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July 27, 2023

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,
2023 Clean Energy Plan and Integrated Resource Plan.
Docket No. LC 80

Dear Filing Center:

Please find enclosed the Opening Comments of the Alliance of Western Energy Consumers in the above-referenced docket.

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

Sincerely,

/s/ Jesse O. Gorsuch
Jesse O. Gorsuch

Enclosure

BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

LC 80

In the Matter of PORTLAND GENERAL ELECTRIC COMPANY, 2023 Integrated Resource Plan/Clean Energy Plan.	))))))))	OPENING COMMENTS OF THE ALLIANCE OF WESTERN ENERGY CONSUMERS

I. INTRODUCTION

Pursuant to the Administrative Law Judge's July 14, 2023 Ruling in the above-referenced matter, the Alliance of Western Energy Consumers ("AWEC") files these comments with the Oregon Public Utility Commission ("Commission") on Portland General Electric Company's ("PGE") Integrated Resource Plan and Clean Energy Plan (collectively, "IRP").

AWEC is concerned that PGE's IRP is subject to a several critical issues that render most IRP findings unsubstantiated and unreliable. AWEC recommends that the Commission not acknowledge PGE's IRP.

AWEC has the following specific concerns:

1) PGE's long-term market price forecast is not consistent with planned resource additions or with planned sales of emitting energy.
2) The portfolio development and evaluation process does not ensure that PGE's system will be able to meet hourly dispatch requirements.

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3) The assumed ELCC for new resources does not account for the impact of similar resources. It is likely that PGE's proposed portfolio will be capacity deficient.
4) PGE's finding that transmission investments are no-regret investments are the result of arbitrary and unrealistic model constraints rather than economic analysis.
5) Transmission action items cannot be acknowledged as presented.
6) PGE has not developed a least-cost approach to satisfying community-based renewable energy requirements.

II. COMMENTS

A. PGE's market price forecast is not reliable.

PGE forecasts market prices using the Aurora model. These prices are used to value annual energy value for each resource type. Resource energy values are inputs to PGE's portfolio selection model, ROSE-E. The ROSE-E model selects new resources to meet capacity and energy targets at a minimum cost. Cost is calculated according to the following formula:

Portfolio Cost = Fixed cost + Variable Cost – Flexibility Value – Energy Value – Community Benefit Value.

Energy Value, one of the main components of ROSE-E's cost calculations, is the result of market price forecasts. However, as discussed below, the Aurora market prices are not reliable. This makes the Portfolio Cost, the variable that is optimized in ROSE-E, unreliable. Thus, there is no basis for relying on the portfolios generated by ROSE-E or the associated portfolio costs. Because of this, no determination can be made about which portfolio is least cost. It is likely that none of the portfolios are least cost because the ROSE-E model optimized an unreliable variable.

PGE's prices are not reliable because PGE relies on many disjointed models rather than a single model. Each of these models takes as fixed the outputs of other models. However, many

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of the outputs and inputs to PGE's various models are endogenous, meaning that they are affected by each other.

Key among these endogenous variables is hourly market price. Hourly market price is a fundamental factor that determines the economic value of generation resources. However, market price is endogenous because market price depends on the supply and demand of energy, and PGE's selection of new generation resources affects the supply and demand of energy.

The Aurora model is used by PGE to evaluate market supply and demand for energy and to forecast hourly market prices. The model uses inputs from Wood Mackenzie, which include assumed buildout of Pacific Northwest resources, to generate the price forecast. The resulting price is then assumed to be fixed, and unaffected by capacity expansion or market sales decisions made by PGE's other models. PGE's ROSE-E model takes prices and energy value as fixed and calculates a least-cost solution for capacity, energy, and carbon requirements. This is problematic because wind and solar have different impacts on market demand and supply. Additional wind will depress market prices during periods when wind is blowing. Additional solar will depress market prices during periods when the sun is shining.

