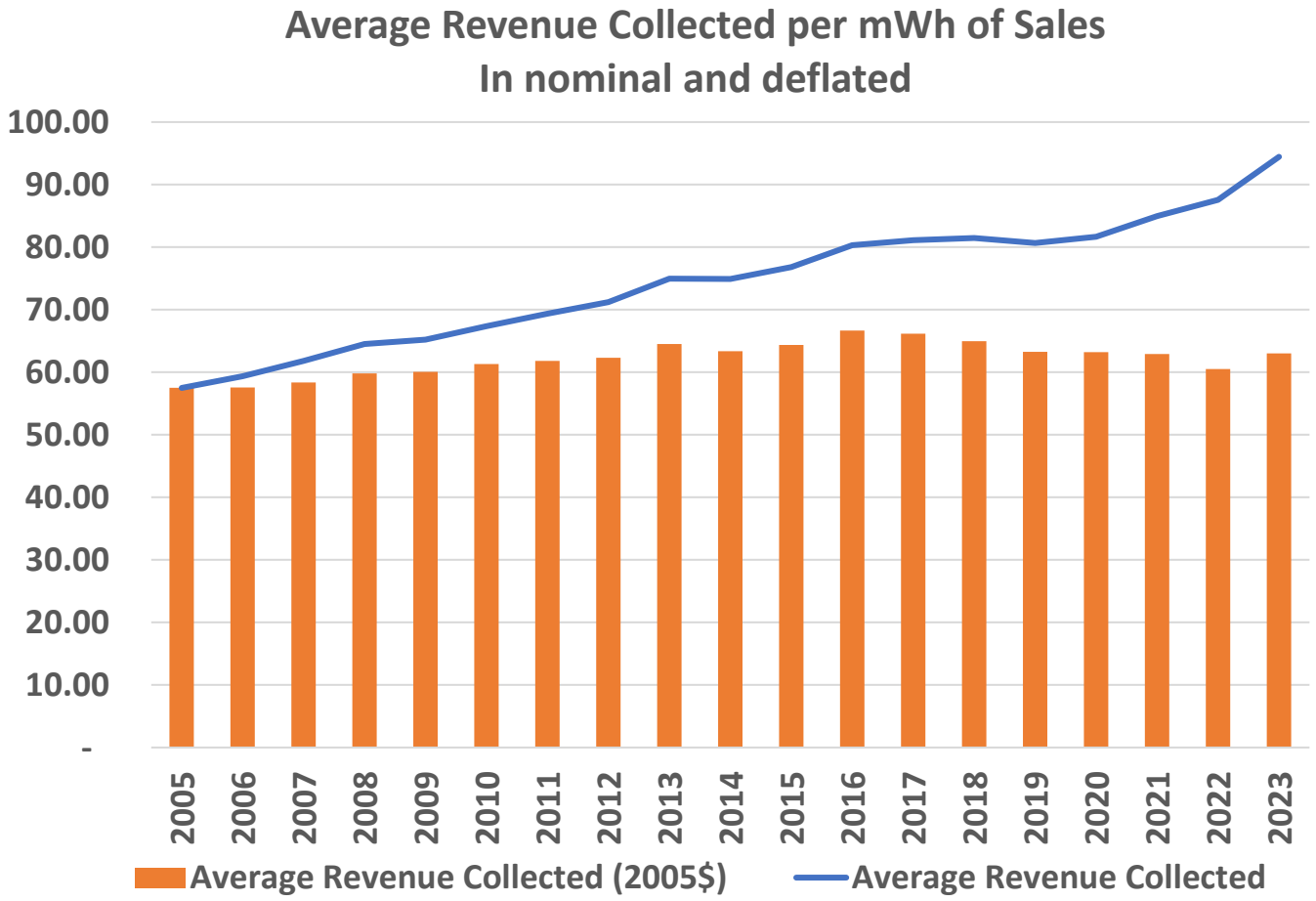
Determinants of Long-term Demand for Power-

Although regional population and economy have grown since 2000, Demand for power has not.

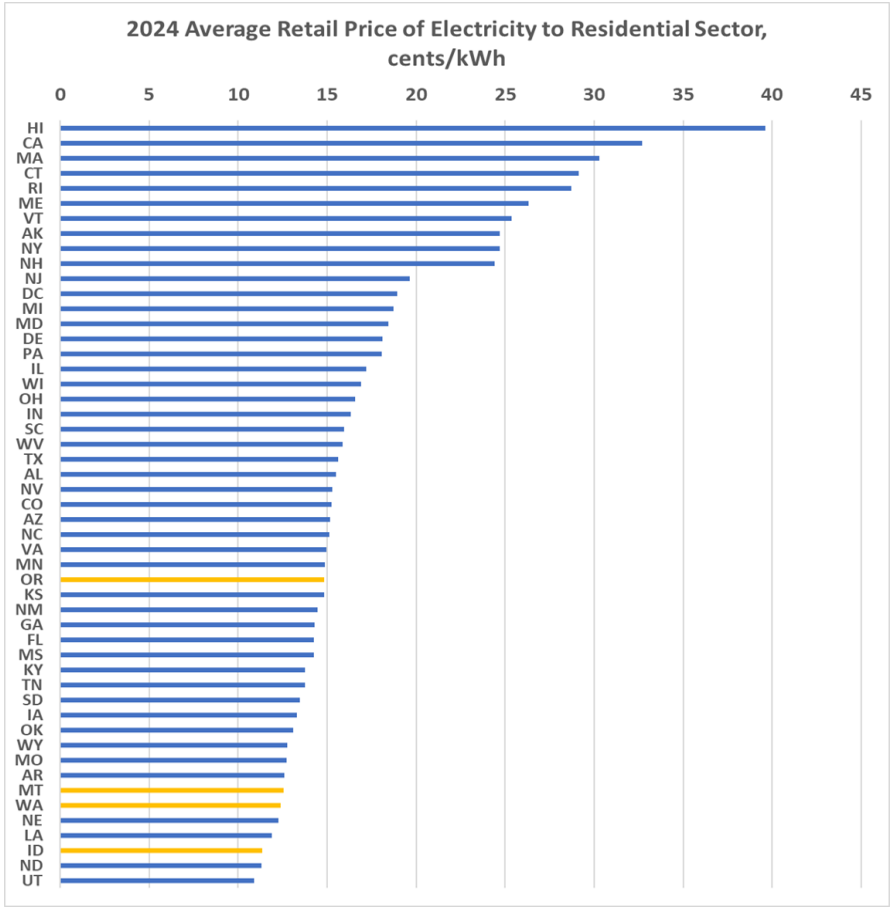
	IDAHO	MONTANA	OREGON	WASHINGTON	Growth since 2000
2024 Population (millions)	2	1.1	4.3	8	34%
2024 GDP (billions Real dollars)	100	58	265	702	203%
Electricity Demand 2024 P	2,900	1,800	6,000	10,000	-0.09%



How Power Rates are set and
How regional power rates compare to other states?



