Platte River Power Authority

Estes Park • Fort Collins • Longmont • Loveland

Board of directors

Aug. 31, 2023

Energy leaders since 1973

Policy on real estate transactions for resource development

Sarah Leonard, general counsel

Real estate transaction flexibility with guardrails

Two related goals:

- Empower Platte River’s general manager to respond quickly to resource development opportunities that involve real estate
- Help the board keep tabs on policies and resolutions that give the general manager broad discretionary powers

Real estate transaction authority

Current approach

- Platte River’s purchasing policy
  - Builds on authority granted in Resolution 25-16 (Fiscal Resolution)
  - States that the “sale of real property, land and land rights . . . requires board of directors’ approval"

Proposed approach

- Give general manager flexible power analogous to contracting authority under Fiscal Resolution

Real estate transaction authority

Proposed new policy

- The general manager cannot sell Platte River-owned real estate without board approval
- The general manager could approve other types of real estate transactions (purchases, easements, leases, access agreements) that meet required conditions
- The general manager must promptly inform the board after completing real estate transactions using this authority

Real estate transaction authority

Proposed new policy

- For the general manager to approve a proposed real estate transaction (excluding sales of Platte River property), the general manager must find the proposed transaction
  - is in Platte River’s best interest
  - furthers Platte River’s Resource Diversification Policy goals
  - helps Platte River maintain its “three pillars” of reliability, financial sustainability, and environmental responsibility
  - can be completed with approved budget or contingency funds, and
  - complies with relevant bond covenants

Board oversight

How can the board monitor policies that give the general manager broad authority?

- Examples of existing policies and resolutions include
  - Fiscal Resolution
  - Resource Diversification Policy
  - Water resources policy
  - Employee total compensation policy

Board oversight

Examples of broad authority language

- Fiscal Resolution:

  "Pursuant to Section 2.10 of the Organic Contract, the General Manager or his/her delegate is authorized to enter into contracts in the name of the Authority, including contracts for the wholesale purchase and sale of electric power and energy."

- Resource Diversification Policy:

  "The board of directors . . . directs the general manager/CEO to proactively work toward the goal of reaching a 100 percent noncarbon resource mix by 2030, while maintaining Platte River's three pillars of providing reliable, environmentally responsible and financially sustainable electricity and services."

Board oversight

The board already has a board meeting governance document

- The board meeting governance document includes a section on continuity of management
- This would be a logical place to flag the board’s responsibility to review broad grants of authority to the general manager
- Suggested new language

  “The board should periodically review any policies and resolutions that grant broad authority to the general manager—particularly when an incoming general manager first takes office—to confirm they continue to meet Platte River’s evolving needs. Examples of existing policies that grant broad authority include the Resource Diversification Policy, the Fiscal Resolution, the water resources policy, and the employee total compensation policy.”

Next steps

If the board concurs

- We will present the proposed real estate transaction policy for board approval in September
- We will update the board meeting governance document to include the new language

Questions or feedback?

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Resource planning studies

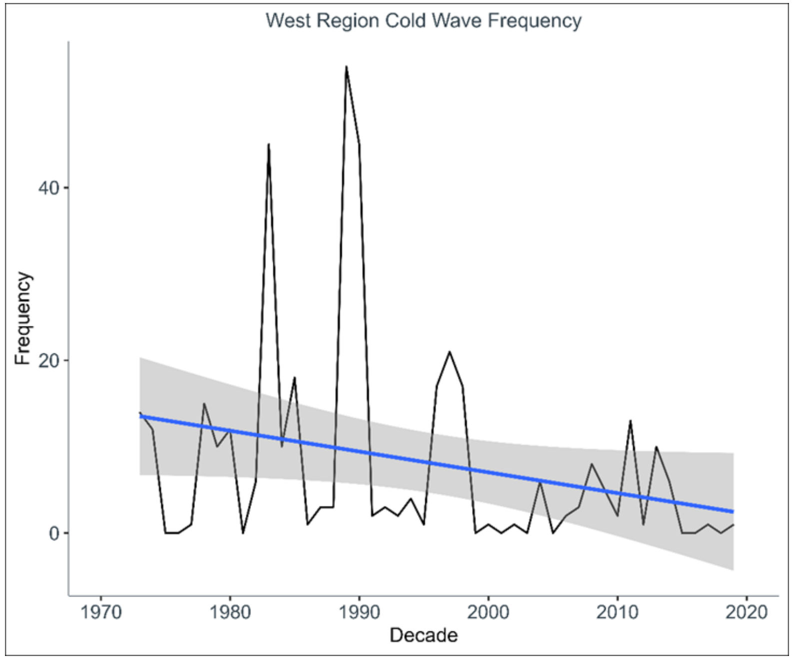
Raj Singam Setti, chief transition and integration officer

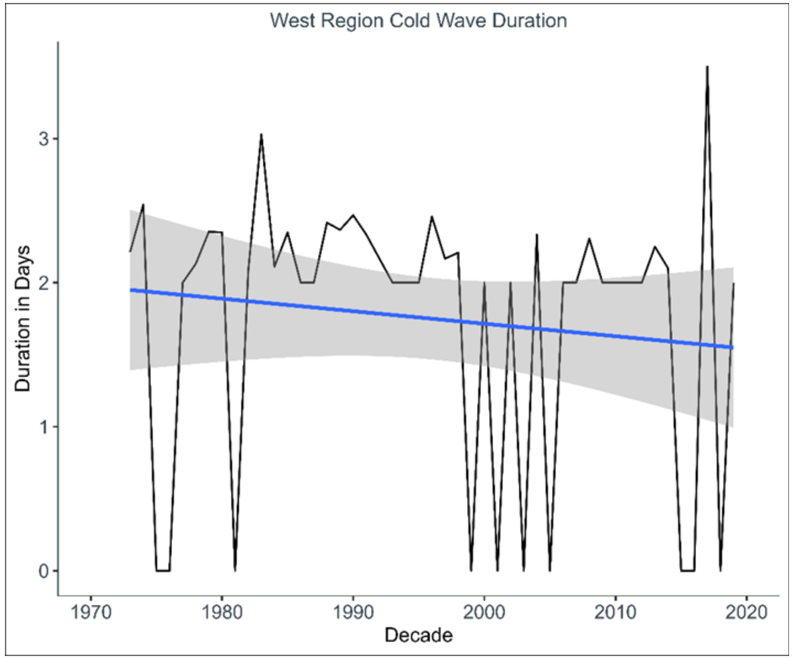
Summary

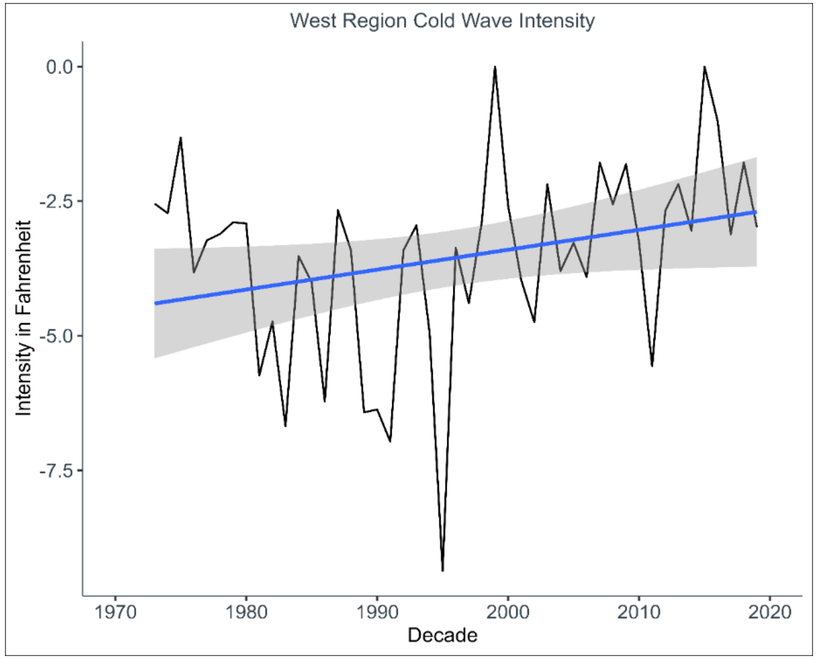
Study	Advisor	Status
Extreme weather event and dark calm analysis	ACES	Completed
Planning reserve margin requirements and effective load carrying capability	Astrape consulting	Completed
Building electrification forecast	Apex Analytics	Completed
DER potential study	Dunsky	Draft Report
Price volatility, congestion, and curtailment	ACES	Completed
Emerging technologies review. Assess state of the art and future cost/availability of dispatchable technologies, hydrogen, ammonia, energy storage and carbon capture	B&V consulting	Expected by Q3
Dispatchable technology selection. Techno-economic assessment of available options and recommendation of the best fit	B&V consulting	Expected by Q3

Extreme Weather Events and Dark Calms

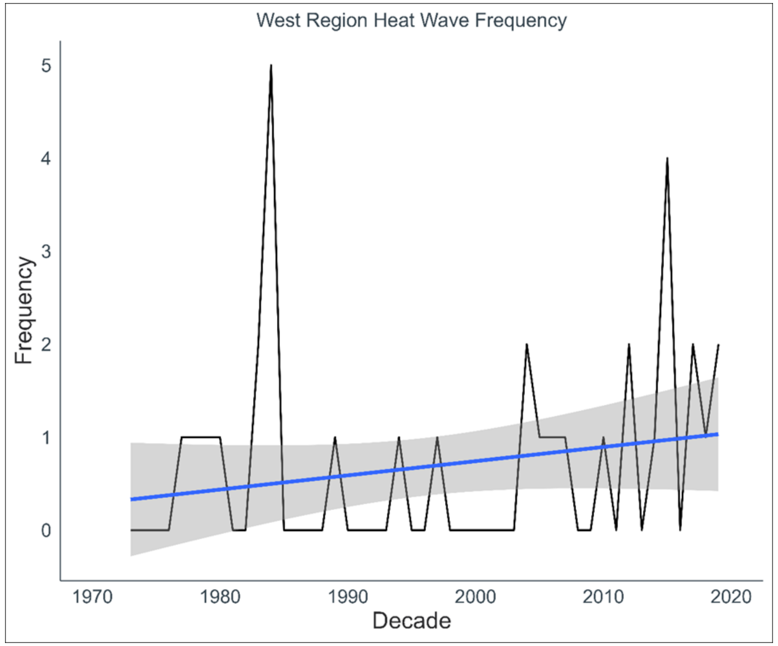
Cold wave frequency, duration and intensity declines

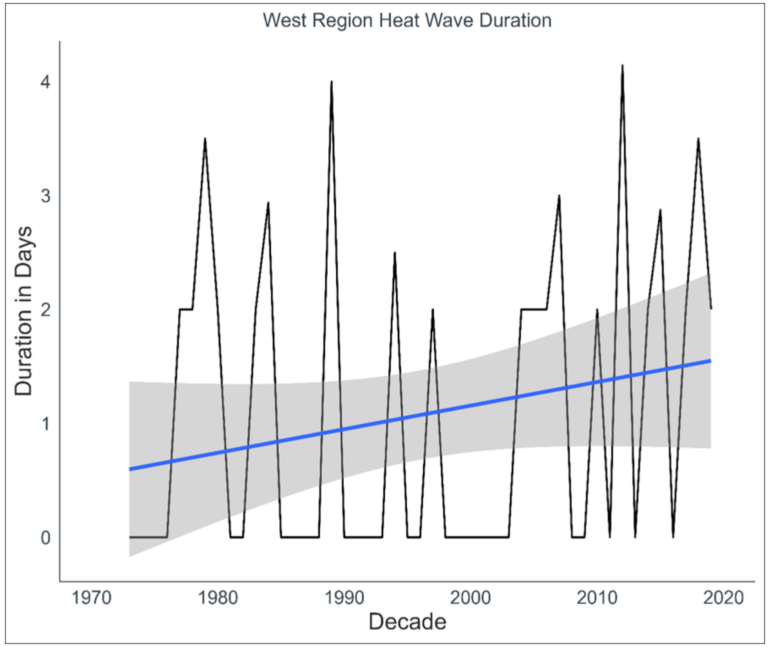


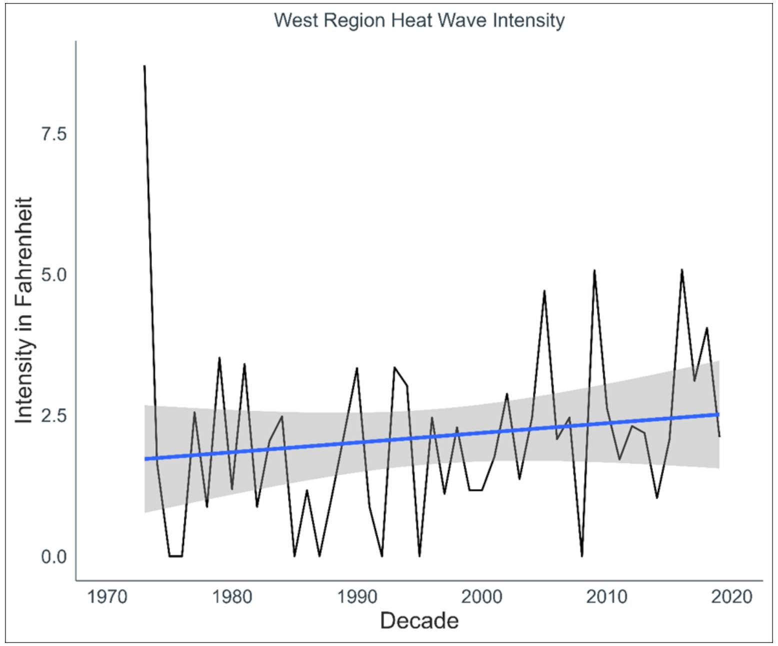




Heat wave frequency, duration and intensity on the rise







Extreme Weather Events Summary

- 4-8 heat and cold waves lasting about a week experienced every year
- Noticeable increase in frequency, duration and intensity of heat waves
- Noticeable decrease in frequency, duration and intensity of cold waves

Heat waves:

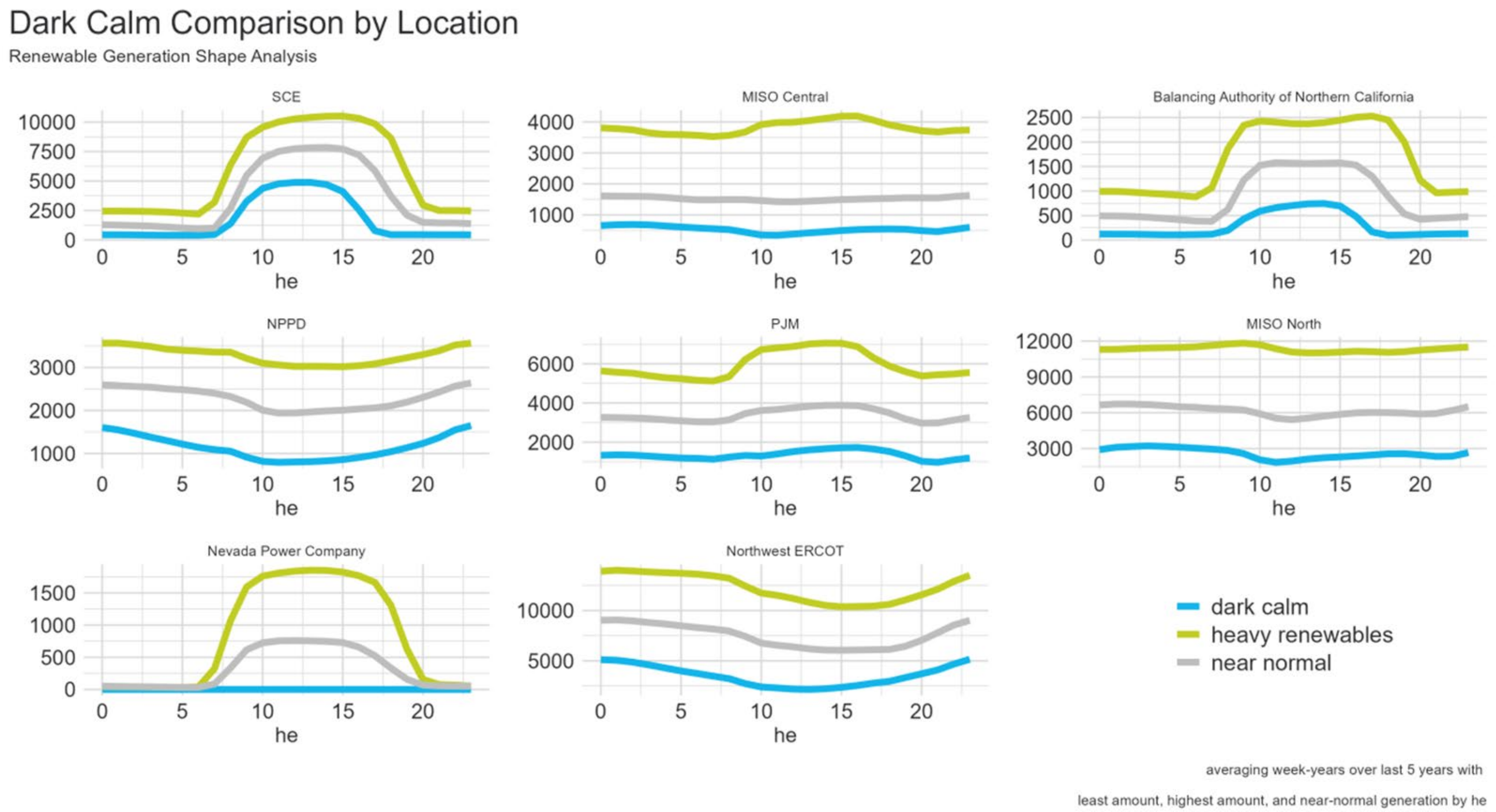
Heat Wave Summary – West Region						
	48 Hours	72 Hours	96 hours	120 hours	144 hours	168 hours
Events per year	0.47	0.02	0.09	0.04	0.021	0.043