To illustrate the problem with treating prices as fixed, suppose regional prices are modeled with large additions of wind in Aurora. This will result in market prices being depressed during hours where wind is blowing, which lowers the energy value of wind resources. ROSE-E will take this result (lower energy value of wind, in this example) as a fixed input, which will make solar relatively more economic because solar generation occurs at different times than wind. Thus, when ROSE-E selects resources, it will favor solar resources. Because, however, market prices are impacted by generation supply and are not a fixed value (as the model treats them), if ROSE-E selects solar resources, then the price inputs used by ROSE-E become invalid

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because the model results are a direct consequence of the assumptions that seed the model (in this case, new wind generation rather than solar).

Previous IRPs have treated market prices as fixed when selecting portfolios. This has led to problems for PGE because PGE's wind resources are less valuable than PGE anticipated. In PGE's 2022 power cost filings, PGE modified its forecast model to account for the negative relationship between wind and price, reducing the expected value of wind by $5.6 million per year.[1]

The historic problem with treating market prices as fixed has been magnified in this IRP because of the Pacific Northwest's transition to clean energy. Most low-cost, clean energy resources are non-dispatchable and have highly correlated output. This is not as problematic when clean energy represents only a portion of a region's generation. However, as the region transitions to 100 percent clean energy, the share of energy produced by variable energy resources ("VERs") will increase, and the impact of VERs on market prices will magnify. In the past market prices have predominantly been driven by demand and fuel cost. In the future, however, market prices will be driven by VERs.

In addition to inappropriately treating market prices as fixed, PGE models increasingly large sales of emitting resources to shed greenhouse gas responsibility, which leads to unrealistic assumptions of market prices in the region. The figure below illustrates PGE emissions by source. Note that from 2023 to 2029 emissions from wholesale sales doubles from 2 million tons to 4 million tons and emissions from market purchases decline by 1.5 million tons. This

[1] Docket No. UE 391, PGE / 100 Vhora – Outama – Batzler / 24.

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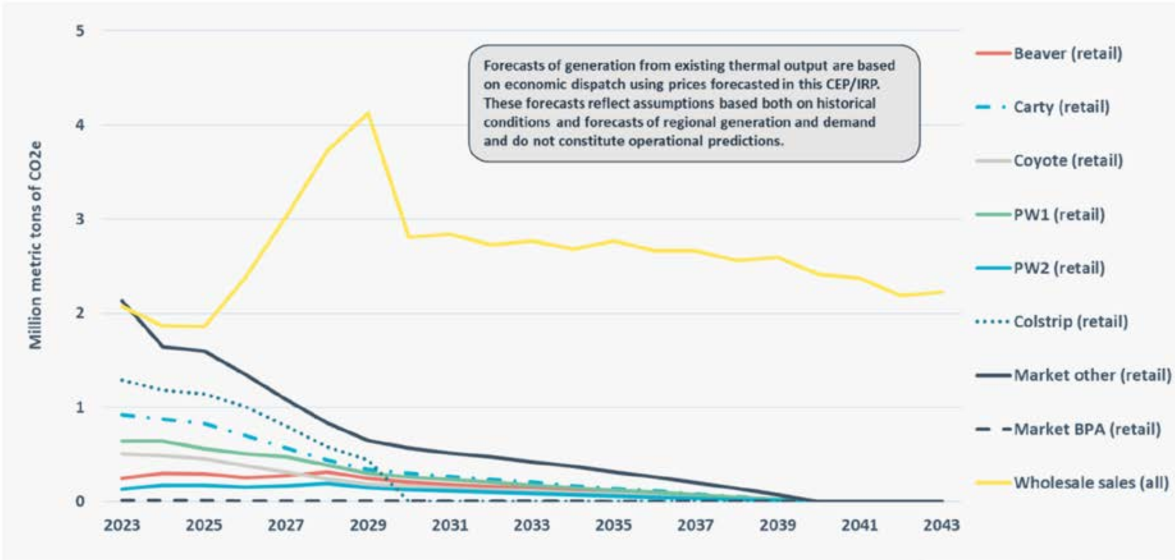
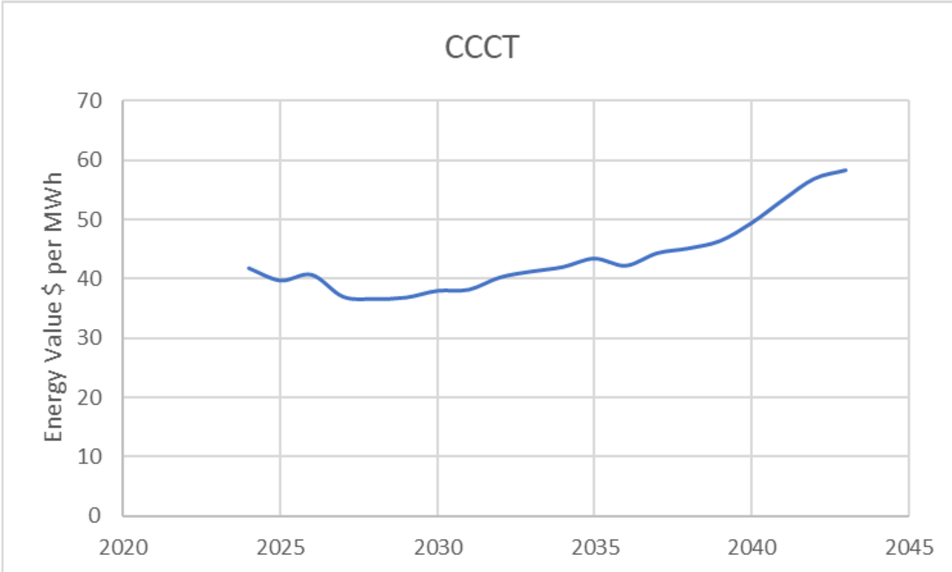
represents a massive increase in the availability of energy on regional markets. The combined impact is an injection of 885 MWa into the market.

