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March 30, 2020

Via Electronic Filing

Public Utility Commission of Oregon
Attn: Filing Center
201 High St. SE, Suite 100
Salem OR 97301

Re: In the Matter of PORTLAND GENERAL ELECTRIC COMPANY, Renewable Resource Automatic Adjustment Clause (Schedule 122)
Docket No. UE 370; and
In the Matter of PORTLAND GENERAL ELECTRIC COMPANY, Renewable Resource Automatic Adjustment Clause (Schedule 122) (BPSC Energy Storage Microgrid and ARC Energy Storage)
Docket No. UE 372 *(Consolidated)*

Dear Filing Center:

Please find enclosed the redacted version of the Opening Testimony and Exhibits of Bradley G. Mullins on behalf of the Alliance of Western Energy Consumers ("AWEC") in the above-referenced dockets.

Please note that AWEC's testimony and exhibits contain protected information that is being handled in accordance with Order No. 19-146. The confidential portions of AWEC's filing have been encrypted with 7-zip software and are being transmitted electronically to the Commission and qualified persons, consistent with the Commission's Order No. 20-088.

Thank you for your assistance. If you have any questions, please do not hesitate to call.

Sincerely,

/s/ Jesse O. Gorsuch
Jesse O. Gorsuch

Enclosures

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I have this day served the **confidential portions of the Opening Testimony and Exhibits of Bradley G. Mullins** upon the parties shown below via electronic mail, consistent with Commission Order No. 20-088.

Dated at Portland, Oregon, this 30th day of March, 2020.

Sincerely,

/s/ Jesse O. Gorsuch
Jesse O. Gorsuch

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BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 370, UE 372

In the Matters of	)
	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (Wheatridge) (UE 370) and	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (BPSC Energy Storage Microgrid and ARC Energy Storage) (UE 372).	)

OPENING TESTIMONY OF

BRADLEY G. MULLINS

ON BEHALF OF

THE ALLIANCE OF WESTERN ENERGY CONSUMERS

(REDACTED VERSION)

March 30, 2020

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I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND OCCUPATION.

A. My name is Bradley G. Mullins. I am the Principal of MW Analytics, an independent consulting firm representing utility customers before state public utility commissions, primarily in the Northwest. My witness qualification statement can be found at Exhibit AWEC/101.

Q. PLEASE IDENTIFY THE PARTY ON WHOSE BEHALF YOU ARE TESTIFYING.

A. I am providing this testimony on behalf of the Alliance of Western Energy Consumers ("AWEC"). AWEC is a non-profit trade association whose members are large energy users in the Western United States, including customers receiving electrical services from Portland General Electric Company ("PGE").

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In this docket, PGE has proposed to implement single-issue ratemaking for the Wheatridge Renewable Energy Facility ("Wheatridge") using the Renewable Adjustment Clause ("RAC") mechanism. PGE's filing addresses only the fixed costs associated with PGE's 33% ownership interest in Wheatridge. The variable cost portion of Wheatridge, including the energy benefits of Wheatridge and the cost of the 200 MW power purchase agreement with NextEra, will be addressed in PGE's Annual Update Tariff ("AUT") filing in April.

In this testimony, I demonstrate that there were serious problems with the 2018 Request for Proposal ("RFP") process that has led to the development of Wheatridge. I also demonstrate that PGE did not update key planning assumptions when reevaluating the economic benefits of the bids received through the cost containment screens. I also address PGE's proposal to return the value of renewable energy credits ("RECs") from Wheatridge to customers until 2025. Finally, I discuss PGE's proposal for recovering the Beaverton and Anderson microgrid projects through the RAC.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. As I will discuss below, PGE's proposed revenue requirement contains several errors and includes several cost items that are not appropriately included in a stand-alone RAC filing.

In addition, PGE did not act prudently when it refused to allow [redacted] to modify the configuration of the winning bid. Instead of working collaboratively with [redacted] to find the most cost-competitive project, PGE acted imprudently by unnecessarily disqualifying this viable and competitive bid. Accordingly, I propose the Commission impose a prudence disallowance with respect to Wheatridge.

I also recommend that the excess REC value associated with Wheatridge be returned to ratepayers through a regulatory liability.

Finally, I recommend the Commission not approve PGE's proposal for RAC recovery of unrelated storage and microgrid costs.

Q. WHAT DO YOU RECOMMEND FOR REVENUE REQUIREMENT?

A. Table 1 below provides a summary of all revenue requirement adjustments that I am recommending:

Table 1
AWEC Revenue Requirement Recommendations ($000)

1	Initial Filing Rev. Req.		26,493
2	PTC Carry-Forwards	(1,321)	
3	Pre COD Services	[redacted]	
4	Contract Manager	(189)	
5	Station Service Costs	(116)	
6	Availability Bonus	[redacted]	
7	Misc. O&M	(207)	
8	Revenue Sensitive Costs	(569)	
9	2021 Plant Additions	(374)	
10	Prudence Disallowance	(5,440)	
11	Net Benefit Reg. Asset	(3,781)	
12	Adjustments		(13,689)
13	Adjusted Rev. Req.		12,804

II. BACKGROUND

Q. WHEN WAS WHEATRIDGE ORIGINALLY PROPOSED?

A. In its November 2016 Integrated Resource Plan ("IRP"), PGE proposed to acquire175 aMW of new renewables.[1/] In Order 17-386, issued on October 9, 2017, the Commission did not acknowledge PGE's action item to issue a 175 aMW renewable RFP, but agreed to allow PGE to update its assessment. On November 9, 2017 PGE filed a revised action plan regarding renewable resource procurement.[2/] The update proposed a "cost-containment screen, requiring that procured resources have forecasted value to customers that exceeds forecasted costs."[3/] PGE also committed to "to return to customers the value associated with RECs procured prior

1/ Docket No. LC 66, PGE 2016 IRP at 29 (Nov. 15, 2016).
2/ Id., PGE's Revised Addendum to 2016 IRP (Nov. 9, 2017).
3/ Id. at 4.

to 2025 through this Revised Renewable Action Plan."[4] In its December 4, 2018 Public Meeting, the Commission did acknowledge this Revised Renewable Action Plan with conditions, but reaffirmed "the fundamental principle … that, regardless of acknowledgment, any resource investment decisions ultimately rest firmly with the company."[5] The Commission did not explicitly approve PGE's proposal to return the value of RECs to customers, and instead invited Staff to request a new docket to consider this issue, which was never opened. With respect to the cost-containment screen, the Commission also stated that the "concept for a cost containment screen assures us that procurement following from the RFP will be limited to high value resources."[6] On February 2, 2018, the Commission issued Order 18-044 approving an RFP for new renewable energy resources of approximately 100 MWa.

Q. WHEN DID THE RFP BEGIN?

A. The RFP was conducted in Docket No. UM 1934. In the Draft RFP, PGE stated that it was seeking to acquire "approximately 100 average megawatts (MWa) of long-term renewable energy supply, bundled with the associated renewable energy credits (RECs)."[7] On May 21, 2018, the Commission issued Order 18-171 where it adopted, with modifications, PGE's draft 2018 RFP. On December 4, 2018, the Commission acknowledged the final shortlist, which was memorialized in Order No. 18-483 issued on December 19, 2018. Wheatridge was selected on February 12, 2019.

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[4] Id.
[5] Docket No. LC 66, Order No. 18-044 at 6 (Feb. 2, 2018).
[6] Id.
[7] UM 1934, Draft RFP at 4 (Mar. 9, 2018)

Q. DID PGE SELECT THE BEST RESOURCE?

A. Likely not. The Commission, and the independent evaluator, noted concerns about how PGE disqualified many projects based on transmission issues when developing the shortlist,[8] and even when PGE selected amongst the shortlist candidates, it did not conduct reasonable due diligence on the potential projects. When questions arose, instead of finding solutions that would benefit ratepayers, PGE disqualified the projects with the potential to provide more benefits than Wheatridge, which itself requires BPA transmission and build out by Umatilla Electric Cooperative ("UEC"). In fact, by the time the Commission issued its order 18-483 acknowledging the final short shortlist from the RFP, only a single viable project remained – Wheatridge.

Q. WHAT DID THE INDEPENDENT EVALUATOR SAY ABOUT THE RFP?

A. PGE provided the Bates White Independent Evaluator report for the RFP in response to AWEC Data Request 13. The report states the following:

> Moreover, in our opinion, PGE's portfolio analysis shows a clear preference when it comes to project selection. Specifically, [redacted]. We would expect the Company to adhere to this preference in pursuing agreements and have a clear explanation if their final portfolio does not reflect this ranking. We understand and acknowledge that the Company may have a different view based on the non-price characteristics of the [redacted]. In our view, the portfolio modeling results should guide the preference order, with the non-price aspects a secondary consideration. In our view, the main non-price deficits of the [redacted], namely the contingent nature of its offer and a less certain transmission plan, are certainly reason to acquire a backup offer in case of project failure. However, if these issues can be remedied the Company's portfolio modeling shows the [redacted] offer to be a better offer.[9]

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[8] Order No. 18-483 at 3.
[9] Confidential AWEC/104 at 6-7.

The IE report then goes on to note that "the [redacted] bids were clearly the best performing offers,"[10/] and that the "[redacted]."[11/]

Q. WHAT WERE THE [redacted] BIDS THAT ULTIMATELY SCORED HIGHEST IN THE RFP?

A. The bids were two variants of what [redacted]. One was a [redacted], while the other was a [redacted].

Q. GIVEN THE "CLEAR PREFERENCE" FOR THE [redacted] BIDS, WHY DID PGE NOT PURSUE EITHER VARIANT OF THIS PROJECT?

A. On December 7, 2018, three days after PGE presented the shortlist to the Commission, [redacted] notified PGE that it had [redacted].[12/] [redacted].[13/]

Q. WHAT WAS PGE'S REPONSE TO [redacted] NOTICE?

A. PGE sent [redacted] a letter on December 17, 2018 stating that it "[redacted]."[14/] PGE went on to note that [redacted]

[10/] Id. at 17.
[11/] Id. at 30.
[12/] Confidential AWEC/102 at 9 (PGE Resp. to AWEC DR 002, Conf. Att. B at 2).
[13/] Id.
[14/] Id. at 13 (PGE Resp. to AWEC DR 002, Conf. Att. C at 1).

[redacted].[15]

Q. WAS PGE'S RESPONSE TO [redacted] REASONABLE?

A. No. By every measure, [redacted] had the winning bid. PGE has an obligation to act in the best interests of customers. [redacted]. It is important to recognize that the [redacted] bid came with transmission (that is the only way it could have made it onto the shortlist without being initially disqualified), and accordingly, customers would have avoided all of the significant transmission costs associated with BPA and the buildout with UEC that come with the Wheatridge project.

Q. DID PGE NOTIFY THE COMMISSION OR PARTIES OF THIS MATERIAL CHANGE TO ITS SHORTLIST?

A. No. PGE had the opportunity to notify parties of the material change to the shortlist. The Commission acknowledged PGE's final shortlist at its December 4, 2018 open meeting, but did not issue a written order memorializing this decision under December 19, 2018. The notice PGE received from [redacted] and PGE's response both occurred between these two dates. At a minimum, if PGE were concerned that allowing [redacted], it could have notified the Commission of what happened and potentially sought a waiver to allow [redacted] PGE took neither of these actions, and now we will never know if the [redacted]

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[15] Id. at 13-14.

[redacted]. Once the [redacted] bid was disqualified, the shortlist was no longer properly considered a list at all, since Wheatridge was the only viable project. Customers want PGE to conduct a competitive and fair process, and here we are left with serious doubts over whether the best resource was selected.

Q. DID PGE IDENTIFY ANY OF THESE ISSUES WITH THE [redacted] BIDS IN ITS OPENING TESTIMONY IN THIS CASE?

A. No. Despite the IE's admonition that PGE provide a "clear explanation if their final portfolio does not reflect [the final shortlist] ranking," PGE's opening testimony discussing the procurement process that led to the selection of Wheatridge reads as if none of these issues ever happened. While PGE identifies that its final shortlist included three bids, plus three bid variants, it does not describe the bids other than Wheatridge on the shortlist, how they were ranked relative to Wheatridge, nor how the other bids ended up becoming disqualified, leaving only Wheatridge to be selected.[16/]

III. WHEATRIDGE REVENUE REQUIREMENT

Q. WHAT AMOUNT OF REVENUE REQUIREMENT HAS PGE PROPOSED RELATED TO WHEATRIDGE?

A. As noted above, this filing includes only the revenue requirement associated with the fixed costs of PGE's 1/3 share ownership in the Wheatridge facility. PGE's initial filing proposes a revenue requirement of $26,493,292 or an approximate 1.2% increase. PGE provided its revenue requirement workpapers in response to CUB Data Request 05. On February 14, 2020, PGE provided an updated estimate of the Net Variable Power Cost impacts of Wheatridge,

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[16/] PGE/100, Armstrong-Batzler/9:21-10:9.

using last year's 2020 AUT forecast in UE 359. PGE forecast only $3,769,000 of net benefits in the AUT for the energy value of Wheatridge and production tax credits. While PGE represented that Wheatridge will financially benefit customers, no net financial benefits will be recognized by customers in calendar year 2021. Based on PGE's proposal, the costs exceed benefits by $22,586,000 in 2021. As a counterexample, PacifiCorp's decision to repower most of its wind fleet, which like Wheatridge was pursued primarily for the economic benefits it was supposed to provide to customers, results in a net benefit to customers immediately.[17/]

Q. WHAT IS THE TOTAL REVENUE REQUIREMENT OF WHEATRIDGE?

A. The $26,493,292 amount represents just the costs we know about today. PGE proposes to recover the majority of Wheatridge through variable power costs, rather than through the RAC filing, because these costs are associated with the PPA with NextEra.[18/] In its February 14, 2020 filing, PGE provided some of the MONET model assumptions that it might use in the AUT. AWEC identified issues about a variety of proposed costs such as integration costs, developer fees, and transmission expense. The impact and scope of these costs will not be known, however, until the 2021 AUT is filed, when PGE implements its modeling assumptions in the 2021 NVPC forecast. Accordingly, AWEC will address these issues in the AUT, but may revise its recommendation in its rebuttal filing in this docket depending on how the NVPC portion of Wheatridge is implemented in the AUT.

17/ See Docket Nos. UE 352, UE 369.

18/ PGE/100, Armstrong-Batzler/1:20-2:3.

a. Production Tax Credit Carry Forwards

Q. WHAT DO YOU RECOMMEND WITH RESPECT TO PRODUCTION TAX CREDIT CARRYFORWARDS?

A. I recommend Production Tax Credit Carryforwards not be considered in the context of the RAC revenue requirement in this case. Because PGE is not doing a full ADIT valuation, there is not sufficient data to conclude, as PGE does, that the PTCs generated by Wheatridge are an incremental addition to its production tax credit deferred tax asset, relative to the assumption currently embedded in rates.

Q. WHAT AMOUNT OF PRODUCTION TAX CREDIT CARRYFORWARDS DOES PGE PROPOSE TO INCLUDE IN THE RAC REVENUE REQUIREMENT?

A. PGE proposes to include an incremental $14,110,507 in production tax credit carryforwards. This value can be identified in cell "H11" in tab "Tax Dept-RaRA Summary" in PGE's response to CUB Data Request 005. This proposed regulatory asset balance is offset by (-)$5,232,345 associated with the Modified Accelerated Cost Recovery (i.e., tax depreciation), and other book/tax differences, to arrive at total Accumulated Deferred Income Taxes of $8,878,162. This addition to rate base amount may be noted in Updated PGE/101, Row 27. Thus, rather than providing a tax benefit to ratepayers, ADIT is an addition to rate base in this case. For a project that was originally justified on tax benefits, these additional tax costs are concerning to ratepayers.

