Proposed 2025 Rate Increase & Future Forecast

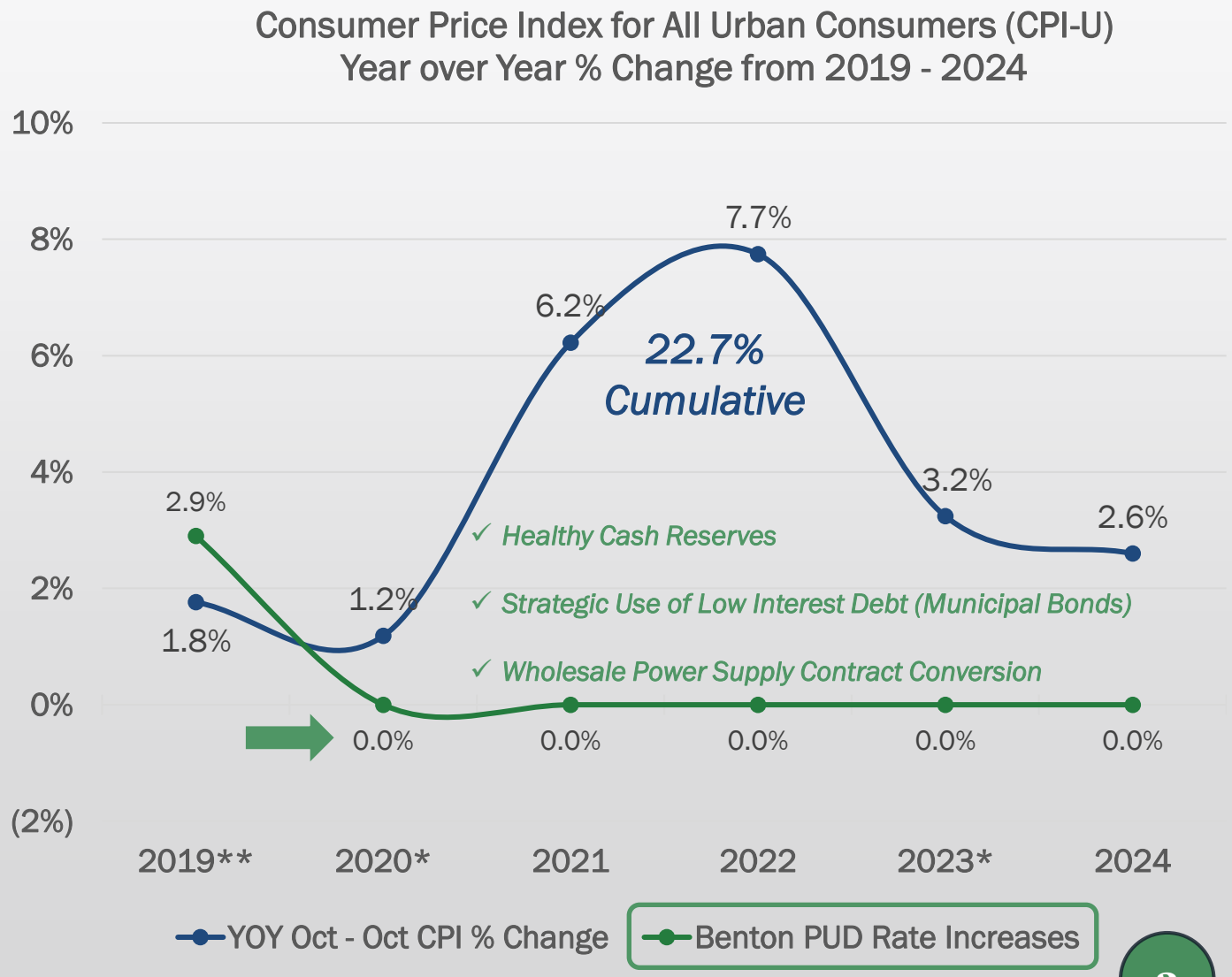
Customer Meetings

January/February 2025

Agenda

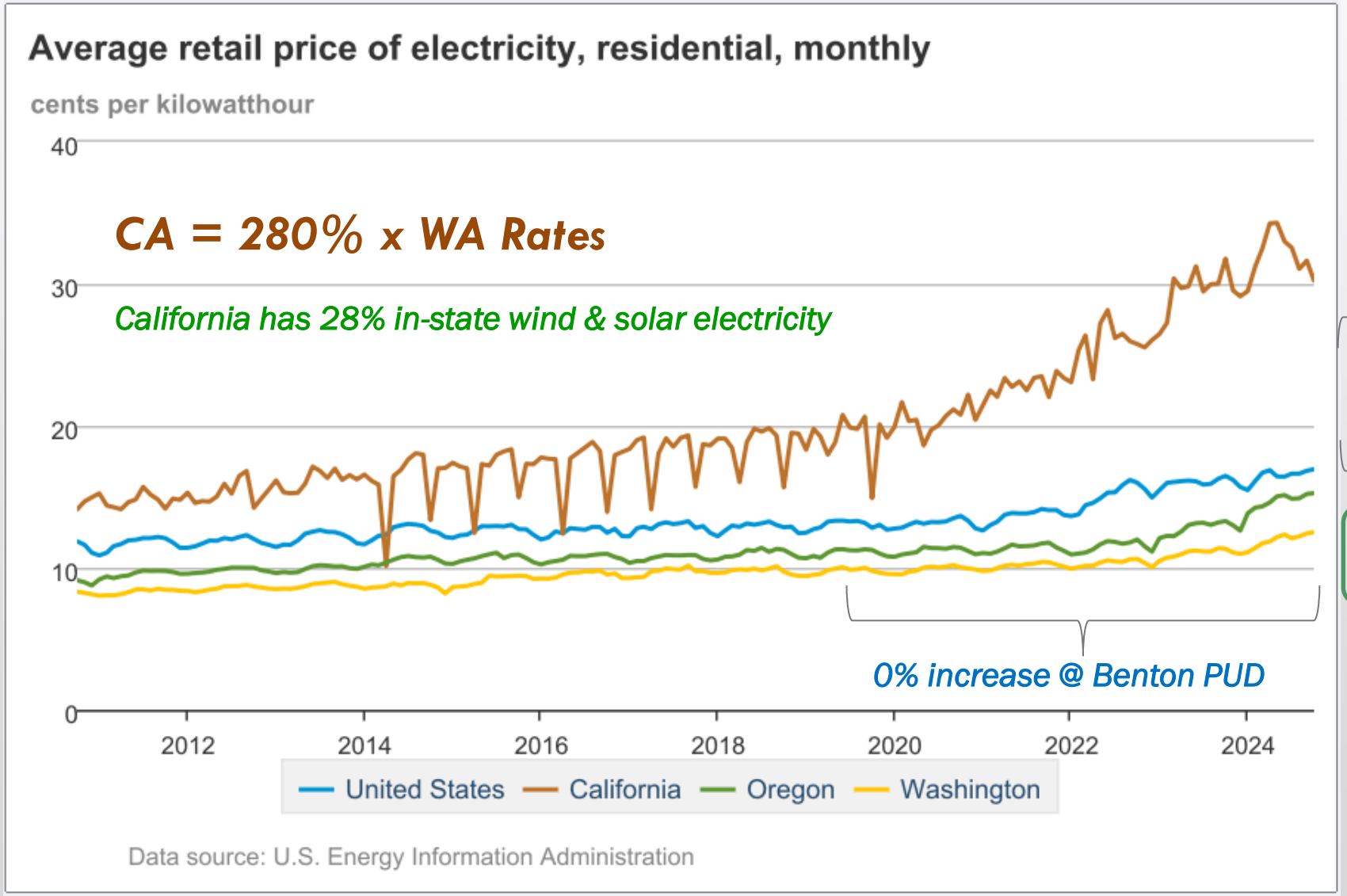
1. Electricity Rate Trends & Perspectives - Proposed 5% Rate Increase
2. Cost Increase Drivers
3. What is Benton PUD Doing to Increase Value & Mitigate Cost Increases?
4. Closing Thoughts

Holding the Line on Rates during High Inflation



*Issued Bonds
**Base year used to calculate cumulative CPI-U percentage increase

Residential Electricity Rates Increasing

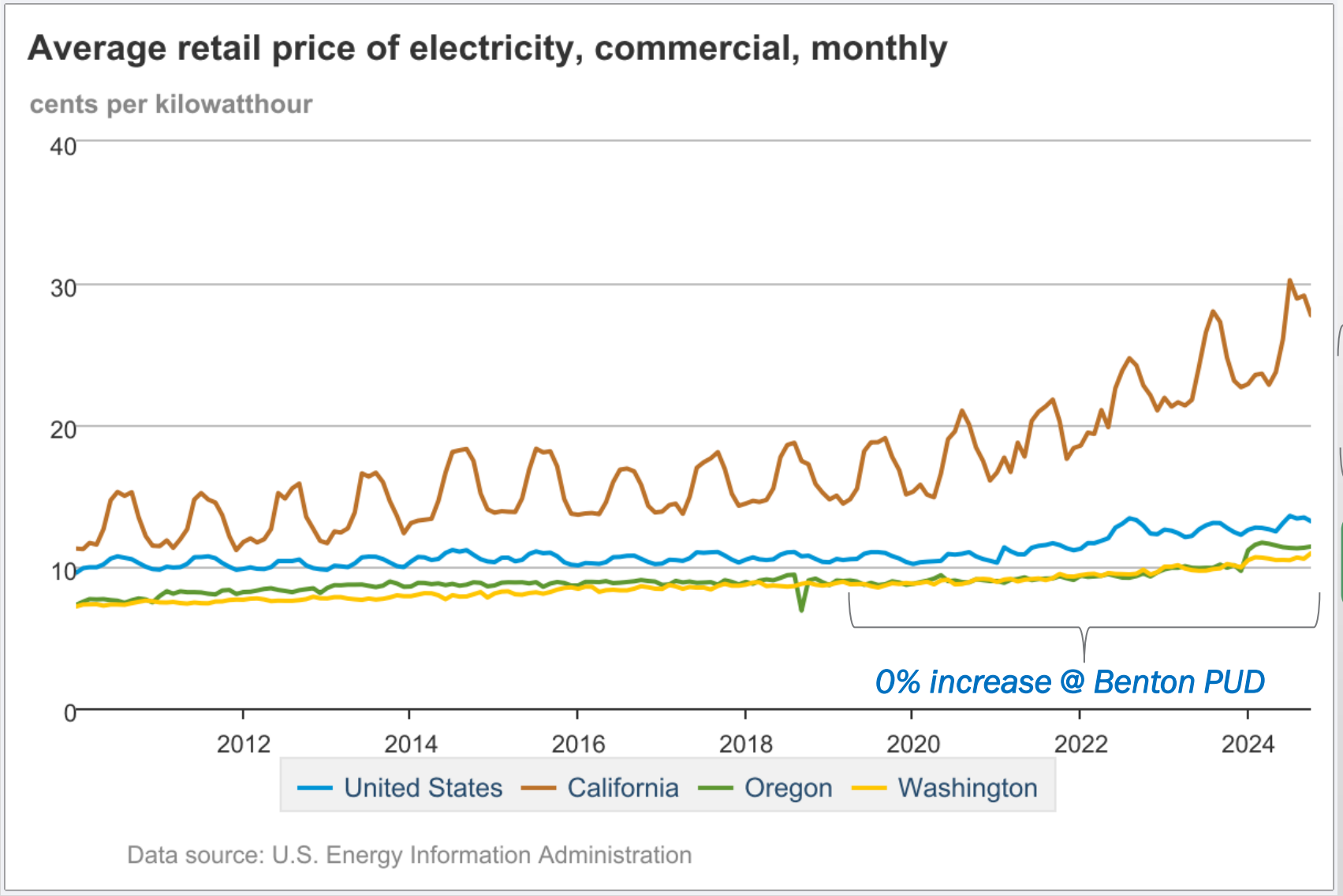


82% increase in California

October 2019 to October 2024

28% increase in Washington

Commercial Electricity Rates Increasing



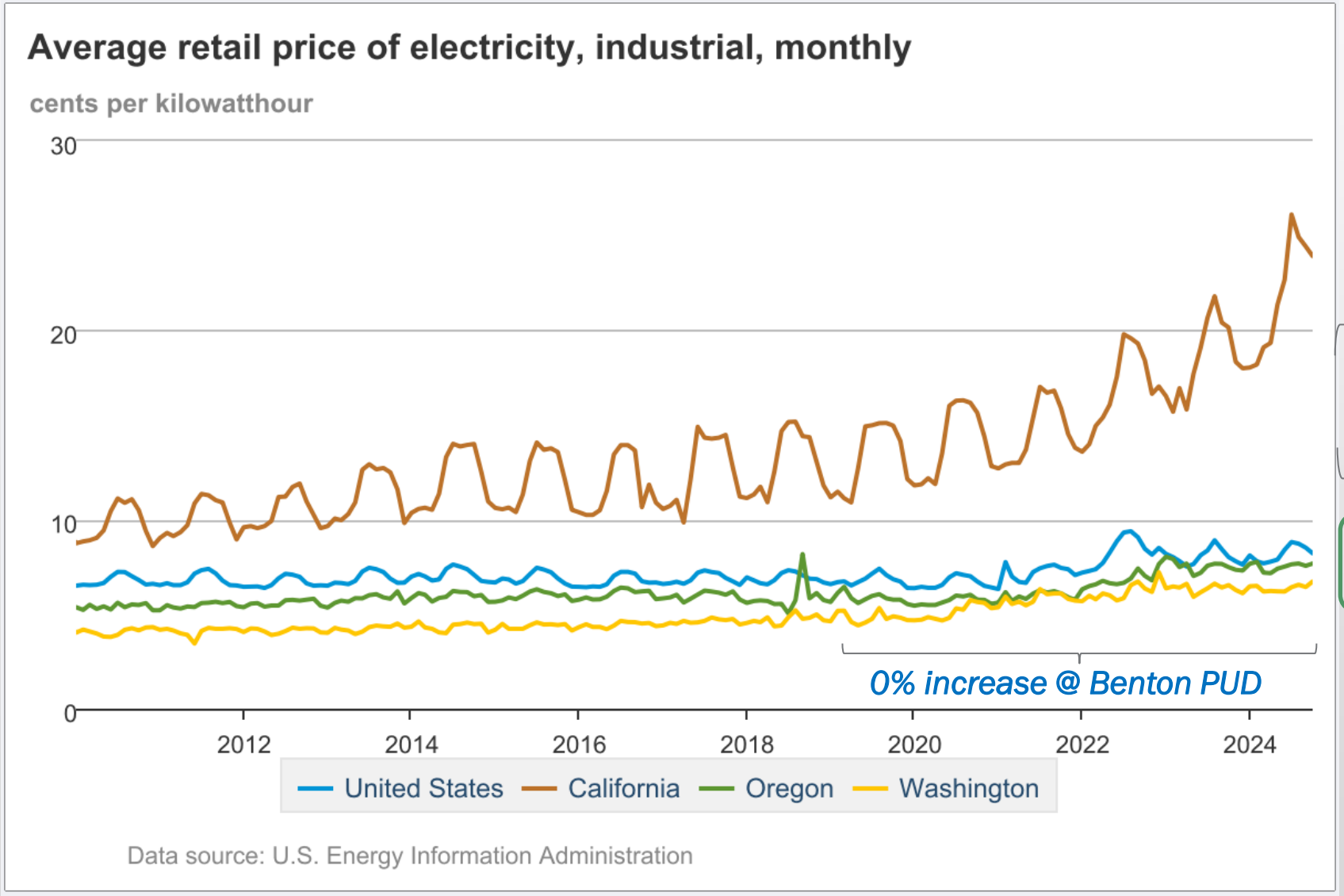
+56% increase in California

October 2019 to October 2024

24% increase in Washington

0% increase @ Benton PUD

Industrial Electricity Rates Increasing



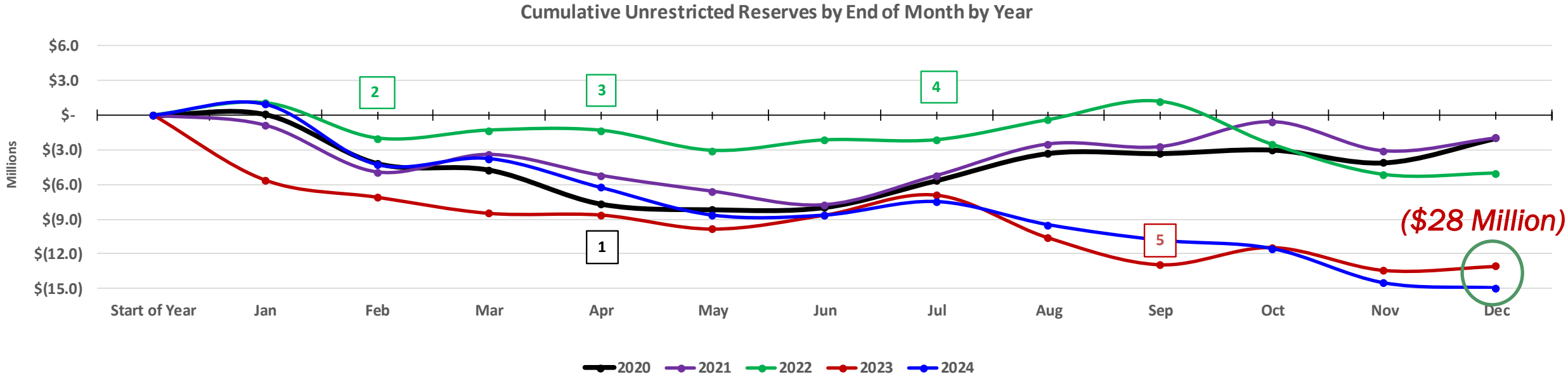
+60% increase in California

October 2019 to October 2024

38% increase in Washington

0% increase @ Benton PUD

Cash Reserve History (2020 – 2024)



Note: Any money disbursed for a bid guarantee, received from the Climate Commitment Act auction proceeds, or received from issuing bonds was removed for comparison purposes (i.e. 2020 bond issue and 2023 bond issue).

Other Notable Information:

Weather can play a major factor with customer loads (retail revenue) that can ultimately increase or decrease the District's Unrestricted Reserves.

1. (2020 - April) Reserves were drawn down an additional $2.2 million due to two factors. First, April included a third payroll and fifth accounts payable cycle because of how the calendar aligned with these cycles (~$1.5 million timing issue). In previous years, May included these additional cycles. Second, past due accounts are above normal levels (~$0.7 million higher).

2. (2022 - February) Adjusted balance down ~$6.3 million for January BPA invoices that were paid in March due to timing of when the invoices were issued. These invoices are typically paid in February.

3. (2022 - April) Adjusted balance down ~$5.7 million for March BPA invoices that were paid in May due to timing of when the invoices were issued. These invoices are typically paid in April.

4. (2022 - July) Adjusted balance down ~$4.3 million for June BPA Power invoice that was paid in August due to timing of when the invoice was issued. This invoice is typically paid in July.

5. (2023 - September) Adjusted balance down ~$5.3 million for August BPA power and transmission invoices that were paid in October due to timing of when the invoice was issued. These invoice would typically pay in September.

Optimistic Forecast from Nov 2024

Description		2023 Actual	2024 Projected	2025	2026	2027	2028	2029
Nov 2024	Projected Rate Increase	-	-	Apr 1 **5.0%**	Mar 1 **2.0%**	Mar 1 **2.0%**	Mar 1 **2.0%**	Mar 1 **2.0%**
	Unrestricted DCOH	131	133	107	100	107	147	125
	Construction Account DCOH	46	-	-	-	47	-	-
	Net Income	$9.3M	$9.2M	$10.9M	$7.4M	$8.4M	$9.3M	$7.9M
	Total Unrestricted Reserves	$49.0M	$48.3M	$39.0M	$37.7M	$40.8M	$56.5M	$49.7M
	Construction Account Reserves	$17.3M	-	-	-	$18.0M	-	-
	Debt to Capitalization	31%	29%	27%	25%	29%	28%	26%

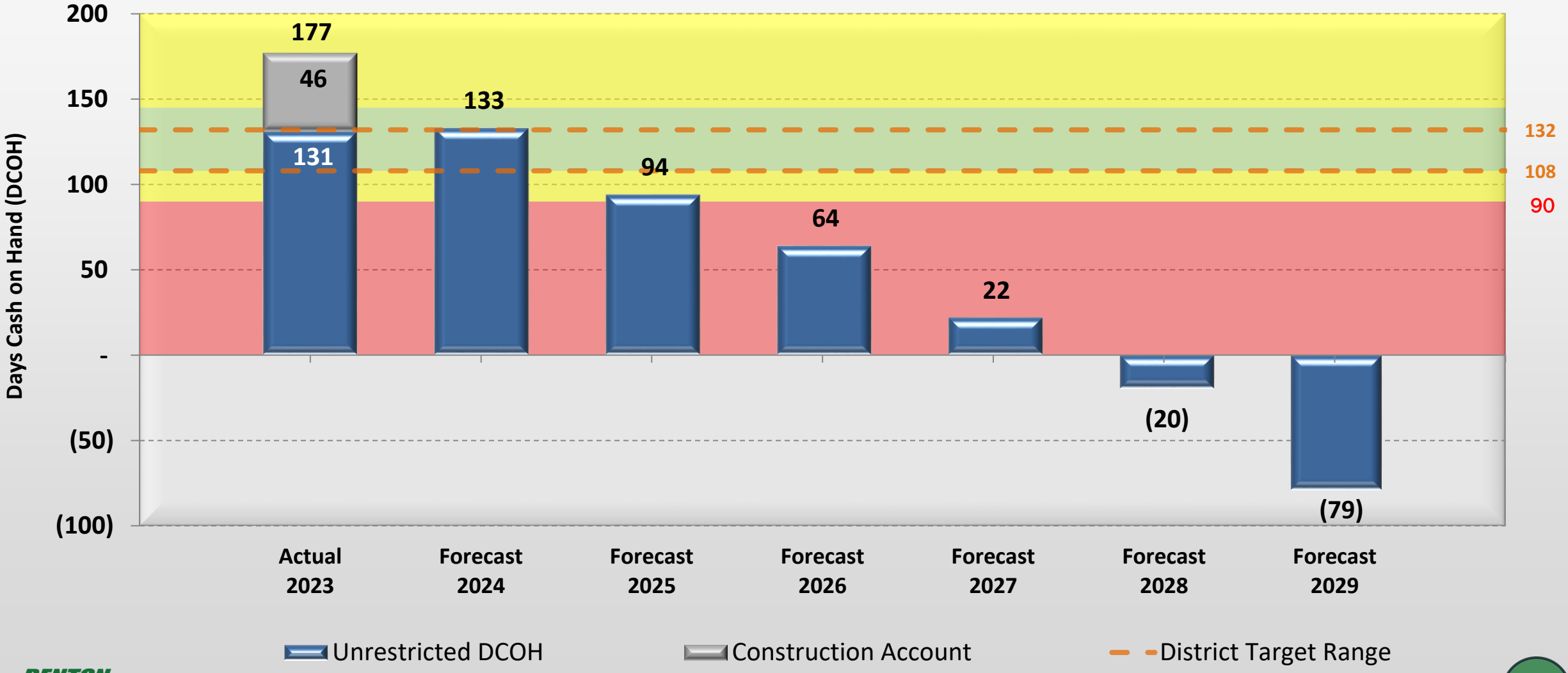
$25M Bond issue in Q4 2027

+13%
cumulative rate increase

Staff's Recommendation

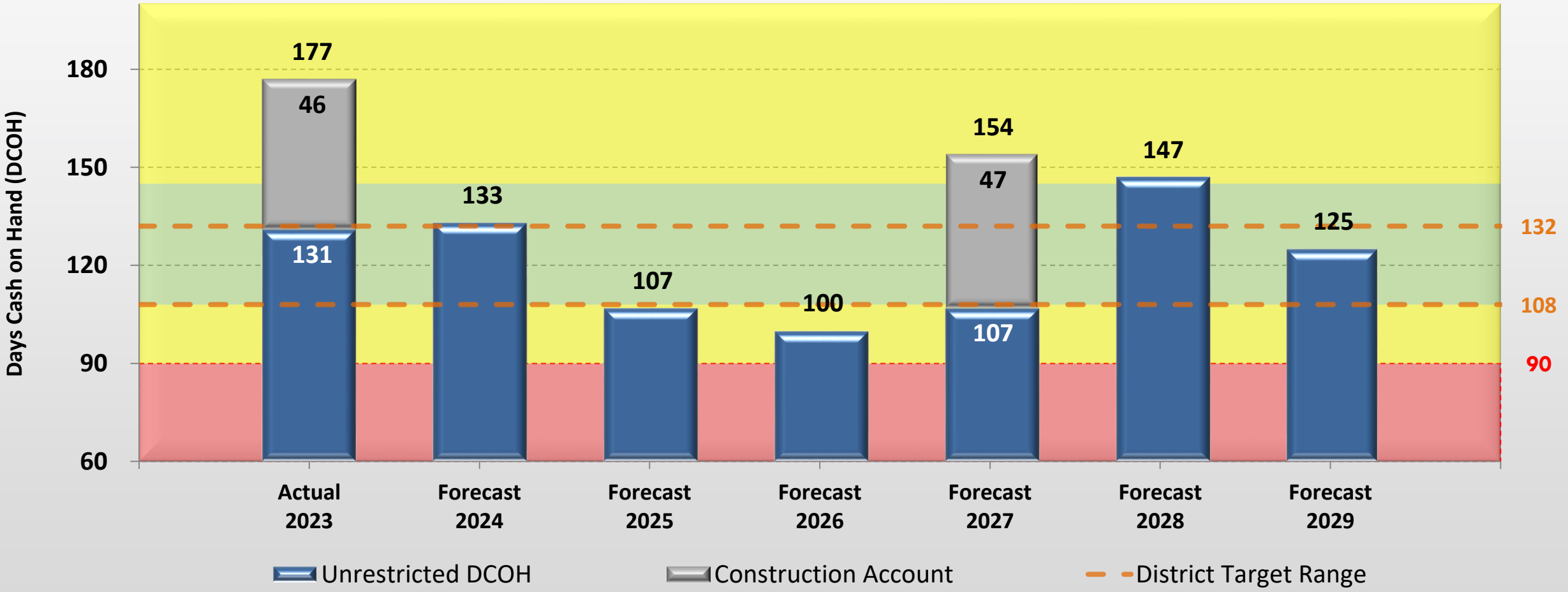
Forecasted Unrestricted Reserves / Days Cash on Hand

Taking no action

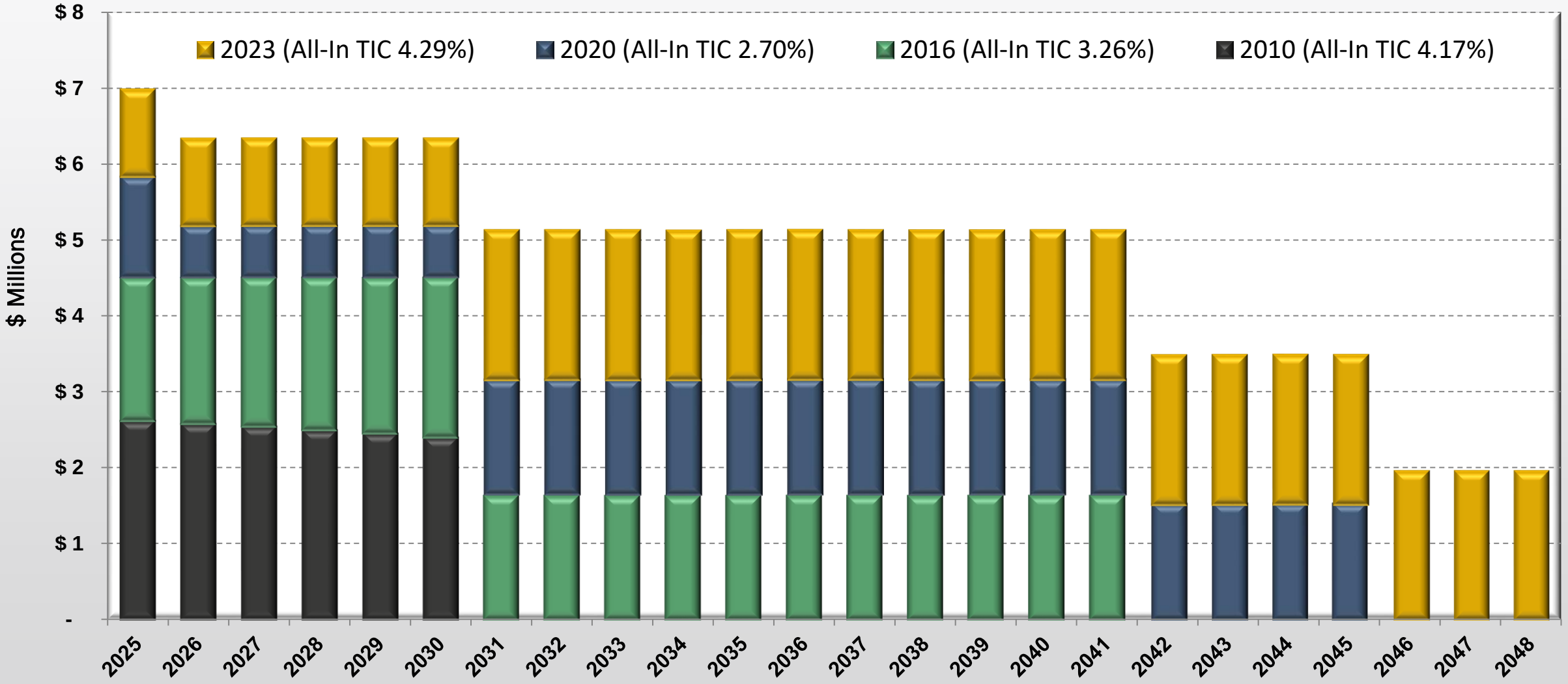


Forecasted Unrestricted Reserves / Days Cash on Hand

(2025: 5% | 2026-2029: 2% |$25M Bond Issue Q4 2027)



