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October 5, 2021

MEMORANDUM

TO: Council Members

FROM: Gillian Charles

SUBJECT: PacifiCorp's 2021 Integrated Resource Plan

BACKGROUND:

Presenter: Shay LaBray, Director, Resource Planning, PacifiCorp

Summary: PacifiCorp filed its 2021 Integrated Resource Plan (IRP) on September 1. This latest rendition of the independently owned utility's 20-year roadmap for the future grapples with many of the same topics that the Council worked through in the draft 2021 Power Plan – retiring thermal units, state clean energy and decarbonization policies, maintaining resource adequacy, augmenting the transmission system, and ensuring reliability and resiliency across PacifiCorp's diverse service territory.

Shay LaBray, Director of Resource Planning at PacifiCorp, will present a summary of the 2021 IRP at the October Council Meeting.

<https://www.pacificorp.com/energy/integrated-resource-plan.html>

More Info: PacifiCorp's service territory covers parts of Washington, Oregon, Idaho, California, Utah, and Wyoming.



CLEAN, RELIABLE, RESILIENT

THE POWER AND PROMISE OF A CONNECTED WEST

THE TIME IS NOW

At PacifiCorp, we share a vision with our customers and communities in which clean energy from across the West powers jobs and innovation. This bold vision has guided our work for years. Most recently, it took shape in our 2017 and 2019 Integrated Resource Plans, in which we outlined an ambitious path to substantially increase our renewable energy capacity, evolving our existing portfolio and connecting supply with demand through an expanded, modernized transmission system.

Now is the time for further action.

DELIVERING ON OUR PROMISE

The power of the West lies in its diversity: windswept plains and high deserts, the sun-soaked Great Basin, and rivers fed by rain and mountain snow. Taken together, these reserves of wind, solar and hydro power can help meet the growing and changing needs of homes and businesses throughout the West, cleanly, reliably and affordably.

Yet, capturing this power alone is not enough. To unlock the full promise of these abundant resources, we must connect the West to its energy future—built on a resilient, hardened, adaptable grid that safely delivers power when and where it's needed.

PacifiCorp's 2021 IRP is a roadmap for action. It sets forth a path to build upon our significant progress toward the goals laid out in the 2017 and 2019 IRPs and identifies critical investments in expanded and modernized transmission, renewable energy, storage, demand response and advanced nuclear resources.

Our integrated system connects and brings new opportunities to the West, building on a foundation of infrastructure designed to handle extreme weather and enhance the energy resilience of communities from the Pacific Coast to the Rocky Mountains, all while continuing to deliver for our customers at prices that are below national and regional averages.

As our 2021 IRP shows, this expanded, modernized transmission will connect supply with demand from east to west and from north to south, serving as the backbone of the West for the hundreds of energy providers that serve this region alongside PacifiCorp.



OUR ROADMAP

The 2021 IRP outlines PacifiCorp's bold vision for the West between now and 2040 and sets us on the path to:

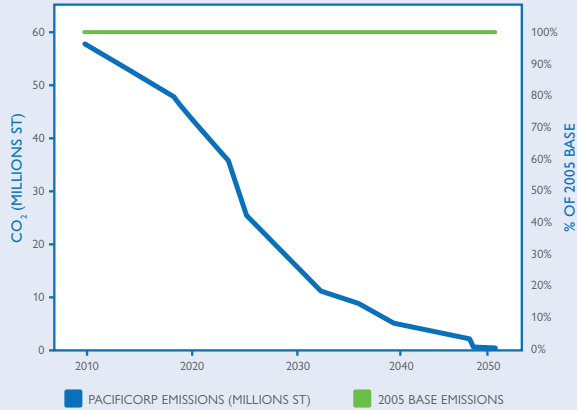
- Continue our growth into a grid powered by clean energy:
 - 4,290 MW of incremental savings through energy efficiency programs.
 - 5,628 MW of new solar resources (most paired with storage).
 - 3,628 MW of new wind resources.
 - 6,181 MW of storage resources, including battery storage co-located with solar, standalone battery storage and pumped hydro storage resources.
 - 2,448 MW of direct load control programs.
 - 500 MW of advanced nuclear (the Natrium™ reactor demonstration project) in 2028, with an additional 1,000 MW of advanced nuclear over the long term.
- Connect and optimize these diverse, clean resources across the West with a strengthened and modernized transmission network that ensures resilient service, reduces costs and creates maximum opportunities for our communities to thrive:
 - 416 miles of new transmission from the new Aeolus substation near Medicine Bow, Wyoming, to the Clover substation near Mona, Utah (Energy Gateway South).
 - 59 miles of new transmission from the Shirley Basin substation in southeastern Wyoming to the Windstar substation near Glenrock, Wyoming (Energy Gateway West Sub-Segment D.1).
 - 290 miles of new transmission from the Boardman substation in north central Oregon to the Hemingway substation in south central Idaho.