Q. WHAT IS THE REVENUE REQUIREMENT EFFECT OF THE PRODUCTION TAX CREDIT CARRYFORWARDS?

A. The impact of PGE's proposed production tax credit carryforward balance is a $1,320,897 increase to revenue requirement.

Q. ARE THE BENEFITS OF WHEATRIDGE PRODUCTION TAX CREDITS INCLUDED IN THE RAC REVENUE REQUIREMENT?

A. No. PGE has proposed to include the Production Tax Credit amounts in its April AUT filing. The February 14, 2020 update also did not provide the Production Tax Credit forecast. Because PGE has not yet filed its AUT, I cannot currently evaluate how these amounts will be applied.

Q. WILL RATEPAYERS RECEIVE THE CURRENT TAX BENEFITS OF WHEATRIDGE?

A. Yes. It is true that customers will receive the current tax benefits associated with production tax credits generated by Wheatridge. It is not necessarily true, however, that PGE will recognize a financing cost due to the fact that it does not have the tax appetite to use the associated tax credits. Needless to say, if customers are required to pay financing costs, they are not getting the full value of the associated PTCs. It is not prudent to rush the acquisition of tax credits that cannot be used.

Q. WHAT AMOUNT OF PRODUCTION TAX CREDIT CARRY FORWARDS ARE INCLUDED IN PGE'S TOTAL REVENUE REQUIREMENT?

A. Foremost, AWEC has contested the inclusion of production tax credits in revenue requirement for several rate cases. In its initial filing in UE 335, PGE included $69,489,835 in ADIT associated with production tax credit carryforwards.[19/] AWEC, however, proposed that no amount of production tax credit carryforwards be included in rates. The current rates reflect a settlement in which the balance associated with production tax credits was not specified.[20/] Accordingly, one cannot know whether a balance has increased or decreased if the initial balance has not been specified. Therefore, it is not possible to state definitively whether the

19/ Docket No. UE 335, AWEC/200, Mullins/28.
20/ UE 335, Order No. 19-129, Appen. D ¶ 2.

balance has actually gone up or down since the last rate case. From AWEC's perspective the PTC carryforwards were not includible in revenue requirement to begin with.

Q. IS THE BALANCE PGE INCLUDED IN ITS INITIAL FILING IN UE 335 DECLINING?

A. Yes. PGE has stopped generating new tax credits at Biglow, so the balance has been declining, even considering the effects of tax reform. In response to AWEC Data Request 21, PGE stated that the December 31, 2019 balance was expected to be approximately $64,000,000. This balance will likely decline further by the time Wheatridge is placed into service. The overall balance will not necessarily go up as a result of Wheatridge in 2021. Accordingly, it is not appropriate to reduce the ADIT benefits in revenue requirement for production tax credit carryforwards when calculating Wheatridge revenue requirement in the RAC.

Q. DID PGE INCLUDE PTC CARRYFORWARDS IN THE IRP UPDATE?

A. No. The decision to issue an RFP was premised on the notion of giving ratepayers the full benefits of production tax credits. In the cost containment screens in the RFP, PGE modified this assumption and reduced the PTC benefit for the owned wind alternatives. That does not change the fact that, when the Commission approved the renewable resource action in the IRP, it did so in order to realize the full benefits of potentially expiring production tax credits.

Q. IS IT FAIR FOR PGE TO EARN A RETURN ON THESE UNUSED TAX CREDITS?

A. No. Production tax credit carryforwards are not the type of capital investment warranting compensation at a utility's full return on equity. It is not fair for PGE to earn a return on unused tax credits in the same way that it earns a return on used and useful utility investments. It is not reasonable to financially reward PGE for the fact that PGE will be unable to monetize these credits, which it so urgently sought to acquire for customers' benefit.

b. Pre COD Services

Q. WHAT AMOUNT OF PRE-COD SERVICES HAS PGE PROPOSED?

A. PGE proposed $[redacted] in pre-COD services as an annual operating expense in revenue requirement.

Q. WHAT DO THOSE AMOUNTS REPRESENT?

A. In response to AWEC Data Request 28, PGE described these amounts as "a onetime fixed fee charged by NextEra to cover their costs associated with preparing to provide O&M services upon PGE taking ownership of its portion of the facility." These amounts represent "the initial equipment, tooling, personnel, minor services, vehicles, and support during commissioning and startup testing."[21]

Q. ARE THESE APPROPRIATELY CONSIDERED AN ANNUAL OPERATING EXPENSE IN REVENUE REQUIREMENT?

A. No. The Pre-COD services are not ongoing costs but a one-time fee. Under PGE's proposal, the one-time fee is basically deferred and amortized over a single year's revenue requirement. I recommend avoiding using the RAC as a deferral, and recommend these amounts be excluded from the RAC operating results.

I recommend the amounts be capitalized to a regulatory asset and spread over the thirty-year life of the Wheatridge investment. This approach is warranted because the fee is a one-time, upfront cost, that is not attributable to the ongoing used and useful service of Wheatridge. Further, the costs PGE identified are the types of costs that one would normally consider capital, such as the initial equipment, tooling, start-up costs, etc.

[21] AWEC/102 at 31 (PGE Resp. to AWEC DR 28(a)).

Q. WHAT IS THE IMPACT OF YOUR RECOMMENDATION?

A. Capitalizing and amortizing these costs results in a $[redacted] reduction to RAC revenue requirement. Note that when capitalizing and amortizing the cost, ADIT increases because the Company will receive a tax deduction at the time the amounts were expensed.

c. Contract Manager

Q. WHAT DOES PGE PROPOSE FOR A CONTRACT MANAGER?

A. In Opening Testimony, PGE proposed to include one Full-Time-Equivalent ("FTE") employee in revenue requirement.[22/] In the Exhibit PGE/100 revenue requirement workpapers, PGE described this position as a "Contract Manager"[23/]

Q. WHAT JUSTIFICATION DID PGE PROVIDED FOR THIS NEW POSITION?

A. PGE mentions the additional FTE in testimony, but provides no justification for this new position.[24/] In response to AWEC Data Request 28, PGE noted that it had not considered the additional FTE when analyzing Wheatridge in the RFP modeling.

Q. DO YOU AGREE WITH INCLUDING THIS EXPENSE IN REVENUE REQUIREMENT?

A. No. Establishing the overall FTE levels at PGE is an issue that is typically considered in the context of a general rate case, on a holistic basis. Absent such consideration, it is not reasonably possible to specify whether PGE needs the additional FTE or not. For example, after the resource is developed, perhaps the need for FTEs will decline because the development activities have ceased.

22/ PGE/100, Armstrong-Batzler/16:19-17:2.
23/ See Tab "O&M Expenses"
24/ PGE/100, Armstrong-Batzler/16:19-17:2.

Q. WHAT IS THE IMPACT?

A. Including the impacts on payroll taxes, removing the FTE costs results in a $188,708 reduction to revenue requirement.

d. Station Service Costs

Q. WHAT STATION SERVICE COSTS HAS PGE PROPOSED TO INCLUDE IN REVENUE REQUIREMENT?

A. PGE includes $111,485 of station service costs in revenue requirement. PGE did not explain these amounts in testimony, nor in discovery.

Q. ARE THESE AMOUNTS APPROPRIATELY INCLUDED IN THE RAC SURCHARGE?

A. No. I recommend these amounts be removed from the RAC surcharge. PGE designed the RAC to exclude variable costs, which are normally included in the AUT. Station service costs are variable costs and are normally included in the AUT. Accordingly, the RAC surcharge should exclude these costs. In addition, PGE did not provide adequate support for these amounts and did not model these costs explicitly in the IRP or RFP.[25]

e. Availability Bonus

Q. WHAT AVAILABILITY BONUS AMOUNTS HAS PGE PROPOSED TO INCLUDE IN REVENUE REQUIREMENT?

A. PGE has proposed to include $[redacted] for an availability bonus, associated with the O&M service agreement.

Q. WAS THE AVAILABILITY BONUS CONSIDERED IN THE RFP?

A. No.[26]

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[25] AWEC/102 at 32 (PGE Resp. to AWEC DR 28(e)).
[26] Id.

Q. WHAT DO YOU RECOMMEND?

A. I recommend the availability bonus be removed from the revenue requirement forecast in this proceeding because these costs were not considered in the RFP evaluation.

f. Misc. O&M

Q. HOW MUCH MISCELLANEOUS O&M HAS PGE PROPOSED TO INCLUDE IN REVENUE REQUIREMENT?

A. PGE includes an additional $200,000 in Miscellaneous O&M in revenue requirement. In Response to AWEC Data Request 28, PGE described these amounts as Software Licenses, Travel Expenditures, Other Business Expense, Training costs, and Additional parts & consumables.

Q. WHAT DO YOU RECOMMEND FOR THESE AMOUNTS?

A. I recommend that these miscellaneous amounts be removed from revenue requirement. These items are de minimis and PGE did not describe why these costs are necessary with respect to Wheatridge. For example, overall travel expenditures will not necessarily increase as a result of Wheatridge and PGE did not identify specific training costs that would not otherwise be considered in its training budget.

g. Revenue Sensitive Costs

Q. WHAT ISSUE HAVE YOU IDENTIFIED WITH RESPECT TO REVENUE SENSITIVE COSTS?

A. When developing the pricing for the Schedule 122 Tariff, PGE applied a 3.2% revenue sensitive adjustment. The total amount of the adjustment was $722,759, which can be found in "Workpapers_ 2020 RAC_Wheatridge Pricing_02.13.2020 update", Tab "Sch122-RAC", cell "B36".

In its revenue requirement workpapers, however, PGE had already included revenue sensitive costs. These can be noted in the Exh. 101 revenue requirement workpapers on the tab "Wheatridge_RevReq."

Q. WHAT DO YOU RECOMMEND?

A. The revenue sensitive costs, such as OPUC Fees and Uncollectibles Expense, are already included in the revenue requirement calculated in Exhibit PGE/101 and do not need to be applied again, a second time, in the pricing worksheet. Accordingly, I recommend eliminating the duplicative revenue sensitive adjustment in the revenue requirement worksheet. The impact is a revenue requirement reduction of $564,408, which is smaller than the amount of revenue sensitive costs in the initial filing due to the impact of other adjustments.

h. <u>2021 Plant Additions</u>

Q. WHAT ISSUE HAVE YOU IDENTIFIED WITH RESPECT TO THE TOTAL PLANT BALANCES?

A. PGE's initially proposed gross plant of $157,434,740 for its 33 aMW share in Wheatridge. This equates to an overnight cost of $1,574/kW for Wheatridge and consists of $148,784,930 of production plant and $8,648,809 of transmission plant, based on the year-end December 31, 2021 gross plant balance. The January 1, 2021 balance, however, is expected to be just $141,000,000. The beginning balance is lower than the ending balance because a $16,000,000 plant addition is expected in May 2021. Thus, PGE's revenue requirement calculation uses End-of-Period ("EOP") rather than the Average-of-Monthly-Average ("AMA") for its Gross Plant calculation.

Q. DID PGE USE EOP FOR OTHER ASPECTS OF RATE BASE?

A. No. For accumulated depreciation PGE used an AMA amount. Rate base is offset by accumulated depreciation reserves of $2,874,875, one-half of the annual $5,749,750 depreciation expense.

Q. DO YOU AGREE WITH PGE'S CALCULATION?

A. No. Use of AMA in a forecast results in better matching because the base is measured ratably over the year in the same way that revenues will be incurred. It is not as if PGE will receive the revenues in one lump-sum at the end of the year. Further, PGE used an average for accumulated depreciation, so it is appropriate to apply the same methodology for gross plant.

Q. WHAT IS THE IMPACT OF THIS CORRECTION?

A. Using the average gross plant value reduces rate base by $4,000,000 and reduces revenue requirement by $374,443.

IV. PRUDENCE DISALLOWANCE

Q. WHY IS AWEC RECOMMENDING A PRUDENCE DISALLOWANCE?

A. PGE did not act in customers' interest when conducting the 2018 RFP. In addition to PGE's imprudent decision not to allow [redacted], PGE made several unreasonable modeling decisions and assumptions when evaluating the bids that I discuss in further detail below. Therefore, AWEC is proposing a prudence disallowance with respect to the Wheatridge costs. If the Commission accepts AWEC's proposal, the disallowance will extend to all aspects of Wheatridge, including those that will be reflected in the AUT.

a. Resource Selection Process

Q. WHAT IS YOUR RECOMMENDED PRUDENCE DISALLOWANCE WITH RESPECT TO PGE'S RESOURCE SELECTION PROCESS?

A. I recommend the Commission cap the revenue requirement for Wheatridge at 50% of the difference between the MWh cost of the [redacted] and Wheatridge.

Q. PLEASE EXPLAIN YOUR REASONING WITH RESPECT TO THIS DISALLOWANCE.

A. Instead of summarily disqualifying the bidder, PGE had an obligation at least to allow [redacted] to ensure it was acquiring the best deal possible for ratepayers. It is true that [redacted], but PGE also considered multiple bid structures for its own facility when analyzing the shortlist resources. PGE considered several different battery and solar configurations and designed the model to accept any configuration that passed the cost containment screen.

While we don't know what the impact of [redacted], given the economics of [redacted], ratepayers would have saved relative to Wheatridge. [redacted] Accordingly, because PGE's actions have eliminated any ability to identify the benefits customers could have realized, using 50% of the difference between the original bid price for the [redacted] and Wheatridge is a conservative proxy of what ratepayers could have expected, had PGE acted prudently.

Q. WHAT IS THE IMPACT OF APPLYING THIS RECOMMENDATION?

A. This calculation has been provided in Exhibit AWEC/103. For purposes of this proceeding, the disallowance results in a $5,440,259 reduction to revenue requirement. For purposes of calculating the adjustment, I used the price from Row 4 of Table 7 from the Independent Evaluator report and compared this price to the revenue requirement of Wheatridge, calculated on a $/MWh basis. For now, this adjustment excludes the impact of NVPC items, which AWEC will address in PGE's 2021 AUT filing.

b. <u>Cost-Containment Screen</u>

Q. DID THE COST CONTAINMENT SCREENS ENSURE THAT RATEPAYERS RECEIVED THE BEST DEAL?

A. No. The cost containment screens were provided in response to AWEC Data Request 19. PGE has represented that Wheatridge passed its cost containment screens, and therefore is still beneficial to customers, regardless of PGE's resource decision. This argument, however, is a red herring, since customers don't want a project just because it produces modeled benefits. In an RFP, customers want the best projects period.

Further, the cost containment screens are 30-year analyses, with many flaws and outdated assumptions. There is great uncertainty over the prospect that future benefits will one day offset the costs that ratepayers are being asked to pay today. We know that Wheatridge is not forecast to provide any net benefits in 2021, at least based on the ratemaking assumptions PGE proposes. For all we know today, it is possible that market energy costs will be negative by 2050. There is very little certainty in such a forecast. As the COVID-19 outbreak demonstrates, all that can really be said is that it is impossible to predict the unpredictable.

Q. HOW DO YOU RECOMMEND THAT THE COMMISSION ACCOUNT FOR THE UNCERTAINTY OVER THE ECONOMIC BENEFITS PGE PROJECTS?

A. PGE's primary rationale for pursuing a renewable resource was the economic benefits associated with this resource, given the existence of tax credits. As I have already demonstrated, however, customers will see a net cost from Wheatridge in 2021. Customers are not projected to see a net benefit in PGE's modeling until 2024. Thus, to ensure that customers do receive the benefits PGE has promised them, I recommend that PGE include in a regulatory asset any costs of Wheatridge that exceed the benefits from the cost containment screens. Once customers begin receiving net benefits, those can be used to pay down the regulatory asset at that time. Furthermore, if customers do not begin seeing net benefits by 2024, recovery of a portion of the costs in the regulatory asset would be disallowed by the amount of benefits PGE had projected would materialize but did not. This would continue each year until the regulatory asset is fully recovered or disallowed.

