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Northwest **Power** and **Conservation** Council

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February 7, 2023

MEMORANDUM

TO: Council Members

FROM: Tina Jayaweera, Power Planning Resources Manager

SUBJECT: Natrium Project

BACKGROUND:

Presenter: Ryan McGraw, Vice President, Project Development, and Jeremy Bries, Director of Nuclear Projects, PacifiCorp

Summary: In the summer of 2021, PacifiCorp joined with TerraPower to undertake a joint study to evaluate the feasibility of deploying an advanced nuclear reactor– the Natrium demonstration project in Kemmerer, Wyoming. PacifiCorp and TerraPower then announced an MOU in the fall of 2022 to undertake a joint study to evaluate up to an additional five Natrium projects in PacifiCorp’s service territory. The joint study will evaluate, among other things, the potential for advanced reactors to be located near current fossil-fueled generation sites, enabling PacifiCorp to repurpose existing generation and transmission assets for the benefit of its customers. Ryan and Jeremy will discuss the motivation to pursue the Natrium Project and how it can support the utility’s future needs.

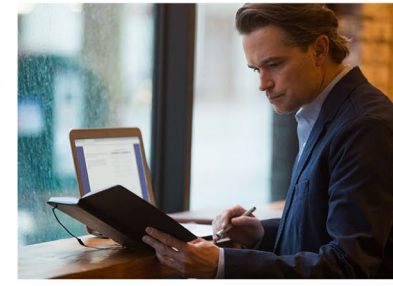
Relevance: The Council’s 2021 Power Plan recognized that there are several promising emerging generating resource technologies that might provide value for future resource needs, and it recommended that the region continue to work with developers and manufactures to research and explore these technologies. One of these technologies is small modular reactors (SMR) and staff are tracking progress on development efforts to inform the mid-term assessment and future power plan development.

Background: This presentation is third in a series on SMR, highlighting the primary options currently available. In November 2022, Kevin Nordt from Grant PUD presented on their SMR exploration and in October 2022, members and staff were able to tour NuScale Power in Corvallis.

More Info: <https://natriumpower.com/wp-content/uploads/2022/05/Natrium-Wyoming-Factsheet2.pdf>

Northwest Power & Conservation Council

February 15, 2023



Agenda

- Introduction
- Quick Overview: Berkshire Hathaway Energy, Rocky Mountain Power, PacifiCorp
- The Changing Energy Landscape: Decarbonization Goals, Ozone Transport Rule
- PacifiCorp's Approach: "All of the Above" Strategy
- TerraPower & PacifiCorp Partnership
- Q&A

Introduction - Who is this guy?

- Ryan McGraw, Vice President, Project Development
- Education
 - Juris Doctorate, licensed attorney (CA & OR)
 - Masters of Business Administration (Strategy, Finance)
 - Perhaps most notably, absolutely zero prior nuclear background
- ~2.5 years at PacifiCorp
- ~20 years in the energy industry
- Developed > 4,000 MW of wind and solar projects that have been placed in operation

BERKSHIRE HATHAWAY ENERGY®

-  PACIFIC CORP.

-  PACIFIC POWER.
-  ROCKY MOUNTAIN POWER.

-  BHE TRANSMISSION.

-  ALTALINK.

-  BHE U.S. TRANSMISSION.

