WUTC DOCKET: UE-230172 & UE-210852
EXHIBIT: RAV-1T
ADMIT ☑ W/D ☐ REJECT ☐

Exh. RAV-1T
Docket UE-230172
Witness: Richard A. Vail

BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PACIFICORP dba PACIFIC POWER & LIGHT COMPANY Respondent.	Docket UE-230172

PACIFICORP

DIRECT TESTIMONY OF RICHARD A. VAIL

March 2023 (REFILED April 19, 2023)

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Q. Please state your name, business address, and current position with PacifiCorp d/b/a Pacific Power & Light Company (PacifiCorp or Company).

A. My name is Richard A. Vail. My business address is 825 NE Multnomah Street, Suite 1600, Portland, Oregon 97232. I am the Vice President of Transmission at PacifiCorp. I am responsible for transmission system planning, customer generator interconnection requests and transmission service requests, regional transmission initiatives, capital budgeting for transmission, transmission and distribution project delivery, and administration of the Open Access Transmission Tariff (OATT).

I. QUALIFICATIONS

Q. Please describe your education and professional experience.

A. I have a Bachelor of Science degree with Honors in Electrical Engineering with a focus in electric power systems from Portland State University. I have been Vice President of Transmission for PacifiCorp since December 2012. I was Director of Asset Management from 2007 to 2012. Before that position, I had management responsibility for a number of organizations in PacifiCorp's asset management group including capital planning, maintenance policy, maintenance planning, and investment planning since joining PacifiCorp in 2001.

II. PURPOSE OF TESTIMONY

Q. What is the purpose of your direct testimony in this case?

A. The purpose of my testimony is to describe PacifiCorp's transmission system and the benefits it provides to Washington customers, and specifically describe PacifiCorp's major capital investment projects for new distribution and transmission systems included in this rate case. These investments include transmission projects associated

with Energy Vision 2024 (Gateway South and Gateway West Segment D.1), various generation interconnection network upgrades, and two new 115–12.5 kilovolt (kV) substations and related projects.

My testimony demonstrates that the Company's decisions are prudent, and that these investments result in an immediate benefit to PacifiCorp's Washington customers. I recommend that the Washington Utilities and Transportation Commission (Commission) find these investments prudent.

III. OVERVIEW OF PACIFICORP'S TRANSMISSION SYSTEM

Q. What is the purpose of this section of your testimony?

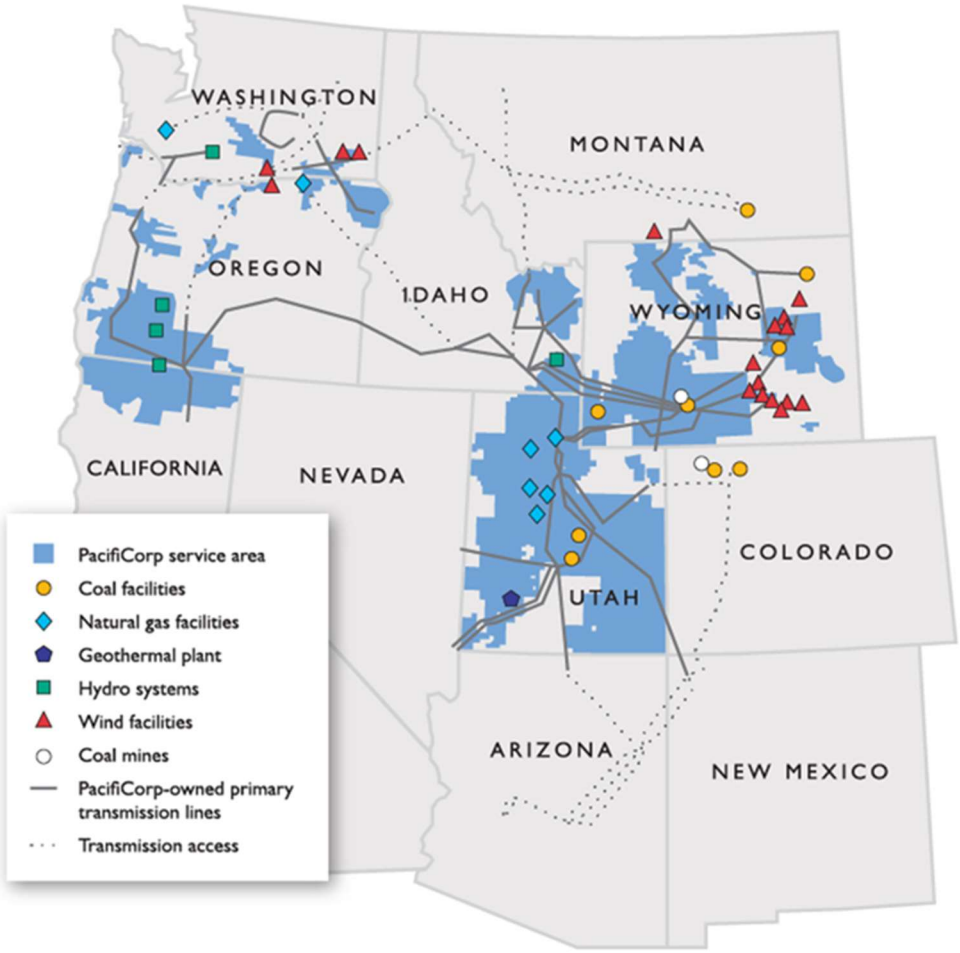
A. I provide an overview of PacifiCorp's transmission system, transmission reliability requirements, and standards and compliance mechanisms.

