

Exh. RG-1T
Docket UE-210829
Witness: Rohini Ghosh

**BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION**

WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,

Complainant,

v.

PACIFICORP dba
PACIFIC POWER & LIGHT COMPANY

Respondent.

Docket UE-210829

PACIFICORP

DIRECT TESTIMONY OF ROHINI GHOSH

July 2023

TABLE OF CONTENTS

I. INTRODUCTION AND PURPOSE 1

II. PACIFICORP’S RESOURCE PLANNING SOFTWARE..... 2

III. RELATIONSHIP BETWEEN PACIFICORP’S IRP AND CEIP 7

IV. PACIFICORP’S REVISED CEIP 9

 A. Creating the Revised CEIP9

 B. Interim and Specific Targets14

 C. Incremental Cost17

 D. Comparing the Initial and Revised CEIPs18

V. CONCLUSION..... 21

1 I. INTRODUCTION AND PURPOSE

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

4 A. My name is Rohini Ghosh and my business address is 825 NE Multnomah Street,
5 Suite 600, Portland, Oregon 97232. I am currently employed as a Senior Resource
6 Valuation/Planning Specialist with PacifiCorp.

7 Q. Please describe your education and professional experience.

8 A. I have a Bachelor of Science (Honors) degree in Economics from the University of
9 Nottingham, Malaysia Campus. I received my Master of Science in Economics from
10 the University of Wyoming in 2017 and I am currently a Ph.D. candidate in
11 Economics expecting to graduate August 1, 2023, from the University of Wyoming.
12 My graduate research focused on energy economics, and the buildout of large-scale
13 wind power and environmental considerations on a transmission-constrained
14 electricity grid.

15 I have been a resource valuation/planning specialist at PacifiCorp since
16 February 2021. My role includes running and analyzing optimization models in
17 PLEXOS, used for the Integrated Resource Plan (IRP), and communicating those
18 inputs and results to stakeholders through written and presented materials.
19 Additionally, I support the ongoing confidential negotiations regarding the Multi
20 State Process framework with analyses and proposals where the six-state cost
21 allocation methodology interacts with, or relies on, outcomes from the IRP. As the
22 subject matter expert on state-specific long-term resource allocation I am responsible

1 for state-specific policy analyses based on the IRP for Washington’s Clean Energy
2 Implementation Plan (CEIP) and Oregon’s Clean Energy Plan (CEP).

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

4 A. As discussed in Matthew D. McVee’s testimony, the Company has filed both an
5 Initial and Revised CEIP with the Commission.¹ My testimony focuses on the
6 processes and methodologies that informed the Company’s Revised CEIP and
7 compares the Initial and Revised CEIPs when appropriate.

8 **II. PACIFICORP’S RESOURCE PLANNING SOFTWARE**

9 **Q. Can you describe the methodology that PacifiCorp used in the 2021 IRP to**
10 **optimally develop system-wide portfolios?**

11 A. Yes. PacifiCorp implemented a new and more advanced optimization modeling
12 system called PLEXOS for its 2021 IRP processes. The PLEXOS modeling system
13 provides three platforms (referred to as Long-Term (LT), Medium-Term (MT) and
14 Short-Term (ST)), that work on an integrated basis to inform the optimal combination
15 of resources by type, timing, size, and location over PacifiCorp’s 20-year planning
16 horizon. The PLEXOS software allows for improved, simultaneous, endogenous
17 modeling of resource options, and greatly reduces the volume of individual portfolios
18 needed to evaluate the impacts of alternative resource decisions.

19 **Q. Can you please describe how PLEXOS improves the Company’s endogenous**
20 **modeling compared to previous modeling software?**

21 A. The PLEXOS model provides more flexibility compared to the Company’s previous
22 software by allowing the model to endogenously select optimal retirement dates for

¹ The Initial CEIP was filed December 30, 2021, and the Revised CEIP was filed March 13, 2023.

