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Work Paper
PacifiCorp Renewable Resources Cost Analysis

Background

Under Washington Administrative Code (WAC) 480-109-210(2), PacifiCorp dba Pacific Power & Light Company (PacifiCorp) must present the incremental cost of eligible renewable resources and the cost of renewable energy credits, and the ratio of this additional investment relative to its total annual retail revenue requirement. WAC 480-109-210 describes the incremental cost as the difference between an eligible resource's levelized cost and the levelized delivered cost of an equivalent amount of a non-eligible resource. This workpaper describes the methodology used to estimate the incremental costs, as required under WAC 480-109-210.

Methodology

PacifiCorp's 2021 EIA report contains 2020 RPS actuals and a 2021 "plan". The methodology described in WAC 480-109-210 and used by PacifiCorp is a one-time calculation of incremental cost comparing the levelized cost of each eligible renewable resource at the time of acquisition to the levelized cost of a non-eligible resource available to the utility at the time of the eligible resource's acquisition.

PacifiCorp is seeking a waiver in its 2021 Renewable Portfolio Standard (RPS Report) of the one-time calculation methodology to:

(1) provide an updated incremental cost calculation for certain resources that underwent a capital upgrade or "repowering" that changed the capacity value, extended useful life, and changed costs and production tax credits, and

(2) identify the capacity value of seven eligible renewable resources[1] based on its 2019 Integrated Resource Plan (IRP) progress report instead of an IRP that has been acknowledged by the Washington Utilities and Transportation Commission (Commission).

PacifiCorp repowered twelve resources in 2019 and 2020—Dunlap, Glenrock I, Glenrock III, Goodnoe Hills, High Plains, Leaning Juniper, Marengo I, Marengo II, McFadden Ridge, Rolling Hills, Seven Mile Hill I and Seven Mile Hill II.

2020 Compliance Year

For the 2020 compliance year, resources are allocated to Washington based on the West Control Area Inter-Jurisdictional Allocation Methodology (WCA). Washington was allocated a system generation share of west-side resources as well as a portion of RECs from some of PacifiCorp's

[1] Ekola Flats, Goodnoe Hills (repowered), Sage Solar I-III, Sweetwater Solar, and TB Flats II.

owned wind resources located outside of the west control area.[2] These east-side resources were not included in Washington customers' rates so they were assigned a weighted average cost of the wind resources within the west control area (Goodnoe Hills, Leaning Juniper, Marengo I and Marengo II) to approximate an incremental cost. The weighted average is calculated by multiplying each resource's levelized incremental cost per megawatt-hour by its proportionate contribution to Washington's RPS.

2021 Compliance Year

Beginning January 1, 2021, Washington approved a new cost allocation protocol – the Washington Inter-Jurisdictional Allocation Methodology (WIJAM). Under this protocol, Washington receives a system generation share of all system renewables, versus recognizing only west-side renewables under the former WCA.

In PacifiCorp's 2021 plan, Washington is allocated RECs from approximately 27 resources from which it did not previously receive an allocation. The company has calculated and provided an incremental cost for these resources. WAC 480-109-210 (2)(a)(i) contains the rules for calculation of incremental cost of RPS resources.

PacifiCorp identified six categories of resources below for consideration of incremental cost calculation:

1) Existing WCA resources;
2) Existing WCA resources that have been repowered;
3) Owned system renewables new to Washington under WIJAM;
4) Owned system renewables new to Washington under WIJAM that have been repowered;
5) System power purchase agreements (PPAs) new to Washington under WIJAM;
6) System power purchase agreements (PPAs) new to Washington under WIJAM, with supplemental REC agreements that already provide RECs to Washington;

General Rule about new resources under WIJAM

When introducing WIJAM system resources PacifiCorp has included information from time of acquisition (or best available at the time the resource was introduced to Washington if the information from the time of acquisition is not available).

