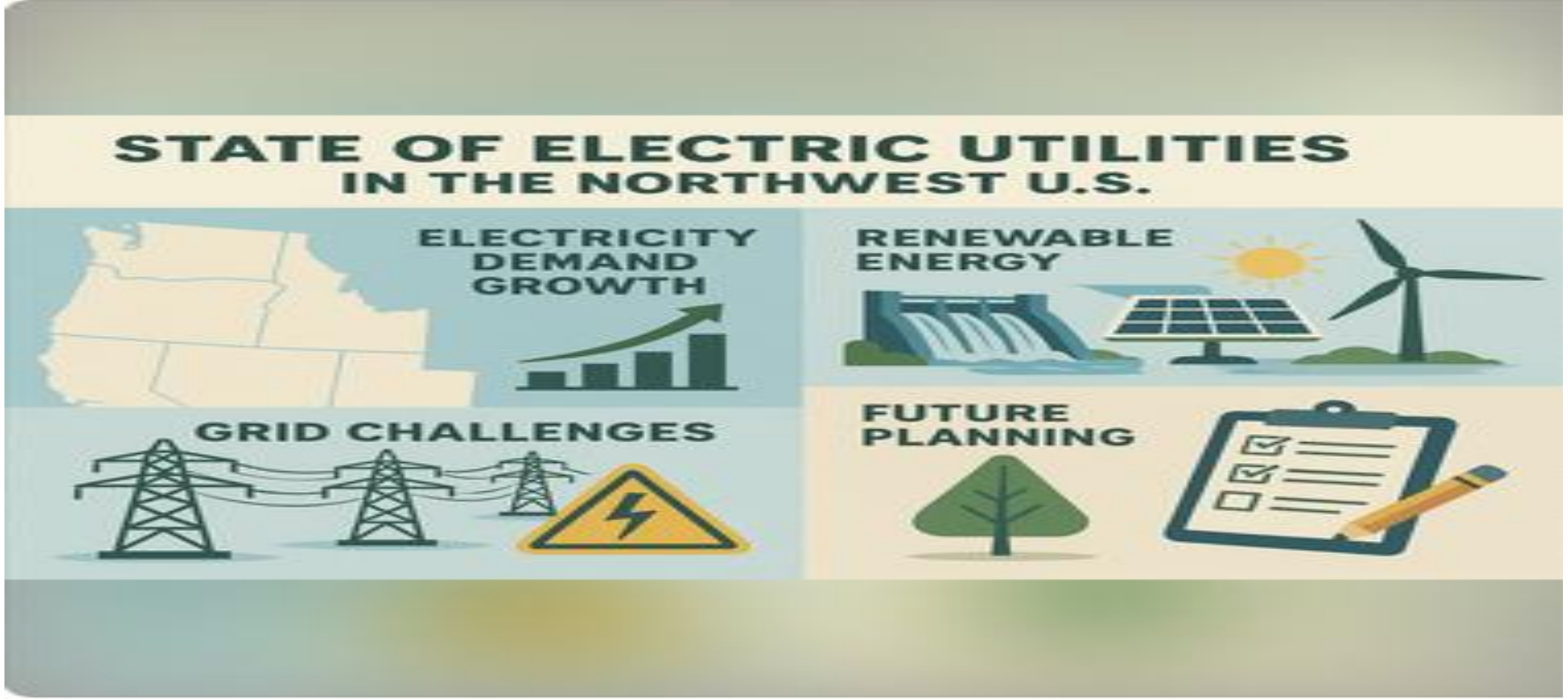


Massoud Jourabchi

Greenway Research Group LLC

In today's Chat:

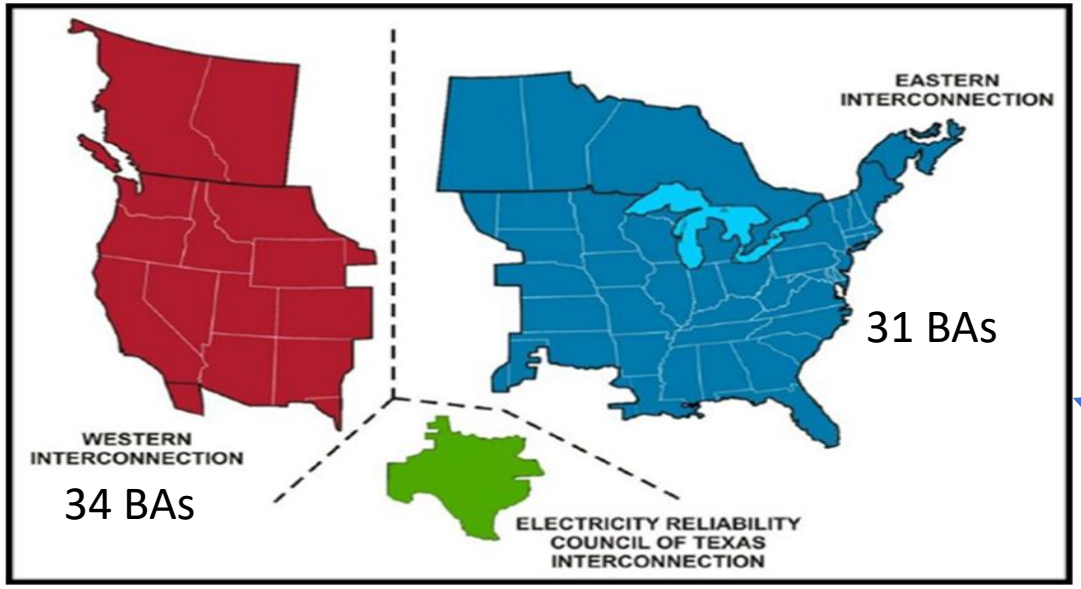
- Brief overview of Regulatory Framework that Electric Utilities Operate Under
- Northwest utilities in the context of Western Electricity Coordinating Council (Interconnection)
- Electric Utility Retail Sales, Revenues, Rates and Bills in recent years