Q. ARE RATEPAYERS ON TRACK TO RECOGNIZE NET BENEFITS BY 2024?

A. No. In the cost containment screens, PGE calculated that revenue requirement would increase by approximately $12,804,000, and eventually be offset by savings beginning starting in 2024. This can be seen in Confidential Figure 1, below.

Confidential Figure 1
Net Revenue Requirement Benefit of Wheatridge
Per Cost Containment Screen ($000)

[redacted]

Q. ARE THE FIRST YEAR COSTS HIGHER OR LOWER THAN THE AMOUNT FORECAST IN THE COST CONTAINMENT SCREENS?

A. Much higher. In this Docket, ratepayers are faced with incremental revenue requirement of $26,493,292, over double the first-year cost that PGE represented in the cost containment screen. Given the cumulative effective of this incremental revenue requirement, it will be difficult for Wheatridge to ever produce net benefits as PGE represented in the RFP if PGE is allowed to recover the full amount it requests.

Q. WHAT AMOUNT SHOULD BE APPLIED TO THE REGULATORY ASSET?

A. I recommend the first-year revenue requirement be capped at the $12,804,000 of first year cost included in the cost containment screen. The excess, excluding the disallowed amount of $5,440,259, would be applied to a regulatory asset that PGE may amortize if it can demonstrate that the costs of Wheatridge exceed the benefits in a future year. This treatment results in a further $3,780,802 reduction to revenue requirement.

Q. WHAT WAS THE TENOR OF THE PRICE CURVES USED IN THE COST CONTAINMENT SCREENS?

A. Based on PGE's response to AWEC Data Request No. 017, the price curves PGE used to evaluate the shortlist were from its 2016 IRP Update. PGE did not specify in the request, but the 2016 IRP update used prices that were developed some time in 2017.

Q. DID PGE UPDATE THE PRICE CURVES WHEN IT CONDUCTED THE RFP?

A. No. When analyzing the economics of bids in the shortlist, PGE did not update its forward price curve. PGE selected Wheatridge on February 12, 2019. Accordingly, PGE made its decision based on price curves that were over a year out of date. By comparison, PacifiCorp updates its forward price curves on a quarterly basis.

Q. HAS THE PRICE OUTLOOK CHANGED SINCE 2017?

A. Yes. In response to AWEC Data Request 29, PGE provided all price curves it has prepared since 2017. Confidential Figure 2, below, details the change in prices since 2017:

Confidential Figure 2
Mid-C Price Change since 2017

[redacted]

Q. WHAT IS THE IMPACT OF UPDATING THE CURVE IN THE PRICE SCREEN ANALYSIS?

A. Prices declined by [redacted]% on average between 2017 and 2019. If I reduce the energy values in the cost containment screen to reflect this reduction, it makes the battery configuration for Wheatridge un-economic. Further, the only reason the battery configuration was even selected in the first place was due to the fact that it was paired with the Solar PPA—PGE did not analyze a bid for Wheatridge with the Solar PPA, but without the Battery storage. Excluding the solar PPA, it was less economic to pursue Wheatridge with the battery storage configuration. This means that a configuration with a stand-alone Solar PPA would have been more cost effective if it excluded the battery configuration. Further still, if PGE had modeled a configuration that included only the PPA portion of Wheatridge, plus the solar PPA, that would have produced an even better cost benefit ratio. The more recent price curves, coupled with PGE's decision to select the most expensive configuration of Wheatridge, make it even less likely that customers will realize net benefits from this procurement in the future.

Q. DID PGE PROPERLY ASSESS THE CAPACITY NEEDS WHEN EVALUATING THE BIDS?

A. No. The capacity value was not representative of current prices for capacity, which have been declining. PGE assumed a $[redacted]/KW-year capacity payment. Notwithstanding, PGE is reluctant to provide this same level of capacity payment to Avoided Cost, Green Tariff and Direct Access customers. The term "capacity" may mean different things to different people. Whatever definition of "capacity" PGE uses, however, PGE needs to apply it in a consistent manner and not make different assumptions depending on the context.

c. Conclusion

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS WITH RESPECT TO THE DISALLOWANCE OF COSTS ASSOCIATED WITH WHEATRIDGE.

A. PGE did not act reasonably in pursuing the best resource for customers. Rather than allowing the winning bidder to substitute its bid, or requesting permission from the Commission to allow a substitute bid, PGE summarily disqualified the winning bidder in favor of its benchmark resource. The Commission, therefore, should reprice Wheatridge at the winning bid price, given that the [redacted] likely would have increased some aspects of its cost and decreased other aspects.

Finally, the Commission should hold PGE to its promise of economic net benefits for customers from Wheatridge. Those net benefits, based on PGE's costs and modeling, will not accrue to customers until later, if they accrue at all. Thus, the Commission should reduce the revenue requirement for Wheatridge in 2021 to match the 2021 benefits and record the difference as a regulatory asset, which PGE can either recover when additional benefits from Wheatridge are realized in the future, or will be disallowed because these benefits failed to materialize.

V. RETURNING REC VALUE TO CUSTOMERS

Q. WHAT IS PGE'S PROPOSAL TO RETURN THE VALUE OF RECS TO CUSTOMERS?

A. PGE proposes to sell all RECs produced by Wheatridge until 2025 to subscribers of PGE's renewable portfolio option.[27/] PGE proposes to assume a price of $[redacted] per REC.[28/] It is my understanding that PGE intends to use this value for the entire period that it monetizes these RECs, regardless of how much it actually sells the RECs for.

Q. DOES AWEC SUPPORT PGE'S PROPOSAL?

A. AWEC believes that a better solution is for PGE to retain these RECs in its bank for future use and for PGE to impute a value for all of the RECs in its bank and to include that value as an offset to rate base. The $[redacted] PGE identifies for Wheatridge RECs is a reasonable estimate of the value of all RECs in PGE's bank; however, if PGE has a more granular estimate of different vintages of RECs, AWEC would be willing to consider this type of valuation approach. PGE, for instance, calculates the cost of RECs used for RPS compliance in its annual RPS compliance reports.[29/] This could be another method of valuing the RECs in PGE's bank.

Q. WHY IS AWEC'S PROPOSAL REASONABLE?

A. RECs are customer property that customers have already paid for and PGE is holding for future customer benefit. Currently, PGE is holding these RECs interest-free and without any other obligation to provide value for these RECs to customers. There are also examples of PGE holding liabilities for customer benefit and reducing rate base like a zero-interest loan.

27/ PGE/100, Armstrong-Batzler/18:13-17.
28/ Id. at 21:9.
29/ See, e.g., Docket UM 2016, PGE 2018 RPS Compliance Report at 7 (June 17, 2019).

Accumulated deferred income taxes is an example of a zero-interest load. The savings PGE received from the Tax Cuts and Jobs Act until it passed those savings back is such an example. AWEC's proposal rests on the same concept.

Q. WHAT ALTERNATIVES TO AWEC'S PREFERRED APPROACH EXIST?

A. Other than a monetary value, the other benefit RECs provide to customers is their ability to defer future investments in physical generation. The RECs PGE proposes to sell from Wheatridge have enhanced potential value in this regard because they are so-called "golden" RECs under the RPS – they never expire. Thus, if PGE follows a resource procurement strategy that maximizes the value of its REC bank, then AWEC would prefer PGE to retain the RECs from Wheatridge rather than selling them.

That said, PGE has so far preferred to pursue a "physical" compliance strategy for the RPS, meaning that it forecasts the acquisition of a new renewable resource anytime it is projected to be resource deficient even if it has RECs in its bank to make up for the deficiency.[30] Under this strategy, unless PGE follows AWEC's preferred approach and assigns a monetary value to its REC bank that earns a return for customers, all RECs in PGE's bank are effectively worthless. If this scenario prevails, AWEC would support PGE selling all, or nearly all, of the RECs in its bank so that customers can at least get some value for them.

VI. STORAGE AND MICROGRID

Q. PLEASE DESCRIBE THE BEAVERTON AND ANDERSON ENERGY STORAGE MICROGRID PROJECTS.

A. In UE 372, which has been consolidated with UE 370 in this case, PGE has requested to recover the costs associated with the Beaverton Public Safety Center ("Beaverton") and

[30] Docket LC 73, PGE 2019 IRP at 204.

Anderson Readiness Center ("Anderson") energy storage microgrid projects in the RAC. These projects are outgrowths of House Bill ("HB") 2193, which mandated that PGE procure at least five MWh of energy storage before 2020. To comply with this law and subsequently adopted Commission guidelines, PGE submitted energy storage system proposals in Docket No. UM 1865. In Order No. 18-290, the Commission approved the Partial Stipulation in Docket UM 1856 in which PGE "submitted a plan to advance its energy storage modeling."[31/] PGE's plan consisted of five energy storage projects, including a "Microgrid Pilot." The description of the "Microgrid Pilot" in the Partial Stipulation does not include information regarding specific microgrid projects,[32/] nor did the Commission specifically approve or consider the Beaverton and Anderson microgrids in Order No. 18-290. PGE testifies that it intends to use the Beaverton and Anderson microgrid projects to inform future program design elements, realized benefits, system costs, and others.

Q. WHY IS PGE PROPOSING TO RECOVER THESE ENERGY STORAGE PROJECTS THROUGH THE RAC?

A. PGE's Schedule 122, allows for the recovery of "revenue requirements of qualifying Company-owned or contracted new renewable energy resource and energy storage projects associated with renewable energy resources (including associated transmission) not otherwise included in rates."[33/] PGE asserts that the Anderson and Beaverton microgrid projects meet these requirements because they "will enhance PGE's resource portfolio flexibility and support renewable resources integration."[34/] PGE further argues that the Beaverton and Anderson

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[31/] Docket No. UE 372, PGE/100, Murtaugh-Cristea/4:10-11.
[32/] Docket No. UM 1856 Partial Stipulation at 6:16-20.
[33/] Portland General Electric Company, Fifteenth Revision of Sheet No. 122-1, Schedule 122 Renewable Resources Automatic Adjustment Clause (Dec. 10, 2019).
[34/] Docket No. UE 372, PGE/100, Murtaugh-Cristea/7:19-21.

energy storage microgrids can be "dispatched in real-time to help mitigate sub-hourly fluctuations and forecast errors associated with renewable generation."[35/] These projects are, therefore, "associated" with renewable energy resources according to PGE.

Q. DO YOU AGREE WITH PGE'S REASONING?

A. No. PGE cannot recover the revenue requirement associated with the Beaverton and Anderson microgrids in the RAC because neither of the energy storage projects are "associated" with renewable energy resources as required pursuant to ORS § 469A.120(2)(a). While I am not a lawyer, PGE's reasoning is flawed as a factual matter because PGE's purported benefits to renewables integration is a benefit incurred by the Company's entire resource portfolio, including sub-hourly fluctuations and forecast errors associated with nonrenewable generation. PGE admitted as much in its last rate case when it first proposed changes to its RAC tariff to incorporate energy storage. There, the Company stated that "PGE considers load balancing to be a primary system benefit of its resource portfolio as a whole, which includes [its natural gas and hydro-generating] facilities …."[36/] PGE cannot isolate the sub-hourly fluctuations nor forecast errors specifically associated with renewable generation. Thus, if PGE's argument were correct, all energy storage projects would by definition be "associated" with renewable energy, as would all other generation resources. This interpretation effectively nullifies the word "associated" in the statute.

In fact, PGE previously argued that sub-hourly fluctuations and forecast errors associated with renewable generation could be isolated from its larger resource portfolio when it and PacifiCorp requested changes to their power cost adjustment mechanisms to allow them

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35/ Docket No. UE 372, PGE/100, Murtaugh-Cristea at 8:6; 10:5-6; 12:9-11.
36/ Docket No. UE 335, AWEC/205 at 10.

to receive dollar-for-dollar recovery of variable costs associated with their renewable resources. These utilities argued that Oregon's RPS law required this type of recovery for variable costs associated with renewable resources and proposed to isolate and separately track those costs.[37/] The utilities made this proposal despite the fact that PacifiCorp had previously taken the position that "[i]t is *not possible* to isolate and quantify the precise cost of wind variability and the related cost of shaping, firming or integration …."[38/] The Commission ultimately agreed with PacifiCorp's original position, finding that "[w]e are not persuaded that there is a material difference between variable power costs associated with RPS-compliant resources and variable power costs associated with other resources" and that "forecast errors exist for *all generation resources*."[39/] The same principle applies here. The microgrids PGE is proposing to recover through the RAC, even if they do help mitigate forecast errors and sub-hourly fluctuations, do not do so with respect to renewable resources specifically. They do so with respect to PGE's total load/resource balance.

Further, the Beaverton and Anderson microgrids are only 250 kW/4-hour and 600 kW/2-hour system projects, respectively.[40/] Given that PGE's generation portfolio is comprised of several gigawatts of capacity, if PGE's purpose in constructing the Beaverton and Anderson microgrids were to "support renewable energy resources integration,"[41/] it would be a pretty poor investment decision. PGE also explicitly states that microgrid resources generally can "provide stability support to the main grid"[42/] and that the Beaverton and

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37/ Docket UM 1662, PGE-PAC/100, Tinker-Dickman/7:18-8:21.
38/ Docket No. UE 246, PAC/2200, Duvall/17:10-13 (emphasis added).
39/ Docket No. UM 1662, Order No. 15-408 at 7 (Dec. 18, 2015) (emphasis added).
40/ Docket No. UE 372, PGE/100, Murtaugh-Cristea/6:11-16.
41/ Id. at 4:2-3.
42/ Id. at 6:6-7.

Anderson microgrids will "provide volt-ampere reactive support to the distribution system for improved voltage management and power factor management."[43/] As such, it is reasonable to conclude that PGE's intention in building the Beaverton and Anderson microgrids is to provide reliability benefits to interconnected customers, rather than support renewable resource integration.

Q. ARE THERE OTHER REASONS TO DENY PGE'S REQUESTED COST RECOVERY FOR THE BEAVERTON AND ANDERSON MICROGRID PROJECTS IN THIS CASE?

A. Yes. PGE has provided almost no information on the microgrid projects themselves and, therefore, has failed to demonstrate the prudence of its decision to invest in these projects. PGE does not explain why it selected the locations for these microgrid projects; how it arrived at the size and configuration of these projects; or why the amount it invested in these projects was reasonable. Again, while the Commission did approve the development of a microgrid pilot as part of the Partial Stipulation in UM 1856, it did not approve these specific projects. Without even a minimal amount of evidence supporting PGE's decision to pursue these projects, the Commission should deny recovery of their costs at this time.

Q. IF THE BEAVERTON AND ANDERSON MICROGRIDS ARE NOT "ASSOCIATED" WITH RENEWABLE RESOURCES, WHAT TYPE OF ENERGY STORAGE PROJECT WOULD QUALIFY FOR RECOVERY THROUGH THE RAC?

A. The Wheatridge facility at issue in these dockets provides a classic example. Wheatridge is a "300 MW wind generation facility, a 50 MW solar facility, and a 30 MW 4-hour duration energy storage facility."[44/] The battery storage facility integrated with Wheatridge is "associated" with renewable energy. Its purpose is to store the energy generated from the wind

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43/ Id. at 12:11-12.
44/ Docket No. UE 370, PGE/100 Armstrong-Batzler at 2:5-6.

and solar portions of Wheatridge to dispatch it in hours when it is more economic to do so, thus enhancing the value of the renewable energy with which it is collocated.

