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?
Board of directors

Aug. 31, 2023

Energy leaders since 1973
Resource planning studies

Raj Singam Setti, chief transition and integration officer
# Summary

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

Heat waves:

- 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

<table>
<thead>
<tr>
<th>Heat Wave Summary – West Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 Hours</td>
</tr>
<tr>
<td>----------</td>
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<tr>
<td>Events per year</td>
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</table>

Cold waves:

<table>
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<th>Cold Wave Summary – West Region</th>
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<td>48</td>
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<td>-----------------</td>
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<tr>
<td>Events per year</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cold Wave Summary – Colorado Region</th>
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</thead>
<tbody>
<tr>
<td>48</td>
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<tr>
<td>-----------------</td>
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<tr>
<td>Events per year</td>
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</table>
Dark Calm frequency and impact

### Dark Calm Events by Location

<table>
<thead>
<tr>
<th>Location</th>
<th>% of Full Output</th>
<th>48 hrs</th>
<th>72 hrs</th>
<th>96 hrs</th>
<th>120 hrs</th>
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<tr>
<td><strong>MISO Central</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>3.00</td>
<td>1.25</td>
<td>0.50</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>11.20</td>
<td>5.60</td>
<td>2.40</td>
<td>2.00</td>
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<tr>
<td></td>
<td>15%</td>
<td>6.20</td>
<td>11.40</td>
<td>3.80</td>
<td>4.80</td>
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<tr>
<td><strong>MISO North</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>5%</td>
<td>1.00</td>
<td>1.00</td>
<td>0.67</td>
<td>0.00</td>
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<td></td>
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<td>5.00</td>
<td>1.75</td>
<td>0.50</td>
<td>1.00</td>
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<td>2.20</td>
<td>3.00</td>
<td>1.20</td>
<td>2.00</td>
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<tr>
<td><strong>Northwest ERCOT</strong></td>
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<td>10%</td>
<td>3.80</td>
<td>1.00</td>
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<td>15%</td>
<td>3.20</td>
<td>3.40</td>
<td>3.00</td>
<td>1.20</td>
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</table>
Planning Reserve Margin (PRM) and Effective Load Carrying Capability (ELCC) Study
Modeling basis

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

- 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 Resource mix

<table>
<thead>
<tr>
<th>Conventional resources ~8,900 MW</th>
<th>Storage and Renewable Resources</th>
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<tr>
<td>Battery storage</td>
<td>867</td>
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<tr>
<td>Distributed solar</td>
<td>1,820</td>
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<tr>
<td>DR</td>
<td>670</td>
</tr>
<tr>
<td>PSH</td>
<td>301</td>
</tr>
<tr>
<td>Solar</td>
<td>3,880</td>
</tr>
<tr>
<td>Wind</td>
<td>6,280</td>
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</tbody>
</table>
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

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

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

High case assumes all-electric new homes required in 2030
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