Current Debt Service Schedule



Staff's Recommendation

- 5% rate increase effective April 1, 2025
  - Applied evenly to **all rate classes**
  - Applied evenly to **all rate components** (Energy, Demand, & Daily System Charge)

Residential Example

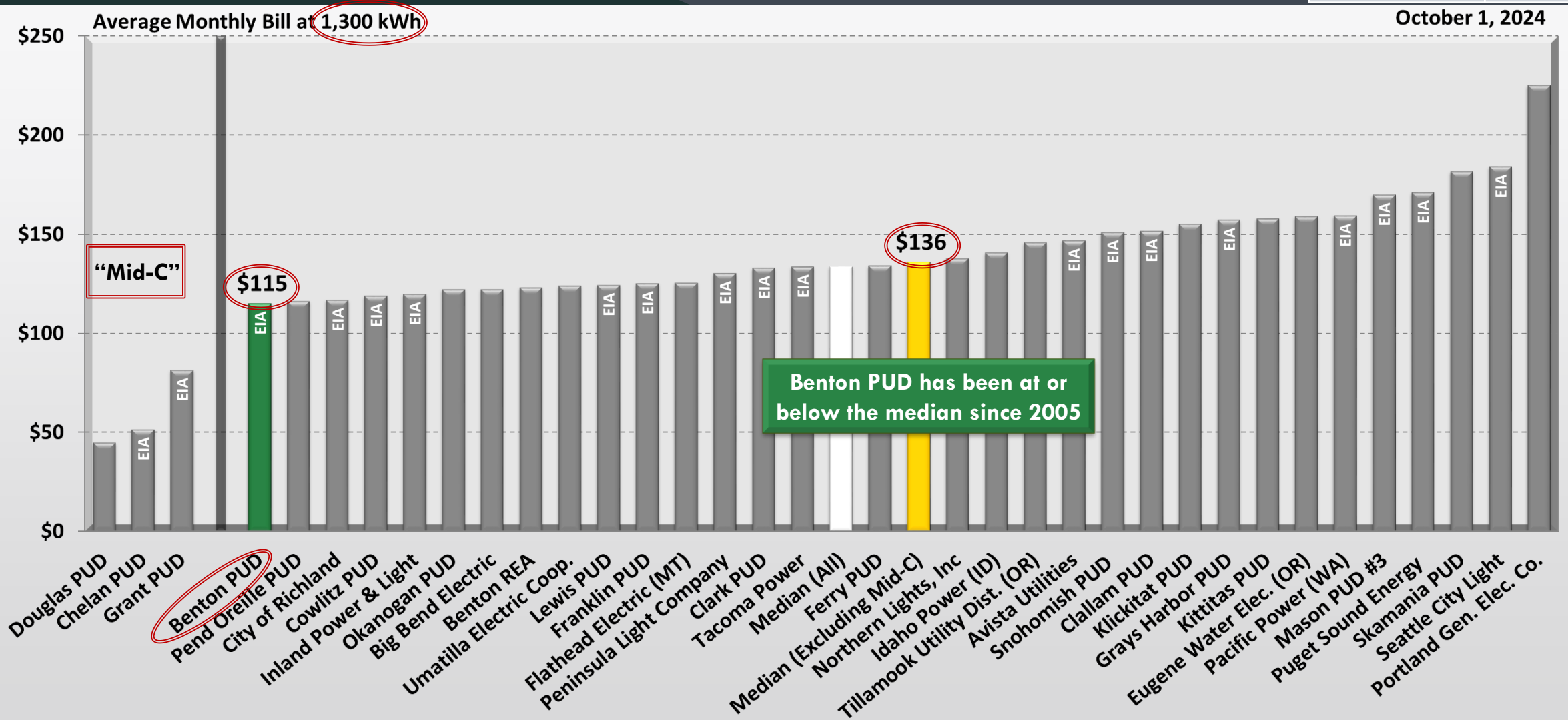
Billing Determinants	Current Rate	Proposed Rate*
Daily System Charge	$0.63 per day	$0.66 per day
Energy Charge	$0.0688 per kWh	$0.0722 per kWh
Demand Charge	$1.00 per KW	$1.05 per KW

*Rate increase percentages and effective dates require explicit commission approval by resolution prior to implementation

Monthly Bill Comparison

Residential

Billing Determinants	Current Rate
Daily System Charge	$0.63 per day
Energy Charge	$0.0688 per kWh
Demand Charge	$1.00 per KW



Average bill information has been calculated by Benton PUD staff from publicly available information from other utilities' websites. Calculation is Benton PUD's best effort to provide comparable information.

Monthly Bill Comparison

Residential

Billing Determinants	Current Rate	Proposed Rate*
Daily System Charge	$0.63 per day	$0.66 per day
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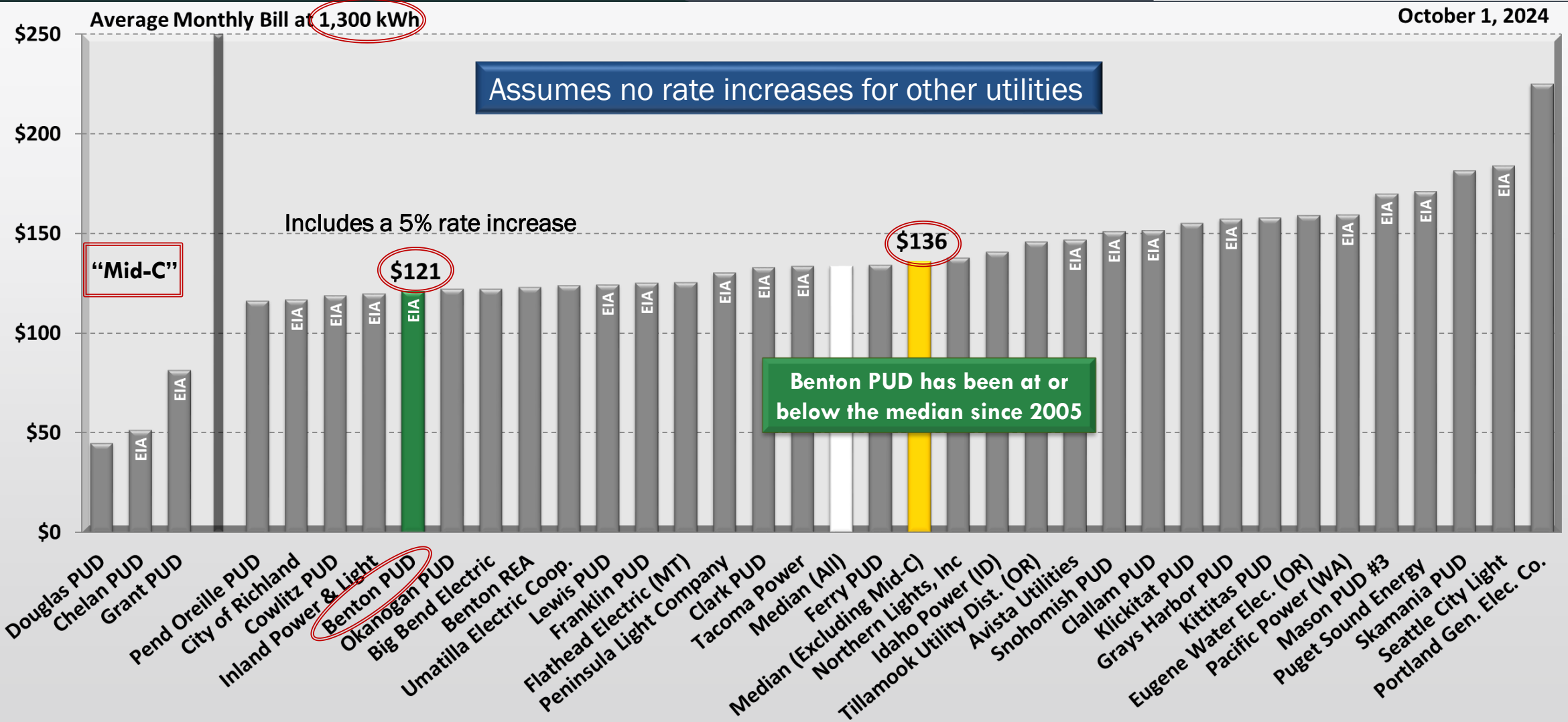

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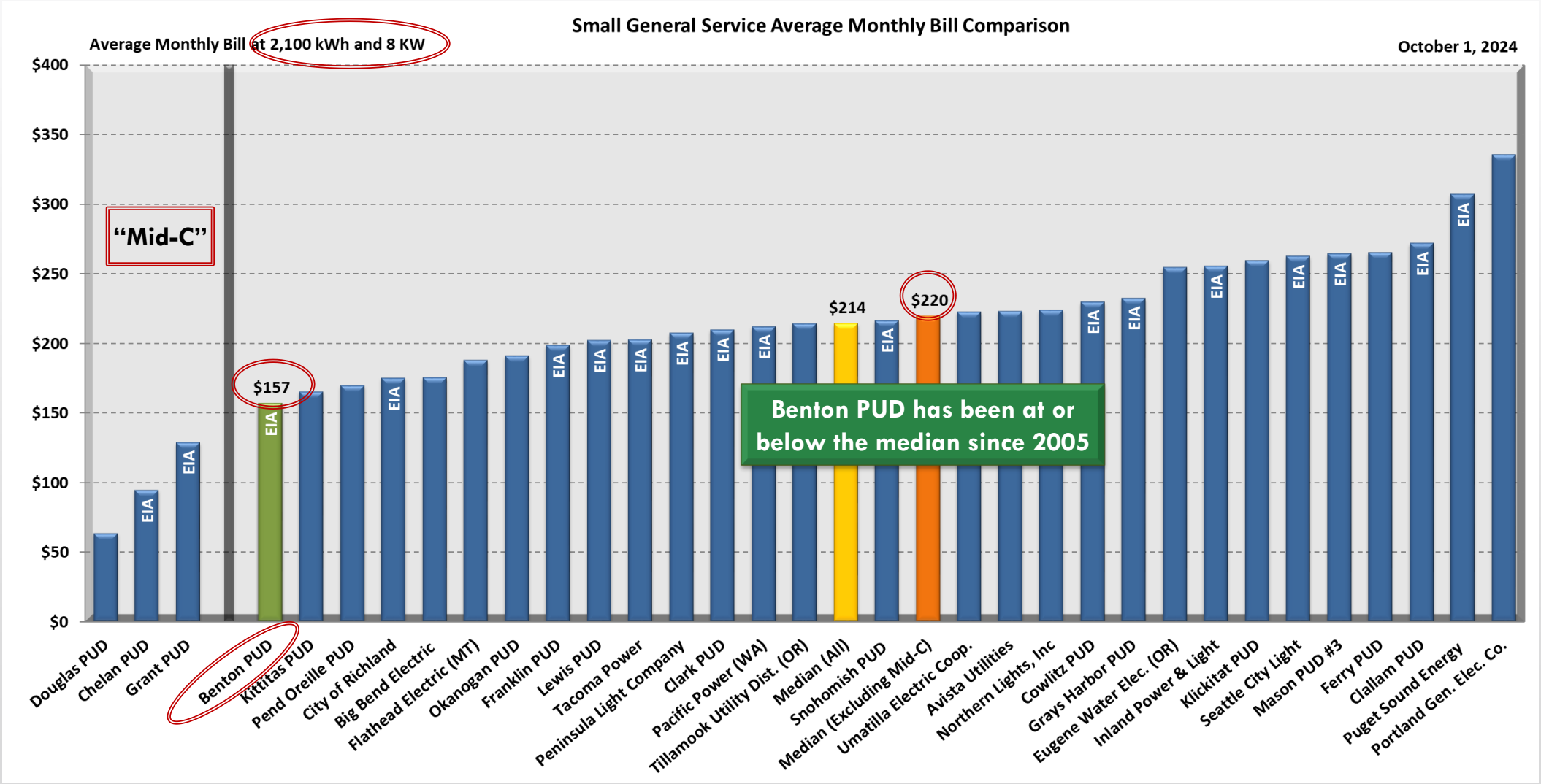
*Rate increase percentages and effective dates require explicit commission approval by resolution prior to implementation

Monthly Bill Comparison

Small General Service (Multi-Phase)

Billing Determinants	Current Rate
Daily System Charge	$0.82 per day
Energy Charge	$0.0592 per kWh
Demand Charge	$1.00 per KW



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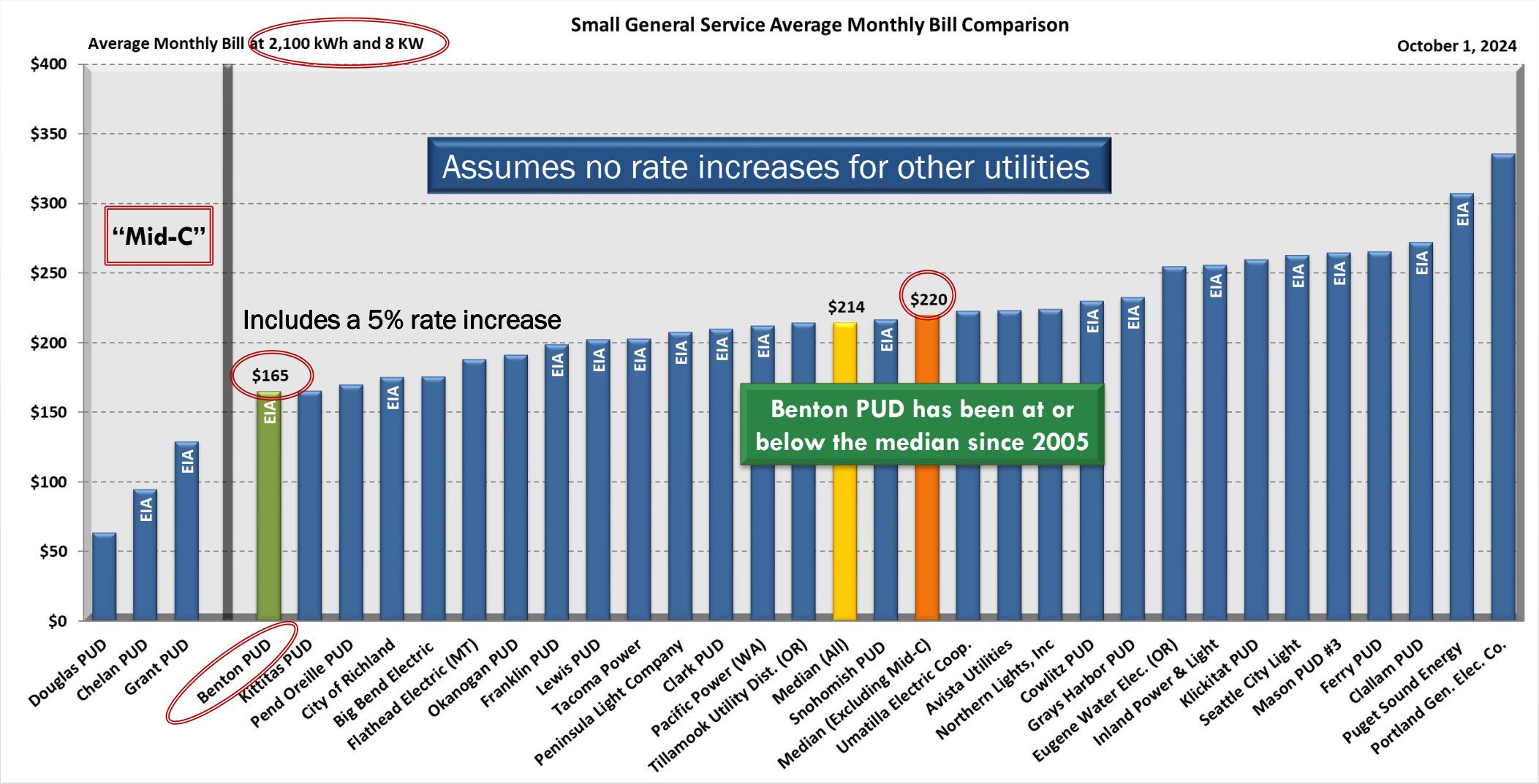
Monthly Bill Comparison

Small General Service (Multi-Phase)

Billing Determinants	Current Rate	Proposed Rate*
Daily System Charge	$0.82 per day	$0.86 per day
Energy Charge	$0.0592 per kWh	$0.0622 per kWh
Demand Charge	$1.00 per KW	$1.05 per KW



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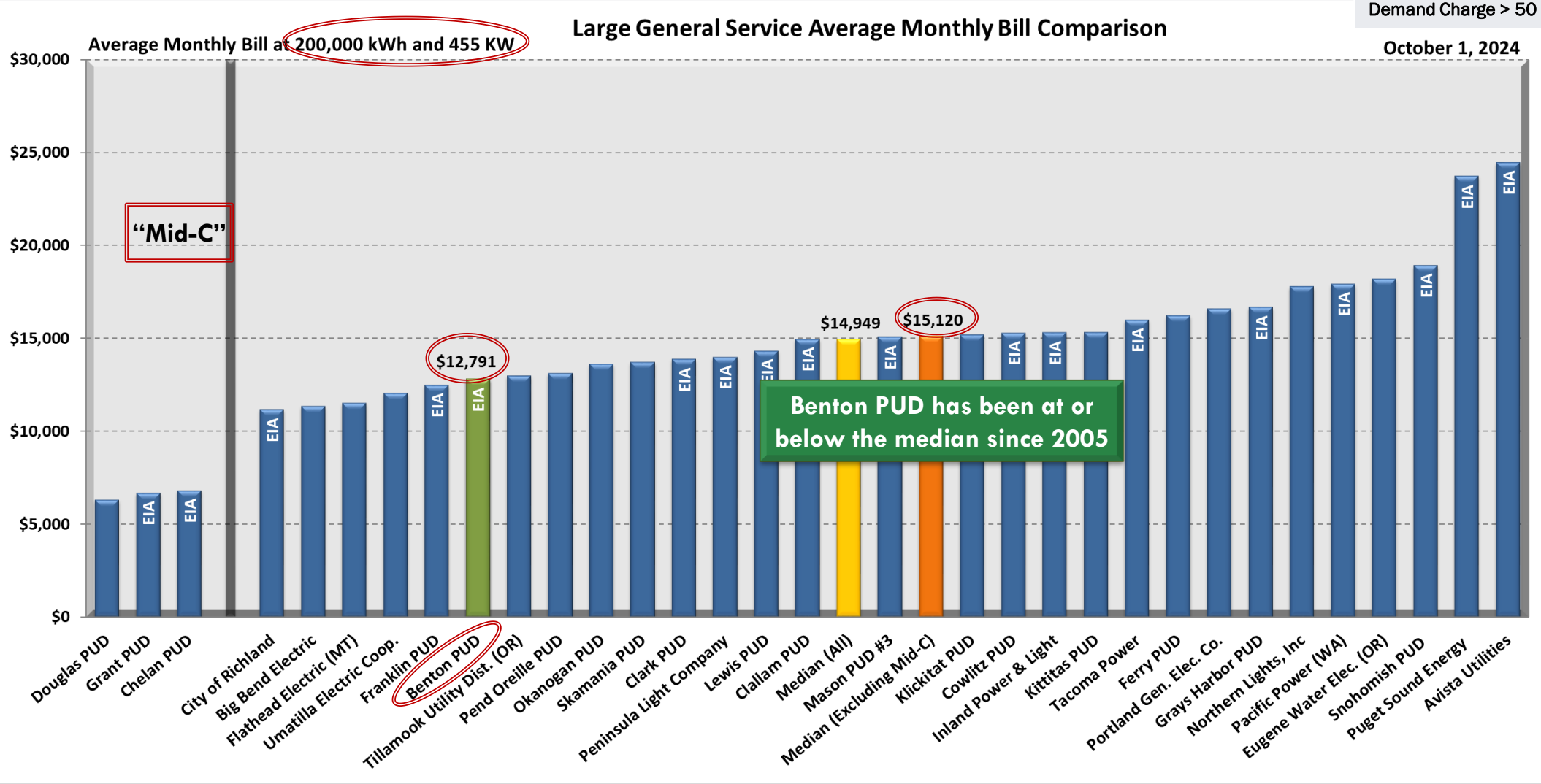
*Rate increase percentages and effective dates require explicit commission approval by resolution prior to implementation

Monthly Bill Comparison

Large General Service

Billing Determinants	Current Rate
Daily System Charge	$2.01 per day
Energy Charge	$0.0469 per kWh
Demand Charge ≤ 50	$1.00 per KW
Demand Charge > 50	$8.15 per KW

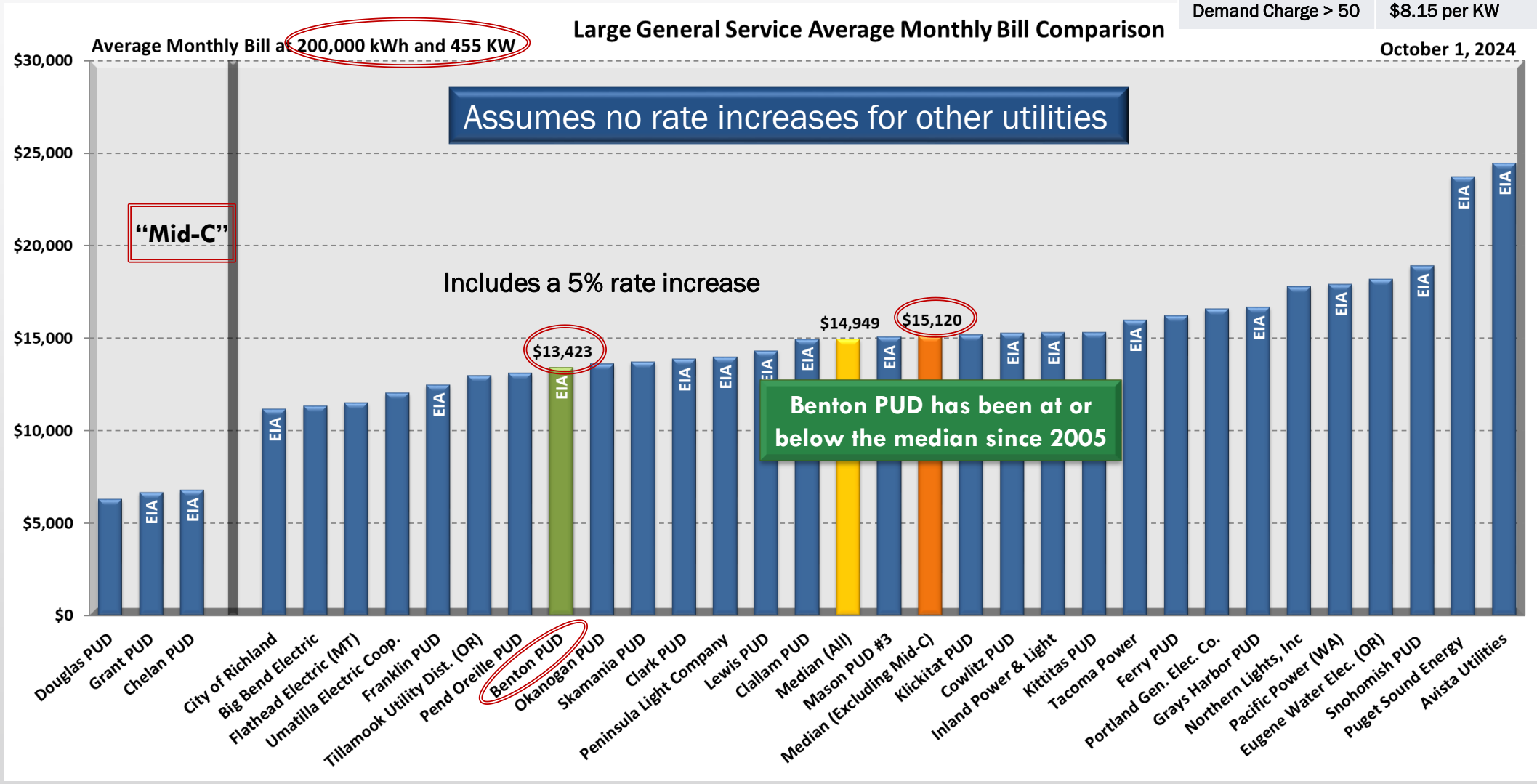


Average bill information has been calculated by Benton PUD staff from publicly available information from other utilities' websites. Calculation is Benton PUD's best effort to provide comparable information.

Monthly Bill Comparison

Large General Service

Billing Determinants	Current Rate	Proposed Rate*
Daily System Charge	$2.01 per day	$2.11 per day
Energy Charge	$0.0469 per kWh	$0.0492 per kWh
Demand Charge ≤ 50	$1.00 per KW	$1.05 per KW
Demand Charge > 50	$8.15 per KW	$8.56 per KW



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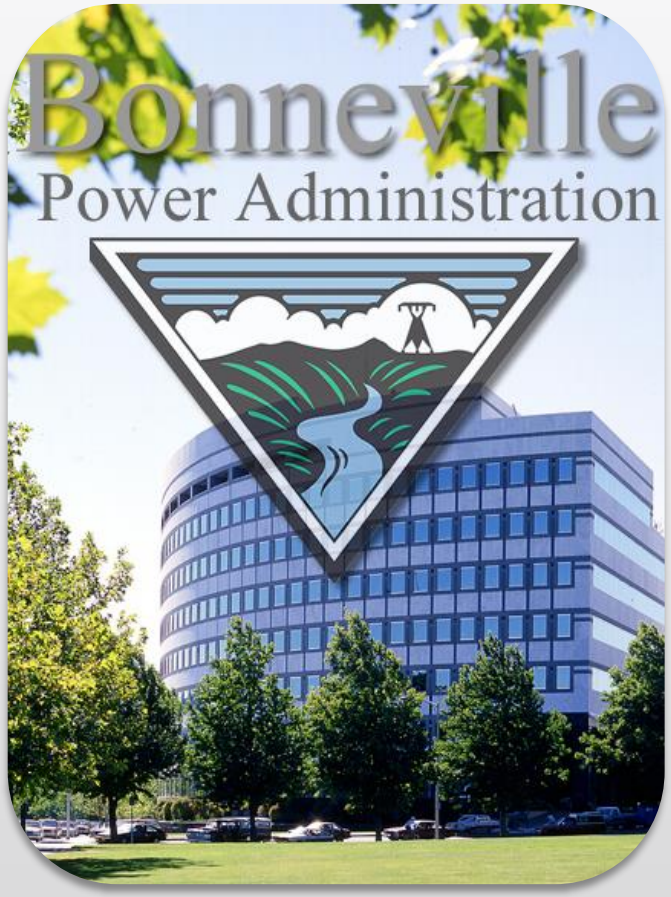
Cost Driver Review



Power Costs

Supply Chain

Labor & Benefits

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Reliable Public Power Provider

Power Costs are on the Rise

ENVIRONMENT AMERICA

Washington state commits to 100% clean energy

Washington is the latest state to go all-in on clean, carbon-free electricity.

Washington is the latest state to go all-in on clean, carbon-free electricity.

On May 7, Gov. Jay Inslee signed the 100% clean electricity bill into law,

SUPPLY & DEMAND

BPA Proposes Double-Digit Increases for Both Power and Transmission

by Steve Ernst

The Bonneville Power Administration's Tier 1 power rates would increase by 10.8 percent and transmission rates would jump by an average of 24 percent, under an initial rate proposal for fiscal years 2026 to 2028, the federal power marketing agency announced on Dec. 9.

The rate case proposal comes almost a month after the agency formally announced plans to adjust its transmission tariff to include a new Generator Interconnection Withdrawal Charge.