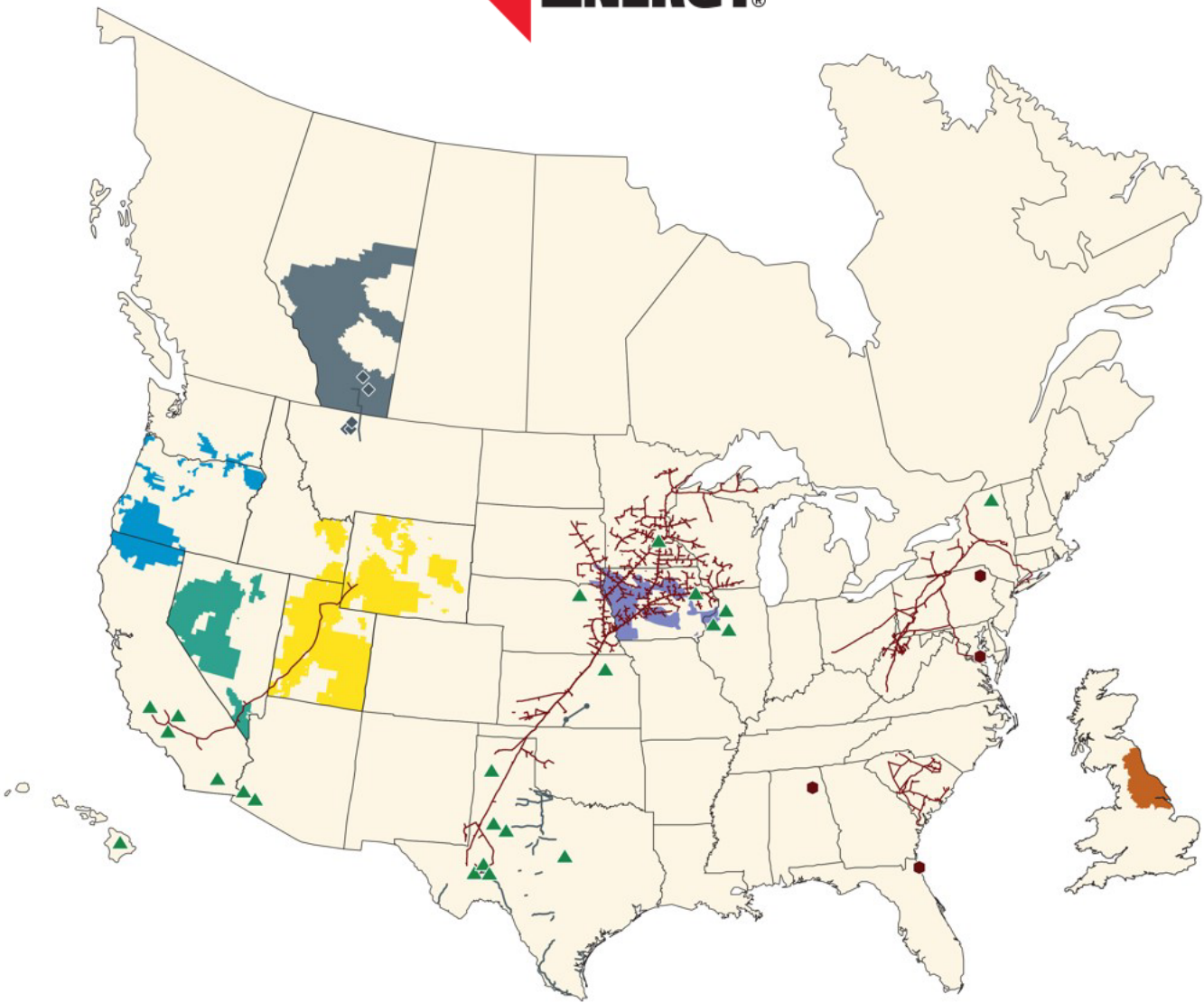
-  MIDAMERICAN ENERGY COMPANY.

-  NV Energy.

-  NORTHERN POWERGRID.

-  BHE PIPELINE GROUP.

-  BHE RENEWABLES.