Q. IF THE COMMISSION DOES NOT ALLOW PGE TO RECOVER THE REVENUE REQUIREMENT ASSOCIATED WITH THE BEAVERTON AND ANDERSON ENERGY STORAGE MICROGRID PROJECTS THROUGH THE RAC, DOES THAT MEAN IT WILL HAVE DISALLOWED RECOVERY OF THESE COSTS?

A. No. PGE can still recover the revenue requirement associated with the Beaverton and Anderson microgrids in a general rate case, as it does with most of its costs.[45/]

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[45/] ORS § 757.205.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 370, UE 372

In the Matters of	)
	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (Wheatridge) (UE 370) and	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (BPSC Energy Storage Microgrid and ARC Energy Storage) (UE 372).	)

EXHIBIT AWEC/101

QUALIFICATIONS OF BRADLEY G. MULLINS

QUALIFICATIONS OF BRADLEY G. MULLINS

Q. PLEASE STATE PROVIDE AN OVERVIEW OF YOUR EDUCATIONAL AND WORK EXPERIENCE?

A. I am the Principal Consultant of MW Analytics, a professional consulting practice that represents utility customers in regulatory proceedings before state utility commissions throughout the West. I have been performing independent energy and utilities consulting services for approximately six years and have provided services to utility customers on matters such as revenue requirement, power cost forecasting, and rate development. I have a Master of Accounting degree from the University of Utah. After obtaining my master's degree, I worked at Deloitte in San Jose, California, where I specialized in performing research and development tax credit studies. I later worked at PacifiCorp as an analyst involved in power cost forecasting.

Q. PLEASE PROVIDE A LIST OF YOUR REGULATORY APPEARANCES.

A. I have sponsored testimony in regulatory jurisdictions around the United States, including the following proceedings:

- <u>In re Public Utility Commission of Oregon, Investigation of the Recovery of Capital Costs Consistent with Commission Legal Authority and the Public Interest,</u> Or.PUC Docket No. UM 2004.
- <u>Avista Corporation 2020 General Rate Case,</u> Wa.UTC Docket No. UE-190334 (Cons.).
- <u>In re Cascade Natural Gas Corporation Application for Approval of a Safety Cost Recovery Mechanism,</u> Or. PUC Docket No. UM 2026.
- <u>In re Avista Corporation, Request for a General Rate Revision,</u> Or.PUC Docket No. UG 366.
- <u>In re Portland General Electric, 2020 Annual Update Tariff (Schedule 125),</u> Or.PUC Docket No UE 359.
- <u>In re PacifiCorp 2020 Transition Adjustment Mechanism,</u> Or.PUC Docket No. UE 356.
- <u>In re PacifiCorp 2020 Renewable Adjustment Clause,</u> Or.PUC Docket No. UE 352.
- <u>2020 Joint Power and Transmission Rate Proceeding,</u> Bonneville Power Administration, Case No. BP-20.
- <u>In the Matter of the Application of MSG Las Vegas, LLC for a Proposed Transaction with a Provider of New Electric Resources,</u> PUC Nv. Docket No. 18-10034.

- Puget Sound Energy 2018 Expedited Rate Filing, Wa.UTC Dockets UE-180899/UG-180900 (Cons.).
- Georgia Pacific Gypsum LLC's Application to Purchase Energy, Capacity, and/or Ancillary Services from a Provider of New Electric Resources, PUC Nv. Docket No. 18-09015.
- Joint Application of Nevada Power Company d/b/a NV Energy for approval of their 2018-2038 Triennial Integrated Resource Plan and 2019-2021 Energy Supply Plan, PUCN Docket No. 18-06003.
- In re Cascade Natural Gas Corporation Request for a General Rate Revision, Or.PUC, Docket No. UG 347.
- In re Portland General Electric Company Request for a General Rate Revision, Or.PUC Docket No UE 335.
- In re Northwest Natural Gas Company, dba NW Natural, Request for a General Rate Revision, Or.PUC Docket No. UG 344.
- In re Cascade Natural Gas Corporation Request for a General Rate Revision, Wa.UTC, Docket No. UE-170929.
- In the Matter of Hydro One Limited, Application for Authorization to Exercise Substantial Influence over the Policies and Actions of Avista Corporation, Or.PUC, Docket No. UM 1897.
- In re PacifiCorp, dba Pacific Power, 2016 Power Cost Adjustment Mechanism, Or.PUC, Docket No. UE 327.
- In re Avista Corporation 2018 General Rate Case, Wa.UTC Dockets UE-170485 and UG-170486 (Consolidated).
- Application of Nevada Power Company d/b/a NV Energy for authority to adjust its annual revenue requirement for general rates charged to all classes of electric customers and for relief properly related thereto, PUCN. Docket No. 17-06003.
- In re the Application of Rocky Mountain Power for Authority to Decrease Current Rates by $15.7 Million to Refund Deferred Net Power Costs Under Tariff Schedule 95 Energy Cost Adjustment Mechanism and to Decrease Current Rates By $528 Thousand Under Tariff Schedule 93, REC and SO2 Revenue Adjustment Mechanism, Wy. PSC, Docket No. 20000-514-EA-17 (Record No. 14696).
- In re the 2018 General Rate Case of Puget Sound Energy, Wa.UTC, Docket No. 170033 (Cons.).
- In re PacifiCorp, dba Pacific Power, 2018 Transition Adjustment Mechanism, Or.PUC, Docket No. UE 323.
- In re Portland General Electric Company, Request for a General Rate Revision, Or.PUC, Docket No. UE 319.
- In re Portland General Electric Company, Application for Transportation Electrification Programs, Or.PUC, UM 1811.
- In re Pacific Power & Light Company, Application for Transportation Electrification Programs, Or.PUC, Docket No. UM 1810.
- In re the Public Utility Commission of Oregon, Investigation to Examine PacifiCorp, dba Pacific Power's Non-Standard Avoided Cost Pricing, Or.PUC, Docket No. UM 1802.

- In re Pacific Power & Light Co., Revisions to Tariff WN U-75, Advice No. 16-05, to modify the Company's existing tariffs governing permanent disconnection and removal procedures, Wa.UTC, Docket No. UE-161204.
- In re Puget Sound Energy's Revisions to Tariff WN U-60, Adding Schedule 451, Implementing a New Retail Wheeling Service, Wa.UTC, Docket No. UE-161123.
- 2018 Joint Power and Transmission Rate Proceeding, Bonneville Power Administration, Case No. BP-18.
- In re Portland General Electric Company Application for Approval of Sale of Harborton Restoration Project Property, Or.PUC, Docket No. UP 334 (Cons.).
- In re An Investigation of Policies Related to Renewable Distributed Electric Generation, Ar.PSC, Matter No. 16-028-U.
- In re Net Metering and the Implementation of Act 827 of 2015, Ar.PSC, Matter No. 16-027-R.
- In re the Application of Rocky Mountain Power for Approval of the 2016 Energy Balancing Account, Ut.PSC, Docket No. 16-035-01
- In re Avista Corporation Request for a General Rate Revision, Wa.UTC, Docket No. UE-160228 (Cons.).
- In re the Application of Rocky Mountain Power to Decrease Current Rates by $2.7 Million to Recover Deferred Net Power Costs Pursuant to Tariff Schedule 95 and to Increase Rates by $50 Thousand Pursuant to Tariff Schedule 93, Wy.PSC, Docket No. 20000-292-EA-16.
- In re PacifiCorp, dba Pacific Power, 2017 Transition Adjustment Mechanism, Or.PUC, Docket No. UE 307.
- In re Portland General Electric Company, 2017 Annual Power Cost Update Tariff (Schedule 125), Or.PUC, Docket No. UE 308.
- In re PacifiCorp, Request to Initiate an Investigation of Multi-Jurisdictional Issues and Approve an Inter-Jurisdictional Cost Allocation Protocol, Or.PUC, UM 1050.
- In re Pacific Power & Light Company, General rate increase for electric services, Wa.UTC, Docket No. UE-152253.
- In The Matter of the Application of Rocky Mountain Power for Authority of a General Rate Increase in Its Retail Electric Utility Service Rates in Wyoming of $32.4 Million Per Year or 4.5 Percent, Wy.PSC, Docket No. 20000-469-ER-15.
- In re Avista Corporation, General Rate Increase for Electric Services, Wa.UTC, Docket No. UE-150204.
- In re the Application of Rocky Mountain Power to Decrease Rates by $17.6 Million to Recover Deferred Net Power Costs Pursuant to Tariff Schedule 95 to Decrease Rates by $4.7 Million Pursuant to Tariff Schedule 93, Wy.PSC, Docket No. 20000-472-EA-15.
- Formal complaint of The Walla Walla Country Club against Pacific Power & Light Company for refusal to provide disconnection under Commission-approved terms and fees, as mandated under Company tariff rules, Wa.UTC, Docket No. UE-143932.
- In re PacifiCorp, dba Pacific Power, 2016 Transition Adjustment Mechanism, Or.PUC, Docket No. UE 296.

- In re Portland General Electric Company, Request for a General Rate Revision, Or.PUC, Docket No. UE 294.
- In re Portland General Electric Company and PacifiCorp dba Pacific Power, Request for Generic Power Cost Adjustment Mechanism Investigation, Or.PUC, Docket No. UM 1662.
- In re PacifiCorp, dba Pacific Power, Application for Approval of Deer Creek Mine Transaction, Or.PUC, Docket No. UM 1712.
- In re Public Utility Commission of Oregon, Investigation to Explore Issues Related to a Renewable Generator's Contribution to Capacity, Or.PUC, Docket No. UM 1719.
- In re Portland General Electric Company, Application for Deferral Accounting of Excess Pension Costs and Carrying Costs on Cash Contributions, Or.PUC, Docket No. UM 1623.
- 2016 Joint Power and Transmission Rate Proceeding, Bonneville Power Administration, Case No. BP-16.
- In re Puget Sound Energy, Petition to Update Methodologies Used to Allocate Electric Cost of Service and for Electric Rate Design Purposes, Wa.UTC, Docket No. UE-141368.
- In re Pacific Power & Light Company, Request for a General Rate Revision Resulting in an Overall Price Change of 8.5 Percent, or $27.2 Million, Wa.UTC, Docket No. UE-140762.
- In re Puget Sound Energy, Revises the Power Cost Rate in WN U-60, Tariff G, Schedule 95, to reflect a decrease of $9,554,847 in the Company's overall normalized power supply costs, Wa.UTC, Docket No. UE-141141.
- In re the Application of Rocky Mountain Power for Authority to Increase Its Retail Electric Utility Service Rates in Wyoming Approximately $36.1 Million Per Year or 5.3 Percent, Wy.PSC, Docket No. 20000-446-ER-14.
- In re Avista Corporation, General Rate Increase for Electric Services, RE, Tariff WN U-28, Which Proposes an Overall Net Electric Billed Increase of 5.5 Percent Effective January 1, 2015, Wa.UTC, Docket No. UE-140188.
- In re PacifiCorp, dba Pacific Power, Application for Deferred Accounting and Prudence Determination Associated with the Energy Imbalance Market, Or.PUC, Docket No. UM 1689.
- In re PacifiCorp, dba Pacific Power, 2015 Transition Adjustment Mechanism, Or.PUC, Docket No. UE 287.
- In re Portland General Electric Company, Request for a General Rate Revision, Or.PUC, Docket No. UE 283.
- In re Portland General Electric Company's Net Variable Power Costs (NVPC) and Annual Power Cost Update (APCU), Or.PUC, Docket No. UE 286.
- In re Portland General Electric Company 2014 Schedule 145 Boardman Power Plant Operating Adjustment, Or.PUC, Docket No. UE 281.
- In re PacifiCorp, dba Pacific Power, Transition Adjustment, Five-Year Cost of Service Opt-Out (adopting testimony of Donald W. Schoenbeck), Or.PUC, Docket No. UE 267.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 370, UE 372

In the Matters of	)
	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (Wheatridge) (UE 370) and	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (BPSC Energy Storage Microgrid and ARC Energy Storage) (UE 372).	)

EXHIBIT AWEC/102

PGE RESPONSES TO DATA REQUESTS

(REDACTED VERSION)

December 30, 2019

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Regulatory Affairs

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 001
Dated December 17, 2019

Request:

Please provide the final shortlist, including ranking and scores, from PGE's RFP in which it selected the Wheatridge Energy Facility.

Response:

Attachment 001-A provides the 2018 Renewable Request for Proposal Final Shortlist Evaluation Results.

Attachment 001-A is protected information and subject to Protective Order No. 19-416

UE 370

Attachment 001-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Final Shortlist Evaluation Results

Table A - Final Shortlist Evaluation Results
Confidential

[redacted]

January 14, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 002
Dated December 31, 2019

Request:

Refer to Confidential Attachment A to PGE's Response to AWEC DR 001.

a. Please confirm that Bidder Number [redacted] is the Wheatridge Energy Center PGE selected from the RFP. If this is incorrect, please identify which Bidder Number represents the Wheatridge Energy Center.
b. Please identify the name of the bidder and the name of the facility associated with Numbers [redacted] and [redacted].
c. Please explain why PGE did not select either Bidder Numbers [redacted] or [redacted] Please provide all documents in PGE's possession supporting its explanation.
d. If not provided in response to the above data request, please provide all communications between PGE and the bidder regarding Numbers [redacted] and [redacted]
e. Please provide all detailed scoring documents for each Bidder Number identified in Confidential Attachment A.

Response:

Please note, certain material requested within this data request is highly confidential and as such, PGE has not posted the material to Huddle. As both AWEC and CUB executed the Modified Protective Order in Docket No. UM 1934 and were given access to similar highly confidential material, PGE will be providing this material to AWEC, CUB, and OPUC Staff via CD. Any other parties wishing to view the material may contact Greg Batzler at (503) 464-8644.

a. Yes. The bid referenced in part (a) above is the Wheatridge Renewable Energy Facility.
b. PGE's response is provided as part of Confidential Attachment 002-A.

c. PGE's response is provided as part of Confidential Attachment 002-A. Confidential Attachment 002-B and Confidential Attachment 002-C provide supporting documentation for PGE's response.

d. PGE objects to this request on the basis that it is unduly burdensome. Additionally, PGE's confidential response to part (c) above contains all relevant information regarding the bid. Notwithstanding this objection, PGE responds as follows: See PGE's response to part (c) of this request.

e. Please refer to Confidential Attachment 002-D. Please note that Attachment 002-D provides the detailed scoring document summarizing price scoring, non-price scoring, and portfolio model results.

Attachments 002-A through 002-D are protected information and subject to Protective Order No. 19-416.

UE 370

Attachment 002-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Confidential Written Response to Part B. and Part C.

UE 370

Attachment 002-B

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Bidder Communications

UE 370

Attachment 002-C

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Bidder Communications

UE 370

Attachment 002-D

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

2018 R-RFP Detailed Scoring Document

February 7, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 004
Dated January 24, 2020

Request:

Referring to Confidential Attachments B and C to PGE's response to AWEC Data Request 002, did PGE perform any modeling of the [redacted] If so, please provide the results of this modeling. If not, please explain why not.