Cold waves:

Cold Wave Summary – West Region													
Number of Hours	48	72	96	120	144	168	192	216	240	264	288	312	336
Events per year	4.9	1.7	0.9	0.4	0.17	0.08	0	0	0	0	0	0	0

Cold Wave Summary – Colorado Region										
Number of Hours	48	72	96	120	144	168	192	216	240	264
Events per year	2.36	0.9	0.3	0.17	0.02	0.04	0	0	0	0

Dark Calm frequency and impact



Dark Calm Events by Location

Breakdown of Events/Year by Renewable Output & Duration

% of Full Output	48 hrs	72 hrs	96 hrs	120 hrs
MISO Central				
5%	3.00	1.25	0.50	0.25
10%	11.20	5.60	2.40	2.00
15%	6.20	11.40	3.80	4.80
MISO North				
5%	1.00	1.00	0.67	0.00
10%	5.00	1.75	0.50	1.00
15%	2.20	3.00	1.20	2.00
Northwest ERCOT				
10%	3.80	1.00	0.20	0.20
15%	3.20	3.40	3.00	1.20

Planning Reserve Margin (PRM) and Effective Load Carrying Capability (ELCC) Study

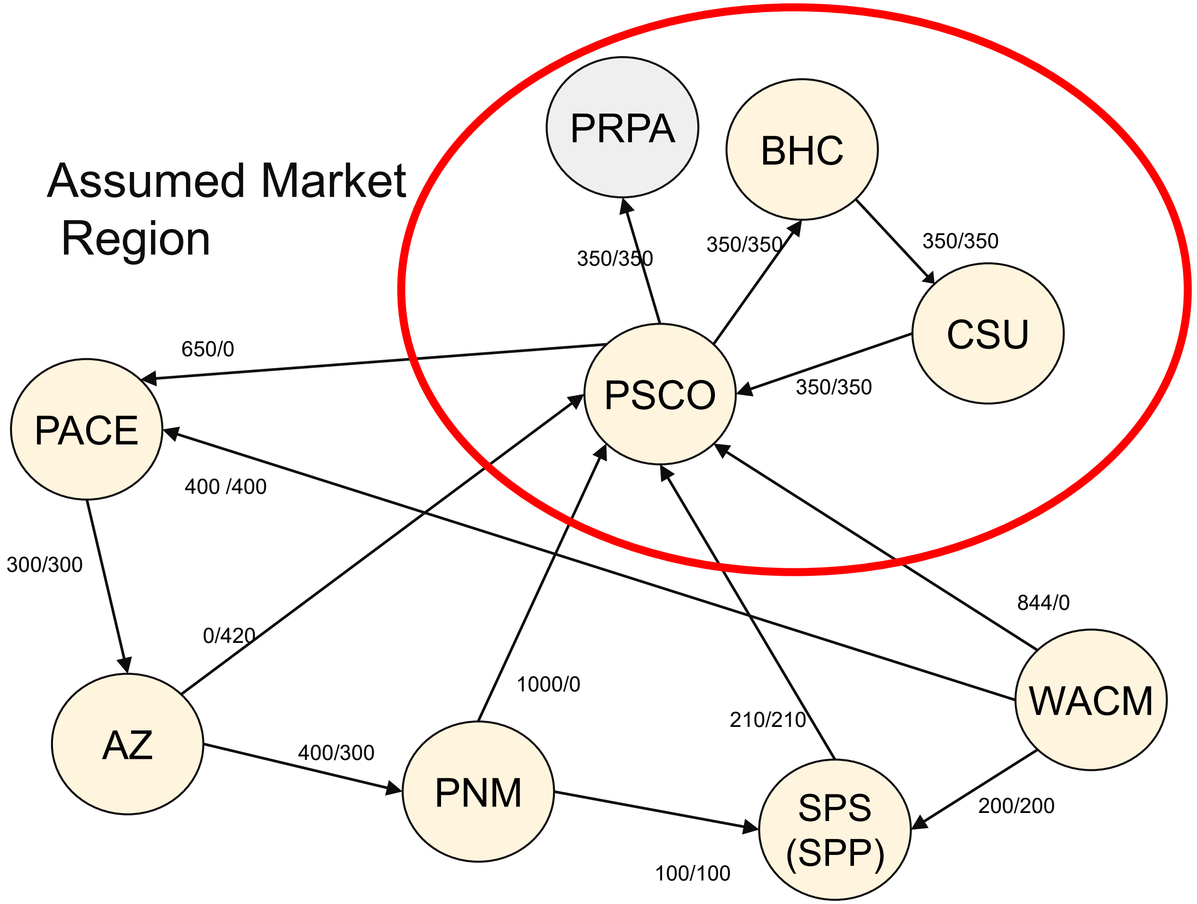
Modeling basis

Modeling year 2030. Assumed a regional market to realize diversity benefits

2030 Resource mix

Conventional resources ~8,900 MW Storage and Renewable Resources	
Battery storage	867
Distributed solar	1,820
DR	670
PSH	301
Solar	3,880
Wind	6,280

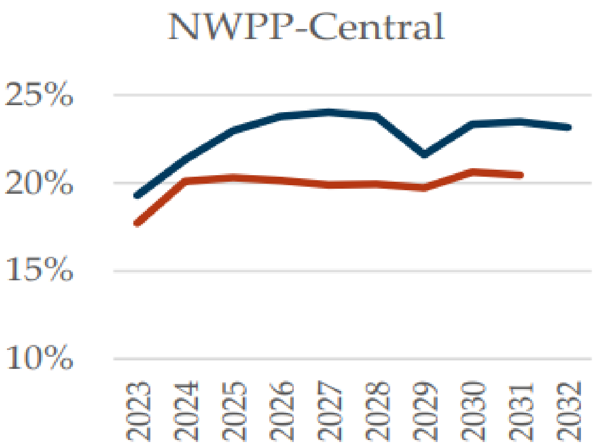
- Assessed regional PRM for one outage in 10 years or annual Loss of Load Expectation (LOLE) of .1
- Ran 63,000 simulations (42 years of historical weather X five load forecast errors X 300 outage patterns)

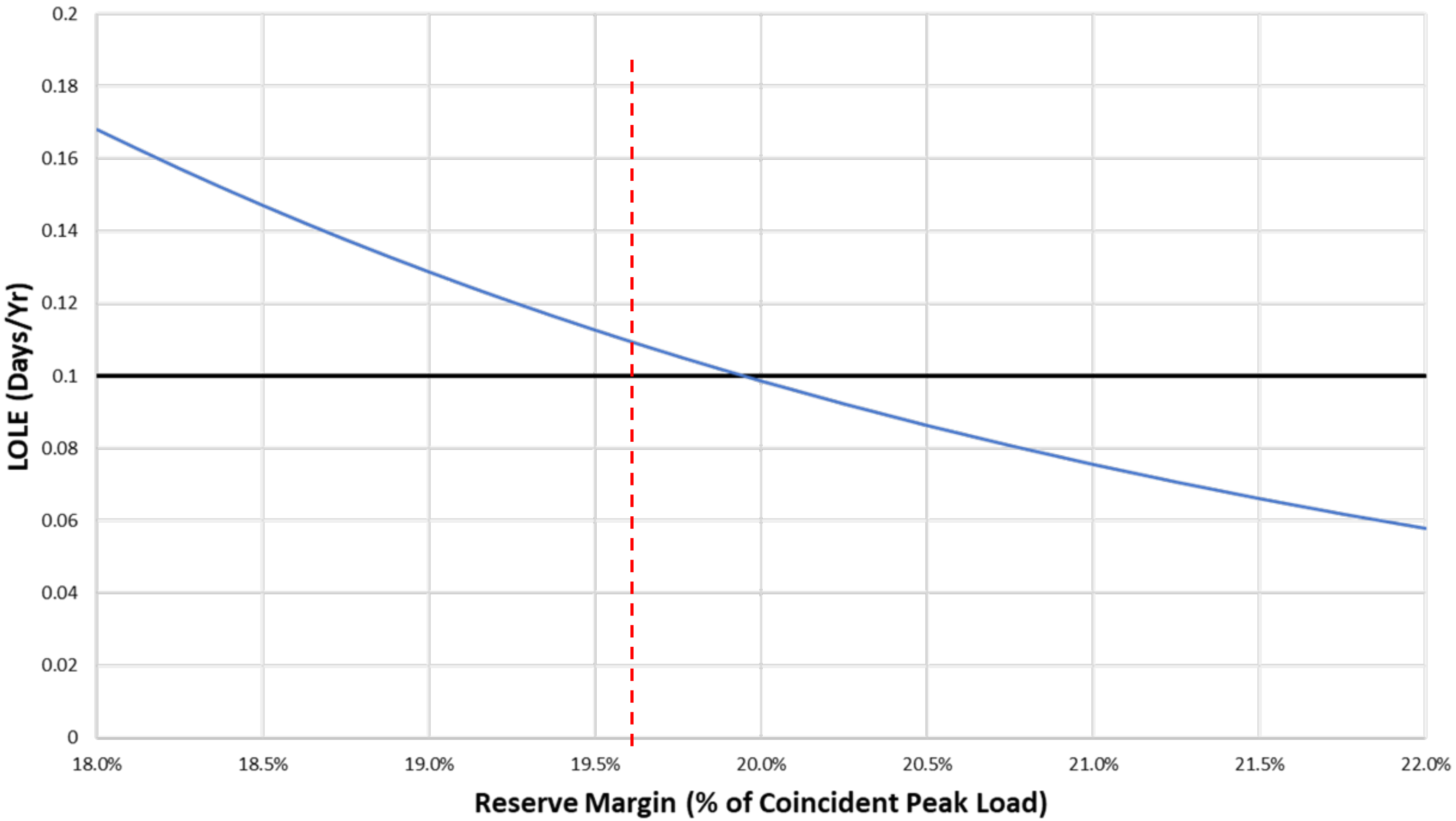


2030 PRM Curve

Study recommends a PRM of 19.9% which includes a diversity benefit of 2.2%

- Results are somewhat in line with proposed PRM requirements for our region



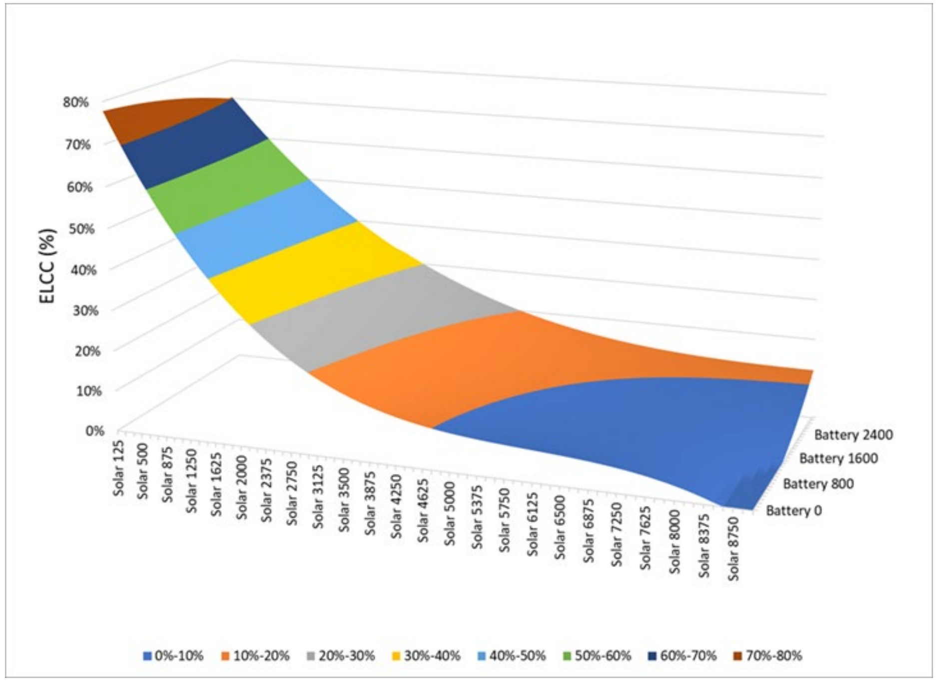


https://www.wecc.org/Reliability/2022%20Western%20Assessment%20of%20Resource%20Adequacy.pdf

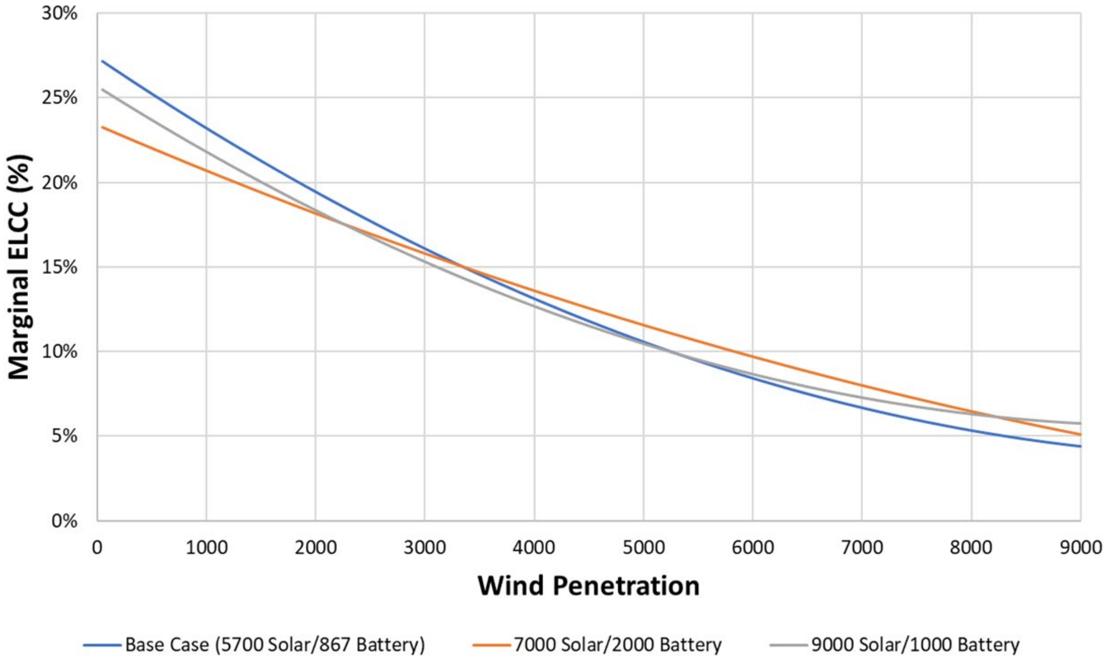
2030 ELCC Curves

ELCC of a renewable/storage resource is the probabilistic capacity to meet peak demand. It depends on total renewable penetration and declines with increased penetration

Solar ELCC curve with different levels of storage



Wind ELCC curve with different levels of solar/storage



2030 ELCCs of long duration storage and DERs

Technology	Penetration (MW)	Average ELCC (%)	Marginal ELCC (%)
8-hour batteries	500	92.7%	91.6%
8-hour batteries	1000	90.5%	84.4%
8-hour batteries	1500	87.0%	75.6%
100-hour batteries	500	92.7%	91.6%
100-hour batteries	1000	91.9%	90.8%
100-hour batteries	1500	91.4%	90.0%
DG Solar	500	8.5%	7.9%
DG Solar	1000	8.0%	7.2%
DG Solar	2000	7.2%	5.8%
DG Solar	4000	5.8%	2.9%
BBE	100	6.9%	7.4%
BBE	200	7.3%	8.2%
BBE	300	7.8%	9.0%
EV	100	32.0%	33.6%
EV	200	33.8%	37.3%
EV	300	35.7%	41.0%
DR	100	92.3%	87.3%
DR	200	87.1%	77.8%
DR	300	82.6%	70.4%