- 12 million customers and end-users
- Top-rated service provider within the industry



- OSHA Recordable Incident Rate of 0.38



- 45% renewable/noncarbon generation



- 35% below national average prices at MidAmerican Energy
- 29% below national average prices at PacifiCorp
- 23% below national average prices at NV Energy

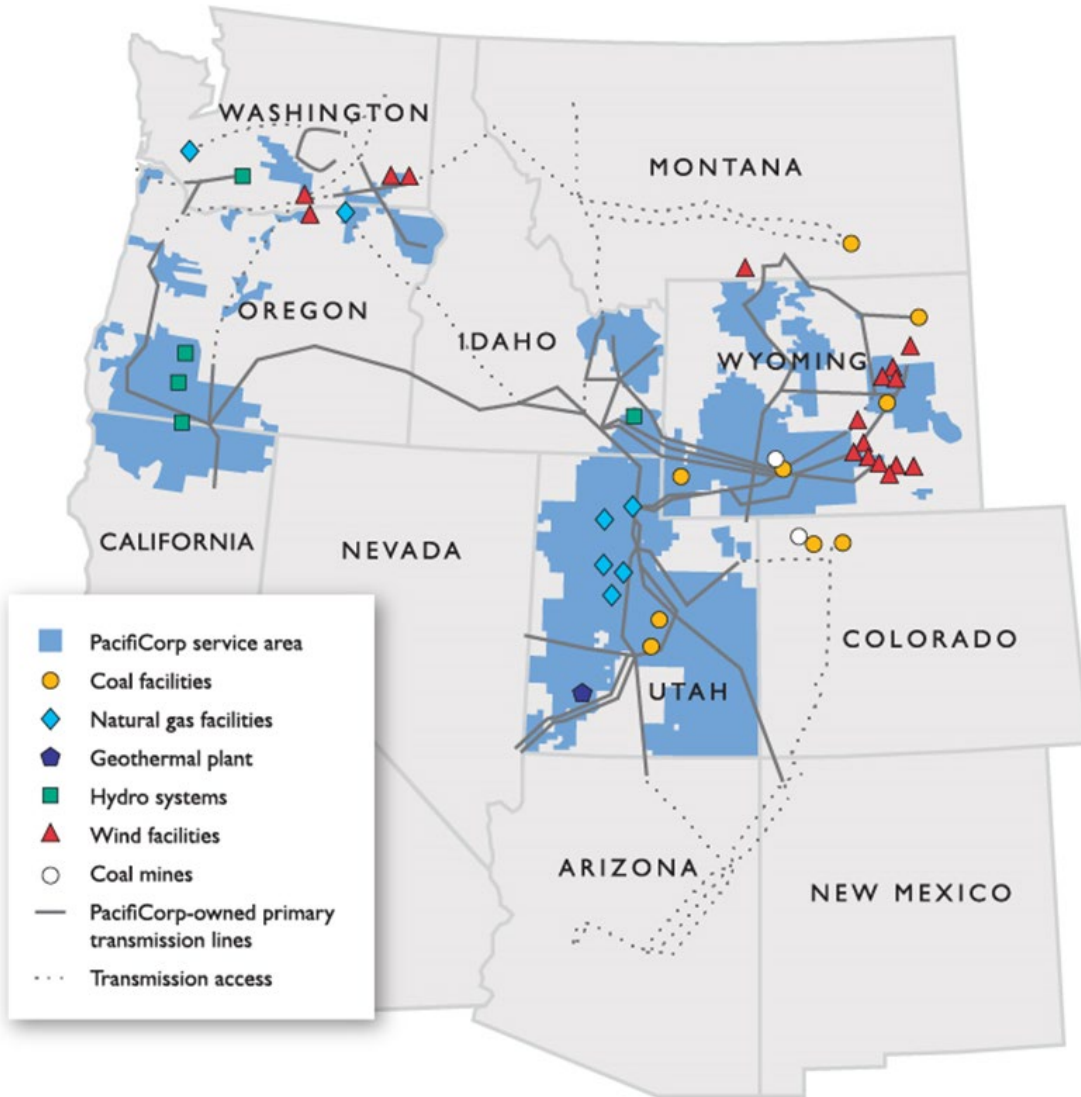


- \$132.1b in total assets