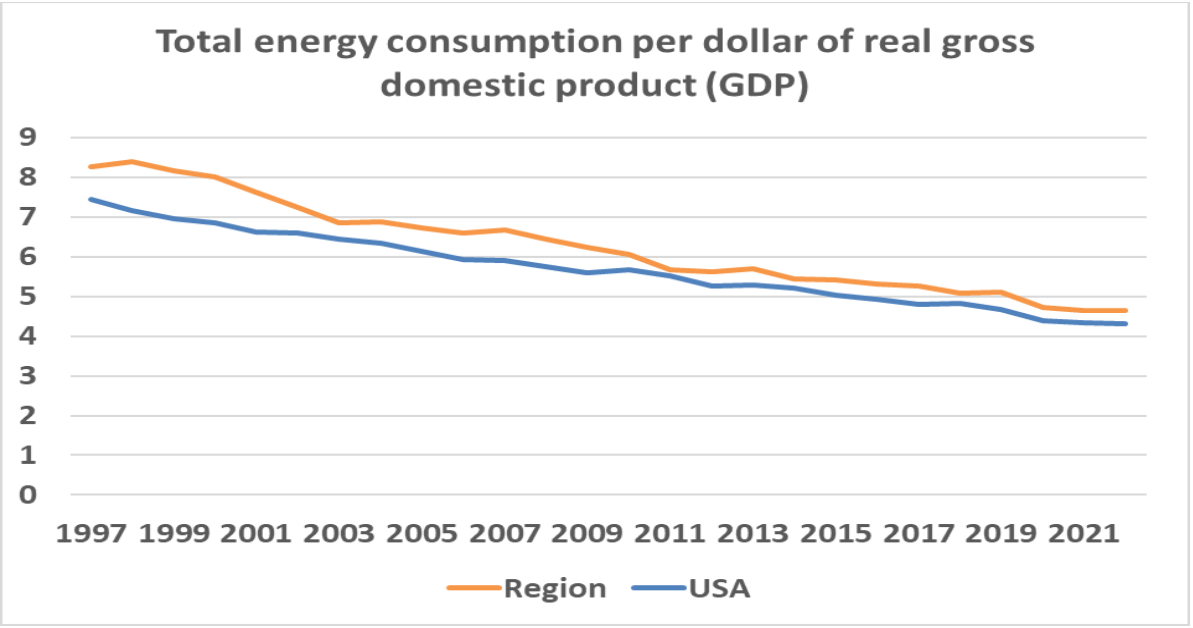
Residential (Cents/KWH)	2023	2024	(% Change)
Washington	11.4	12.4	9%
Idaho	11.5	12.4	8%
Montana	13.2	13.5	3%
Oregon	13.2	15.2	15%
US Average	16.3	16.8	3%

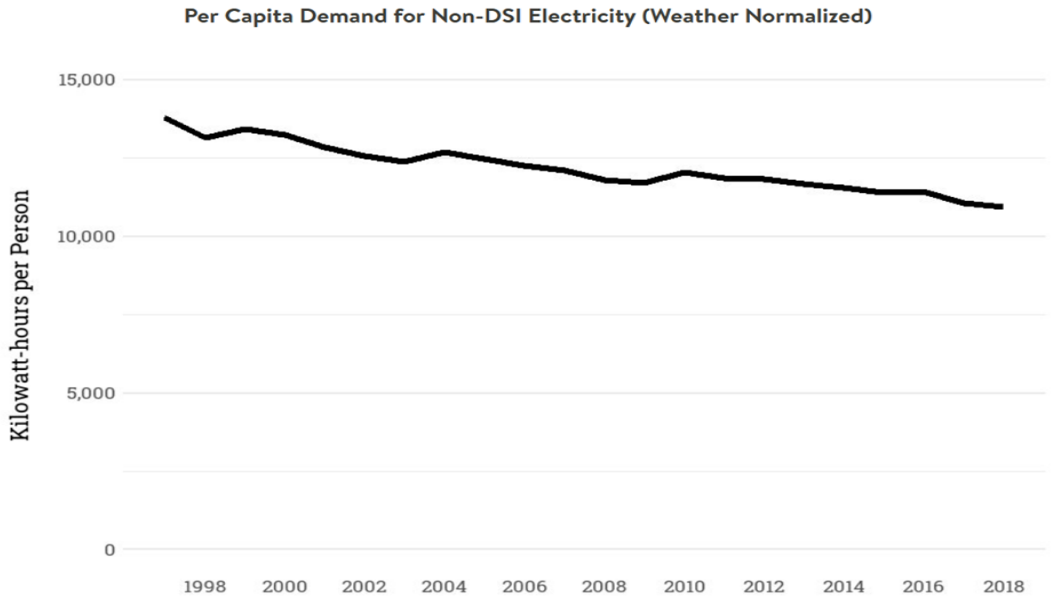


Regional Electric Bills have been Fairly Stable (in Real terms) over the past 20 years, with some recent sharp increases

Why Regional Power Rates have been Low?

Doing More with Less





Historically regional power prices have been low compared to other states and two major factors can explain this:

1. **Change in industrial mix, moving away from low value high-power intensity products (Aluminum and wood)**
2. **Investments in energy efficiency programs**