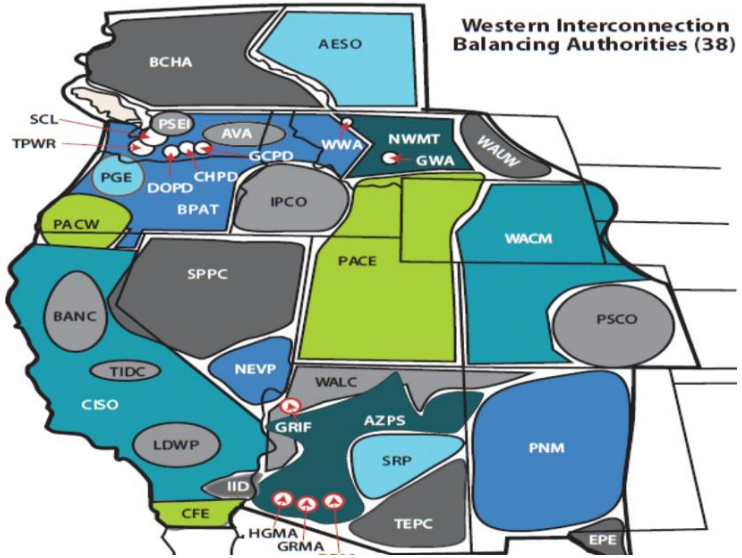
- Trends in Demand and Loads (Energy and Peak)

- Who and How, Electric Rates are set

here.

Before you can turn on the lights, utilities have to operate in a swimming pool of acronyms from FERC to NERC, to WECC, to BAs, ISO, RTO, & PUC…





Federal Energy Regulatory Commission (FERC)
Responsible for interstate commerce and reliability and security of the national electric grid

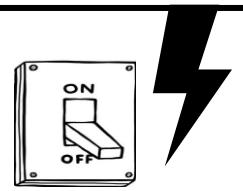
National Electric Reliability Commissions (NERC) Develops and enforces reliability standards for the bulk power system.

Three Interconnection Regions in the East, West and Texas
Western Electric Coordinating Councils (WECC)

Balancing Authorities : Responsible for matching electricity supply and demand in real-time. 31 in the East, 34 in the West

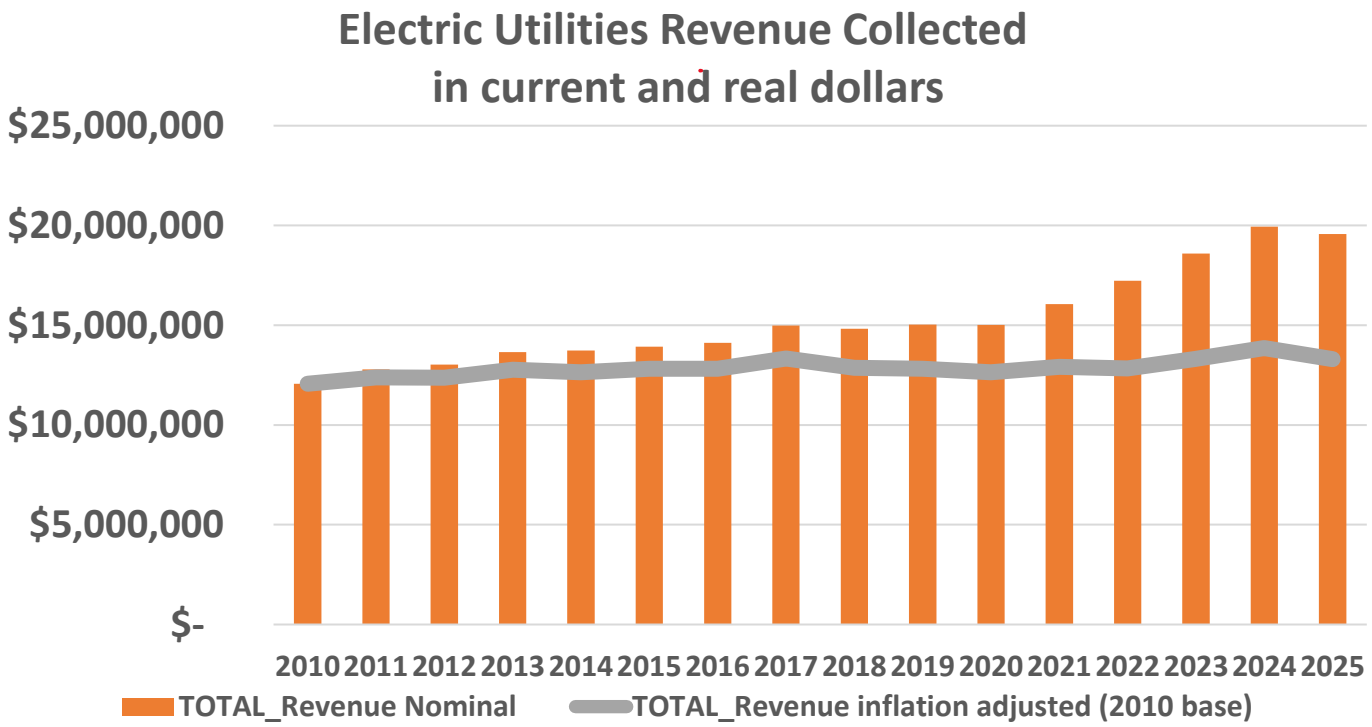
State Public Utility Commissions: setting rates

Local Utility



Growth in Demand for Electricity in the NW has been slow. Since 2010 Energy grew at 0.6% and Peaks grew at 0.9% annually

- **7.5 million customers (res, com, ind.)**
- **$20 billion dollars revenue, roughly ~4% of US**
- **8 Investor-Owned Utilities**
- **155 Publicly Owned Utilities**
- **12 Power marketers**
- **3 Behind-the-meter entities**



2010-2025 Average Annual Growth Rate%	Energy	Peaks (Non-coincident)
BPA	0.8%	0.7%
Douglas County PUD	4.0%	2.3%
Idaho Power	1.0%	1.3%
Pacificorp West	0.2%	0.7%
Chelan County PUD	-3.0%	-0.9%
Portland General Electric Co.	1.0%	1.4%
Grant County PUD	3.4%	2.9%
Puget Sound Energy	0.1%	0.2%
Seattle City Light	-0.3%	-0.1%
Tacoma Power	-0.5%	-0.4%
Northwestern	1.4%	2.7%
Avista corp	-0.3%	-0.6%
PAC E ID	1.1%	4.9%
Four States	0.6%	0.9%

Utilities highlight in yellow, have higher number of large data centers

Power Consumption of Large Data Centers has been going up But

	2006	2021	2023
US Data Centers (TWH) National level	61*	150*	180*
Total US Electrical Consumption (TWH)	3660	3800	3680
DC electricity demand as % of national electricity demand	1.5%	4%	5%

While total US demand for electricity has been flat, electricity demand from large data centers have gone up 300%.