- Exceptional cyber and physical protection



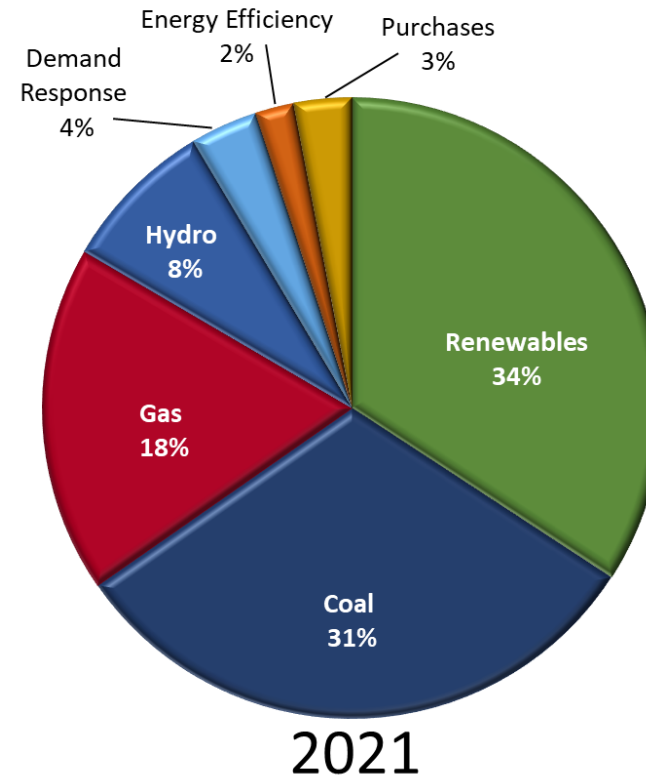
- 2021 net income > \$6.2b
- Operating cash flows > \$8.7b

PacifiCorp Overview



- Two divisions – Rocky Mountain Power and Pacific Power
- Approximately 4,800 Employees
- 2 million electricity customers
- 141,500 square miles of service territory in six states
- 17,457 miles of transmission
- 11,771 MW owned generation capacity