Q. Please provide a brief overview of the purpose of PacifiCorp's transmission system.

A. PacifiCorp's transmission system is designed to reliably transfer affordable electric energy from a broad array of generation resources to loads both within the Company's balancing authority areas (BAAs) and beyond, including other BAAs that PacifiCorp interconnects with, and participants in the California Independent System Operation's (CAISO) Western Energy Imbalance Market (EIM).

Q. Please briefly describe PacifiCorp's transmission system.

A. As seen in the image below PacifiCorp owns and operates approximately 17,770 miles of transmission lines ranging from 46 kV to 500 kV across multiple western states. PacifiCorp serves nearly two million customers with approximately 140,000 customers located in Washington.

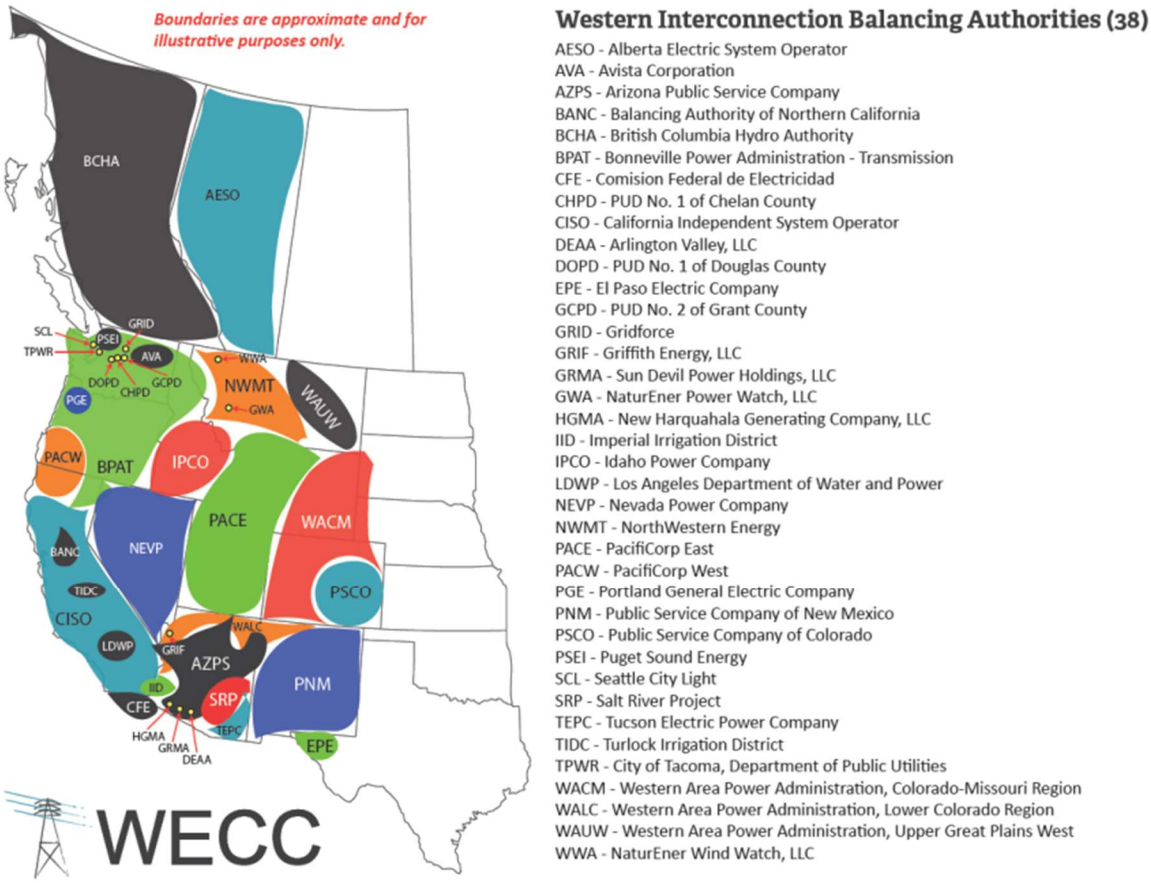


Q. What are Balancing Authorities and BAAs?

A. A Balancing Authority is the entity responsible for maintaining balance of load, generation, and interchange in a specific BAA, and supports interconnection frequency in real time. BAAs include all of the generation, transmission, and loads within a specific metered region.