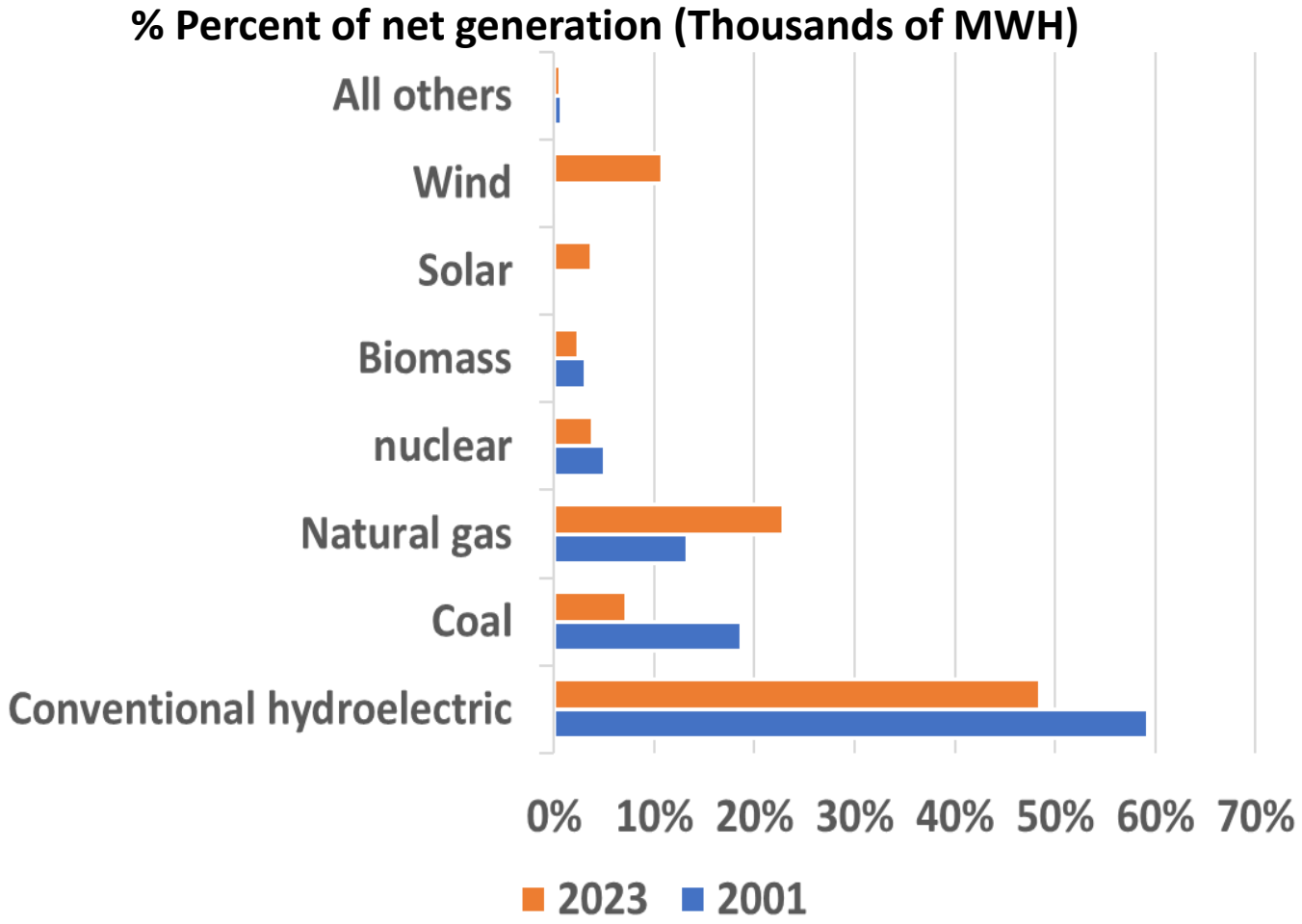
However, Future

- **Required investment in Renewables,**
- **Calls for Electrification of economy,**
- **Increased variance in regional temperatures**

Can raise Power Prices

Impact of Weather on Generation

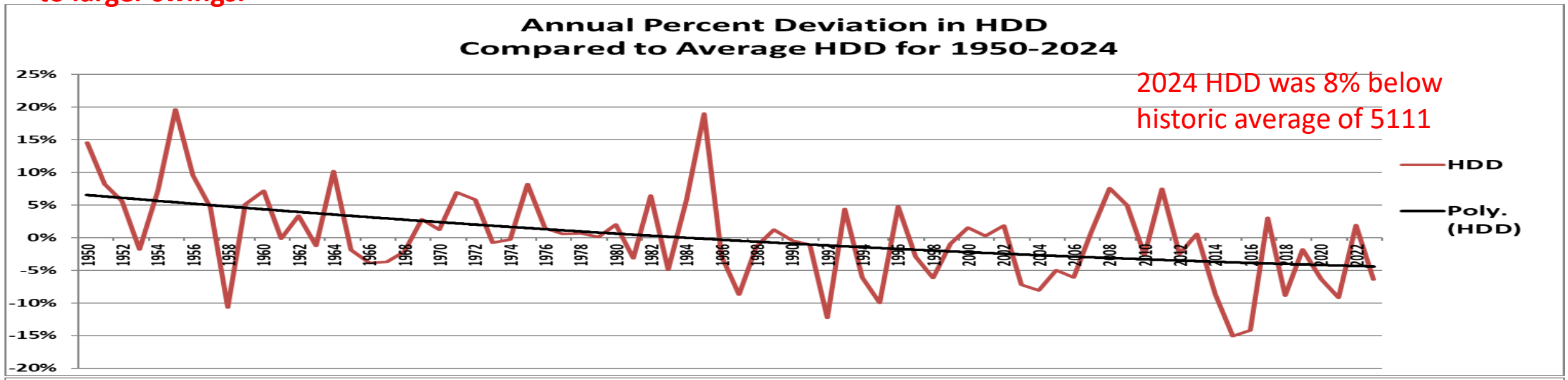
Renewables, including conventional hydro makes up 63% of regional resources exposing regional power generation to climate change fluctuations