The proposal would subject power developers to a charge of between $5 million and $10 million if an interconnection request is withdrawn or deemed withdrawn after executing a Phase 2 Cluster Study Agreement. The charges increase, depending on how far into the cluster study process the project is withdrawn, according to the BP-26 Partial Rates Settlement Agreement.

U.S. Department of Energy/Flickr

Bonneville Power Administration transmission towers and lines with Mount Hood in the background.

understands the drivers leading to the proposed rate increas

Outside of Existing Hydropower and CGS Nuclear, there is no such thing as reliable, affordable & CO2-free electricity

- ✓ *Power Costs Increasing 9.8%*
- ✓ *Transmission Costs Increasing 21%*
- ✓ *Tier-2 Rates Up 94% over 2020 Rate ($68/MWh versus $35/MWh)*

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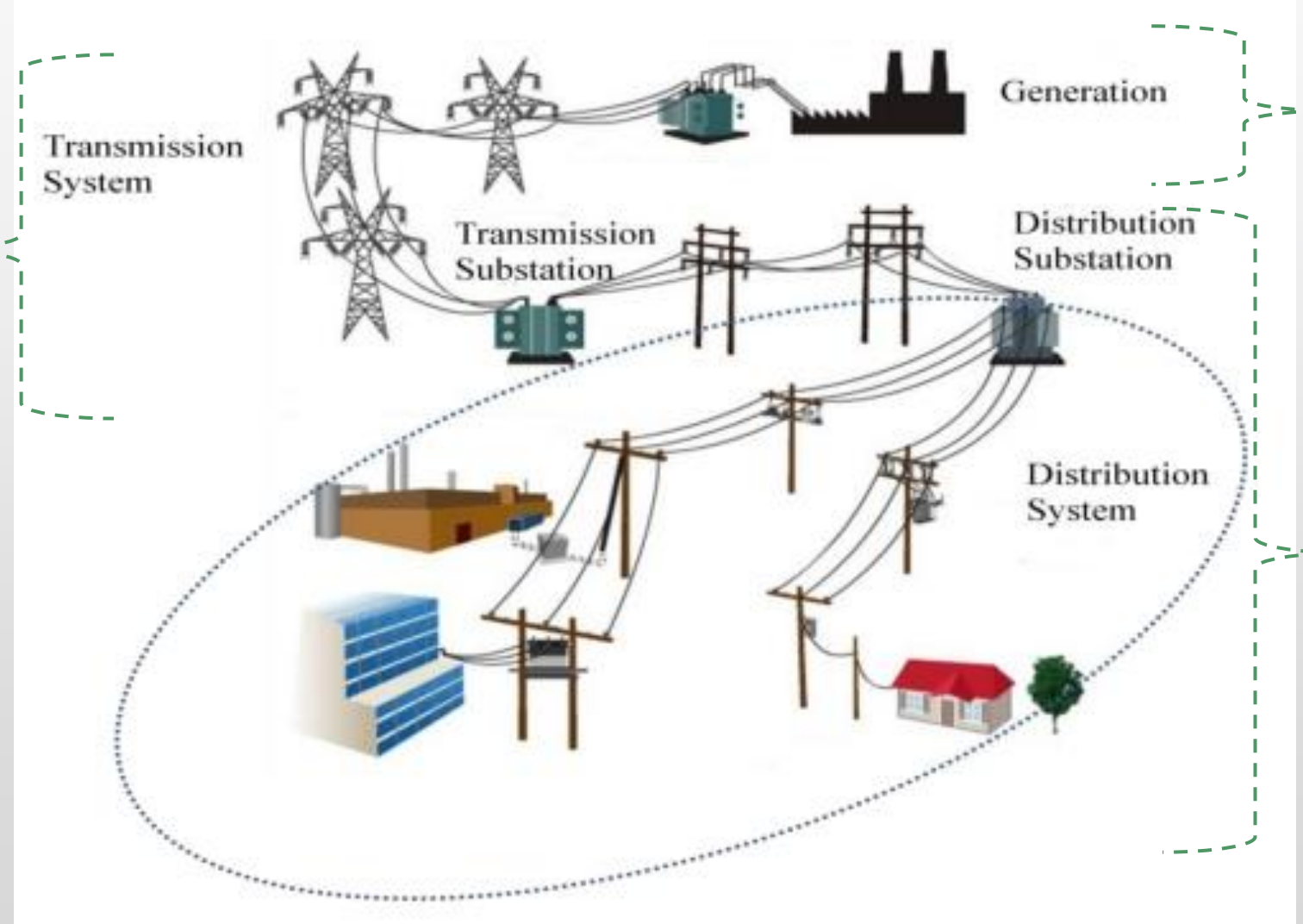
Electricity Supply Chain

Bonneville Power Administration

Federal Power Marketer

- 31 Federal Hydroelectric Dams
- Columbia Generating Station nuclear plant

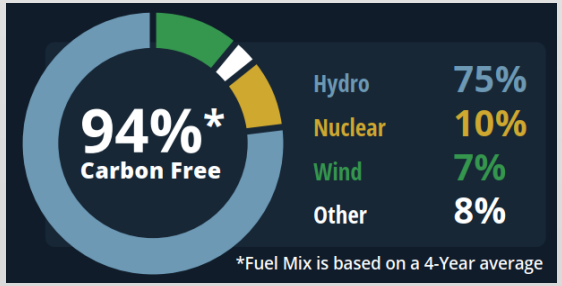


US Army Corps of Engineers

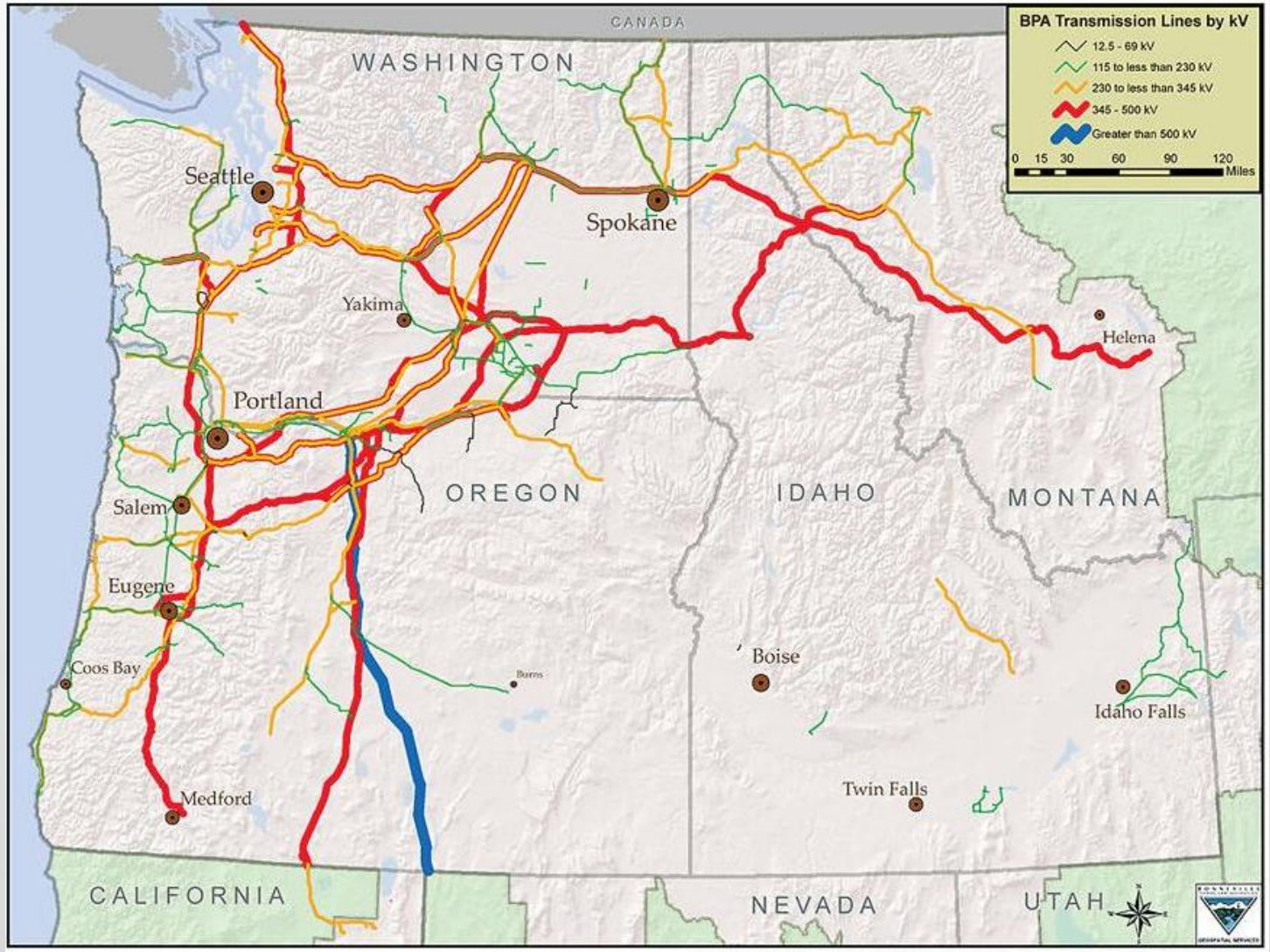
Bureau of Reclamation

Energy Northwest

Benton P.U.D



BPA Transmission Lines: *How the Power Flows*



Transmission system

Operating voltage	Circuit miles
1,100 kV	1
1,000 kV	264[10]
500 kV	4,860
345 kV	570
287 kV	229
230 kV	5,337
161 kV	119
138 kV	56
115 kV	3,440
below 115 kV	301
Total[11]	15,179

10/ BPA's portion of the PNW/PSW direct-current intertie. The total length of this line from The Dalles, Oregon, to Los Angeles, California is 846 miles.
11/ Total circuit miles as of February 2019.

BPA Owns & Operates 75% of Northwest Grid

BPA Hydropower: *Foundation of Public Power Supply*

Bonneville POWER ADMINISTRATION

Federal Power Marketer

- 31 Federal Hydroelectric Dams
- Columbia Generating Station nuclear plant

124

Customers	
Cooperatives	54
Municipalities	42
Public utility districts	28
Federal agencies	7
Investor-owned utilities	6
Direct-service industries	1
Port districts	1
Tribal utilities	3
Total	142

- Investor-Owned Utilities ***do not receive*** physical firm electricity
  - Receive *financial payments* on behalf of residential & farm customers (residential exchange program)

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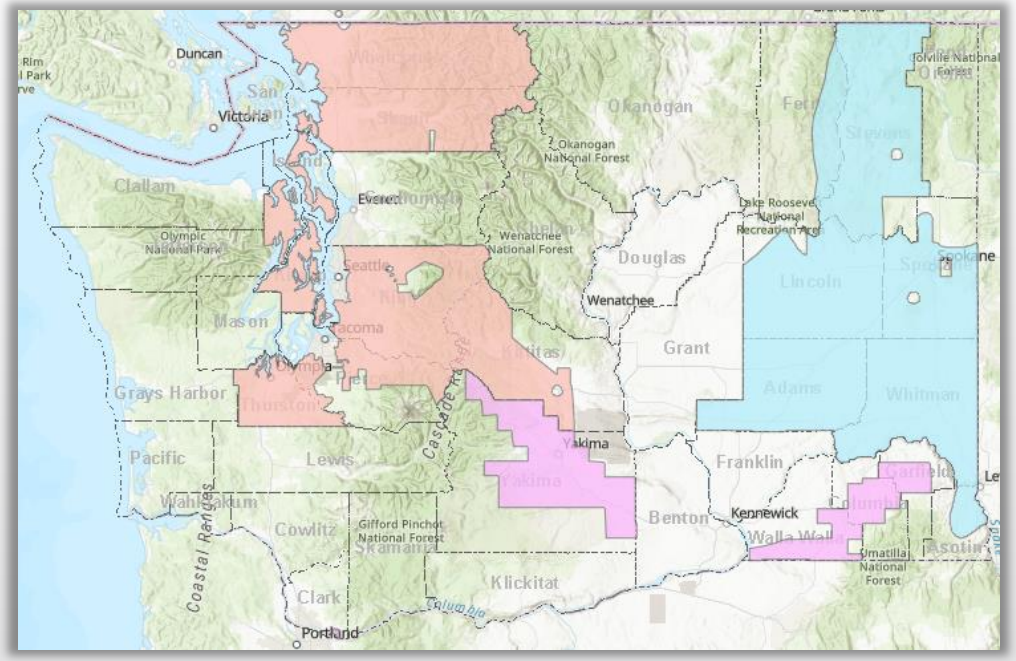
Investor-Owned Utilities: *WUTC Regulated*

Avista Energy

PacifiCorp

Puget Sound Energy



- Generation portfolio approved by ***governor appointed*** commissioners
- Guaranteed ***rate-of-return*** on investments
  - Rates regulated by WUTC
- Maximizing ***shareholder*** value is primary objective

WUTC = Washington Utilities and Transportation Commission

Majority of WA state electricity sector CO_2 emissions are attributable to IOUs

- ✓ *PSE: +52% Non-Emitting*
- ✓ *Avista: +39%*
- ✓ *PacifiCorp: +25%*

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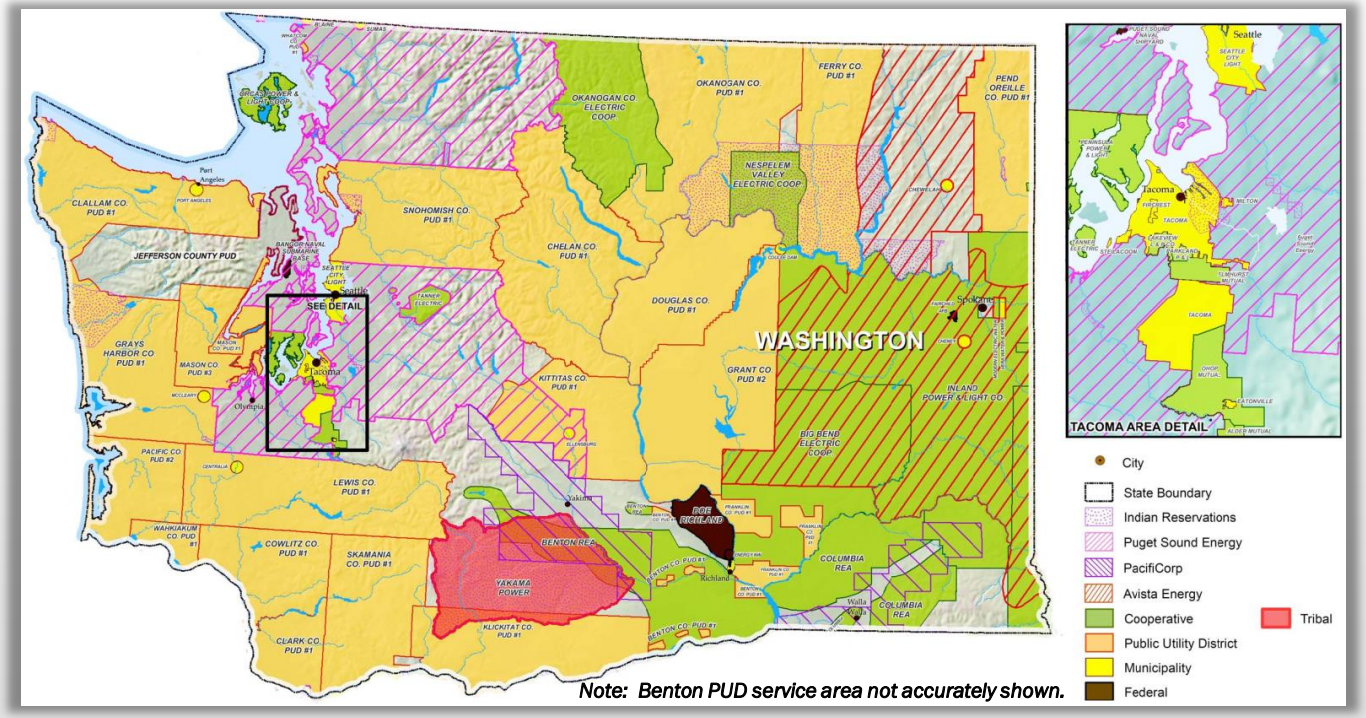
CONSUMER-OWNED UTILITIES: *LOCAL CONTROL*



- Generation portfolio approved by locally elected boards/commissions but now ***highly constrained by state law***
- Long time beneficiaries of low-cost ***federal hydropower*** marketed by the Bonneville Power Administration (***BPA***)
- ***Not-for-Profit***
  - Rates Regulated by Local Boards/Commissions

Many consumer-owned utilities have +95% non-CO_2 emitting portfolios today

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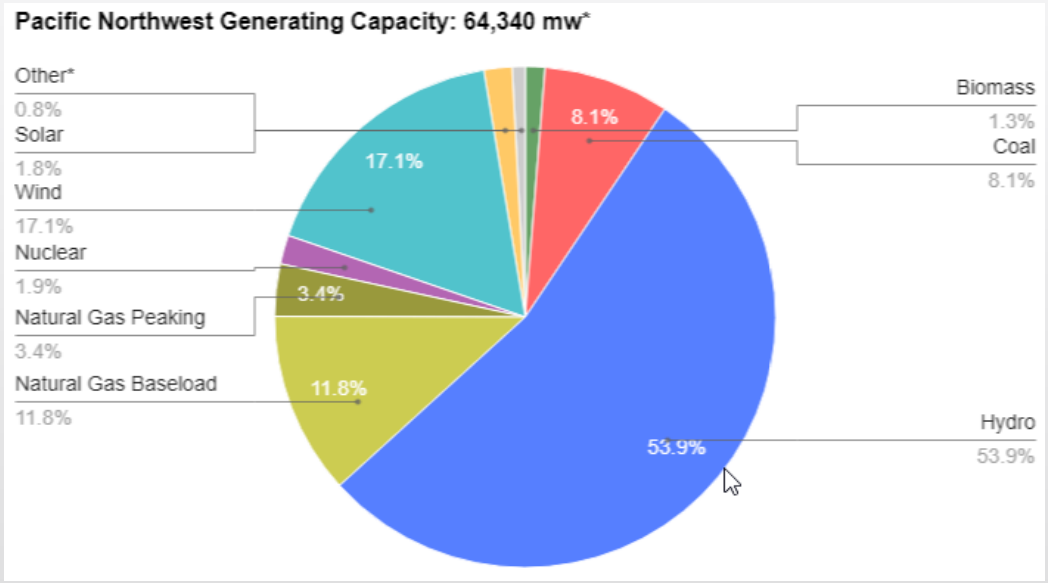
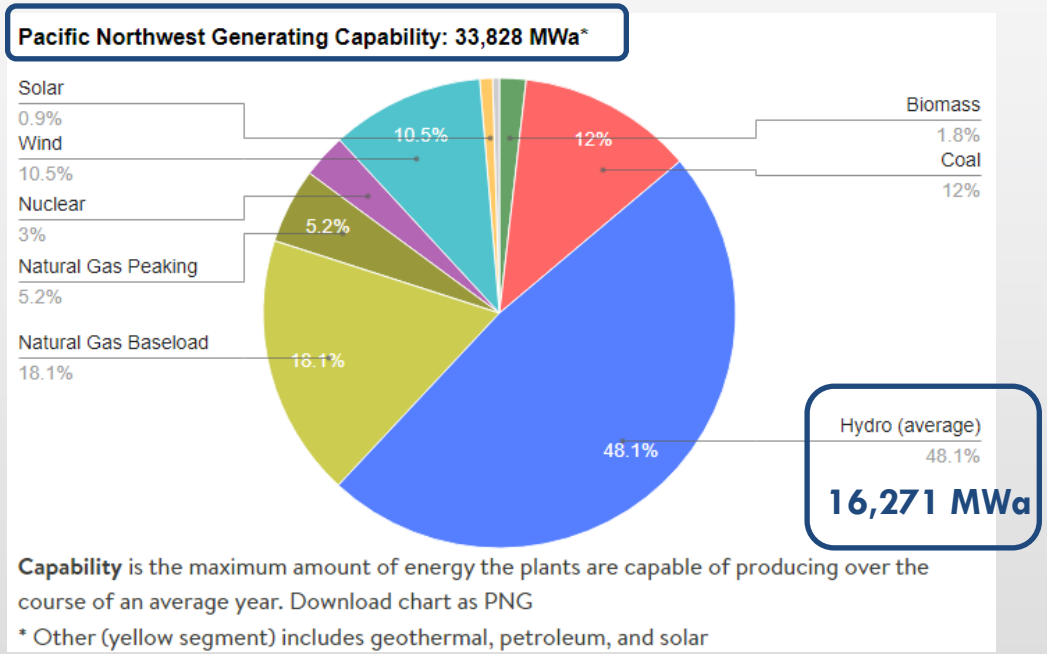
HYDROPOWER: *FOUNDATION OF PACIFIC NORTHWEST ELECTRICITY SUPPLY*

PNW Nameplate Capacity



Source: https://www.nwcouncil.org/energy/energy-topics/power-supply

PNW Annual Electricity Production



- ✓ WA State Annual Electricity Consumed > 10,000 MWa
  - *30% of PNW Total*
  - *60% from Hydropower*

- ✓ *BPA* represents ≈ *50% of hydro* generation in average year

BPA Hydro: *Firm Energy is Spoken For*

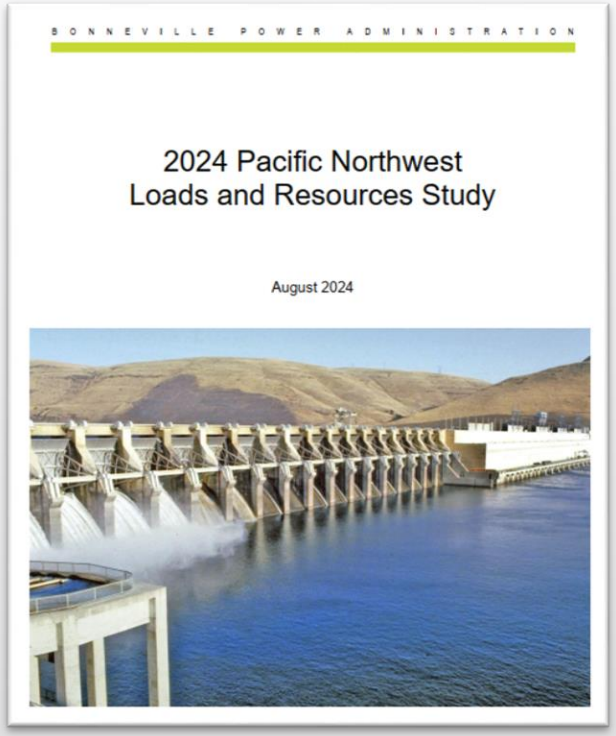
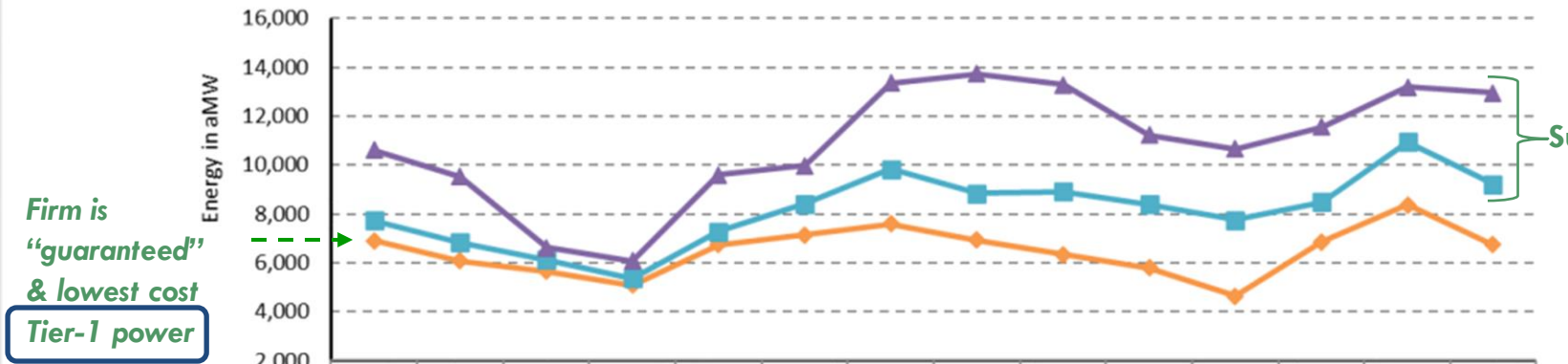


Table 2-9 Federal System Monthly Hydro Generation Variability by Streamflow Conditions – OY2025



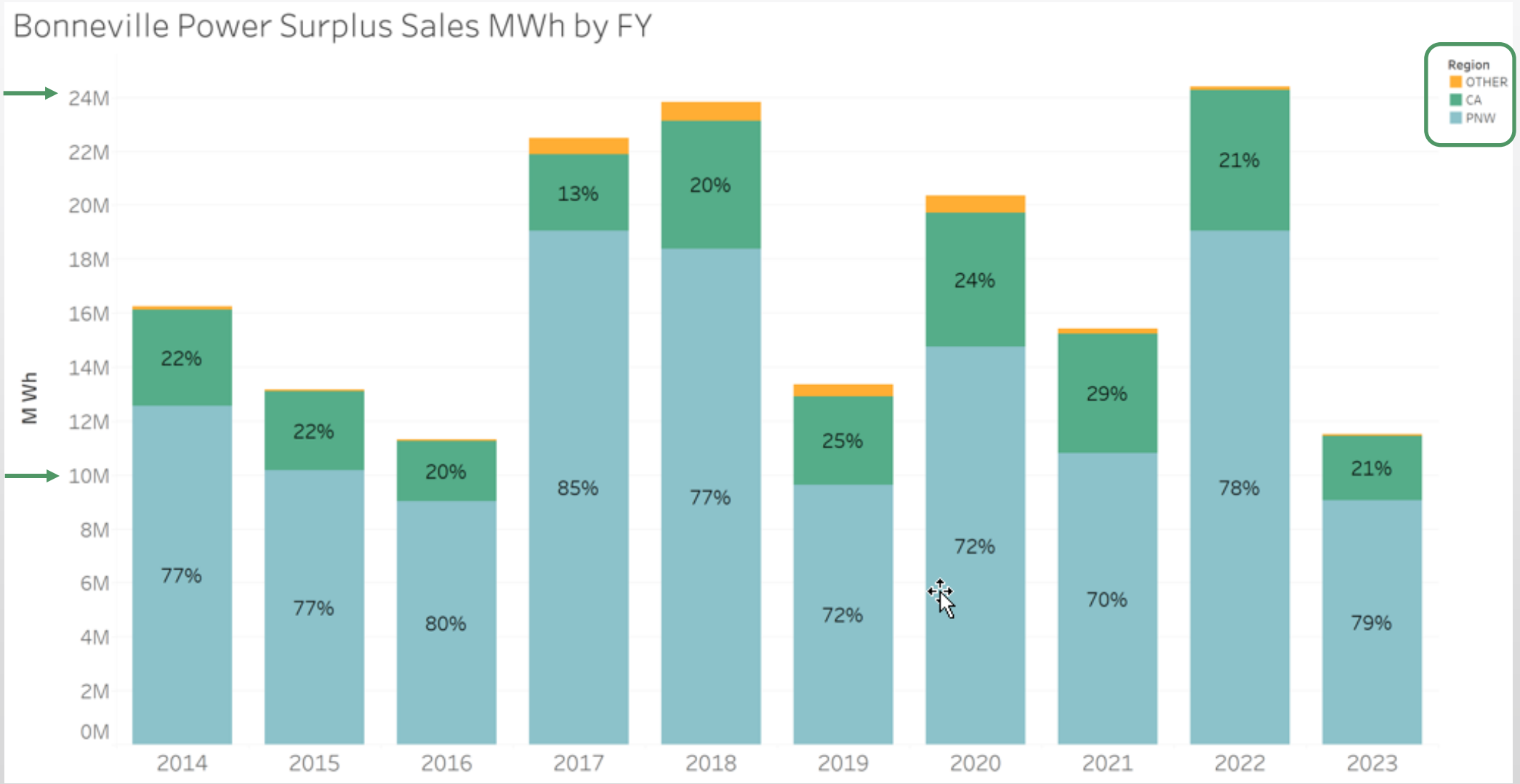
	Aug1	Aug16	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr1	Apr16	May	Jun	Jul
Firm Water (P10)	6,905	6,077	5,649	5,072	6,731	7,148	7,586	6,928	6,333	5,800	4,635	6,856	8,360	6,732
Median Water (P50)	7,727	6,835	6,121	5,357	7,284	8,416	9,840	8,830	8,904	8,395	7,748	8,484	10,931	9,220
High Water (P90)	10,620	9,522	6,620	6,070	9,601	9,962	13,355	13,732	13,291	11,224	10,652	11,567	13,185	12,956

Lowest-cost *firm Hydropower* is spoken for. *Surplus* used to meet demand *above* firm allocations & *sold* in power markets to *buy down* BPA utility customer *rates*.