This indicates gains in efficiency in other sectors.

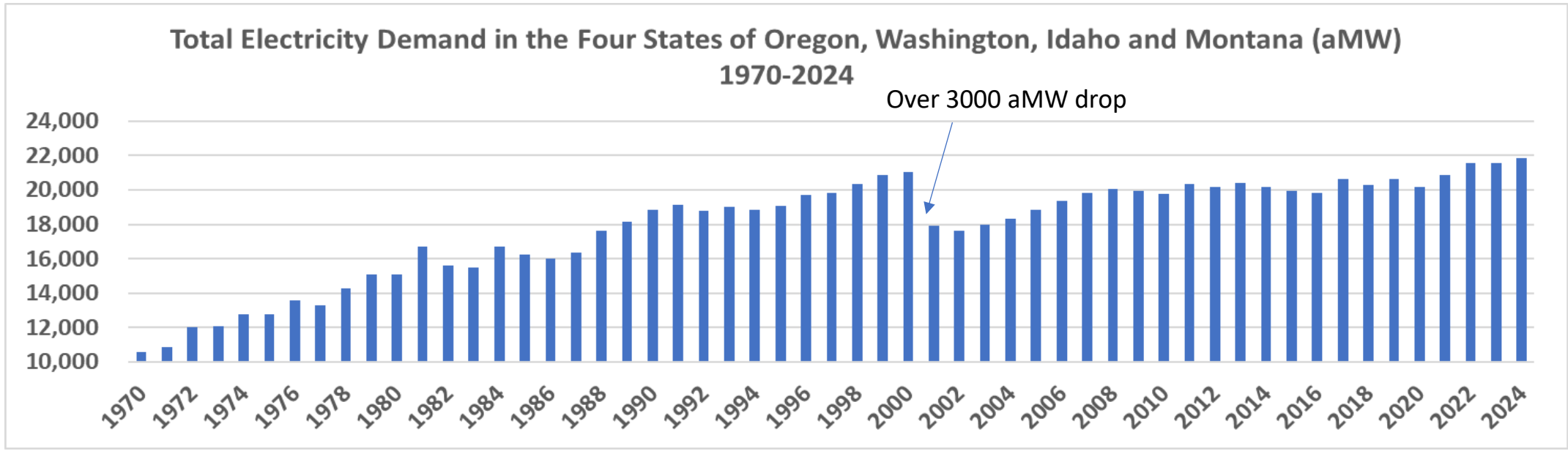
*- LBL National Assessment of Large data centers 2024 report
https://escholarship.org/uc/item/32d6m0d1

Past Trends in Electric Demand in the Northwest show significant slowdown

AAGR **	Demand	Retail Price
1970-1982	4.70%	10.40%
1982-2000	1.70%	2.40%
2000-2024	0.17%	3.00%

** Robust regional conservation investments have been able to achieve demand reductions. Since 1980, the region has saved **8,042 average megawatts (aMW)** of electricity through energy efficiency, enough to power eight cities the size of Seattle.

Energy efficiency has met more than half of region's load growth since 1980.



Preliminary data suggests 2025 demand decreased further and YTD 2026 has been lower than 2025

Source: EIA SEDS dataset

Determinants of Electrical Demand (Energy and Peak)

Energy

- long-term demand for electricity is driven by:
  - Economic drivers (population, demographic changes, employment, income, rates)
  - Policy mandates (electrification, resource retirement, Renewable Portfolio Standards)
  - Investments in efficiency and load management (utility programs, codes and standards)
  - Climatic Trends