1 existing coal resources. Each thermal resource is analyzed individually in PLEXOS
2 for the optimal retirement decision as part of the larger resource portfolio. For
3 example, PLEXOS allows each of PacifiCorp's majority-owned coal units to retire
4 every 3 years to model optimal resource selections. The prior Enterprise Portfolio
5 Management (EPM) capacity expansion model was less sophisticated, and only
6 exogenously analyzed coal thermal retirements. This model setup required multiple
7 retirement scenarios to be studied to produce a range of thermal retirements, and this
8 method then informed resource selection on existing coal retirements. This process
9 was burdensome, time consuming, and is now accomplished automatically by the
10 PLEXOS model.

11 **Q. Please describe how PacifiCorp used the LT model.**

12 A. PacifiCorp used the LT model to produce unique resource portfolios across a range of
13 different planning cases. Informed by the public-input process, PacifiCorp identified
14 case assumptions that were used to produce optimized resource portfolios, each one
15 unique regarding the type, timing, location and amount of new resources that could be
16 pursued to serve customers over the next 20 years. Portfolios from the LT model are
17 informed by an hourly review of reliability conditions, based on ST model
18 simulations (described below). This ensures each portfolio meets minimum reliability
19 criteria in all hours over the planning horizon.

20 **Q. Please describe how PacifiCorp used the MT model.**

21 A. PacifiCorp used the MT model to perform stochastic risk analysis of the portfolios.
22 Each portfolio was evaluated for cost and risk among up to five price-policy scenarios
23 (MM, MN, HH, LN and SCGHG). A primary function of the MT model is to

1 calculate an optimized risk-adjustment, representing the relative risk of a portfolio
2 under unfavorable stochastic conditions for that portfolio.

3 **Q. Can you please describe what are stochastic risk and optimized risk-**
4 **adjustments?**

5 A. Stochastic risk is the range of present value revenue requirements (PVRR) that result
6 from expected outcomes. This allows the probability of specific portfolios to be
7 examined under the range of results, and also provides a measure of standard
8 deviation. The MT model applies 20 iterations in the stochastic study setup and
9 shocks loads, electric and gas prices, hydro generation, and thermal outages. A
10 primary function of the MT model is to calculate an optimized risk-adjustment,
11 representing the relative risk of a portfolio under unfavorable stochastic conditions
12 for that portfolio. The optimized risk-adjustment is measured as the ST PVRR plus 5
13 percent of the 95th stochastic iteration PVRR.

14 **Q. Please describe how PacifiCorp used the ST Model.**

15 A. PacifiCorp used the ST model to evaluate each portfolio to establish system costs
16 over the entire 20-year planning period. The ST model accounts for resource
17 availability and system requirements at an hourly level, producing reliability and
18 resource value outcomes as well as a PVRR, that serves as the basis for selecting
19 least-cost, least-risk portfolios. As noted above, ST model simulations were also used
20 to identify the potential need for resources in the portfolio to maintain system
21 reliability.

22 **Q. Can you describe PVRR?**

23 A. Yes. PVRR is the anticipated net present value of the costs and expenses that are

1 expected to result from any given portfolio of resources, expressed as a traditional
2 cost of service revenue requirement. The PVRR for any given portfolios is compared
3 against alternative portfolios to determine the least-cost, least-risk portfolio of
4 resources. PVRR includes both the known and projected net present values of various
5 costs and expenses, including: existing contracts, market purchase costs, market sales
6 revenues, generation costs (fuel, fixed and variable operation and maintenance,
7 decommissioning, emissions, unserved energy and unmet capacity), costs of demand-
8 side management (DSM) resources, amortized capital cost for existing and potential
9 new resources, and cost for existing and potential transmission upgrades, to name a
10 few.

11 **Q. How did these three PLEXOS models work together to inform the economic**
12 **analysis presented in PacifiCorp's 2021 IRP and CEIP?**

13 A. In the first step, resource portfolios were developed using the LT model. The LT
14 model develops portfolios of resources that minimize operating costs for existing and
15 prospective new resources, subject to system load balance, reliability, and other
16 constraints. Over the 20-year planning horizon, the model optimizes resource
17 additions subject to known or projected resource costs and load constraints. These
18 constraints include seasonal loads, operating reserves, and regulation reserves, in
19 addition to a minimum capacity reserve margin for each load area represented in the
20 model.