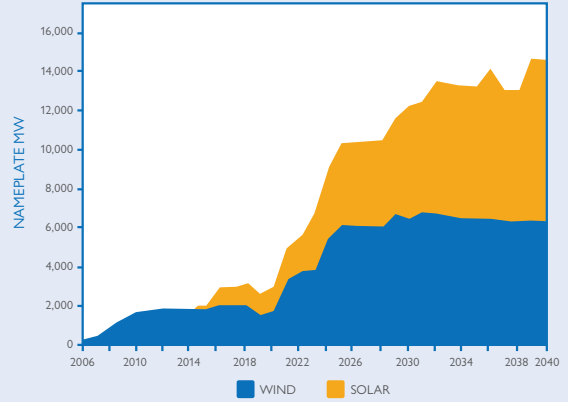
MEETING OUR GOALS. ACCELERATING OUR PROGRESS.

Our 2021 IRP positions PacifiCorp to rapidly expand our clean energy while increasing our storage capacity and delivering cost savings to our customers.

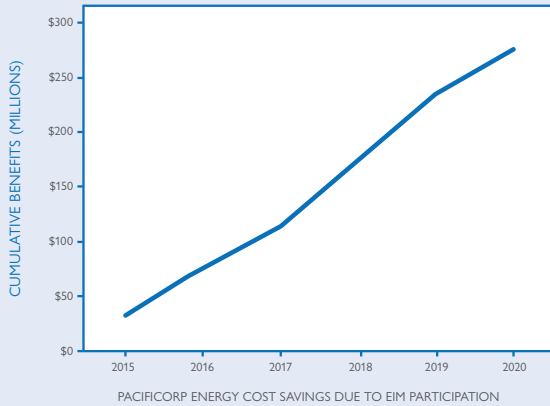
EMISSIONS



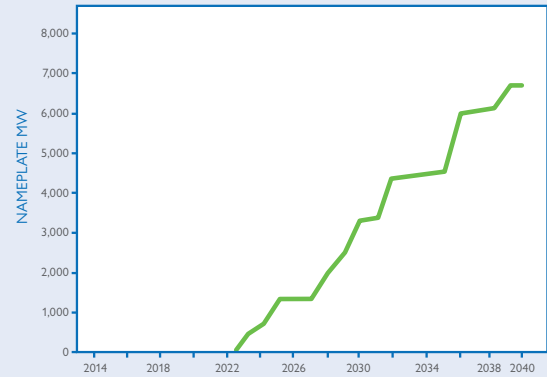
WIND AND SOLAR CAPACITY*



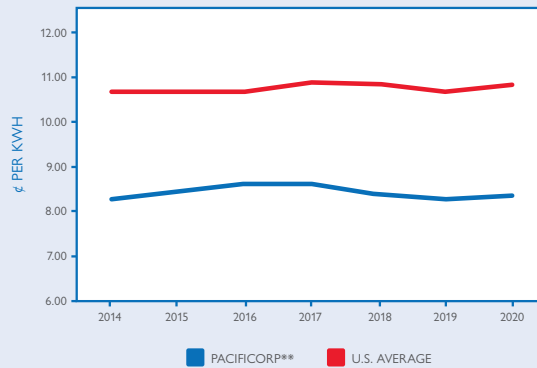
ENERGY COST SAVINGS



NEW STORAGE CAPACITY



AVERAGE TOTAL ELECTRICITY RATES FOR RETAIL CUSTOMERS



Source: Sales and revenue for the twelve months ending December of each year, as reported to the Edison Electric Institute

*Resources acquired through customer partnerships, used for renewable portfolio standard compliance, or for third-party sales of renewable attributes are included in the total capacity figures quoted.

**Weighted average of rates for Utah, Oregon, Wyoming, Washington, Idaho and California.



EVOLVING OUR PORTFOLIO

Working in close partnership with our communities, we are making significant progress in our evolution to an increasingly low-carbon portfolio. Over the past two years, our progress toward those goals has included:

- A completed coal-to-gas peaker conversion of Naughton Unit 3 in Kemmerer, Wyoming.
- Retirement of the Cholla Unit 4 coal-fired generator in Joseph City, Arizona.

Our resource strategy outlined in the 2021 IRP continues that progress, and within the next four years will:

- Begin the process of retiring or divesting Colstrip Units 3 and 4 in Colstrip, Montana.
- Begin the process of a coal-to-gas peaker conversion of Jim Bridger Units 1 and 2 in Rock Springs, Wyoming.
- Begin the process of retirement or sale of Naughton Units 1 and 2.

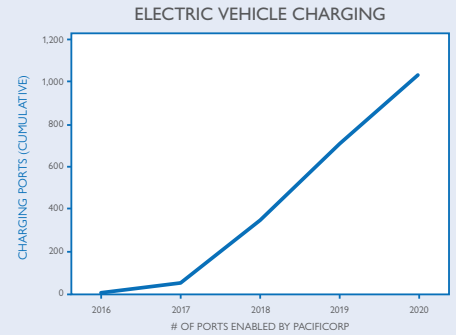
Throughout, we are collaborating closely with affected communities and with state leadership to support a successful transition for our employees and their communities.