PacifiCorp is a Balancing Authority and manages two BAAs: PacifiCorp East (PACE) BAA and PacifiCorp West (PACW) BAA. The PACW BAA includes interconnections with the Bonneville Power Administration (BPA), northern points of CAISO, and other utilities in California, Oregon, and Washington. The PACE BAA interconnects with utilities in the intermountain west and southwest, and also provides

access to the southern portion of the CAISO. As a Balancing Authority, PacifiCorp manages the production and consumption of electricity in these areas, by ensuring that there are adequate available generation resources or electricity transfers from other BAAs to meet load. As seen in the figure below, there are 38 BAAs in the Western Interconnection.[1]



Q. How does PacifiCorp operate the two BAAs?

A. PacifiCorp separately balances each BAA for energy and load. To optimize dispatch for the benefit of customers, PacifiCorp dispatches generation across both BAAs to serve load across the entire system. Deliveries of energy over PacifiCorp's

[1] Available at https://www.wecc.org/Administrative/06-Balancing%20Authority%20Overview.pdf.

transmission system are managed and scheduled in accordance with the Federal Energy Regulatory Commission's (FERC) requirements. The flexibility of PacifiCorp's integrated transmission system provides options for optimizing dispatch to serve load and designating units for holding reserves, and provides for additional reliability during planned or unplanned generation outages. PacifiCorp also provides transmission service across both BAAs, meaning that a transmission customer can purchase transmission service from any point in one BAA to the other BAA for a single tariff rate.

Q. Please describe PacifiCorp's responsibility for maintaining open access to its transmission system and creating stakeholder transmission planning processes.

A. In 1996, the FERC required transmission system owners like PacifiCorp to provide non-discriminatory access to their transmission systems for all transmission customers.[2] FERC expanded this open-access policy in 2011 by requiring transmission system owners to create regional, inter-regional, and local transmission planning processes.[3]

Under these authorities, the Company is required to provide non-discriminatory and reliable transmission and interconnection service according to the rates, terms, and conditions of PacifiCorp's OATT, and must engage in participant-driven planning processes covering its six-state transmission footprint.[4] These planning processes incorporate economics, reliability, and public policy inputs and

[2] *See, In re Open Access Transmission Services*, Order No. 888, 75 FERC ¶ 61,080 (May 10, 1996).
[3] *See, In re Transmission Planning and Cost Allocation,* Order No. 1000, 136 FERC ¶ 61,051 (Jul. 21, 2011).
[4] *See,* PacifiCorp's Open Access Transmission Tariff Volume No. 11, Attachment K (updated Aug. 31, 2022) (available Microsoft Word - PAC OATT 2.1.2022 PRINT (oati.com)).

requirements to develop comprehensive transmission development strategies.[5]

Where a request for transmission service cannot be reliably provided on the existing system, the Company's OATT and FERC policies require the Company to construct and expand its system to provide FERC-jurisdictional transmission and interconnection service.[6] This obligation to construct transmission facilities in response to transmission or interconnection service requests applies to both newly identified facilities and planned system expansions or upgrades.[7]

Q. Please describe PacifiCorp's responsibility for maintaining reliability on its transmission system.

A. In 2005, Congress directed the FERC to establish reliability standards to ensure the safe and reliable operation of the Nation's Bulk Electric System.[8] The following year, the FERC adopted rules to implement the statute,[9] and delegated these responsibilities to the North American Electric Reliability Corporation (NERC).[10]

[5] *See, e.g.,* PacifiCorp's Local Transmission System Plan (2020-2021 Biennial Cycle) (Dec. 30, 2021) (available Attachement K Transmission System Plan Draft Report (oati.com)).
[6] PacifiCorp's OATT, §§ 28.2 and 15.4 (reflecting FERC's pro forma tariff and requiring PacifiCorp to construct facilities as necessary to reliably provide requested transmission service); *In re Standardized Generator Interconnection Agreements and Procedures*, Order No. 2003, 104 FERC ¶ 61,103 at 767 (2003) (explaining that FERC's pro forma interconnection services "provide for the construction of Network Upgrades that would allow the Interconnection Customer to flow the output of its Generating Facility onto the Transmission Provider's Transmission System in a safe and reliable manner."); *In re Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, 118 FERC ¶ 61,119 at 814 (2007) (explaining that despite certain policy reforms, transmission providers "will continue to be obligated to construct new facilities to satisfy a request for service if that request cannot be satisfied using existing capacity").
[7] *See, In re CAISO Tariff Revision,* 133 FERC ¶ 61,224 (2010) (OATT construction obligations attach to planned facilities identified as necessary to grant interconnection requests, stating that "[t]he fact that CAISO has voluntarily chosen to evaluate a network upgrade in its transmission planning process should not affect the obligation to build these facilities.").
[8] 16 USC § 824o.
[9] *In re Electric Reliability Standards Rulemaking,* 71 FR 8662-01, Docket No. RM05-30-000; Order No. 672 (Feb. 17, 2006).
[10] *In re NERC Certification,* 116 FERC ¶ 61,062 (Jul. 20, 2006), *aff'd Alcoa Inc. v. FERC,* 564 F.3d 1342 (D.C. Cir. 2009).

NERC proceeded to establish various reliability standards, including transmission system planning performance requirements (TPL Standards). NERC's TPL Standards establish, among other things, "Transmission system planning performance requirements within the planning horizon to develop a Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies."[11] These TPL Standards, along with regional (*i.e.*, established by the Western Electricity Coordinating Council (WECC)) and utility-specific planning criteria, define the minimum transmission system requirements to safely and reliably serve customers.

