



**Platte River**  
Power Authority

Estes Park • Fort Collins • Longmont • Loveland

# Board of directors

April 29, 2021



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# Strategic planning and goals

# Agenda

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- Strategic planning - Alyssa Clemsen Roberts, chief strategy officer
- Goals - Jason Frisbie, general manager/CEO



# Strategic planning

# Timeline of strategic planning process

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## April

- Two new board members from Fort Collins
- Issue RFI

## October

- Select strategic planning consultant
- Vendor selection

## January

- Kick off
- Bring back to board timeline for strategic planning events (work sessions-drafts)

## July

- One new board member from Loveland
- Issue RFP for strategic planning consultant

## November

One new board member from Longmont

# Strategic planning

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- Kickoff meeting
- Board surveys
- Board work sessions
- White paper with draft version
- Presentation
- Board approval
- Stakeholder communication



# Goals

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# Current IRP milestones

**2021**

DER strategy completed

**2023**

150 MW of solar added

**2025**

77 MW of Craig Unit 1 retired

**2029**

- 100 MW of energy storage added\*
- 100 MW of wind added\*
- 280 MW of Rawhide Unit 1 retired

**2022**

Entry into WEIM

**2024**

**Second IRP completed**

**2028**

- 74 MW of Craig Unit 2 retired
- **Third IRP completed**

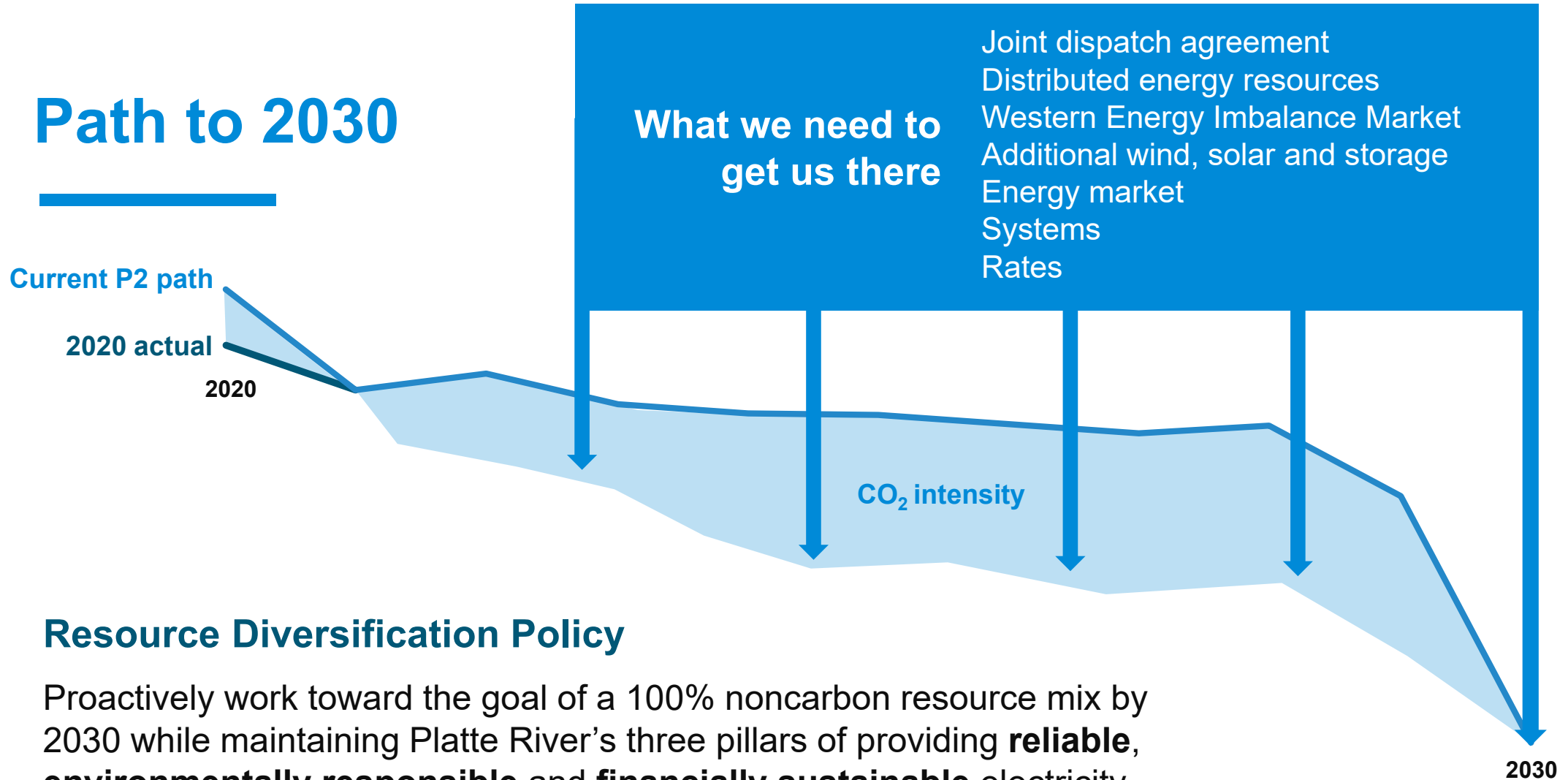
**2030**

- 104 MW of RICE added\*
- 300 MW of solar added\*
- 200 MW of energy storage added\*
- 100 MW of wind added\*
- 60 MW of Spring Canyon wind added back to the system

\*All resources in 2029 and 2030 will require further modeling to determine timing, type and amount of resource



# Path to 2030



## Resource Diversification Policy

Proactively work toward the goal of a 100% noncarbon resource mix by 2030 while maintaining Platte River's three pillars of providing **reliable**, **environmentally responsible** and **financially sustainable** electricity and services.



Access to low cost, low carbon purchases have reduced baseload carbon output

# Joint dispatch agreement

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- Platte River, Black Hills Colorado and PSCo began operating joint dispatch agreement (JDA) in June 2017
- Expanded to include Colorado Springs Utilities in March 2020
- Each JDA participant must have sufficient resources to meet hourly load
- Adjusts dispatch of resources in PSCo balancing authority to lower overall dispatch costs through coordination of generation dispatch
- Higher-cost generation resources displaced by lower cost generation
- JDA transactions allowed Platte River to reduce its coal generation output, resulting in 560,000 fewer tons of carbon emission in 2020

Greater control of load and distributed resources will allow integration of more renewables

# Distributed energy resources

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- Complete coordinated distributed energy resources (DER) strategy for all five utilities in 2021