PacifiCorp's Energy Mix – 2021



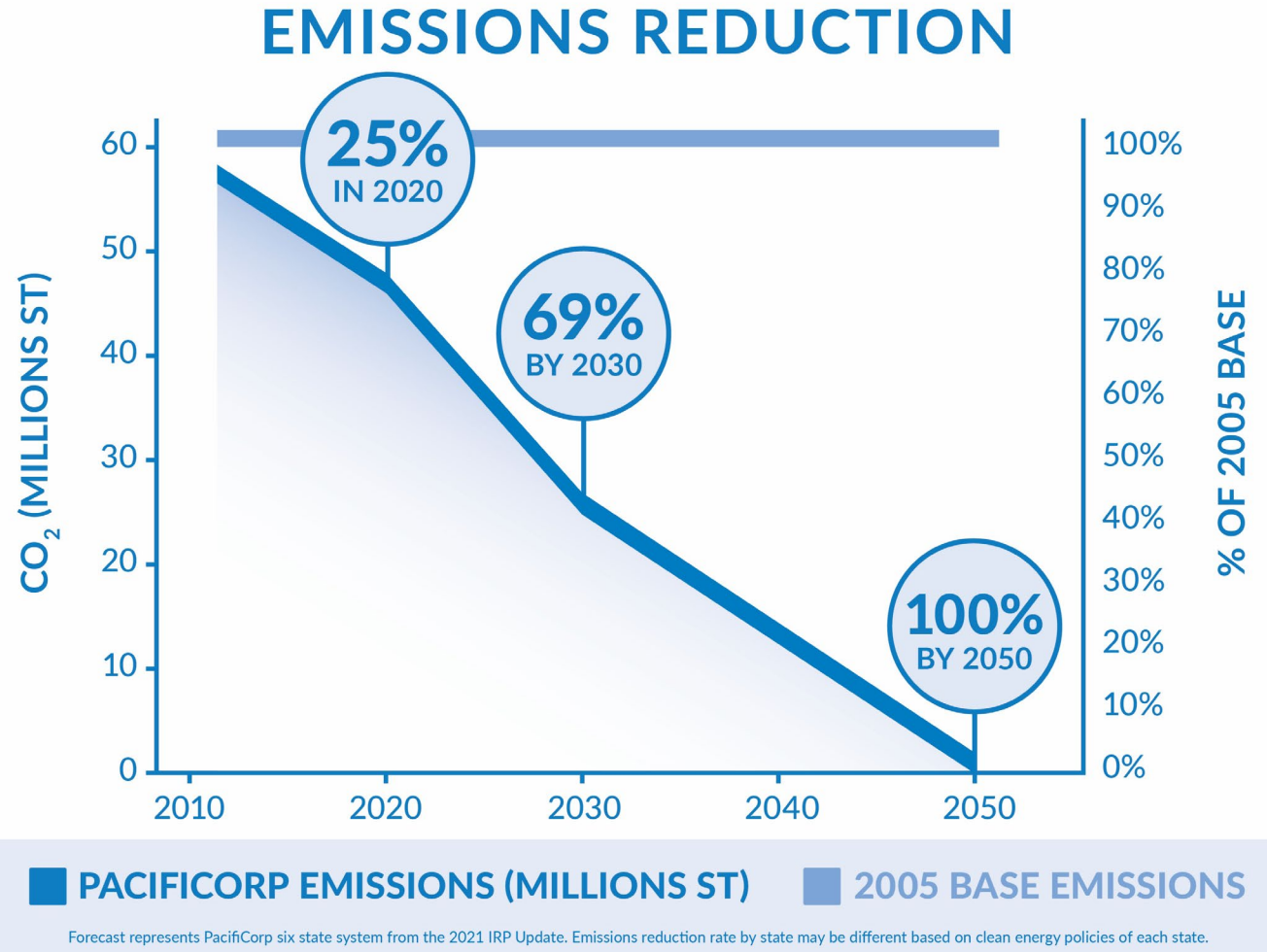
Note: PacifiCorp system resource mix

The 2021 system resource mix is based on its 2021 Integrated Resource Plan data. In developing