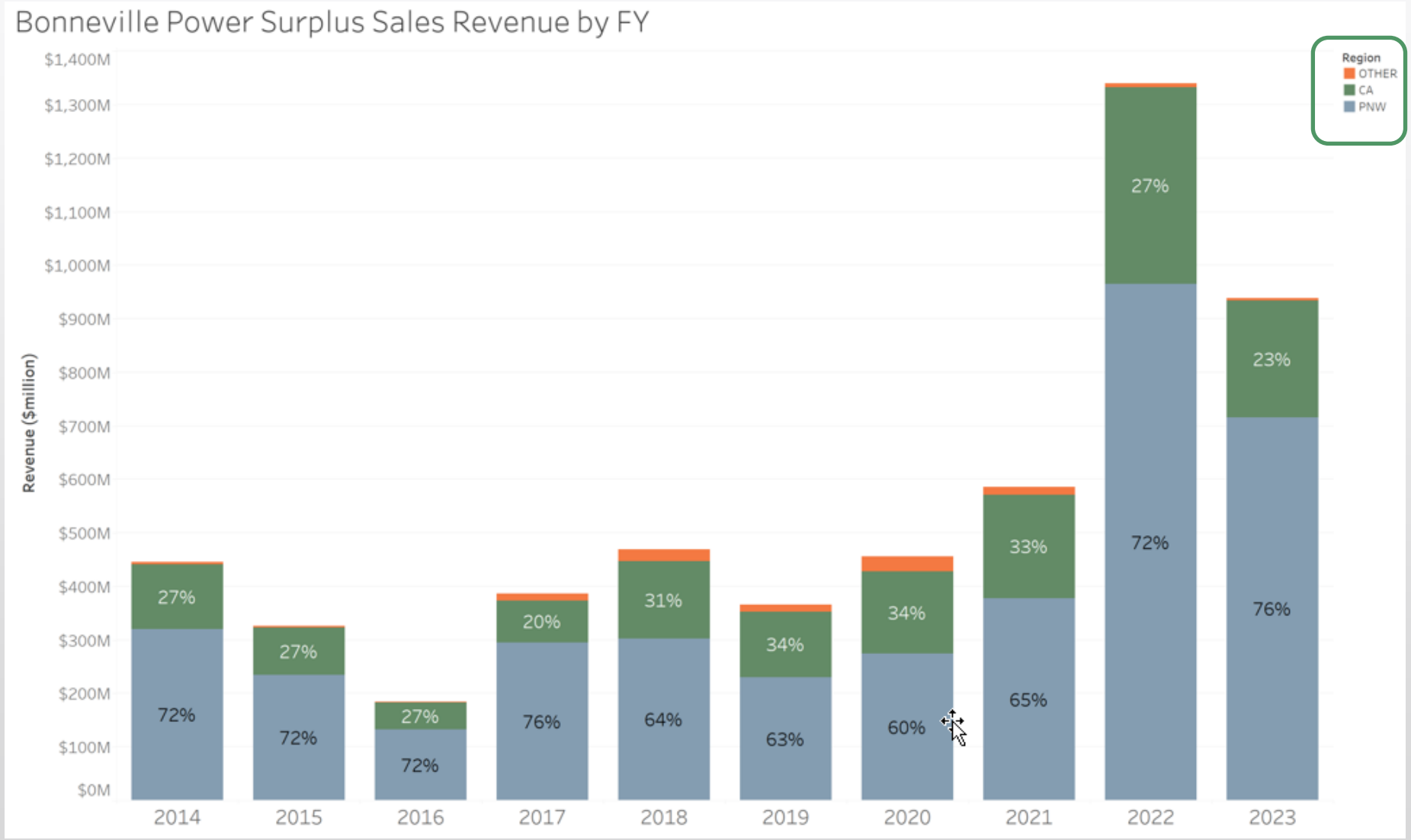
BPA Hydro: *Surplus Energy Sales Energy*

2,740 aMW

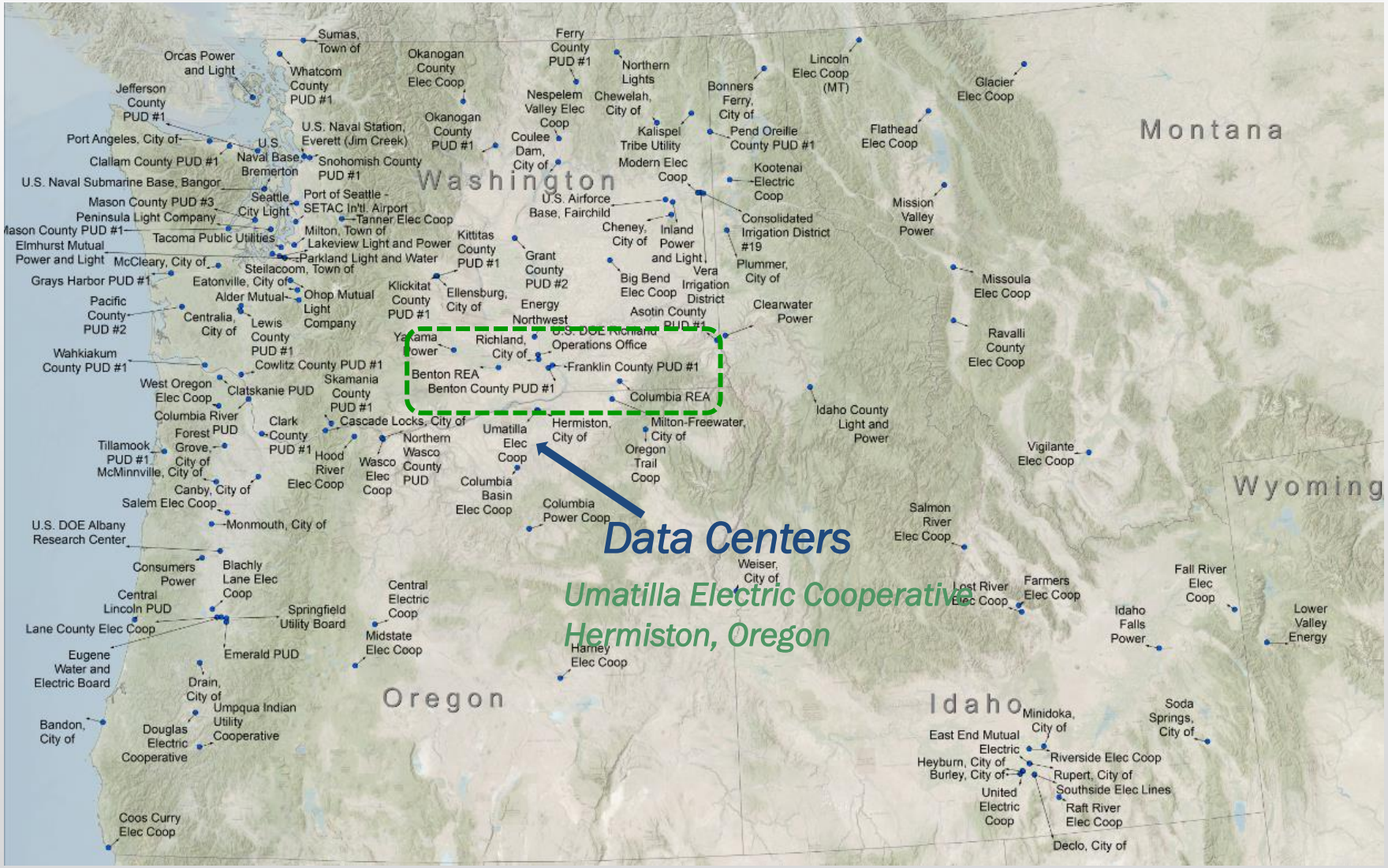
1,141 aMW



BPA Hydro: *Surplus Energy Sales Revenue*



Tri-Cities Area: *Electricity Demand*

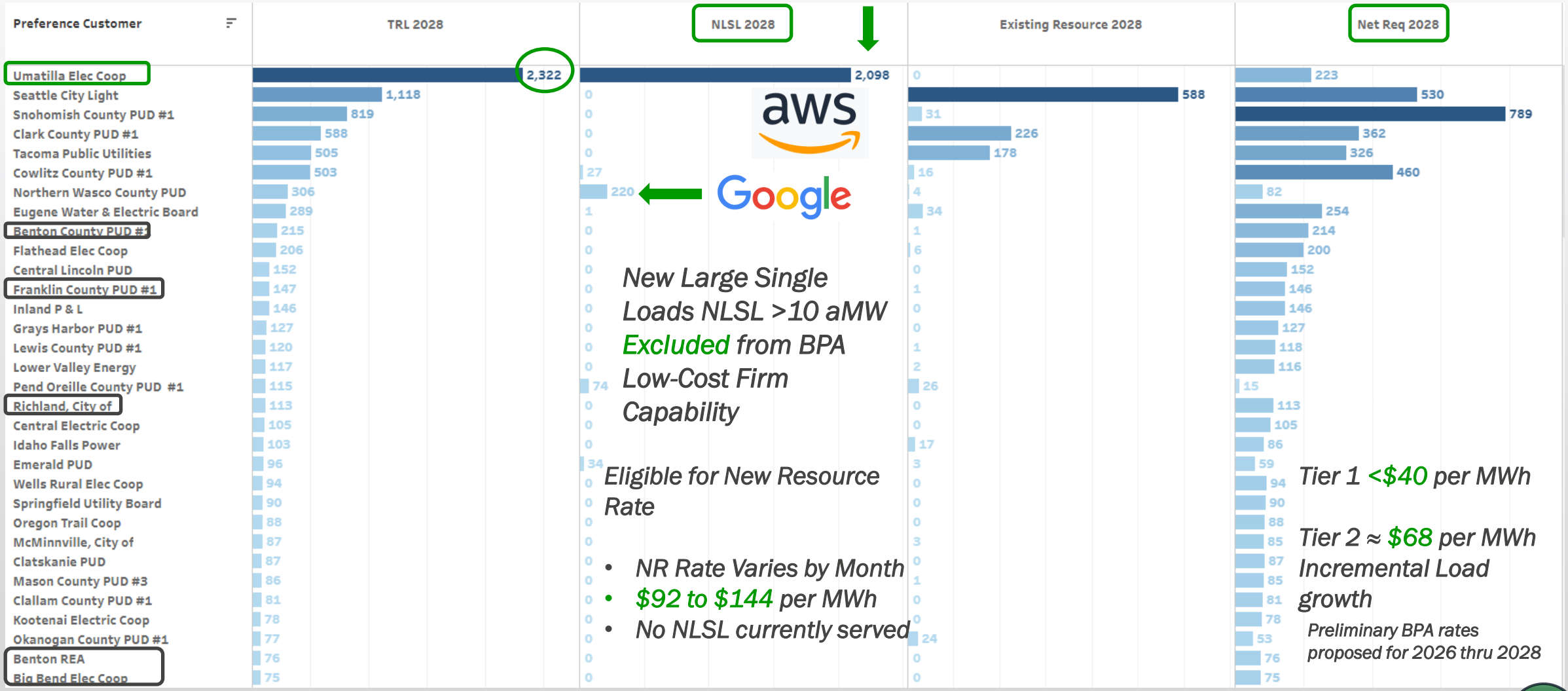


Utility	2025 Annual MWa
Benton PUD	212
Franklin PUD	136
City of Richland	112
Big Bend Electric Coop	68
Benton REA	65
TOTAL	593

Umatilla Electric = 1,052 MWa

BPA Firm Energy: *Where it Flows & Doesn't*

Data Centers/Industrial Loads — *Load Served by BPA*



New Large Single Loads NLSL >10 aMW Excluded from BPA Low-Cost Firm Capability

Eligible for New Resource Rate

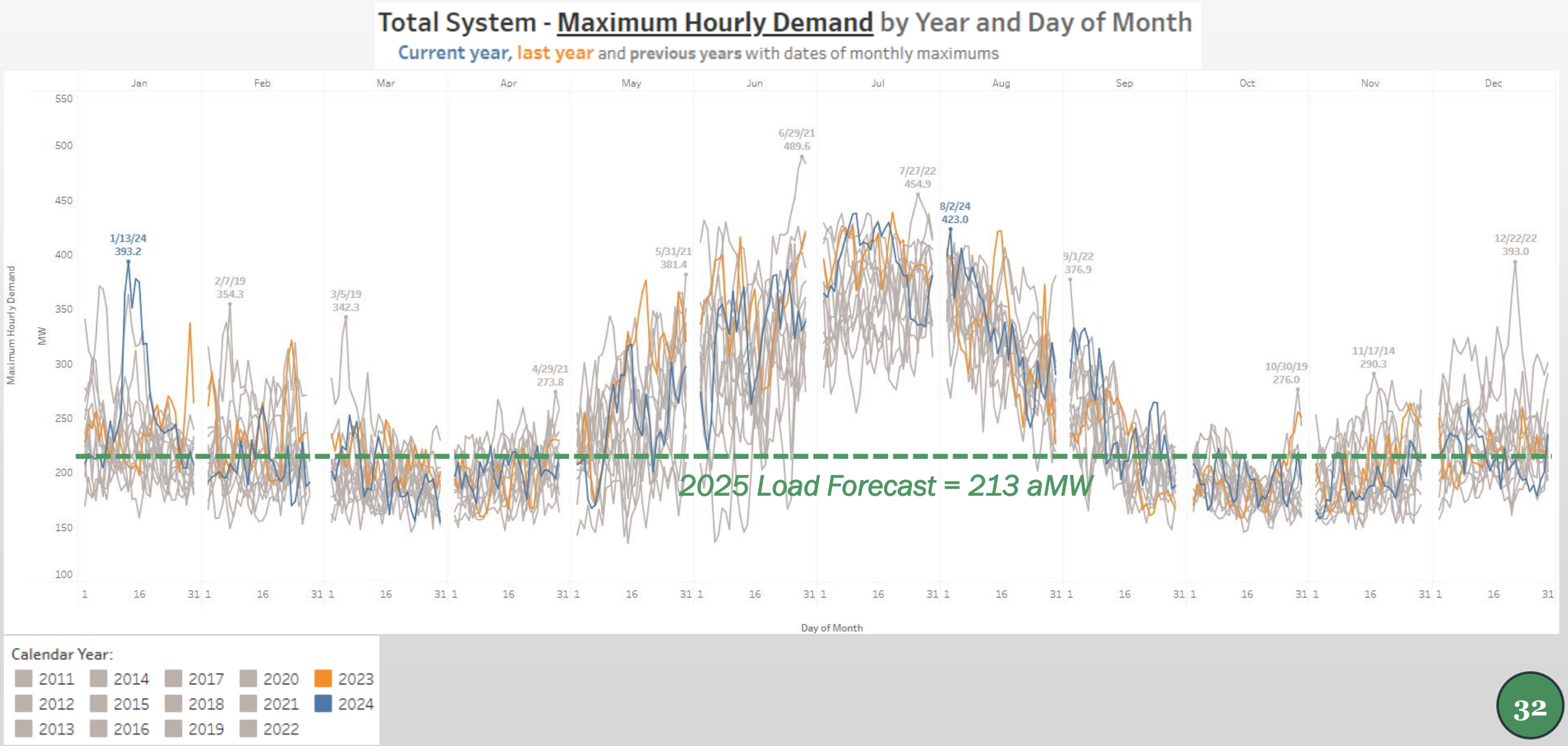
- *NR Rate Varies by Month*
- *$92 to $144 per MWh*
- *No NLSL currently served*

Tier 1 <$40 per MWh

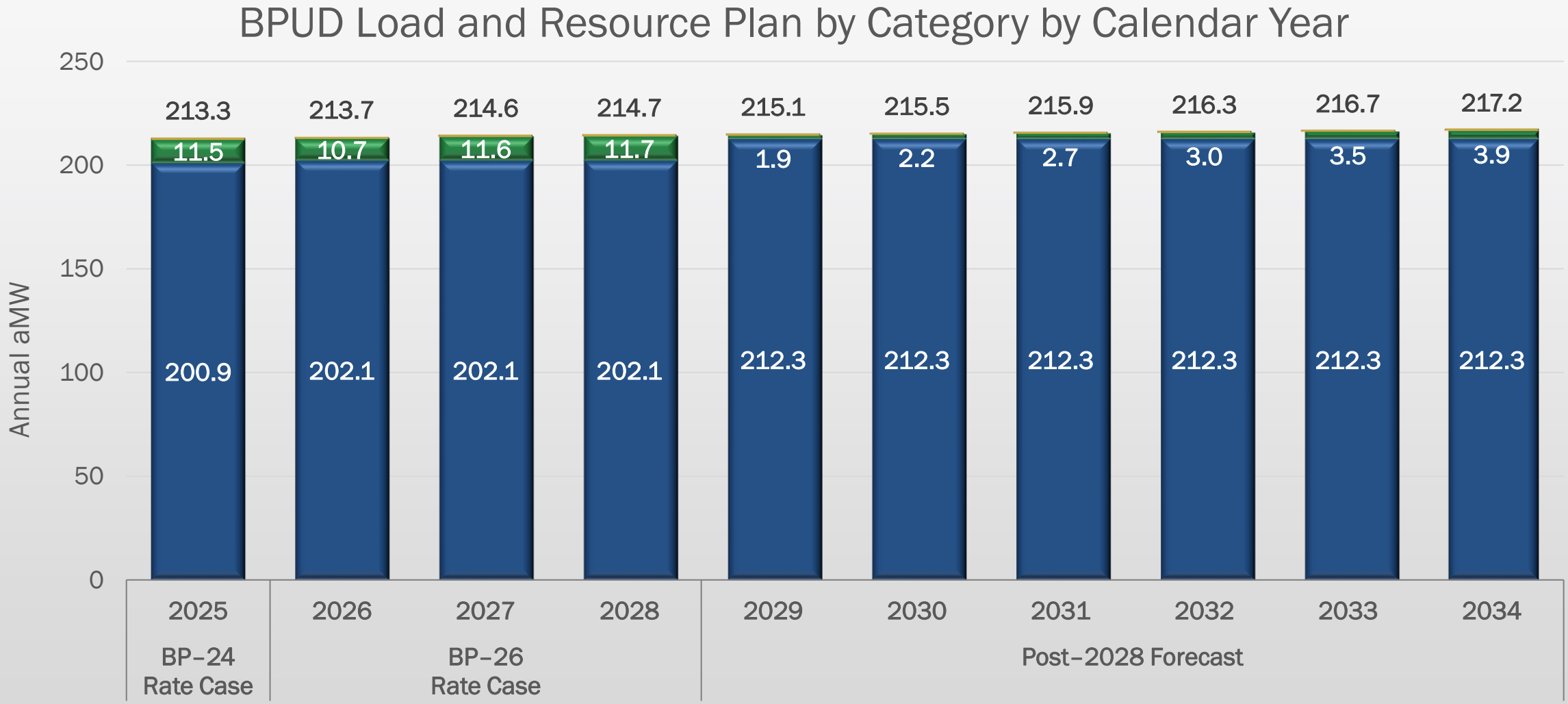
Tier 2 ≈ $68 per MWh Incremental Load growth

Preliminary BPA rates proposed for 2026 thru 2028

Benton PUD Max. Hourly Demand & Average Load

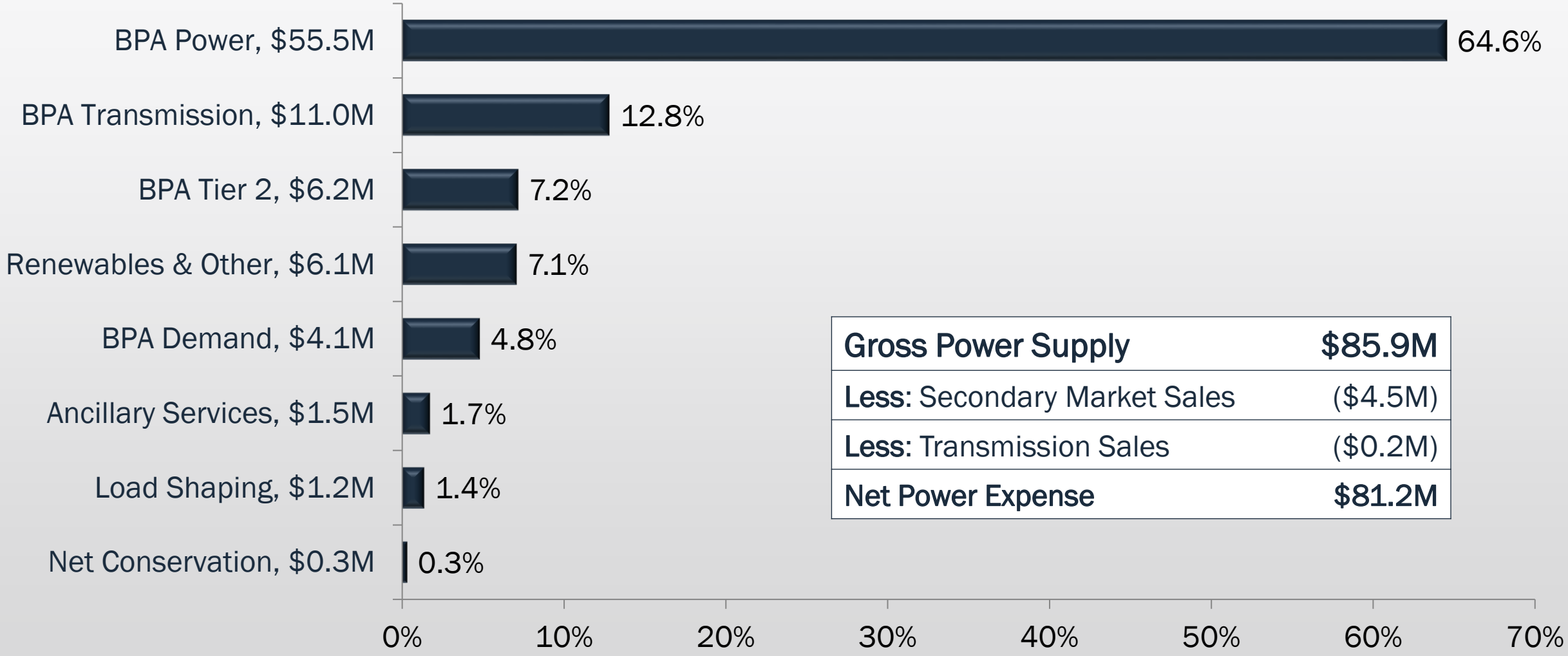


BPUD Loads and BPA Products under Load Following



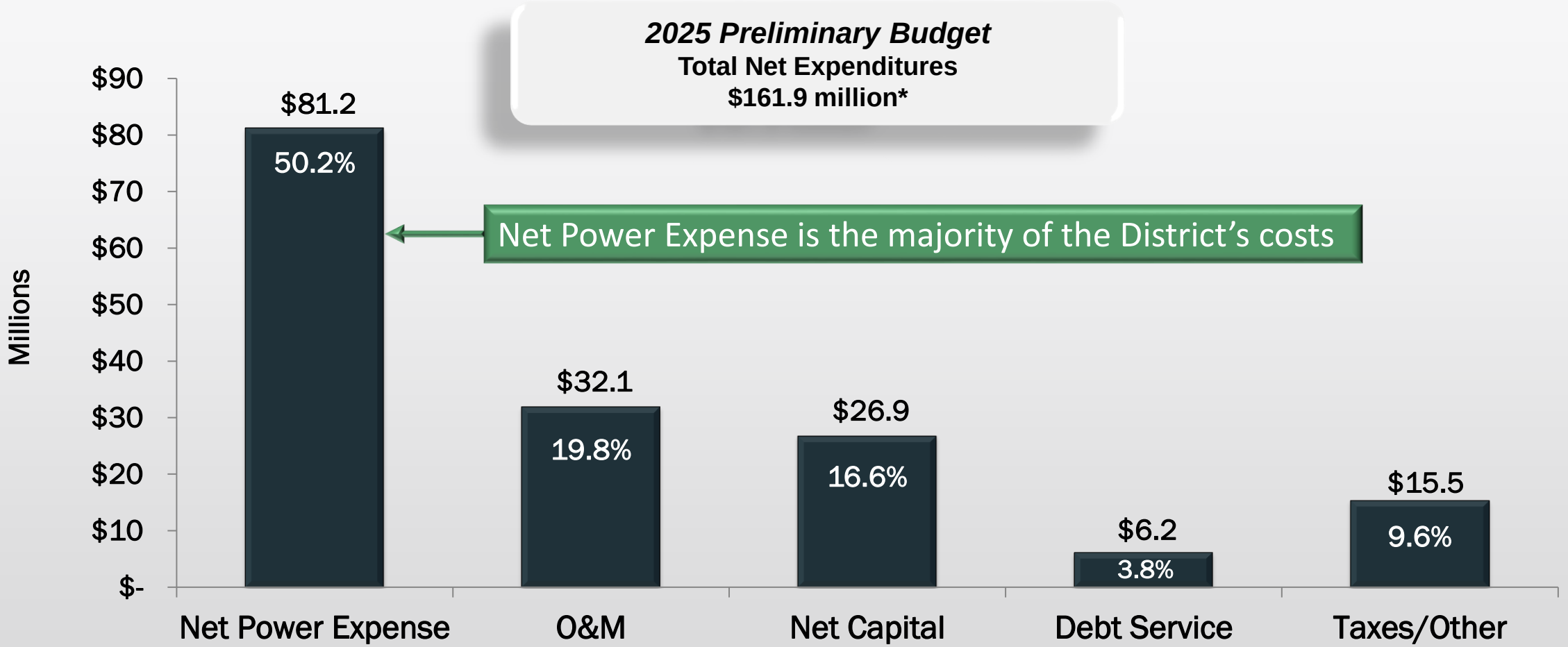
*Packwood is a dedicated resource at .92 aMW

2025 Gross Power Supply Cost by Source



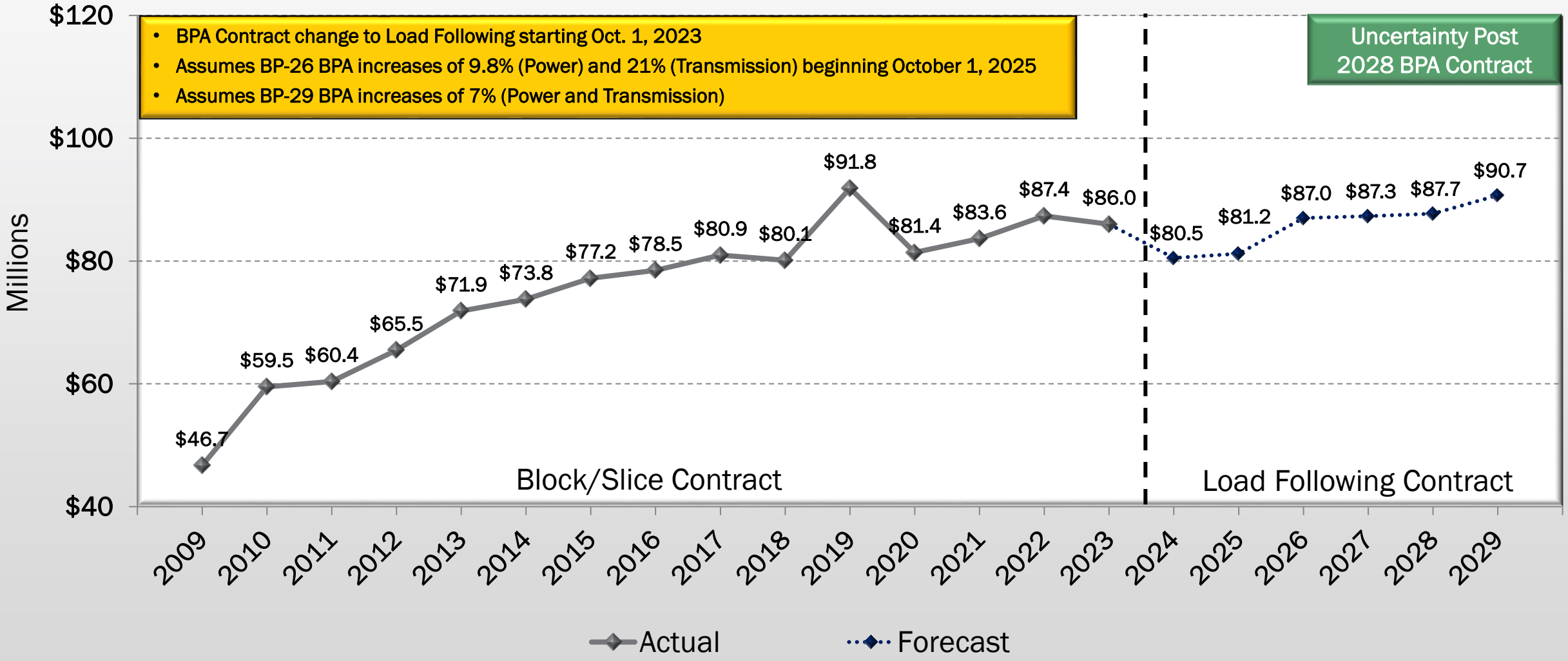
Gross Power Supply	**$85.9M**
Less: Secondary Market Sales	($4.5M)
Less: Transmission Sales	($0.2M)
Net Power Expense	**$81.2M**

