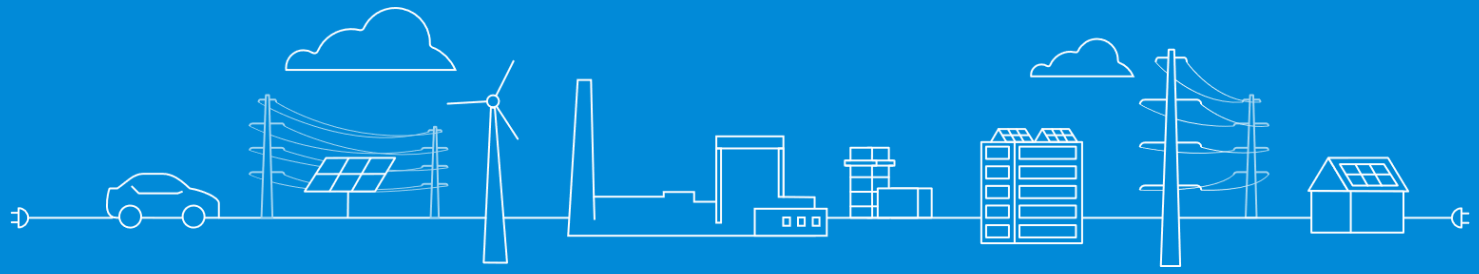
Platte River Power Authority

Estes Park • Fort Collins • Longmont • Loveland

Charting OUR energy future



Welcome

Jason Frisbie

General manager/CEO

Platte River Power Authority

Our mission

Provide safe, reliable, environmentally responsible, and competitively-priced energy and services.

Our vision

As a respected leader and responsible energy partner, improve the quality of life for the citizens served by our owner communities.

Our values

- Safety
- Operational excellence
- Integrity
- Sustainability
- Customer service
- Respect
- Innovation

About
Platte River Power Authority

Platte River Power Authority is a not-for-profit wholesale electricity generation and transmission provider that delivers safe, reliable, environmentally responsible and financially sustainable energy and services to its owner communities of Estes Park, Fort Collins, Longmont and Loveland for delivery to their utility customers.

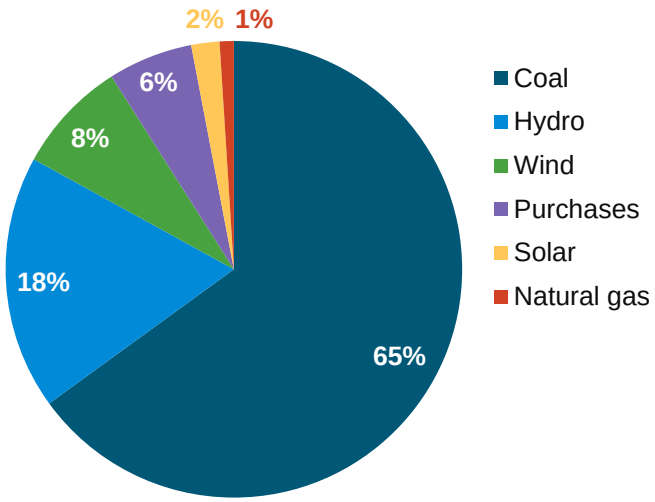
Began operations:	1973
General Manager:	Jason Frisbie
Governance:	Platte River is governed by an eight-person board of directors designed to bring relevant expertise to the decision-making process. The board includes two members from each of the owner communities.
The organization:	Platte River is a not-for-profit political subdivision of the State of Colorado
Employees:	252
Peak municipal demand:	688 MW on July 10, 2018
Projected deliveries of energy (2019):	4,273,534 MWh
Projected deliveries of energy to owner communities (2019):	3,229,726 MWh

Current resources

2019 resources	MW	
Rawhide Unit 1 (coal)	280	
Rawhide units A, B, C, D, F (natural gas)	388	
Craig units 1 and 2 (coal)	151	
Hydropower	90	
Wind power	78	9.75
Rawhide Flats Solar	30	9
Total	1,017	928