CO-CREATING ENERGY SOLUTIONS WITH CUSTOMERS AND COMMUNITIES

The communities PacifiCorp serves are why we exist, so we're working in close collaboration with them to build the opportunities and infrastructure that enables communities to thrive.

Clean transportation infrastructure

There are good things ahead for electric transportation in the West. In addition to the more than 2,100 new electric vehicle charging ports that we have already helped install, we're expanding workplace charging, supporting regional solutions to electrify interstates for cleaner freight transportation, and making electric vehicle ownership more accessible for rural and underserved communities.



Solar + Storage

PacifiCorp is partnering with communities throughout our service area to leverage grid-scale battery storage and solar projects to help meet community energy needs. In Panguitch, Utah, a 1 MW peak capacity, 5 MWh energy storage system anticipates and responds to peak electricity consumption and levels demand on the local grid. This enables PacifiCorp to employ batteries as an alternative to traditional grid poles-and-wires infrastructure. The 650-kilowatt solar photovoltaic component of this project was funded through a grant from the company's Blue SkySM renewable energy program.

Similarly, through a partnership with the Oregon Institute of Technology in Klamath Falls, Oregon, PacifiCorp is installing a 2 MW peak capacity, 6 MWh energy storage system that will partner with the existing geothermal and solar resources on the campus to provide increased local grid stability. PacifiCorp will also facilitate the interconnection of 64 MW through the Oregon Community Solar Program. These projects are designed to provide an opportunity for residential and low-income customers to share in the benefits of local solar energy production.

Advanced nuclear demonstration project

A developer of an advanced nuclear reactor, TerraPower, has received support from the Department of Energy to construct a demonstration plant for its NatriumTM technology. TerraPower is investigating the opportunity to site Natrium at a retiring coal plant in Wyoming. The project promises many benefits to PacifiCorp including a 24/7 reliable source of clean energy with embedded storage, safety, cost and reduced spent fuel advantages while providing an employment transition opportunity for our existing coal employees and an economic boost to the community where they reside. Using safety features that take advantage of natural forces and do not require human intervention, this reactor will be able to shut down safely and independently, greatly reducing the risks associated with earlier nuclear reactors.





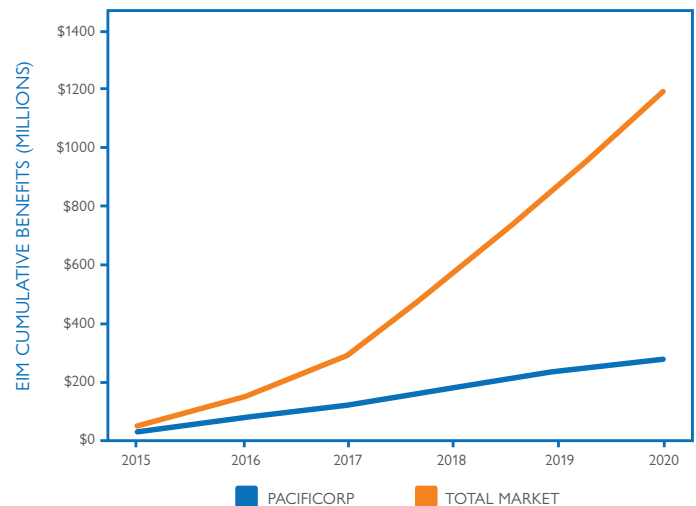
Delivering resilience and reliability through a connected West

The diversity of the West’s landscape—including its abundant clean energy resources—are the key to our strategy for delivering least-cost, least-risk, resilient power to our customers. We have already collaborated with utilities from across the region to form the Western Energy Imbalance Market (EIM), which allows utilities to trade surplus power in near-real time. The EIM leverages diverse clean energy resources from across the West to dramatically lower greenhouse gas emissions while increasing the grid’s resilience and lowering costs for our customers.

In our 2019 IRP, we expanded our plans stemming from the 2017 IRP to significantly increase our transmission capacity to more effectively integrate new renewable resources into the grid and to deliver the full benefit of the EIM to our customers. We are on target with all benchmarks established by that IRP.

- Completed reinforcements of high-voltage transmission in Utah Valley, northern Utah, southern Utah, and Yakima, Washington. These projects will allow the company to respond to interconnection requests and accommodate the renewable resources identified in the 2019 IRP.
- Continuing the regulatory process to construct the Energy Gateway South and Energy Gateway West Sub-Segment D.1, which will connect eastern Wyoming to central Utah, enhance system reliability and provide access to more generation resources.

PACIFICORP AND TOTAL EIM BENEFITS



Expanded conservation measures

We're championing technical innovations that use fast-acting residential demand response resources to support the bulk power system. Our approach moves beyond peak-load management to create a grid-scale solution that turns demand response resources into frequency-responsive operating reserves. With over 100,000 customers participating in our Cool Keeper program, more than 200 MW of operating reserve are available and can be dispatched in a matter of seconds. This reduces our need to buy reserve power on the market, and it is only used in emergencies, minimizing inconvenience to customers.