2025 Budgeted Expenses



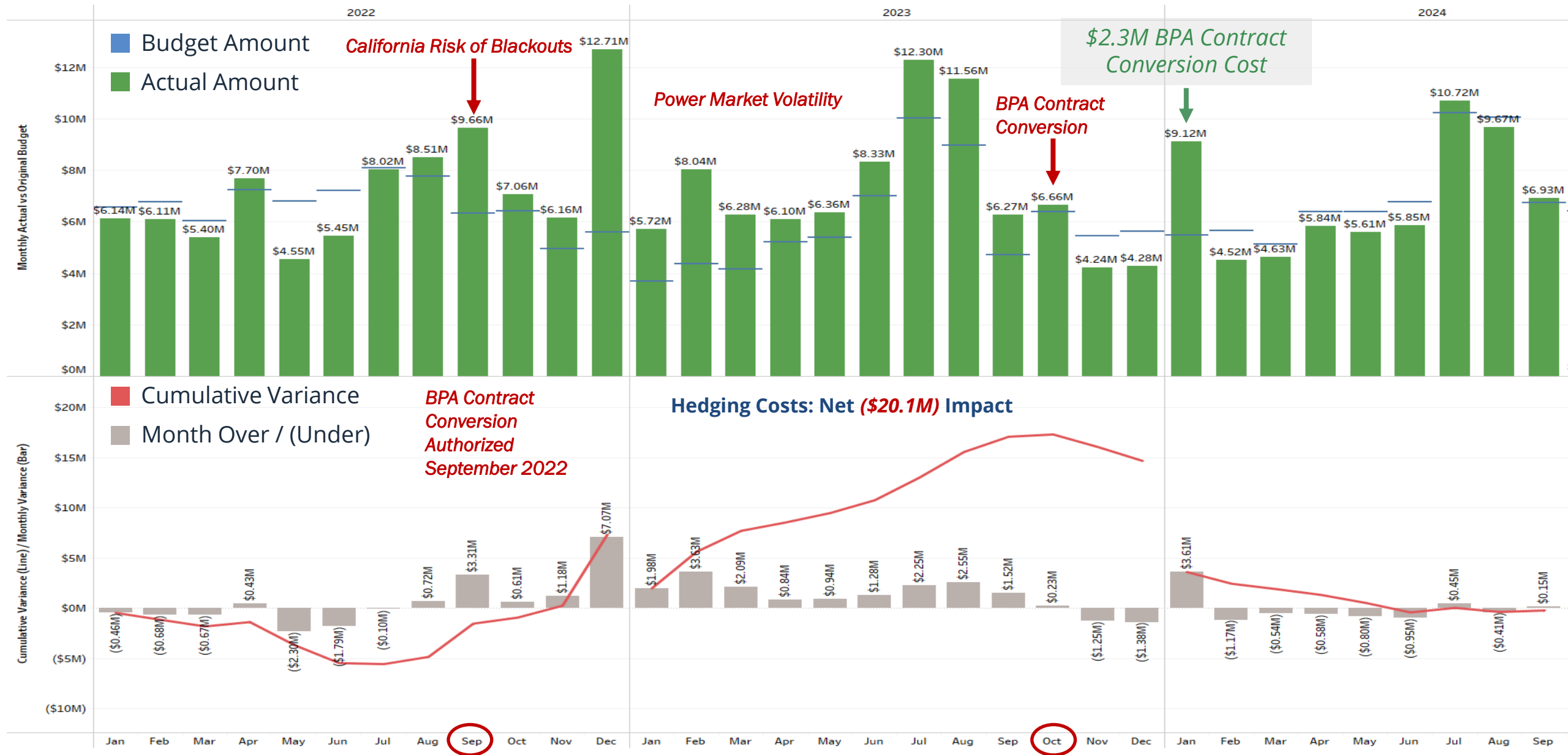
** Net of secondary market sales of $4.7 million, capital contributions of $4.0 million, and Build America Bonds subsidy of $0.3 million*

Net Power Costs*

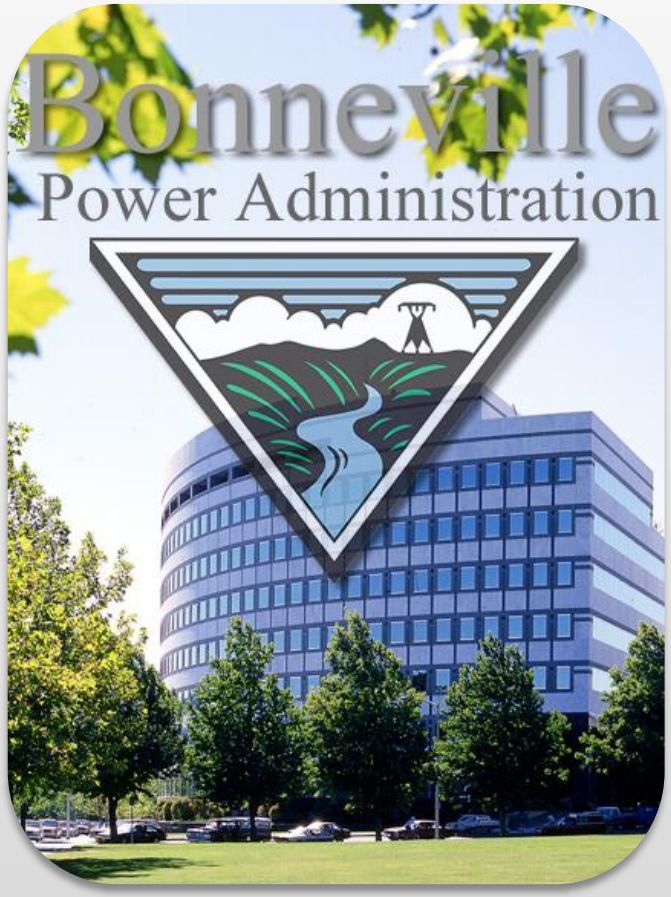


* *Net power costs (NPC) = gross power costs (including power and transmission) less sales for resale.*

Net Power Costs Recent History



Cost Driver Review



Power Costs

Supply Chain

Labor & Benefits

Supply Chain: Costs & Lead Times Way Up

2020: $578k
2024: $1.3M to $2.2M

6 to 9 month lead time
1.5 to 3.5 year lead time

25-megawatt Substation Transformer

2020: $1,355
2024: Up to $8,732

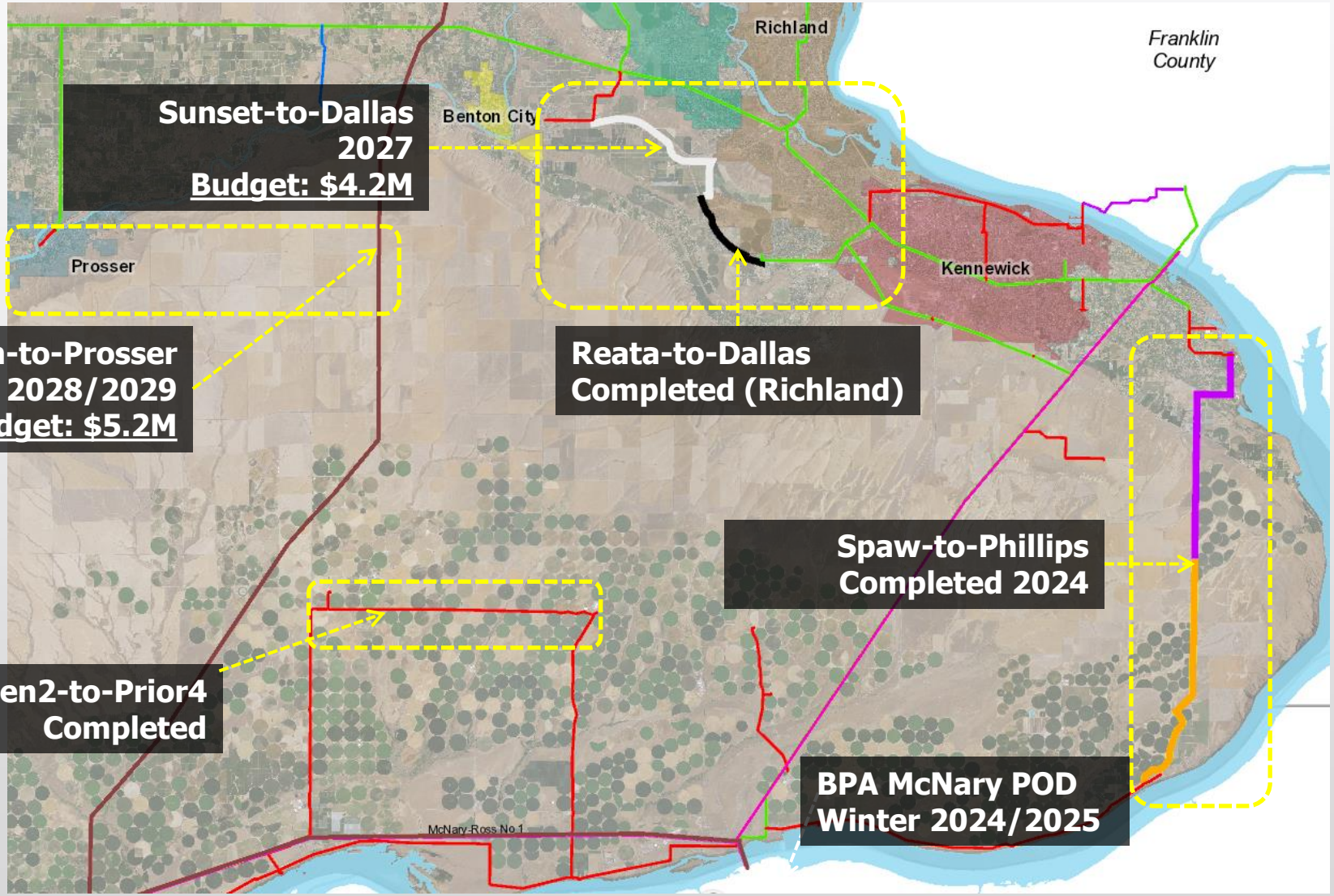
12 to 16 weeks lead time
Up to 2-year lead time

25-kilowatt Residential Transformer

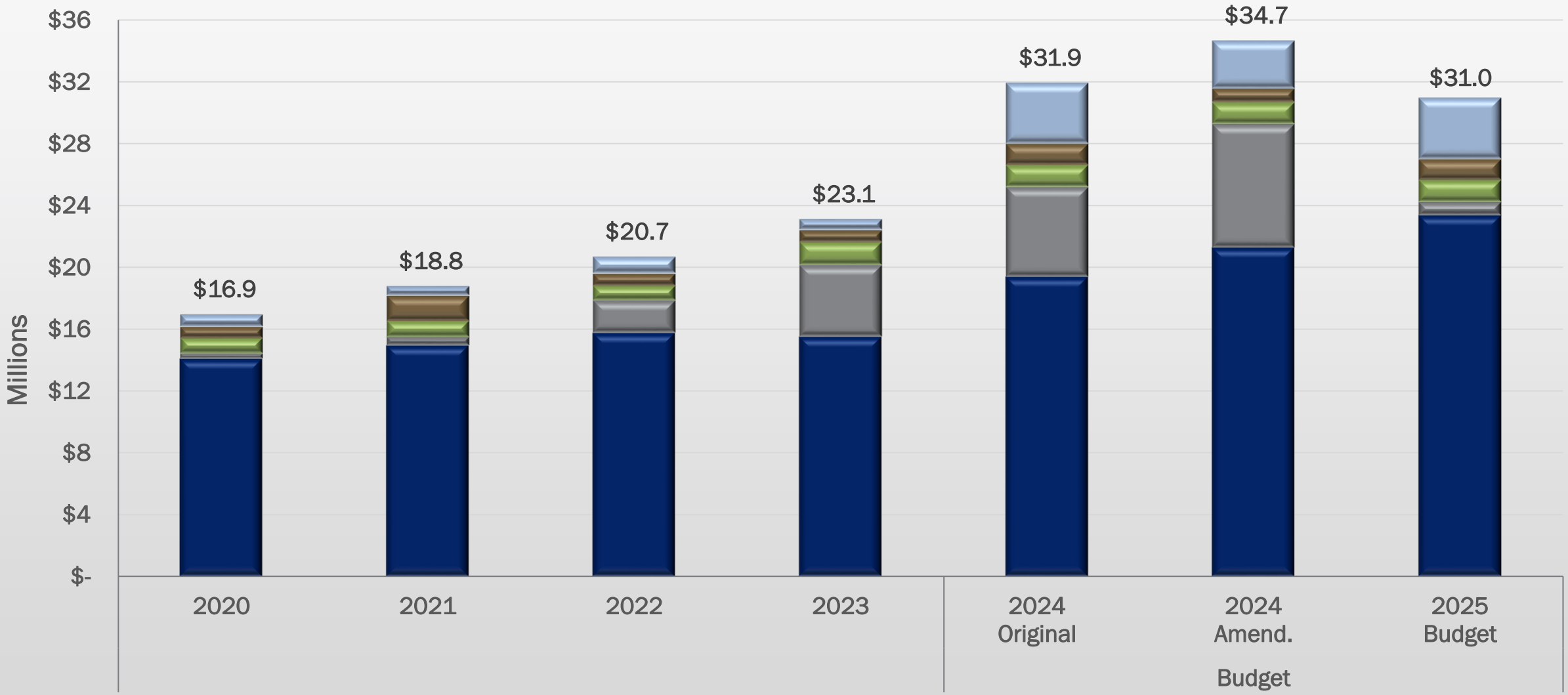
Source: Benton PUD contracts & purchasing department

Transmission Reliability Improvement Projects

115-kV Transmission Lines for Redundancy

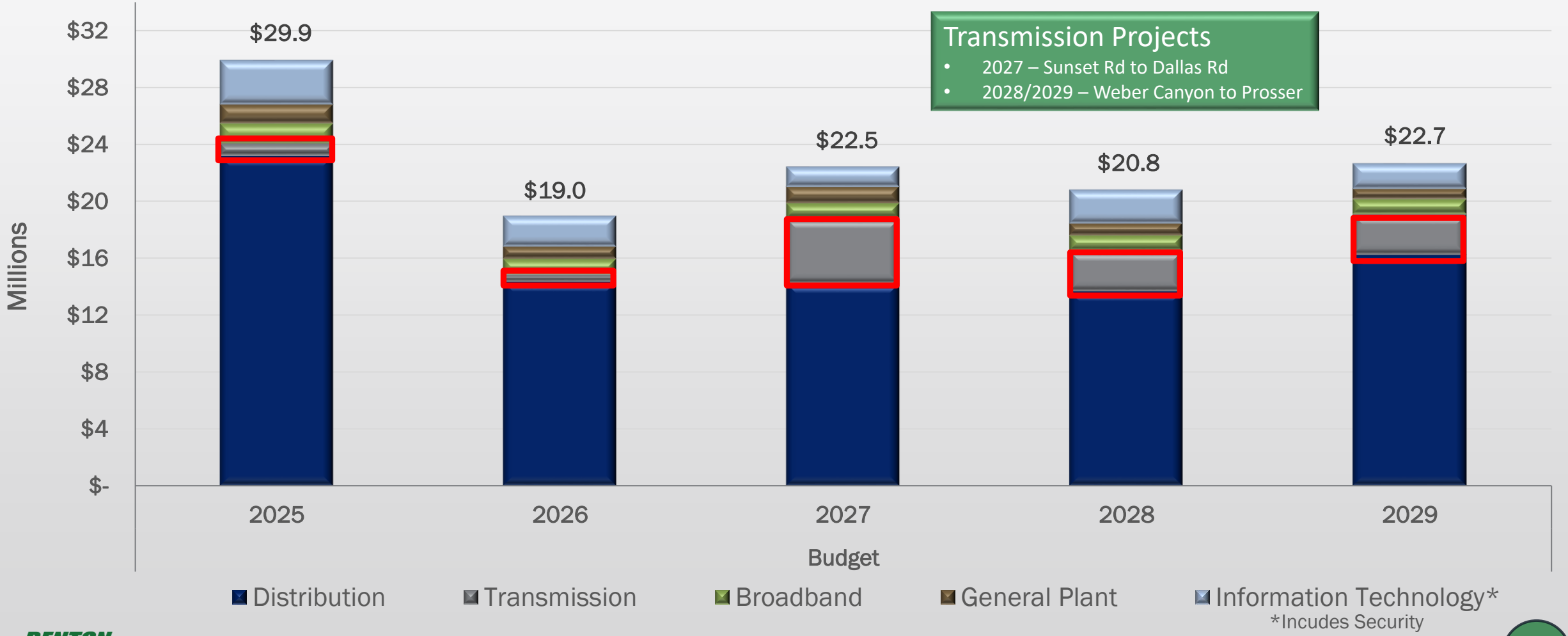


2020 – 2025 Gross Capital Expenditures by Category

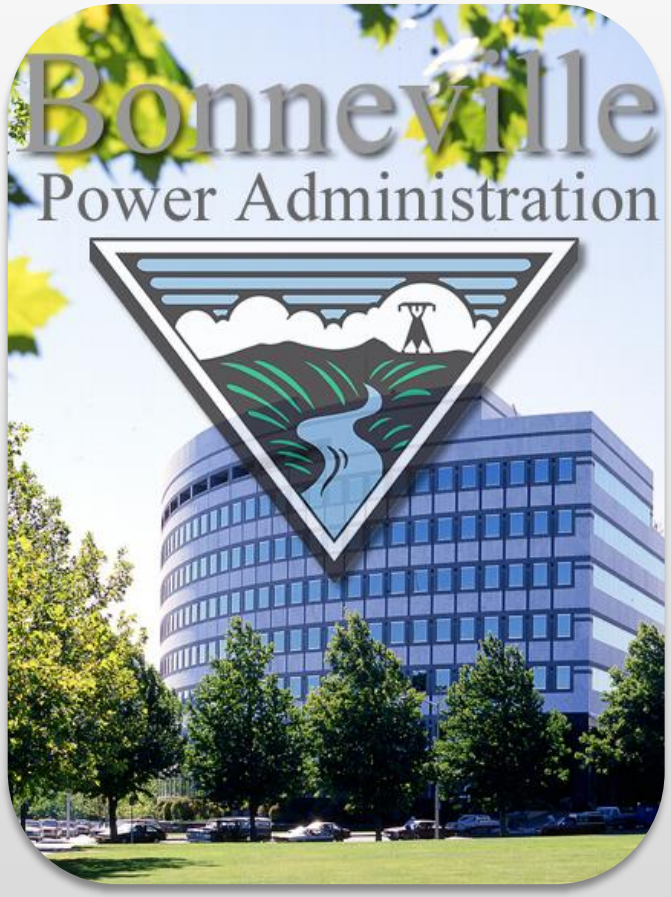


*Incudes Security

2025 - 2029 Gross Capital Expenditures by Category



Cost Driver Review



Power Costs

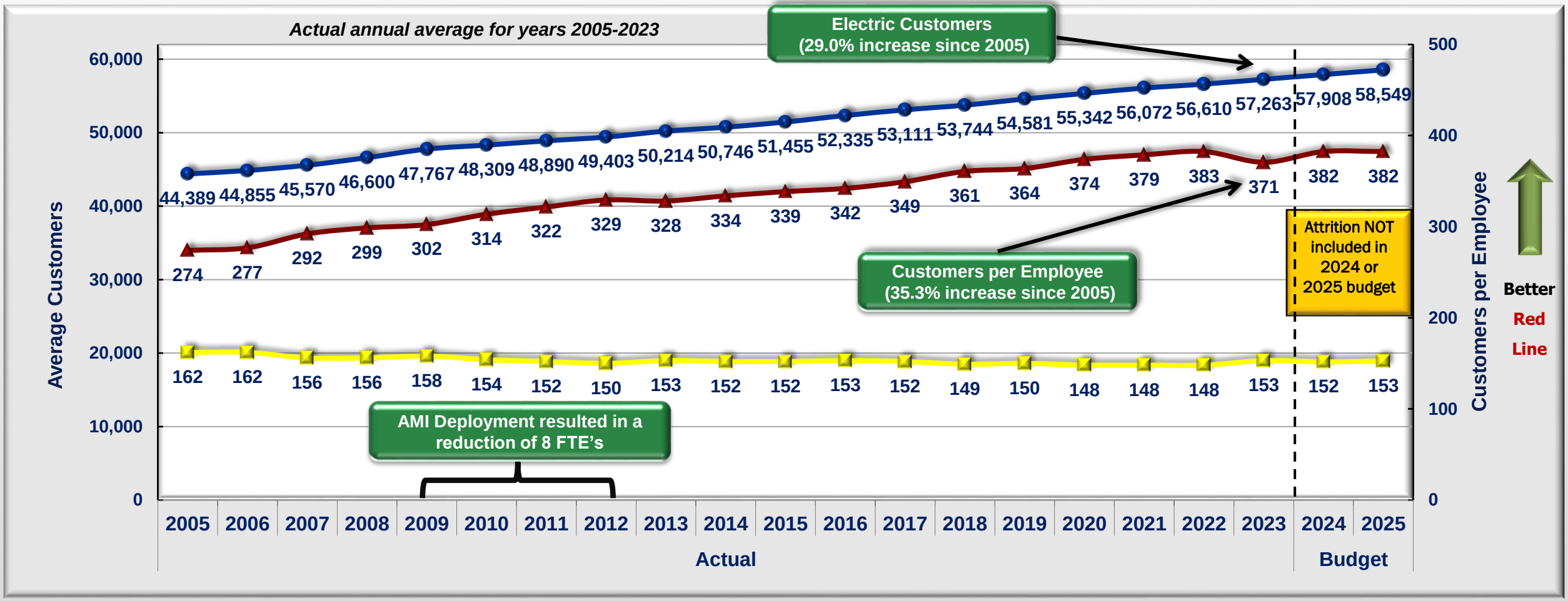
Supply Chain

Labor & Benefits

BENTON P·U·D

Reliable Public Power Provider

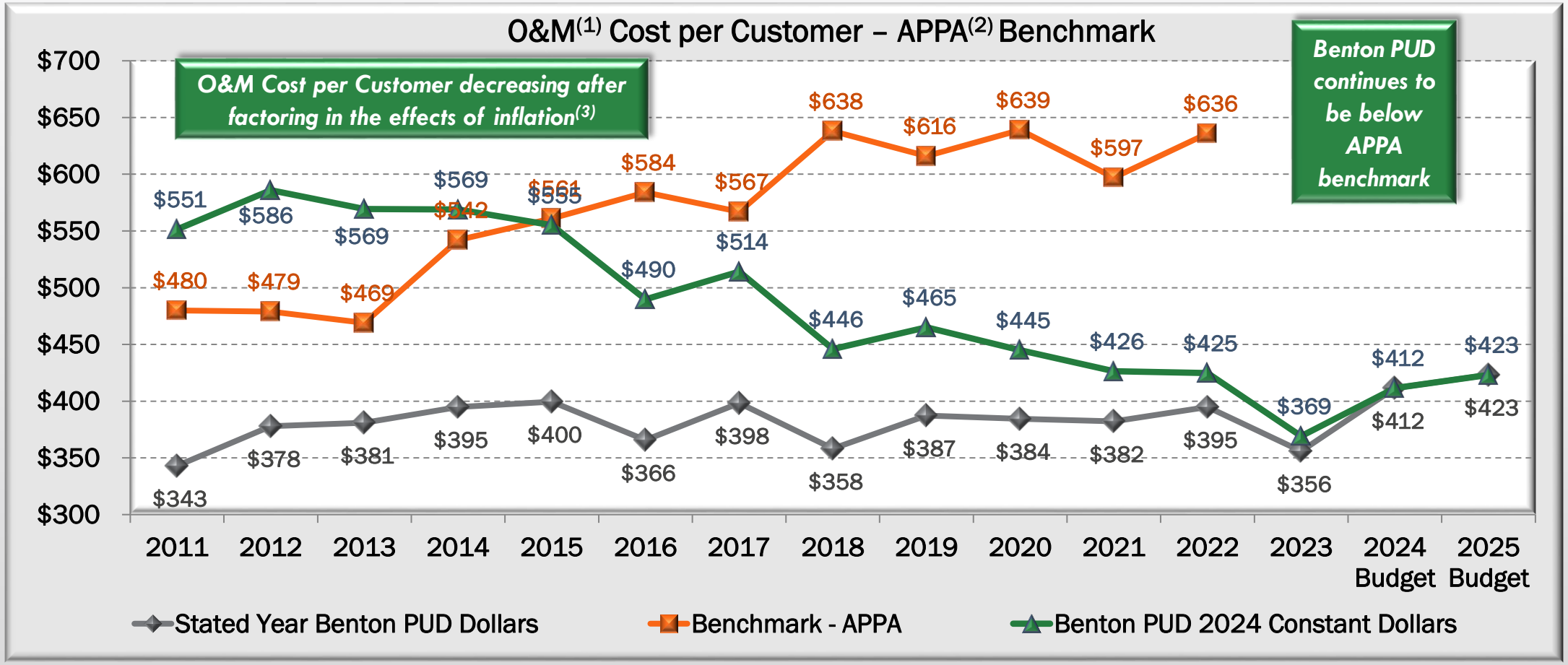
Customers per District Employee



Definition of Customer per American Public Power Association

Note: -Average customer figures have been restated to be consistent with method used by new enterprise system.
-FTE figures have been restated and now include a reduction for the FTEs shared and paid for by other utilities. Currently 0.5 FTEs are shared and paid for by other utilities.