Building electrification

Key findings

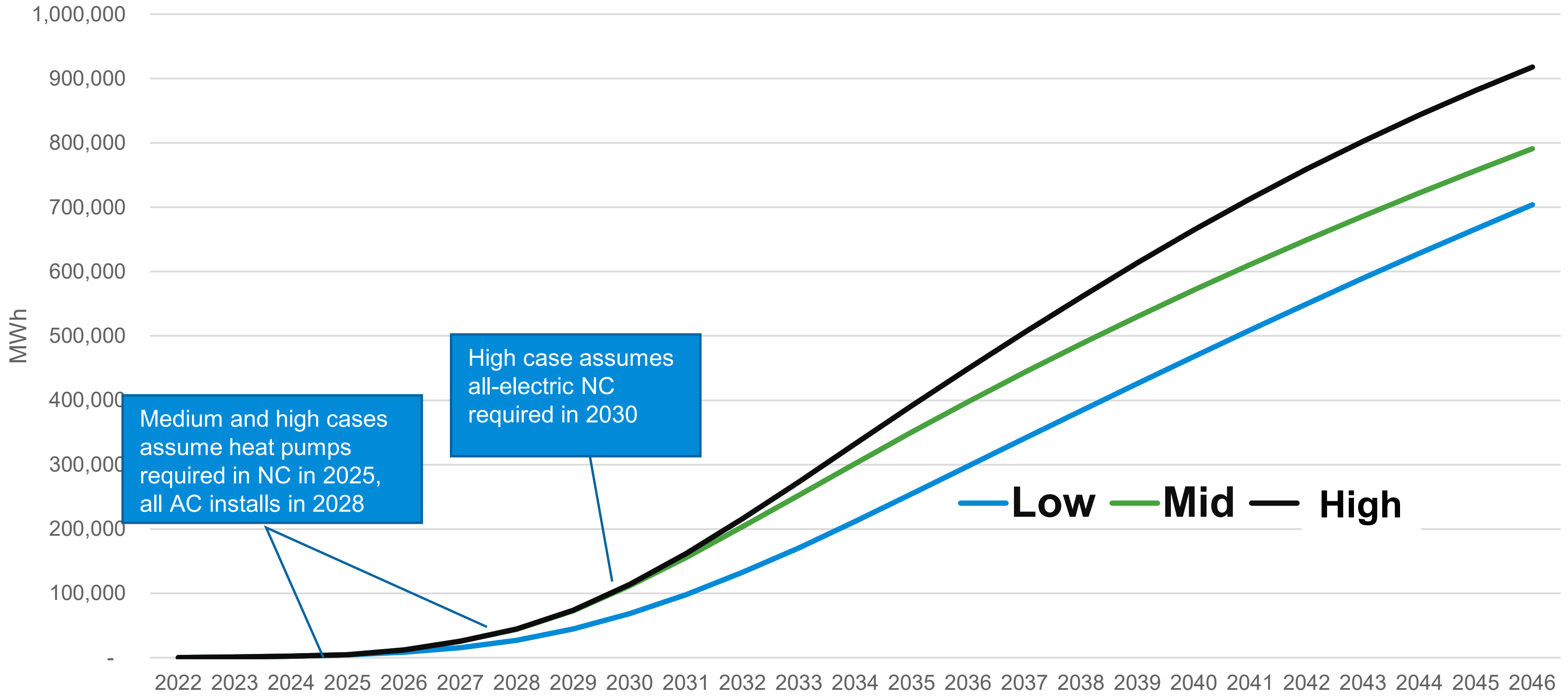
- Space heating has the biggest impact, especially after 2030
- Partial electrification of heat with gas back up improves load factor
- Full electrification causes significant impact on winter peak

Components of electrification load

Sector	End use	Percent of 2040 fossil fuel GHG emissions	Included in PRPA forecast
Residential	**Space Heating**	**51.8%**	**Yes**
Residential	Water Heating	12.5%	Yes
Residential	Cooking	1.7%	Yes
Residential	Lawn and Garden	0.9%	No
Residential	Clothes Dryer	0.5%	No
Commercial	**Space Heating**	**23.6%**	**Yes**
Commercial	Cooking	4.7%	Yes
Commercial	Water Heating	2.9%	Yes
Commercial	Fork Lifts	0.8%	No
Commercial	Lawn and Garden	0.6%	No

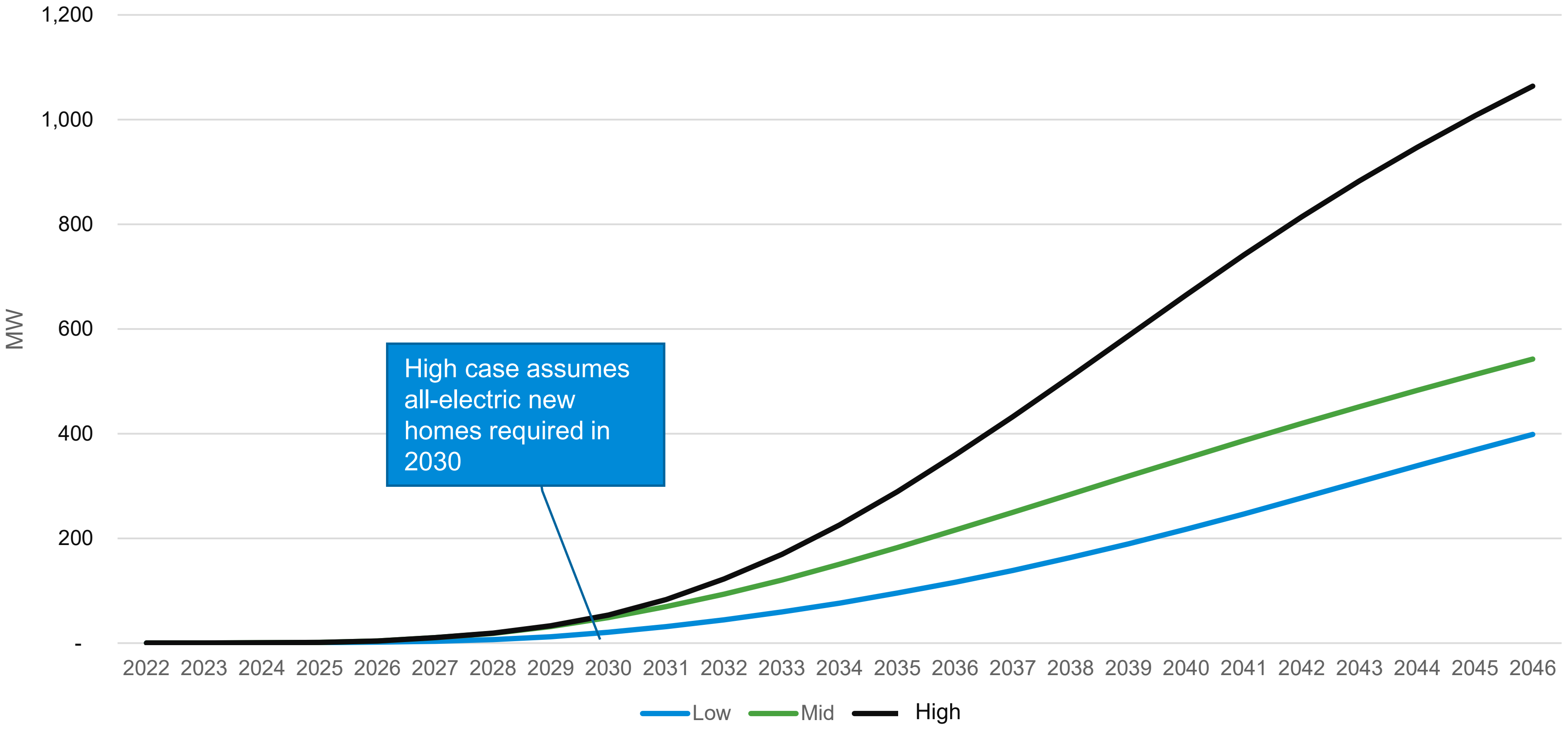
Annual building electrification energy consumption

- Building electrification load accelerates after 2030, going from 3% (of base load) in 2030 to about 15% in 2040
- Load is mostly residential



Building electrification winter peak projection

- Platte River may become winter peaking sometime after 2040
- Winter peaking starts roughly 5-7 years after all electric new building code goes into effect

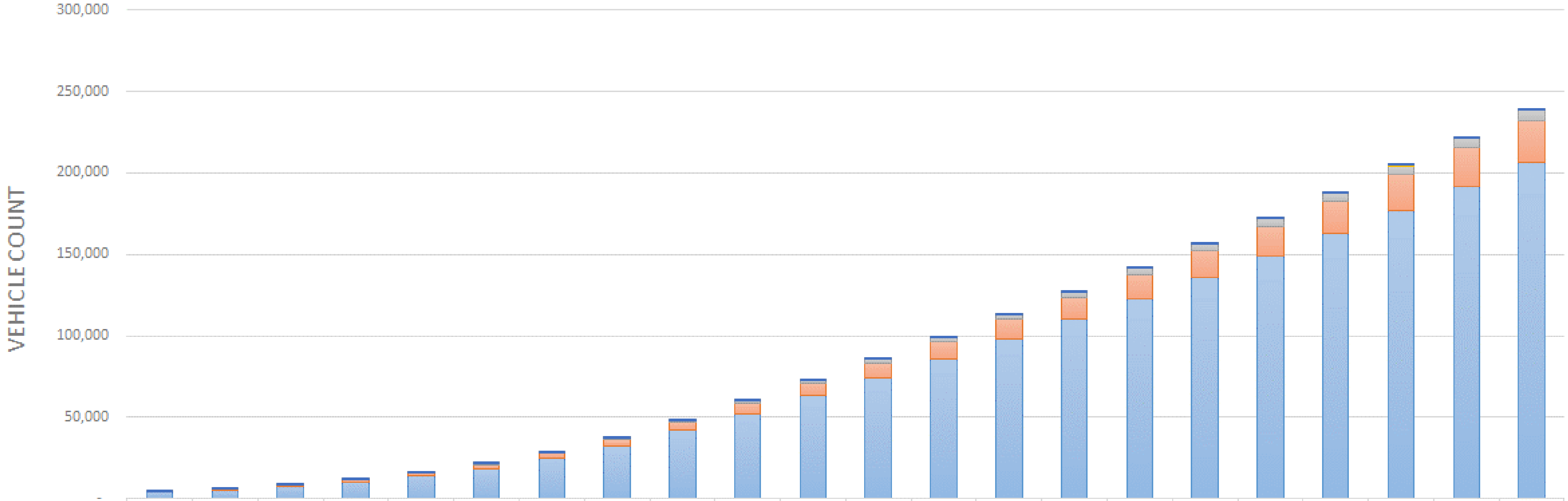


DER potential study

DER potential study scope

- **Technologies:** transportation electrification, distributed generation + storage and demand response
- **Scenarios:** three market potential scenarios that consider market/technology factors and program/utility levers (incentives, rates, policy, etc.)
- **Sectors:** residential single family, residential multi-family, small commercial, large commercial
- **Outputs:** technology adoption (number of units), annual energy impacts (MWh), hourly demand impacts (MW), program metrics (budgets)

Transportation electrification: medium growth



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Bus	2	3	5	8	12	16	22	29	38	47	58	71	85	100	116	134	153	174	197	220	244	269
HDV	2	3	6	9	14	20	27	35	45	55	67	80	94	110	126	144	164	184	206	229	254	280
MDV	56	102	161	233	320	446	609	810	1,047	1,320	1,630	1,963	2,318	2,696	3,096	3,517	3,960	4,424	4,908	5,413	5,938	6,482
Commercial LDV	483	657	916	1,272	1,718	2,303	3,055	4,031	5,184	6,466	7,807	9,194	10,625	12,091	13,598	15,150	16,752	18,404	20,107	21,867	23,668	25,517
Passenger LDV	3,912	5,313	7,410	10,294	13,899	18,630	24,719	32,614	41,942	52,317	63,167	74,390	85,963	97,830	110,02	122,57	135,53	148,90	162,68	176,92	191,49	206,45

Passenger LDV   Commercial LDV   MDV   HDV   Bus

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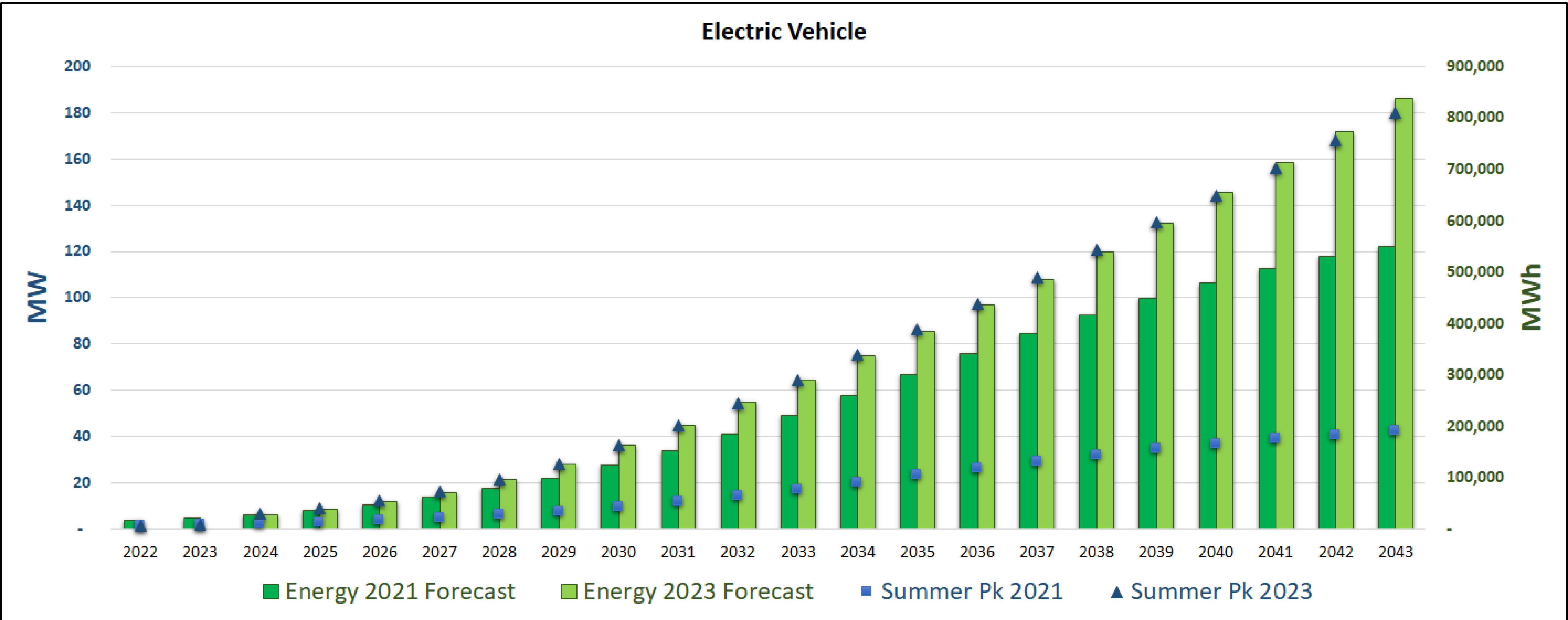
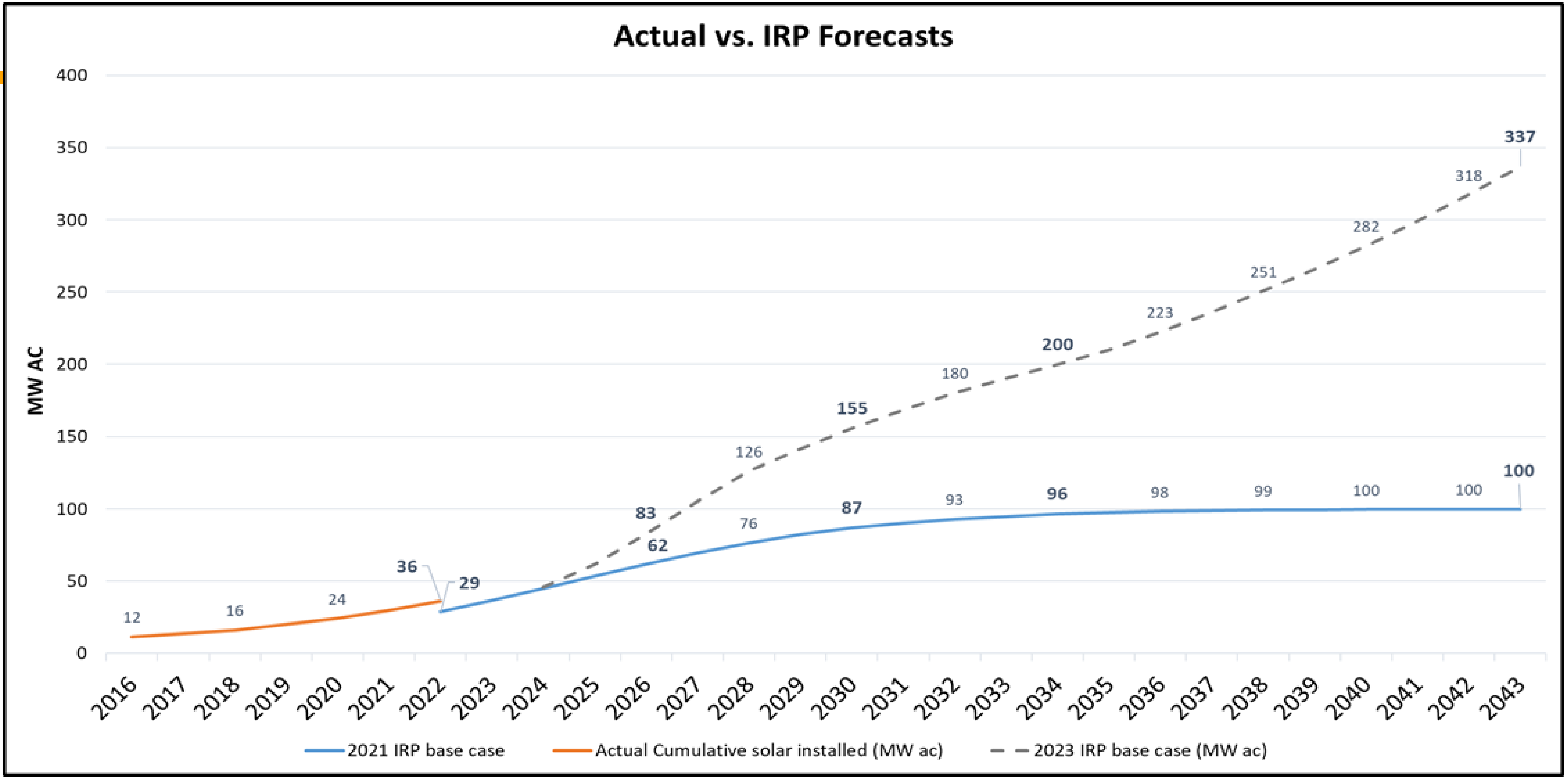
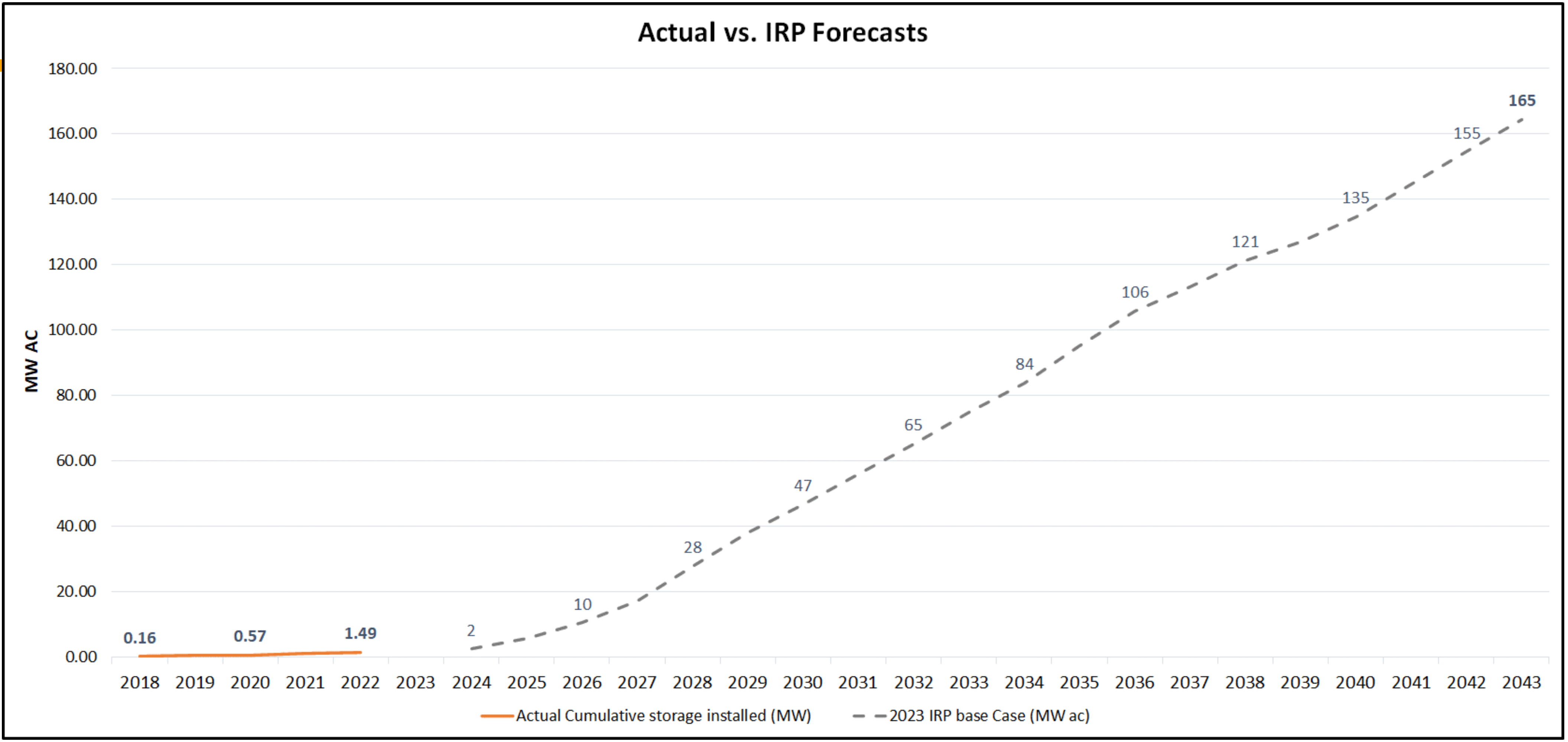
Transportation electrification *unmitigated* energy and demand summer medium growth