2019 projected deliveries to owner communities

3,229,726 MWh



2019 peak demand to owner communities:
664 MW on July 19

Approx. 30% noncarbon

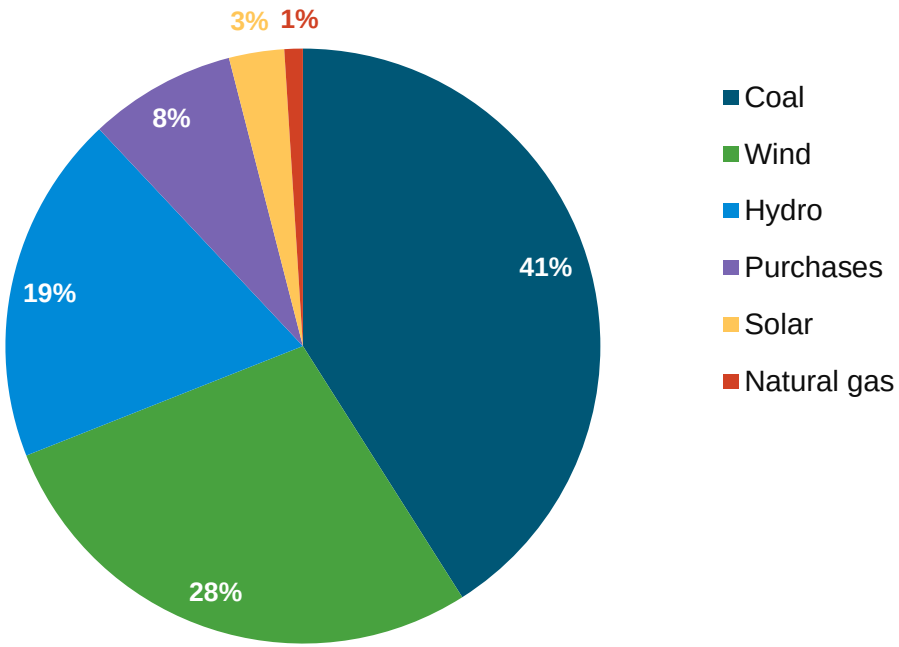
Resource diversification timeline

2016	• Rawhide Flats Solar, 30 MW • Craig Unit 1 closure agreement, December 31, 2025
2017	• Zero net carbon study
2018	• Roundhouse agreement, 150 MW • Initiate integrated resource plan • Resource diversification policy • Extended organic contract and power supply agreements to 2060
2019	• Rate restructuring • Rawhide Prairie Solar, 22 MW + 2 MW battery storage • Distributed energy resource strategy • Craig Unit 2 discussion, no later than 2030 • Roundhouse, additional 75 MW • Request for proposal, additional solar up to 150 MW

Approximately 50% noncarbon by 2021

Projected deliveries to owner communities

3,283,971 MWh



Why we're here

- Share with you all the work done toward meeting our owner communities' and Platte River's goals
- Provide updates on the IRP progress
  - Nine studies
  - Modeling portfolios
  - Deliberative process
- Listen
  - Community listening sessions
  - IRP microsite

Pat Connors

Vice president of power supply

Platte River Power Authority

An integrated resource plan

- Integrates demand and supply-side resources to provide an action plan for reliable, environmentally responsible and financially sustainable energy and services
- Assists with preparing for industry changes including:
  - Technological progress
  - Consumer preferences
  - Regulatory mandates
- Meets Western Area Power Administration requirements
  - Was last submitted in 2016
  - Submit July 2020

Why an IRP now?

A lot has changed since Platte River's last IRP

- Owner communities' goals
- Board adopted resource diversification policy
- Technological advancements
- Cost of renewable generation and storage have declined
- Business and industry changes
- Added more renewable resources
- Market creation and forces
- Consumer interest and active engagement (DER)

Schedule

Initial assumptions and technical studies

Stakeholder outreach

Modeling and internal review

Stakeholder outreach

Revisions and document development

Final review and stakeholder presentations

Independent consulting studies and inputs

Outside studies and data sets

Study	Status	
Generation technology review	✓	Published
Regional economic impacts	✓	Published
Energy storage technology assessment	✓	Published
Coal cycling study	✓	Published
Thermal generation alternatives study	✓	Published
Resource adequacy review	✓	Published
Market analysis	✓	Data set
Distributed energy resources potential	Q4	In process
Life cycle carbon impact assessment	Q4	In process

Generation technology review

Pace/Siemens Inc.