Operations and Maintenance



(1) O&M = non-power operations & maintenance cost (distribution, transmission, customer accounts, and administrative and general). Excludes Broadband.
(2) American Public Power Association - 2022 median for West utilities.
(3) Inflation rate utilized comes from a producer price index for electric utilities, which on average has been slightly under 3%

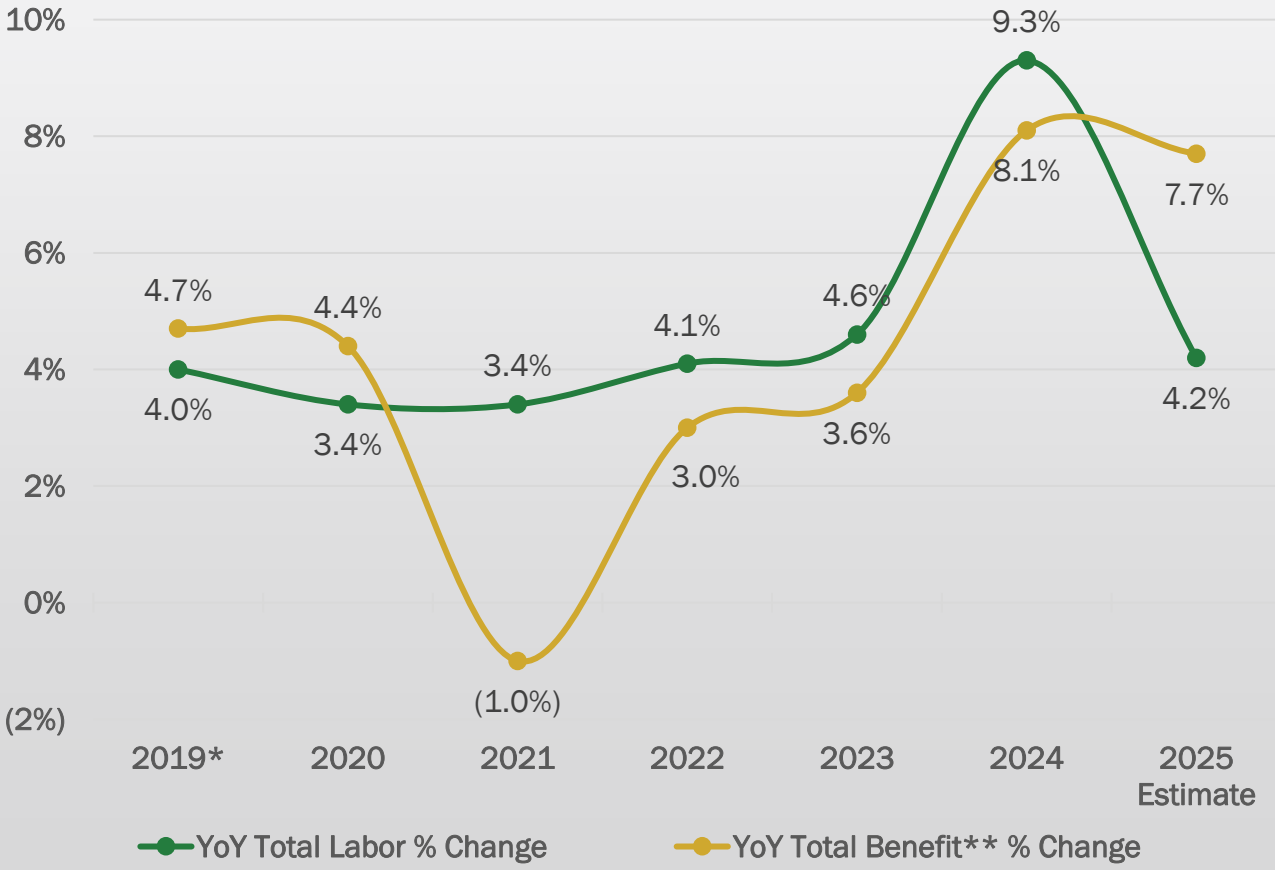
District Labor & Benefit Changes

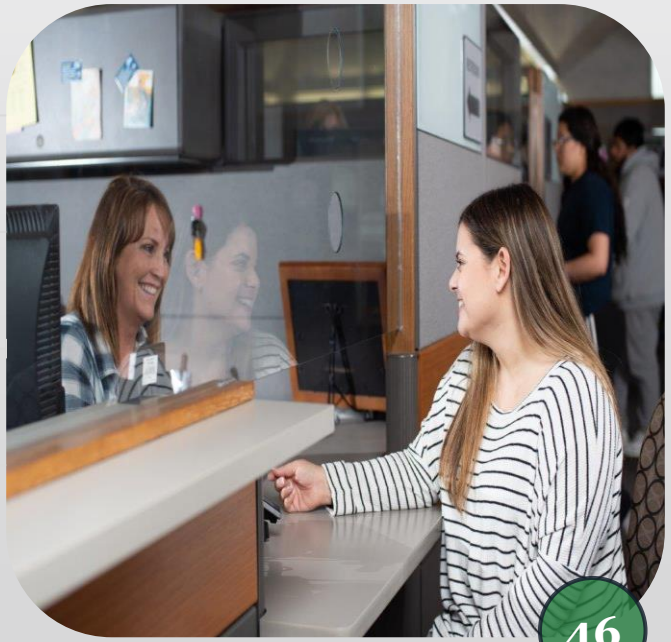
(55% Bargaining (Union) Employees | 45% Non-Bargaining Employees)

2019 – 2024

Total Cumulative Labor Increase 27.3%

Total Cumulative Benefit Increase 19.2%





*Base year used to calculate cumulative Labor and Benefit percentage increase

**Benefits include Medical, Dental, Vision, Social Security, Medicare, State Industrial, Public Employee Retirement, Deferred Compensation, and other miscellaneous benefits

Payroll Taxes & Benefits

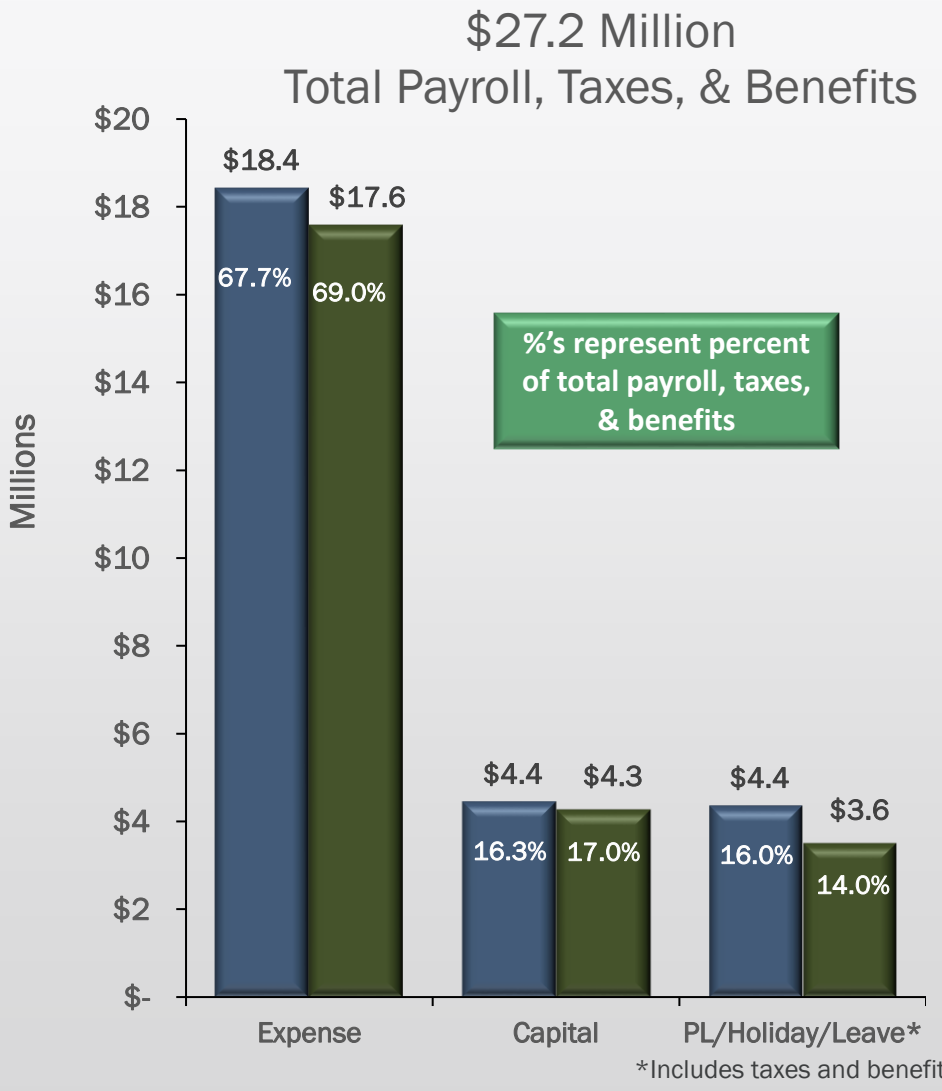
Dollars in thousands	2025 Budget	2024 Original Budget	Increase/ (Decrease)	% Change
Labor				
Overtime Wages	$1,004	$1,009	($5)	(0.5%)
Regular Labor - Salaries and Wages	18,322	17,228	1,094	6.4%
Total Labor	**$19,326**	**$18,237**	**$1,089**	**6.0%**
Payroll Taxes				
Social Security	$1,177	$1,113	$64	5.8%
Medicare	280	264	16	6.1%
Total Payroll Taxes	**1,457**	**1,377**	**$80**	**5.8%**
Employee Benefits				
State Industrial/Unemployment	227	185	$42	22.7%
Public Employee Retirement System	1,727	1,662	65	3.9%
Deferred Compensation Match	765	631	134	21.2%
VEBA Contributions	362	361	1	0.3%
Medical/Dental/Vision Insurance	3,055	2,799	256	9.1%
Other Benefits	316	239	77	32.2%
Total Employee Benefits	**$6,452**	**$5,877**	**$575**	**9.8%**
Total Payroll Taxes and Benefits	**$7,909**	**$7,254**	**$655**	**9.0%**
Grand Total Labor, Payroll Taxes and Benefits	**$27,235**	**$25,491**	**$1,744**	**6.8%**

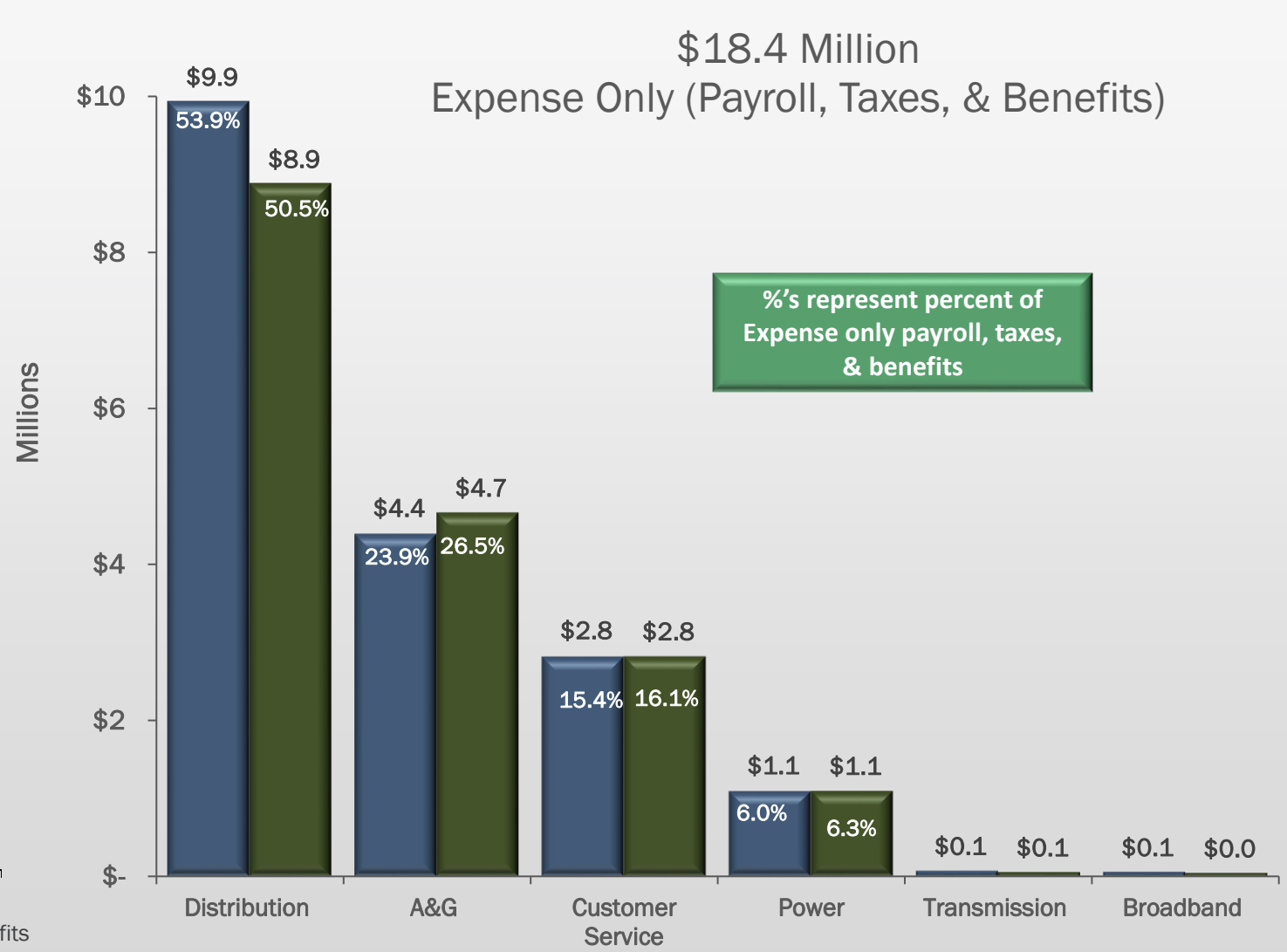
Total L, T & B = 19.6% of Energy Sales Revenue Requirement

5% L, T & B Increase = 1% Rate Increase

Increase in medical premiums is due to a 12.6% increase to medical rates.

Payroll, Taxes, & Benefits
(By Category)





2025 Preliminary Budget 2024 Original Budget

Increasing Value w/ Strategic partners

nisc

hub

sensus

PURMS

Welcome to the Public Utility Risk Management Services

UIP

Unified Insurance Program

Power Apps

+ableau

Smart Grid @ BPUD: Advanced Metering & Apps

- ✓ *Energy Use Data on Short Time Intervals*
- ✓ *Remote Service Connection & Disconnection*
- ✓ *On-Demand Reads*
- ✓ *Service Theft and Tamper Detection*
- ✓ *Power Quality Monitoring*
- ✓ *Outage Detection and Reporting*

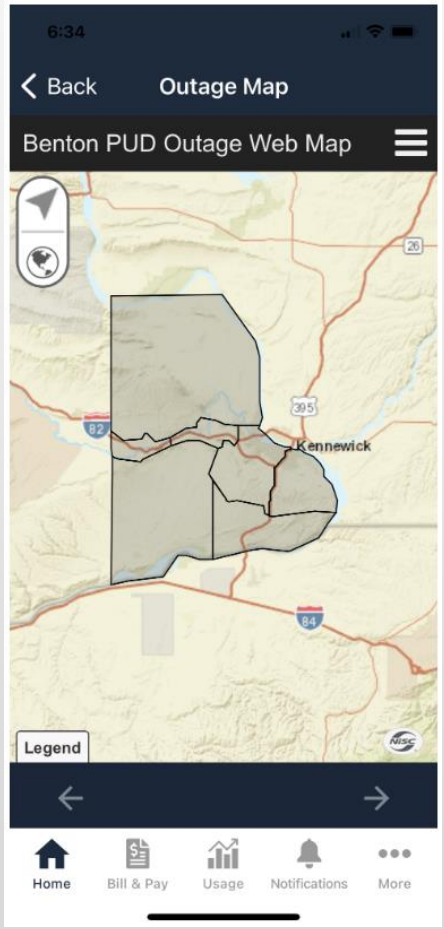
- ✓ *Enable Active Participation by Consumers*
- ✓ *Internet Access to Energy Use Data*

BENTON P·U·D

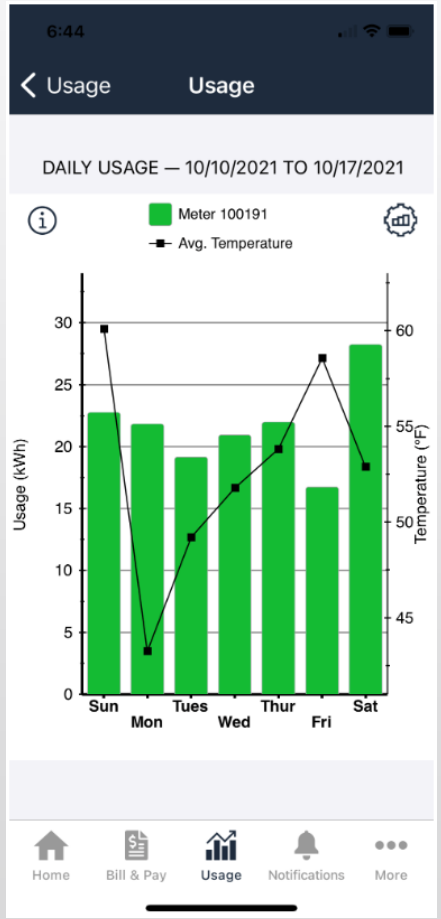
Reliable Public Power Provider

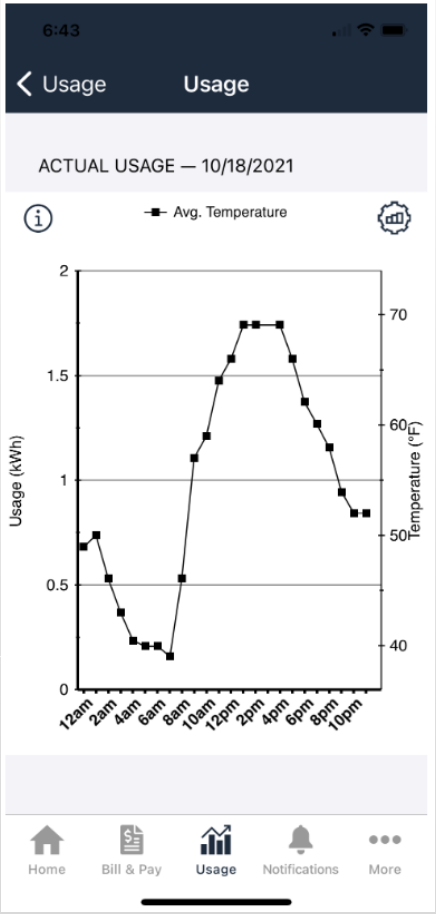
Smart Grid @ BPUD: Customer Interface

Outage Status

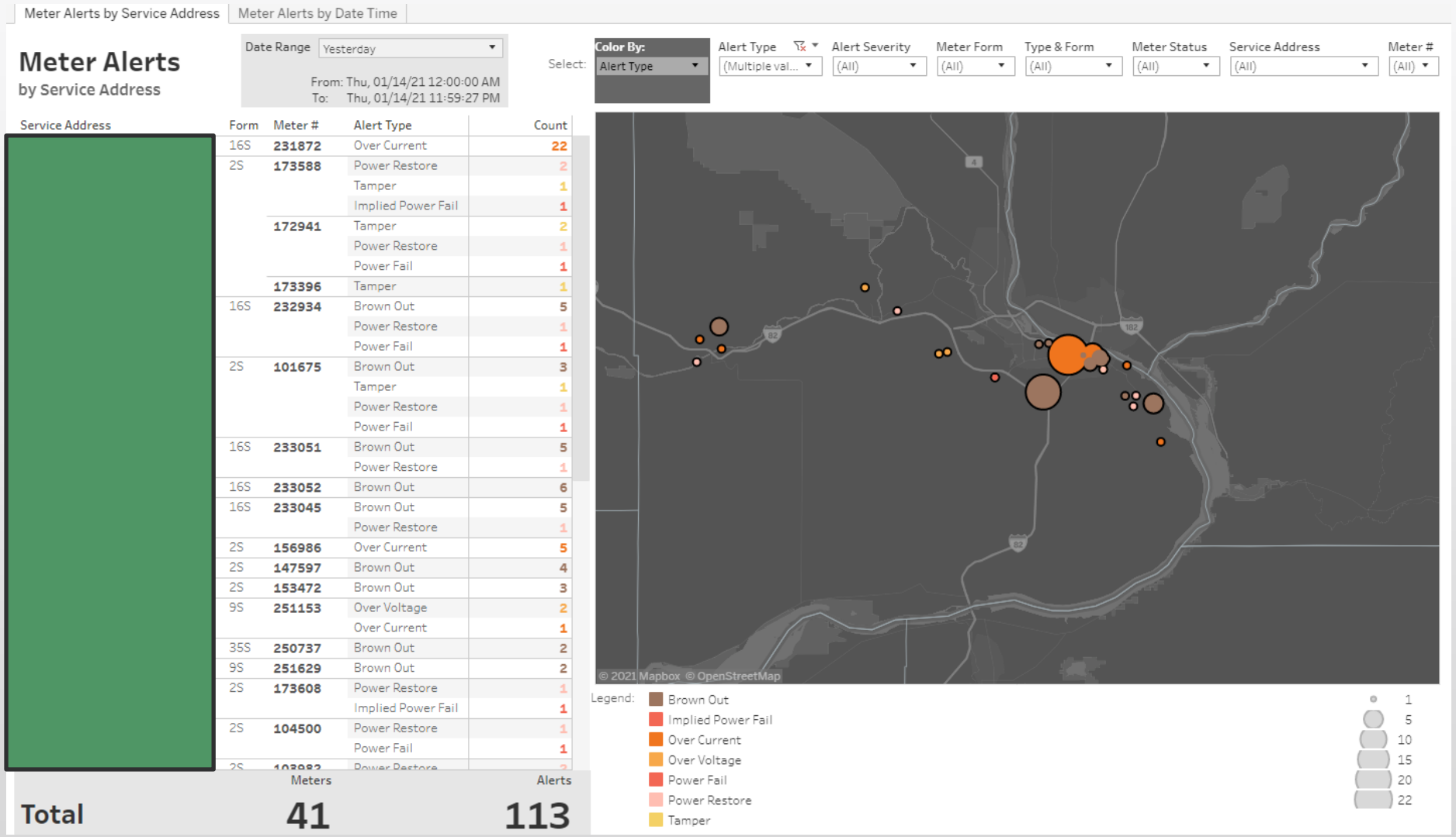


Customer Usage Profiles and Notifications



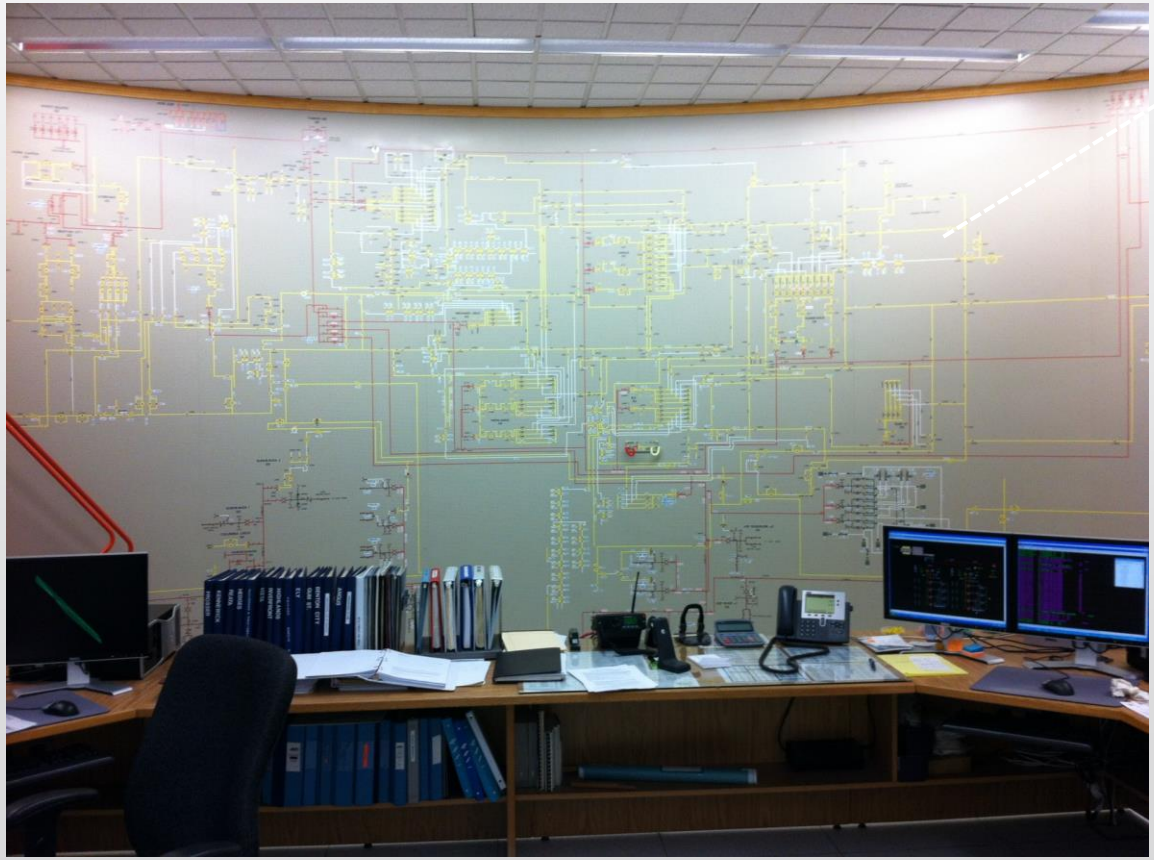


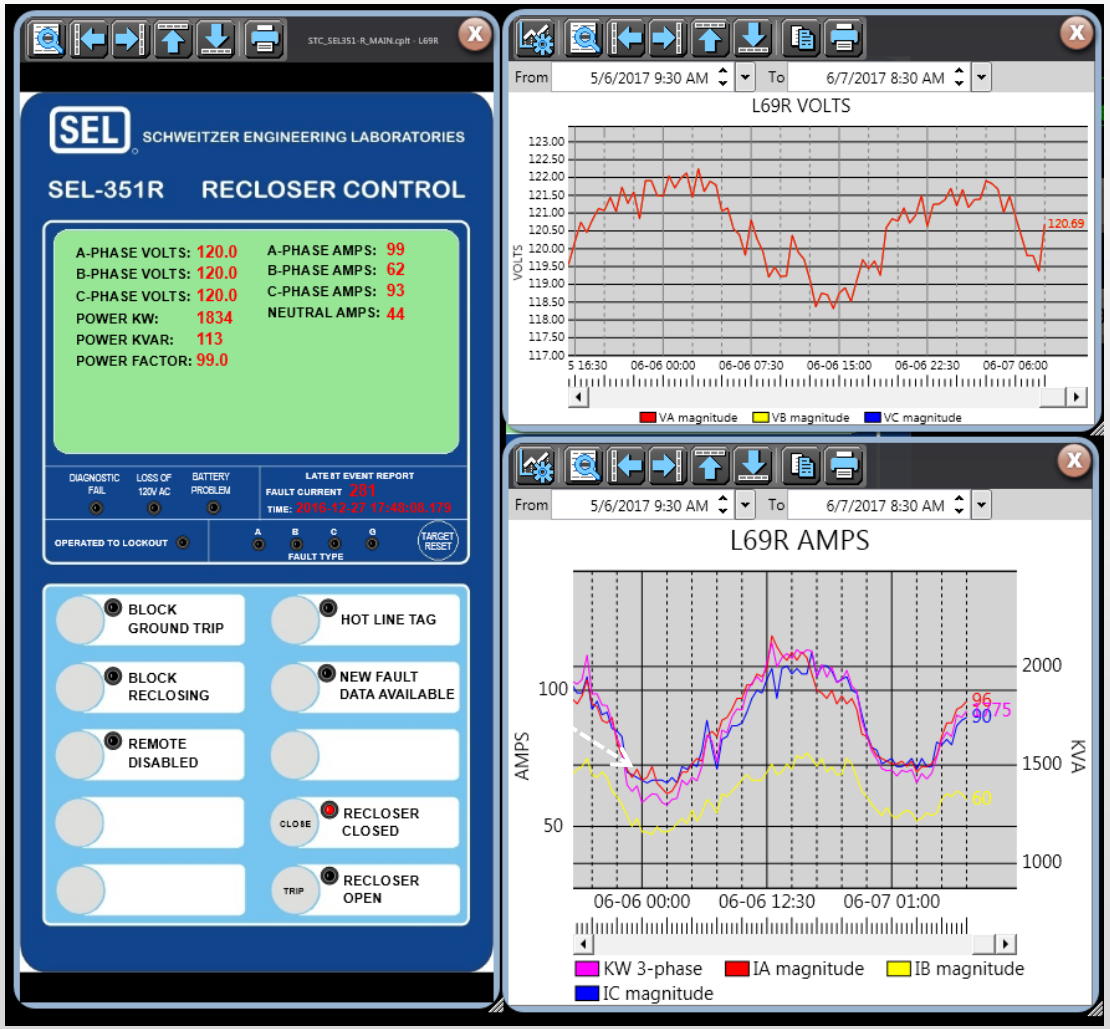
Smart Grid @ BPUD: AMI Meter Alerts



SMART GRID @ BPUD: SCADA

Increased Distribution "Visibility"





Smart Grid @ BPUD: SCADA Expansion

Reclosers (Circuit Breakers)

Voltage Regulators

Benton PUD Low Income Programs

- Low Income Discount
  - ~ **$625 thousand** per year
  - Assisted:
    - **~1,900** customers **per month** (2021 – 2024)
  - Discounts: **10%–25%** of monthly bill
    - Greater of daily system charge or percentage of billed charges
  - Available to:
    - Seniors, disabled individuals, and veterans

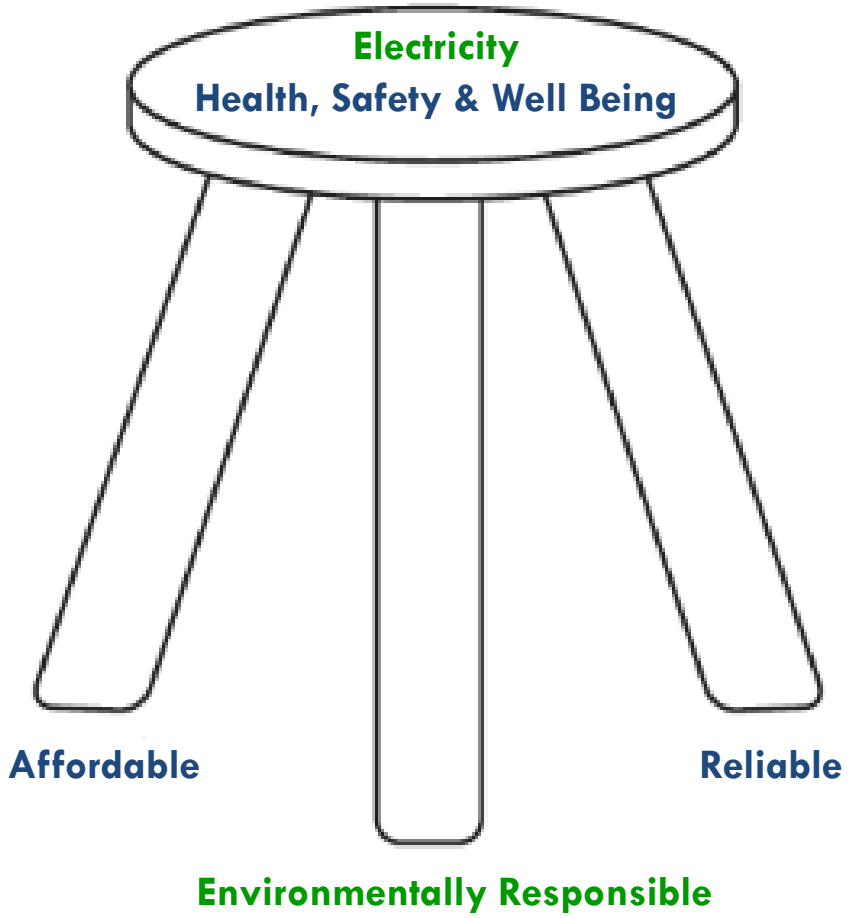
- Low Income Energy Efficiency
  - ~ **$615 thousand** in 2024
  - Assisted:
    - **~70** households
  - Administered by:
    - Benton PUD & Community Actions Committee (CAC)