Behind the meter solar potential:
medium + medium Net Energy Metering blended



Behind the meter storage potential:
medium + medium Net Energy Metering blended



DER potential: key characteristics

Enrolled Effective Capacity

X

Coincidence Factor

(% of load that coincides with time)

=

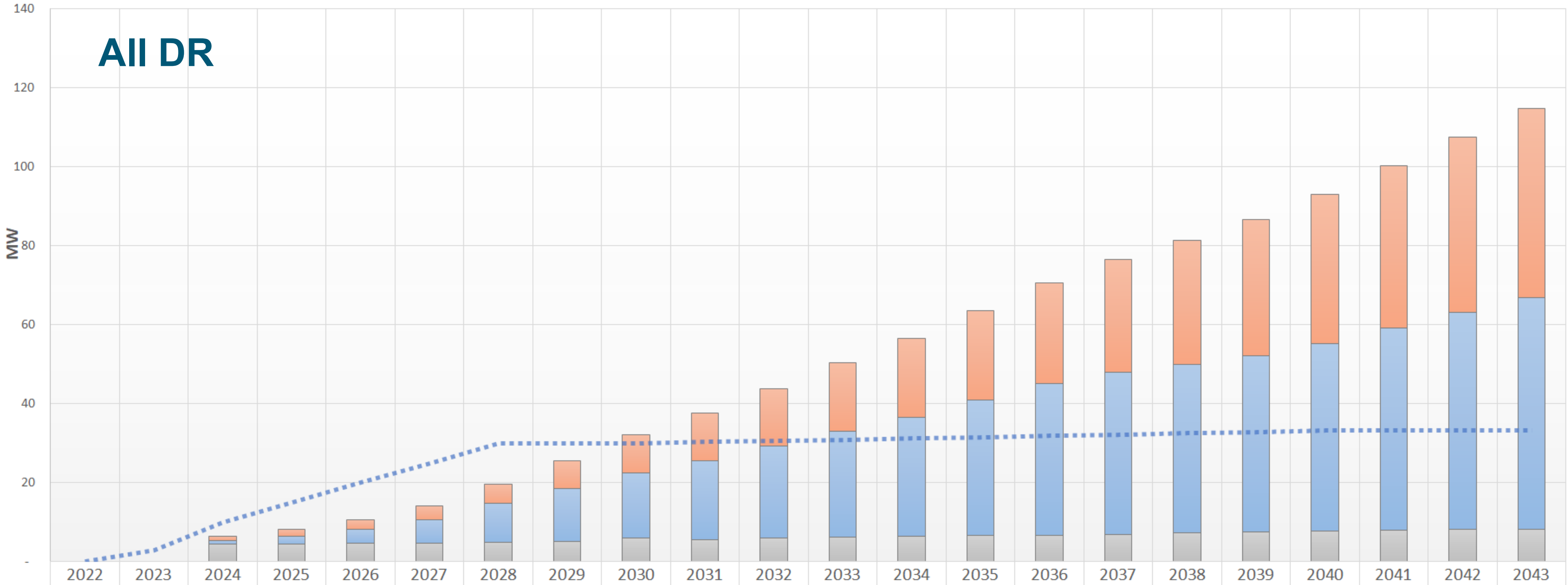
Achievable Peak Reduction Potential

Measure Group	Measure Sub-Groups	Characteristics							
		Curtailment Potential	Event Duration (hours)	Pre-charge time	Pre-charge Sizing	Rebound Time	Rebound Sizing (per hour)	Event Frequency (per year)	Response Time
HVAC Controls	Smart Thermostats	[75%, 33%]	Up to 2 h	1 h	40%	2 h	30%	20	<1 sec
EV Charging	EV Smart Chargers	100%	4 h +	N/A	N/A	6 h	17%	300+	<1 sec
	Vehicle-to-Grid	100%	4 h +	N/A	N/A	6 h	17%	300+	<1 sec
Water Heating	Electric Water Heaters	100%	Up to 4 h	2 h	17%	4 h	17%	15	<1 sec
Other Load Flexibility	Large C&I Curtailment	25%	Up to 4 h	N/A	N/A	N/A	N/A	15	<10 mins

Measure Group	Measure Sub-Groups		Characteristics					
		Size (kW)	Curtailment Potential	Round Trip Efficiency	Typical Event Duration (hours)	Typical Rebound / Pre-charge Time	Typical Event Frequency (per year)	Response Time
Storage	Battery Storage - Residential	3.3	33%	85%	4 h	4 h	300+	<10 ms
	Battery Storage - Small Commercial	5	100%	85%	4 h	4 h	300+	<10 ms
	Battery Storage - Large Commercial	50	100%	85%	4 h	4 h	300+	<10 ms

Achievable sustained peak reduction potential:
(5pm-9pm) / medium forecast

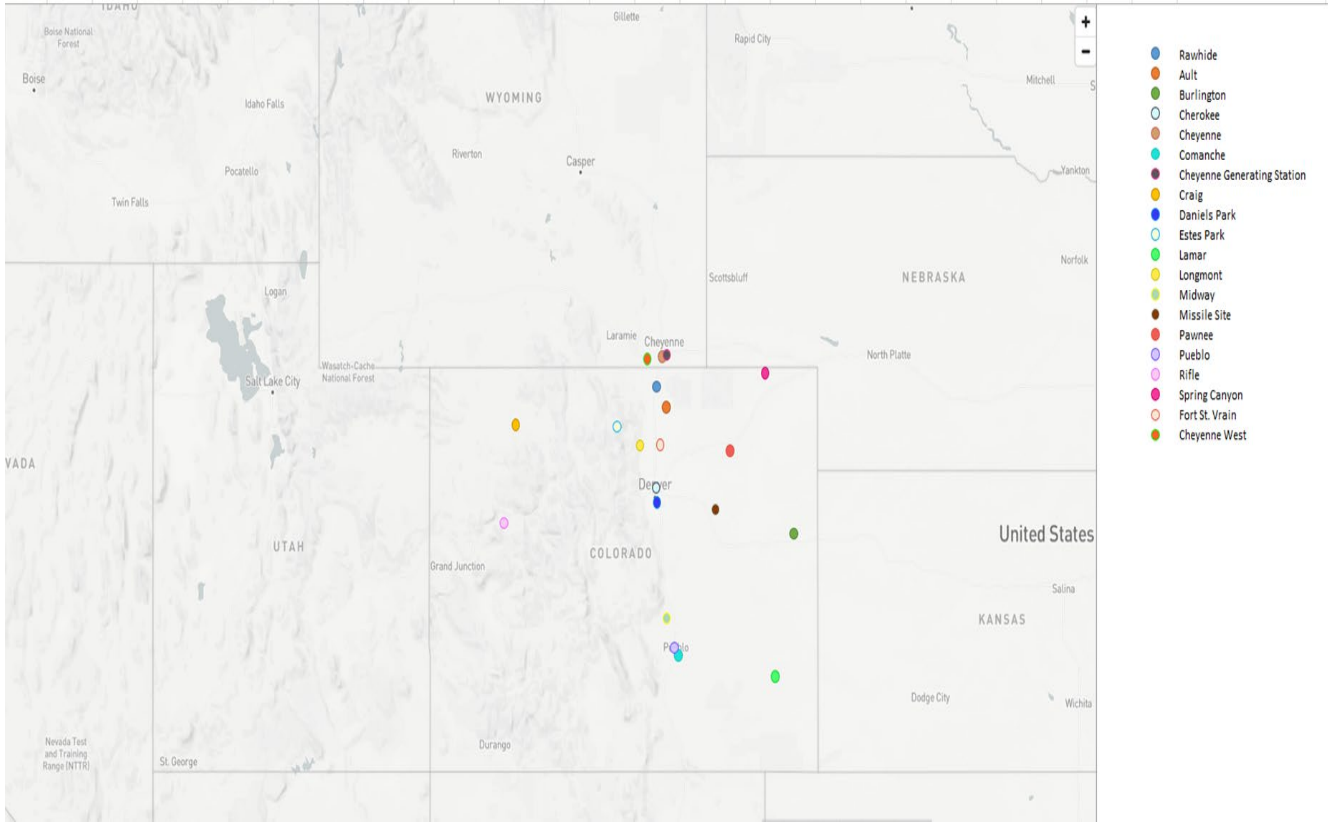
Traditional DR Includes:
- Electric Resistance Smart Thermostat
- Residential Water Heating
- Heat Pump Smart Thermostat
- Residential AC Thermostat
- Large C&I Curtailment
- Commercial Hot Water



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
2023 Summer EV DR			1	2	2	3	5	7	10	12	15	17	20	23	25	28	31	35	38	41	44	48
2023 Summer Storage DR			1	2	4	6	10	13	17	20	23	27	30	34	38	41	43	45	48	51	55	59
2023 Summer Traditional DR			4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	8	8	8	8
2021 IRP Summer DR Forecast	-	3	10	15	20	25	30	30	30	30	31	31	31	32	32	32	32	33	33	33	33	33

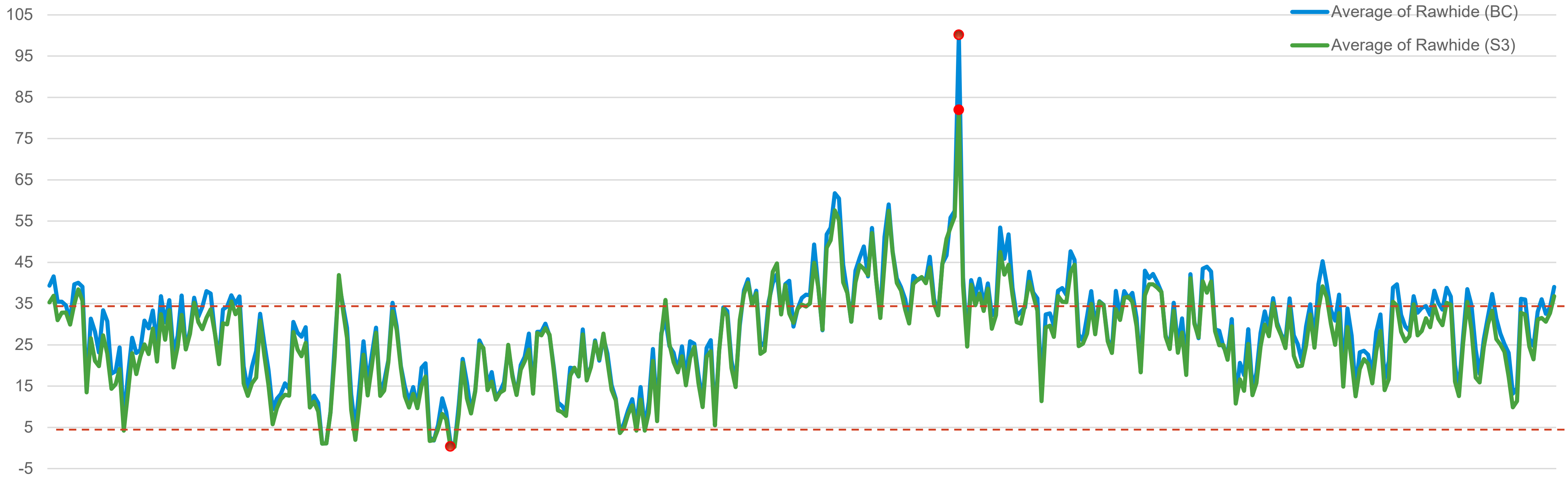
Market price volatility

Locational Marginal Price (LMP) forecast



2030 Base case assumptions (20 locations)
500 MW wind at Rail Tie site in WY
1800 MW of Wind connecting to Gateway South in Wester WY
3000 MW of Wind connecting to Colorado Power Pathway
500 MW of wind near Casper WY
500 MW of solar near Craig CO
2000 MW of Utility Scale Solar in the Denver-Pueblo Area
1000 MW of distributed solar in Denver-Pueblo Area
200 MW of peaking generation at Cheyenne Energy Station
1300 MW of peaking generation in Denver area
500 MW of batteries in Denver area
Retirement of all coal Units in CO

LMP forecast - 2030



New dispatchable technology selection

Internal team process

Met with vendors and operators. Leveraged engineering, operation, commercial, environmental and economic analysis expertise to reach an objective conclusion.

- Met with vendors:
  - GE
  - Mitsubishi
  - Mitsubishi aero (Pratt and Whitney)
  - Siemens
  - Wartsila
- Visited three plants
  - Cheyenne Prairie Generating Station (Black Hills)
  - Drake Plant (Colorado Springs Utilities)
  - Pueblo Airport Station (Black Hills)
- Met with utilities (OPPD, etc.)
- Performed Plexos modeling
- Performed air quality modeling and reviewed air permit applications from other utilities

Black & Veatch process

Levered B&V's global expertise in power generation with a nine step evaluation process:

1. Screening
   - From 58 scenarios to six
   - Detailed evaluation of four to recommend one
2. Operational characteristics – output, heat rate
3. Levelized Cost Of Electricity (LCOE) at different capacity factors (5, 20, 30) and cost levels
4. Operational flexibility – ramp rates, turn down, minimum run and down times to accommodate renewable intermittency
5. Reliability – availability and failure rate at normal and extreme weather
6. Fuel versatility – gas, back up liquid fuels, H2
7. Emissions – Nox, CO2, VOCs, etc.
8. Constructability – supply chain
9. Market Performance – Ancillary Services (A/S)

Relative scores from the decision matrix

Qualification	Weighting
Reliability	0.30
Emissions	0.25
Costs	0.20
Operational Flexibility	0.10
Fuel Versatility	0.05
Constructability	0.05
Market Performance	0.05
Total weighted score	**1.0**

The team did their best to objectively score different aspects, but many were hard to value numerically. So, there is a subjectivity in these scores, but there was **unanimity** among the team members and with B&V.