21 To accomplish these optimization objectives, the LT model performs a least-
22 cost dispatch function for existing and potential planned generation, while
23 considering cost and performance of existing contracts and new DSM alternatives

1 within PacifiCorp's transmission system. Resource dispatch is based on
2 representative data blocks for each of the 12 months of every year. This dispatch
3 function also determines optimal electricity flows between zones and includes spot
4 market transactions for system balancing and seeks to minimize system PVRR.

5 Each portfolio developed by the LT model must have sufficient capacity to be
6 reliable ⁽¹⁾over the IRP's 20-year planning horizon. The resource portfolios reflect
7 a combination of planning assumptions such as resource retirements, carbon dioxide
8 (CO₂) prices, wholesale power and natural gas prices, load growth net of assumed
9 private generation penetration levels, cost and performance attributes of potential
10 transmission upgrades, and new and existing resource cost and performance data,
11 including assumptions for new supply-side resources and incremental DSM
12 resources.

13 **Q. What is the next step in the modeling process?**

14 A. In the second step, the Company conducted a reliability assessment using the ST
15 model. The ST model begins with a LT model portfolio that has not been assessed for
16 hourly reliability and simulates the portfolio at an hourly level over the 20-year
17 planning horizon. This retrieves two critical pieces of data: (1) reliability shortfalls by
18 hours; and (2) the value of energy potential of each resource to the system. This
19 information then determines the most cost-effective resource additions needed to
20 meet reliability shortfalls, leading to a reliability-modified portfolio. The ST model is
21 then run again with the modified portfolio to calculate an initial PVRR, that is risk-
22 adjusted by outcomes of MT model stochastics that occur in the third step of the
23 process.

1 **Q. Please describe how the MT model is used to conduct cost and risk analysis.**

2 A. In the third step, the resource portfolios developed by the LT model and adjusted for
3 reliability by the ST model are simulated in the MT model to produce metrics that
4 support comparative cost and risk analysis among the different resource portfolio
5 alternatives. The stochastic simulation in the MT model produces a dispatch solution
6 that accounts for chronological commitment and dispatch constraints. The MT
7 simulation incorporates stochastic risk in its production cost estimates by using the
8 Monte Carlo sampling of stochastic variables, which include load, wholesale
9 electricity and natural gas prices, hydro generation and thermal unit outages. The MT
10 results are used to calculate a risk adjustment that is combined with the ST model
11 system costs to achieve a final risk-adjusted preferred portfolio of resources.

12 **Q. What does the final risk-adjusted preferred portfolio of resources represent?**

13 A. The preferred portfolio is the least-cost, least-risk portfolio of resources that, based on
14 then-current assumptions and data, will best serve PacifiCorp's customers over the
15 20-year planning period.

16 **III. RELATIONSHIP BETWEEN PACIFICORP'S IRP AND CEIP**

17 **Q. How is PacifiCorp's CEIP related to the 2021 IRP?**

18 A. The Company currently conducts system-wide planning across its six-state service
19 territory. To allow Washington customers to continue to receive the substantial
20 benefits from system-wide planning, the Company's 2021 IRP preferred portfolio
21 represents the first step to evaluate Clean Energy Transformation ACT (CETA)
22 compliance.

1 This preferred portfolio is then compared against CETA’s targets to determine
2 what additional Washington actions or resources are needed to comply with the
3 state’s energy policies. Any incremental actions and resources are selected based on
4 the same PLEXOS modeling steps discussed above, and the medium carbon proxy
5 price is replaced with Washington’s social cost of greenhouse gases (SCGHG). New
6 generation resources are considered situs to Washington, while energy efficiency and
7 demand response resources (which are situs resources by their nature) are
8 automatically maximized for Washington in both the initial IRP analysis and final
9 CEIP analysis. These additional actions or resources becomes the Company’s CEIP
10 preferred portfolio.