Q. How does PacifiCorp ensure compliance with NERC TPL Standards?

A. The Company plans, designs, and operates its transmission system to meet or exceed NERC Standards for BES and WECC Regional standards and criteria. To ensure compliance with applicable TPL Standards, PacifiCorp conducts an annual system assessment to evaluate the performance of the Company's transmission system and to identify system deficiencies. The annual system assessment is comprised of steady-state, stability, and short circuit analyses to evaluate peak and off-peak load seasons in the near-term (one-, two-, and five-year) and long-term (10-year) planning horizons.[12] The assessment is performed using power flow base cases maintained by WECC and developed in coordination among all transmission planning entities in the

[11] *See* Standard TPL-001-4 — Transmission System Planning Performance Requirements, at A(3) (available RSCompleteSet.pdf (nerc.com)) (last accessed Winter 2023).

[12] Analyses consist of taking a normal system (N-0) and applying events (N-1, N-1-1, N-2, etc.) within each category (P0, P1, P2, P3, etc.) listed within the TPL Standards to identify system deficiencies. For example: An N-1-1 event describes two transmission system elements out of service at the same time, but due to independent causes. An example of an N-1-1 event would be a planned outage of one 230 kilovolt transmission line followed by an unplanned outage of any additional element in the system being used to continue service with the initial element out.

Western Interconnection. These base cases include load and resource forecasts along with planned transmission system changes for each of the future year cases and are intended to identify future system deficiencies to be mitigated.

As part of the annual system assessment, corrective action plans are developed to mitigate identified deficiencies, and may prescribe construction of transmission system reinforcement projects or, as applicable, adoption of new operating procedures. In certain instances, operating procedures prescribing action to change the configuration of the transmission system can prevent deficiencies from occurring when there are two back-to-back (N-1-1) (or concurrent) transmission system events with allowed system adjustments between two events in form of an operating procedure. However, the use of operating procedure actions have limitations. In particular, actions taken in connection with operating procedures that are designed to protect the integrity of the larger integrated transmission system in the Western Interconnection of the United States can lead to large numbers of customers being at risk of an outage upon the occurrence of the second of two back-to-back (N-1-1) events. An effective corrective action plan is critical to ensuring system reliability so that large numbers of customers are not subjected to avoidable outage risk.

Q. Is compliance with the reliability standards optional?

A. No. The reliability standards are a federal requirement, subject to oversight and enforcement by WECC, NERC, and FERC. PacifiCorp is subject to compliance audits every three years, and may be required to prove compliance during NERC or WECC reliability initiatives or investigations. Failure to comply with the reliability standards could expose the Company to penalties of up to $1.29 million per day, per

violation. Accordingly, compliance with reliability standards is a major driver for the new capital investments in PacifiCorp's system transmission assets identified in and supported by my testimony.

Q. Are there additional concerns that influence PacifiCorp's distribution and transmission system investment decisions?

A. Yes. Depending on the project, there are several factors that inform whether PacifiCorp will build new distribution and transmission facilities, including increased demand for transmission capacity, requests for transmission service, increased demand for distribution capacity, and the age and condition of existing distribution and transmission facilities. The specific concerns for the projects addressed in my testimony are described in more detail below.

IV. CUSTOMER BENEFITS OF PACIFICORP'S TRANSMISSION SYSTEM

Q. Please describe how the PacifiCorp transmission system benefits Washington customers.

A. PacifiCorp's transmission system is designed to reliably transport electricity from a broad array of generation resources to load across both BAAs, and the Company operates a geographically diverse and expansive transmission system serving retail customers in six western states. This unique geographic footprint, including over 17,770 miles of transmission lines, allows the Company to take advantage of efficiencies and economies from both a planning and operational perspective due to, among other things, retail load characteristics, and variable resource diversity. PacifiCorp's transmission system provides over 200 interconnections with adjacent transmission provider BAAs as well as access to regional energy market hubs in

Washington, the California-Oregon Border, Utah, the Four Corners area, and Arizona.

PacifiCorp's geographic diversity, access to adjacent transmission providers and BAAs, and access to regional energy market hubs allows PacifiCorp to economically dispatch units across its system and transfer energy from other systems as facilitated by the Company's participation in the EIM. This expansive footprint ensures PacifiCorp is uniquely situated to access some of the nation's best wind and most cost-effective solar resources to serve load through PacifiCorp's service territory.

PacifiCorp also takes advantage of its transmission system to minimize operation costs related to generation reserve requirements and blackstart capability. The Company is required to carry reserves to ensure system reliability in the event of changes in load or system events. Instead of being required to carry reserves and blackstart capability in each individual BAA, PacifiCorp is able to operate its transmission as a collective system and use resources that are geographically remote to meet the system requirements in all areas that PacifiCorp serves. This allows the Company to engage in the most economic dispatch to lower costs for its customers.

Q. Does PacifiCorp currently carry reserves in each BAA sufficient to meet that BAA's requirements?

A. Not always. PacifiCorp often meets its reserve requirements in PACW with resources located in PACE. While meeting reliability standard reserve requirements is not a transmission function, PacifiCorp's transmission system provides flexibility for PacifiCorp to meet its reserve requirements.

Q. Are investments across the system necessary to maintain PacifiCorp's transmission system?

A. Yes. The ability to flexibly use a diverse set of energy resources depends significantly on the strength and reliability of PacifiCorp's transmission system connecting those resources to the PacifiCorp retail customers in all six states. Transmission system outages and other real-time operation constraints place additional burden on the remainder of the transmission system as corrective actions plans are implemented to maintain compliance with NERC and WECC standards and guidelines and ensure the reliability of service to all PacifiCorp customers. Increasing PacifiCorp's transmission system capacity enhances reliability and allows more generation to interconnect to serve customer load, as well as allows PacifiCorp flexibility in designating generation resources for reserve capacity to comply with mandatory reliability standards.