- DER planning, operations and evaluations committees will initiate pilot programs
- Evaluate DER options versus supply-side options
- Develop DER pilot programs and test appropriate level of controls
- Expand programs that provide benefit to the system and customers
- Work toward full integrated planning
- Work toward system integration and grid management/controls



Broad geographic market access will increase value of excess renewables

# Western Energy Imbalance Market

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- Platte River, Black Hills and PSCo plan to begin operating in the CAISO Western Energy Imbalance Market (WEIM) in 2022
- Determine optimal dispatch for resources offered into market every five minutes
- Calculate and settle prices at every point of injection or withdrawal on the transmission system for each five-minute period
- Optimally commit and decommit resources up to four and a half hours ahead of operating hour, which will improve unit commitment to serve load in a least-cost manner



Earlier resource additions than proposed in P2 will further reduce carbon emissions

# Current IRP resource additions

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## 2023

- 150 MW solar

## 2029

- 100 MW x four-hour storage
- 100 MW wind

## 2030

- 104 MW RICE/peaking
- 300 MW solar
- 100 MW wind
- 200 MW x four-hour storage
- 60 MW wind (Spring Canyon back on system)



Ensures system reliability is maintained and appropriate transmission is constructed

# Energy market

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## Independent system operator/regional transmission organization (RTO)

- Benefits of the WEIM plus the benefits of an ancillary service market and day-ahead market
- Ancillary service market allows more resources to provide ancillary services, enabling more renewables integrated into system
- All resources must offer into day-ahead and real-time markets proving least-cost solution for all resources in region
- Day-ahead market allows least-cost resources to be committed well ahead of the operating hour resulting in lower market prices
- Day-ahead market improves reliability by ensuring appropriate and sufficient resources are committed well ahead of operating hour
- Full RTO coordinates planning and construction of sufficient transmission to keep the system reliable at reasonable cost

# Systems

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- Evaluate existing transmission rights with coal plant retirements
  - Potential for new renewable interconnections
  - Minimal transmission investment needed
- Evaluate more interconnections with other WEIM participants
  - Dispatch coordination with more market participants
  - Physical interconnection does not confer transmission service rights
- Expand transmission to improve access to geographically diverse resources
- Potential for significant investment in regional transmission



# Wholesale rate structures

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**Completed rate strategy and rate design, implemented Jan. 1, 2020**