- Helping Hands
  - ~ **$90 thousand** in 2024
  - Assisted:
    - **~300** households
  - Funded by:
    - Customer donations

Closing Thoughts

1. Existing Electricity Supply & Demand in Washington
2. Washington State Energy Strategy
3. What to Expect Going Forward

NW Utility Balancing Act: *Becoming Increasingly Difficult*



- Hydropower Erosion
  - Increased **spill** & threats of **dam breaching**

- Eliminating CO_2 valued above all factors
  - Coal-plant retirements & **no new natural gas** in WA & OR

- Wind & Solar: Weather Dependent & Energy Dilute
  - Located remotely from population centers & require vast swaths of land due to need for **extreme overbuild**

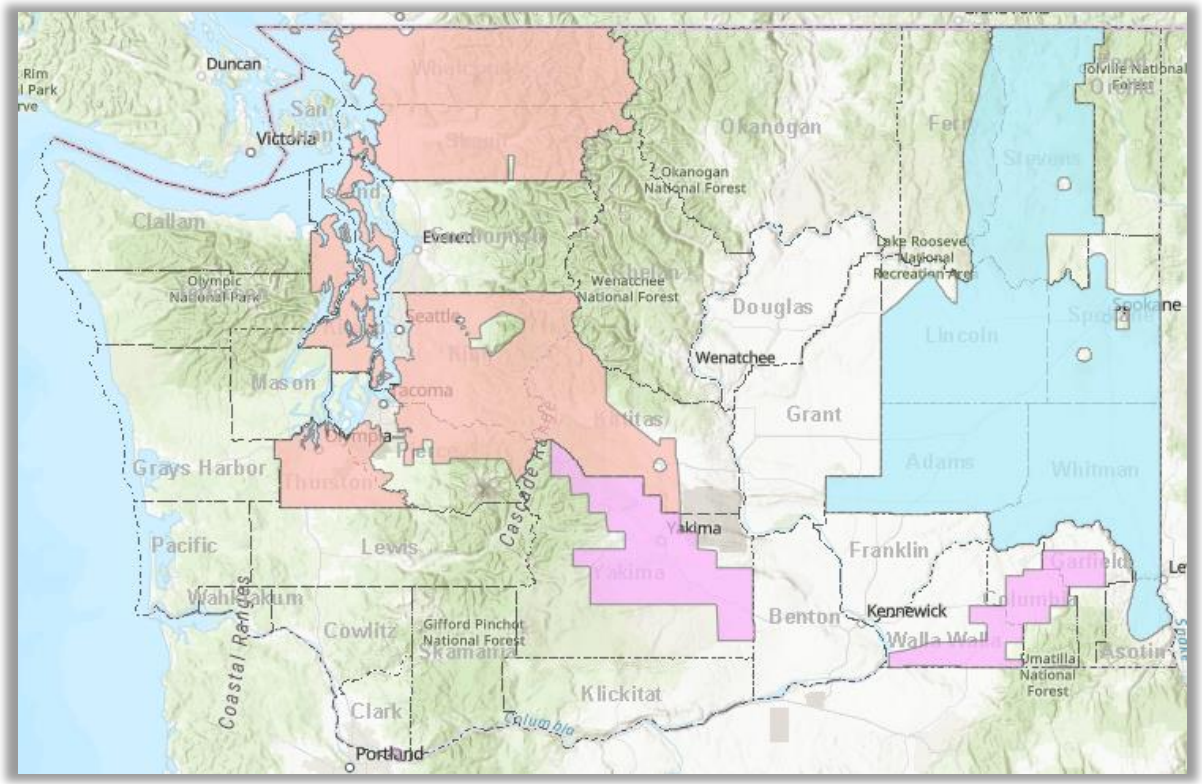
- Increasing **Costs** & Risk of **Blackouts**

Washington Electric Utilities 2022 Energy Supplied

Avista Energy

PacifiCorp

Puget Sound Energy



Electric Utilities Investor Owned or Public	Average Megawatts aMW	% of Total aMW
Avista	710	6.8%
PSE	2,583	24.5%
PacifCorp	494	4.7%
Investor-Owned Subtotal	3,787	36%
Seattle	1,117	10.6%
Snohomish PUD	802	7.6%
Clark PUD	578	5.5%
Tacoma	563	5.3%
Major Metro Public Subtotal	3,060	29%
All Others	3,666	35%
TOTAL aMW	10,513	100%

1 average Megawatt (aMW) = 500 to +1,000 households

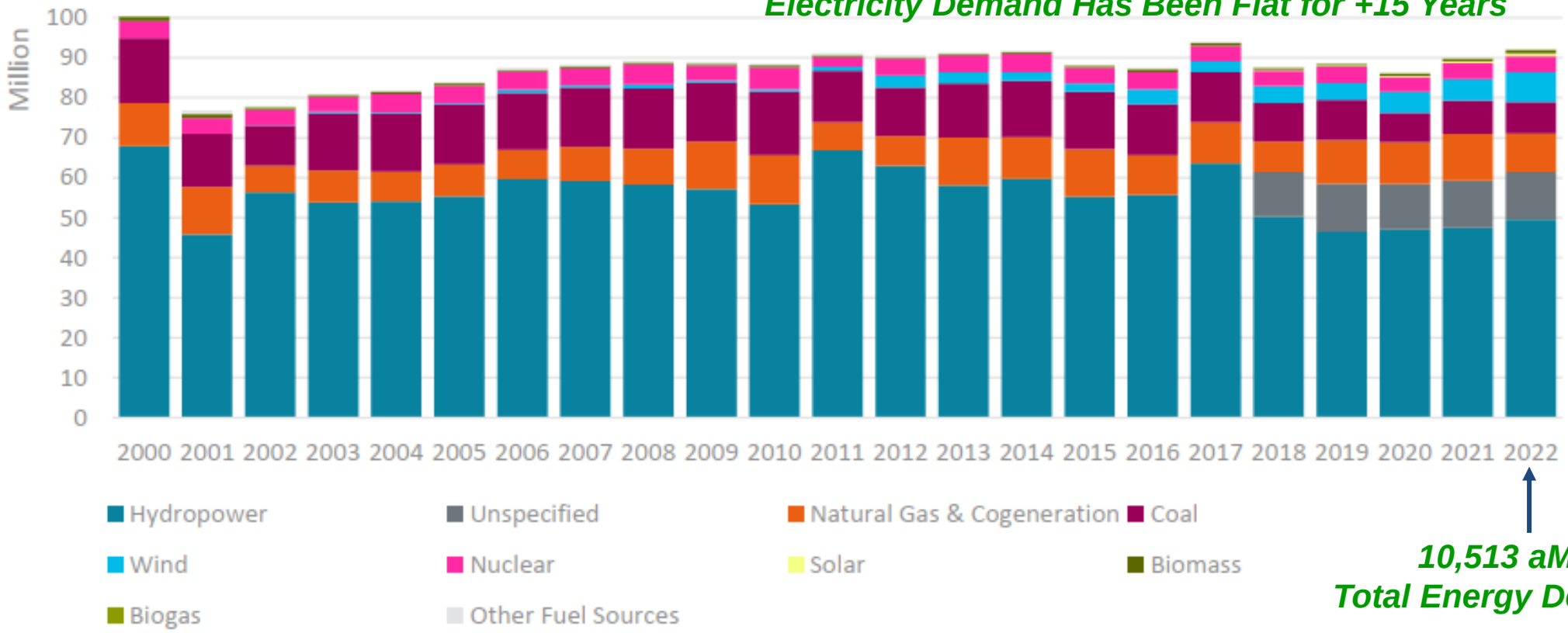
100 aMW = 50,000 to 100,000 households

1,000 aMW = Output of Columbia Generating Station Nuclear Plant

Washington Electric Utilities Energy Mix

Figure 2: Aggregate Fuel Mix Time Series (MWh) for Washington Electric Utilities[1]

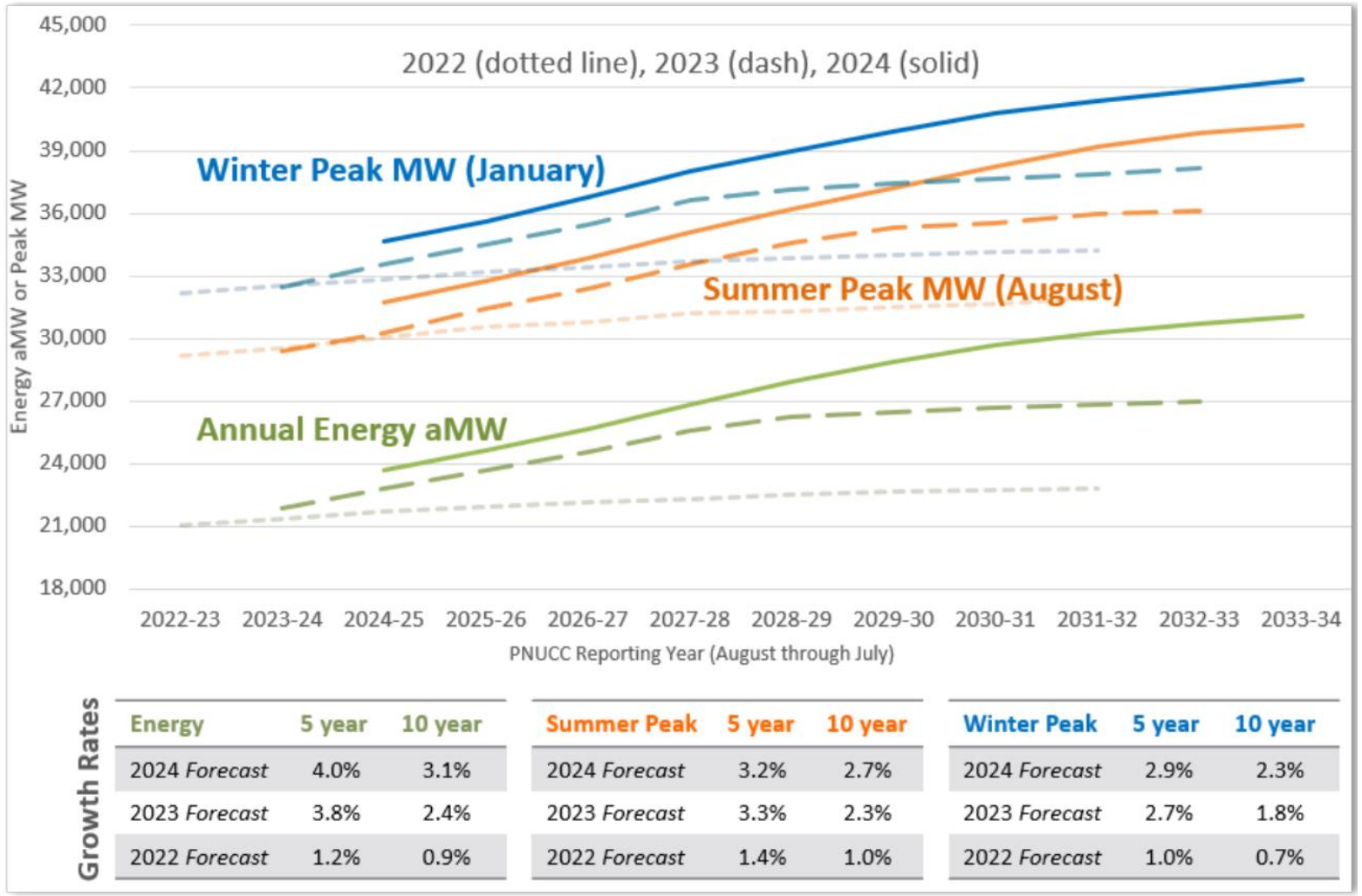
Electricity Demand Has Been Flat for +15 Years



10,513 aMW
Total Energy Delivered

Source: Washington Electric Utility 2023 Fuel Mix Disclosure Report – Washington State Department of Commerce

Northwest Demand +30% *in 10 Years*



Growth Rates

Energy	5 year	10 year
2024 *Forecast*	4.0%	3.1%
2023 *Forecast*	3.8%	2.4%
2022 *Forecast*	1.2%	0.9%

Summer Peak	5 year	10 year
2024 *Forecast*	3.2%	2.7%
2023 *Forecast*	3.3%	2.3%
2022 *Forecast*	1.4%	1.0%

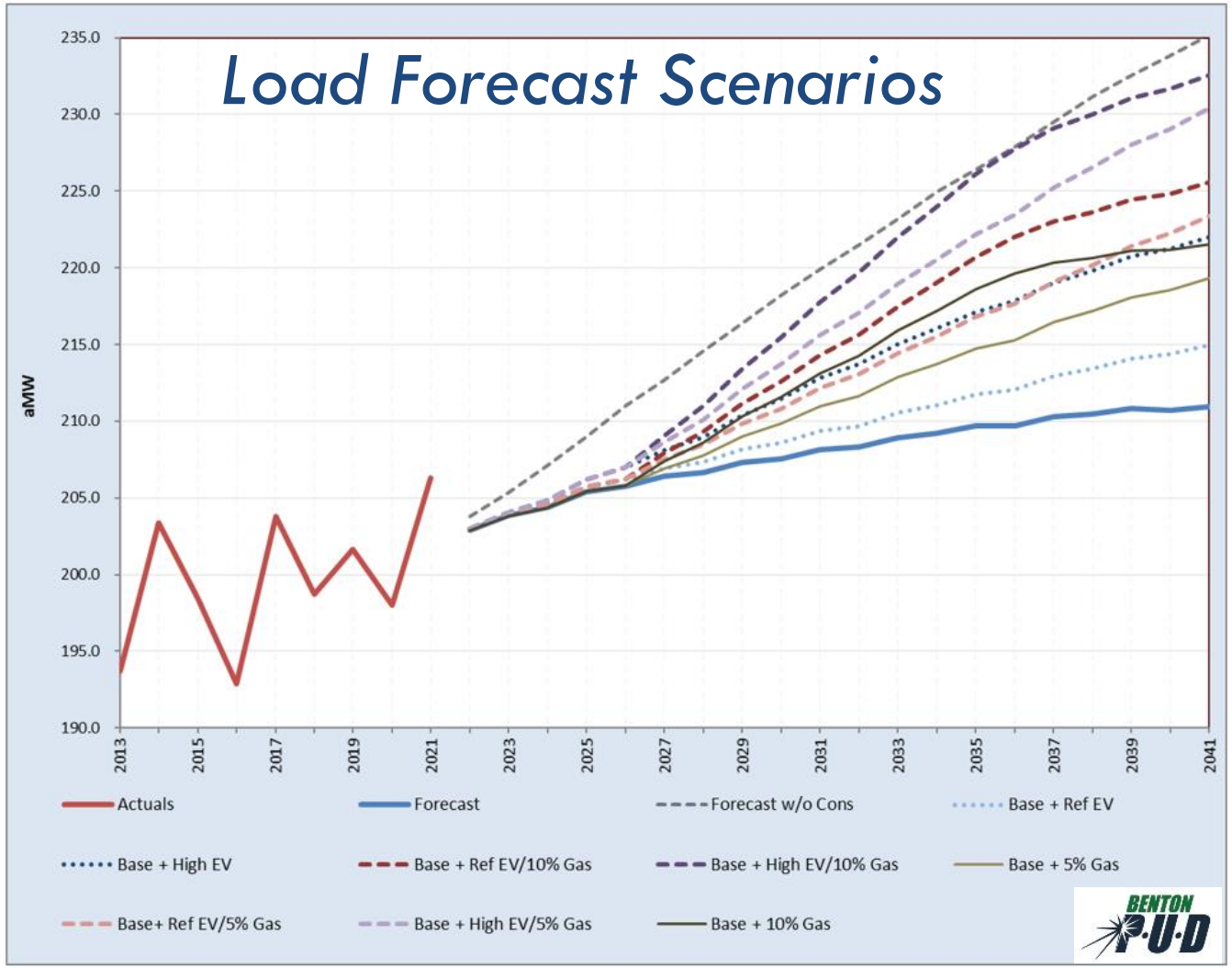
Winter Peak	5 year	10 year
2024 *Forecast*	2.9%	2.3%
2023 *Forecast*	2.7%	1.8%
2022 *Forecast*	1.0%	0.7%

https://www.pnucc.org/system-planning/northwest-regional-forecast/

PNUCC
May 2024

- ✓ *Winter & Summer **Firm** **Peak** Requirements*
- ➢ *Could Increase Nearly **10,000 MW** in 10 yrs*

Utility Forecasts: *Highly Uncertain*



← *High Electrification*

Which is it?

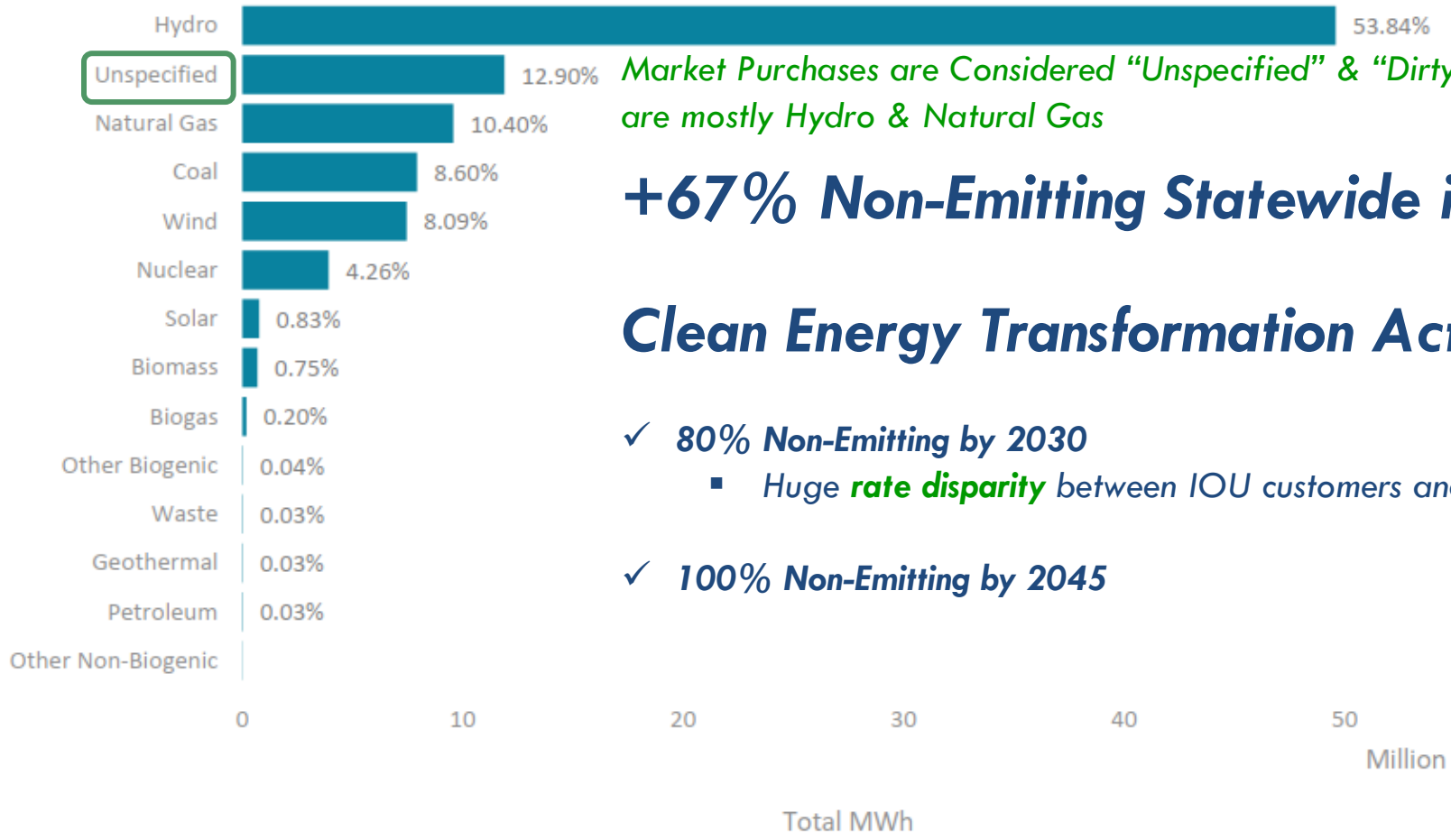
← *Status Quo*

✓ ***What about Data Centers & other Electricity Intensive Loads?***

✓ ***Drives need for scalable, rapidly deployable, CO_2-free, & reliable generation***

Washington Electric Utilities Energy Mix

Figure 1: 2022 Aggregate Fuel Mix for Washington Electric Utilities



Market Purchases are Considered "Unspecified" & "Dirty" but are mostly Hydro & Natural Gas

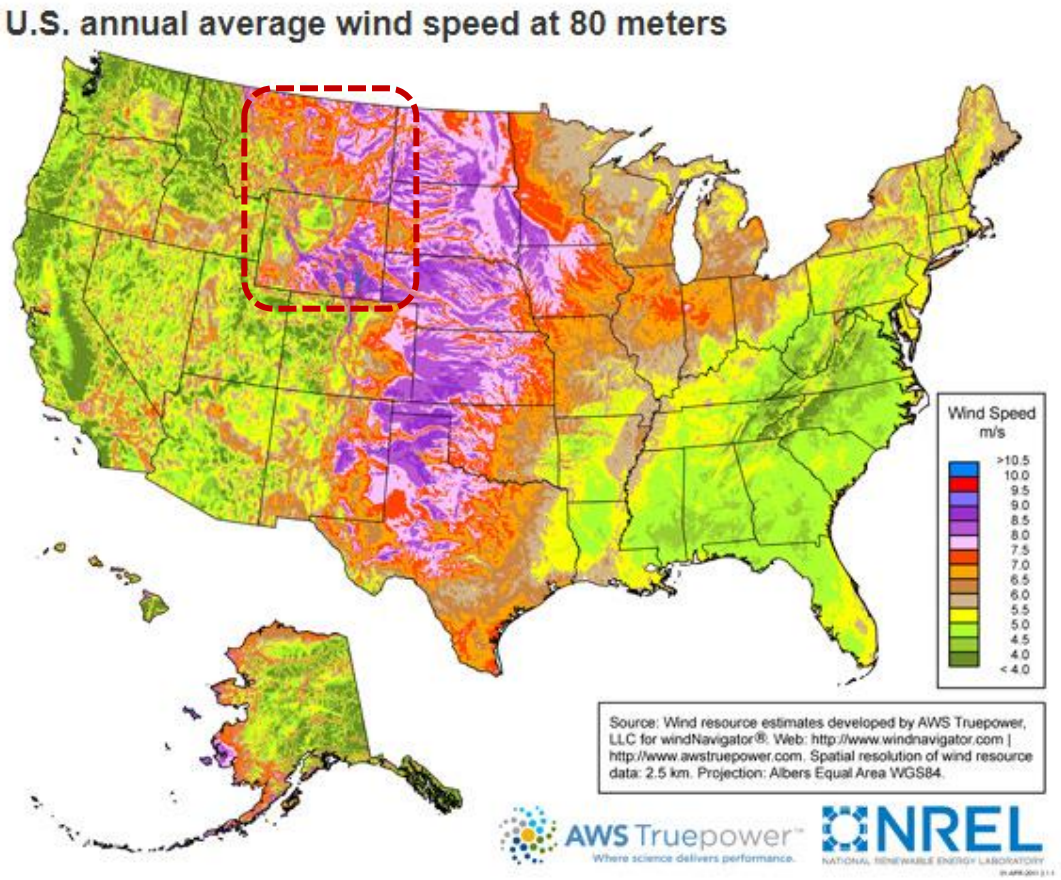
+67% Non-Emitting Statewide in 2022

Clean Energy Transformation Act (CETA)

- ✓ ***80% Non-Emitting by 2030***
  - *Huge **rate disparity** between IOU customers and Public Power*
- ✓ ***100% Non-Emitting by 2045***

Source: Washington Electric Utility 2023 Fuel Mix Disclosure Report – Washington State Department of Commerce

We're Coming for Your Wind MT & WY!