Incremental cost requirements established in rule:

"A utility must:

(i) Make a one-time calculation of incremental cost for each eligible resource at the time of acquisition or, for historic acquisitions, the best information available at the time of the acquisition:

[2] Campbell Hill, Dunlap I, Glenrock I, Seven Mile Hill I, and Top of the World.

Capacity factor	as calculated in the utility's ***most recent integrated resource plan acknowledged by the commission*** [WAC 480-109-210 (2)(a)(i)(B)]
Integration cost	determined by the utility's ***most recently completed renewable resource integration study*** [WAC 480-109-210 (2)(a)(i)(A)]
Non-eligible CCCT	lowest-reasonable-cost, noneligible resource available to the ***utility at the time of the eligible resource's acquisition*** for each corresponding eligible resource. [WAC 480-109-210 (2)(a)(i)(C)]
Non-eligible CCCT levelized energy cost	determine the cost of acquiring the same amount of energy as expected to be produced by the eligible resource, levelized over a time period equal to the facility life or contract length of the eligible resource and at the same discount rate used in (a)(i)(A) of this subsection; [WAC 480-109-210 (2)(a)(i)(D)]
Non-eligible CCCT levelized capacity cost	Calculate the levelized capital cost of obtaining an equivalent amount of capacity provided by the eligible resource, as determined in (a)(i)(B) of this subsection, from a noneligible resource. This cost must be levelized over a period equal to the facility life or contract length of the eligible resource and at the same discount rate used in (a)(i)(A) of this subsection. To make this calculation, a utility must use the lowest-cost, noneligible capacity resource identified in its ***most recent integrated resource plan acknowledged by the commission.*** However, if a utility determines that cost information in the integrated resource plan is no longer accurate, it may use cost information from another source, with documentation of the source and an explanation of why the source was used; [WAC 480-109-210 (2)(a)(i)(E)]

The regulation also defines Legacy Resources as Any eligible resource that the utility acquired prior to March 31, 1999, is deemed to have an incremental cost of zero. [WAC 480-109-210 (2)(a)(i)(G)]

Category 1: Existing WCA resources – Status Quo

These are standard company-owned hydro resources for which Washington has received RECs historically under the WCA. PacifiCorp will apply the same one-time calculation methodology to these resources as done in previous filing for the resources that were previously part of WCA.

This category includes only the following incremental hydro resources:

Resource	Resource Type	IRP	Notes
JC Boyle (Upgrade 2005)	Incr Hydro	2003 IRP	No change from 2020 RPS report
Lemolo 1 (Upgrade 2003)	Incr Hydro	2008 IRP	No change from 2020 RPS report
Lemolo 2 (Upgrade 2009)	Incr Hydro	2008 IRP	No change from 2020 RPS report
Prospect 2 (Upgrade 1999)	Incr Hydro	2003 IRP	No change from 2020 RPS report

Capacity factor	From the time of Incremental Hydro Upgrade
Plant life	From the time of Incremental Hydro Upgrade
O&M	From the time of Incremental Hydro Upgrade
Discount rate	IRP at the time of Incremental Hydro Upgrade
Inflation forecast	IRP at the time of Incremental Hydro Upgrade
Generation forecasts	From the time of Incremental Hydro Upgrade
Integration cost	None for Hydro
Non-eligible CCCT	IRP at the time of Incremental Hydro Upgrade

Category 2: Existing WCA resources - Repowered

These are company-owned, repowered wind resources for which Washington has received a system generation share of RECs historically under the WCA. PacifiCorp will apply the same methodology to repowered resources as done in the 2020 RPS report for Leaning Juniper and Goodnoe Hills. This methodology was arrived at by a stakeholder workgroup in 2020 and filed in docket UE-190448. The primary feature of this methodology is that it utilizes inputs from the IRP at the time of acquisition to the time of repowering, and updated inputs from the IRP at time of repowering to the end of the plant life. *The company sought a waiver of the incremental cost rules in to implement this methodology, as agreed upon with staff and working group members.*

This category includes the following resources:

Resource	Resource Type	Repowered	IRP	Notes
Dunlap I †	Wind	Repowered	2008/2017	
Glenrock I †	Wind	Repowered	2007/2017	
Goodnoe Hills	Wind	Repowered	2007/2019***	No change from 2020 RPS report. Incremental cost of repowering calculated previously in 2020 RPS report.
Leaning Juniper	Wind	Repowered	2007/2017	No change from 2020 RPS report. Incremental cost of repowering calculated previously in 2020 RPS report.
Marengo I	Wind	Repowered	2007/2017	The incremental cost of repowering was not calculated in 2020 RPS because at that time, commission rules required a resource to have reached commercial operation by January 1 of the compliance year in which the RECs were being used.
Marengo II	Wind	Repowered	2007/2017	The incremental cost of repowering was not calculated in 2020 RPS because at that time, commission rules required a resource to have reached commercial operation by January 1 of the compliance year in which the RECs were being used.
Seven Mile Hill I †	Wind	Repowered	2007/2017	
Seven Mile Hill II †	Wind	Repowered	2007/2017	

†Through 2020, the incremental cost was calculated as the weighted average cost of west-side WCA renewables.

***The commission did not acknowledge the company's 2019 IRP. It sought waiver of this requirement in the 2020 RPS report, and will seek the same waiver this year, as the 2021 IRP will not be filed, or acknowledged by June 1, 2021.

Capacity factor	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Plant life	Extended repower life (Starts from the time of acquisition to the end of plant life after repowering)
O&M	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Discount rate	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Inflation forecast	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Generation forecasts	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Integration cost	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Non-eligible CCCT	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
SCCT	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)
Capacity Contribution Factor	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life (2019 IRP for Goodnoe Hills only)

Category 3: New to Washington Under WIJAM - Owned system renewables

These are company-owned system renewable resources for which Washington has not received RECs historically under the WCA, but will receive a system share under the WIJAM protocol 2021 onward. PacifiCorp will calculate the incremental cost of these resources based on capacity factors and non- eligible resource criteria used in Oregon. Although this may not line up perfectly with the most recent IRP, most of these resources are current enough that this information will not meaningfully impact the levelized cost of the eligible or non-eligible resource.

This category includes the following resources:

Resource	Resource Type	Repowered	IRP	Notes
Blundell	Geothermal	No	n/a	**Legacy resources**. - Any eligible resource that the utility acquired prior to March 31, 1999, is deemed to have an incremental cost of zero.
Blundell II	Geothermal	No	2008 IRP	
Cedar Springs Wind II	Wind	No	2017 IRP	

Resource	Resource Type	Repowered	IRP	Notes
Ekola Flats Wind	Wind	No	2019 IRP***	
Rock River I	Wind	No	2003 IRP	
TB Flats II	Wind	No	2019 IRP***	

***The commission did not acknowledge the company's 2019 IRP. It sought waiver of this requirement in the 2020 RPS report, and will seek the same waiver this year, as the 2021 IRP will not be filed, or acknowledged by June 1, 2021.

Capacity factor	Time of acquisition IRP
Plant life	Time of acquisition IRP
O&M	Time of acquisition IRP
Discount rate	Time of acquisition IRP
Inflation forecast	Time of acquisition IRP
Generation forecasts	Time of acquisition IRP
Integration cost	Integration studies were only available from 2017, 2015 and 2007 IRPs. Resources were aligned with the studies from the year of acquisition of the IRP preceding the time of acquisition.
Non-eligible CCCT	Time of acquisition IRP
SCCT	Time of acquisition IRP
Capacity Contribution Factor	Capacity Contribution studies were only available from 2017, 2015 and 2007 IRPs. Resources were aligned with the studies from or preceding the time of acquisition IRP.

Category 3a: New WIJAM Incremental Hydro-

These are company-owned qualifying incremental hydro resources for which Washington has not received RECs historically under the WCA, but will receive a system share under the WIMAM protocol 2021 onward.