**Rates established to achieve Platte River's rate setting goals:**

- Improve value added of Platte River in support of owner communities
- Offer a desirable portfolio of services and rates that meet owner communities' needs
- Better align wholesale pricing signals with cost of service
- Send pricing signals that result in system benefits

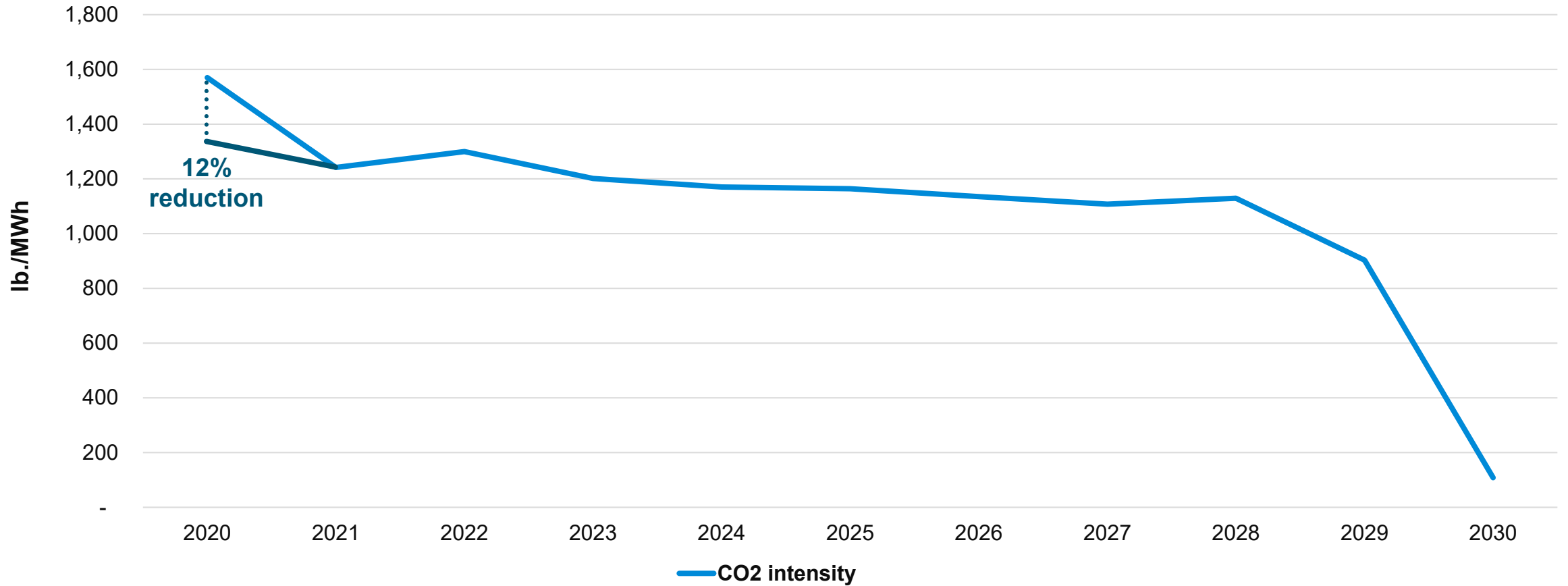
**Work toward alternative rate structures or modifications to support:**

- Distributed energy resource objectives
- Intermittent resources and storage
- Organized energy market
- Wholesale/distribution rate alignment



# CO<sub>2</sub> intensity

Coal unit: 2,080 lb./MWh  
EA gas unit: 1,540 lb./MWh  
FA gas unit: 1,350 lb./MWh  
RICE gas unit: 1,000 lb./MWh



# Key takeaways

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**We continue to drive down carbon by proactively working on:**

- Joint dispatch agreement
- Distributed energy resources
- Western Energy Imbalance Market
- Additional wind, solar and storage
- Energy market
- Systems
- Rates

While maintaining our three pillars of **reliable**, **environmentally responsible** and **financially sustainable** energy and services.