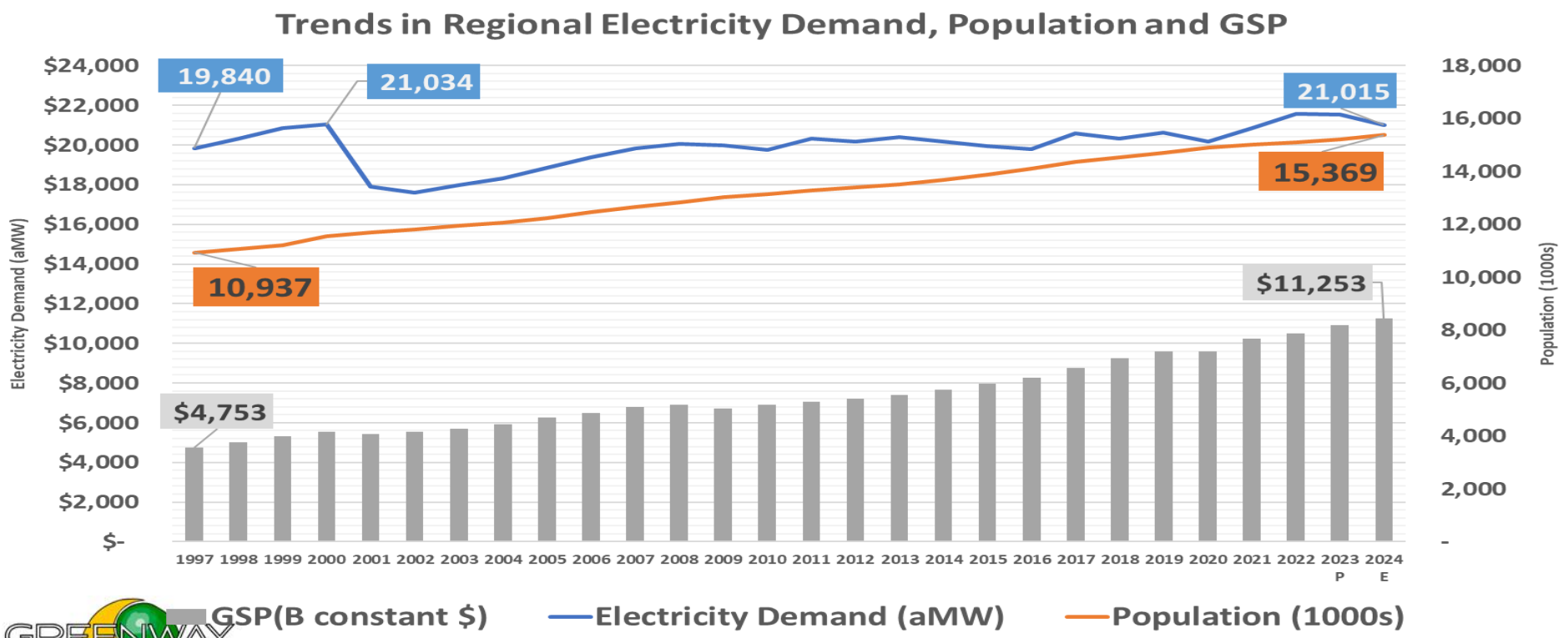
Peak

- shorter-term, rapid change in hourly and daily temperatures cause large swings in peak demand

Determinants of Long-term Demand for Power (Energy)

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

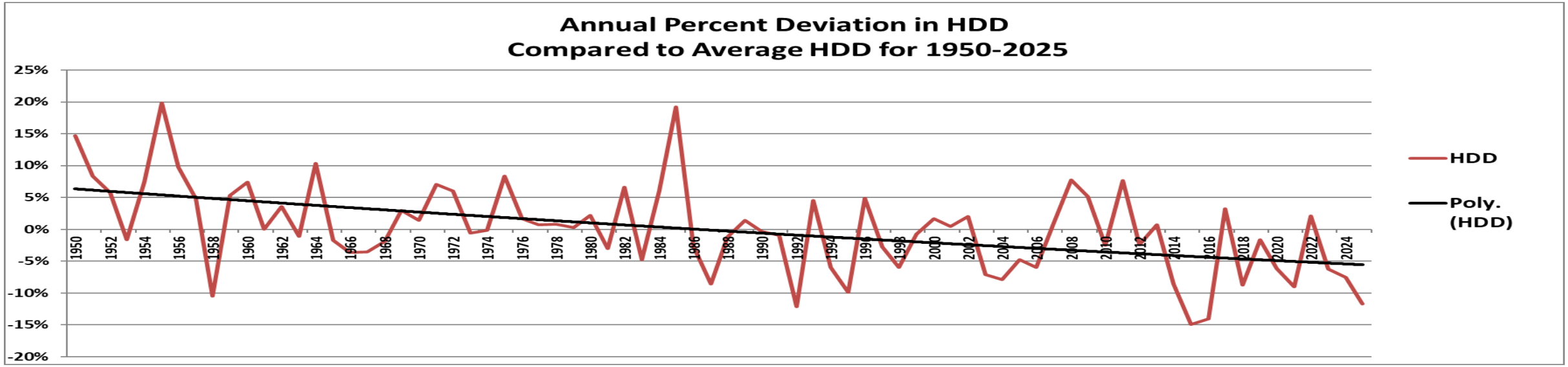
2000-2025	IDAHO	MONTANA	OREGON	WASHINGTON	Growth since 2000
2025 Population (millions)	2	1.1	4.3	8	34%
2025 GDP (billions Real dollars)	102	62	266	715	107%
Electricity Demand 2024	2,900	1,800	6,000	10,000	-0.09%

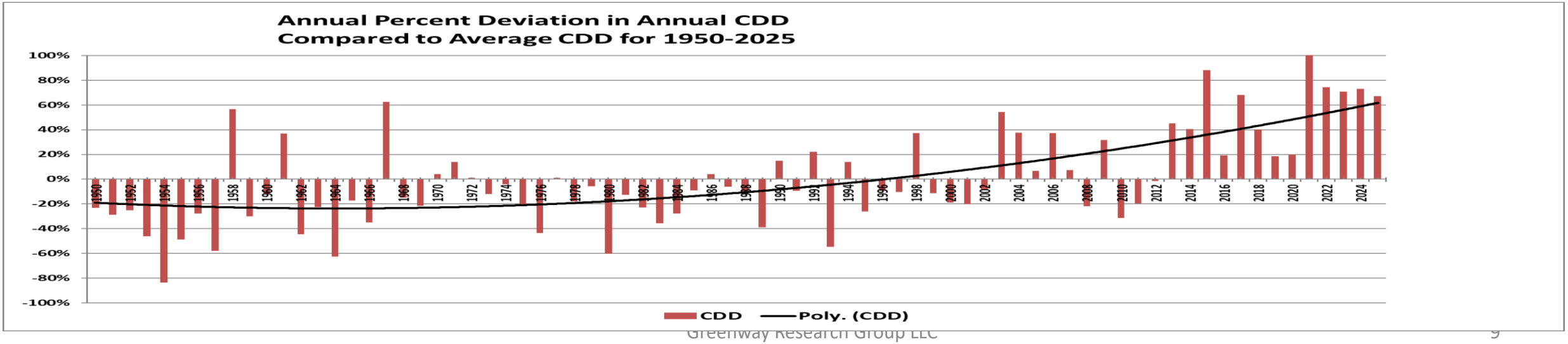


Future demand for electricity is heavily influence by variation in Temperatures, Climate Mitigation/ Adaptation Strategies. Conservation investments. Policies in Electrification of Transportation, Economy, Data Centers, etc.