Washington State Energy Strategy

+10,000 aMW = 10 x Columbia Generating Station Nuclear Plant

Decarbonizing the Electricity Sector

97% growth in electricity end use demand by **2050**

43% of electricity imported by 2050

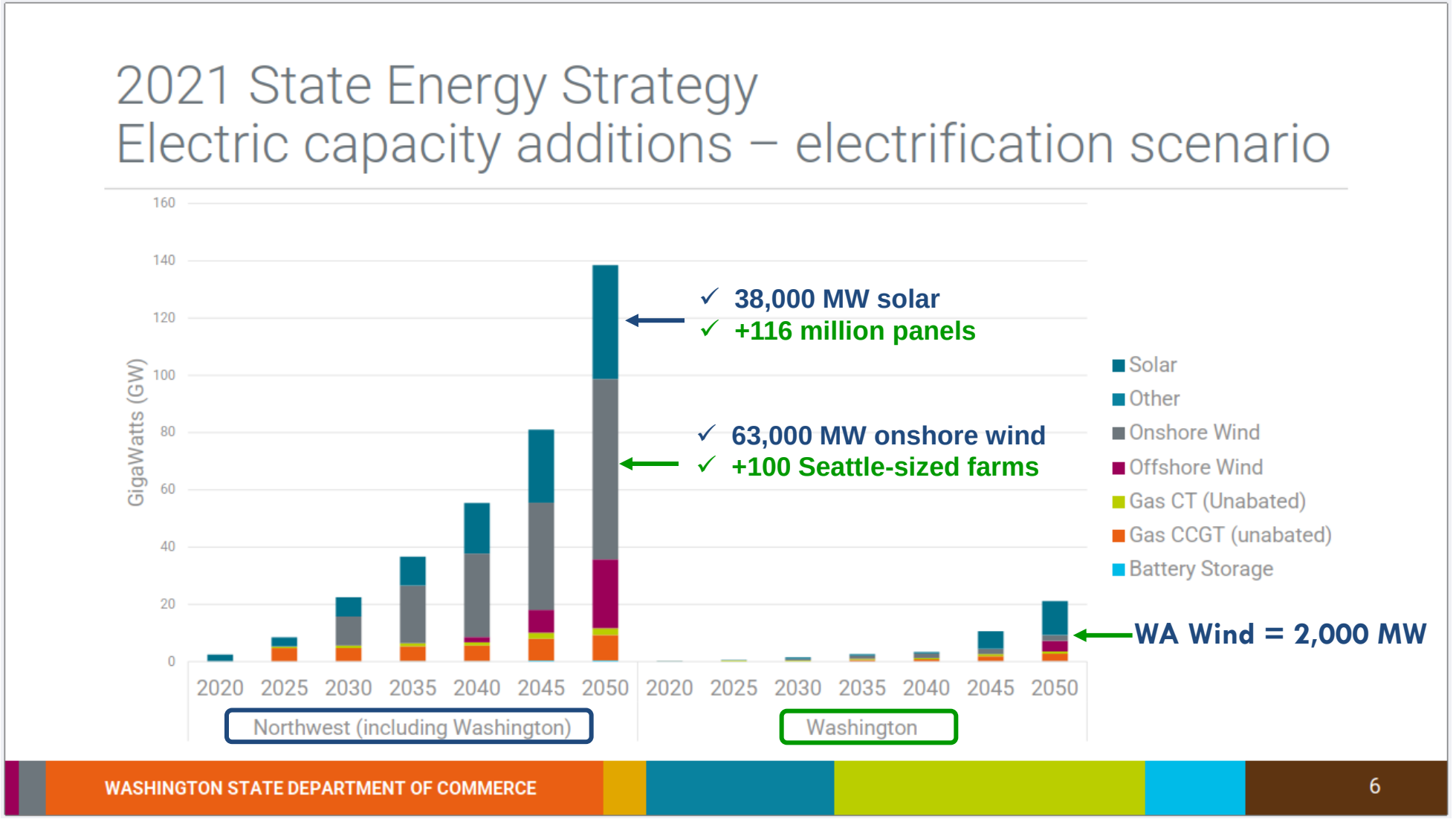
36% from WY & MT wind

ELECTRICITY EMISSIONS INTENSITY

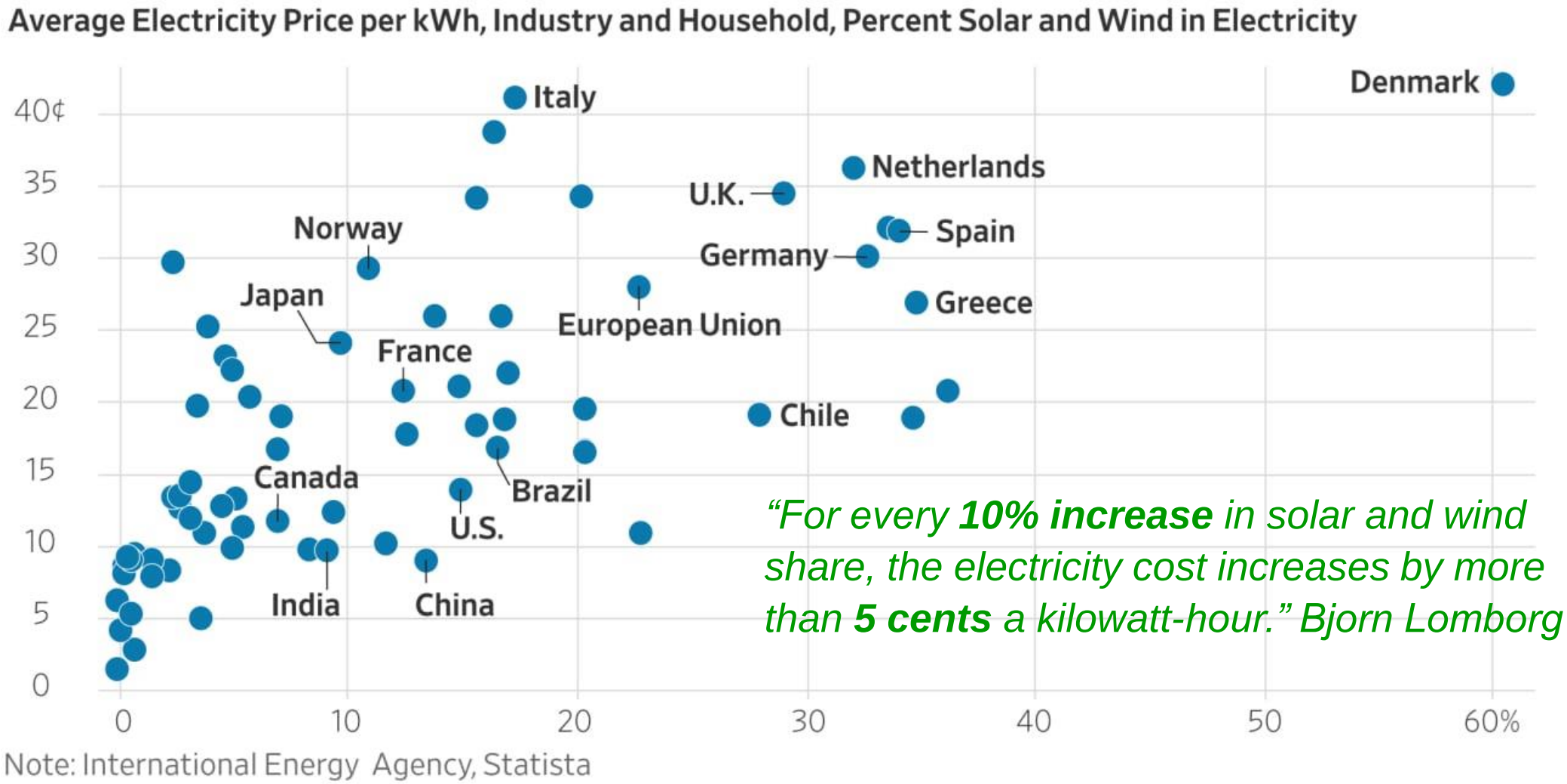
2020	2030	2050
85 grams/kWh	6.5 grams/kWh	0 grams/kWh

- Double end use electricity load by 2050
  - ✓ Electricity to displace fuels in transportation, industry, buildings
  - ✓ Hydrogen electrolysis and electric boilers as flexible demand resources
- Invest in new transmission capacity and renewable generation, coordinating with other states
- Develop distributed energy resources with smart grid capabilities to ensure reliability and flexibility
- Strengthen market mechanisms to ensure resource adequacy and efficient electricity markets.
  - ✓ Coordination with other states and federal government

WA Energy Strategy: *Everywhere but Here*



"Cheap" Wind & Solar is Untrue

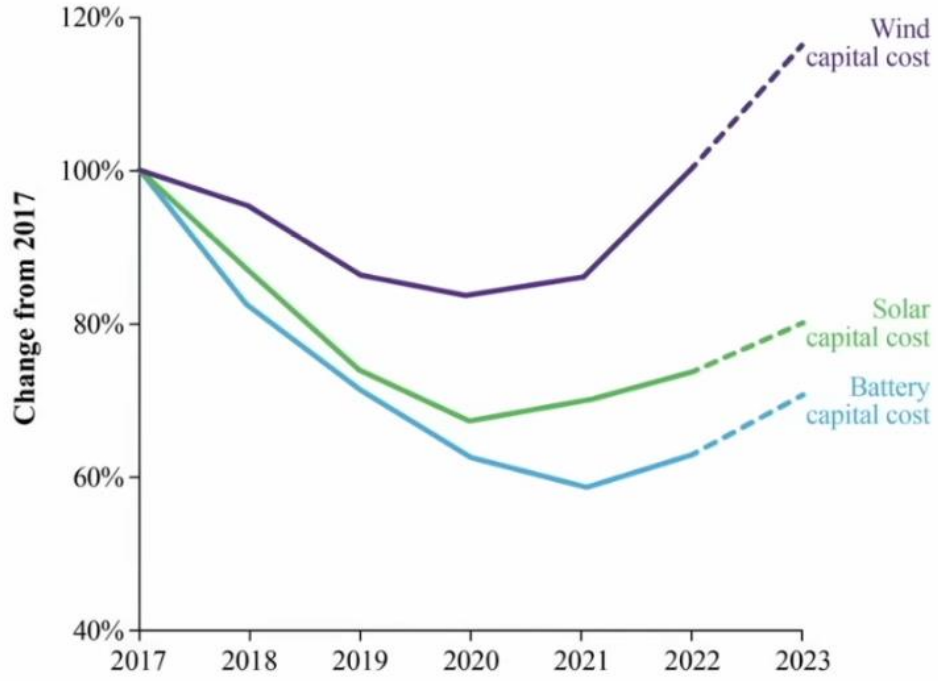


*"For every **10% increase** in solar and wind share, the electricity cost increases by more than **5 cents** a kilowatt-hour." Bjorn Lomborg*

"Cheap" Wind & Solar is Untrue

Green Machines Costs Rising

Material inputs ~70% cost solar module, battery

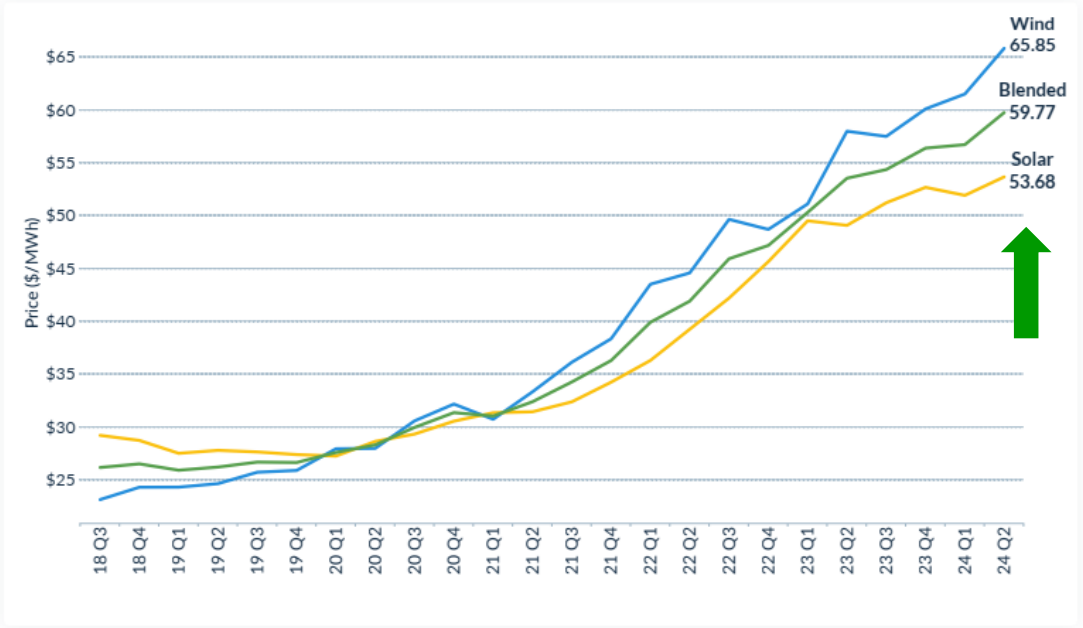


Mark Mills Manhattan Institute: https://www.youtube.com/watch?v=sgOEGKDVvsg

Power Purchase Agreement (PPA) Pricing

Q3 2018 TO Q2 2024

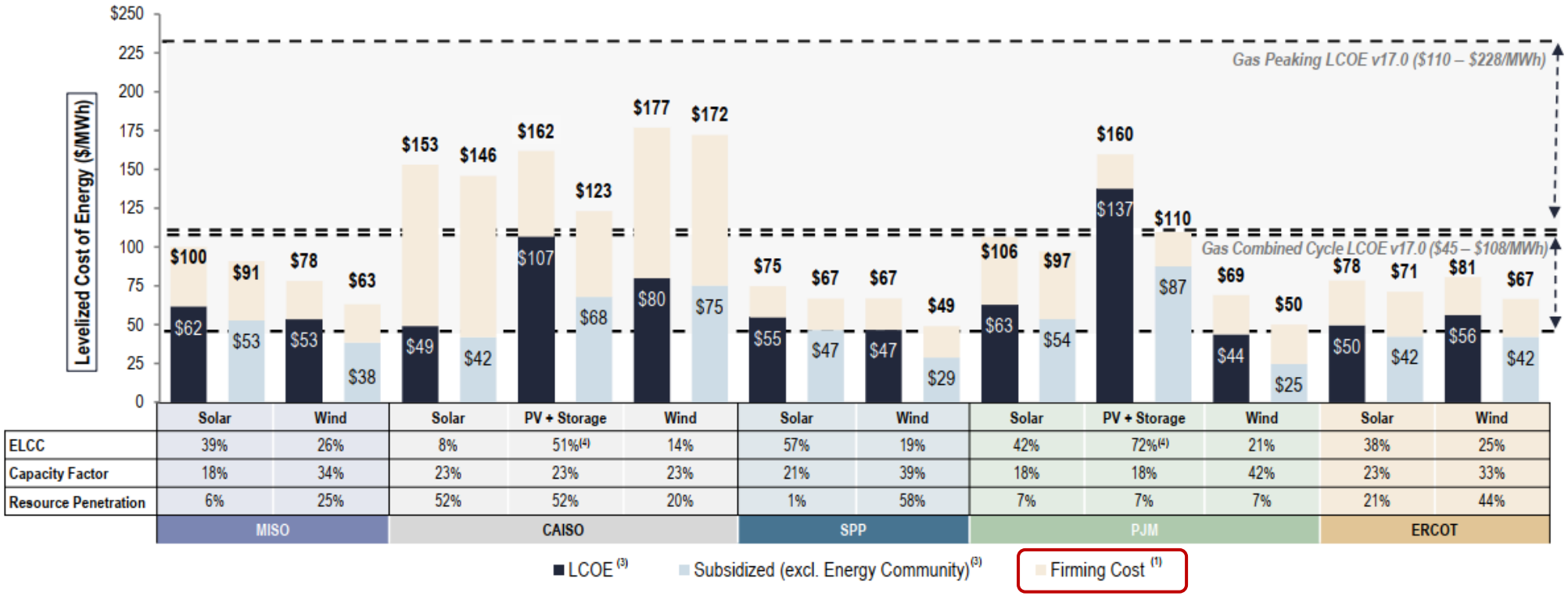
Market-Averaged Continental Index



LEVELTEN ENERGY
Q2 2024 PPA PRICE INDEX NA EXECUTIVE SUMMARY

"Cheap" Wind & Solar is Untrue

LCOE Including Levelized Firming Cost ($/MWh)[3]



	Solar	Wind	Solar	PV + Storage	Wind	Solar	Wind	Solar	PV + Storage	Wind	Solar	Wind
ELCC	39%	26%	8%	51%[4]	14%	57%	19%	42%	72%[4]	21%	38%	25%
Capacity Factor	18%	34%	23%	23%	23%	21%	39%	18%	18%	42%	23%	33%
Resource Penetration	6%	25%	52%	52%	20%	1%	58%	7%	7%	7%	21%	44%
	MISO		CAISO			SPP		PJM			ERCOT	

■ LCOE [3] ■ Subsidized (excl. Energy Community)[3] ■ Firming Cost [1]

Source: *Lazard and Roland Berger estimates and publicly available information.*

Note: Total LCOE, including firming cost, does not represent the cost of building a 24/7 firm resource on a single project site, but, instead, the LCOE of a renewable resource and the additional costs required to achieve the resource adequacy requirement in the relevant reliability region based on the net cost of new entry ("Net CONE"). ISO ELCC data as of April 2024.

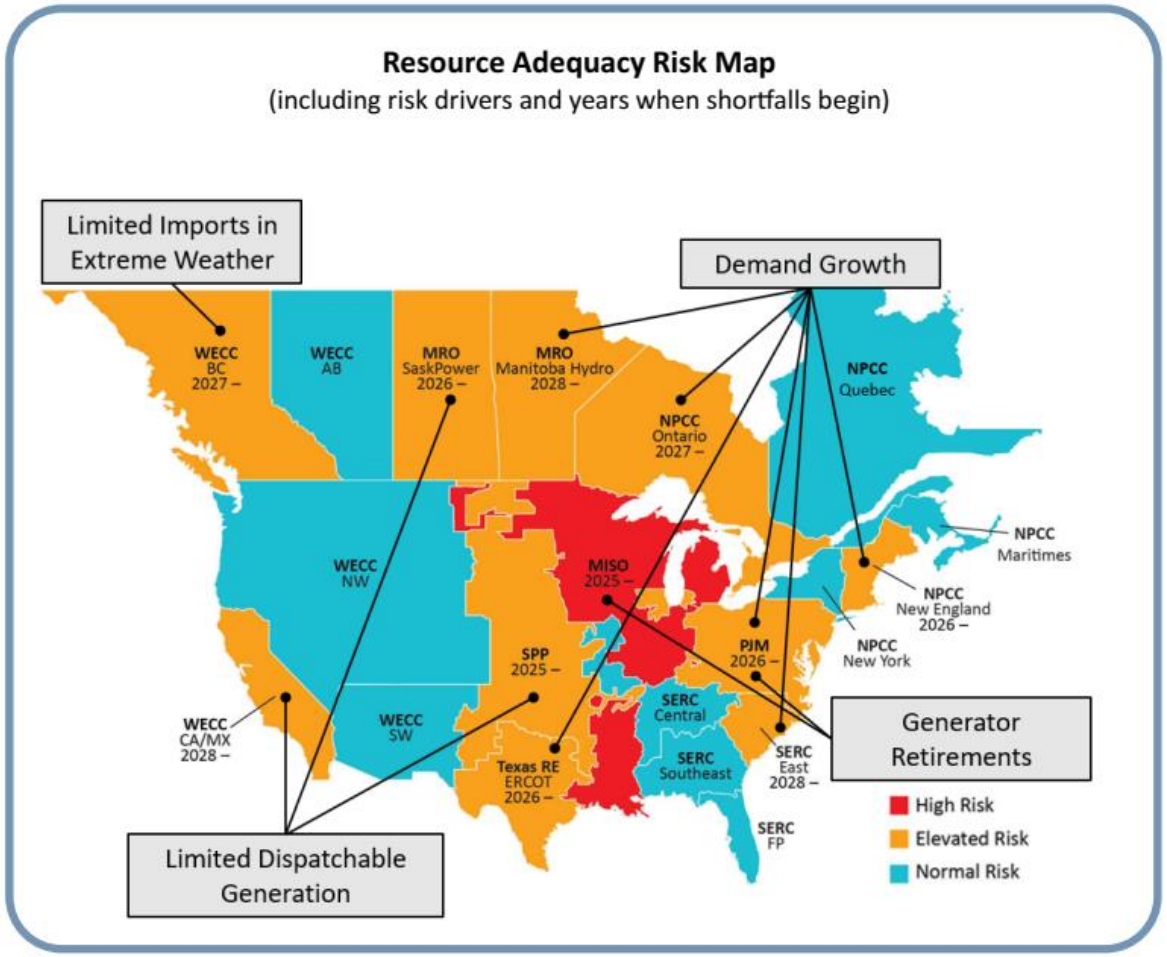
(1) Firming costs reflect the additional capacity needed to supplement the net capacity of the renewable resource (nameplate capacity * (1 – ELCC)) and the Net CONE of a new firm resource (capital and operating costs, less expected market revenues). Net CONE is assessed and published by grid operators for each regional market. Grid operators use a natural gas peaker as the assumed new resource in MISO ($8.22/kW-mo), SPP ($8.56/kW-mo) and PJM ($10.20/kW-mo). In CAISO, the assumed new resource is a 4-hour lithium-ion battery storage system ($18.92/kW-mo). For the PV + Storage cases in CAISO and PJM, assumed storage configuration is 50% of PV MW and 4-hour duration.

(2) ELCC is an indicator of the incremental reliability contribution of a given resource to the electricity grid based on its contribution to meeting peak electricity demand. For example, a 1 MW wind resource with a 15% ELCC provides 0.15 MW of capacity contribution and would need to be supplemented by 0.85 MW of additional firm capacity in order to represent the addition of 1 MW of firm system capacity.

(3) Reflects the average of the high and low of Lazard's LCOE v17.0 for each technology using the regional capacity factor, as indicated, to demonstrate the regional differences in project costs.

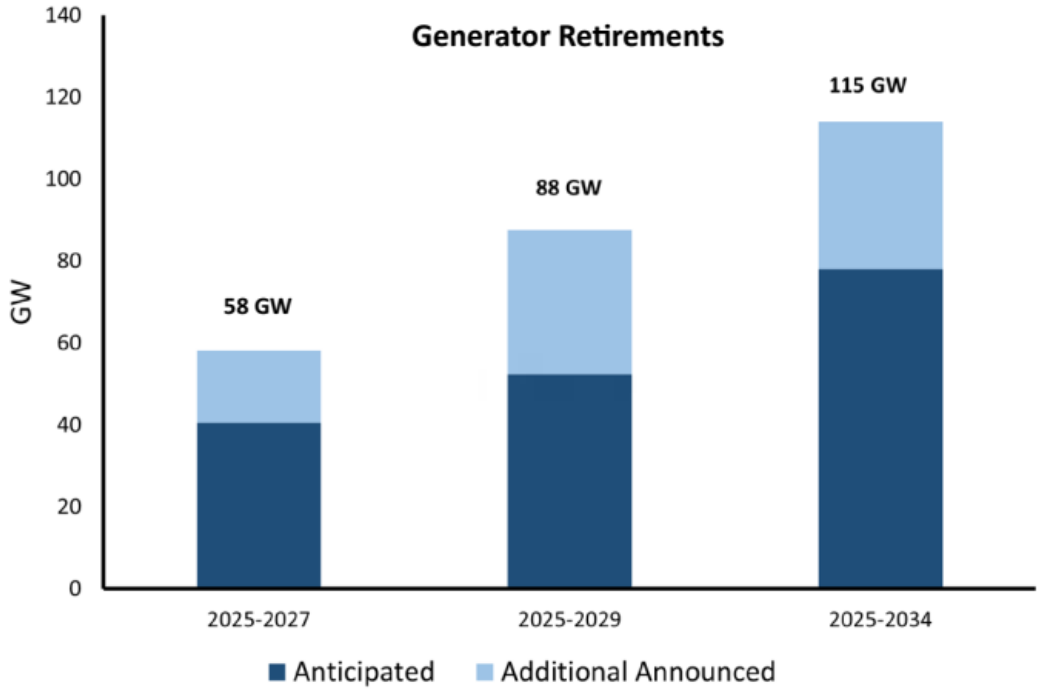
(4) For PV + Storage cases, the effective ELCC value is represented. CAISO and PJM assess ELCC values separately for the PV and storage components of a system. Storage ELCC value is provided only for the capacity that can be charged directly by the accompanying resource up to the energy required for a 4-hour discharge during peak load. Any capacity available in excess of the 4-hour maximum discharge is attributed to the system at the solar ELCC. ELCC values for storage range from 90% to 95% for CAISO and PJM.

2024 Long Term Reliability Assessment



There really is no "Normal Risk"

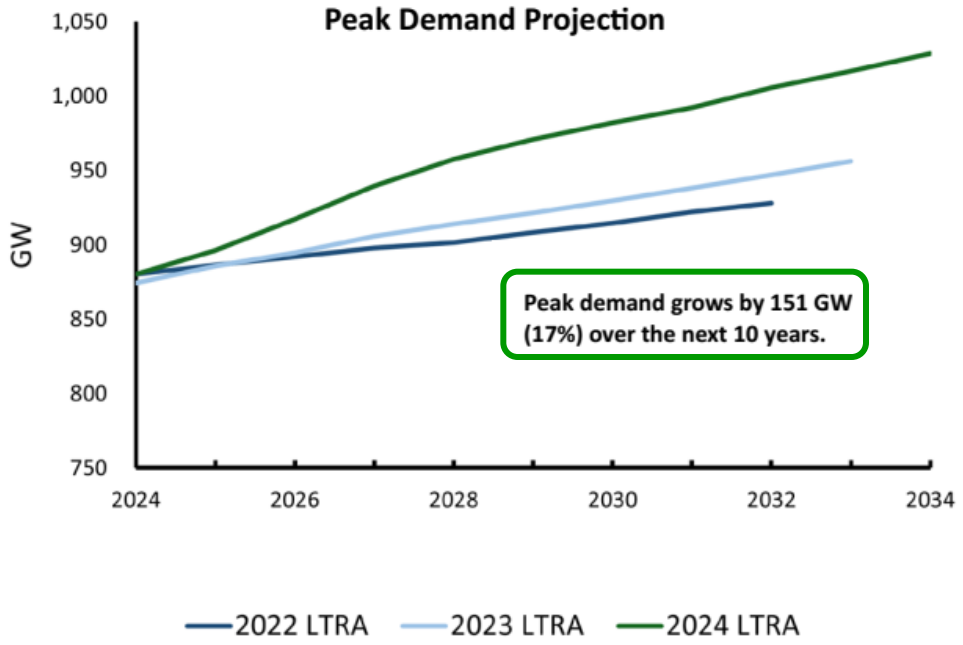
Accelerating Retirements: Resource needs to meet escalating demand growth are threatened by the current pace of generator retirements.

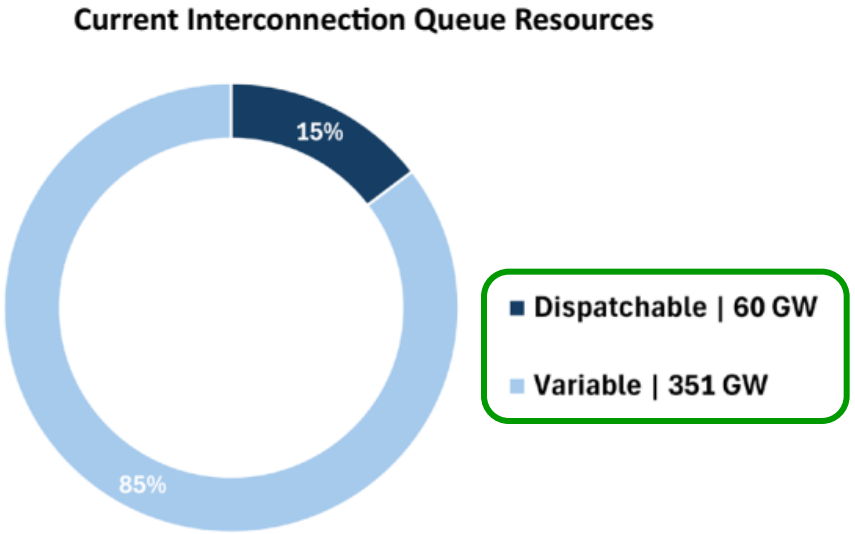


2024 Long Term Reliability Assessment

Escalating Demand Growth: Peak demand and energy forecasts have jumped and are at their highest levels in decades.

Declining Dispatchable Resources: Replacement resources projected over the next decade are more weather dependent and lack key reliability attributes.





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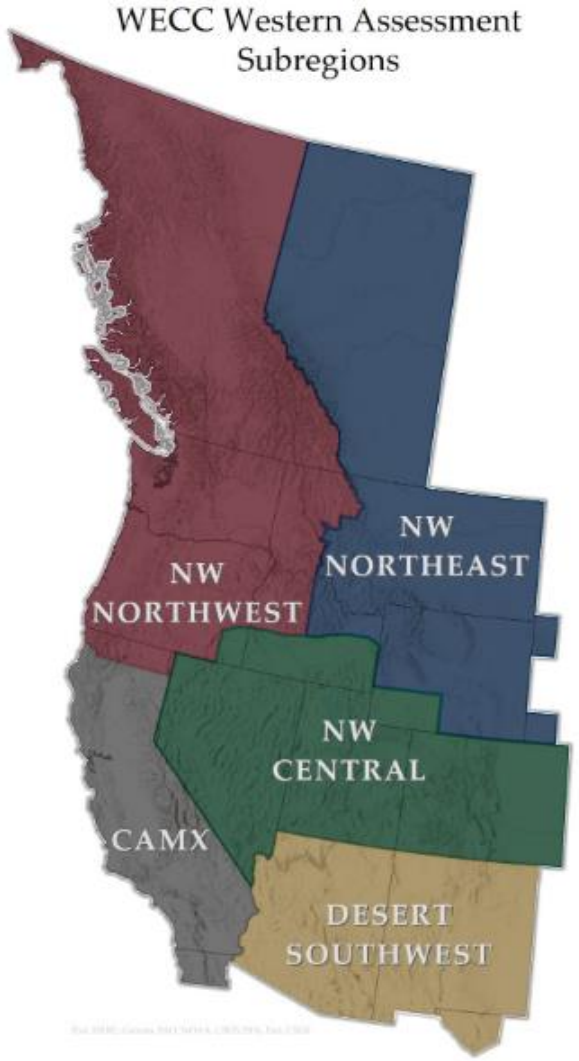

The pace of change is increasing the risks to reliability across North America. The supply of electricity is not growing fast enough to keep up with demand growth. What was once a simple problem of supply and demand has become complicated by rapid change and increasing variability. Unless we prioritize reliability as the resource mix evolves and becomes more variable, we are at risk for serious and more frequent disruptions. The West must move quickly and more decisively to ensure resource adequacy over the next decade.

https://feature.wecc.org/wara/

Western Electricity Coordinating Council

Risks to Planned Resource Additions

Supply Chain Disruptions

Supply chain issues that surfaced during the pandemic in 2020 continue to affect the industry, particularly the construction of new projects and the interconnection of new generating resources. A recent survey found that supply chain issues remain a significant problem in 2024.

Interconnection Queue

The interconnection queue nationwide grew more than 30% in 2023 and has increased eightfold in the last decade. The planned additions over the next 10 years will exacerbate this issue, although FERC Order 2023 calls for reforms to reduce the backlog and address uncertainty in the interconnection process.

Siting Delays

There has been increasing resistance to building new energy facilities, particularly wind, solar, and battery projects. These projects have encountered opposition in at least 45 states, according to a recent report that found that local opposition to new energy facilities is widespread and growing.

Increased Costs

Increased costs of materials for new wind and solar construction, transmission expansion, and replacement of plant equipment have caused project delays and maintenance deferrals. The rise in interest rates in recent years has also substantially increased the cost of capital for all energy projects.

Hydropower Insulates Benton PUD Customers from an Increasingly De-Stabilized Northwest Power Grid . . . For Now

Questions?


Hydropower: Foundation of PNW & WA Electricity Supply
PNW Annual Electricity Production
Fuel Mix Disclosure