11 **Q. Are the IRP preferred portfolio and the CEIP portfolio fundamentally similar?**

12 A. Yes. For many years, PacifiCorp has been on an independent trajectory to
13 economically develop clean energy while also investing in new innovations that will
14 power the Western grid for decades to come. For example, the Company’s last three
15 major IRP filings (2019, 2021, and the Two-Year Progress Report), have only
16 included non-emitting and renewable capacity expansion resources. Accordingly, the
17 bulk of the renewable and non-emitting resource acquisitions that would otherwise be
18 necessary to comply with CETA have already been identified (and the Company has
19 taken steps to procure), in PacifiCorp’s previous and current IRP cycles. To the point:
20 there is no difference between the Company’s 2021 IRP system-wide preferred
21 portfolio and the CEIP portfolio in the initial CEIP action plan window. For this
22 reason, in addition to the benefits from system-wide planning, the Company’s IRP

1 remains a solid foundation to determine what incremental actions are needed to
2 comply with CETA.

3 **IV. PACIFICORP'S REVISED CEIP**

4 **Q. What is the purpose of this section?**

5 A. In this section I discuss how the Company created its Revised CEIP, and the
6 Company's resulting interim and specific targets, incremental costs, and compare the
7 Company's Initial and Revised CEIPs.

8 **A. Creating the Revised CEIP**

9 **Q. How did the Company create the Revised CEIP?**

10 A. Creating the Revised CEIP involved four steps. Beginning with the Company's 2021
11 IRP portfolio modeling, the Company: (1) selected a system-wide portfolio that
12 effectively replaced the medium carbon price assumption with the SCGHG (P02-
13 SCGHG); (2) identified which resources from this six-state portfolio optimized under
14 SCGHG should be allocated to Washington customers; (3) determined whether any
15 additional resources or actions were necessary to comply with CETA; and (4)
16 extrapolated results from the Company's 20-year planning horizon five years through
17 2045, creating the CEIP portfolio (P02-SC-CETA). Each step is discussed below.

18 **Q. What is the SCGHG?**

19 A. The SCGHG is a hypothetical cost that represents Washington's estimate of the direct
20 and indirect costs associated with the emissions of greenhouse gases.

1 **Q. Did PacifiCorp’s 2021 IRP and Initial and Revised CEIPs include a SCGHG**
2 **planning adder?**

3 A. Yes. PacifiCorp’s 2021 IRP and CEIPs analyzed the SCGHG under various scenarios
4 and in several portfolios.

5 **Q. Did PacifiCorp include the SCGHG planning adder in every portfolio in the**
6 **2021 IRP?**

7 A. No. PacifiCorp plans for its six-state system, and no state that PacifiCorp operates
8 in—including Washington—requires utilities to incorporate the SCGHG as a dispatch
9 adder that impacts the expected operations of existing generating facilities. Rather
10 Washington requires utilities to use the SCGHG a planning adder for IRP and CEIP
11 purposes. Because of that, the Company did not include the SCGHG in every
12 portfolio in the 2021 IRP.

13 **Q. Can you please explain how PacifiCorp’s Revised CEIP_[sc(2)] incorporated the**
14 **SCGHG?**

15 A. Yes. In every IRP, PacifiCorp models several carbon adders based on assumptions of
16 real-world conditions during the 20-year planning horizon. Under then-current
17 planning assumptions, the Company’s 2021 IRP determined that medium carbon and
18 medium natural gas prices were the conditions that were the most reasonably
19 expected to occur over the planning horizon. These two conditions are reflected in
20 “MM” of the Company’s P02-MM preferred portfolio.

21 For the Revised CEIP, the Company selected the P02-SCGHG portfolio in
22 place of the P02-MM portfolio, which effectively replaced the medium carbon
23 planning adder with the SCGHG. For Washington resource selections, the SCGHG

1 was assumed to start in 2021, and just like the medium carbon planning adder, the
2 SCGHG price is reflected in market prices and dispatch costs for the purposes of
3 developing each portfolio (i.e., incorporated into capacity expansion optimization
4 modeling).

5 **Q. Was the Revised CEIP portfolio fully optimized using the SCGHG planning**
6 **adder?**

7 A. Yes. The portfolio P02-SCGHG was developed using the SCGHG in the resource
8 capacity expansion decisions, specifically, in the LT modeling step of portfolio
9 development. This means that the SCGHG dispatch adder is applied to all emitting
10 resources on a dollars per pound basis, where the model calculates the amount of
11 emissions based on fuel usage and is also reflected in market prices. Additionally,
12 portfolios developed under all price curves, including the SCGHG, were run and
13 dispatched under the SCGHG price curve in the MT and ST models to reflect the
14 hypothetical impact of SCGHG in operations for these portfolios.