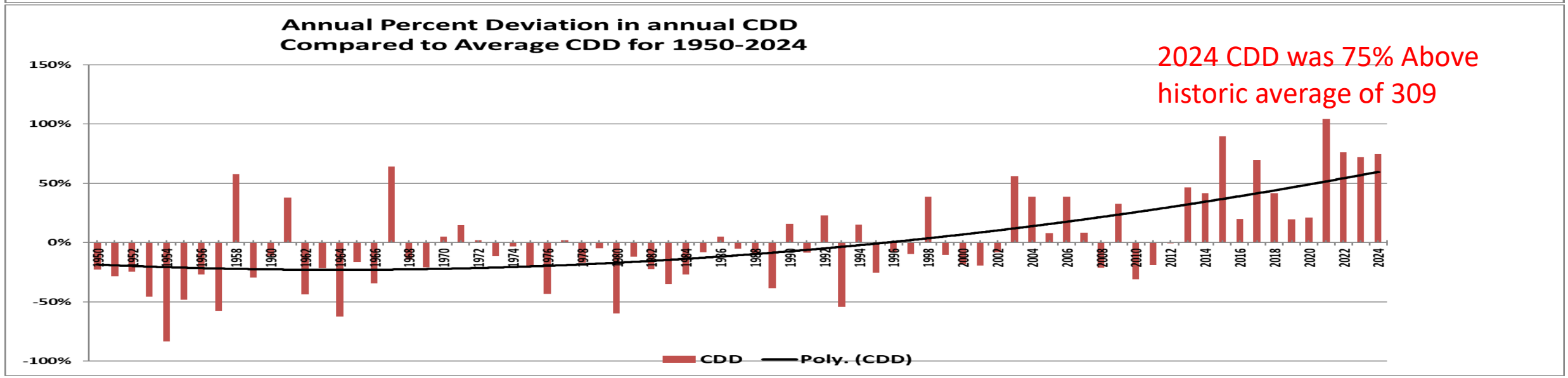


Source EIA 923

Impact of weather on Loads

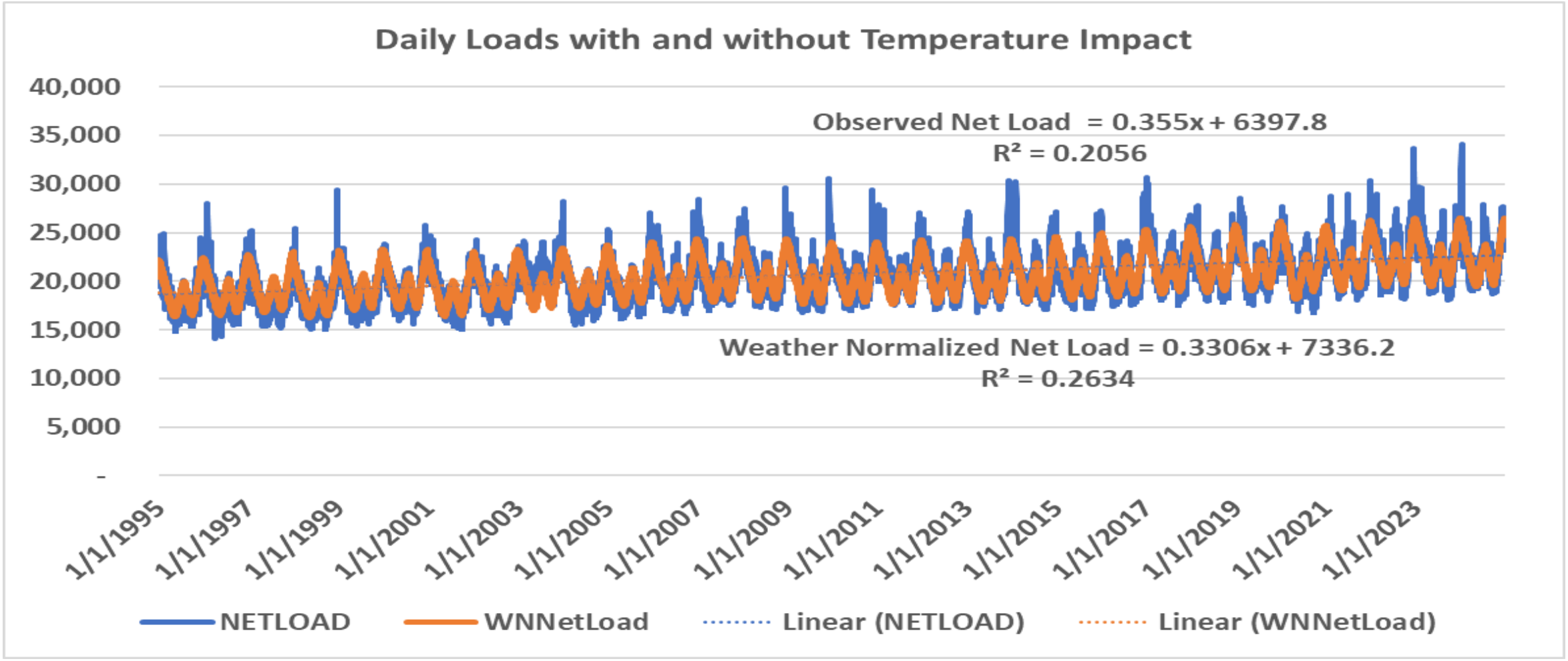
Increasing fluctuations in temperatures and increasing penetration of space conditioning exposes regional power demand to larger swings.



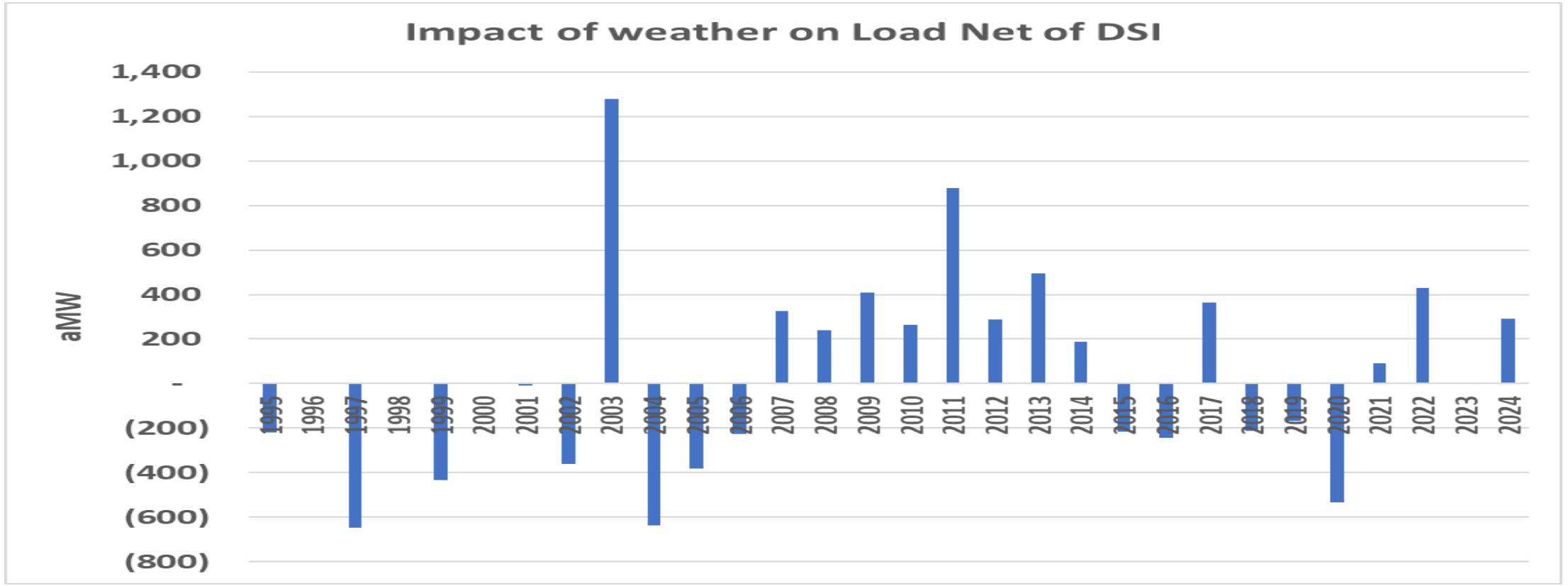


Isolating impact of weather

When temperatures and loads were normalized using econometric relationships full impact on fluctuations on loads can be measured