Questions

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Board of directors

Aug. 31, 2023

Energy leaders since 1973

Transmission strategy and planning

Darren Buck, director of power delivery

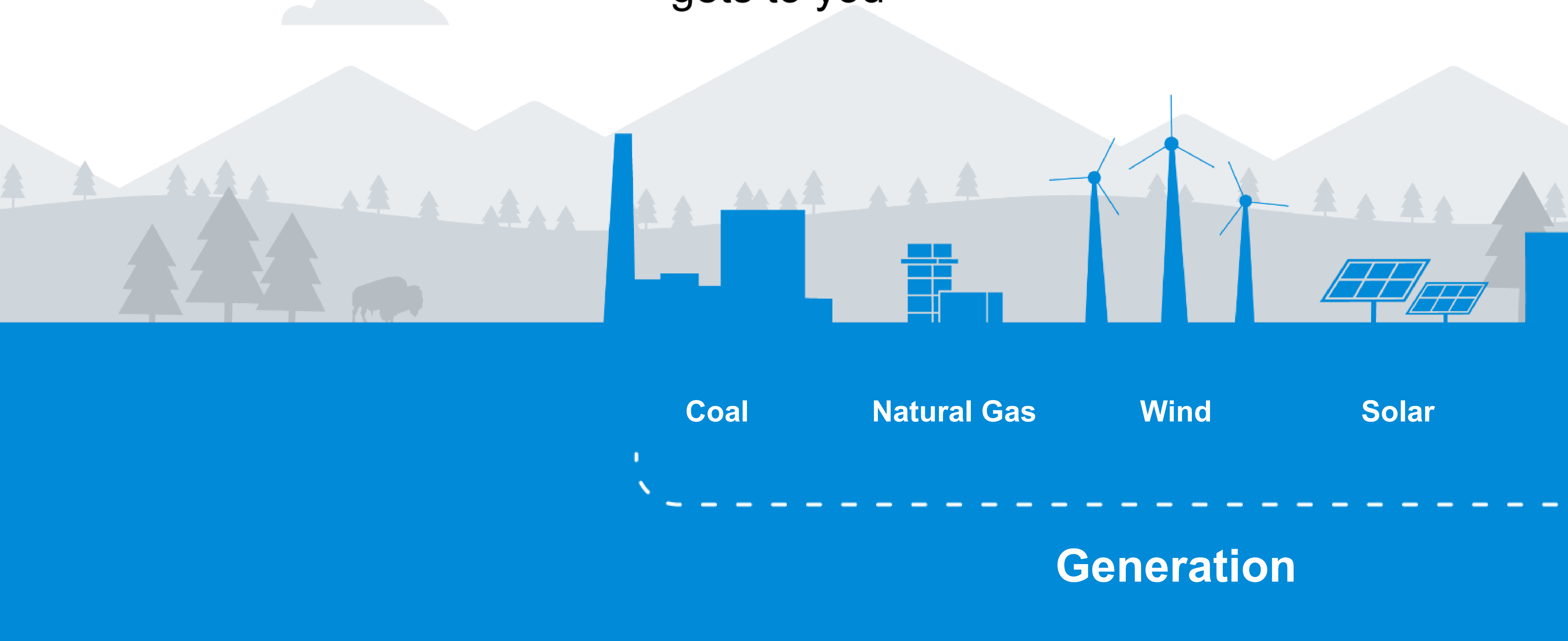
Transmission

- How transmission serves load
- History of Platte River transmission investment
  - Past
  - Present
  - Future
- SPP RTO West transmission planning changes

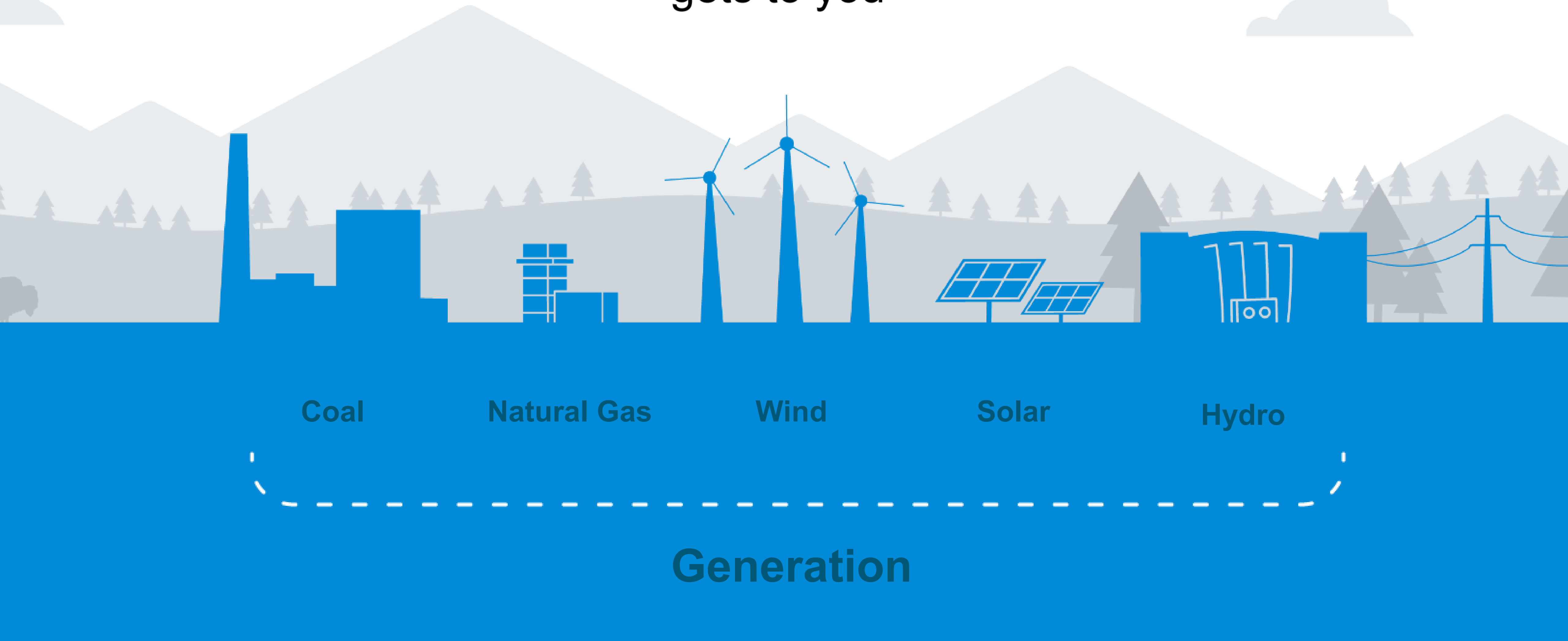
How

ELECTRICITY

gets to you



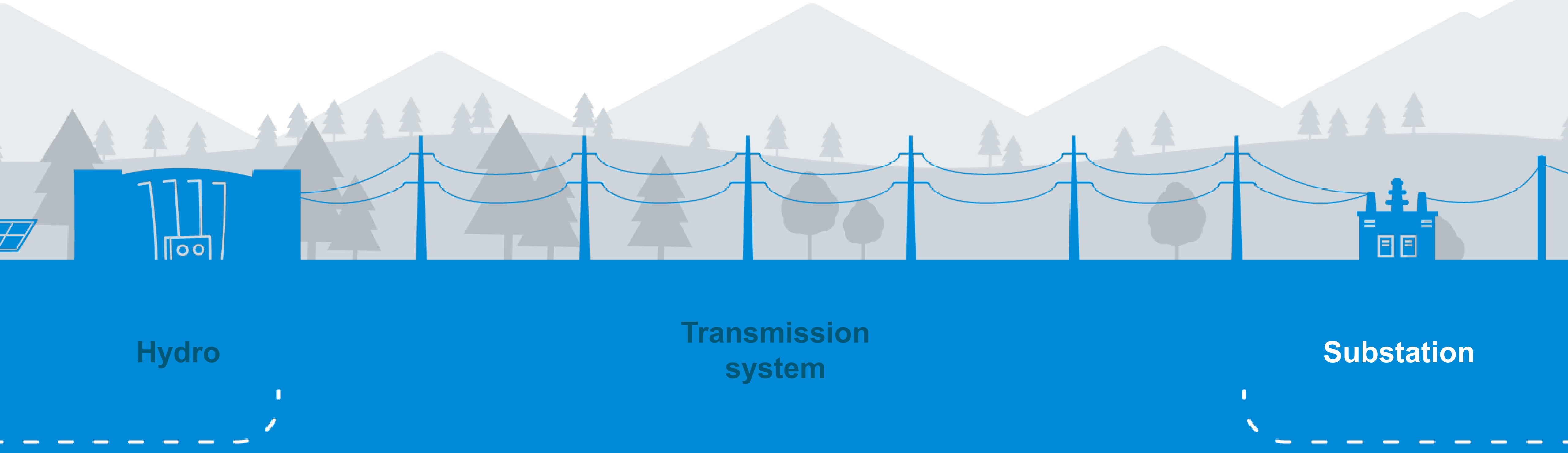
How ELECTRICITY gets to you



How

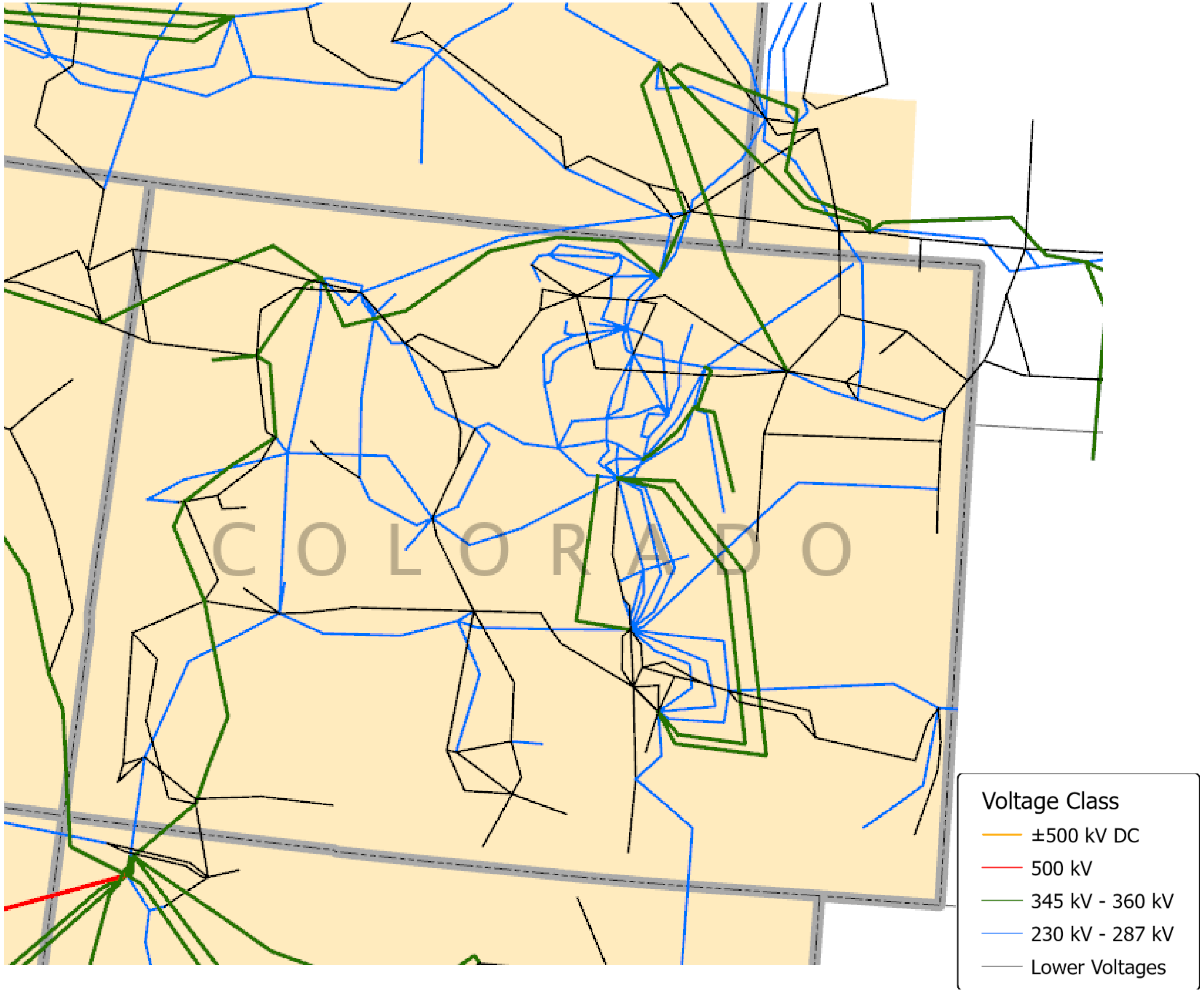
ELECTRICITY

gets to you



Regional view

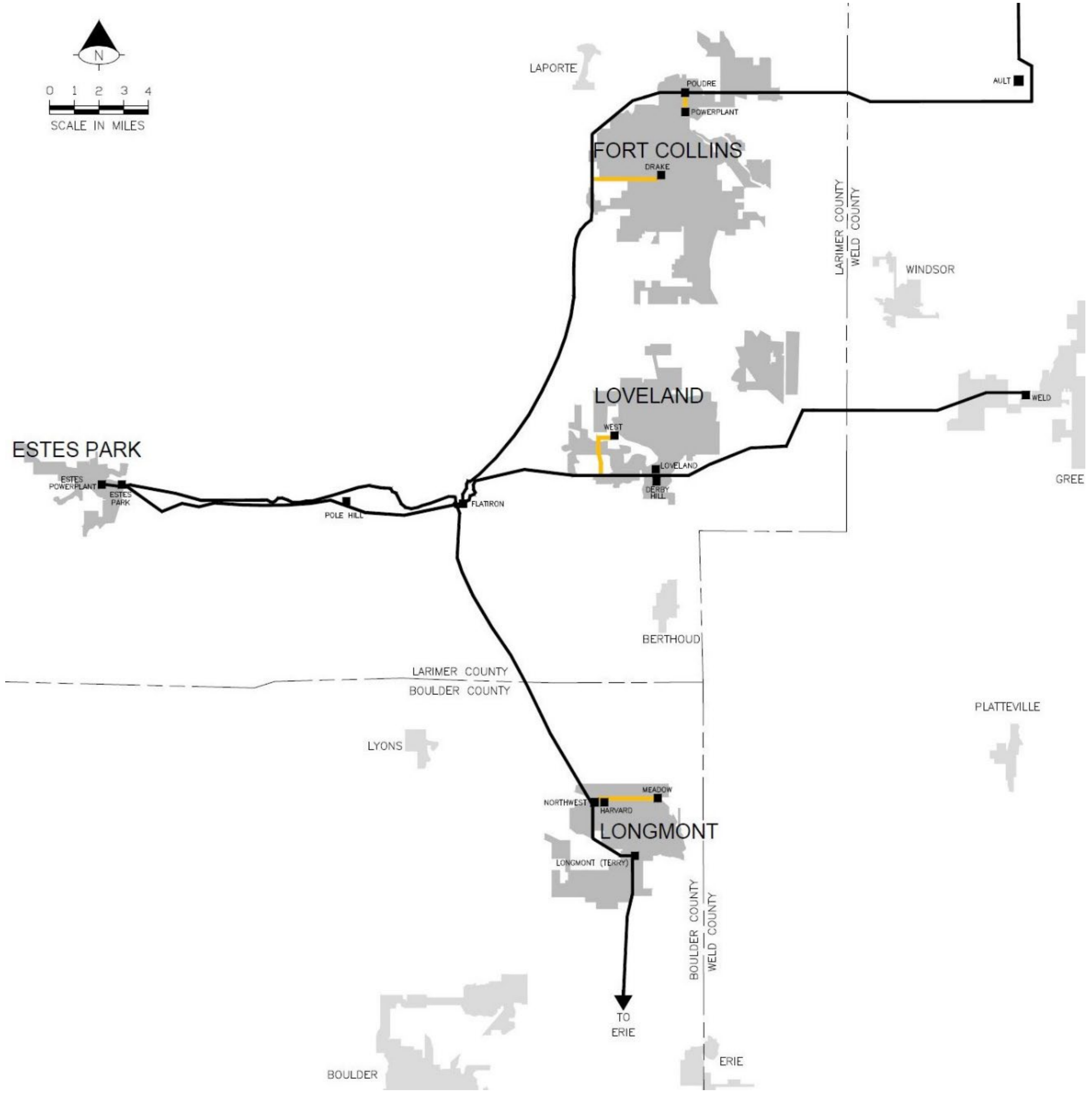
- Not linear from generation to load
- Networked for redundancy
- Designed to meet 100% load
- Planning between entities
    - Outages impact all
    - Coordination essential