Overview of existing generation resources and an assessment of future resource options

Key findings:

- Existing generation resources continue to provide reliable supplies until their respective retirement dates
- Should consider solar, wind, battery storage, distributed resources, energy efficiency, demand response and gas-fired fossil fuel generation to meet future energy needs

Regional economic impacts

Colorado State University

Assess the economic impact of changing wholesale rates from -20% to +100% by 2030

Key findings:

- Rate increases
  - Higher impact on low income households
  - Can negatively impact businesses through higher production costs

	Potential positive impact	Potential negative impact
Employment	+0.45% (668 jobs created)	-1.03% (1,536 jobs lost)
Household income	+0.39% (+$40 M)	-0.83% (-$85 M)
Domestic supply	+0.65% (+$147 M)	-1.3% (-$291 M)

Energy storage technology assessment

HDR Inc.

Technology overview and life cycle cost estimates

Key findings:

- Lithium ion batteries and pumped hydro storage are commercially-proven technologies
- Lithium ion batteries have the lowest life cycle cost estimate for four-hour storage requirements
- Pumped hydro storage has the lowest life cycle cost for 10-hour storage
    - May take 8-10 years to build
    - Environmental impacts

Coal cycling study

Burns & McDonnell Inc.

Operational and economic impacts on the Rawhide coal unit, for various levels of wind and solar penetrations

Key findings:

- Rawhide coal unit will have more starts per year to follow intermittent renewable generation
- Fixed operations and maintenance cost will increase

Thermal generation alternatives study

HDR Inc.

Technical specifications and cost data for different thermal generation technologies

Key findings:

- Small gas turbines and reciprocating engines are viable backup thermal resources for Platte River to complement intermittent renewable resources
- Reciprocating engines can be installed in smaller increments
- Small gas turbines have lower capital cost

Resource adequacy review

Burns & McDonnell Inc.

Reliability planning metrics and an assessment of capacity contribution of additional solar and wind generation

Key findings:

- Continue to use 15% planning reserve margin as recommended by the North American Electric Reliability Corporation
- Use declining curves for capacity contribution from wind and solar resources for reliability purposes

Market analysis

PACE/Siemens Inc.

Price forecasts for gas, power, renewables and emissions

Key findings:

- Gas prices will stay depressed through 2023, before increasing due to increasing exports and consumption in the power sector
- A carbon tax will be levied within the next five years
- In the short run, solar and wind prices will increase due to tax incentive expiration in 2023
- Over the long run, solar and battery prices will continue to decline due to technological improvements

Distributed energy resources potential

HDR Inc.

- Evaluate distributed energy resources, including energy efficiency, demand response (including distributed energy storage and electric vehicles) and distributed solar
- Forecast how much distributed energy resources are cost-effective and achievable

Key findings:

- May be able to increase annual energy efficiency results
- Demand response has potential to reduce peak hour electric demand
- Distributed solar is anticipated to grow

Life cycle carbon impact assessment

Colorado State University

Estimate the lifetime carbon emissions of generation resources, including carbon emissions during manufacturing, construction and operation

- Results will be available late 2019

Modeling assumptions

- Carbon tax beginning 2025
- Craig Unit 1 and Craig Unit 2 retire no later than 2025 and 2029, respectively
- Commodity prices from Pace/Siemens
- DER program penetration from HDR
- 100 MW solar added in 2023
- New wind, solar, battery and gas capacity added optimally to reliably supply member load

Modeling portfolios

Portfolio	Details
Continuity	Additional renewables, gas and batteries added optimally
Integrated utilities	Battery and solar prices drop more than projected as well as higher penetration of electric vehicles, distributed energy resources, batteries and microgrids
Zero coal	Retire all coal-fired units and maintain peaking units
Zero carbon	By 2030

Modeling sensitivities

Carbon

- No tax
- Social cost of carbon

Natural gas prices

- Low
- High

DER penetration

- Med
- High

High load growth

Next steps

- Consolidate input from all stakeholders in October
- Consider any additional inputs provided to IRP team
- Incorporate input into IRP modeling
- Present results in spring 2020

Open forum

Questions and comments

Platte River Power Authority

Estes Park • Fort Collins • Longmont • Loveland