15 **Q. Did this result in PacifiCorp's Revised CEIP including the SCGHG in the**
16 **selection of each resource allocated to Washington?**

17 A. Yes.

18 **Q. In the second step, how did PacifiCorp identify resources that should be**
19 **allocated to Washington customers?**

20 A. Because the Company's PLEXOS software plans for system-wide resources, the
21 Company had to perform a post-modelling allocation exercise to determine what
22 renewable and non-emitting resources were necessary to comply with CETA while
23 also serving Washington ratepayers over the 20-year planning horizon.

1 This exercise built from the system-optimized P02-SCGHG portfolio and
2 layered on several material assumptions, including then-relevant forecasts of the
3 Company’s anticipated Washington load growth and market prices, and what
4 resources qualified as CETA-compliant renewable and non-emitting energy. For
5 example, when a resource (excluding hydroelectric generation) was expected to
6 generate renewable energy certificates (RECs), and that energy was allocated to
7 Washington, that resource was assumed to generate one renewable megawatt-hour
8 that could be used to comply with CETA for every REC generated. For hydroelectric
9 generation, the Company assumed that the generation could be used to comply with
10 CETA as a non-emitting resource whether or not the resource was registered in
11 WREGIS and generated RECs. And the Company assumed that nuclear and hydrogen
12 non-emitting peaking plants would qualify as non-emitting resources under CETA.

13 This analysis identified the resources that were forecasted to be allocated to
14 Washington customers^[IT(3)]^[GR(4)], and as a result, the Company’s CEIP includes a
15 portion of the resources that were included in the system-optimized P02-SCGHG
16 portfolio.

17 **Q. Did this allocation of resources result in a CETA-compliant portfolio?**

18 A. No. As described in the Revised CEIP, the Company’s modeling and post-allocation
19 processes identified two de minimis capacity shortfalls. The estimated renewable and
20 non-emitting energy allocated to Washington in 2030 would only amount to 77
21 percent of retail sales (a 14 MW average annual capacity deficit), and from 2040
22 through 2045 would not amount to 100 percent (a 28 MW average annual capacity
23 deficit). These shortfalls are slight compared to the several gigawatts of resources

1 included in the Washington-allocated P02-SCGHG CEIP portfolio, but nonetheless
2 would not have resulted in a CETA-compliant portfolio.

3 In this third step, to become compliant PacifiCorp identified an 80 MW co-
4 located wind, solar, and storage resource located in Yakima, Washington (added in
5 2030), and another incremental 55 MW resource (added in 2040). In total, 135 MWs
6 of incremental renewable and non-emitting capacity were added to the CEIP portfolio
7 and were assumed to be situs-assigned to Washington customers in terms of
8 generation, costs and benefits. These incremental resources additions were added to
9 the Washington-allocated P02-SCGHG portfolio.

10 **Q. What was the final step to create the Revised CEIP preferred portfolio?**

11 A. While PacifiCorp's IRP planning horizon is currently 20 years (ending in 2041 for the
12 2021 IRP), the Company extrapolated results from 2041, including the underlying
13 data and assumptions, forward through 2045 for the Revised CEIP. This is consistent
14 with traditional IRP modeling, as the IRP uses data extrapolation for many inputs in
15 the 20-year planning horizon (for example, including the escalation calculations used
16 to determine solar, wind and battery storage profiles). These four steps, derived from
17 the Company's six-state planning processes, resulted in the Revised CEIP preferred
18 portfolio P02-SC-CETA.