This category includes the following resources:

Resource	QF	Resource Type	Repowered	IRP	Notes
Big Fork	No	Hydro	No	2003 IRP	

Capacity factor	From the time of Incremental Hydro Upgrade
Plant life	From the time of Incremental Hydro Upgrade
Capital and O&M	From the time of Incremental Hydro Upgrade
Discount rate	IRP at the time of Incremental Hydro Upgrade
Inflation forecast	IRP at the time of Incremental Hydro Upgrade
Generation forecasts	From the time of Incremental Hydro Upgrade
Integration cost	None for Hydro
Non-eligible CCCT	IRP at the time of Incremental Hydro Upgrade

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Category 4: New to Washington Under WIJAM - Owned system renewables (Repowered)

These are company-owned, repowered wind resources which Washington may have received RECs, but was not allocated a share of the costs historically under the WCA. Washington will receive and pay for a system share under the WIJAM protocol 2021 onward. The methodology is consistent with Category 2. It was derived with a stakeholder workgroup in 2020 and filed in docket UE-190448.

This category includes the following resources:

Resource	QF	Resource Type	Repowered	IRP	Notes
Foote Creek I (co-own w. EWEB, sold to BPA)	No	Wind	Yes	n/a	**Legacy resources**. - Any eligible resource that the utility acquired prior to March 31, 1999, is deemed to have an incremental cost of zero.
Glenrock III	No	Wind	Yes	2007/2017	
High Plains †	No	Wind	Yes	2007/2017	
McFadden Ridge	No	Wind	Yes	2007/2017	
Rolling Hills †	No	Wind	Yes	2007/2017	

†Through 2020, the incremental cost was calculated as the weighted average cost of west-side WCA renewables.

Capacity factor	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Plant life	Extended repower life (Starts from the time of acquisition to the end of plant life after repowering)
O&M	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Discount rate	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Inflation forecast	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Generation forecasts	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Integration cost	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Non-eligible CCCT	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
SCCT	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life
Capacity Contribution Factor	Time of acquisition IRP from acquisition to repower 2017 IRP from repower to end of life

Category 5: New to Washington Under WIJAM - system PPAs

These are system renewable power purchase agreements for which Washington may have received RECs, but was not allocated a share of the costs historically under the WCA.

Washington will receive and pay for a system share of these resources under the WIJAM protocol 2021 onward.

Data for renewable resources acquired through PPAs reflect the associated contract terms. Nominal levelized incremental cost was calculated by using an average $/MWh based on the incremental cost calculations for each resource, multiplied by anticipated generation. The nominal prices do not include the cost of integration, which is added as an adjustment in the levelized cost calculation.

This category includes the following resources:

Resource	QF	Resource Type	Repowered	IRP	Notes
Campbell Hill †		Wind	No	2008 IRP	
Cedar Springs Wind I		Wind	No	2017 IRP	
Cedar Springs Wind III		Wind	No	2017 IRP	
Latigo Wind	QF	Wind	No	2015 IRP	
Mountain Wind 1	QF	Wind	No	2007 IRP	
Mountain Wind 2	QF	Wind	No	2007 IRP	
Pavant Solar II LLC	QF	Solar	No	2015 IRP	
Pioneer Wind Park I LLC	QF	Wind	No	2015 IRP	
Sage Solar I, LLC	QF	Solar	No	2019 IRP***	
Sage Solar II, LLC	QF	Solar	No	2019 IRP***	
Sage Solar III, LLC	QF	Solar	No	2019 IRP***	
Sweetwater Solar, LLC	QF	Solar	No	2019 IRP***	
Top of the World †		Wind	No	2008 IRP	
Wolverine Creek		Wind	No	2004 IRP	

†Through 2020, the incremental cost was calculated as the weighted average cost of west-side WCA renewables.
***The commission did not acknowledge the company's 2019 IRP. It sought waiver of this requirement in the 2020 RPS report, and will seek the same waiver this year, as the 2021 IRP will not be filed, or acknowledged by June 1, 2021.