<table>
<thead>
<tr>
<th>Year</th>
<th>Passenger LDV</th>
<th>Commercial LDV</th>
<th>MDV (MDV)</th>
<th>HDV (MDV)</th>
<th>Bus (MDV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>3,912</td>
<td>5,313</td>
<td>7,410</td>
<td>10,294</td>
<td>13,899</td>
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<tr>
<td>2023</td>
<td>4,194</td>
<td>5,821</td>
<td>7,698</td>
<td>10,583</td>
<td>14,396</td>
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<tr>
<td>2024</td>
<td>4,476</td>
<td>6,323</td>
<td>7,986</td>
<td>10,870</td>
<td>14,893</td>
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<tr>
<td>2025</td>
<td>4,758</td>
<td>6,825</td>
<td>8,274</td>
<td>11,157</td>
<td>15,390</td>
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<tr>
<td>2026</td>
<td>5,040</td>
<td>7,327</td>
<td>8,562</td>
<td>11,444</td>
<td>15,887</td>
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<tr>
<td>2027</td>
<td>5,322</td>
<td>7,829</td>
<td>8,850</td>
<td>11,731</td>
<td>16,384</td>
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<td>2028</td>
<td>5,604</td>
<td>8,331</td>
<td>9,138</td>
<td>12,018</td>
<td>16,881</td>
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<td>2029</td>
<td>5,886</td>
<td>8,833</td>
<td>9,426</td>
<td>12,305</td>
<td>17,378</td>
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<tr>
<td>2030</td>
<td>6,168</td>
<td>9,335</td>
<td>9,714</td>
<td>12,592</td>
<td>17,875</td>
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<td>2031</td>
<td>6,450</td>
<td>9,837</td>
<td>10,002</td>
<td>12,879</td>
<td>18,372</td>
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<tr>
<td>2032</td>
<td>6,732</td>
<td>10,339</td>
<td>10,290</td>
<td>13,166</td>
<td>18,869</td>
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<td>2033</td>
<td>7,014</td>
<td>10,841</td>
<td>10,578</td>
<td>13,453</td>
<td>19,366</td>
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<tr>
<td>2034</td>
<td>7,296</td>
<td>11,343</td>
<td>10,866</td>
<td>13,740</td>
<td>19,863</td>
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<tr>
<td>2035</td>
<td>7,578</td>
<td>11,845</td>
<td>11,154</td>
<td>14,027</td>
<td>20,360</td>
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<tr>
<td>2036</td>
<td>7,860</td>
<td>12,347</td>
<td>11,442</td>
<td>14,314</td>
<td>20,857</td>
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<td>2037</td>
<td>8,142</td>
<td>12,849</td>
<td>11,730</td>
<td>14,601</td>
<td>21,354</td>
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<tr>
<td>2038</td>
<td>8,424</td>
<td>13,351</td>
<td>12,018</td>
<td>14,888</td>
<td>21,851</td>
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<tr>
<td>2039</td>
<td>8,706</td>
<td>13,853</td>
<td>12,306</td>
<td>15,175</td>
<td>22,348</td>
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<tr>
<td>2040</td>
<td>8,988</td>
<td>14,355</td>
<td>12,594</td>
<td>15,462</td>
<td>22,845</td>
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<td>2041</td>
<td>9,270</td>
<td>14,857</td>
<td>12,882</td>
<td>15,749</td>
<td>23,342</td>
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<td>2042</td>
<td>9,552</td>
<td>15,359</td>
<td>13,170</td>
<td>16,036</td>
<td>23,839</td>
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<td>2043</td>
<td>9,834</td>
<td>15,861</td>
<td>13,458</td>
<td>16,323</td>
<td>24,336</td>
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</table>
Transportation electrification *unmitigated* energy and demand for summer medium growth.
Behind the meter storage potential: medium + medium Net Energy Metering blended

Actual vs. IRP Forecasts

Actual Cumulative storage installed (MW) vs. 2023 IRP base Case (MW ac)
### DER potential: key characteristics

<table>
<thead>
<tr>
<th>Measure Group</th>
<th>Measure Sub-Groups</th>
<th>Characteristics</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Curtailment Potential</td>
</tr>
<tr>
<td>HVAC Controls</td>
<td>Smart Thermostats</td>
<td>[75%, 33%]</td>
</tr>
<tr>
<td>EV Charging</td>
<td>EV Smart Chargers</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Vehicle-to-Grid</td>
<td>100%</td>
</tr>
<tr>
<td>Water Heating</td>
<td>Electric Water Heaters</td>
<td>100%</td>
</tr>
<tr>
<td>Other Load Flexibility</td>
<td>Large C&amp;I Curtailment</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Enrolled Effective Capacity**

\[ \times \]

**Coincidence Factor**

\[
(\% \text{ of load that coincides with time})
\]

**Achievable Peak Reduction Potential**
# Achievable sustained peak reduction potential:
(5pm-9pm) / medium forecast

![Bar chart showing All DR](image)

<table>
<thead>
<tr>
<th>Year</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
<th>2027</th>
<th>2028</th>
<th>2029</th>
<th>2030</th>
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<th>2037</th>
<th>2038</th>
<th>2039</th>
<th>2040</th>
<th>2041</th>
<th>2042</th>
<th>2043</th>
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<tbody>
<tr>
<td>Summer EV DR</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>15</td>
<td>17</td>
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<td>38</td>
<td>41</td>
<td>44</td>
<td>48</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Summer Storage DR</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>13</td>
<td>17</td>
<td>20</td>
<td>23</td>
<td>27</td>
<td>30</td>
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<td>51</td>
<td>55</td>
<td>59</td>
<td>60</td>
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</tr>
<tr>
<td>Summer Traditional DR</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>6</td>
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<tr>
<td>2021 IRP Summer DR Forecast</td>
<td>-</td>
<td>3</td>
<td>10</td>
<td>15</td>
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<td>25</td>
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<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td></td>
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</tbody>
</table>
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
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
Relative scores from the decision matrix