Q. Can the benefits of a reliable system be easily quantified?

A. No. Reliability is, essentially, the absence of system disruptions. It is very difficult to quantify the benefit of reliability investments. That said, the access to different regions and redundancy in operations provides reliable service under a variety of conditions that benefits all PacifiCorp's customers.

Q. How does PacifiCorp propose to allocate the costs and benefits from the transmission assets in this case?

A. Consistent with the Washington Inter-Jurisdictional Allocation Methodology (WIJAM) approved by the Commission in the Company's last general rate case, docket UE-191024, PacifiCorp proposes to allocate the costs and benefits of the

entirety of PacifiCorp's transmission system to Washington. This includes all transmission assets in both PACW and PACE.

V. OVERVIEW OF INVESTMENTS

Q. What specific distribution and transmission system investments are you addressing in your testimony?

A. My testimony addresses PacifiCorp's major planned distribution and transmission system projects that will go in-service during the test period for this rate case. Each of these investments will increase PacifiCorp's load serving capability, enhance reliability, conform with NERC Reliability Standards, improve transfer capability within the existing system, relieve existing congestion, and interconnect and integrate new wind resources into PacifiCorp's transmission system. These projects include:

- The Gateway South Segment F Aeolus to Mona/Clover 500 kV (Gateway South) and Gateway West Segment D.1 Windstar to Aeolus 230 kV (Gateway West) Transmission Lines;
- GWS Supporting Projects;
- Ahtanum 115-12.5 kV Substation Projects; and
- Flint 115 kV to 12.5 kV Substation Projects.

Q. What are the projected investment costs and their anticipated in-service dates?

A. Please see the table below for the total-Company costs and in-service dates for each project. These amounts include costs for engineering, project management, materials and equipment, construction, right-of-way, and an allowance for funds used during construction. These costs are detailed in the testimony and exhibits of Company

witness Sherona L. Cheung. The in-service dates are based on our current best available information at the time of preparing this case.

TABLE 1

Project	Total-Company Cost	Washington-Allocated Cost	In-Service Date
Gateway South	$2,046.0 million	$163.2 million	Oct-24
Gateway West	$285.8 million	$22.8 million	Dec-24
EV2024 Network upgrades	$36.3 million	$2.9 million	Dec-24
Ahtanum 115-12.5 kV Substation Projects	$11.1 million	$8.3 million	May-25
Flint 115-12.5 kV Substation Projects	$15.1 million	$7.9 million	Dec-22

Q. Will PacifiCorp's OATT transmission customers pay their proportional share of these assets?

A. Yes. Transmission customers pay for transmission and ancillary services through the Company's transmission formula rate included in PacifiCorp's OATT.[13] Formula rates are updated by the Company's annual transmission revenue requirement (ATRR) filing that includes the total cost of providing firm transmission service over the test year.[14] This includes all transmission system investments made by the Company, a return on rate base, income taxes, expenses, and certain revenue credits, among other specific elements and adjustments.[15] Transmission assets, including the capital expenditures described in this rate case, will be included in the Company's annual ATRR filing when each asset is placed in service, weighted by months in service as necessary. This annual filing results in a wholesale customer rate by

[13] *In re PacifiCorp's Application for Formula Rates*, 143 FERC ¶ 61,162 (May 23, 2013) (letter order approving settlement agreement establishing formula rate).
[14] *See, e.g.,* PacifiCorp's OATT Volume No. 11, Attachment H: ATRR for Network Integration Transmission Service, at 326–365 (available Microsoft Word - PAC OATT 2.1.2022 PRINT (oati.com)).
[15] *Id.* at Attachment H-2: Formula Rate Implementation Protocols, at 366–386 (available Microsoft Word - PAC OATT 2.1.2022 PRINT (oati.com)); *See, e.g., In re PacifiCorp's 2022 Transmission Formula Annual Update,* Docket No. ER11-3643 (May 13, 2022) (available 2022_Annual_update-Formula_rate_filing.pdf (oati.com)).

dividing the total ATRR by firm transmission demand. This rate is then assessed against PacifiCorp's transmission customers.[16]

Q. Do PacifiCorp's Washington retail customers receive an offsetting revenue credit for a portion of the transmission revenue received under PacifiCorp's OATT?

A. Yes. A portion of PacifiCorp's transmission revenues are credited to the Company's state retail customers. Under this approach, the Company allocates 100 percent of its transmission costs to both state retail and FERC-jurisdictional customers. The FERC, through the Company's ATRR filings, determines the appropriate amount to be recovered from PacifiCorp's wholesale customers. This same amount is then credited to PacifiCorp's retail customers. This ensures that PacifiCorp recovers its transmission expenditures, and both wholesale and retail customers only pay their proportional share of the Company's transmission system.