# Board input

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- Timing of new resources
- Approval of Clean Energy Plan
- Annual carbon reporting – intensity, total or reduction from 2005 levels
- Budgeting support:
  - O&M approval
  - Capital approval
  - Staffing approval
- Annual meeting will include update on status of progress toward Resource Diversification Policy



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# Resource planning software

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# Why a new model

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- In 2018 the board passed the Resource Diversification Policy
- 2020 integrated resource plan (IRP) process showed a need for modeling deep decarbonization portfolios
- Need next generation planning tool with the following capabilities:
  - Ability to handle 100% renewable penetration
  - Provide optimal battery charging and discharging
  - Sub-hourly modeling of the Western Energy Imbalance Market
  - Budget development and transaction evaluation

# Model selection

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- Identified modeling needs during IRP process (early 2020)
- Created initial list of planning software options
- Evaluated options throughout the year
- Made final selection at the end of 2020

# Models explored

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- [Energy Exemplar](#) – makes Plexos and Aurora models
- [Anchor Power Solutions](#) – Encompass software built by former Strategist developer
- [Ascend Analytics](#) – focus on stochastic analysis, helped Hawaiian Electric develop 100% renewable plan
- [ABB](#) – offers multiple options including legacy platforms (PROSYM)
- [PCI](#) – offers long-term production cost model integrated with operational tools but lacks capacity expansion planning



# Models explored cont.

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- [Astrape](#) – SERVM model focuses on reliability modeling and associated cost tradeoffs
- [Vibrant Clean Energy](#) – Newer model and not widely used
- [E3 Consulting](#) – In house model Resolve used for consulting and by some utilities or industry groups, used by Hawaiian Electric in conjunction with PLEXOS
- [Enelytix](#) – Nested loop production cost model useful for capturing operational cycles in markets. No capacity expansion planning capability
- [NREL](#) – Resource Planning Model (RPM) used in-house at the National Renewable Energy Laboratory, no plans to release the software publicly
- [Sandia National Lab](#) – PRESCIENT model allows stochastic production cost modeling but lacks expansion planning capability

# Planning software comparison

	Aurora (existing software)	EnCompass	Plexos
<b>Annual cost</b>	Medium	Low	High
<b>National/regional database (\$/year)</b>	Included but limited	Less than \$25K	Less than \$25K
<b>Solution methodology</b>	Iterative convergence	Mixed integer linear programming	Mixed integer linear programming
<b>Input/output</b>	Excel/SQL Server	Excel/SQL Server	XML
<b>Support, training, documentation</b>	Comprehensive	Limited	Comprehensive
<b>Userbase</b>	Large	Limited	Worldwide
<b>Scripting</b>	Available	Available	Available

# Top two summary

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	Pros	Cons
<b>Plexos</b>	<ul style="list-style-type: none"><li>• Well established</li><li>• Detailed and flexible</li><li>• Large user base</li><li>• Detailed training regime</li></ul>	<ul style="list-style-type: none"><li>• More expensive over long-term</li><li>• Steep learning curve</li></ul>
<b>EnCompass</b>	<ul style="list-style-type: none"><li>• Simple and easy to learn</li><li>• Easy I/O through Excel</li><li>• Increased adoption by utilities</li></ul>	<ul style="list-style-type: none"><li>• Still a developing product</li><li>• Documentation and training not well developed</li></ul>

# Plexos details

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- Large installed customer base and industry acceptance
- Access to training and continued product development and improvement
- Proven long-term resource optimization under deep decarbonization scenarios
- Performs budgeting and rate projections with sufficient details
- Performs next day/week optimization of supply and demand options for use in operations

# Questions



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# March operational results

Category	March variance		YTD variance	
Municipal demand	(6.5%)	■	0.5%	◆
Municipal energy	5.4%	●	5.9%	●
Baseload generation	(17.7%)	■	(9.3%)	■
Wind generation	(37.0%)	■	(20.5%)	■
Solar generation	0.5%	◆	(12.9%)	■
Surplus sales volume	(37.2%)	■	(20.8%)	■
Surplus sales price	2.5%	●	33.8%	●
Purchase volume	296.3%	■	135.9%	■
Purchase price	(23.9%)	●	(0.8%)	◆
Dispatch cost	2.7%	■	(0.2%)	◆

Variance key: Favorable: ● >2% | Near budget: ◆ +/- 2% | Unfavorable: ■ <-2%



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# Financial summary

Category	March variance from budget (\$ in millions)		Year to date variance from budget (\$ in millions)	
Net income	\$0.3	●	\$4.8	●
Fixed obligation charge coverage	.26x	●	.67x	●
Revenues	\$(1.6)	■	\$1.3	●
Operating expenses	\$2.2	●	\$3.9	●
Capital additions	\$1.1	●	\$5.1	●

> 2% ● Favorable | 2% to -2% ◆ At or near budget | < -2% ■ Unfavorable



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