these figures, purchased power is reported in identifiable resource categories where possible.

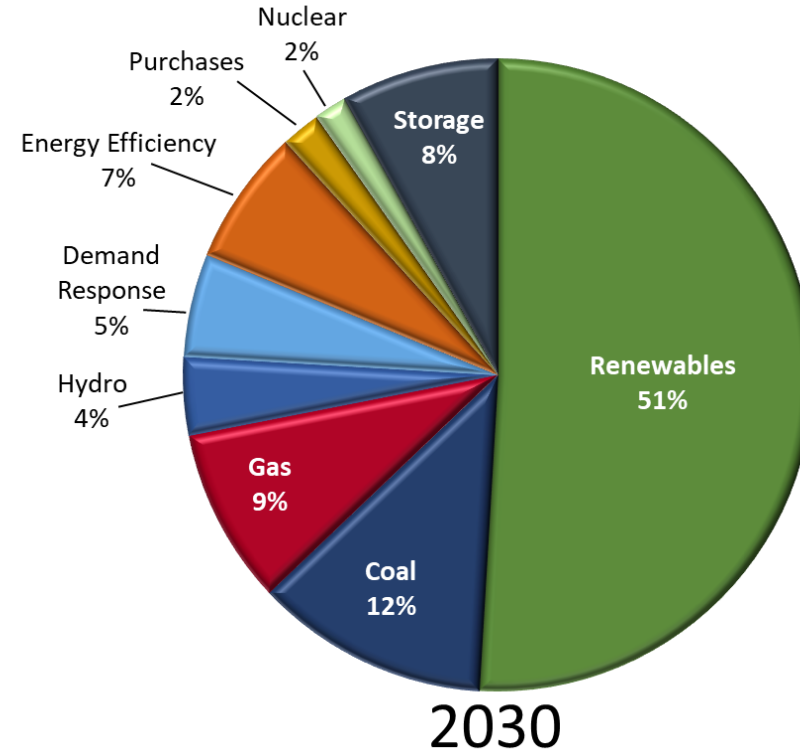
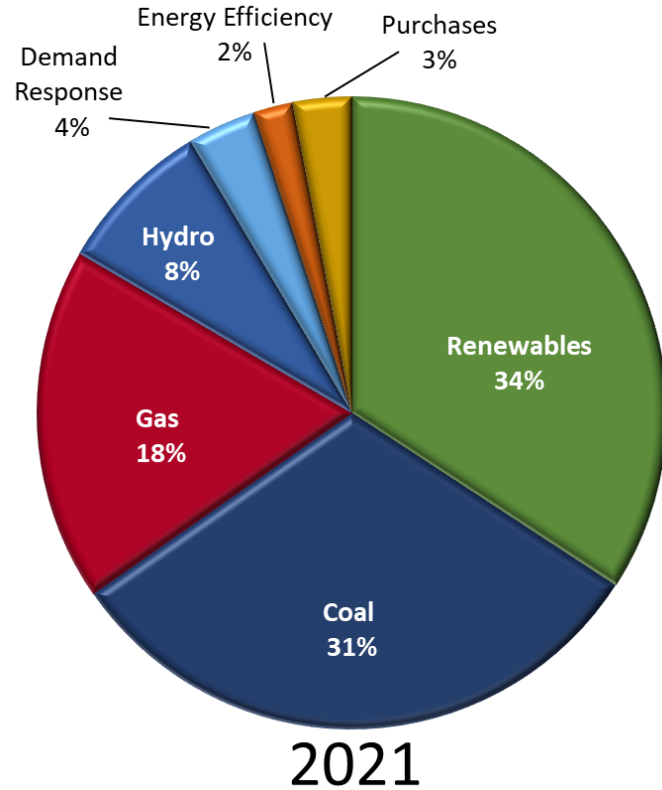
The Changing Energy Landscape