19 **Q. Were the Company's assumptions and methodologies for the Revised CEIP
20 reasonable and based on relevant information at the time?**

21 A. Yes. However as discussed in the testimony of Matthew McVee, several of these
22 assumptions and methodologies are now out-of-date. For example: the inclusion of
23 2020 All-Source Request for Proposals bid resources, assumptions made about a

1 future interjurisdictional allocation methodology, impacts stemming from recent
2 federal legislation, and changes to the load forecast, to name a few.²

3 **B. Interim and Specific Targets**

4 **Q. How did PacifiCorp determine its interim targets?**

5 A. After identifying the share of resources from P02-SCGHG that were allocated to
6 Washington customers, adding the 135 MWs of incremental resources, and
7 extrapolating through 2045, PacifiCorp identified which generation sources from this
8 total portfolio of resources could count towards CETA's renewable and non-emitting
9 energy targets. From the final resources included in the P02-SC-CETA portfolio, the
10 Company developed a forecast of renewable and non-emitting energy allocated to
11 Washington customers and divided that forecast by anticipated Washington retail
12 sales in each year over the planning horizon. The resulting quotient was the
13 Company's interim targets for each year.

14 Based on this methodology, PacifiCorp projected meeting 60 percent of
15 Washington retail sales with renewable and non-emitting generation by 2025, 84
16 percent in 2030, and over 100 percent beginning in 2041.

17 **Q. Does PacifiCorp rely on alternative compliance mechanisms to meet CETAs
18 clean energy targets?**

19 A. Yes. Through 2044, up to 20 percent of Washington's greenhouse gas neutral
20 standard can be met with alternative compliance options. As needed, PacifiCorp may
21 use unbundled RECs to satisfy Washington's greenhouse gas neutral standard through
22 2044.

² *In re PacifiCorp's 2021 CEIP*, Docket No. UE-210829, Motion for Clarification or Review, ¶¶ 14-20 (May 30, 2023) (discussing several examples why an update was needed).

1 **Q. Do you have anything else you would like to add regarding PacifiCorp's interim**
2 **targets?**

3 A. Yes. The Company's interim targets rely on forecasts of system-wide and
4 Washington-allocated energy and retail electric sales, and additional variables that are
5 outside of PacifiCorp's control. Even under the best circumstances, PacifiCorp cannot
6 guarantee that actual conditions will reflect forecasted interim targets.

7 **Q. How are the Company's specific targets related to the interim target?**

8 A. The Company's specific targets for renewable energy, energy efficiency, and demand
9 response are incorporated in the Revised CEIP's interim targets: the renewable
10 energy efforts increase the percentage of retail sales served by renewable and non-
11 emitting electricity, while the energy efficiency and demand response targets decrease
12 the Company's projected retail sales.

13 **Q. Can you describe how the Company identified the energy efficiency and demand**
14 **response specific targets?**

15 A. CETA requires a four-year conservation target (2022-2025) and an intermediate
16 target (2022-2023). The 2021 IRP Preferred Portfolio and the CEIP portfolio
17 identified cost-effective, reliable, and feasible conservation targets from 2022 through
18 2031 for the Energy Independence Act (EIA) target. PacifiCorp proposed using the
19 same forecast to draft specific targets for the CEIP, and the 2022-2023 draft target
20 was provided with the Biennial Conservation Plan (BCP) filed on November 1, 2021.
21 The 2024-2025 targets use an additional two years of conservation pro-rata share,
22 plus adders for decoupling. The Company will update these targets through the 2023
23 BCP process.

1 The conservation forecast for end-use efficiency, behavioral programs and
2 market transformation (collectively referred to as energy efficiency) was developed
3 using the following data sources, assumptions and methodology: completion of the
4 2021 Conservation Potential Assessment (CPA); economic screening and selection of
5 resources through the 2021 IRP and CEIP development process; additions of
6 projected savings from the existing Home Energy Reports (behavioral) program;
7 identification of adjustments to the 2021 IRP preferred portfolio conservation
8 resource selections based on updates from the Regional Technical Forum (RTF) Unit
9 Energy Savings (UES) values; and comparison of the annual conservation forecast
10 with the pro-rata share of the ten-year forecast. The target is the larger of the two
11 consistent with the methodology used in the EIA process. The 2022-2025 energy
12 efficiency target was 212,431 MWh.