Capacity factor	Based on PPA contract terms
Plant life	Based on PPA contract length
O&M	Annual nominal prices based on contract terms
Discount rate	Commission acknowledge IRP that led to PPA execution or most current the time of execution
Inflation forecast	Commission acknowledge IRP that led to PPA execution or most current the time of execution
Generation forecasts	Based on PPA contract terms
Integration cost	Commission acknowledge IRP that led to PPA execution or most current the time of execution

Non-eligible CCCT	Commission acknowledge IRP that led to PPA execution or most current the time of execution
SCCT	Commission acknowledge IRP that led to PPA execution or most current the time of execution
Capacity Contribution Factor	Commission acknowledge IRP that led to PPA execution or most current the time of execution

Category 6: PPAs with supplemental REC agreement

These are system renewable power purchase agreements (QFs) for which PacifiCorp is not entitled to the RECs under the standard PPA. But the company subsequently purchased the RECs in 2016 and 2019 via requests for proposals.

The company will continue to represent the incremental cost of these RECs as the RFP REC purchase price.

Resource	QF	Resource Type	IRP	Notes
Adams Solar††	QF	Solar	n/a	Incremental cost is REC Purchase Price
Bear Creek Solar††	QF	Solar	n/a	Incremental cost is REC Purchase Price
Bly Solar††	QF	Solar	n/a	Incremental cost is REC Purchase Price
Elbe Solar††	QF	Solar	n/a	Incremental cost is REC Purchase Price
Enterprise††	QF	Solar	n/a	Incremental cost is REC Purchase Price
Granite Mountain East	QF	Wind	n/a	Incremental cost is REC Purchase Price
Granite Mountain West	QF	Wind	n/a	Incremental cost is REC Purchase Price
Pavant††	QF	Solar	n/a	Incremental cost is REC Purchase Price

††The purchased RECs are allocated only to Washington, Oregon, and California. Granite Mountain East and Granite Mountain West RECs are allocated 100% to Washington.

Capacity factor	NA
Plant life	NA
O&M	NA
Discount rate	NA
Capacity contribution	NA
Inflation forecast	NA
Generation forecasts	NA
Integration cost	NA
Non-eligible CCCT	NA

Eligible Resource Costs—Incremental Hydroelectric Upgrades

In PacifiCorp's RPS compliance filings before 2016, the company reported the incremental costs associated with the equipment replacements for Lemolo 1, Lemolo 2, JC Boyle and Prospect 2 as

zero, on the economic basis that the marginal cost of gaining output from these resources was less than the cost of an equivalent alternative. Beginning with the company's 2016 RPS Report, as requested by Commission Staff, PacifiCorp has calculated the levelized incremental costs associated with these eligible hydroelectric upgrades, rather than assume a zero incremental cost for RPS purposes. Using the same methodology described in WAC 480-109-210(2)(a)(i), the incremental costs for these hydroelectric upgrades were derived using the best information available from the time of the resource acquisition.

Comparison of Eligible Resource Cost to Non-Eligible Resource Cost

To arrive at the cost per megawatt-hour or the incremental cost of the eligible renewable resource, the company calculated the cost difference between the eligible renewable resource and the non-eligible resource for each year, beginning with the year the resource was placed into service. The resulting annual values are nominal and levelized over the life of the eligible resource to arrive at a single nominal cost value applicable to the facility life. The annual cost differential is calculated in dollars and is divided by the annual generation to arrive at an annual dollars-per-megawatt-hour resource cost, which is also nominal levelized over the life of the eligible renewable resource.

Annual Calculation of Revenue Requirement Ratio

The revenue requirement ratio for a given compliance year was calculated by summing the costs of compliance (incremental costs of all eligible resources used plus the cost of any unbundled RECs purchased for compliance in the target year) and dividing the total renewable costs by the utility's annual revenue requirement for the target year.