Our partnership with The Wasatch Group also enabled us to develop and manage a first-of-its-kind battery demand response solution at an all-electric apartment building. That success has shaped a new battery demand response option for any Utah customer with on-site solar generation. The network of renewable energy stored in customer-owned batteries will enable greater use of renewable power, improves overall grid resiliency and helps keep prices down.

In the coming years, our ongoing conservation and cost-effective demand-response initiatives will target to deliver:

- 603 MW of energy efficiency between 2021 and 2024.
- 549 MW of demand response between 2021 and 2024.



PUTTING OUR SHARED VISION TO WORK FOR OUR CUSTOMERS

Our 2021 IRP is grounded in our commitment to deliver reliable, affordable power to all our customers through a dynamic, connected grid. It is the roadmap for a future of clean energy and strengthened infrastructure to support the delivery of this essential service. It's shaped by our customers, communities, and new technologies and programs, like demand response. And it's bolstered by innovations in power generation and storage that will help decarbonize our portfolio while lowering costs and increasing reliability.

This is the vision, with clear, measurable steps that will connect the region to its massive energy-generating potential and leverage our transmission infrastructure across our six-state service area to enhance reliability and resilience throughout the West.

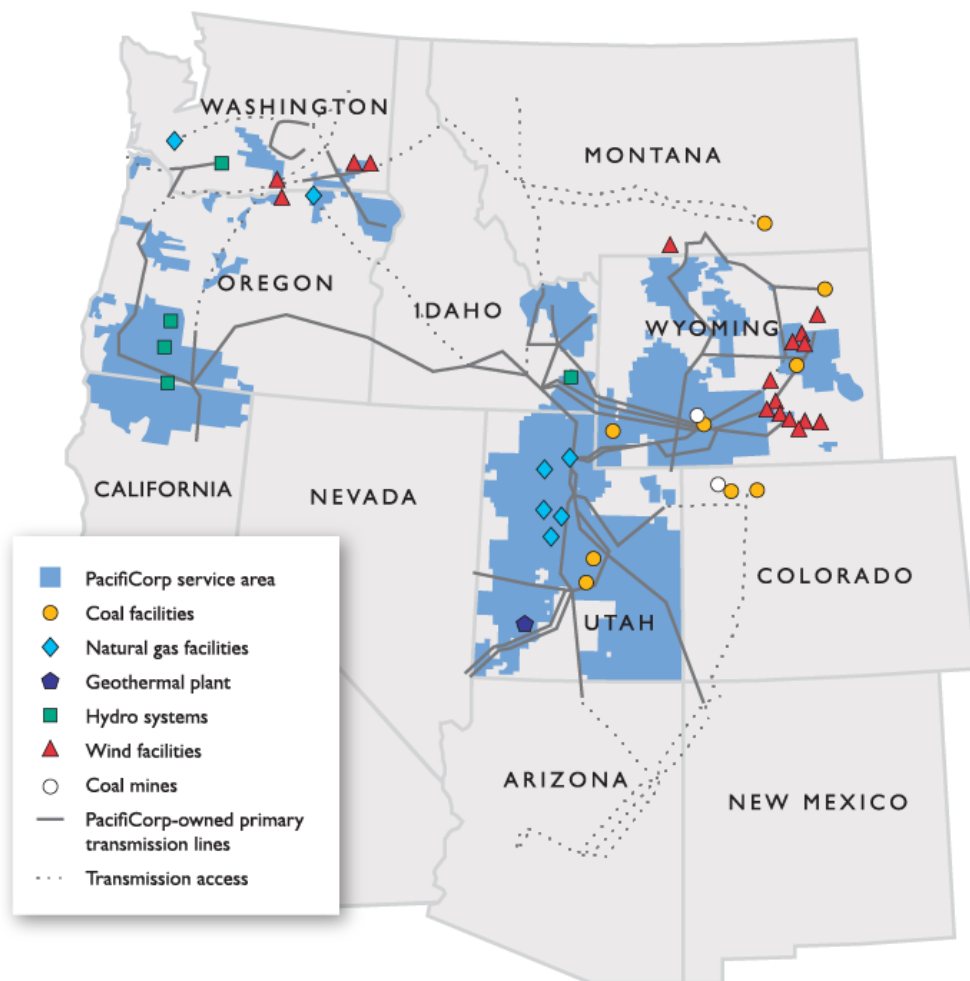
By investing in resilience, through expanded transmission lines, a hardened grid, and a diverse, increasingly clean portfolio, we are delivering on our commitment to ensuring safe, reliable, affordable power for our customers, now and for generations to come.