Figure 181. Total (retail + wholesale) GHG emissions under a linear reduction glidepath (Reference Case)[555]



It is unreasonable for PGE to expect Pacific Northwest markets to absorb this much emitting energy. PGE is anticipating reducing market purchases to avoid carbon burden. Yet PGE appears not to anticipate that other market participants will be making similar plans, despite the fact that many are subject to the same or similar laws. This means that, simultaneous to PGE's planned injection of energy, there will be a substantial decrease in the demand for carbon emitting energy. Despite these market dynamics, PGE does not anticipate material declines in the value of emitting generation, which runs counter to principles of energy markets. The figure below shows that PGE finds the value of energy from a combined cycle combustion turbine ("CCCT") to be increasing between 2023 and 2043.



PGE's energy values for solar and wind also increase over time despite expected increased penetration of these resources. PGE models increasing amounts of solar and wind generation. Because these resources have relatively low contributions to peak capacity needs, PGE must over-build these resources to achieve its summer and winter capacity needs. And because the resources are over-built to meet capacity needs, PGE will become increasingly energy surplus. PGE intends to market its excess non-emitting energy as well. It is reasonable to expect that many Pacific Northwest utilities will also be acquiring wind and solar resources and will have similar needs to market excess energy. The result of this would be that energy value of variable energy resources should decrease over time. However, the inputs used in PGE's ROSE-E model show energy values from these resources increasing over time.[2]

Another issue with PGE's modeling of transmission is related to its resource dispatch model used to evaluate existing and incremental resources. The PGE zone model (or "PZM")

[2] There is an initial decline in values, but beginning in 2028, the energy from most variable energy resources is flat or increasing in value over time. *See* Attachment A (PGE's Response to AWEC DR 39, energy_value_hydro.txt.).

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assumes a single zone and thus does not consider transmission constraints[3]. By failing to consider transmission constraints, the PZM cannot reasonably simulate dispatch needs across PGE's service area. The lack of transmission constraints also means that VER curtailments are not properly modeled, and energy values of VER are over-estimated. This introduces further error into PGE's portfolio selection process.

B. PGE's Portfolio Does Not Meet Grid Reliability Standards.

The typical measures of reliability for energy systems are loss of load probability or loss of load hours. However, PGE did not evaluate its preferred portfolio using these metrics because ROSE-E is not an hourly dispatch model.[4] While ROSE-E is not an hourly dispatch model, PGE has access to hourly dispatch models, such as Aurora, and PGE could therefore evaluate the reliability of its preferred portfolio. However, PGE's preferred portfolio was created by the ROSE-E model and therefore does not use the standard measures of hourly reliability.