A. Gateway South and Gateway West Transmission Lines

Q. Please describe the Energy Gateway Transmission Expansion.

A. In 2007, PacifiCorp launched the Energy Gateway Transmission Expansion, a multi-year strategy to add approximately 2,000 miles of new transmission lines across the west. To date, three major segments of Energy Gateway are complete and in service.[17] After over a decade of planning, the Company now proposes to move forward with constructing the Gateway South and a portion of Gateway West lines

[16] *See PacifiCorp's Transmission and Ancillary Services Rates* (effective Jun. 1, 2022) (available Rate Table 20220601.xlsx (oati.com)).
[17] *See generally* Energy Gateway (pacificorp.com).

(D.1).[18] The following graphic provides an overview of the Energy Gateway Transmission Expansion generally, and the Gateway South and Gateway West lines specifically:

Q. Please describe the Gateway South Transmission Project.

A. The Gateway South project includes the following elements:

[18] *See, e.g.,* PacifiCorp 2021 Integrated Resource Plan, Vol. 1, Ch. 4 – Transmission, at 83–102 (available 2021 IRP Volume I (pacificorp.com)).

- A 416-mile, high voltage 500 kV transmission line from the Aeolus substation, near Medicine Bow, Wyoming to the Clover substation near Mona, Utah.
- Rebuilding certain 345 kV transmission facilities in and around the Mona and Clover substations in Utah.
- Two new series compensation stations.
- Expansion of the Aeolus, Anticline, and Clover substations along with modifications to the Mona substation.
- Additional shunt capacitors at Bonanza (Utah), Riverton and Mustang (Wyoming) substations.
- Additions and modifications to various remedial actions schemes, voltage controllers and control schemes necessary to ensure protection and control of the grid after integration of Gateway South.

Q. Please describe the Gateway West Segment D.1 Transmission Project.

A. Gateway West Segment D.1 includes the following elements:

- A new 59-mile high-voltage, 230 kV transmission line from the Shirley Basin substation in southeastern Wyoming to the Windstar substation near Glenrock Wyoming.
- Rebuild of the existing Dave Johnston – Amasa – Difficulty – Shirley Basin 230 kV transmission line, which runs approximately 57 miles from the Shirley Basin substation in southeastern Wyoming to the Dave Johnston substation near Glenrock, Wyoming.
- A new 230 kV Heward substation adjacent to the Difficulty substation.

- Construction of four miles of high voltage 230 kV transmission line from the Aeolus substation to the Freezeout substation near Medicine Bow, Wyoming.
- Additions to the Shirley Basin, Dave Johnston, and Windstar substations.

Q. Please explain why the Gateway South and Gateway West Transmission Projects (collectively, the Transmission Projects) are needed.

A. The Transmission Projects are an important component of the Company's Energy Gateway Transmission Expansion, and Gateway South has long been recognized as a key transmission segment in the region's long-term transmission planning. These lines will provide substantial customer benefits.

For example, the Company needs additional resources to serve load by 2024, and the Transmission Projects enable new, cost-effective Wyoming generation resources to fill this need, and these Transmission Projects allow the Company to interconnect up to approximately 2,030 megawatts (MW) of new resources. These projects also improve reliability of the transmission system by providing capacity between Gateway West and Gateway Central, and relieve transmission congestion on the existing Wyoming transmission system. The Gateway South line allows transfers of up to 1,700 MW from eastern Wyoming to central Utah.

Q. Is the increased capacity provided by the Transmission Projects consistent with the Company's obligation to provide transmission service under its OATT?

A. Yes. PacifiCorp adhered to OATT processes when identifying the need for these transmission projects in response to nearly 2,500 MW of transmission and interconnection service requests, and the Transmission Projects have been included in multiple FERC-jurisdictional executed contracts. For example, PacifiCorp has

executed 13 contracts with third-party customers that require constructing one or both of the Transmission Projects, including a transmission service agreement that requires construction of Gateway South to reliably provide 500 MW firm point-to-point (PTP) transmission service beginning by the contract start date of January 1, 2024. The Transmission Projects are lynchpins in PacifiCorp's ability to meet its obligation to grant generator interconnection service and transmission service under the OATT.

The Transmission Projects will also enhance the Company's ability to comply with mandated NERC and WECC reliability and performance standards. Congestion on the current transmission system in eastern Wyoming limits the ability to deliver energy from eastern Wyoming to PacifiCorp load centers in Wyoming, Idaho, Utah, and the Pacific Northwest.

Q. Do the Transmission Projects increase the amount of generation that can be interconnected and delivered across the Company's transmission system?

A. Yes. The Transmission Projects will allow the Company to interconnect an additional 2,030 MW of generation resources in eastern Wyoming and increase the system transfer capability by approximately 875 MW from the Windstar/Dave Johnston area south to Shirley Basin/Aeolus, which will create approximately 1,700 MW of incremental transfer capability from eastern Wyoming (Aeolus) to the central Utah energy hub (Mona/Clover).

Q. Did the Company consider alternatives to Transmission Projects?

A. Yes. PacifiCorp and Northern Tier Transmission Group evaluated an alternative.

The Company analyzed one 345 kV line with bundled conductor from Aeolus to Anticline (138 miles), and two 345 kV lines with bundled conductors from

Anticline to Populus (approximately 198 miles each), along with other supporting mitigation such as transformers and shunt capacitors at different substations. These analyses indicated that the amount of renewable resources that could be interconnected to eastern Wyoming is reduced by approximately 1,100 MW. The high-level estimated cost of this alternative is $2.023 billion in 2020 dollars. This alternative also showed additional reliability issues on the transmission system between Rock Springs and Monument, as well as between Populus and Terminal that would have to be mitigated, resulting in additional cost burdens. Like the Aeolus to Mona line, this alternative does not provide an adequately diverse path for PacifiCorp's network loads.