PacifiCorp's 2021 Integrated Resource Plan (IRP) Overview



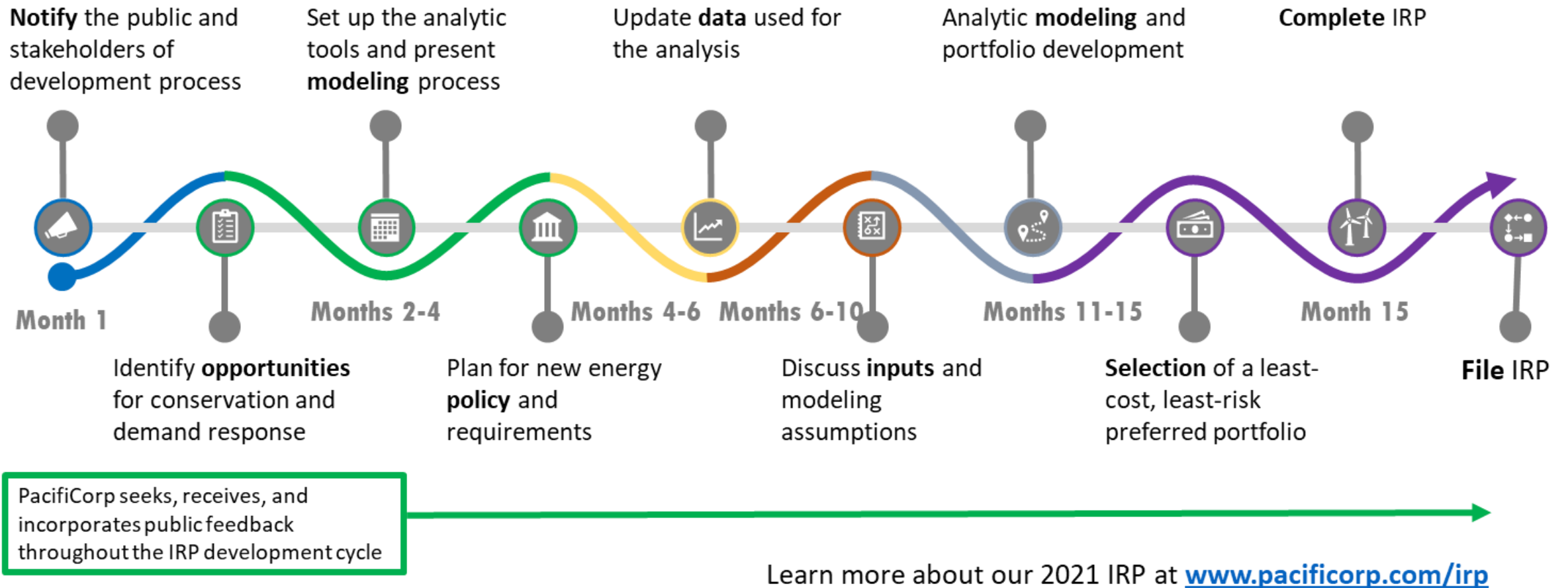
Northwest Power and Conservation Council
October 13, 2021
Shay LaBray, PacifiCorp

PacifiCorp Overview



- PacifiCorp serves approximately 1.9 million customers across six states
- Rocky Mountain Power serves Utah, Idaho and Wyoming customers
- Pacific Power serves Oregon, Washington and California customers
- Extensive generation, transmission and distribution infrastructure across the west
- Large decarbonization efforts underway
- Extensive energy efficiency portfolio
- Long-term resource planning occurs in PacifiCorp's Integrated Resource Plan