13 For the demand response targets, the Company identified demand response
14 resources from two sources: the 2021 CPA and bids solicited through the 2021
15 demand response request for proposals (RFP). Most demand response resources
16 included in the near-term 2021 IRP modeling were derived from competitive bids in
17 the 2021 demand response RFP. PacifiCorp's demand response target for 2022-2025
18 was 37.4 MW. Total demand response volume is subject to change based on timing of
19 programs and contract negotiations.

20 **Q. Does the CEIP drive PacifiCorp's ability to meet CETA targets in the four-year**
21 **planning period?**

22 A. No. PacifiCorp's clean energy procurement strategies predate CETA. And as
23 indicated by the Company's previous and current requests for proposals, the

1 Company is on track to comply with CETA without significant incremental resources
2 or actions caused by Washington's energy policies during the first four-year
3 implementation period.

4 **C. Incremental Cost**

5 **Q. Can you describe how PacifiCorp calculated incremental cost?**

6 A. Yes. As defined in Washington Administrative Code (WAC) 480-100-660(1),
7 PacifiCorp determined the incremental cost of actions taken to comply with the
8 Revised Code of Washington (RCW) §§19.405.040 and 19.405.050 by comparing its
9 lowest reasonable cost portfolio the CEIP portfolio (P02-SC-CETA), with the
10 Alternative Lowest Reasonable Cost Portfolio that would have resulted in the absence
11 of CETA (P02-SCGHG).

12 The modeled incremental cost is defined as the forecasted difference in
13 Washington-allocated costs between P02-SC-CETA and P02-SCGHG for the CEIP
14 planning window 2022-2025. Because no additional actions needed to be taken to
15 comply with CETA before 2030, there is effectively no modeled incremental cost
16 during this first four-year CEIP planning period. Any differences between the
17 portfolio costs during this period are negligible and within the bounds of arbitrary
18 model outcomes.

19 However, the Company anticipates incurring certain CETA implementation
20 costs not related to procurement efforts during the four-year period. These include
21 administrative costs such as EAG-related moderation and communication costs,
22 incremental staffing requirements, and costs related to activities undertaken to
23 enhance reach and equitable distribution of DSM programs. These implementation

1 costs above the Company's procurement efforts average approximately \$2.4 million
2 dollars per year.

3 The estimated annual revenue requirement impact of CETA-compliance,
4 combining both the modeled and non-modeled costs, amounted to an average of
5 \$2.59 per year across the four-year CEIP period.

6 **Q. Does PacifiCorp's estimate of incremental cost represent actual costs?**

7 A. No. The CEIP is a planning document and provides an estimate of the costs
8 associated with CETA compliance. Actual compliance costs will be determined in
9 subsequent rate proceedings.

10 **Q. Does PacifiCorp anticipate staying below CETA's cost cap for the first
11 implementation period?**

12 A. Yes.

13 **D. Comparing the Initial and Revised CEIPs**

14 **Q. Are there any material differences in the steps to create the Company's CEIP
15 portfolio between the Initial and Revised CEIPs?**

16 A. No. Both the Initial and Revised CEIP resource portfolios are based on the same 2021
17 IRP modeling process described above, and result in materially similar resources.
18 And the Company's Initial CEIP resource portfolio would have resulted in lower
19 costs, and lower risk, compared to the Revised CEIP.

20 For example, the Company initially analyzed the P02-SCGHG portfolio in the
21 2021 IRP to determine whether it should be the basis for the Company's CEIP
22 portfolio. After review, the P02-SCGHG resources for Washington customers were
23 virtually identical to the Washington-allocated resources under the Company's 2021

1 preferred portfolio, P02-MM. And both portfolios (P02-SCGHG and P02-MM)
2 would require additional incremental resources for CETA compliance and need to be
3 extrapolated to 2045. Accordingly, instead of P02-SCGHG, the Company used P02-
4 MM as the basis for the Initial CEIP, because P02-MM was the top-performing
5 system-wide portfolio in the 2021 IRP (least-cost, least-risk overall). After taking the
6 steps discussed above and incorporating the higher Washington energy efficiency
7 selections from P02-SCGHG into P02-MM, the Company's Initial CEIP portfolio
8 became P02-MM-CETA.