PGE's transition to low emission generation makes reliability analysis of the preferred portfolio increasingly important. This is because VERs can be seasonal and, within seasons, can be subject to extended periods of low generation.[5] While the ROSE-E model requires portfolios to meet annual energy needs, it does not require the model to meet monthly, weekly, or daily needs. PGE has high winter energy needs, but solar generation produces energy primarily in the summer. PGE also has daily energy needs, but wind generation can be low-producing for consecutive days in both the summer and the winter. It is extremely problematic that PGE has not considered this critical aspect of clean energy. While PGE's methodology for reliability

[3] PGE's response to Staff DR 067.
[4] Attachment A (PGE Response to AWEC Data Request 003).
[5] AWEC requested that PGE provide historic VER generation which could quantify this, but PGE declined to provide this data. *See* Attachment A (PGE Response to AWEC Data Request 020).

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analysis was imperfect for conventional carbon emitting resources, it is deadly for modeling renewable resources.

PGE's current dispatchable generation can be used temporarily to manage PGE's energy shaping needs. However, PGE anticipates rapidly reducing the annual retail energy from dispatchable resources and PGE has not developed a plan capable of replacing these shaping functions.

C. ELCC is not Consistent with Preferred Portfolio.

PGE has analyzed the effective load carrying capability ("ELCC") of incremental additions of generation. PGE has found that the ELCC of new resources declines with larger additions. The table below provides the amount of solar selected in PGE's preferred portfolio.[6]

Resource	2024	2025	2026	2027	2028	2029	2030
bCV_Hyb_1	0	0	0	0	69	200	200
bCV_Hyb_2	0	0	0	0	310	310	310
CBRE_solar	0	0	22	28	36	43	50
CV_Hyb_1	0	0	299	299	299	299	299
CV_Hyb_2	0	0	0	0	191	191	191
MCMN_Hyb_1	0	0	0	0	0	10	10
Solar_NV	0	0	0	0	0	153	400
Total Solar	0	0	321	327	905	1,206	1,460

In 2030 the portfolio includes a variety of solar resources, each with nameplate capacity less than 400. However, the total amount of solar selected is 1,460 MW. The figure below illustrates the ELCC for these resources. The amounts selected in 2030 are flagged with stars, while the combined amounts are circled.

[6] Attachment A (PGE's response to AWEC Data Request 039).

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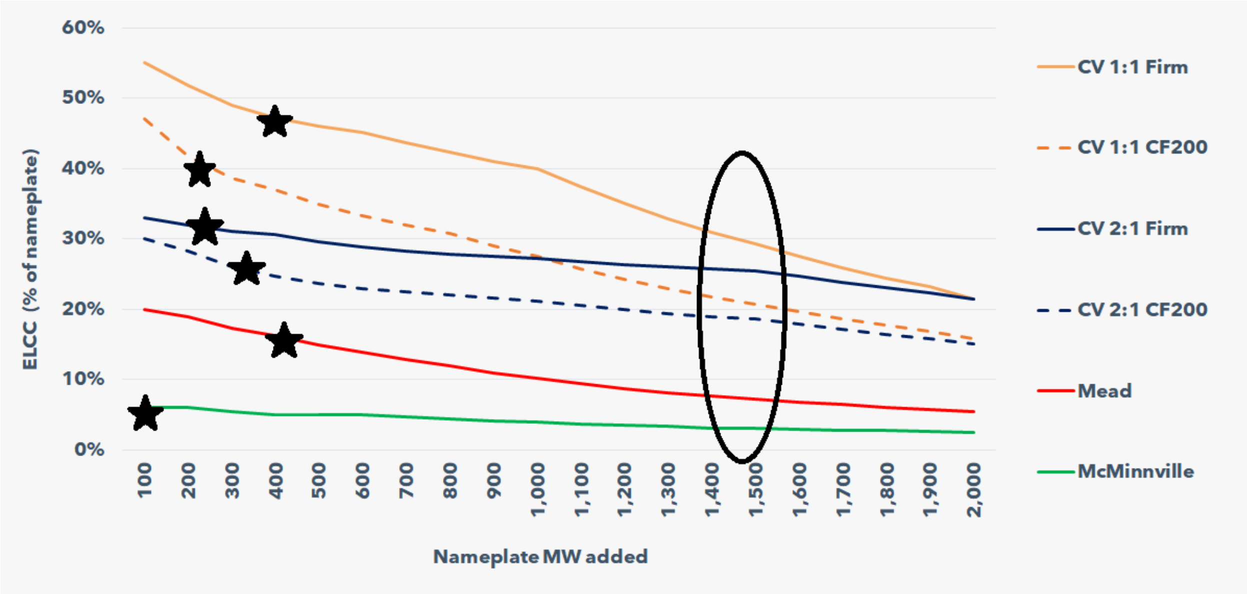