Past

1973 transmission map

- Majority of transmission owned by Western Area Power Administration (WAPA)
- Cities had small tap extensions
- 115kV wood H-frame construction dating back to the 1940s



Investment in local and regional transmission

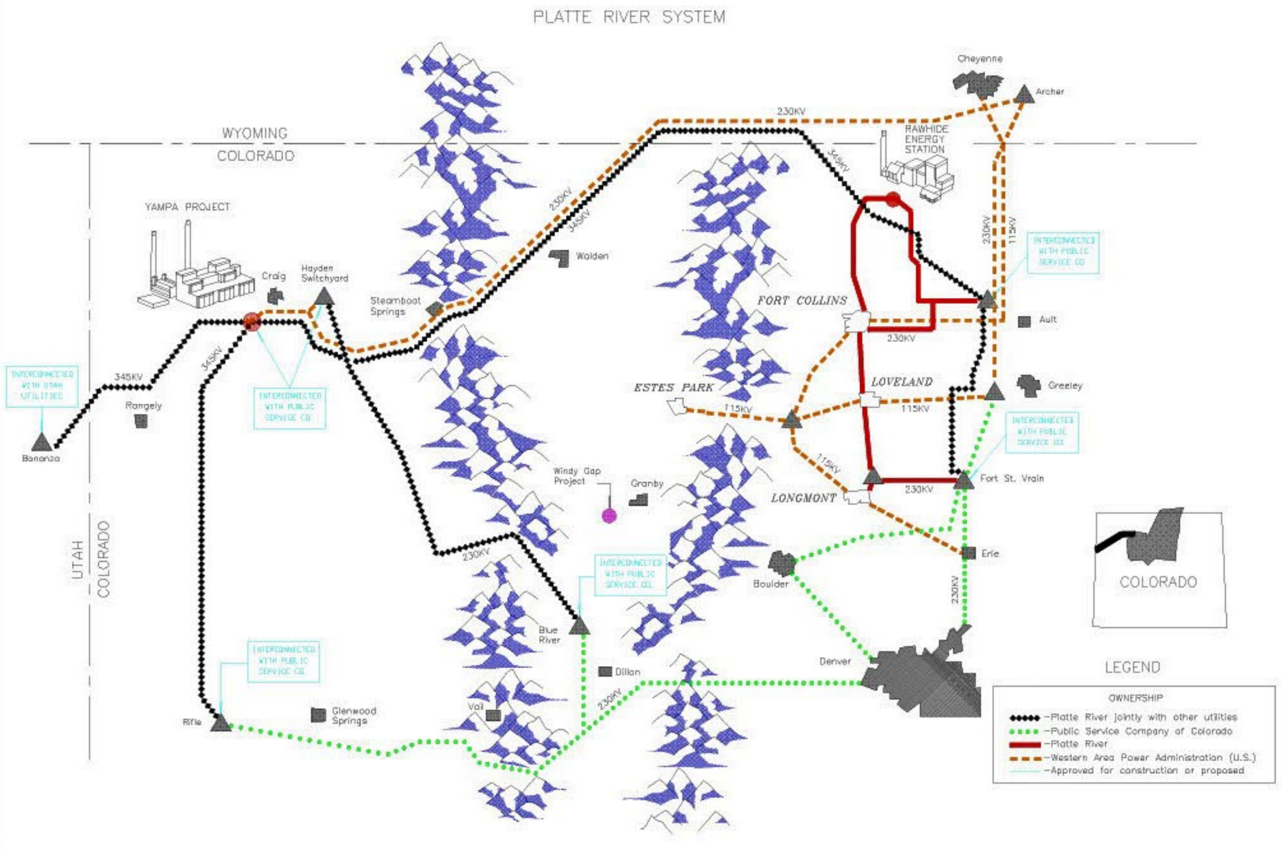
- Partnership with other utilities
  - Yampa project investment Craig-Ault 345 kV
  - Craig-Bonanza (Utah)
  - Craig-Rifle
  - Ault-Fort St. Vrain
- Front range backbone investment
  - Rawhide four 230 kV lines
  - 230 kV backbone

$424 million invested since 1975

Present

Present transmission map

- 263 miles of wholly owned and operated high-voltage lines
- 522 miles of high-voltage lines jointly owned with other utilities
- 19-mile 230 kV generator outlet line that carries power from Roundhouse to Rawhide Energy Station
- 27 substations



Investment in upgrading and maintaining existing facilities

- Timberline (1975) and Longs Peak (1978) transformers
- Reactors for voltage control at Ault
- Construction of new Severance Substation
- Drake, transmission and equipment replacement
- Longmont’s circuit switcher installations, Rogers Road Substation
- Loveland, Airport Substation, city switchgear and Platte River relay/breaker replacement
- Western States funding support for the WAPA Flatiron-Estes and Lyons-Estes rebuild

Timberline T3 replacement – installed in 1975

Drake transmission replacement

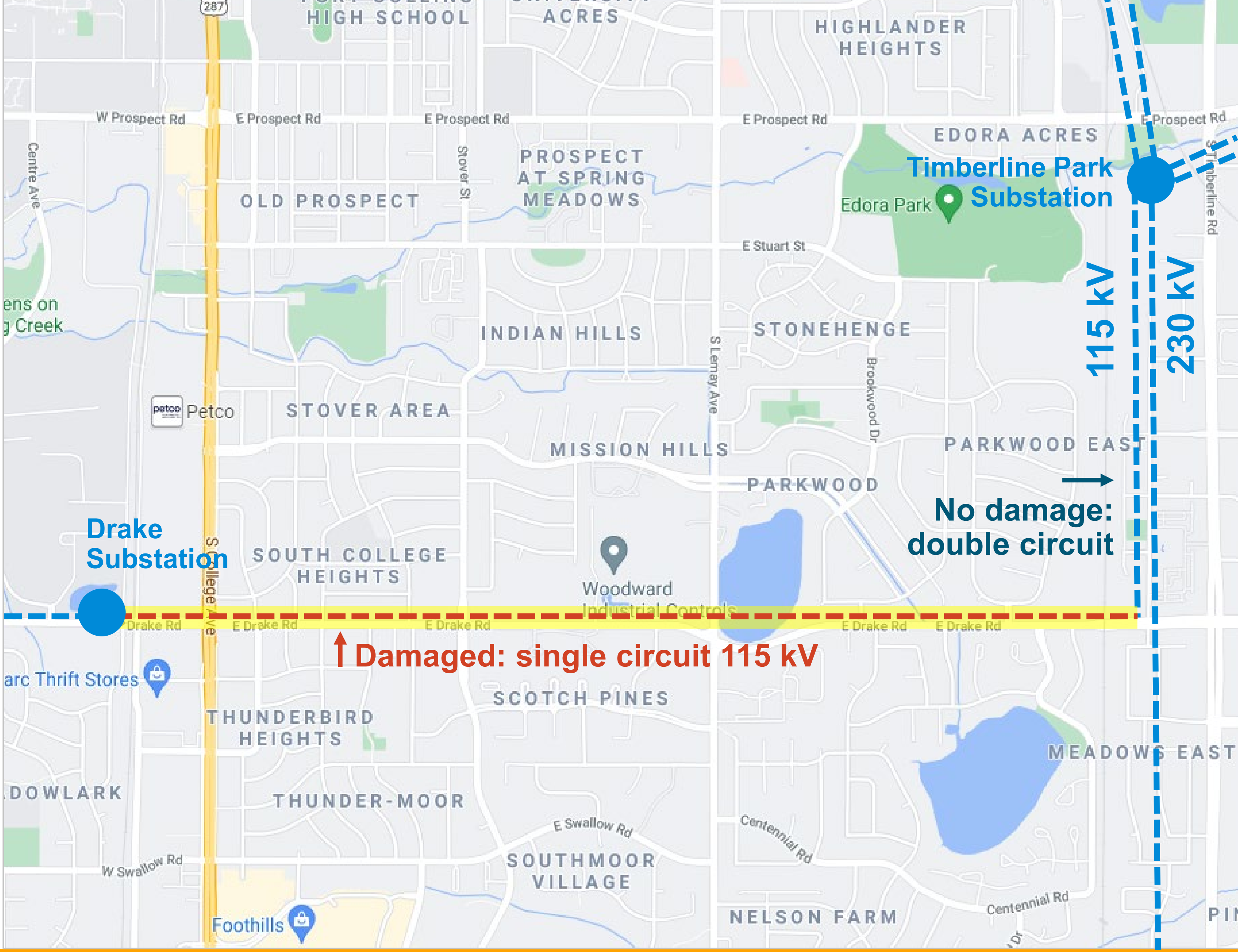
Drake to Timberline

Overhead three-mile transmission line

- Two-mile single circuit
- One-mile double circuit

Proposed rebuild section

- Two-mile section
- 19 structures
- East Drake Road
- Drake Substation to the Power Trail/railroad tracks



Drake pole damage

WAPA Flatiron-Estes, Lyons-Estes

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Transmission sales

Managing risk and policy allowing for increased availability to third parties

- Continue to provide industry leading service to owner communities
- Reduces owner community costs
- Monitoring system operating limits
- Non-discriminatory access

Future

New transmission investment

- Support implementation of resource diversification policy and integrated resource portfolio
- New load-serving substations
- Partnerships following similar historic examples
- Limiting or eliminating constraints
- Resiliency

Industry lessons learned

- Large solar outages
  - 2016 Blue Cut fire 1,200 MW, California
  - 2021 Odessa disturbance 1,112 MW, Texas
  - 2022 Odessa disturbance 844 MW synchronous and 1,711 MW solar, Texas
- Generation location changes
  - Location of large coal plants different from new solar and wind
  - Power flow changes

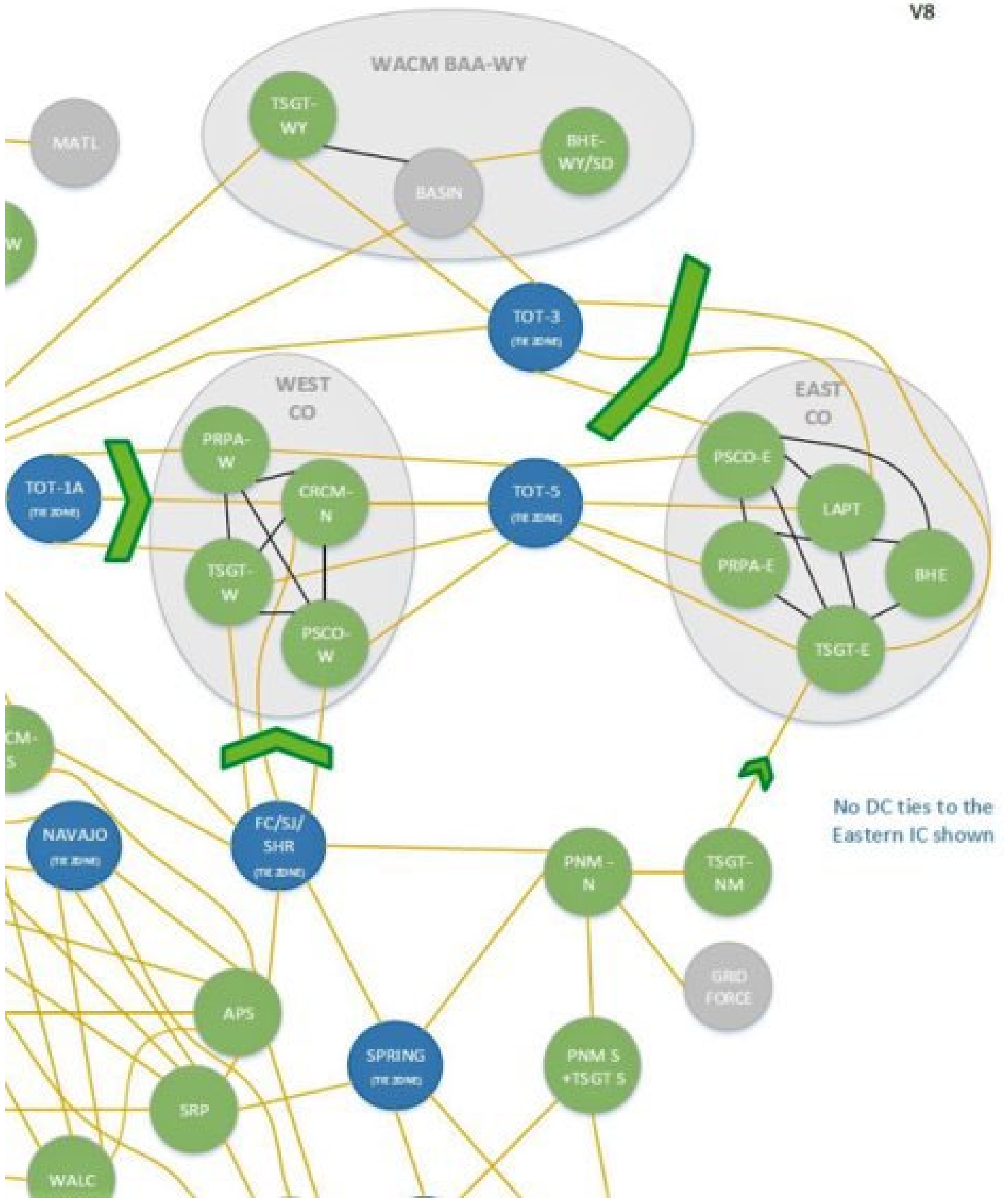
Inverter based resources (IBR) interconnections

- IBRs require tuning of inverter variables
- Complex simulations required
  - Steady state root mean square – reflect power changes accurately, but fail to capture dynamics after a fault
  - Electromagnet transient – reflect power changes and faults accurately, but require significant computational effort
- Inertia – IBRs considered zero inertia
  - Difficult system ride through
- Phasor measurement units necessary for post disturbance analysis

Transmission limits

- Inter-region
  - Platte River

    Rawhide plant injection limit
  - Path 40/TOT7
- Regional
  - Path 30/TOT1A
  - Path 36/TOT3
  - Path 39/TOT5



SPP RTO West

Planning for new transmission

- Generation interconnection studies
  - Upgrades needed to connect new generation
- Aggregate transmission studies
  - Transmission upgrades needed to transmit from new generation
- Specific transmission studies
- Integrated transmission planning process

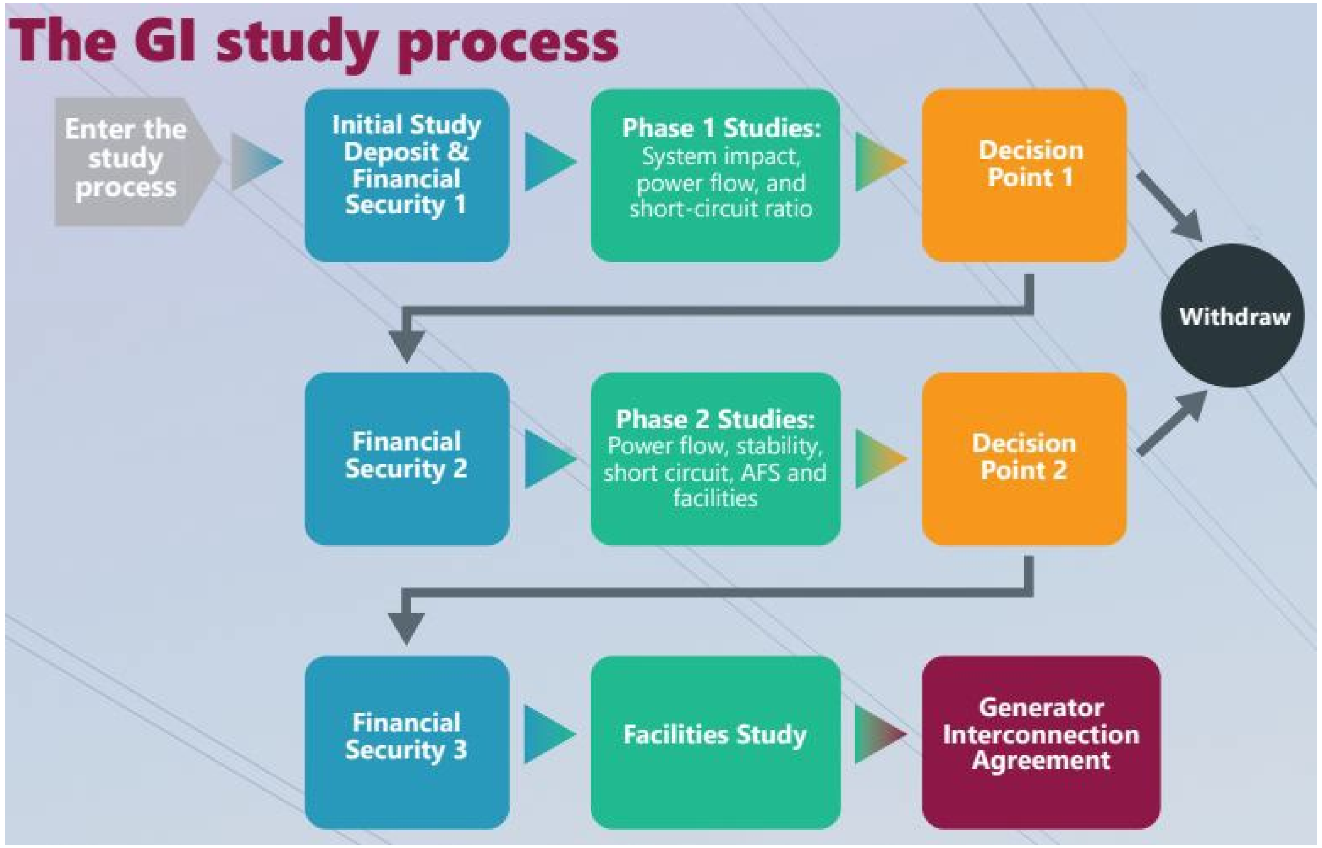
Regional transmission planning and cost allocation Schedule 11