Impact of weather on Loads

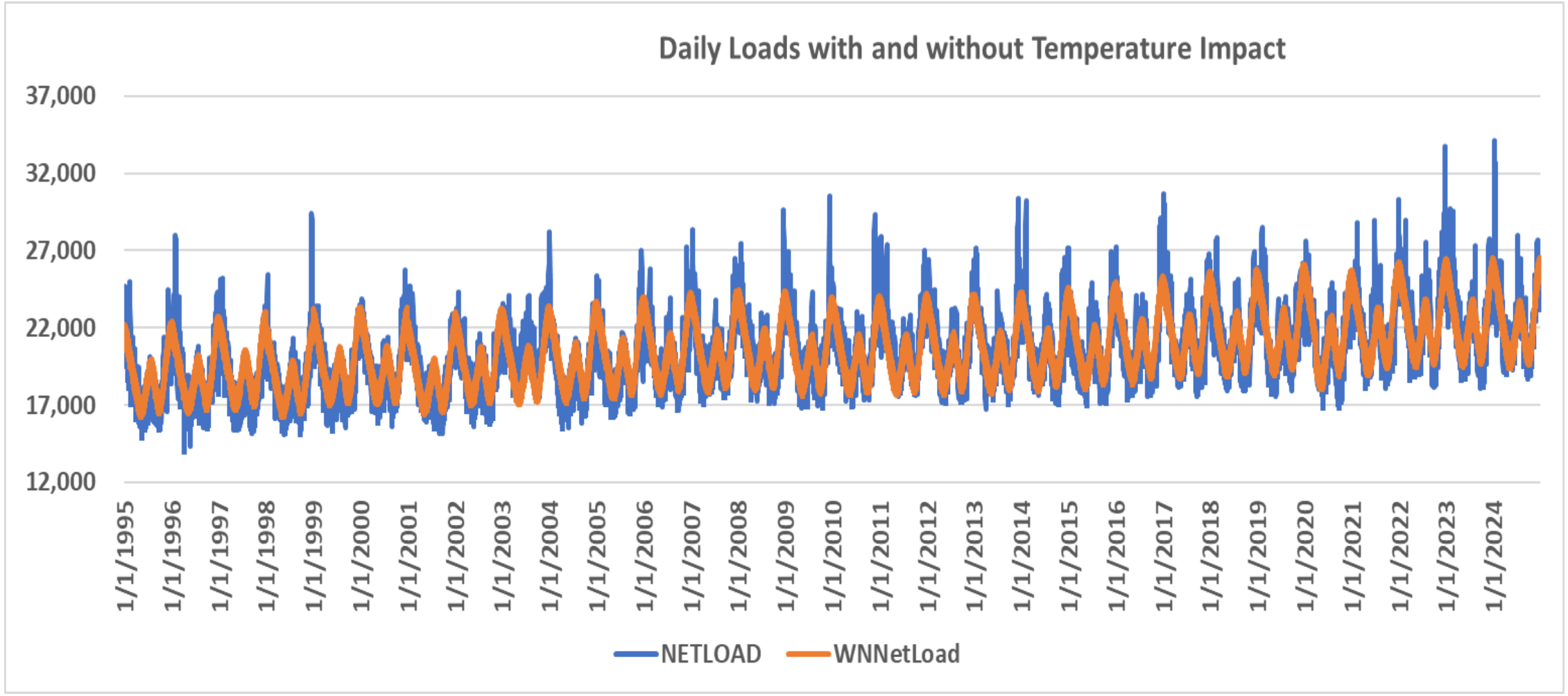
Increasing fluctuations in temperatures and increasing penetration of space conditioning exposes regional power demand to larger swings .