Note that the circled ELCC levels have an ELCC 30 to 50 percent less than the modeled ELCC. PGE's preferred portfolio is capacity deficient because it over-estimates the capacity contribution of resources. This over-estimation occurs because PGE separately evaluates the ELCC of very similar resources instead of accounting for the full amount of their planned acquisition, which reduces the combined ELCC of all similar resources.

D. Transmission Modeling is Generic.

PGE presents transmission as a "no-regrets"[7] investment. However, PGE's transmission modeling of South of Alston ("SoA") is generic, and thus the IRP cannot be used to support investment in any specific transmission path. The ROSE-E model constrains resource additions of all resource types except generic capacity and energy.[8] Christmas Valley, McMinnville, Gorge, SEWA, and Montana resources are all modeled as transmission constrained and require

[7] PGE 2023 IRP at 28.
[8] PGE modified this constraint in its addendum to allow additions of pump storage, but these additions are poorly modeled.

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the selection of "SoA" transmission.[9] Because PGE's model can only add non-generic resources if it adds transmission, and because generic resources are priced to be extremely expensive,[10] PGE finds transmission to be a "no regrets" investment, and proposes to invest in SoA flowgate and Bethel-Round Butte.

PGE's finding that transmission investment is "no regrets" is problematic because PGE's model cannot distinguish between different types of investment. All regional resources are enabled by the same generic transmission resource, but the actions that PGE proposes are for specific transmission paths. This begs the question of why PGE does not model specific transmission paths in its IRP.

The SoA path selected by PGE is to the northwest of Portland, PGE's main load center. However, the resources that PGE models are north, east, and south of PGE. Some resources, such as McMinnville and Christmas Valley, are unlikely to materially benefit from investment in the SoA flowgate. Other resources, such as Montana wind, will require much more investment than only the SoA flowgate. It is reasonable for PGE to find that transmission investment is warranted. But PGE's IRP provides no insight into what transmission to invest in, the incremental value of this transmission, or how to evaluate the results of various transmission and generation options.

In addition to the generic nature of the SoA transmission constraint, PGE limits the maximum transmission additions. SoA transmission additions are limited to 400 MW. Nevada and Wyoming resources, which also require transmission to their respective regions, are limited

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[9] The remaining constraints are discussed in a later section.

[10] "The generic resources are priced slightly higher than the most expensive supply-side resource available to the model." PGE 2023 IRP at 531.

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to 400 MW each. The remaining resource options, such as hydrogen, offshore wind, and long duration batteries, are constrained to be zero regardless of transmission.

As a result, after 400 MW of transmission are selected for each of SoA, Nevada, and Wyoming, the only resource ROSE-E can select is generic capacity and generic energy. This approach is unreasonable because it results in an IRP that has no long-term information on generation capacity. After 2029 the only generation resources that PGE adds are generic capacity and generic VER. The nature of these resources is so vague that their selection provides no real information about the operation of PGE's system. This means that PGE's IRP is only a six-year plan.

E. Transmission Action Items Are Not Actionable.

PGE's transmission action items are summarized in its addendum as follows:

		2023 CEP/IRP	LC 80 Addendum
Transmission actions	Pursue options to alleviate congestion on the South of Alston (SoA) flowgate	n/a	Unchanged
	Explore options to upgrade the Bethel-Round Butte line (from 230 to 500 kV)	n/a	Unchanged

PGE's own summary of transmission highlights that initial transmission actions are "n/a", or not applicable, and this status is unchanged in the addendum. This is because the actions are vague and non-actionable that despite the nearly 50% increase in capacity need in the addendum, no changes to transmission could be made. Pursuing and exploring options has no specificity. Acknowledgment of an action plan has meant that "the plan is reasonable at the time of acknowledgement."[11] While "explor[ing]" options may be *per se* reasonable, it says nothing of

[11] *In re PGE 2019 Integrated Resource Plan*, Docket No. LC 73, Order No. 20-152 at 1 (May 6, 2020).