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Weighting</th>
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<tbody>
<tr>
<td>Reliability</td>
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<tr>
<td>Emissions</td>
<td>0.25</td>
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<tr>
<td>Costs</td>
<td>0.20</td>
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<tr>
<td>Operational Flexibility</td>
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<tr>
<td>Fuel Versatility</td>
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<tr>
<td>Constructability</td>
<td>0.05</td>
</tr>
<tr>
<td>Market Performance</td>
<td>0.05</td>
</tr>
<tr>
<td><strong>Total weighted score</strong></td>
<td><strong>1.0</strong></td>
</tr>
</tbody>
</table>

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
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

- Coal
- Natural Gas
- Wind
- Solar

Generation
How ELECTRICITY gets to you
How electricity gets to you

Hydro

Transmission system

Substation

Platte River's own
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
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
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

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
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<tbody>
<tr>
<td>Sponsored</td>
<td>Project owner builds and receives credit for use of transmission lines</td>
</tr>
<tr>
<td>Directly-assigned</td>
<td>Project owner builds and recovers cost through retail rates</td>
</tr>
<tr>
<td>Highway/byway</td>
<td>Most SPP projects paid for under this methodology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Region pays</th>
<th>Local zone pays</th>
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</thead>
<tbody>
<tr>
<td>300 kV and above</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Above 100 kV and below 300 kV</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>100 kV and below</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
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
Board of directors

Aug. 31, 2023

Energy leaders since 1973
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

**Sept. 27**
Larimer County

**Oct. 29**
Climate Action Sunday

**Presenters:**
- Nick Combs, FCU
- Javier Camacho
- Masood Ahmad
City council IRP presentations

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

Community engagement
- Ongoing public engagement in collaboration with owner communities
  - Community meeting #1
  - Community meeting #2
  - Community meeting #3

Resource planning
- IRP modeling
- Portfolio development
- Review results
- Board presentation
- IRP document development
- Reliability assessment with renewables and DER integration
- Pre-IRP studies
- Load forecasting
- Other inputs, assumptions
Questions
Appendix

Example community presentation

Energy leaders since 1973
Resource planning update
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
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
Includes renewable energy credit allocations to carbon resources

Due to drought conditions, not all hydropower may be considered noncarbon
2023 budget system total
33.3% noncarbon resources
66.7%

2030 projected system total
88.4% noncarbon resources
11.6%

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**
- Ongoing public engagement in collaboration with owner communities
- Listening session

**Resource planning**
- IRP modeling
- Portfolio development
- Review results
- Board presentation
- IRP document development
- Reliability assessment with renewables and DER integration
- Pre-IRP studies
- Load forecasting
- Other inputs, assumptions
2024 Integrated Resource Plan

Masood Ahmad, resource planning manager
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

- Solar: 2020 = 75%, 2023 = 80%
- Wind: 2020 = 75%, 2023 = 80%
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

- **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**: Shift energy to align electric use to renewable availability and to decarbonize the electric system in a cost effective and reliable manner.
- **Distributed energy storage**: Flexible DERs that can form a virtual power plant.
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
Board of directors

Aug. 31, 2023

Energy leaders since 1973
## July operational results

<table>
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<tr>
<th>Category</th>
<th>July variance</th>
<th>YTD variance</th>
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<tbody>
<tr>
<td>Owner community demand</td>
<td>(7.5%)</td>
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<td>Owner community energy</td>
<td>(8.4%)</td>
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</tr>
<tr>
<td>Wind generation</td>
<td>3.9%</td>
<td>(5.4%)</td>
</tr>
<tr>
<td>Solar generation</td>
<td>(7.0%)</td>
<td>(0.5%)</td>
</tr>
<tr>
<td>Net variable cost to serve owner community load*</td>
<td>(65.4%)</td>
<td>(0.4%)</td>
</tr>
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Variance key:
- **Favorable**: ●
- **Near budget**: ◆
- **Unfavorable**: ■

*Total resource variable costs plus purchased power costs less sales revenue
# July financial summary

<table>
<thead>
<tr>
<th>Category</th>
<th>July variance from budget ($ in millions)</th>
<th>YTD variance from budget ($ in millions)</th>
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<tr>
<td>Change in net position*</td>
<td>$3.7</td>
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<td>Fixed obligation charge coverage</td>
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<td>.31x</td>
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<tr>
<td>Revenues</td>
<td>$1.9</td>
<td>$(7.7)</td>
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<td>Operating expenses</td>
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<td>$14.2</td>
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<tr>
<td>Capital additions</td>
<td>$(0.3)</td>
<td>$17.8</td>
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</table>

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.
Board of directors

Aug. 31, 2023

Energy leaders since 1973