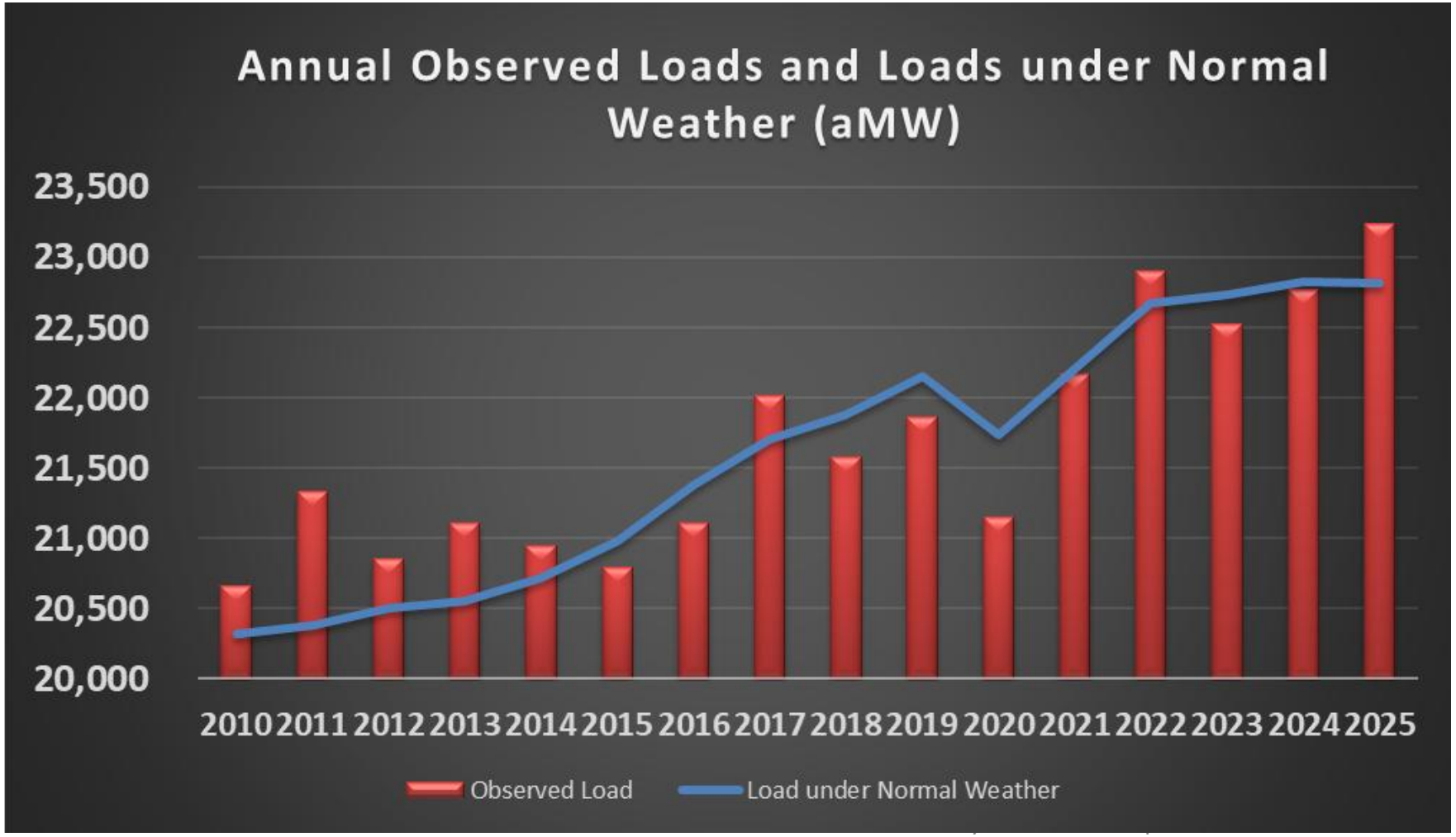
Isolating impact of weather

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



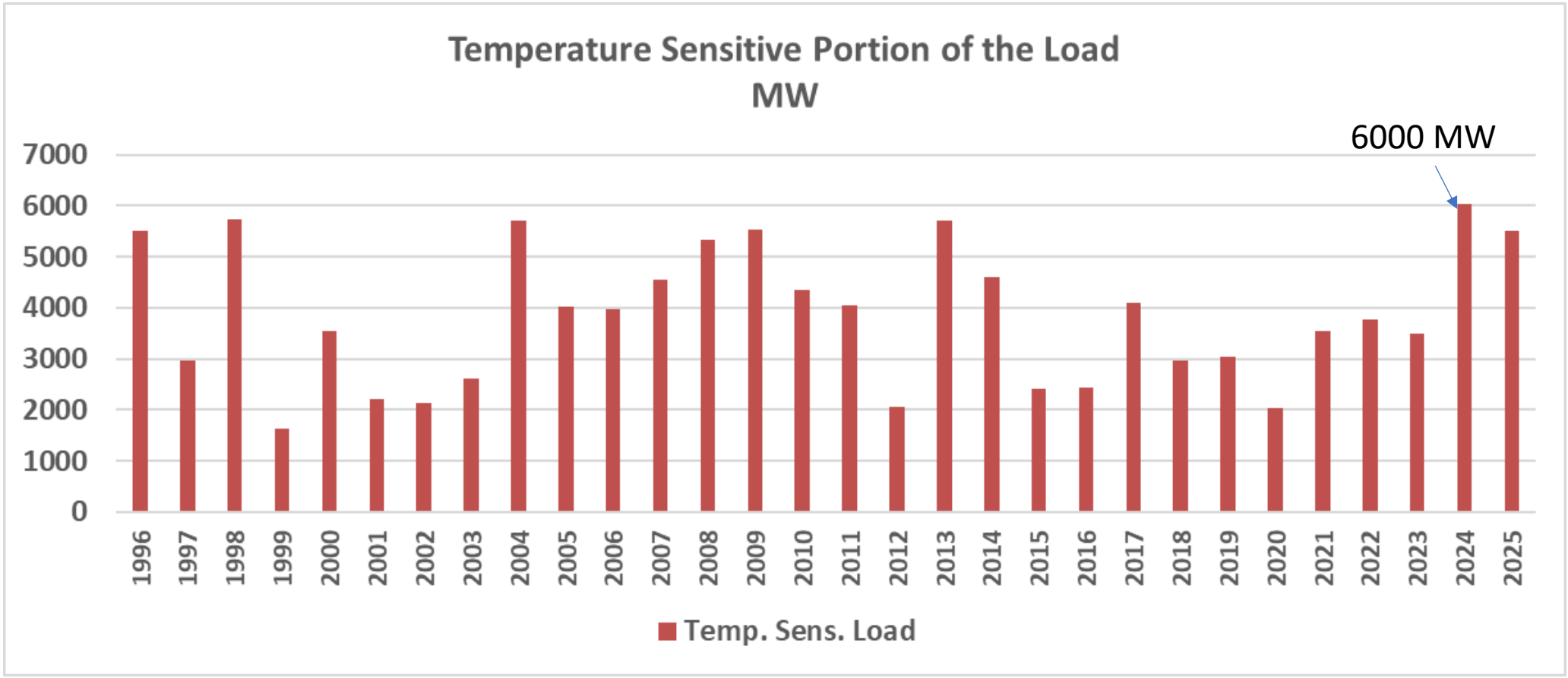
Weather impact on Regional **Energy Demand** is low,

On average about 90 aMW, or about 0.4% of load



	Impact of Weather on Loads aMW
2010	340
2011	953
2012	353
2013	554
2014	235
2015	(193)
2016	(265)
2017	301
2018	(299)
2019	(288)
2020	(581)
2021	(36)
2022	223
2023	(211)
2024	(60)
2025	426

However, Temperature variations have significantly impacted Peak Loads



Electric Rates Impact Demand

- Who sets them
  - IOUS
  - PUBLICS
  - Federal Authorities
- What factors come play in
  - Cost of Service
  - Revenue Requirements
  - Market Price forecasts
  - Load Forecasts

How Power Rates are set and what is covered

- **Utilities are permitted to recover their costs plus an allowed rate of return on investments**

$$\text{Revenue Requirement} = \text{Operating Expenses} + (\text{Rate Base} \times \text{Allowed Rate of Return})$$

- **Operating Expenses, include fuel cost, maintenance costs, cost of market transactions , etc.**

Rates = Forecast of Revenue Requirements Spread over Forecast of Sales

Electric utilities allocate their total revenue requirement to customer classes using contribution to energy and peak from each customer class.