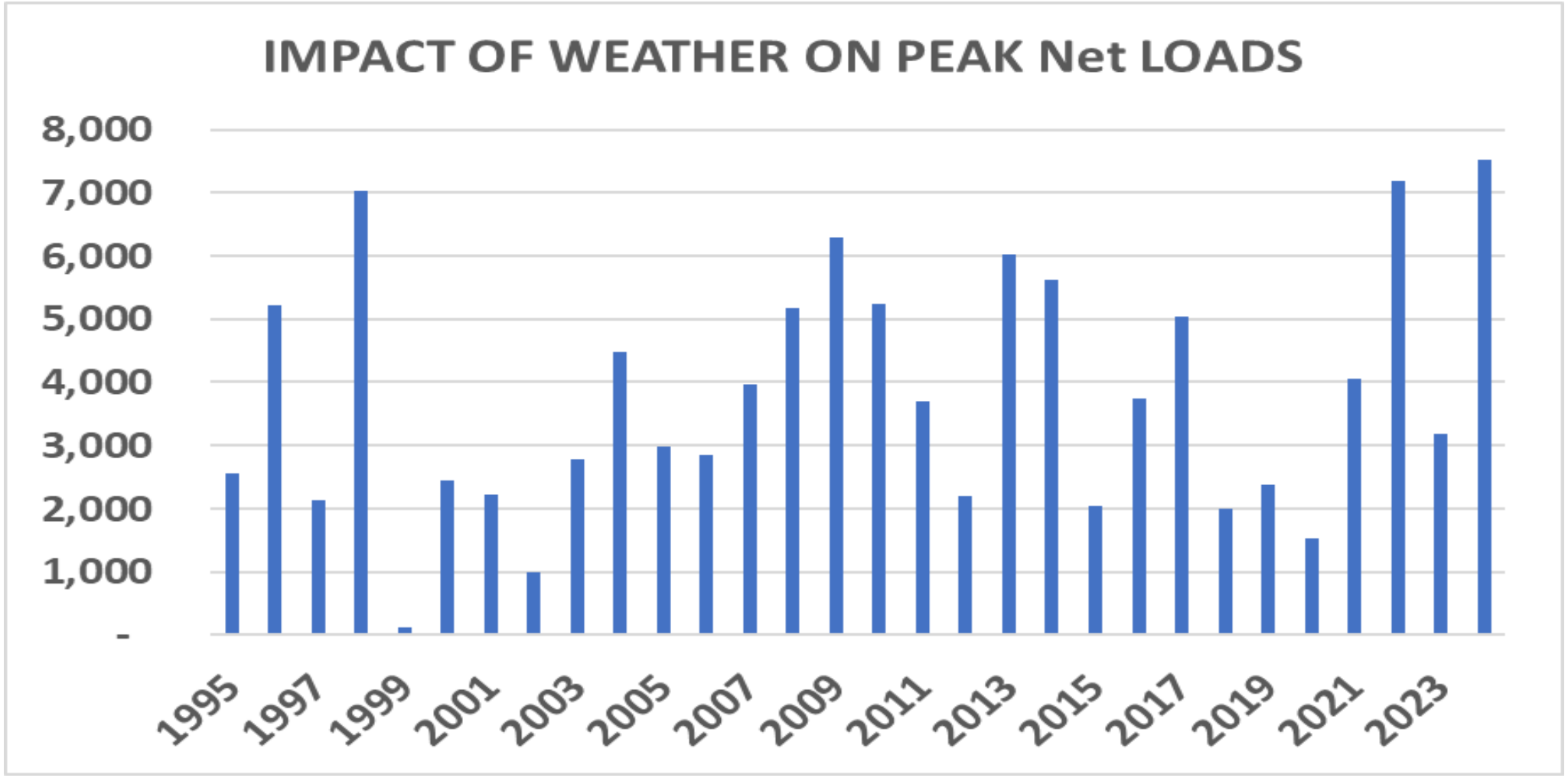


Impact of weather on Energy loads (Netting of DSI) on Annual Basis

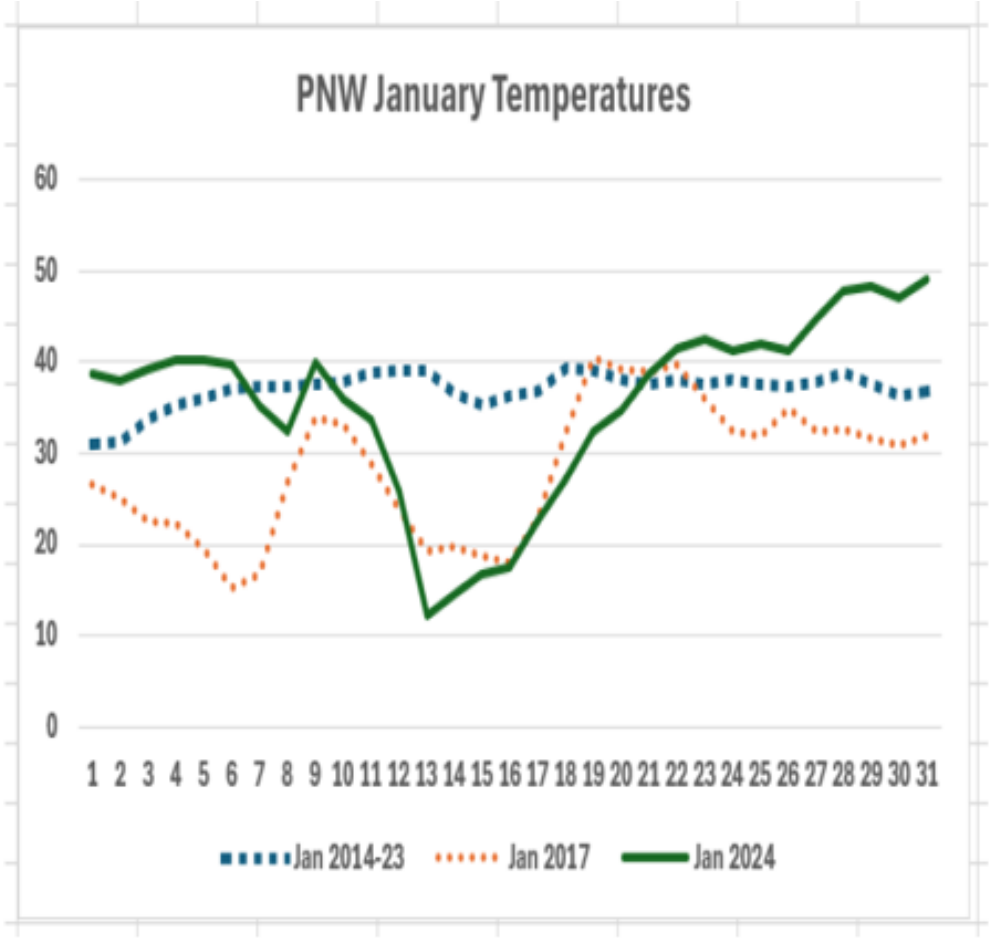


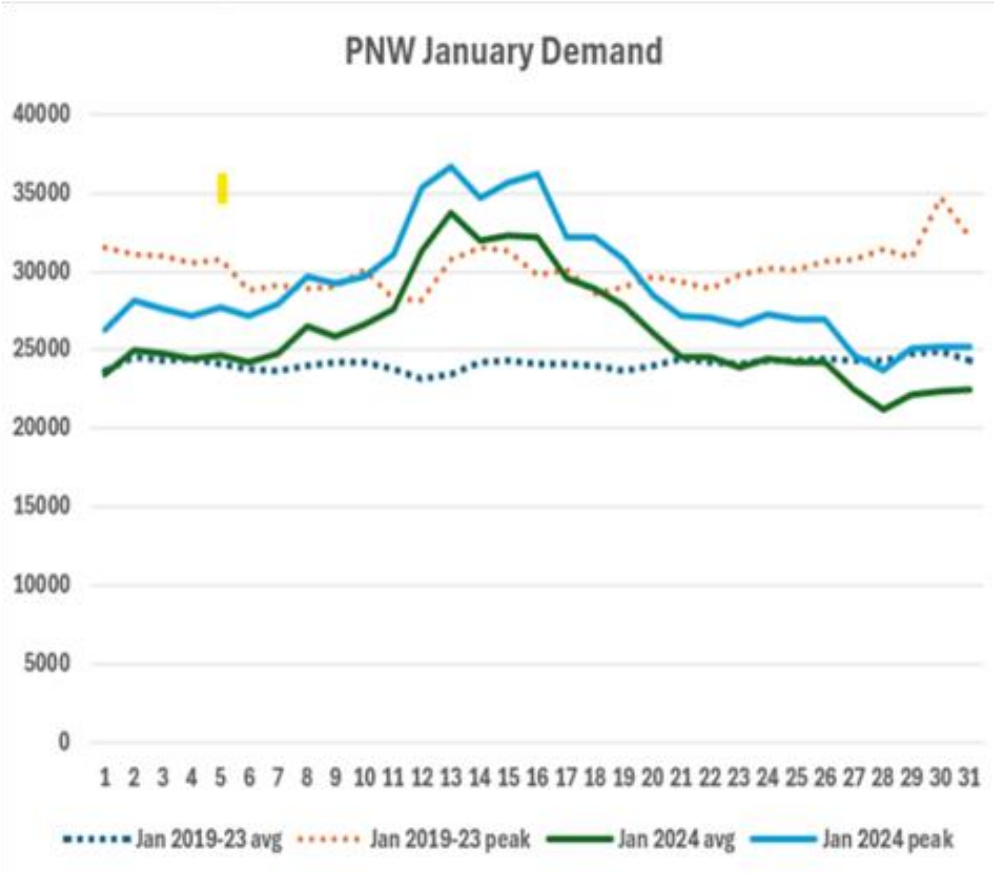
positive values indicate observed load were above normal weather load

Weather has more Peak Load impact than Data Centers or EVs



An example of impact of temperatures on loads can be seen on January 2024



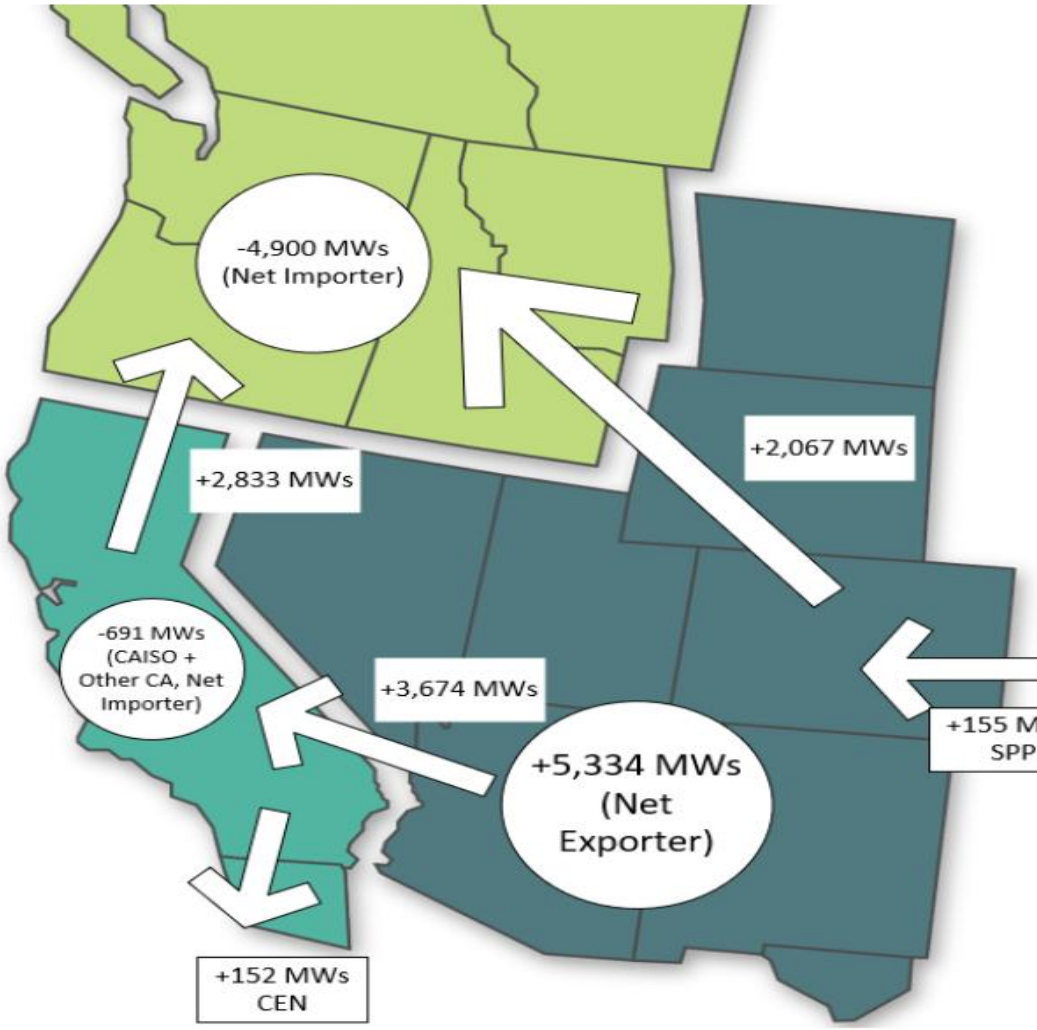


With permission from Fred Heutte NWEC. Presentation to WCEA Resource Adequacy Working group

The entire West provided support for the Northwest

During the January 2024 Event, the U.S. region declared reliability, emergencies, experienced elevated wholesale market prices, and required substantial imports from outside the region, the majority of which were supplied from entities in the U.S. Southwest and Rockies region

Inadequate capacity during peak demand hours, and
Insufficient fuel supply across the multi-day event.