Response:

No. PGE did not perform any additional modeling. As stated in PGE's Response to AWEC Data Request No. 002, Confidential Attachment C, [redacted]

February 7, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 005
Dated January 24, 2020

Request:

Referring Confidential Attachments B and C to PGE's response to AWEC Data Request 002, [redacted]

Response:

[redacted]

February 7, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 006
Dated January 24, 2020

Request:

Referring to PGE's response to AWEC Data Request 002, subpart d, please clarify whether the attachments to subpart c of this response represent the universe of communications between PGE and [redacted] related to the bids [redacted] submitted.

a. If this does not represent the universe of such communications, please explain why these additional communications are not potentially relevant to the issues in this docket.

b. If this does not represent the universe of such communications, please provide any additional communications between PGE and [redacted]

Response:

a. Throughout the course of the RFP, [redacted]

b. [redacted]

February 28, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 012
Dated February 14, 2020

<u>Request:</u>

Please provide the total project cost separately for bid [redacted] and bid [redacted].

<u>Response</u>:

PGE interprets 'total project cost' to mean the forecasted net present value (NPV) of all costs associated only with the offered bids. PGE notes that this metric does not account for differences in volume necessary to compare bids. PGE has also included each bid's Real Levelized Cost of Energy (RLCOE).

For [redacted] the NPV of the total costs was [redacted] The RLCOE was [redacted].

For [redacted] the NPV of the total costs was [redacted]. The RLCOE was [redacted].

All figures are in 2018 dollars.

March 9, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 013
Dated February 24, 2020

Request:

Please provide the final, unredacted copy of the Bates White Independent Evaluator Report for the 2018 Request for Proposal.

Response:

Please Attachment 013-A for the requested information.

Attachment 013-A is protected information and subject to Protective Order No. 19-416.

UE 370

Attachment 013-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Bates White Independent Evaluator's Final Report on PGE's 2018 Renewables RFP

March 9, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 017
Dated February 24, 2020

Request:

Please provide, and identify the tenor of, the final forward price curves that were used to evaluate the short list resources in PGE's response to AWEC Data Request 002.

Response:

PGE's price scoring and portfolio analysis used the forward price curves developed and acknowledged in the 2016 IRP Update. Please refer to Appendix F and Appendix G of the 2016 IRP Update available at https://edocs.puc.state.or.us/efdocs/HAO/lc66hao12513.pdf.

March 20, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 019
Dated March 6, 2020

Request:

Reference PGE's response to AWEC Data Request 12:

a. Please provide workpapers used to calculate the total cost associated with the respective bids.
b. Please provide workpapers used to calculate the Real Levelized Cost of Energy for the respective bids.

Response:

These workpapers have been previously provided in PGE's response to OPUC Data Request No. 054, confidential Attachment 054-A. For convenience, they are provided here as Attachment 019-A.

Attachment 019-A is macro-enabled and each partial bid for short-listed bids can be selected by entering in the "Partial Bid #" located on row 38 into cell A3 of the tab titled "Assump". Partial bid results for total cost can be found in cell N811 and for Real Levelized Cost of Energy in cell N813. Total bid costs are calculated through a macro-routine the results of which can be found in the cells L875:AH924.

Attachment 019-A is protected information and subject to Protective Order No. 19-416.

UE 370

Attachment 019-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

Price Score Model

March 25, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 021
Dated March 6, 2020

Request:

Please provide PGE's production tax credit carryforward balance as of December 31, 2019.

Response:

PGE will not file its 2019 tax return until Q3 of 2020. However, the estimated production tax credit carryforward balance as of December 31, 2019 is $64M.

March 26, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 024
Dated March 6, 2020

Request:

Reference PGE's response to OPUC DR 054, Confidential Attachment A, Tab "Assump", Cells "P88:W88":

a. In cell P88, PGE assumed a wheeling expense of $1.47/kW-mo. Please provide PGE's basis for this assumption.
b. Does PGE agree that BPA's current wheeling Point to Point rates are $1.533 /kW-mo?
c. Please identify the amount of wheeling costs payable to Umatilla Electric Cooperative in the model.

Response:

a. The assumption of $1.47 per kilowatt month that PGE used is BPA's PTP-18 long-term firm point to point service, as provided in their rate schedule for Fiscal Year (FY) 2018-2019. PGE used this rate as it was the current rate at the time of the RFP scoring process.

b. PGE does agree that the current BPA firm point-to-point rate for FY2020-2021 is $1.533/kw-mo. However, this rate was not in place at the time of RFP bid scoring.

c. PGE does not pay wheeling costs to Umatilla Electric Cooperative and thus does not include this cost in the model. Transmission costs are included within the total EPC Capital Cost in cell T125.

March 26, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 025
Dated March 6, 2020

Request:

Reference PGE's response to OPUC DR 054, Confidential Attachment A, tab "Assump", Cell "P94":

a. Please provide PGE's basis for assuming integration costs of [redacted].

b. Does the integration cost of $[redacted] include the cost of day-ahead wind integration, also called the "Day-ahead Forecast Error" in MONET?

Response:

a. The integration costs assumed are based on BPA's Variable Energy Resource Balancing Service from Fiscal Year 2018-2019, which includes Regulating Reserves ($0.13/kw-mo.), Following Reserves ($0.42/kw-mo.), and Imbalance Reserves ($0.16/kw-mo.).

b. This cost does not include the wind day-ahead forecast error cost included in MONET. Please note, the wind day-ahead forecast error cost is used in MONET for both PGE-owned wind projects and wind contracts.

March 25, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 026
Dated March 6, 2020

Request:

Reference PGE's response to OPUC DR 054 Confidential Attachment A cells "P267:AW314": Please provide workpapers used to calculate the energy value of plant for each bid the referenced cells. If a computer model was used, please provide a copy of all model input files and output files associated with each bid, and a copy of all model documentation. Please also provide any files which are used to summarize the output files in order to derive the energy value estimates. Please identify where in the output files the referenced values may be found.

Response:

See Attachment 026-A.

Attachment 026-A is protected information and subject to Protective Order No. 19-416.

UE 370

Attachment 026-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

RFP Energy Value Model

March 25, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 027
Dated March 6, 2020

Request:

"Reference workpaper 2020 RAC - Wheatridge - Confidential\Wheatridge PGE\Royalty\#_2020AUTWheatridgePGERoyaltyPayments": Please identify where in PGE's RFP analysis in OPUC DR 054 Confidential Attachment A the [redacted] was modeled.

Response:

The developer royalty cost can be found on the 'wk_BEN1000' tab of PGE's response to OPUC Data Request No. 054, confidential Attachment A. Royalties are located in column N, which is labeled "Fuel Costs." The real levelized cost of the royalties on this tab is [redacted] In their 'Best and Final Offer,' [redacted] has a real levelized cost of [redacted]. As such, [redacted] is the value used on the 'Assump' tab in cell T116 of PGE's response to OPUC Data Request No. 054, confidential Attachment A.

March 26, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 028
Dated March 6, 2020

Request:

Reference the Attachment provided in PGE's response to CUB Data Request 05, Tab "O&M Expenses":

a. Please provide a description of the pre-COD services of [redacted]

b. Please identify where in PGE's RFP analysis from OPUC DR 054, Confidential Attachment A, the [redacted] pre-COD services was modeled.

c. Please provide a description of the Annual Service Agreement amount of [redacted]

d. Please identify where in PGE's RFP analysis in OPUC DR 054, Confidential Attachment A, the annual service agreement amount of [redacted] was modelled.

e. Please identify where in PGE's RFP analysis in OPUC DR 054, Confidential Attachment A, the Contract Manager, Transmission O&M, Station Service Costs, Availability Bonus, Property Insurance, Decommission Bond, and Miscellaneous O&M amounts were modeled.

f. Please identify each Miscellaneous O&M item and the amount for each item.

Response:

a. Per PGE's response to OPUC Data Request No. 028, part c, the Pre-COD Services is a onetime fixed fee charged by NextEra to cover their costs associated with preparing to provide O&M services upon PGE taking ownership of its portion of the facility. It includes the initial equipment, tooling, personnel, minor services, vehicles, and support during commissioning and startup testing. The fee will be charged to FERC account 553.

b. The [redacted] (pre-COD services) and [redacted] (first year of O&M Annual Services Agreement) total [redacted], which is found in E9 of the wk_BEN1000 tab of PGE's response to AWEC Data Request No. 019, confidential Attachment A, and OPUC Data Request No. 054, confidential Attachment A. This tab calculates the real levelized cost of Turbine O&M which for 2021 includes the O&M Annual Service Agreement and the pre-COD services amount.

c. The Annual Service Agreement as described in the O&M agreement is compensation for performance of the Fixed Scope Work. This fee changes from year to year as outlined in Appendix C of the same agreement.

d. See part (b) above.

e. The 'Wk_BEN1000' tab of PGE's response to OPUC Data Request No. 054, confidential Attachment A, includes the following items:

	Worksheet Column	Column Label	Explanation
Contract Manager	N/A	N/A	Not modeled, but is partially offset by the modeled amount in column L, Professional Services.
Transmission O&M	F	BOP O&M	
Station Service Costs	I	General Costs	
Availability Bonus	N/A	N/A	Not modeled, but it is included in the O&M service agreement.
Property Insurance	K	Insurance Costs	$100,000 lower than the modeled amount, which partially offsets higher than modeled Misc. O&M costs.
Decommission Bond	G	Utilities Costs	
Miscellaneous O&M	M	Other G&A	

f. Below are the forecasted items and amounts included in the Miscellaneous O&M items:

Software Licenses	$65,000
Travel Expenditures	15,000
Other Business Expense	10,000
Training costs	10,000
Additional parts & consumables	100,000
Total Miscellaneous O&M	**$200,000**

March 27, 2020

TO: Jesse O. Gorsuch
Alliance of Western Energy Consumers'

FROM: Jaki Ferchland
Manager, Revenue Requirement

PORTLAND GENERAL ELECTRIC
UE 370
PGE Response to AWEC Data Request No. 029
Dated March 6, 2020

Request:

Please provide each forward price curve that PGE has issued since its 2016 Integrated Resource Plan. Please provide monthly detail for each market where PGE transacts. Please also identify the tenor of each curve.

***Response**:*

PGE objects to this request to the extent that it is overly broad, unduly burdensome, seeks information not relevant to this proceeding, and is vague. Without waiving these objections, PGE responds as follows:

In the context of this proceeding, PGE responds based on wholesale market price forecasts produced for long-term planning purposes for the 2016 IRP Update and the 2019 IRP.

For the 2016 IRP, PGE produced price forecasts for the Pacific Northwest. PGE did not produce price forecasts for other zones. Please see PGE's First Supplemental response to AWEC Data Request No. 017, confidential Attachments 017-A through 017-C for the price forecast from the 2016 IRP Update.

Attachment 029-A provides the monthly on and off-peak prices for the OregonWest zone in the Reference Case from the 2019 IRP. PGE did not produce monthly prices for other zones.

Attachment 029-B provides annual prices for the California-Oregon Border (COB) and Southern California Edison (SCE) zones in the Reference Case from the 2019 IRP. The SCE zone in Aurora is similar to SP-15. As mentioned above, PGE did not produce monthly prices for COB or SCE zones.

Attachment 029-A is protected information and subject to Protective Order No. 19-416.

UE 370

Attachment 029-A

Provided in Electronic Format only

Protected Information Subject to Protective Order 19-416

AURORA projected wholesale market prices for the OregonWest price zone

UE 370

Attachment 029-B

Provided in Electronic Format only

Annual Wholesale Electricity Prices: COB, SCE

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 370, UE 372

In the Matters of	)
	)
PORTLAND GENERAL ELECTRIC	)
COMPANY,	)
	)
Renewable Resources Automatic Adjustment	)
Clause (Schedule 122) (Wheatridge)	)
(UE 370) and	)
	)
Renewable Resources Automatic Adjustment	)
Clause (Schedule 122) (BPSC Energy	)
Storage Microgrid and ARC Energy Storage)	)
(UE 372).	)

EXHIBIT AWEC/103

REVENUE REQUIREMENT ADJUSTMENT CALCULATIONS

(REDACTED VERSION)

Oregon UE-370, PGE 2021 RAC Filing
Wheatridge Annualized Revenue Requirement
Dollars in $000s

		PGE Proposed	Remove PTC Carry-forward
		Annualized for RAC RevReq	**Annualized for RAC** RevReq
1	Sales to Consumers	26,493	(1,321)
2	Sales for Resale		
3	Other Revenues		
4	Total Operating Revenues	26,493	(1,321)
5	Net Variable Power Costs		
6	Production O&M (excludes Trojan)	4,006	-
7	Trojan O&M		
8	Transmission O&M	51	-
9	Distribution O&M		
10	Customer & MBC O&M		
11	Uncollectibles Expense	86	(4)
12	OPUC Fees	85	(4)
13	A&G, Ins/Bene., & Gen. Plant	360	-
14	Total Operating & Maintenance	4,588	(9)
15	Depreciation	5,750	-
16	Amortization		
17	Property Tax	856	-
18	Payroll Tax	10	-
19	Other Taxes		
20	Franchise Fees	672	(34)
21	Utility Income Tax	2,855	(248)
22	Total Operating Expenses & Taxes	14,731	(290)
23	**Utility Operating Income**	11,762	(1,031)
24	**Rate Base**		
25	Gross Plant	157,434	-
26	Accum. Deprec. / Amort	(5,750)	-
27	Accum. Def Tax	8,878	(14,111)
28	Accum. Def ITC	-	-
29	**Net Utility Plant**	160,562	(14,111)
30	Misc. Deferred Debits	-	-
31	Operating Materials & Fuel	-	-
32	Misc. Deferred Credits	-	-
33	Working Cash	564	(11)
34	**Rate Base**	161,126	(14,122)
35	**Rate of Return**	7.300%	7.300%
36	**Implied Return on Equity**	9.500%	9.500%

Oregon UE-370, PGE 2021 RAC Filing
Wheatridge Annualized Revenue Requi
Dollars in $000s

	Pre-COD Services	Contract Manager	Station Service
	Annualized for RAC RevReq	**Annualized for RAC** RevReq	**Annualized for RAC** RevReq
1 Sales to Consumers	[redacted]	(189)	(116)
2 Sales for Resale			
3 Other Revenues			
4 Total Operating Revenues		(189)	(116)
5 Net Variable Power Costs			
6 Production O&M (excludes Trojan)		(173)	(111)
7 Trojan O&M			
8 Transmission O&M		-	-
9 Distribution O&M			
10 Customer & MBC O&M			
11 Uncollectibles Expense		(1)	(0)
12 OPUC Fees		(1)	(0)
13 A&G, Ins/Bene., & Gen. Plant		-	-
14 Total Operating & Maintenance		(174)	(112)
15 Depreciation		-	-
16 Amortization		-	-
17 Property Tax		-	-
18 Payroll Tax		(10)	-
19 Other Taxes			
20 Franchise Fees		(5)	(3)
21 Utility Income Tax		(0)	(0)
22 Total Operating Expenses & Taxes		(188)	(115)
23 **Utility Operating Income**		(1)	(0)
24 **Rate Base**			
25 Gross Plant		-	-
26 Accum. Deprec. / Amort		-	-
27 Accum. Def Tax		-	-
28 Accum. Def ITC		-	-
29 **Net Utility Plant**		-	-
30 Misc. Deferred Debits		-	-
31 Operating Materials & Fuel		-	-
32 Misc. Deferred Credits		-	-
33 Working Cash		(7)	(4)
34 **Rate Base**		(7)	(4)
35 **Rate of Return**	7.300%	7.300%	7.300%
36 **Implied Return on Equity**	9.500%	9.500%	9.500%

Oregon UE-370, PGE 2021 RAC Filing
Wheatridge Annualized Revenue Requi
Dollars in $000s