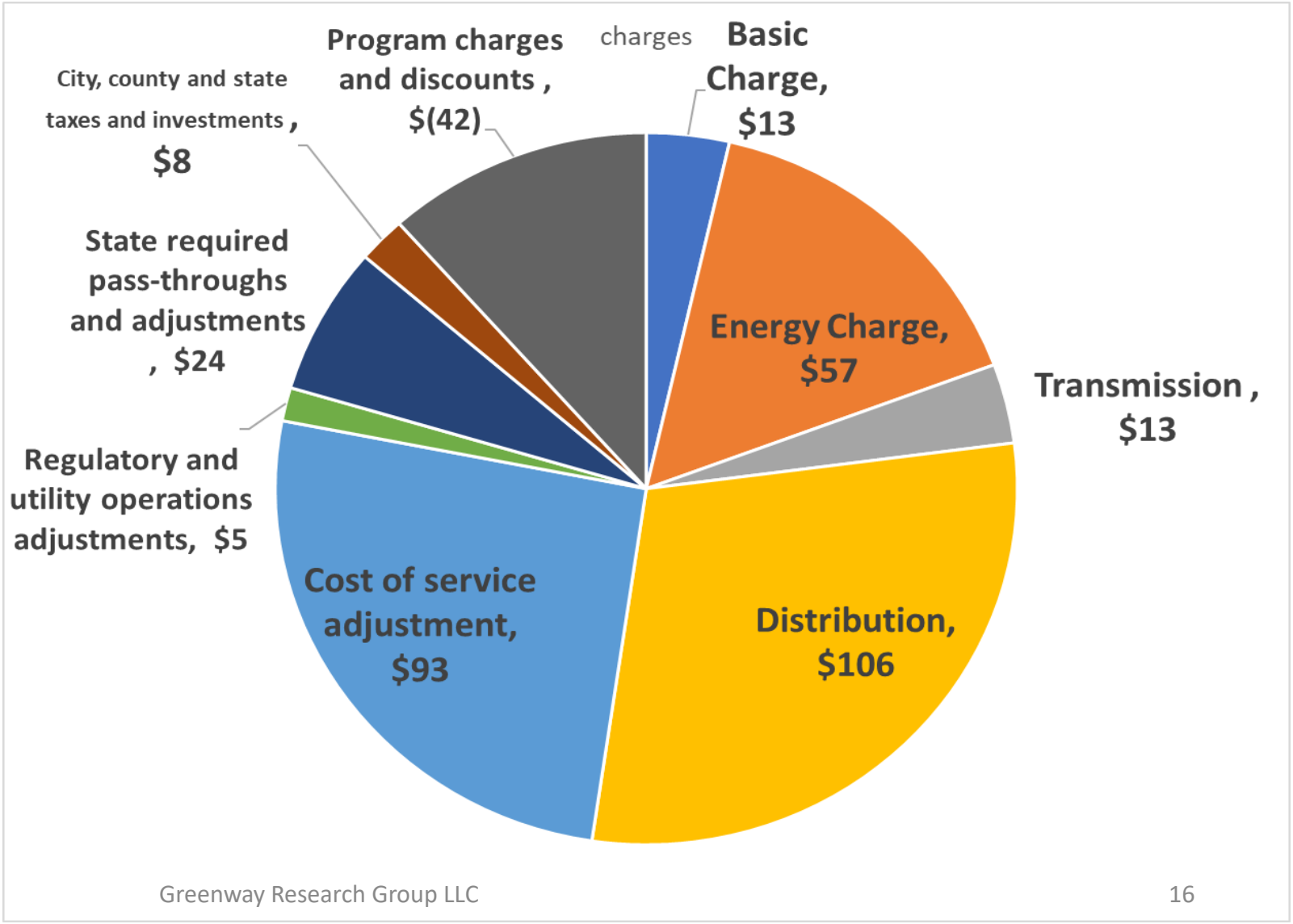
Example from an actual bill for a residential All Electric Residential Account – after 2025 Rate increase – 1.9 MWH of Demand from this residence

Rate Schedule with Time of Day	charges	$/KWH	Percent
Basic Charge	$ 13	$ 0.01	5%
Energy Charge	$ 57	$ 0.03	20%
Transmission charge	$ 13	$ 0.01	5%
Distribution charge	$ 106	$ 0.06	38%
Cost of service adjustment	$ 93	$ 0.05	33%
Regulatory and utility operations adjustments	$ 5	$ 0.00	2%
State required pass-throughs and adjustments	$ 24	$ 0.01	9%
Program charges and discounts	$ (42)	$ (0.02)	-15%
City, county and state taxes and investments	$ 8	$ 0.00	3%
Total	$ 277	$ 0.15	100%