PacifiCorp has set ambitious decarbonization goals

- Carbon reduction goals
 - 69% reduction by 2030
 - 100% reduction by 2050
- Renewable energy goals
 - Currently: 3,422 MW (YE 2021)
 - Increase to 3,900 MW by 2025
 - Increase to 10,100 MW by 2040
- Energy storage goals
 - ~700 MW by 2025
 - Increase to 6,600 MW by 2040



PacifiCorp's Projected Energy Mix



Note: PacifiCorp system resource mix

The 2021 system resource mix is based on its 2021 Integrated Resource Plan data. The "system resource mix" is intended to demonstrate how PacifiCorp's system energy and nameplate capacity mix is projected to change over time. In developing these figures, purchased power is reported in identifiable resource categories where possible.

Ozone Transport Rule (OTR)

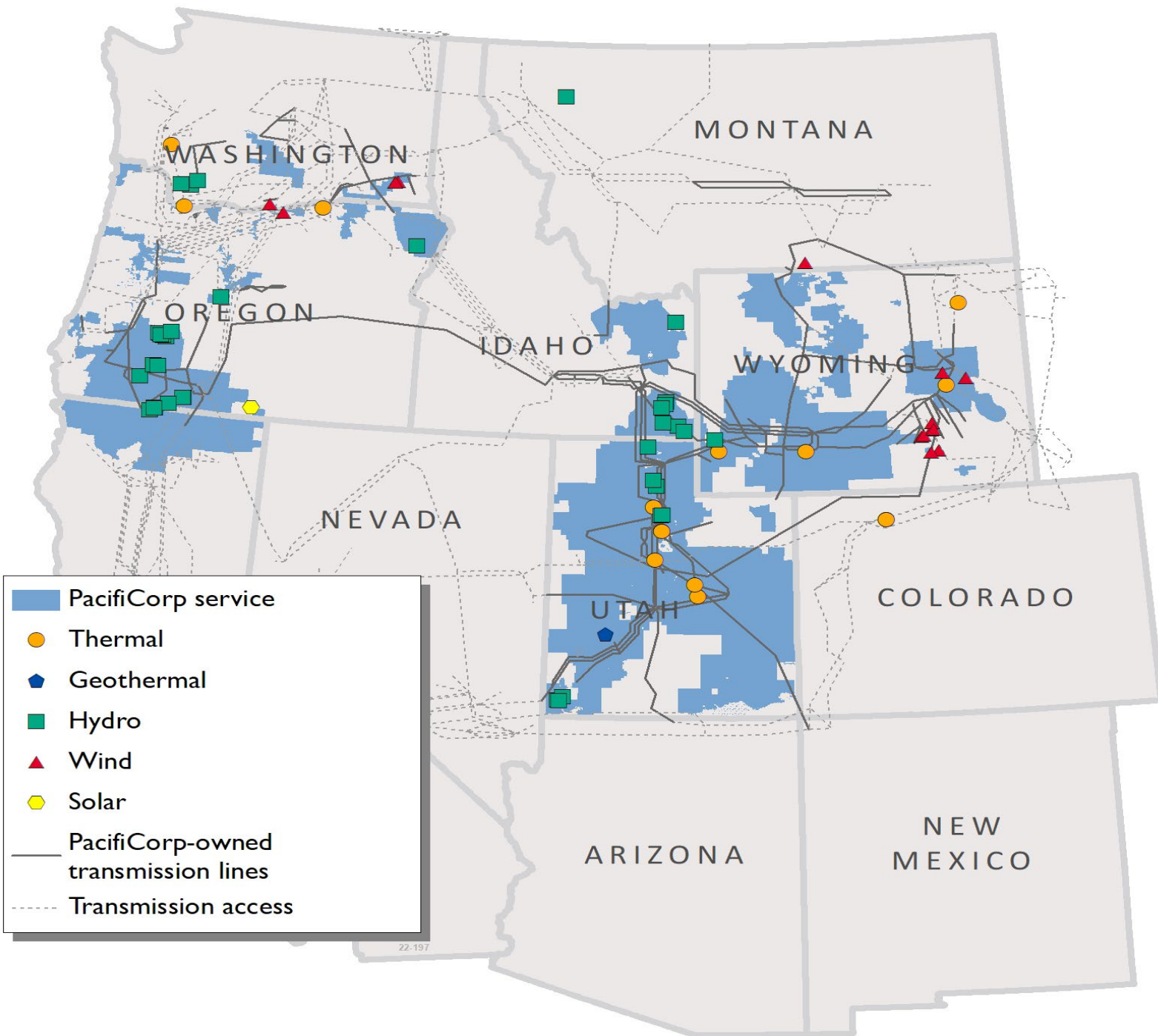
- In April 2022, the Environmental Protection Agency proposed the "Ozone Transport Rule" (OTR), also referred to as the Good Neighbor Rule or Cross-State Air Pollution Rule
- OTR is focused on reductions of nitrogen oxides (NO_x), precursor pollutants to ozone formation
- OTR will now cover 25 states. Three new states are included for the first time – Utah, Nevada and California (possibly Wyoming as well)



Ozone Transport Rule (OTR)

Facility	MW
Hunter - 1	418
Hunter - 2	269
Hunter - 3	471
Huntington - 1	459
Huntington - 2	450
Dave Johnston - 1	99
Dave Johnston - 2	106
Dave Johnston - 4	330
Wyodak	268
Total	2,870

- Starting in May of 2026, NOx emission budgets are expected to be set for coal-fired units at levels achievable through the installation of selective catalytic reduction (SCR) controls
- In many cases SCR requirements have proven cost-prohibitive and have forced early retirement or conversion of coal plants
- If PacifiCorp coal units without SCR are retired in 2026 instead of installing SCR, OTR requirements alone could cause PacifiCorp to retire 2,870 MW (PAC share)



