

## **Work Paper**

### **PacifiCorp Renewable Resources Cost Analysis**

#### Background

Under Washington Administrative Code (WAC) 480-109-210(2), PacifiCorp dba Pacific Power & Light Company (PacifiCorp or Company) 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

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 2020 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 one of the repowered eligible resources 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).

In a collaborative working group facilitated by Commission Staff, participating parties agreed that the non-eligible "proxy" resource selection should align to the timing of the repowering as follows: from acquisition to repowering using a non-eligible resource selected from the company's IRP at the time of acquisition of the eligible resource; and using a non-eligible resource from the point of repowering forward from PacifiCorp's IRP at the time of repowering.

PacifiCorp repowered four resources in the west control area in 2019 and 2020—Marengo I, Marengo II, Leaning Juniper, and Goodnoe Hills. As of January 1, 2020, repowering was complete at Leaning Juniper and Goodnoe Hills. PacifiCorp will therefore recalculate incremental costs for repowering for those two resources in its 2020 compliance report. It will not recalculate the incremental costs of repowering for Marengo I and Marengo II.

For this analysis, Leaning Juniper aligns with the 2017 IRP. But the repowered capacity value and resource characteristics for Goodnoe Hills were not included in the Company's 2017 IRP, and will therefore align with the Company's 2019 IRP progress report filed October 18, 2019.

Washington customers are also allocated RECs from some of PacifiCorp’s owned wind resources located outside of the west control area<sup>1</sup> using the control area generation west or CAGW allocation factor in accordance with the company’s inter-jurisdictional allocation methodology. These resources are not included in Washington customers’ rates so they are 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.

Eligible Resource Costs—Wind

As required under WAC 480-109-210(2)(a)(i), each eligible renewable resource’s cost was calculated using the best information available at the time of acquisition, which was the company’s resource acquisition analysis and the IRP from the time of acquisition. Eligible costs were derived using the following data:

**Table 1**

<b>Resource</b>	<b>Cost Component Data Source</b>
Goodnoe Hills	<p><b>Pre-repowering (2007-2018 data)</b> Resource acquisition analysis for each resource, with 2007 IRP Resource Capacity Contribution and Integration costs.</p> <p><b>Post- Repowering (2019-2049 data)</b> 2019 IRP progress report filed on October 18, 2019. Values reflect IRP’s least-cost, least-risk resource portfolio (Preferred Portfolio)</p>
Leaning Juniper	<p><b>Pre-repowering (2006-2018 data)</b> Resource acquisition analysis for each resource, with 2007 IRP Resource Capacity Contribution and Integration costs.</p> <p><b>Post- Repowering (2019-2049 data)</b> 2017 IRP filed April 4, 2017. Values reflect IRP’s least-cost, least-risk resource portfolio (Preferred Portfolio)</p>
Marengo I and II	Resource acquisition analysis for each resource, with 2007 IRP Resource Capacity Contribution and Integration costs.
Lemolo 1 – Upgrade 2003	
Lemolo 2 – Upgrade 2009	
JC Boyle – Upgrade 2005	
Prospect 2 – Upgrade 1999	

<sup>1</sup> Only refers to the portion of PacifiCorp resources allocated to Washington in order to fulfill Washington’s total CAGW share of west control area resources. Washington’s resource allocations are explained in detail on pages 15-17 of PacifiCorp’s 2020 Renewable Portfolio Standard Report.

### 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.

### Non-Eligible Resource Selection Costs

The incremental cost methodology described in WAC 480-109-210(2)(C) requires the selection of the lowest-reasonable-cost non-eligible resource available to the utility at the time of the eligible resource’s acquisition. To meet the guidelines set forth in WAC 480-109-210(2), the company used the lowest-cost, non-eligible capacity resource identified in its most recent integrated resource plan acknowledged by the commission at the time of the acquisitions. As noted above, two non-eligible resources are used for repowered resources. The selection of non-eligible resources is aligned with the timing of the repowering as follows: from acquisition to repowering using a non-eligible resource selected from the IRP at the time of acquisition; and from the point of repowering forward using a non-eligible selection from the IRP at the time of repowering. As stated above, for this analysis, Leaning Juniper will align with the 2017 IRP. However, Goodnoe Hills repowered capacity value and resource characteristics were not included in the company’s 2017 IRP and will therefore align with the company’s 2019 IRP progress report filed on October 18, 2019

For each of PacifiCorp’s eligible resources, the non-eligible resources selected for the incremental costs are combined cycle combustion turbines (CCCTs). The table below identifies the relevant IRP and the corresponding non-eligible resource (proxy plant) selected for the incremental cost calculations:

**Table 2**

<b>Resource</b>	<b>Relevant IRP</b>	<b>Non-Eligible Resource from IRP</b>
Goodnoe Hills	2007 IRP	602-megawatt west side CCCT water-cooled “F” class 2x1 with duct firing
	2019 IRP progress report	505-megawatt east side CCCT Dry “J/HA.02” class 1x1 with duct firing
Leaning Juniper	2007 IRP	602-megawatt west side CCCT water-cooled “F” class 2x1 with duct firing
	2017 IRP	436-megawatt west side CCCT Dry “G/H” class 1x1 with duct firing

<b>Resource</b>	<b>Relevant IRP</b>	<b>Non-Eligible Resource from IRP</b>
Marengo I and II	2007 IRP	602-megawatt west side CCCT water-cooled “F” class 2x1 with duct firing
Lemolo 1 – Upgrade 2003	2003 IRP	570-megawatt west side CCCT “7FA” class 2x1 with duct firing
Lemolo 2 – Upgrade 2009	2008 IRP	569.67-megawatt west side CCCT water-cooled “F” class 2x1 with duct firing
JC Boyle – Upgrade 2005	2004 IRP	525-megawatt east side CCCT air-cooled “F” class 2x1 with duct firing
Prospect 2 – Upgrade 1999	2003 IRP <sup>2</sup>	570-megawatt west side CCCT “7FA” class 2x1 with duct firing

Capital and energy costs for the non-eligible resource are based on the IRP, and the non-eligible resource is sized to produce the same amount of energy as expected to be produced by the eligible resource.

Energy cost of the non-eligible resource includes fuel and emission costs associated with producing the same amount of energy as expected to be produced by the eligible resource, levelized over the time period equal to facility life of the eligible resource. Capital costs of the non-eligible resource include fixed costs of the CCCT (including operation and maintenance costs). The capacity costs of the energy-equivalent combined cycle combustion turbine are reduced, based on the fixed costs of a simple cycle combustion turbine (SCCT) identified in each relevant IRP, until the non-eligible resource capacity is equivalent to the capacity value of the eligible resource.

#### 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.

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<sup>2</sup> The 2003 IRP was used for Prospect 2 because this is the earliest IRP from which the company has data.