Sponsored	Project owner builds and receives credit for use of transmission lines
Directly-assigned	Project owner builds and recovers cost through retail rates
Highway/byway	Most SPP projects paid for under this methodology

Voltage	Region pays	Local zone pays
300 kV and above	100%	0%
Above 100 kV and below 300 kV	33%	67%
100 kV and below	0%	100%

Generation interconnection queue

- Where generation is connected
- Generating capacity
- Impact on surrounding system
- Study approaches
  - Individual
  - Cluster



Conclusions

- Future investment in transmission is critical
  - Continue to operate reliably
  - Pursue resource diversification
  - Remain competitive
- Partnerships have been historically beneficial
  - Continue to pursue new transmission with the same philosophy
  - Allows broader access with shared ownership

Questions

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Board of directors

Aug. 31, 2023

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IRP community engagement update

Eddie Gutiérrez, chief strategy officer

IRP communications

Collaboration with utility communications teams

- Continue to identify organizations and schedule community meetings

Communications

- Translated microsite and IRP materials
- Date for IRP community engagement meeting #2: Nov. 2
- Developed IRP one pager

Social media strategy for fall listening session

- In alignment with marketing efforts to reach diverse audiences
- Paid and organic social media outreach including cross-promotional efforts with utility teams

Community meeting areas of focus

- About Platte River
- Resource Diversification Policy, progress since 2018
- IRP timeline
- 2024 IRP
  - What is an IRP
  - Modeling process and studies
  - Renewable integration
  - Technology evaluation and implementation
  - Distributed energy resources

Key highlights from engagement

- Emerging technologies and what is commercially available
  - Hydrogen, biomass, geothermal, batteries, nuclear
  - Realistic timeline, scale and cost
- Electric vehicles
  - Estimated load
  - Vehicle to grid
- Comparison to successful integration of renewables from Europe
- "Prosumers"
- Relationship between Platte River and owner communities
  - Energy goals
  - DERs
  - Responsibility

Meetings to be scheduled

Estes Park

- Board of Trustees
- Chamber of Commerce
- League of Women Voters
- Estes Park Sierra Club

Fort Collins

- City council
- Youth council
- Fort Collins Sustainability Group

Meetings to be scheduled

Longmont

- City council
- Latino chamber of commerce
- Longmont economic development partnership
- Equitable climate action team
- Youth council

Loveland

- City council
- League of Women Voters
- Downtown Development Authority
- Loveland Public Library
- FUEL – Loveland's young professional group

Community engagement – completed or scheduled

Aug. 10

Fort Collins Energy Board

Presenters:

- John Phelan, FCU
- Javier Camacho
- Masood Ahmad
- Paul Davis

Aug. 16

Longmont Sustainability Advisory Board

Presenters:

- Darrell Hahn, LPC
- Javier Camacho
- Masood Ahmad

Aug. 17

Longmont Neighborhood Group Leadership Association

Presenters:

- Darrell Hahn, LPC
- Susan Bartlett, LPC
- Javier Camacho

Community engagement - scheduled

Aug. 22
Colorado State University

Presenters:
- Barb Andrews, FCU
- Javier Camacho
- Masood Ahmad

Aug. 23
Loveland Utilities Commission

Presenters:
- Kevin Gertig, LWP
- Javier Camacho
- Masood Ahmad

Sept. 20
Fort Collins Natural Resources Advisory Board

Presenters:
- Nick Combs, FCU
- Javier Camacho
- Masood Ahmad

Sept. 26
Colorado Solar and Storage Association

Presenters:
- Nick Combs, FCU
- Javier Camacho
- Masood Ahmad

Community engagement - scheduled

Sept. 26
Northern Colorado Renewable Energy Society

Presenters:
- Nick Combs, FCU
- Javier Camacho
- Masood Ahmad

Sept. 27
Larimer County

Presenters:
- Nick Combs, FCU
- Javier Camacho
- Masood Ahmad

Oct. 29
Climate Action Sunday

Presenters:
- Susan Bartlett, LPC
- Javier Camacho

City council IRP presentations

- Estes Park: September (tentative)
- Fort Collins: October (tentative)
- Longmont: October (tentative)
- Loveland: August (confirmed)

Timeline

June | July | Aug | Sept | Oct | Nov | Dec | Jan | Feb | Mar | April | May | June

Community engagement

Community meeting #1

Community meeting #2

Community meeting #3

Ongoing public engagement in collaboration with owner communities

Resource planning

- Pre-IRP studies
- Load forecasting
- Other inputs, assumptions

IRP modeling

Portfolio development

Review results

Reliability assessment with renewables and DER integration

Board presentation

IRP document development

Questions

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Appendix

Example community presentation

Platte River Power Authority

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Resource planning update

Energy leaders since 1973

Agenda

- About Platte River Power Authority | **Javier Camacho**
- 2024 Integrated Resource Plan process and timeline | **Masood Ahmad**

Stay engaged

Stay informed

- prpa.org/2024irp

Submit additional questions and request community presentations

- 2024irp@prpa.org


City of Fort Collins
Owners
Owners
ESTES PARK COLORADO
Platte River
Power Authority
CITY OF LONGMONT COLORADO
Owners
Owners
City of Loveland

About Platte River Power Authority

Platte River Power Authority is a not-for-profit, community-owned public power utility that generates and delivers safe, reliable, environmentally responsible and financially sustainable energy and services to Estes Park, Fort Collins, Longmont and Loveland, Colorado, for delivery to their utility customers.

At a glance

Headquarters
Fort Collins, Colorado

General manager/CEO
Jason Frisbie

Began operations
1973

Employees
297

Peak demand
707 MW on July 28, 2021

2023 projected deliveries of energy
5,174,234 MWh

2023 projected deliveries of energy to owner communities
3,301,376 MWh (~33% renewable)

Transmission system
Equipment in 27 substations, 263 miles of wholly owned and operated high-voltage lines and 522 miles of high-voltage lines jointly owned with other utilities.

Resource Diversification Policy

Passed by Platte River's Board of Directors in 2018

Purpose

To provide guidance for resource planning, portfolio diversification and carbon reduction.

Goal

To support owner community clean energy goals, we will proactively work towards a 100% noncarbon resource mix by 2030 while maintaining our foundational pillars of providing reliable, environmentally responsible and financially sustainable energy and services.

Accomplished

- An organized regional market must exist with Platte River as an active participant

In progress

- Transmission and distribution infrastructure investment must be increased
- Transmission and distribution delivery systems must be more fully integrated
- Improved distributed generation resource performance
- Technology and capabilities of grid management systems must advance and improve
- Advanced capabilities and use of active end user management systems
- Generation, transmission and distribution rate structures must facilitate systems integration

Awaiting technology

- Battery storage performance must mature and the costs must decline
- Utilization of storage solutions to include thermal, heat, water and end user available storage

Foundational pillars

Platte River is committed to decarbonizing our resource portfolio without compromising our three pillars:

- Reliability
- Environmental responsibility
- Financial sustainability

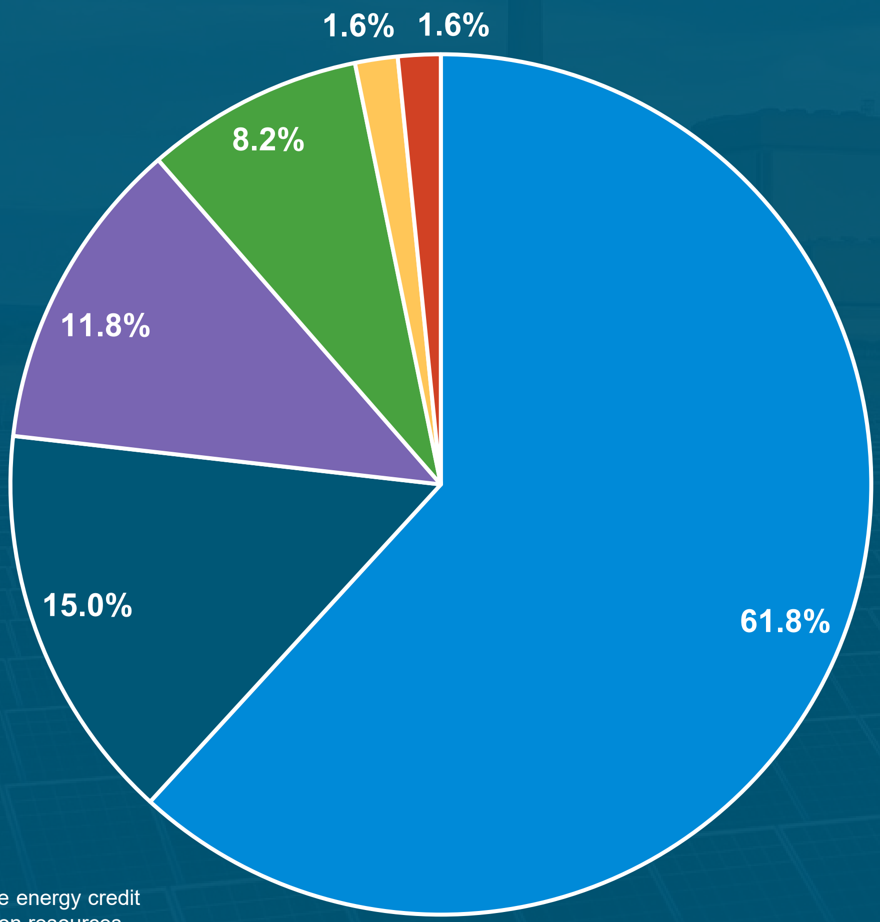
Progress since 2018

The 2024 IRP builds on the 2020 IRP and resource planning and modeling that occurred in 2021 and 2022

- 225 MW of Roundhouse wind
- Announcement to decommission coal resources
- Developed a distributed energy resources strategy
- Filed 2020 IRP
- 22 MW Rawhide Prairie Solar with 2 MWh battery
- 150 MW Black Hollow Solar power purchase agreement
- Additional solar and energy storage RFPs
- Filed Clean Energy Plan with the state of Colorado, which requires all electric utilities to achieve 80% carbon reduction by 2030
- Entry into Southwest Power Pool Western Energy Imbalance Service market

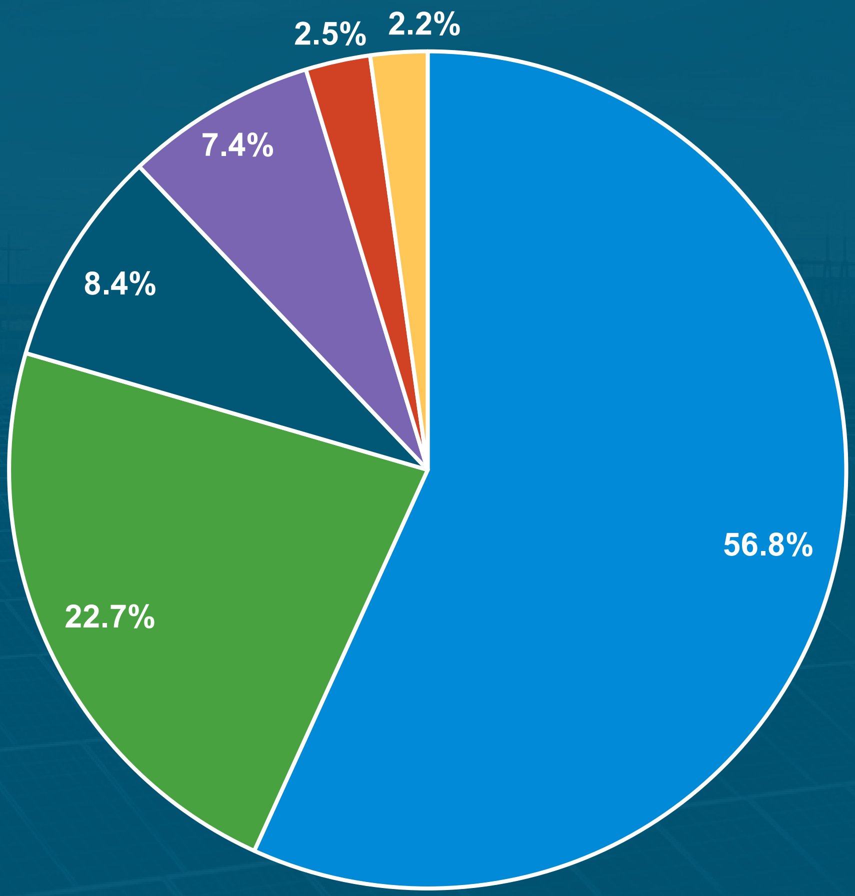
2018 system total

24.8% noncarbon resources



2023 budget system total

33.3% noncarbon resources



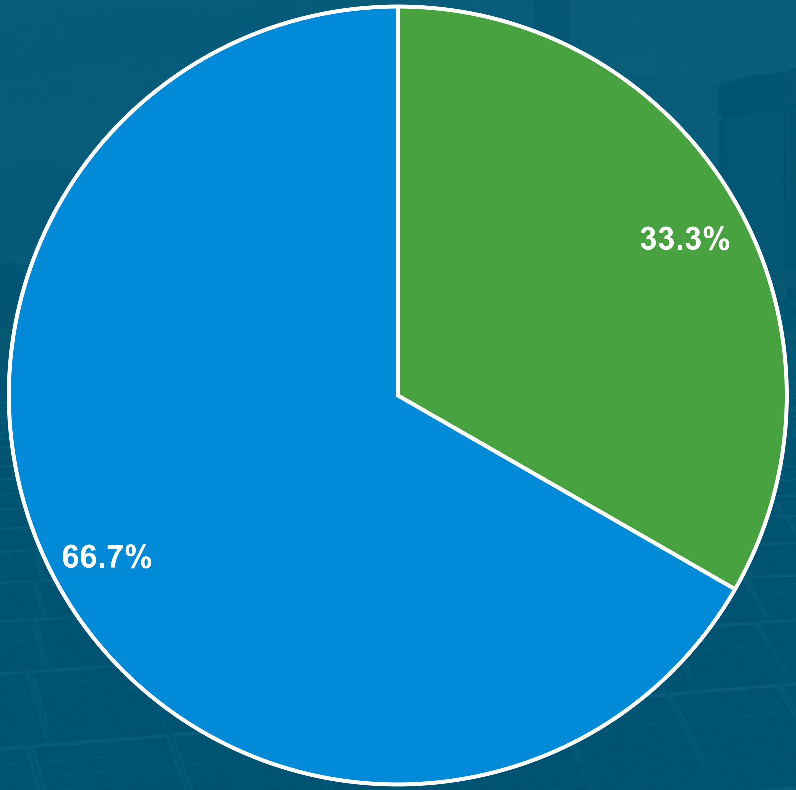
Includes renewable energy credit allocations to carbon resources

Due to drought conditions, not all hydropower may be considered noncarbon

Coal Wind Hydropower Solar Other purchases Natural gas

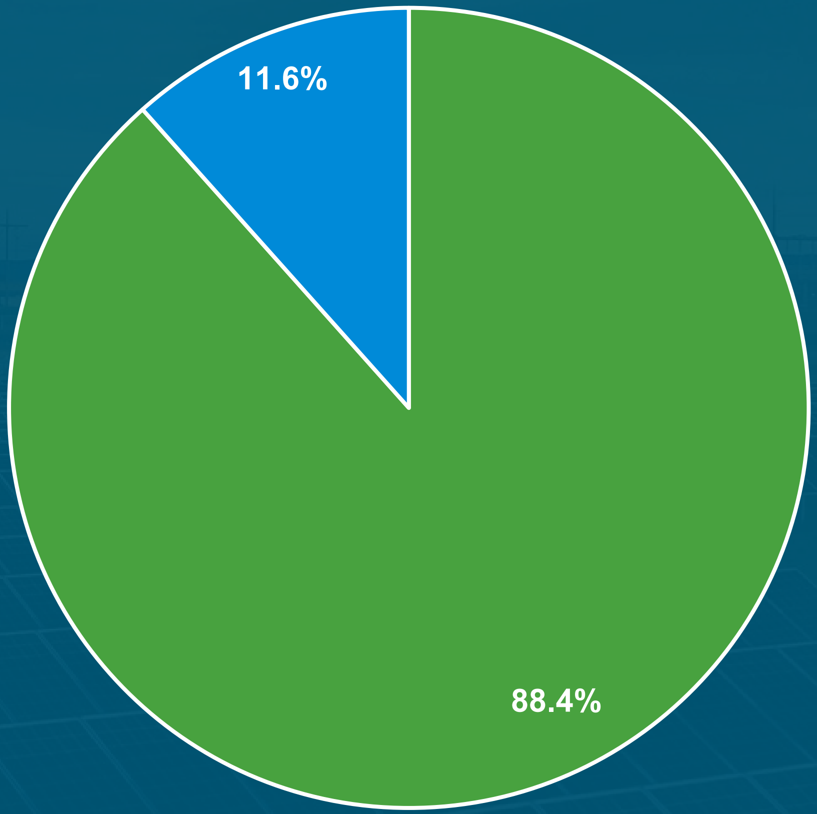
2023 budget system total

33.3% noncarbon resources



2030 projected system total

88.4% noncarbon resources



Includes renewable energy credit allocations to carbon resources

Due to drought conditions, not all hydropower may be considered noncarbon

Renewable resources Dispatchable resources (includes purchases)