Interconnected Transmission System

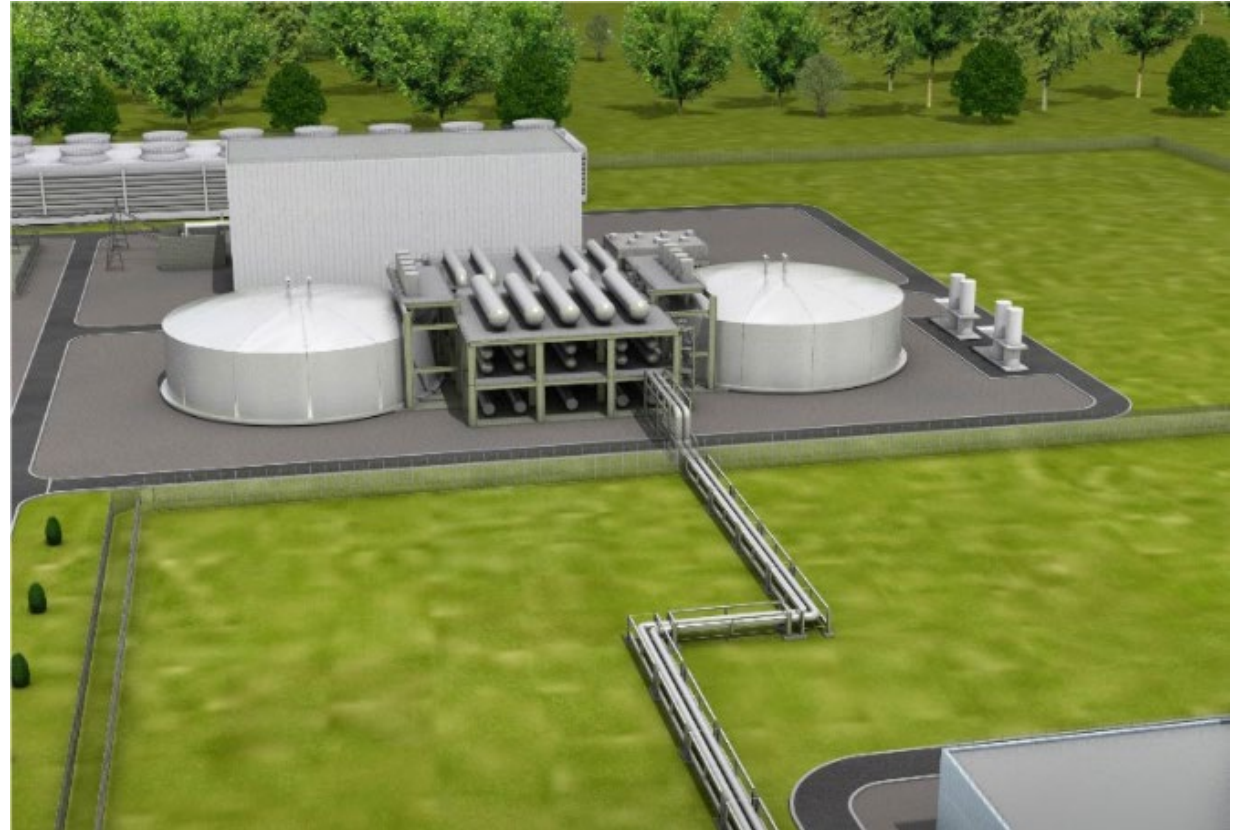


All-of-the-Above Strategy

- Transmission
- Wind
- Solar
- Battery
- Pumped Hydro
- Traditional Hydroelectric
- Blue/Green Hydrogen
- Advanced Nuclear
- Geothermal
- Natural Gas
- Coal
- Coal + CCUS

TerraPower + PacifiCorp

- Sodium advanced nuclear demonstration project in Kemmerer, Wyoming
- Announcement 10/24/2022
 - Agreement to jointly studying up to 5 more Sodium projects across Utah & Wyoming
 - Considering operations prior to 2035
 - Evaluating sites near existing generating assets
 - Study will inform inputs and assumptions for future resource planning, will ultimately require regulatory approvals



QUESTIONS?