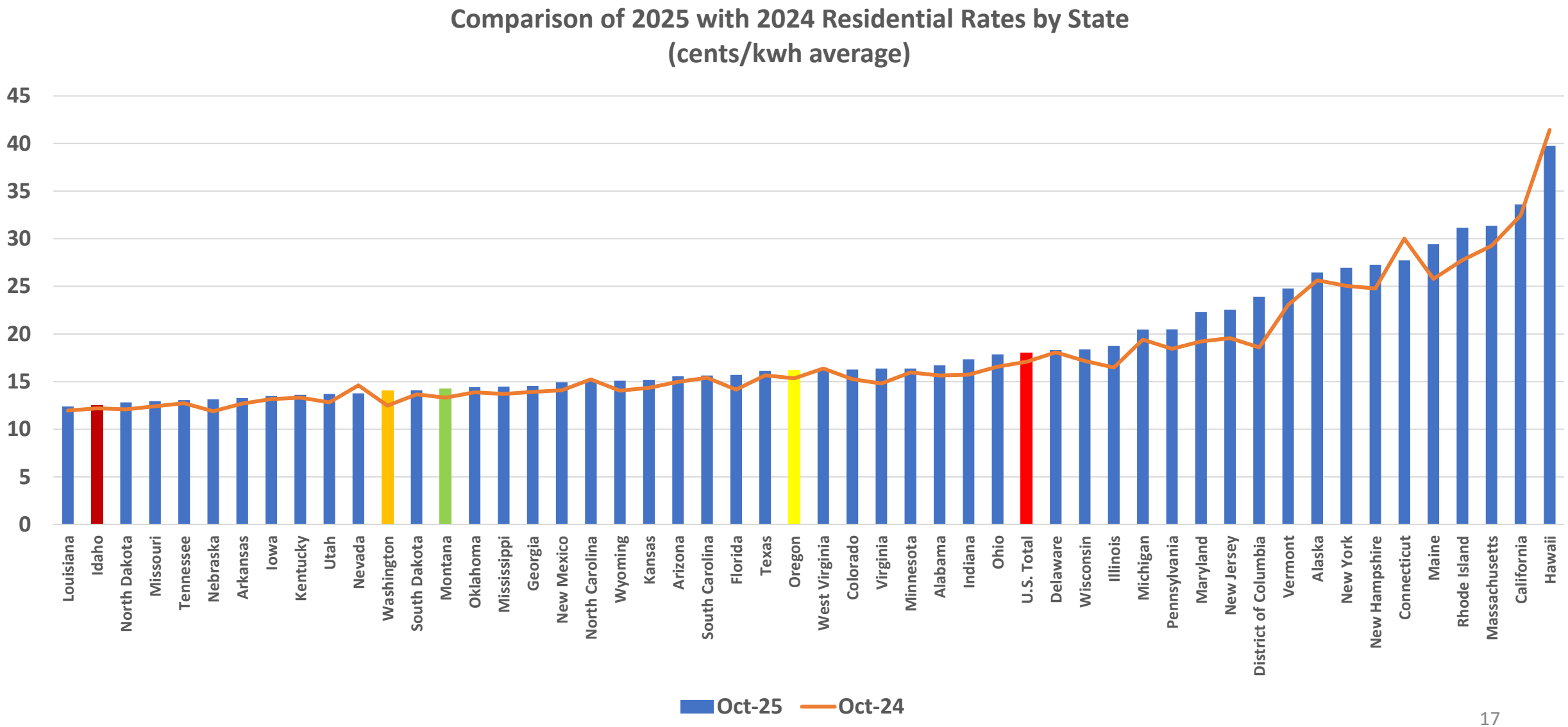
There are many cost components to electric rates besides cost of generation, transmission or distribution.

- **Total of Basic, Energy , Transmission & Distribution Charges: $189 dollars or about 10 cents/kwh**

- **All other charges add another 5 cents/kwh**



Residential Rates in the Northwest have been on the low end of spectrum



A recent LBL Report released October 2025 identified these factors in Influencing Retail Electricity Prices in the United States

- **Mix of sources of supply: gas, coal, oil, nuclear, hydropower, wind, solar, storage, etc.**
- **Local natural resource quality and delivery (pipeline, transmission) constraints**
- **Relative cost of building new infrastructure given labor costs and other regional dynamics**
- **Characteristics of customer load: quantity, growth, load factor, flexibility, etc.**
- **Balance of supply and demand: is the market tight or oversupplied**
- **Age of existing assets and relative need for replacement**
- **Investments in grid modernization: technology and resilience**
- **Impact of natural disasters, extreme weather, wildfires**
- **Policy & planning: RPS, EE, DER, low-income assistance, cap-and-trade, nuclear, etc.**
- **Health and environmental regulations that impact plant retirement and costs**
- **Utility ownership structure: public-vs. investor-owned**
- **Presence and design of wholesale competitive market**
- **Presence and nature of retail electricity competition**
- **Degree of vertical integration (generation ownership) among utilities**
- **Service territory size, geography, population, and other characteristics**

Source: LBL report on **Factors Influencing Recent trends in Retail Electricity Prices in the United States 2019-2024**

Key Findings from National Electricity Price Trends study

- **Nominal retail prices increased by 23% from 2019-2024; real prices remained flat or declined 8% since 2010.**
- **Residential prices rose faster than commercial and industrial, with residential up 3.5 cents/kWh (27%) and C&I up 1.3 cents/kWh (19%).**
- **Inflation-adjusted prices in 2024 mostly declined or remained stable across states; nominal prices increased in nearly all states.**
- **Residential bills as a share of income and GDP are near historic lows, but some households' face hardship.**
- **Utility-level retail prices are diverse; most utilities charge 8-17¢/kWh, with IOUs generally higher than POUs and cooperatives.**
- **IOUs experienced faster nominal price increases than POUs, partly due to wildfire costs, debt, and policies.**
- **Distribution and transmission expenditures have contributed to price increases, driven by aging infrastructure, supply chain issues, and resilience investments.**
- **Natural disasters, wildfires, and extreme weather have caused short- and long-term costs, raising prices in affected states.**
- **Load growth at the state level has generally depressed prices by spreading fixed costs, benefitting commercial customers more.**
- **Wind and solar deployment, especially market-based growth, do not correlate strongly with recent price increases; some evidence suggests prices may decrease.**
- **RPS programs tend to increase retail prices; the average increase from 2019-2024 is about 0.25-1¢/kWh, with notable impacts in New England and Mid-Atlantic.**
- **Net energy metering (NEM) solar benefits adopters but can raise retail prices, with impacts up to 2¢/kWh in some states.**
- **Other policies, such as carbon cap-and-trade, nuclear costs, and EV infrastructure, have limited or mixed effects on recent prices.**
- **Wholesale market rules and capacity auctions influence prices; recent PJM capacity auction led to significant price spikes, especially in states like Pennsylvania, New Jersey, and Maryland.**

In Summary

- Although regional population and economy has been growing quickly, utility retail sales have not. They grew by less than 900 aMW in the past 25 years.
- Retail revenues have been flat. From $12 billion in 1980 to $13 billion in 2024 (constant dollars)
- Temperatures trends continue to play major role in peak demand (6000 MW jump).
- Region achieved about 160 aMW of savings per year in 2023 through 2025.
- Cumulatively more than 8000 aMW of conservation was acquired since 1980.
- Consumers can lower their electric bill managing efficiency and timing of their demand.
- Retail rates in the four states are some of the lowest in the nation.
- Rates have increased but mostly to keep up with general inflation.
- Large flat loads can lower retail rates by spreading revenue requirements over larger sales.
- A variety of factors including national and state policies, tariffs, climate change, and large loads influence retail rates.

Thank You

Questions