		Availability Bonus	Misc. O&M
		Annualized for RAC RevReq	**Annualized for RAC** RevReq
1	Sales to Consumers	[redacted]	(207)
2	Sales for Resale		
3	Other Revenues		
4	Total Operating Revenues		(207)
5	Net Variable Power Costs		
6	Production O&M (excludes Trojan)		(200)
7	Trojan O&M		
8	Transmission O&M		-
9	Distribution O&M		
10	Customer & MBC O&M		
11	Uncollectibles Expense		(1)
12	OPUC Fees		(1)
13	A&G, Ins/Bene., & Gen. Plant		-
14	Total Operating & Maintenance		(201)
15	Depreciation		-
16	Amortization		-
17	Property Tax		-
18	Payroll Tax		-
19	Other Taxes		
20	Franchise Fees		(5)
21	Utility Income Tax		(0)
22	Total Operating Expenses & Taxes		(207)
23	**Utility Operating Income**		(1)
24	**Rate Base**		
25	Gross Plant		-
26	Accum. Deprec. / Amort		-
27	Accum. Def Tax		-
28	Accum. Def ITC		-
29	**Net Utility Plant**		-
30	Misc. Deferred Debits		-
31	Operating Materials & Fuel		-
32	Misc. Deferred Credits		-
33	Working Cash		(8)
34	**Rate Base**		(8)
35	**Rate of Return**	7.300%	7.300%
36	**Implied Return on Equity**	9.500%	9.500%

Oregon UE-370, PGE 2021 RAC Filing
Wheatridge Annualized Revenue Requi
Dollars in $000s

	2021 Plant Additions	Rev Sens. Costs	Prudence Disallowance
	Annualized for RAC RevReq	**Annualized for RAC** RevReq	**Annualized for RAC** RevReq
1 Sales to Consumers	(374)	(569)	(5,440)
2 Sales for Resale			
3 Other Revenues			
4 Total Operating Revenues	(374)	(569)	(5,440)
5 Net Variable Power Costs			
6 Production O&M (excludes Trojan)	-	-	-
7 Trojan O&M			
8 Transmission O&M	-	-	-
9 Distribution O&M			
10 Customer & MBC O&M			
11 Uncollectibles Expense	(1)	(56)	(18)
12 OPUC Fees	(1)	(55)	(17)
13 A&G, Ins/Bene., & Gen. Plant	-	-	-
14 Total Operating & Maintenance	(2)	(111)	(35)
15 Depreciation	-	-	(5,248)
16 Amortization	-	-	-
17 Property Tax	-	-	-
18 Payroll Tax	-	-	-
19 Other Taxes			
20 Franchise Fees	(10)	(435)	(138)
21 Utility Income Tax	(70)	(4)	(4)
22 Total Operating Expenses & Taxes	(82)	(551)	(5,425)
23 **Utility Operating Income**	(292)	(19)	(15)
24 **Rate Base**			
25 Gross Plant	(4,000)	-	-
26 Accum. Deprec. / Amort	-	-	-
27 Accum. Def Tax	-	-	-
28 Accum. Def ITC	-	-	-
29 **Net Utility Plant**	(4,000)	-	-
30 Misc. Deferred Debits	-	-	-
31 Operating Materials & Fuel	-	-	-
32 Misc. Deferred Credits	-	-	-
33 Working Cash	(3)	(255)	(208)
34 **Rate Base**	(4,003)	(255)	(208)
35 **Rate of Return**	7.300%	7.300%	7.300%
36 **Implied Return on Equity**	9.500%	9.500%	9.500%

Oregon UE-370, PGE 2021 RAC Filing
Wheatridge Annualized Revenue Requi
Dollars in $000s

		Adjusted Rev. Req.
		Annualized for RAC RevReq
1	Sales to Consumers	17,314
2	Sales for Resale	
3	Other Revenues	
4	Total Operating Revenues	17,314
5	Net Variable Power Costs	
6	Production O&M (excludes Trojan)	1,734
7	Trojan O&M	
8	Transmission O&M	51
9	Distribution O&M	
10	Customer & MBC O&M	
11	Uncollectibles Expense	-
12	OPUC Fees	-
13	A&G, Ins/Bene., & Gen. Plant	360
14	Total Operating & Maintenance	2,145
15	Depreciation	502
16	Amortization	-
17	Property Tax	856
18	Payroll Tax	-
19	Other Taxes	
20	Franchise Fees	783
21	Utility Income Tax	2,548
22	Total Operating Expenses & Taxes	6,832
23	**Utility Operating Income**	10,482
24	**Rate Base**	
25	Gross Plant	155,022
26	Accum. Deprec. / Amort	(5,776)
27	Accum. Def Tax	(5,654)
28	Accum. Def ITC	-
29	**Net Utility Plant**	143,592
30	Misc. Deferred Debits	-
31	Operating Materials & Fuel	-
32	Misc. Deferred Credits	-
33	Working Cash	-
34	**Rate Base**	143,592
35	**Rate of Return**	7.300%
36	**Implied Return on Equity**	9.500%

Oregon UE-370, PGE 2021 RAC Filing
Calculation of Wheatridge Disallowance
Impact on RAC Rates, and Excluding NVPC impact

[redacted]

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

UE 370, UE 372

In the Matters of	)
	)
PORTLAND GENERAL ELECTRIC COMPANY,	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (Wheatridge) (UE 370) and	)
	)
Renewable Resources Automatic Adjustment Clause (Schedule 122) (BPSC Energy Storage Microgrid and ARC Energy Storage) (UE 372).	)

EXHIBIT AWEC/104

INDEPENDENT EVALUATOR'S FINAL REPORT ON PGE'S 2018 RENEWABLE RFP

(REDACTED VERSION)

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THE INDEPENDENT EVALUATOR'S FINAL REPORT ON PORTLAND GENERAL ELECTRIC'S 2018 RENEWABLE REQUEST FOR PROPOSALS

Presented to:
OREGON PUBLIC UTILITY COMMISSION

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October 2, 2018

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I. INTRODUCTION AND SUMMARY

A. INTRODUCTION

This is Bates White's Final Closing Report on Portland General Electric's (PGE or the Company) 2018 Renewables RFP (RFP). Bates White served as the Independent Evaluator (IE) for this RFP. The primary purpose of this report is to provide the Oregon Public Utility Commission (Commission) with the IE's findings with respect to the Company's selection of a Final Shortlist. This report is also intended to provide the Commission with a record of the development and evaluation process for both the Initial and Final Shortlists.

B. THE FINAL SHORTLIST

The Company has selected three projects for the Final Shortlist representing approximately 600 MW. These projects are:

[redacted] - A proposed 100 MW wind project located in [redacted]. This project is to be developed by [redacted] and will sell power to PGE under a [redacted] power purchase agreement (PPA). [redacted] has also offered an option for this project which included the addition of solar generation and battery energy storage to complement the wind project.

[redacted] - A proposed wind project located in [redacted]. This project is to be developed by [redacted]. The project will sell 200 MW of power to PGE under a [redacted] PPA. The offer is a part of a larger overall project, which is currently planned to be approximately 400 MW.

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Wheatridge Wind Energy Facility - A proposed 300 MW project located in Morrow County, Oregon. This project is to be developed by PGE's Benchmark team, which includes personnel from both PGE and NextEra Energy Resources. The project is divided into two transactions, a 100 MW wind farm that will be sold under a Build Own Transfer (BOT) agreement to PGE, and a 200 MW PPA under which NextEra will sell energy from the project to PGE. The Benchmark team also offered options which (a) add battery energy storage to the BOT portion or (b) add solar generation and battery energy storage to the PPA portion.

We have the following findings:

The selected bids were the top offers that were able to meet all RFP qualification criteria. PGE's analysis shows that all three projects are projected to deliver cost savings to ratepayers under reference case assumptions as well as many other alternate scenarios.

The selected bids are the best-qualified offers from a reasonably competitive process. The RFP received bids from 8 suppliers offering a total of 10 projects representing about 1,950 MW. Some of these projects offered multiple options. In total there were 26 bid options presented. Offers were received from wind, solar, and geothermal projects and several bids were offered with battery storage capability. Offers included power purchase agreements and build-own-transfer agreements.

Our independent analysis confirmed that the selected bids were reasonably priced. Our analysis included the creation of our own cost models for each bid option, a review of PGE's modeling and a review of the terms and conditions of each bid.

One Company-sponsored Benchmark bid was chosen, and we took special care to confirm that selection. We confirmed the accuracy of the Benchmark costs and scoring and provided the Commission with a complete review of all costs of each

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offer variant prior to bid receipt. We also confirmed the Benchmark's status by: (a) reviewing the project's Initial and Final Shortlist scores and models, (b) independently scoring the project's non-price characteristics, (c) comparing the cost and output of the project to recent third-party bids, and (d) evaluating the bid costs in our own cost model. We note that the offer has better risk protection than a typical self-build option as two-thirds of the offer is being sold to PGE under a third-party, pay-for-performance PPA, substantially lowering risks to ratepayers.

The RFP aligns with the Company's Integrated Resource Planning (IRP) process, including the revised renewable action plan filed on November 9, 2017 and acknowledged by the Commission in December of 2017. The Initial and Final Shortlist analyses used current assumptions from the IRP process. The models and processes used to select the Final Shortlist were the same models that the Company uses in its IRP process.

We participated in the entire RFP process from design, through bid receipt and analysis, to the selection of the Initial and Final Shortlists. During that time we:

1. Reviewed and commented on drafts of the RFP;
2. Attended the pre-bid conference;
3. Monitored bidder contact, including the answers to bidder questions;
4. Confirmed the assumptions, models and processes used in the analyses;
5. Confirmed the initial qualification of bidders and the confirmation of proposal details;
6. Provided input with respect to bidder disqualifications;
7. Reviewed the price and non-price scores and models for the Company's Initial Shortlist process and confirmed the Company's selection of an Initial Shortlist; and

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8. Reviewed the models for the selection of the Initial and Final Shortlist and confirmed the Company's selection of the Initial and Final Shortlist.

Throughout the process, we were in constant contact with PGE's evaluation team. The Company was transparent in their discussions with us and provided all the information that we asked within a reasonable timeframe.

C. ADDITIONAL COMMENTS AND RECOMMENDATIONS

We make our findings here with the understanding that PGE [redacted] and that the inclusion of three projects is intended to provide backup in case one or more offers should drop out during contract negotiations. [redacted]. In our view, PGE's portfolio modeling does not support signing PPAs with all three projects. PGE's analysis shows that such a portfolio may provide higher levels of benefits in several cases, including PGE's reference case, but would ultimately be too risky when compared to signing offers with one or two projects. PGE's analysis generally supports signing one or two offers, depending on the time frame analyzed and assumptions regarding the cost of replacement supply in later years.

Moreover, in our opinion, PGE's portfolio analysis shows a clear preference when it comes to project selection. Specifically, [redacted] We would expect the Company to adhere to this preference in pursuing agreements and have a clear explanation if their final portfolio does not reflect this ranking. We understand and acknowledge that the Company may have a different view based on the non-price characteristics of the [redacted]. In our view, the portfolio modeling results should guide the preference order, with the non-price aspects a secondary consideration. In our view, the main non-price deficits of the [redacted], namely the contingent nature of its offer and a less certain transmission plan, are certainly reason

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to acquire a backup offer in case of project failure. However, if these issues can be remedied the Company's portfolio modeling shows the [redacted] offer to be a better offer.

This RFP saw a number of disqualifications, mainly due to the requirements surrounding transmission service. These were not completely unexpected as there is limited service available from the Bonneville Power Administration (BPA) territory, where most projects were located. In fact, during the RFP design phase, we did make some efforts to make the RFP's minimum threshold requirements less strict. While we had no objection to any of the disqualifications, all which were based on the requirements laid out in the RFP, the experience did suggest to us two areas of potential improvement for future RFPs.

First, PGE should, when possible, endeavor to allow for more flexibility in transmission planning for RFPs. The requirements here were driven by the sunsetting of the Production Tax Credit (PTC) which required bids to be operational by 2020. PGE essentially required firm transmission service which lined up with this commercial operations date (COD), meaning that offers had to have firm transmission commitments by the end of the year. This requirement disqualified several offers, including some with very attractive prices. We understand the needs for service commitments in this RFP and agreed with PGE regarding disqualifications. However, we would suggest that in future RFPs with more flexible time limits PGE consider ways to be more flexible in its planning and acquisition of projects, specifically with regards to transmission requirements and giving projects more time to make service commitments.

Second, and partially due to the rapid time frame for the RFP, PGE conducted due diligence on all offers essentially on an ongoing basis, asking for information at bid submission and more information at the time of initial shortlisting. For some offers, this resulted in PGE initially determining that the offers were qualified to be evaluated for the Initial Shortlist and then revising this determination. This resulted in very few bids being evaluated for the Final Shortlist. Moreover, had there been additional offers that were qualified to participate in the RFP that did not make the Initial Shortlist, they could have been edged out by offers that were ultimately not qualified. While this did not happen in this particular case, it has the potential to affect future RFPs.

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In future RFPs we would recommend that the Company seek a more streamlined process by (a) making any qualification decisions first, (b) conducting initial shortlist scoring, (c) modeling shortlisted offers for the Final Shortlist, then (d) seeking any additional materials needed from their top selections to ensure qualification for the Final Shortlist. This would help reduce the burden on evaluators to review and vet only the offers which the Company seeks to put on the shortlist.

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II. IRP APPROVAL TO BID RECEIPT

PGE's 2016 IRP was filed on November 15, 2016 in OPUC Docket LC-66. The IRP was acknowledged by the Commission in October of 2017 with modifications and one exception related to the Company's renewable action plan. In response to that exception, PGE filed a revised renewable action plan on November 9, 2017. The plan included a proposal to conduct a RFP for 100 MWa of RPS-eligible resources to meet PGE's capacity and energy needs by 2021. The Commission acknowledged this request, with conditions, at its December 13, 2017 public meeting and in Order 18-044 issued February 2, 2018.

PGE provided the IE with an initial draft of the RFP on January 31, 2018. We provided initial thoughts and reviewed subsequent revisions. We provided our assessment of the final draft RFP to the Commission on April 6, 2018 and it was filed in Docket UM-1934. In their May 8, 2018 meeting the Commission asked the Company and the IE to make filings in advance of the special public meeting to review the RFP. We were also asked to address a number of questions related to stakeholder comments and Commission concerns. PGE filed a revised draft RFP on May 11, 2018 addressing a number of our concerns and we filed our review and comments on May 15, 2018. We appeared at the Commission's May 16, 2018 special public meeting to answer questions related to our assessment.

The RFP was approved by the Commission, with modifications and guidance, at the May special public meeting. This approval was memorialized in Order 18-171 on May 21, 2018. The Commission ordered modifications to the RFP regarding scheduling requirements, non-price scoring, transmission service requirements modeling sensitivities and delivery requirements in the *pro forma* PPA.

PGE made the required changes to the RFP and issued the final RFP to market on May 22, 2018. We reviewed the changes made and had no objections.

Since PGE issued the RFP in late September the following steps have been completed:

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Table 1: Milestone Events to Date

Milestone	Date
RFP Issued to Market	5/22/2018
Bidder's Conference	5/22/2018
Benchmark Bid Due	6/8/2018
RFP Bids Due	6/15/2018
Initial Shortlist Evaluation Completed	8/13/2018
BAFO Price Update	8/17/2018
Final Shortlist Evaluation Completed	9/18/2018
IE Report submitted to OPUC	10/2/2018

PGE held a Bidder's Conference on May 22, 2018. The conference was simulcast online. Bates White attended the conference in person in Portland. PGE personnel walked through the RFP process, including bid qualification and valuation. At the conference, PGE answered several questions regarding the RFP, qualification and bid evaluation. Several questions that could not be answered at the conference were later answered in online postings. Bates White reviewed all questions and answers prior to posting as bidder continued to ask questions until bid receipt. All questions and answers were posted publically on the RFP website so that all bidders would have access to the same information.