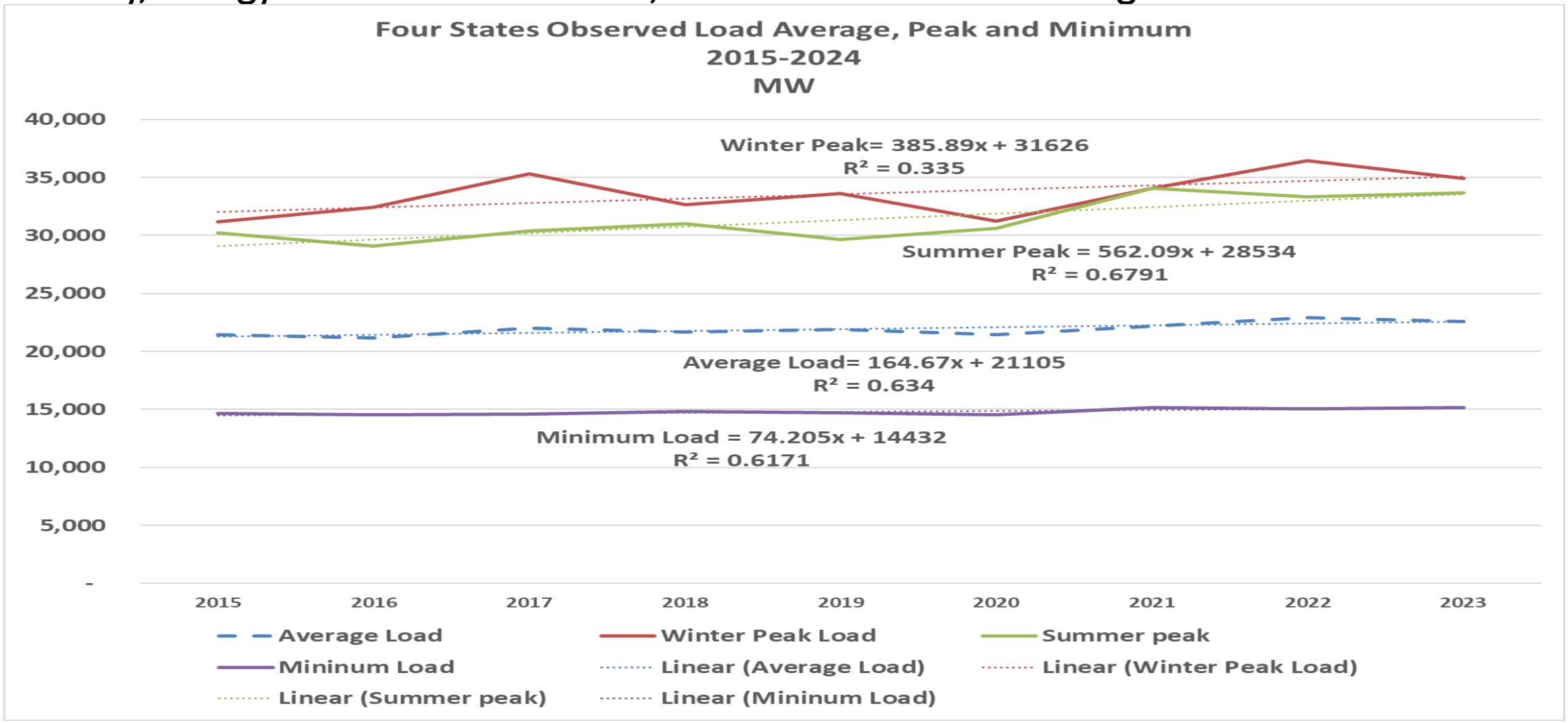


Western Power Pool

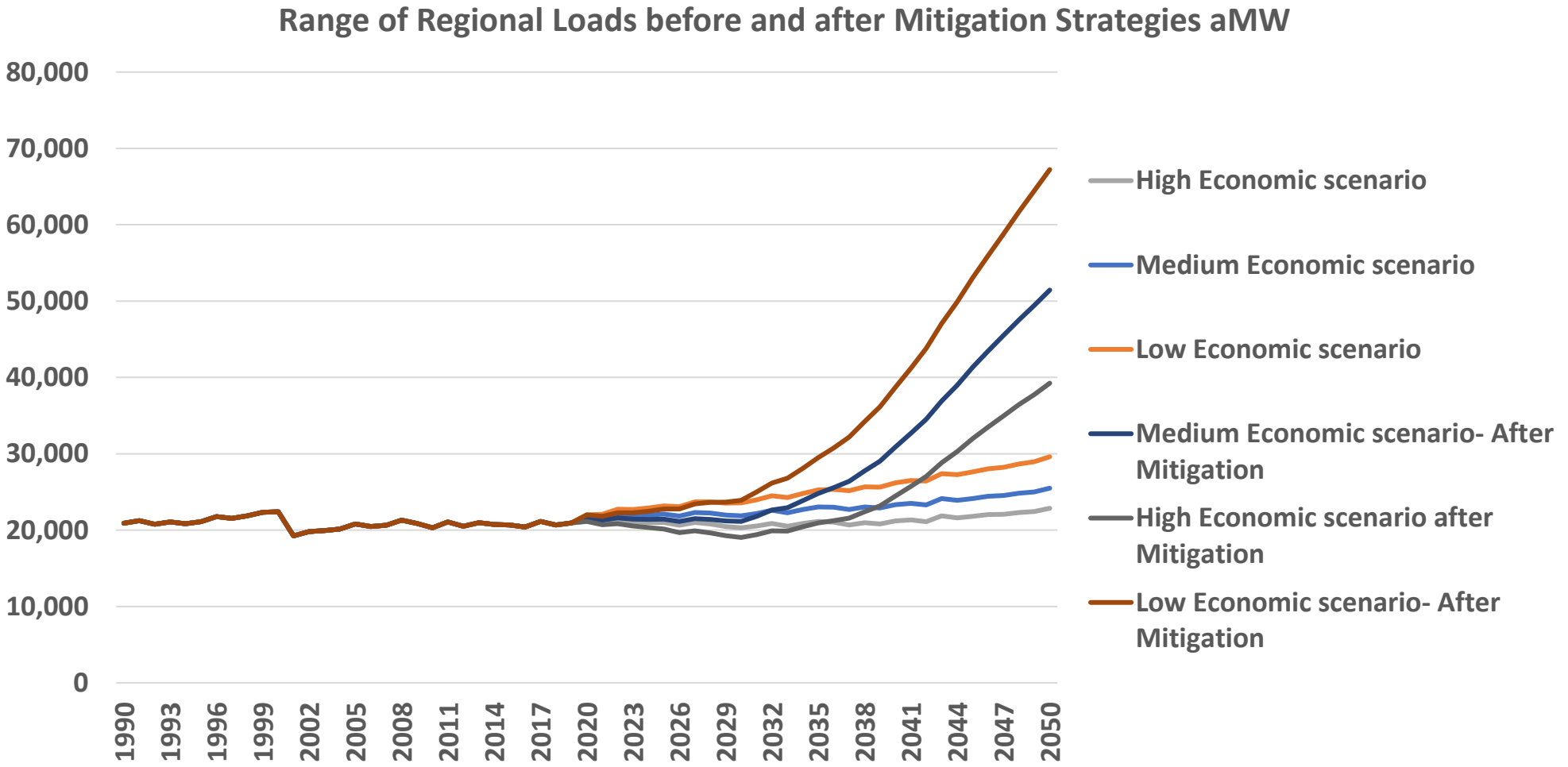
- **Imports via the AC Intertie and the Energy Imbalance Market made up for a lot of the hydro deficit**