Q. If the Company did not construct the Transmission Projects would you be able to provide the roughly 2,500 MW of interconnection and transmission service without constructing additional facilities?

A. No. To grant only the 500 MW transmission service request, the Company would be required to construct a 230 kV line at a cost of approximately $1 billion. To grant the transmission and interconnection service requests, consistent with the Company's OATT, would require construction of the functional equivalent of the Transmission Projects.

Q. Has the Company obtained all necessary permits and rights-of-way (ROW) for the Transmission Projects?

A. All permits and ROW for the Gateway West Segment D.1 have been obtained. All permits and ROW have been obtained for the Gateway South Project, with the exception of property rights from the Utah Department of Natural Resources (DNR)

lands. The ROW from the Utah DNR are expected to be procured no later than April 15, 2023, and no delays are expected to the current project schedule while the Company secures these rights.

Q. When did PacifiCorp begin construction of the Transmission Projects?

A. The Company began construction of the Gateway South project in June 2022 once all permits and rights-of-way required within Wyoming were obtained. Once the Company received the permits and rights-of-way for Gateway West Segment D.1, construction began in late September 2022. Regular construction status updates are being filed with the Commission as required.

Q. Is the Company confident that the Transmission Projects will be in service by 2024?

A. Yes. To manage construction schedule risk, the Company has structured and managed the projects on firm, date-certain, fixed-price, turnkey contracts. Construction contractors and equipment suppliers will be held to key construction and delivery milestones, guarantees, and development of compressed schedule mitigation plans, if required. The construction remains on-track and on schedule.

Q. Are the Transmission Projects currently on budget?

A. Yes. The project budgets consist of firm, date-certain, fixed price, turnkey contracts that include fixed cash flows assessed monthly against confirmed construction progress, in addition to identification and mitigation of projects risks that could stall or delay completion. To date, the projects are on budget.

Q. What are the remaining major milestones for the Transmission Projects?

A. Key milestones remaining before the October 2024 in service date for these two projects include:

- Complete construction of the 230 kV Windstar to Shirley Basin line by December 2023.
- Complete all wound core device deliveries by May 2024.
- Complete construction of the 500 kV transmission line and reconstruction of the 230 kV transmission line by October 2024.
- Complete all communications network additions and upgrades by October 2024.
- Complete commissioning and placed in-service in fourth quarter of 2024.

The Transmission Projects are on track to achieve each milestone.

B. EV2024 Network Upgrades

Q. What are network upgrades?

A. Network upgrades are the modifications or additions to transmission-related facilities that are integrated with and support PacifiCorp's overall Transmission System for the general benefit of system users.[19]

Q. Please explain how network upgrade cost allocation works under the OATT.

A. When PacifiCorp receives a request for generation interconnection or transmission service, the Company completes various studies to determine what new facilities or upgrades to existing facilities are required to accommodate the request.[20] The studies classify any required additions to support the requested service into two categories:

[19] *See, e.g.,* PacifiCorp's OATT Volume No. 11, § 1.27 (available Microsoft Word - PAC OATT 2.1.2022 PRINT (oati.com)).
[20] *Id.* §§ 38–43.

direct assigned or network upgrade. Direct-assigned assets are those assets that only benefit, or are used solely by, the customer requesting generator interconnection or transmission service. Those costs are directly assigned and paid for by that customer and will not be included in either the Company's ATRR or retail rates. Network upgrades, on the other hand, are assets that benefit all customers that use the transmission system. Network upgrade costs can be included in PacifiCorp's ATRR, and ATRR revenues, are then credited to PacifiCorp's retail customers in each state.[21]

Q. Is the Company requesting recovery of any Generation Interconnection Network Upgrades?

A. Yes. There are six generation interconnection projects that were selected from a recent request for proposal to interconnect 1,640 MW of new wind generation to the Company's transmission system in eastern Wyoming. The request for proposal process and the resulting resources selected are described in the testimony of Company witness Rick T. Link. A separate generation interconnection agreement was negotiated and signed for all six projects, and each will require generation interconnection network upgrades to interconnect and integrate with PacifiCorp's system. These projects include:

- Q0409 Boswell Springs Wind. This project is a 320 MW wind facility that will interconnect to the existing Freezeout 230 kV substation near Aeolus, and is planned to be in service by December 31, 2024. This project includes a new breaker at the Freezeout substation, and a new remedial action scheme and communications equipment at Aeolus substation.

[21] *Id.* 47.