9 **Q. Were there any meaningful differences in the resources between the Initial and**
10 **Revised CEIP?**

11 A. No. There was only a small number of long-term capacity expansion resources that
12 were different between the two portfolios: P02-MM-CETA included five additional
13 hybrid solar, wind, and storage resources, while P02-SCGHG included three different
14 non-emitting peaking plans and wind resources.³ Yet these different resources in P02-
15 SCGHG were caused by increased reliability and diversity needs resulting from
16 heavy coal retirements after 2025 when the SCGHG was applied across the
17 Company's six-state system. However, none of these coal-replacement resources
18 were assumed to be allocated to Washington customers—under either the Initial or
19 Revised CEIP—because under CETA Washington is coal-free by 2025. Accordingly,
20 none of the resources that are included in P02-SCGHG, but not in P02-MM-CETA
21 were included in the Initial CEIP.

³ Revised CEIP Appendix F, Table F.9.

1 As a result, under the Initial CEIP’s P02-MM-CETA portfolio, Washington
2 customers would end up with a higher amount of installed capacity of renewable and
3 non-emitting resources than in P02-SCGHG over the 20-year planning horizon (the
4 five additional renewable and non-emitting resources described in Table F.9).

5 Additionally, P02-SCGHG, because it includes the higher dispatch cost of
6 carbon in operations (ST model), understates the need for additional renewable
7 capacity for Washington, to increase clean energy targets. Also, early retirements in
8 coal under SCGHG (not deemed optimal for the system under MM) and replacement
9 brownfield capacity, cannot be reasonably allocated or attributed to Washington
10 customers.

11 However, the company notes that the trajectory is identical between the two
12 portfolios during the CEIP planning period, 2022 – 2025.

13 **Q. How do the interim targets differ between the Initial and Refiled CEIP?**

14 A. The interim targets for renewable and non-emitting energy increased from 55 percent
15 to 60 percent in 2025 in the Refiled CEIP. This change in the interim target
16 calculation was caused by re-stating the estimated hourly dispatch outcomes under
17 the SCGHG, instead of MM. The higher cost of carbon in operations (in the ST
18 model) causes dispatch to adjust because reliance on market purchases and emitting
19 generation is more costly. PacifiCorp chose to present the interim targets in the Initial
20 CEIP dispatched under MM because the company felt this was more representative of
21 actual system-wide operations where no Federal carbon price exists. Interim targets
22 calculated under the SCGHG likely over-state the expected generation from
23 renewable and non-emitting resources.

1 **Q. Are there any other differences in the Company’s Revised CEIP compared to**
2 **the Initial CEIP?**

3 A. No. Consistent with the Commission-approved settlement in SCGHG Complaint
4 docket, the Company’s additional specific targets (for energy efficiency and demand
5 response, for example), and specific actions (for procurement efforts and community
6 engagement, for example), were unchanged between the Initial and Revised CEIP.
7 For additional discussion regarding the steps the Company took to create the Revised
8 CEIP, please refer to Appendix F of the Revised CEIP.

9 **V. CONCLUSION**

10 **Q. Please summarize your testimony.**

11 A. For many years, PacifiCorp has been on an independent trajectory to economically
12 develop clean energy, powering jobs and innovation. This trajectory is exemplified in
13 PacifiCorp’s 2021 IRP which serves as the basis for this CEIP.

14 My testimony describes the modeling process and software in PacifiCorp’s
15 determination of the 2021 IRP preferred portfolio and the Revised CEIP; discussed
16 how the Company created the Revised CEIP, our resulting interim and specific
17 targets and incremental costs; and compared the Initial and Revised CEIPs. As our
18 Revised CEIP portfolio confirms, the company is already on a strong path to meet
19 CETA’s clean energy targets, and the current CEIP includes minimal incremental
20 resource additions for Washington customers to meet CETA targets.

21 My testimony also highlights that while these assumptions and methods were
22 reasonable at the time, several important areas need to be updated to reflect current
23 realities, including assumptions about the interjurisdictional allocation of PacifiCorp

1 resources amongst its six-state territory, underlying forecasts for load, prices,
2 technology available, and evolving regional or federal energy policy, to name a few.

3 **Q. Does this conclude your direct testimony?**

4 A. Yes.