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III. BENCHMARK BID ANALYSIS

On June 8, 2018, in accordance with the RFP timeline, PGE's Benchmark team submitted their offers to the IE and the PGE evaluation team. The Benchmark team consisted of personnel from PGE as well as NextEra Energy Resources (NextEra). The team provided an offer for a single project, the Wheatridge Wind Energy Facility located in Morrow County, Oregon. The project has a nominal capacity of 300 MW and will consist of 12 GE 2.3-116 (2.3 MW) and 108 GE 2.5-127 (2.5 MW) wind turbine generators (WTGs). The project offered three variants. These variants are shown in Table 2.

Table 2: Benchmark Project Summary Data

Bid	Bid Capacity	Sources	Source MW	Technology
Base	300 MW	Build-Own-Transfer Power Purchase Agreement	100 200	Wind Wind
Alternate I	300 MW	Build-Own-Transfer Power Purchase Agreement	100 200	Wind +Battery Storage Wind
Alternate II	300 MW	Build-Own-Transfer Power Purchase Agreement	100 250	Wind Wind + Solar + Storage

In all cases the project was divided amongst two separate transactions, a power purchase agreement and a build-own-transfer agreement. Variants of the project included both battery storage and solar energy to the planned wind project.

After the bid receipt, Bates White undertook a multi-part review of the offers. First, we reviewed the full contents of the submissions made by PGE. Second, we compared the capital costs and PPA price in the offer to prices received in PacifiCorp's recent 2017R wind RFP. Third, we compared the benchmark capital costs and PPA price to publicly available data from respected sources. Fourth, we compared the forecast capacity factor of the project to 2017R RFP bids and public data. Finally, we reviewed submission documents, including the proposed pro forma PPA and BOT term sheet, to assess the other unique risks proposed by the transaction. We found that the Benchmarks were acceptable based on this analysis. We note that initially the second alternative was deemed non-

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compliant because the solar facility would come on-line in 2023, after the deadline established in the RFP. In response to this determination, the Benchmark team (when provided an opportunity to cure the deficiency – a right given to all bidders) altered the in-service date of the solar facility to conform to the RFP requirements.

In addition, as required by the Oregon Competitive Bidding Guidelines, we reviewed PGE's price and non-price scoring of the benchmarks prior to receipt of third-party offers. The price score was based on a comparison of the bid's costs to the value of the energy and capacity the bid would replace. The non-price score was based on criteria laid out in the RFP. Bates White confirmed the price scores by inputting key bid criteria into our own busbar levelized cost model. Additional details about all scores are provided later in this memo. All scoring was confirmed prior to the review of third-party offers, per Oregon's Competitive Bidding Guidelines.

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IV. BID RECEIPT AND QUALIFICATION

Bids from third-party bidders were due on June 15, 2018. Bids were submitted via a secure website. Neither Bates White nor PGE had access to the submissions until the closing of the bid window. We delayed opening the offers for several additional days in order to complete and finalize the Benchmark Bid scoring. No bids were rejected for being untimely, and there was no indication that any bidder had offers they wished to submit but were unable to.

Ultimately, eight suppliers submitted a total of ten projects representing almost 1,950 MW—which is about 6.5 times the quantity solicited.[1] The majority of these projects were wind projects, though some solar projects were offered as well, along with a geothermal project. Most contained several options or variants, typically differences in project technology or transaction type (i.e., PPA versus BTA or a combination thereof). Several projects offered an option with battery energy storage. The majority of these projects were located in the territory of the Bonneville Power Administration (BPA). Only one offer was proposed in PGE's territory.

After the receipt of offers, PGE worked with bidders to confirm and collect bid fees. Upon final receipt of bids and bid fee confirmation, PGE went to work confirming bid details with bidders. PGE sent multiple sets of questions to bidders and bidders confirmed project information and provided updated information where their original response was lacking. Bates White was copied on all questions and responses.

Once the bids were confirmed, PGE and the IEs reviewed the offers for qualification purposes. Bids were held to several minimum requirements. Key requirements included: (a) demonstrating that the project could be commercially operational no later than December 31, 2021, (b) having requested interconnection with PGE's system or a third-party system, and (c)

[1] Note that the target in this RFP was 100 average MW (MWa), so an average hourly output. This calculation assumes a capacity factor of about 33%.

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demonstrating a clear plan to deliver to PGE's territory with a schedule that allowed for service commitments by the end of the year.

We discussed potential disqualifications with PGE evaluators. Ultimately, two bidders had projects disqualified from consideration for the Initial Shortlist. The disqualified projects were as follows:

[redacted]

Bates White was consulted on the decision to remove each of these bidders and bid options and we agreed with the decision to remove them. Neither bidder voiced major objections to the decision.

In addition, PGE removed some of the bid options presented by the [redacted]. The developer offered several options for the project that differed in transaction type (PPA vs. BOT), project size, and delivery point. PGE removed from consideration any offers for project sized above [redacted] We agreed with this decision as well.

[2] See RFP Section 6.2.6.

[3] See RFP Section 6.1.6.

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V. INITIAL SHORTLIST DEVELOPMENT

After the bids were received and bid details were confirmed, the Company began the Initial Shortlist evaluation. Per the RFP, each bid was scored on price and non-price factors. The total bid score was weighted at a maximum 60% for price and a maximum 40% for non- price factors. The non-price factors were defined as follows:

Table 3: Non-Price Factor Weighting

Non-Price Factor	Non-Price Factor Weighting
Development Criteria	10%
Physical Characteristics	13%
Performance Certainty	12%
Credit Evaluation	5%

Appendix H of the RFP laid out specific point values and requirements within each of these categories. The price score was based on a comparison of the cost of the bid to the benefits of the bid. Costs differed based on the type of bid. For BTA bids the costs were:

(a) the revenue requirement needed to cover the project's capital cost,

(b) O&M costs,

(c) insurance, land lease and other services costs,

(d) network upgrade costs,

(e) any transmission services needed to deliver the power to PGE's territory, including wheeling, line losses, reserves, and balancing costs) and,

(f) the value of the Production Tax Credit. This value was reduced for PGE-owned units due to the fact that PGE does not project to have the taxable income to fully use the PTC as it is earned. PGE presumed that any PTC earned would be carried forward as a deferred tax asset and used in the 2027-2030 time frame. The additional carrying cost for this asset was counted against the PGE-owned offer.

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For PPA bids the costs included:

(a) the PPA price, and

(b) all applicable transmission costs.

On the benefits side PGE looked at three categories of benefits:

(a) Energy Value – This is the value of the energy that is being purchased from the unit. It is calculated by using the Company's forward price curve and the hourly unit dispatch projections from the bid.

(b) Capacity Value – This is the value of capacity from the project. The quantity of capacity provided by each offer was calculated by using the RECAP model and the output projections from the bidder. The price of capacity was based on the cost of a new simple-cycle combustion turbine (SCCT).

(c) Flexibility Value – For projects in which PGE had sufficient control of dispatch the Company used its Resource Optimization Model (ROM) to value that flexibility. The value was based on a comparison of dispatch costs using various time frames (day-ahead, hour-ahead, etc.) and the hourly production of the resource.

Costs and benefits were calculated on a real-levelized basis in 2018 dollars per megawatt-hour. Price scores were created by looking at the cost to benefit ratio. These approaches were laid out in the RFP.

A. RANKING THE BIDS

Bates White independently verified the rankings in three ways. First, we reviewed each model on a line-by-line basis to make sure that the details of the bids were properly input and that all bids used the same default assumptions. Second, we reviewed the terms and conditions of the bids and compiled our own non-price scores. Third, we tested PGE's models by inputting key costs of each bid option into our own cost model, which determined an annual $/MWh annuity cost for the bid option. After we reviewed the bids, we conferred with the Company to come to a consensus on shortlist candidates.

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Our simplified cost models were able to match PGE's models reasonably well, with small differences generally owing to the greater precision of PGE's modeling. The table below shows the offers for each project.

[redacted]

The table above allows us to make several findings. First, the [redacted] bids were clearly the best performing offers. These projects were notable because the bidder offered [redacted]. Second, the solar bids tended to have slightly higher benefits, this is mainly due to the fact that solar offers contribute more supply in the middle of the day and, therefore, bring more capacity benefits. Third, the best benchmark offer, while competitive, was only the [redacted] project when ranked solely by the cost/benefit ratio. Fourth, PPAs generally did slightly better than ownership options from the same project. This can be credited, in part, to the Company's accounting for the cost of not being able to use the PTC as it is earned, which tended to add something on the order of [redacted].

PGE used these numbers to create a price score, with the top offer receiving 600 points and the lowest offer receiving a score based on a comparison of its ratio to the best score. Other scores were interpolated.

PGE then added in the non-price scores. Non-prices scores were determined by PGE's evaluation team based on Appendix H in the RFP, including subject matter experts. Bidders could receive a maximum of 400 points. We were able to review the scores as well and found

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them reasonable, though we had small differences in scoring. Once the scores were added together the list of bids for consideration into the initial shortlist was as follows.[4]

[redacted]

Here we see that the [redacted] projects are still the top two projects. However, the [redacted] is now much more competitive. The [redacted] did receive very high non-price marks, mainly due to the fact that it had an executed interconnection agreement and long-term firm transmission rights to deliver the entire supply of the project. To be clear, these rights were held by the developer, [redacted]; they were not existing PGE transmission rights.

In order to select bid options for the Initial Shortlist, PGE and the IE proceeded with the following goals in mind:

1. Selecting the bids with the greatest net benefit in terms of price and non-price benefits,
2. A diversity of bidders and projects,
3. A mix of PPAs and BOTs,
4. A relatively clear split between the score of the last bid picked and the next bid that was not selected, and
5. The RFP goal that there be a minimum of 150% (or 150 MWa) of projects taken, not including the benchmark offer.[5]

[4] Note that the scores in Table 5 do not reflect the additional analysis of the third-party review of project wind studies.
[5] RFP Section 3.8.

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PGE suggested a shortlist that would be comprised of any bid option which scored over 600 points. This would include both [redacted], all Benchmark options, both options from [redacted], and one option each from [redacted]

While this did not provide for a large split between the final option taken and the next option [redacted] the selection did fulfill the other criteria. It provided for six projects, more than enough to meet the supply targets, a diversity of technology and transaction types, and the top bids were selected based on the established RFP scoring system.

During the development of the RFP, we expressed some concern that the evaluation would place too much emphasis on non-price factors. We cited PacifiCorp's 2017R RFP scoring, which gave 70% weight to price factors and 30% to non-price factors. In response, PGE agreed to look at different levels of price and non-price weighting. These analyses made for slight changes in bid ranking but there were no offers which were selected in the standard 60/40 split that would not be among the top offers under a 70/30 price non-price split. Based on this we felt comfortable concluding that the scoring split had no adverse effects on bid selection.

B. INITIAL SHORTLIST

Following the evaluation explained above, PGE placed the following projects and bidders on the Initial Shortlist.

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[redacted]

[redacted]

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VI. BID REVIEW AND PRICE UPDATES

Best and Final Offers (BAFO) from all bidders on the Initial Shortlist were requested by August 17, 2018. In addition, PGE requested more information regarding the shortlisted offers. Most notably PGE sought information regarding financial support, interconnection status, and transmission plans. Moreover, for BOT offers, PGE had an independent third-party engineer review O&M cost projections offered by bidders to make sure they were reasonable. PGE also, per Oregon guidelines, had a third-party consultant review the bidder's wind studies.

Most – but not all – bidders took advantage of the opportunity to adjust their pricing. The table below compares the costs and benefits of each bid before and after the information and price updates. Note that this uses PGE's real levelized costs, while Table 4 above uses nominal levelized costs.

[redacted]

[redacted]

With these updates complete, the Company was ready to move to final shortlist modeling. However, based on the additional information provided by the bidders, i.e., regarding financial support, interconnection status, and transmission plans, PGE determined that three more projects were not qualified to continue in the RFP. They were:

[redacted]

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[redacted]

[redacted]

[redacted]

[6] See RFP Section 6.2.6.
[7] See RFP Section 4.3.

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[redacted]

As with the other disqualifications, PGE consulted with the IE prior to each decision and we agreed with the conclusions. Our one bit of concern comes with the way in which these were integrated into the process. Ideally, in our view, once a project has met the requirements for the initial shortlist they should be considered acceptable to be analyzed in the final shortlist process. Furthermore, final shortlist qualifications should only be applied to the offers which the company wishes to place on the final shortlist.

The reason for the first statement is that if a bid is accepted into the initial shortlist that does not, in the evaluators view, meet the shortlist criteria, then it might be crowding out an otherwise valid offer. For example, if a requirement for a bid being reviewed at all is that it demonstrates a reasonable transmission plan and the Company accepts the bids plan and places it on an initial shortlist, only to change that decision when more information is brought to light the offer may have taken the place of another offer which would be valid.

The reason for the second statement is that applying elimination criteria prior to analyzing bids for the final shortlist prevents evaluators from knowing how the shortlist conditions play into the evaluation. We recognize that some decisions are straightforward, but other times disqualifications can require tough judgment calls. In the latter case, it is extremely helpful to all parties to understand just what the effect of an elimination will be on the final portfolio.

We do understand the need for a quick project approval, in this case, to capture the PTC gave PGE less time to conduct all the due diligence it may have wanted prior to the Initial Shortlist. To be clear, in this particular procurement there were no offers that did not make the Initial Shortlist that would have been otherwise viable. All rejected offers would have been rejected under

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the company's cost screen or suffered the same issues as other, rejected, offers. We simply offer these suggestions for future work when there is more control over the evaluation timeframe.

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VII. FINAL SHORTLIST MODELING

A. METHODOLOGY

PGE subjected the remaining three projects (offering a total of six bid options) to their final shortlist modeling process. To do this, PGE created portfolios consisting of several possible combinations of bid options. From the six-bid options, PGE evaluated a total of 23 combinations of offers.

PGE then calculated the value of each offer portfolio, looking at the total costs of the portfolio in each year and comparing those costs to the value of energy, capacity and flexibility provided by the bids in each year. In this manner, they developed a net cost of each offer. PGE looked at years running from 2021 through 2051 when the longest-lived offers (the BOT offers) would reach the end of their book life. In order to evaluate all portfolios on a consistent basis PGE filled in any unmet energy and capacity needs, up to targeted levels for a given simulation with a generic resource, priced at either (a) the cost of generic wind from PGE's IRP process or (b) the average cost of the offers on the shortlist.

Each portfolio was analyzed under a number of different scenarios. Specifically, PGE looked at three levels of hydro generation, three levels of natural gas prices, and three levels of CO_2 cost. This resulted in each of the 23 portfolios being valued under a total of 27 different scenarios.

The purpose of the evaluation was to develop a ranking of the 23 portfolios, from most to least valuable to ratepayers. To do so, for each portfolio, PGE calculated several metrics in order to compare the portfolio to other offers. These metrics – listed below – were taken from the Company's IRP process. These metrics were used to score each of the 23 portfolios across each of the 27 scenarios.

- Net Cost – This was the net present value of the net portfolio cost in PGE's reference case.