- Q0713 Cedar Springs IV Wind. This project is a 350 MW wind facility that will interconnect to the existing Yellowcake 230 kV substation near Windstar, and is planned to be in service on January 15, 2025. This project includes construction of a new line position at the Yellowcake substation, including the installation of three new 230 kV circuit breakers, and requires a new microwave system and approximately 18 miles of fiber optic cable between Yellowcake and Windstar substations.
- Q0719 Two Rivers Wind. This project is a 280 MW wind facility that will interconnect to the existing Freezeout 230 kV substation near Aeolus, and is planned to be in service on December 31, 2024. This project includes expansion and conversion of the Freezeout substation with three new breakers, bus work, and other protection and control equipment with updates to the remedial action scheme.
- Q0785 Anticline Wind. This project is a 100 MW wind facility that will interconnect to a new substation on PacifiCorp's Casper – Claim Jumper 230 kV line, and is planned to be in service on December 31, 2024. This project includes a new three breaker ring bus substation on the Casper – Claim Jumper 230 kV line, substation loop in on transmission line, communications upgrade at Casper substation, and Main Grid operations center updates.
- Q0835 Rock Creek Wind. This project is a 190 MW wind facility that will interconnect to PacifiCorp's existing Foote Creek 230 kV substation and is planned to be placed in service on December 15, 2024. This project includes expansion of substation, bus, and line position at Foote Creek substation,

expansion for new breaker and line positions at Freezeout and Aeolus substations, construction of new approximately 3.5 miles long 230 kV transmission line between Aeolus and Freezeout substations.

- Q0836 Rock Creek Wind 2. This project is a 400 MW wind facility that will interconnect to PacifiCorp's existing Aeolus 230 kV substation and is planned to be placed in service on December 15, 2024. This project includes a new bay for a 230 kV line terminal at Aeolus substation.

Q. Why are these projects classified as network upgrades, and not directly assigned assets?

A. The interconnection study for each project indicated that these upgrades would provide system-wide benefits. Under PacifiCorp's OATT, this requires the Company to include these costs in the Company's ATRR, as opposed to directly assigning these costs to each project. Accordingly, the network upgrade costs for each of these projects are reflected in their respective Large Generator Interconnection Agreements.

Q. Is the Company confident that it can manage any construction schedule risk and deliver the network upgrades for the new wind facilities by the planned in-service dates?

A. Yes. To manage construction scheduling risk, the Company structured each network upgrade contract on a firm, date-certain, turnkey contract basis. Construction contractors and equipment suppliers are being held to key construction and delivery milestones and development of compressed schedule mitigation plans, if required. The Company also established construction contract completion dates and

backstopped them with guarantees. To date, the remaining network upgrades remain on track for planned in-service dates.

C. Ahtanum 115-12.5 kV Substation Projects

Q. Please describe the proposed Ahtanum 115-12.5 kV Substation Projects.

A. This project will construct a new 115-12.5 kV substation for the Company's urban service area in south Yakima, Washington, and a new 115 kV transmission line from Union Gap to the new substation. The transmission component of this project will be in service by March 2025, and the distribution components will be in service by May 2025.

Q. Please explain why these projects are needed and beneficial.

A. The area surrounding the new substation is expected to experience load growth over the next 5 to 10 years that will outpace existing capacity at the Clinton, Nob Hill, Voelker, and Union Gap substations without significant improvements to each substation. This new Ahtanum substation will immediately provide capacity relief to these existing substations, improve system reliability and operability, and solve outage concerns during peak loading periods due to the limited load transfer capacity between current substations. The new 115 kV lines will also relocate an existing 115 kV off Yakama Nation land.

Q. Did PacifiCorp consider alternatives to investing in the Ahtanum 115-12.5 kV Substation projects?

A. Yes, however the only reasonable alternative is to delay these projects until the area reaches maximum loading capability (expected to occur sometime in the next ten-year period). This delay would result in more substantial investments, because in

addition to the Ahtanum 115-12.5 kV Substation projects, the Company would need to replace three transformers and construct two 25 MVA distribution transformers, as well as upgrade the transmission and distribution equipment at each of the affected four substations.

There are also reliability concerns with delaying these projects. By waiting until each substation transformer reaches its maximum loading capability over the next ten years, the substation and distribution systems will remain limited and exposed to poor reliability for that same duration, as opposed to providing immediate capacity relief to all four substations which shortens feeder lengths and improves system operability. The Ahtanum 115-12.5 kV Substation projects result in more incremental investments and greater reliability.

D. Flint 115-12.5 kV Substation Projects

Q. Please describe the Flint 115-12.5 kV Substation Projects.

A. This project constructs a new substation in the Flint, Washington area north of the Yakima River, and extends a new 115 kV transmission line approximately 9.3 miles from Punkin Center substation to supply the new substation. The majority of this project was placed in-service in December 2022.

Q. Please explain why these projects are needed and beneficial.

A. These projects help resolve capacity restrictions at the existing Wapato and Toppenish Substations that are located on the Yakama Indian Reservation in the lower Yakima valley area of Washington.

Q. Did PacifiCorp consider alternatives to investing in the Flint 115-12.5 kV?

A. Yes. The Yakama Tribe recently enacted restrictions that prevent the upgrade of distribution system facilities that supply areas off the tribal lands. To respect this requirement, the Company considered constructing a 115 kV from the BPA Moxee substation to the Donald area, rebuild the Union Gap to Hopland 115 kV transmission line to higher capacity conductor, and then construct a small distribution substation in the Donald area to off load Wapato substation. However, this alternative offers far less additional capacity for the initial investment cost, and the new Flint substation would still be needed in future years to address the distribution capacity problems out of Toppenish and Punkin Center substations.

VI. CONCLUSION

Q. Please summarize your testimony.

A. I recommend that the Commission conclude that the projects described above are prudent.

Q. Does this conclude your direct testimony?

A. Yes.