Timeline

Community engagement

Resource planning

- Pre-IRP studies
- Load forecasting
- Other inputs, assumptions

2024 Integrated Resource Plan

Masood Ahmad, resource planning manager

SINCE 1973

What is an IRP

- IRP is a planning process which integrates customer demand and distributed energy resources (DERs) with utility resources to provide reliable, economical and environmentally desirable electricity to customers
- Typically developed for the next 10-20 years and updated every few years
- IRP assists with preparing for industry changes including:
  - Technological progress
  - Consumer preferences
  - Regulatory mandates
- Required by Western Area Power Administration (WAPA) every five years
- WAPA requires a short-term action plan and an annual follow up on plan execution
  - Last IRP was submitted in 2020

IRP modeling process

Input assumptions

- Load forecast
- DER potential
- Power price forecast
- Resource cost forecast
- Extreme weather models
- Renewable profiles

Portfolio development

- Resource mix
  - Renewable
  - New technology
- Least cost
- Carbon reduction
- Reserve margins

Reliability testing

- Portfolio testing with
  - Dark calms (low supply)
  - Extreme weather (high demand)
  - Different wind/solar profiles

Plexos model

Studies

Complex modeling of an uncertain future

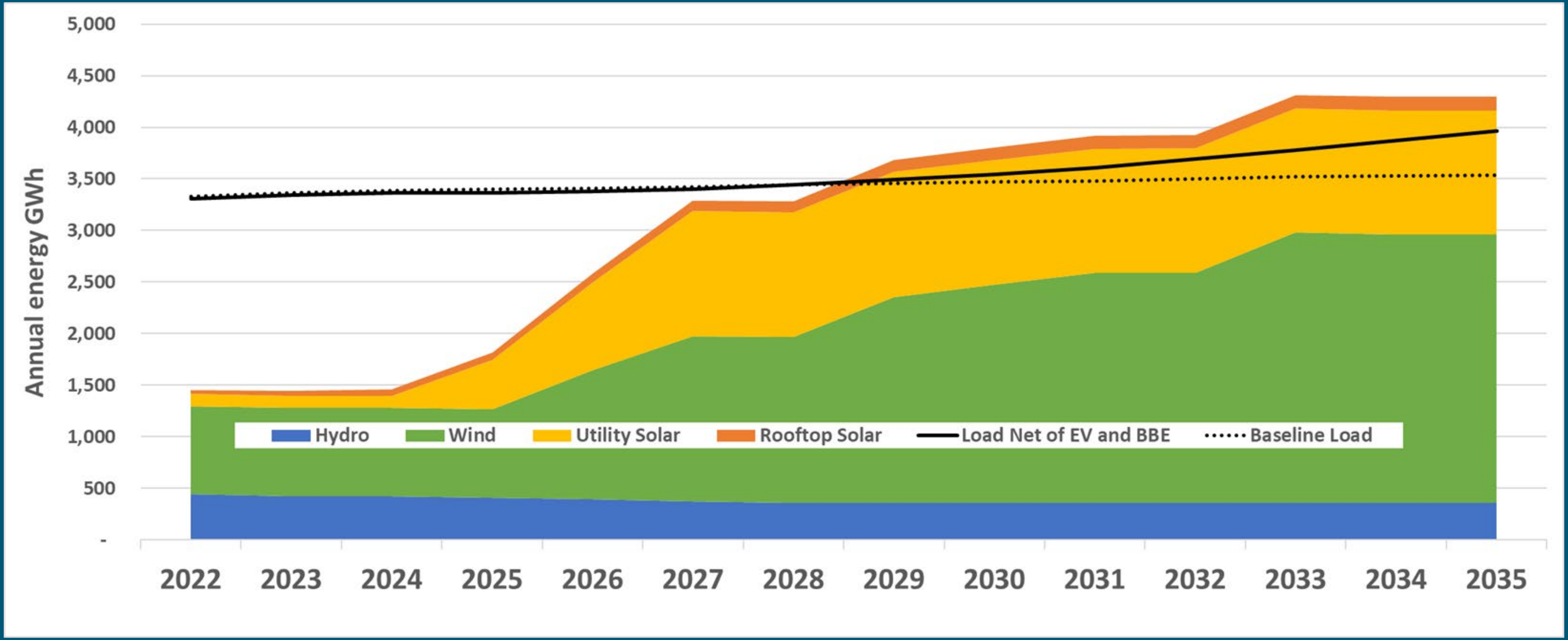
- Extreme weather modeling
- Load forecast, customer load contributions/flexibility
- Market prices, volatility and congestion
- Required reserve margin and ELCC
- Beneficial electrification assessment

Technology evaluation

- Emerging technology screening
  - Cost curves
  - Time to maturity
- Dispatchable technology evaluation
  - High flexibility
  - Low carbon
  - Proven technology
- Distributed energy resource assessment
  - Customer adoption rate
  - Usage profiles

Integration of renewable resources

Currently planned renewable supplies

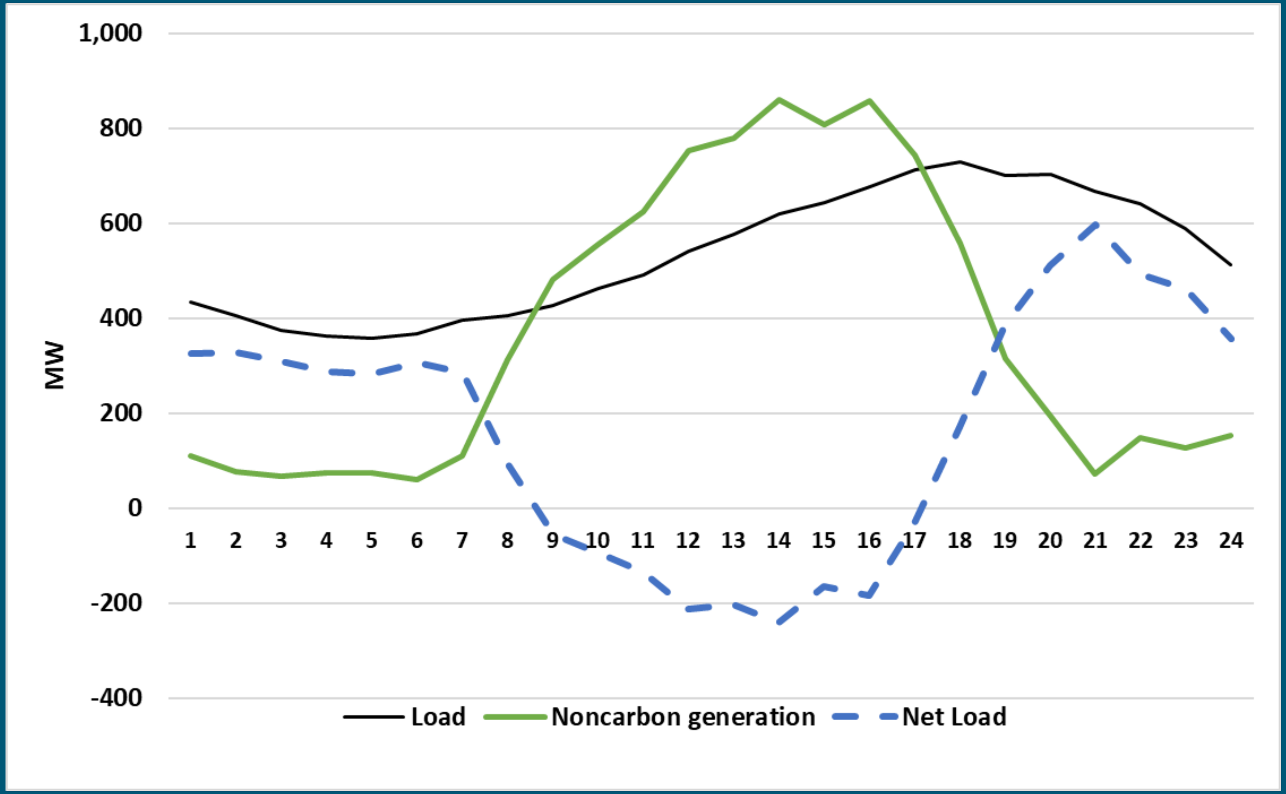


Renewable integration challenges

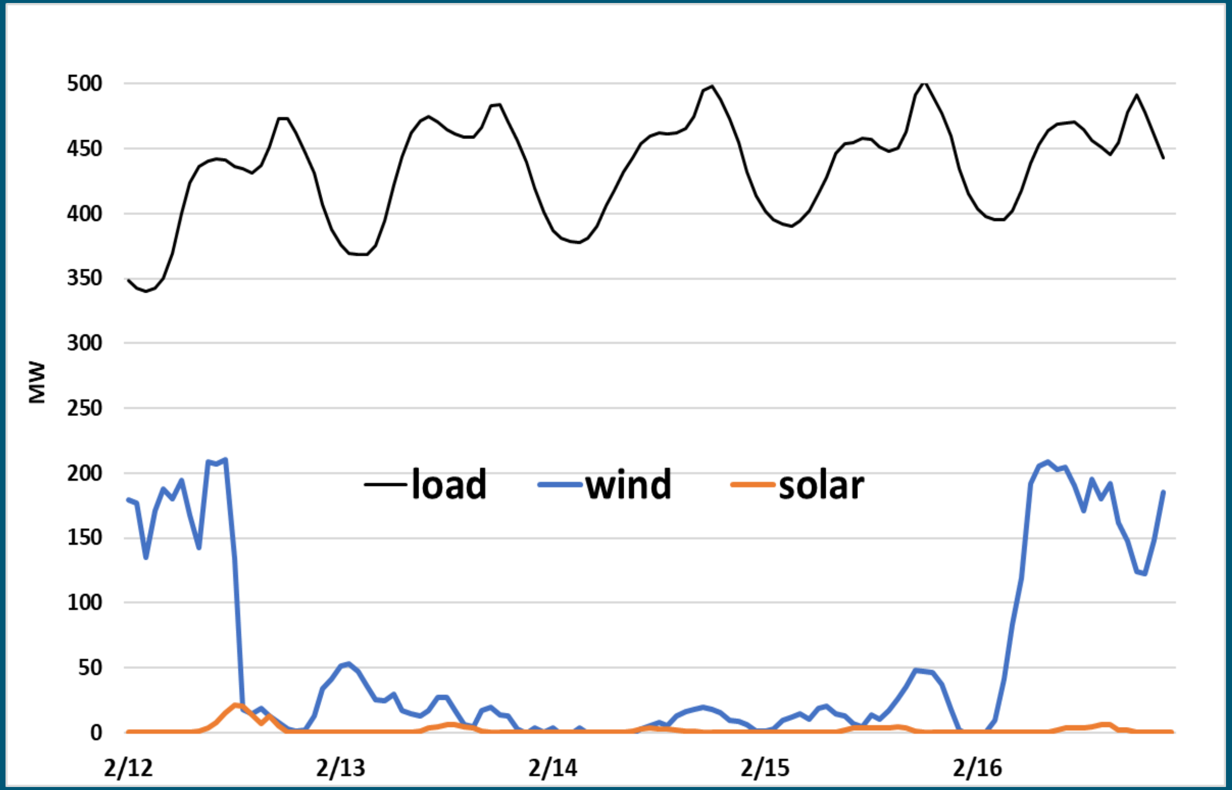
- Renewable intermittency
  - Day to day operation
  - Extreme weather operation
- Ensuring reliability in all weather conditions
- Serving load with intermittent renewable generation will require:
  - Long duration energy storage
  - Flexible DERs
  - Dispatchable generation

Renewable intermittency challenges

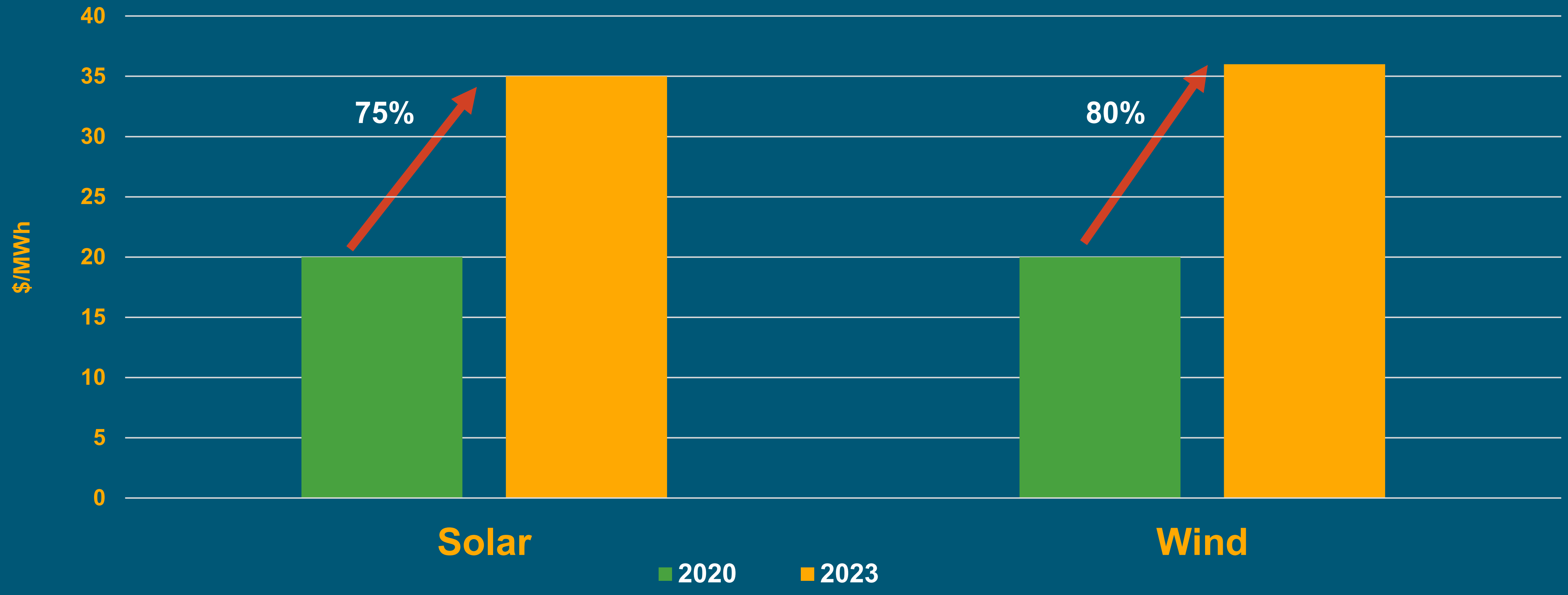
Hourly (Summer 2030 forecast)



Extreme weather (Valentine's week 2021)



Trends in renewable costs



Technology evaluation and implementation

Battery storage technology

Opportunities

- Currently available technology: four-hour storage (short duration storage)
  - Major use cases include clipping daily peaks (charge and discharge within 24 hours)

Challenges

- Technology is not viable for long duration storage strategy
  - Primary challenge in decarbonization
  - Example: adopting this technology for 24 hours of storage would cost $3 billion and more than double rates (2020 IRP portfolio 3)

Future technology

Opportunities

- Exploring and possibly piloting technologies
  - Hydrogen
  - Carbon sequestration
  - Renewable fuels
- Will adopt when commercially and economically viable
- DERs

Challenges

- Time to maturity
- Cost

Distributed energy resources

Flexible DERs that can form a virtual power plant

Energy efficiency

Save energy and save money by using energy more efficiently

Electrification

Reduce greenhouse gases by replacing fossil fuel use with increasingly decarbonized electricity

Distributed generation

On site noncarbon generation provides customer benefits and reduces utility investments

Demand response

Distributed energy storage

Shift energy to align electric use to renewable availability and to decarbonize the electric system in a cost effective and reliable manner

Summary

- Modeling is a complex and challenging process
- Next steps: modeling, reviewing studies, engaging industry experts
- New technologies
  - Incorporate commercially proven ones
  - Monitor emerging technologies
  - Pilot those that are promising
- Your input is appreciated

Questions

prpa.org/2024irp

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July operational results

Category	July variance		YTD variance	
Owner community demand	(7.5%)	■	(2.8%)	■
Owner community energy	(8.4%)	■	(3.9%)	■
Wind generation	3.9%	●	(5.4%)	■
Solar generation	(7.0%)	■	(0.5%)	◆
Net variable cost to serve owner community load*	(65.4%)	●	(0.4%)	◆

Variance key: Favorable: ● | Near budget: ◆ | Unfavorable: ■

*Total resource variable costs plus purchased power costs less sales revenue

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Aug. 31, 2023

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July financial summary

Category	July variance from budget ($ in millions)		YTD variance from budget ($ in millions)	
Change in net position*	$3.7	●	$8.0	●
Fixed obligation charge coverage	1.11x	●	.31x	●
Revenues	$1.9	●	$(7.7)	■
Operating expenses	$1.3	●	$14.2	●
Capital additions	$(0.3)	■	$17.8	●

Variance key: Favorable: ● | Near budget: ◆ | Unfavorable: ■

* July and YTD change in net position was impacted by $0.5 million and $1.7 million unrealized gains on investments, respectively.

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