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- Severity – This is the average net present value of the portfolio in its three most costly sensitivities.
- Variability – This is the semi-variance of the net present value of the portfolio across all sensitivity cases in which the cost exceeded the reference case.
- Standard Deviation – This is the standard deviation of the net cost of the portfolio over all sensitivity cases.
- Durability – This is the percentage in which the portfolio is in the top third of all portfolios less the percentage in which the portfolio is in the lowest third of all portfolios.
- Cost/Risk – This was the primary ranking metric per the RFP and was calculated as one-half the reference case net cost NPV plus one half the standard deviation net cost NPV across all 27 sensitivities. This was meant to strike a balance between the expected cost of the portfolio and the risk created with a given portfolio.

For each portfolio and cluster of 27 scenarios, PGE looked at three levels of QF additions; assuming 50% of the current executed contracts come on line, assuming 100% of executed contracts come on line and assuming 100% of the executed contracts *plus* an additional 50% of proposed contracts come on line. PGE also looked at varying the procurement target, choosing 75, 100, or 125 MWa to add to the portfolio. As stated above, any gaps between the target and the energy provided by the portfolio were met with generic fill beginning in 2025 and priced at IRP generic wind cost or the average shortlisted bid cost.

PGE then looked at the number of times a given portfolio was among the top five portfolios based on the cost/risk metric. Per their direction in the RFP PGE examined this metric at two points in time, 2040 and 2051. This enabled evaluators to get another sense of whether or not the costs of generic fill resources were tilting the decision in any way. PGE also evaluated each portfolio’s average performance across all study assumptions.

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B. MODELING RESULTS

The overall results can be seen in the table below. This table shows the number of times a given portfolio was in the top five portfolios as measured by the cost/risk metric. As noted above this incorporates (a) three levels of energy target (75, 100 and 125 MWa), (b) three levels of QF acquisition (50% executed, 100% executed and 50% proposed), and (c) two-time frames (until 2040 and until 2051). The table separates out results by which fill cost was used, PGE IRP cost or the average cost of bids.

Table 8: Final Shortlist – Frequency in the Top Five portfolios

Portfolio	Bids in the Portfolio	Times in Top five	
		Average Bid Fill	IRP Bid fill
F-1	[redacted]	-	2
F-2		-	-
F-3		4	17
F-4		17	1
F-5		16	1
F-6		15	10
F-7		-	-
F-8		-	5
F-9		-	-
F-10		-	-
F-11		-	-
F-12		-	-
F-13		-	7
F-14		4	13
F-15		-	-
F-16		17	16
F-17		17	18
F-18		-	-
F-19		-	-
F-20		-	-
F-21		-	-
F-22		-	-
F-23		-	-

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Portfolios F-16 and F-17 which contained the [redacted] projects were the most selected offers overall. These projects also were often selected on their own (Portfolios F-4 through F-6) under the average bid fill cost assumption. All projects were selected in at least some of the scenarios. [redacted]

We took a closer examination of the data provided by PGE and reached a number of conclusions.

Three bids are never preferred

As can be seen from the table above, under no scenarios were portfolios with three offers ever in the top five portfolios based on the cost/risk metric. A closer look reveals that this is mainly due to the risk of the portfolio. As more bids are added, the overall potential savings increases, but so does the cost in cases in which market conditions are not favorable to the bids. For example, the table below shows the net cost, standard deviation and rankings by the cost/risk metric for each portfolio assuming a 100 MWa target, average bid cost fill, 100% executed QF additions, and a time horizon through 2051. Bear in mind that negative numbers represent a cost reduction or a net benefit.

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Table 9: Net Cost and Standard Deviation With 100 MWa target, Average Bid Fill, and 100% Executed QF

Portfolio	Bids in the Portfolio	Net Cost (000s)	Standard Deviation	Cost/Risk	Rank
F-1	[redacted]	$ 14,794	$ 245,757	$ 115,088	11
F-2		$ 34,095	$ 244,521	$ 126,437	15
F-3		$ (55,232)	$ 272,505	$ 100,282	7
F-4		$ (10,790)	$ 221,240	$ 92,022	5
F-5		$ (11,097)	$ 220,326	$ 89,925	4
F-6		$ (33,885)	$ 234,336	$ 89,021	3
F-7		$ (44,969)	$ 305,041	$ 119,502	10
F-8		$ (36,126)	$ 290,850	$ 114,738	9
F-9		$ (159,729)	$ 426,378	$ 129,689	12
F-10		$ (24,058)	$ 303,805	$ 131,499	16
F-11		$ (15,884)	$ 289,614	$ 126,465	14
F-12		$ (121,746)	$ 425,142	$ 148,548	19
F-13		$ (109,309)	$ 331,796	$ 106,983	8
F-14		$ (105,144)	$ 317,602	$ 100,337	6
F-15		$ (179,679)	$ 453,121	$ 134,411	13
F-16		$ (88,801)	$ 281,711	$ 89,690	2
F-17		$ (77,249)	$ 267,527	$ 86,027	1
F-18		$ (176,756)	$ 485,659	$ 151,301	20
F-19		$ (189,444)	$ 471,471	$ 137,863	17
F-20		$ (133,826)	$ 484,423	$ 172,148	23
F-21		$ (146,514)	$ 470,235	$ 158,710	22
F-22		$ (192,120)	$ 512,408	$ 157,844	21
F-23		$ (204,808)	$ 498,217	$ 144,404	18

As can be seen in this table the net cost in the reference case goes down as more bids are added to the portfolio—that is, the net benefits of the portfolio to ratepayers increase. However, adding projects to the selected portfolio also increases risk, and so as that happens the standard deviation of net costs across all 27 scenarios increases, meaning that the variability of outcomes increases. When both of these effects are accounted for via the cost/risk metric the three-bid portfolios are ranked near the bottom—in other words, the additional modeled net benefits are not worth the added risk they carry according to this metric.

We note that PGE also examined the average cost across all scenarios. Unlike the cost/risk metric, this metric generally supported taking more offers as, on average, more MW taken produced more benefit. This aligns with the observation above that reference case benefits increased with larger projects. However, this metric was not the main metric put forth in the RFP and doesn't present as specific a feel for the risk in each portfolio.

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The choice between one and two bids is a close call

As can be seen from the overall results above, the top five portfolios vary between one and two bids selected. In total, using the average bid fill cost, 52 of top portfolios or 58% of all selections, had just one bid, while the remaining offers had two bids. Under the IRP bid fill cost assumptions 34% of top portfolios had just one offer.

The choice of bid fill cost assumption matters

In general, the company's IRP assumptions regarding the cost of generic wind beginning in 2025 were higher in cost than the offers received here in the RFP.[8] Because of this difference, the assumption regarding the cost of energy needed to fill out the portfolio did make a difference in portfolio ranking. As shown above, with the lower-cost fill, the selection was slightly more biased toward single-resource portfolios. Using higher-cost IRP fill assumptions also biased the selection toward long-termed resources [redacted]. As seen in the table above [redacted] was in the top five selections much more often using the IRP fill assumptions.

There was a clear preference order for bids

While all projects were ultimately among the top performing portfolios there was a clear preference exhibited in terms of which offers were selected more often. [redacted]. The table below shows the number of times a project was among the top five portfolios on the cost/risk metric.

[8] Using a 7% discount rate, the levelized nominal cost of the energy fill was about $82/MWh stating in 2025. The levelized nominal cost for offers on the Initial Shortlist ranged from about $35/MWh to about $55/MWh.

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Table 10: Number of times in the Top Five portfolios

	# of Inclusions in top Five Portfolios		% of Time in Top Five Portfolios		
[redacted]	Average Fill Cost	IRP Fill Cost	Average Fill Cost	IRP Fill Cost	Overall
	71	61	79%	68%	73%
	49	44	54%	49%	52%
	8	44	9%	49%	29%

As can be seen from the table, the [redacted]

Portfolios perform poorly under low gas and zero CO_2 cost conditions

PGE looked at the net costs of the portfolios under a number of difference assumptions regarding hydro levels, natural gas prices, and carbon prices. While portfolios nearly always provided net benefits in the reference case, there were a number of sensitivities under which they actually were projected to be a net cost addition to the portfolio. The table below shows for one specific portfolio (F-23, with all three offers) the net present value of net costs under each sensitivity case. All cases assume an energy target of 100 MWa, Average Bid cost, 100% Executed QFs, and run through 2051. Sensitivities where there is a net cost to ratepayers are highlighted in red.

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Table 11:Net costs under various Sensitivities

Hydro	Carbon	Natual Gas	F-23 Net Cost NPV
Reference	High	High	$ (1,079,353)
Reference	High	Low	$ (207,224)
Reference	High	Reference	$ (422,590)
Reference	Low	High	$ (468,409)
Reference	Low	Low	$ 537,867
Reference	Low	Reference	$ 315,091
Reference	Reference	High	$ (867,594)
Reference	Reference	Low	$ 2,638
Reference	***Reference***	***Reference***	***$ (204,808)***
Low	High	High	$ (1,236,118)
Low	High	Low	$ (317,700)
Low	High	Reference	$ (545,961)
Low	Low	High	$ (645,717)
Low	Low	Low	$ 451,065
Low	Low	Reference	$ 212,914
Low	Reference	High	$ (1,028,190)
Low	Reference	Low	$ (101,132)
Low	Reference	Reference	$ (316,517)
High	High	High	$ (872,647)
High	High	Low	$ (81,086)
High	High	Reference	$ (284,044)
High	Low	High	$ (273,218)
High	Low	Low	$ 627,206
High	Low	Reference	$ 427,379
High	Reference	High	$ (681,416)
High	Reference	Low	$ 110,726
High	Reference	Reference	$ (80,569)

As can be seen from the table the portfolio is expected to deliver a net present value cost reduction of about $209 million in the reference case. This metric, however, can range from a reduction of over $1.1 billion to a cost increase of over $600 million. Cost increases are typically associated with low carbon and low to reference case natural gas prices. This result makes some intuitive sense since market prices for energy would be lower in a low carbon cost/low natural gas cost vision of the world, reducing the benefit that these fixed-cost resources can provide. Conversely,

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in a world where energy prices are high (with high carbon costs and natural gas prices) the portfolio is very valuable.

All Portfolios are affected by the same market variables

Because all three projects are fixed-cost wind resources (with additional contribution from solar and battery storage in some cases) they are all affected similarly by market forces. The table below shows the NPV of net costs under all market scenarios for portfolio F-23 [redacted] F-17 [redacted] and F-5 [redacted]

Table 12:Net costs under various Sensitivities

Hydro	Carbon	Natual Gas	F-23 Net Cost NPV	F-17 Net Cost NPV	F-5 Net Cost NPV
Reference	High	High	$ (1,079,353)	$ (546,761)	$ (397,306)
Reference	High	Low	$ (207,224)	$ (77,935)	$ (4,691)
Reference	High	Reference	$ (422,590)	$ (195,607)	$ (107,787)
Reference	Low	High	$ (468,409)	$ (222,191)	$ (130,728)
Reference	Low	Low	$ 537,867	$ 324,648	$ 322,318
Reference	Low	Reference	$ 315,091	$ 200,314	$ 213,470
Reference	Reference	High	$ (867,594)	$ (430,451)	$ (300,037)
Reference	Reference	Low	$ 2,638	$ 36,332	$ 89,556
Reference	***Reference***	***Reference***	***$ (204,808)***	***$ (77,249)***	***$ (11,097)***
Low	High	High	$ (1,236,118)	$ (628,807)	$ (465,682)
Low	High	Low	$ (317,700)	$ (135,496)	$ (51,044)
Low	High	Reference	$ (545,961)	$ (260,260)	$ (161,196)
Low	Low	High	$ (645,717)	$ (315,497)	$ (206,627)
Low	Low	Low	$ 451,065	$ 277,930	$ 285,792
Low	Low	Reference	$ 212,914	$ 145,548	$ 168,846
Low	Reference	High	$ (1,028,190)	$ (514,011)	$ (369,126)
Low	Reference	Low	$ (101,132)	$ (18,247)	$ 45,185
Low	Reference	Reference	$ (316,517)	$ (136,101)	$ (59,688)
High	High	High	$ (872,647)	$ (439,134)	$ (306,129)
High	High	Low	$ (81,086)	$ (11,877)	$ 50,012
High	High	Reference	$ (284,044)	$ (123,271)	$ (47,004)
High	Low	High	$ (273,218)	$ (118,949)	$ (45,259)
High	Low	Low	$ 627,206	$ 371,671	$ 359,403
High	Low	Reference	$ 427,379	$ 260,106	$ 262,710
High	Reference	High	$ (681,416)	$ (333,736)	$ (217,760)
High	Reference	Low	$ 110,726	$ 92,660	$ 136,187
High	Reference	Reference	$ (80,569)	$ (12,529)	$ 43,733

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As can be seen from the table, the cases in which the bids are a net cost to ratepayers are generally the same. Also, as noted earlier, as more bids are added the reference case net benefit increases, but the range of potential results (i.e., the risk of the portfolio) increases as well.

Timeframe, energy target, and QF levels do not matter as much as other variables

PGE looked at varying levels of QF additions as well as different evaluation time frames. In general, these did not make as big a difference in the selection of top portfolios as did energy fill cost.

While certain offers were preferred, all projects projected value

While there was a clear preference order for projects based on the cost/risk metric, all projects did project net cost reductions. The table below shows the NPV of net costs (assuming 100 MW energy target, 100% executed QF additions and average bid fill cost) portfolios consisting of only [redacted]

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Table 13: Net costs under various Sensitivities for three projects

Hydro	Carbon	Natual Gas	F-3 Net Cost NPV	F-5 Net Cost NPV	F-6 Net Cost NPV
Reference	High	High	$ (528,624)	$ (397,306)	$ (444,810)
Reference	High	Low	$ (51,860)	$ (4,691)	$ (32,915)
Reference	High	Reference	$ (172,871)	$ (107,787)	$ (137,771)
Reference	Low	High	$ (196,455)	$ (130,728)	$ (161,123)
Reference	Low	Low	$ 357,994	$ 322,318	$ 320,323
Reference	Low	Reference	$ 229,791	$ 213,470	$ 208,635
Reference	Reference	High	$ (412,197)	$ (300,037)	$ (341,858)
Reference	Reference	Low	$ 62,925	$ 89,556	$ 67,809
Reference	***Reference***	***Reference***	***$ (55,232)***	***$ (11,097)***	***$ (33,885)***
Low	High	High	$ (615,567)	$ (465,682)	$ (515,339)
Low	High	Low	$ (112,538)	$ (51,044)	$ (82,253)
Low	High	Reference	$ (241,468)	$ (161,196)	$ (193,469)
Low	Low	High	$ (294,863)	$ (206,627)	$ (240,766)
Low	Low	Low	$ 310,087	$ 285,792	$ 279,825
Low	Low	Reference	$ 172,664	$ 168,846	$ 161,166
Low	Reference	High	$ (499,854)	$ (369,126)	$ (413,054)
Low	Reference	Low	$ 5,928	$ 45,185	$ 20,800
Low	Reference	Reference	$ (117,050)	$ (59,688)	$ (84,637)
High	High	High	$ (415,256)	$ (306,129)	$ (353,059)
High	High	Low	$ 17,828	$ 50,012	$ 23,410
High	High	Reference	$ (96,202)	$ (47,004)	$ (75,992)
High	Low	High	$ (87,703)	$ (45,259)	$ (73,093)
High	Low	Low	$ 406,720	$ 359,403	$ 360,434
High	Low	Reference	$ 292,459	$ 262,710	$ 259,951
High	Reference	High	$ (309,722)	$ (217,760)	$ (259,995)
High	Reference	Low	$ 122,587	$ 136,187	$ 115,611
High	Reference	Reference	$ 13,649	$ 43,733	$ 21,114

Again, the results play out largely by project size. The [redacted] Again, the results are mostly driven by market conditions.