Overview of PacifiCorp's IRP Development Process



2021 IRP Near-Term Actions Overview

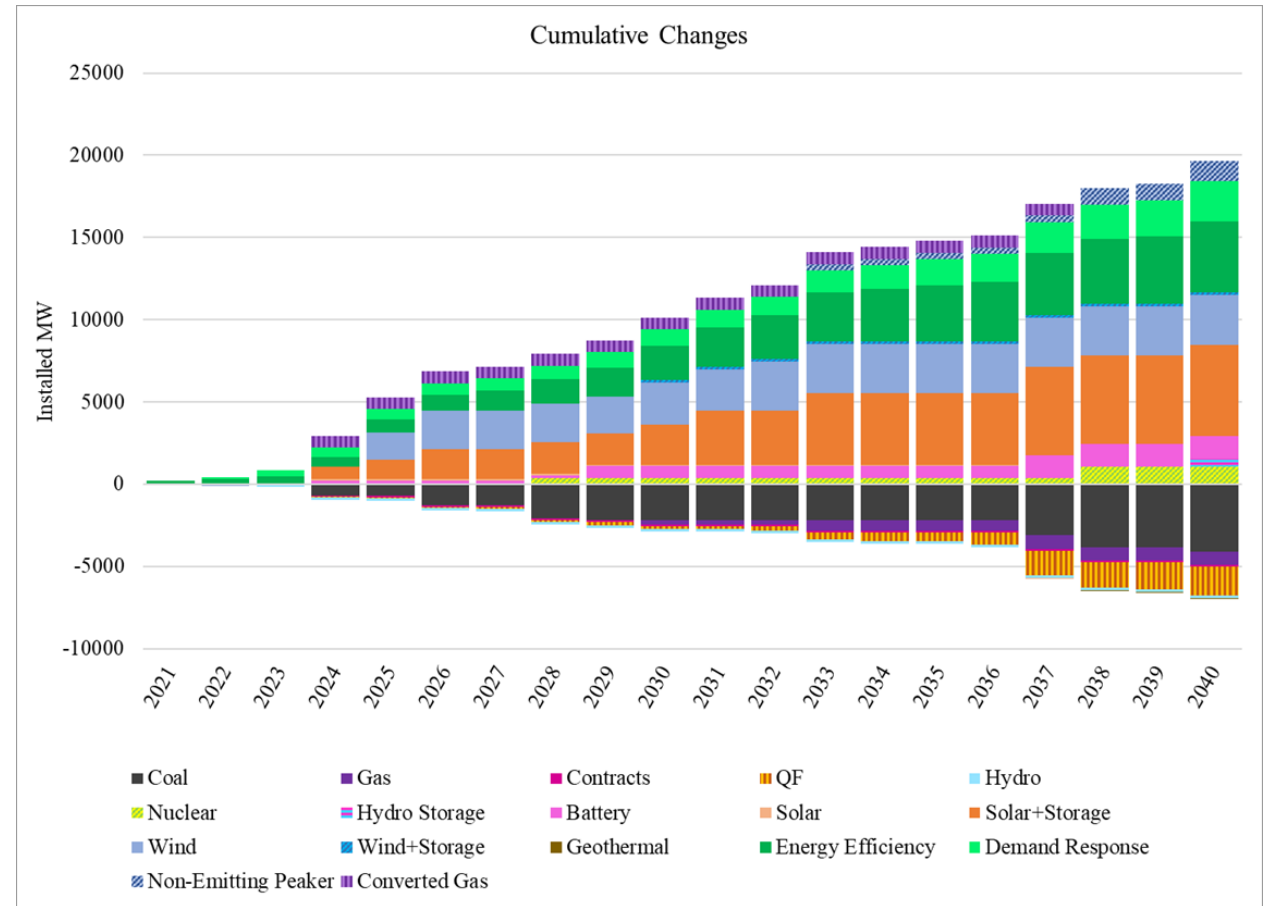
PacifiCorp's 2021 Integrated Resource Plan (IRP) builds upon the results of the 2017 and 2019 IRPs and identifies new investments including those in renewable energy, advanced nuclear, storage, demand response, energy efficiency, and modernized transmission.

- 3,294 megawatts (MW) of **renewables with storage** capacity through 2024
- Approximately 2,000 MW of additional **renewables with storage** capacity by the end of 2026
- 500+ MW of new **energy efficiency**
- 550+ MW of **demand response** programs
- High-voltage **transmission** projects
- 500 MW advanced **nuclear** demonstration project in Wyoming by 2028