With permission from Fred Heutte NWEC. Presentation to WCEA Resource Adequacy Working group

Utilities are responsible for making sure supply and demand in their system are met constantly.
(Load is equal to sum of Demand and Transmission and Distribution Losses)
Historically, Energy loads has been stable, with Peak Loads fluctuating due to weather.



Electrification Strategies will Increase Regional Loads Significantly 200% or More over the next 30 years.



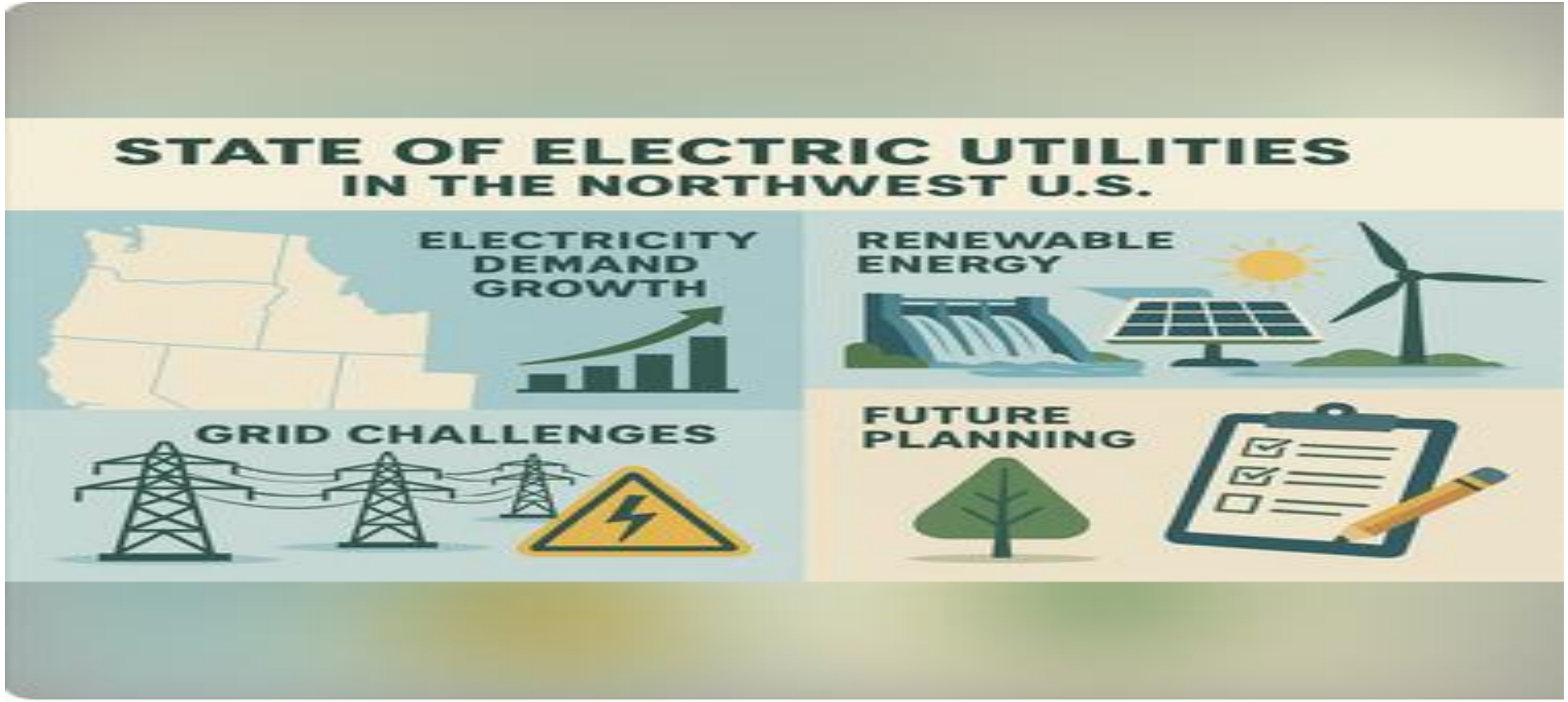
These forecasts were recently updated.

Our next speaker Steve Simmons will present these updates, next.

In summary

- Northwest population and economy are powered by a large mix of electric utilities both within the region and west-wide (includes Canada)
- Variations in Peak loads are dominated by weather fluctuations
- Retail power rates are expected to increase in the near-term.
- Future growth in demand for power is expected to come from
  - Decarbonization – through both mitigating and adapting policies in response to climate change
  - Data Centers (hyperscale's)
  - Impact of weather on peak loads could greater than impact of new Data Centers or EVs .
- Utilities will face serious challenges to provide reliable power and meet climate change goals at the same time.

Questions?


STATE OF ELECTRIC UTILITIES
IN THE NORTHWEST U.S.
ELECTRICITY DEMAND GROWTH
RENEWABLE ENERGY
GRID CHALLENGES
FUTURE PLANNING