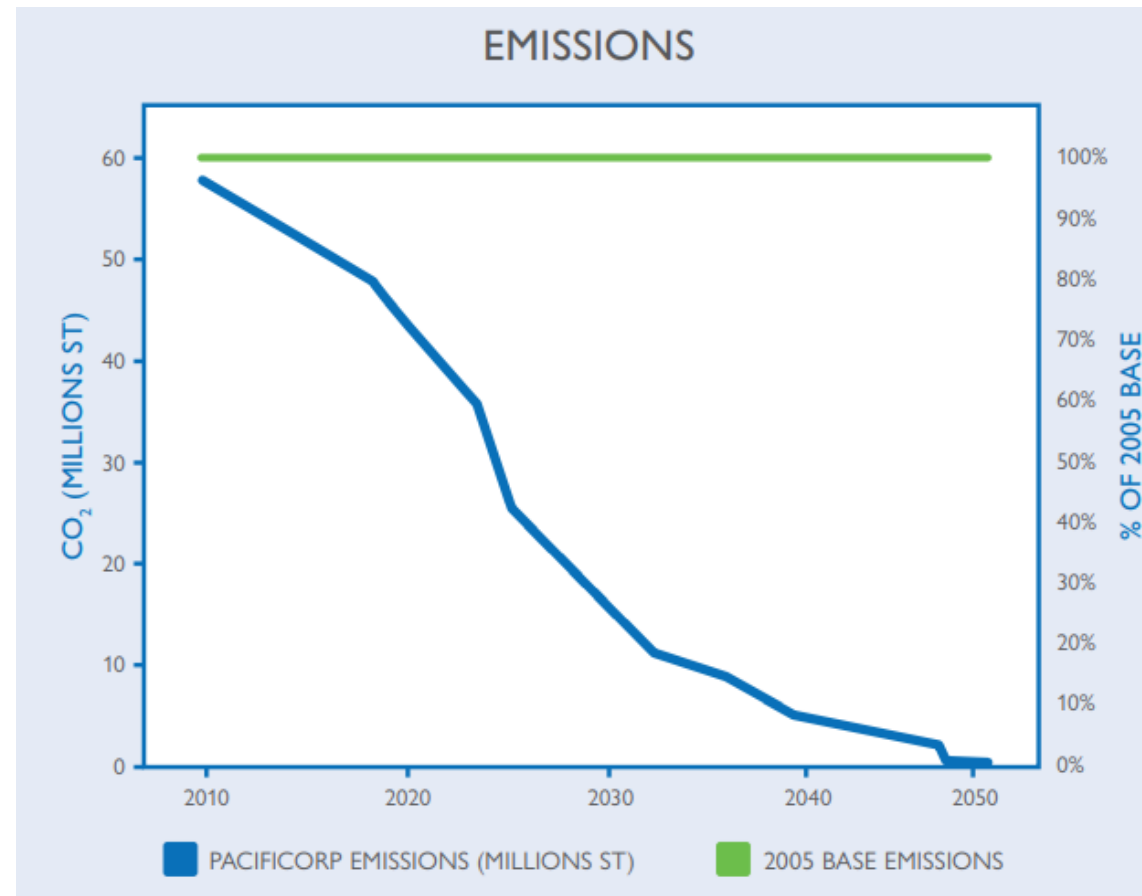
2021 IRP 20-Year Preferred Portfolio

- The 2021 IRP is a road map of PacifiCorp’s bold vision for the west between now and 2040 and sets us on the path to continue growth into a grid powered by clean energy
 - 4,290 MW of incremental savings through energy efficiency programs.
 - 5,628 MW of new solar resources (most paired with storage).
 - 3,628 MW of new wind resources.
 - 4,181 MW of storage collocated with solar resources, 1,400 MW standalone battery storage and a 500 MW pumped hydro storage project.
 - 2,448 MW of direct load control programs.
 - 500 MW of advanced nuclear in 2028 (Natrium™ demonstration project), with another 1,000 MW of advanced nuclear over the long term.
 - Reduction of over 4,000 MW of coal-fueled generation capacity and over 1,550 MW of natural gas-fueled generation capacity through 2040.

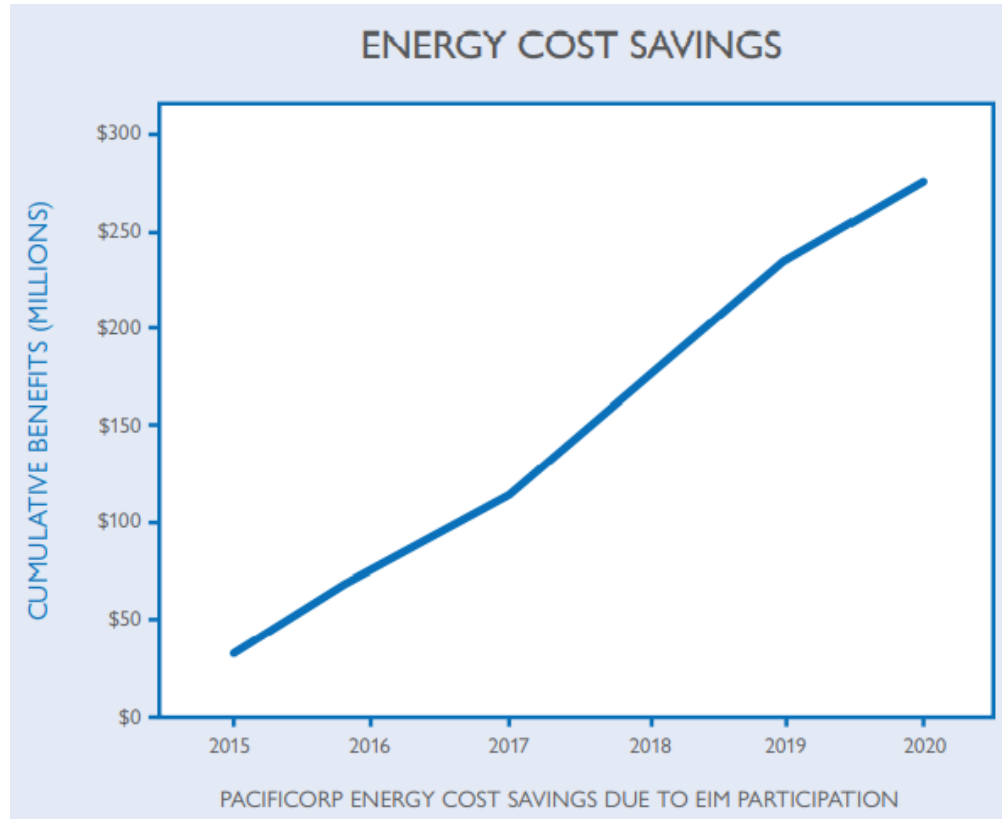


Reduction in Greenhouse Gas Emissions

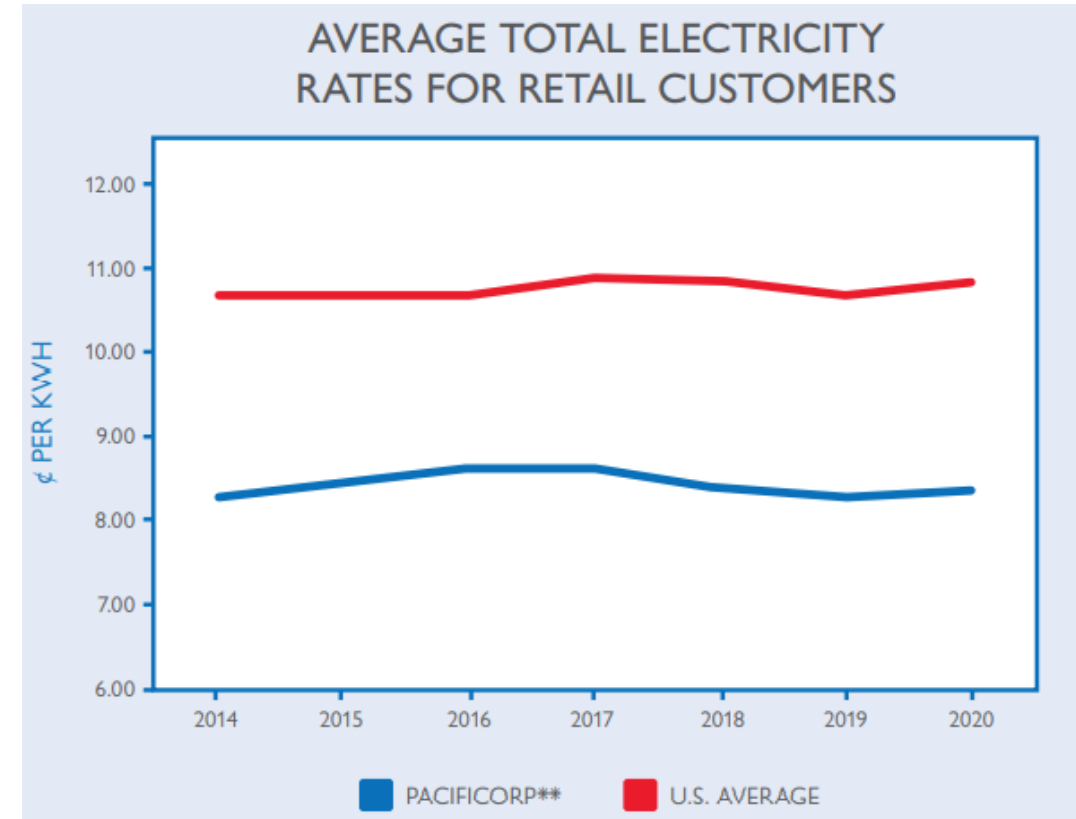
- 74% reduction in greenhouse gas emissions from 2005 levels by 2030, increasing from a 59% reduction outlined in the 2019 plan.
- 98% reduction in greenhouse gas emissions from 2005 levels by 2050.



Low-Cost Power to Customers



EIM has lowered costs for customers by delivering \$310 million in savings.



Rates have remained steady over the past six years.

Investments to Ensure a Reliable Electrical Grid

- Advanced nuclear resource anticipates a clean baseload resource planned for 2028:
 - Industry leading design
 - Utilize local workforce
 - Safe and secure
- Conversion of Jim Bridger units 1 and 2 to natural gas by 2024.
- Battery and hydro pumped storage projects increase system flexibility and support system reliability.
- Championing technical innovations that use demand response programs to support the bulk power system.



Investments to Modernize Transmission Network

- Connects new diverse, clean resources to customers.
- Delivers full benefits of the Energy Imbalance Market by further connecting western markets.
- Increases grid resiliency and reliability. Specific projects include:
 - Energy Gateway South – 500 kV
 - New 230 kV transmission line in Wyoming (D1)
 - Boardman to Hemingway – 500 kV



This map is for general reference only and reflects current plans. It may not reflect the final routes, construction sequence or exact line configuration.

2021 IRP Summary

Putting Our Shared Vision To Work For Our Customers

- IRP is a commitment to deliver reliable, affordable power to customers bolstered by innovations in power generation and storage that will help decarbonize our portfolio and increase reliability.
- A vision, with clear, measurable steps that will connect the region to its energy generation and leverage our transmission infrastructure across our six-state service area.
- By investing in resilience, through expanded transmission lines, a hardened grid, and a diverse, increasing clean portfolio, we are delivering on our commitment to ensure safe, reliable, affordable power for our customers, now and for generations to come.



A young boy with a backpack and arms raised in front of wind turbines. The boy is wearing a plaid shirt and shorts, and has a purple backpack. He is looking up and to the right with a slight smile. The background shows several wind turbines against a clear blue sky. A red graphic element is visible in the top right corner.

Questions?

www.pacificorp.com/energy/integrated-resource-plan