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PGE's actual intentions with respect to transmission acquisition. If the Commission acknowledges these actions, it will not be clear if the Commission is acknowledging further study or actual acquisition of transmission.

F. PGE'S Proposal to Acquire Community-Based Renewable Energy ("CBRE") Resources Will Unnecessarily Increase Costs for Customers.

PGE's Action Plan proposes to issue an RFP to acquire 66 MW of CBRE resources by 2026, with an ultimate goal of acquiring 155 MW of CBRE resources by 2030. The Commission should not acknowledge this Action Plan item.

1. <u>PGE's CBRE Action Plan item proposes to acquire more expensive resources than are required.</u>

PGE's IRP/CEP devotes significant attention to CBRE resources and proposes a material acquisition of these resources despite the fact that PGE admits that these resources "present[] a higher cost resource than more traditional utility-scale resources"[12] and despite the fact that HB 2021 requires only that PGE "[e]xamine the costs and opportunities of offsetting energy generated from fossil fuels with community-based renewable energy."[13]

PGE's IRP creates the impression that the CBRE is a resource option that is selected by PGE's capacity expansion model. However, in PGE's preferred portfolio the selection of CBRE resources is forced through minimum build requirements. The table below illustrates the preferred portfolio constraints in ROSE-E for CBREs.[14]

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[12] PGE IRP/CEP at 309.
[13] ORS 469A.415(4)(d).
[14] Attachment A (PGE Response to AWEC DR 39).

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		2024	2025	2026	2027	2028	2029	2030
Community Scale Solar	Maximum Build	0	0	22	6	8	7	7
	Minimum Build	0	0	22	6	8	7	7
Solar Microgrids	Maximum Build	0	0	43	13	15	14	15
	Minimum Build	0	0	43	13	15	14	15
In-Conduit Hydro	Maximum Build	0	0	1	0	2	2	0
	Minimum Build	0	0	1	0	2	2	0

PGE justifies acquisition of CBRE resources by including arbitrary and unsubstantiated benefits so that it can conclude that these results "suggest distribution-connected CBRE resources are part of the least-cost and -risk set of resource additions."[15] Analogizing to the Northwest Power Act's 10% credit for energy efficiency,[16] PGE reduces the cost of CBRE resources by 10%.[17] PGE asserts that this is reasonable because this method "leverage[s] the logic that in planning, we cannot necessarily know which benefits are applicable for each resource as they depend on many factors, such as the resource location and the nature of the resource."[18] This statement is meaningless with respect to the evaluation of the costs and benefits of a CBRE resource. In addition to the obvious distinction that energy efficiency receives a 10% credit because it is statutorily mandated, whereas no such requirement applies to CBRE resources under HB 2021, energy efficiency acts as a substitute for supply-side resources, thus reducing risks inherent to such resources, whereas CBRE resources are still resources. Their "location" and "nature" remain just as unknown as any other supply-side resource at this time. Accordingly, applying a 10% cost reduction to these resources is entirely arbitrary and bears no relation to any purported benefits unique to CBRE resources. PGE should instead leverage its community solar and distributed energy studies to quantify a cost reduction for CBRE.

[15] PGE IRP/CEP at 309.
[16] 16 U.S.C. § 839a(4)(D).
[17] PGE IRP/CEP 250.
[18] *Id.*

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2. <u>PGE should limit acquisition of CBRE resources to satisfying its statutory requirements.</u>

Only one statutory requirement applies to the acquisition of CBRE resources – the requirement in ORS 469A.210 that at least 10% of the aggregate electrical capacity of all electric companies serving more than 25,000 customers be composed of the following "community-based renewable energy projects" by 2030: (a) small-scale renewable energy projects with a generating capacity of 20 megawatts or less that generate energy compliant with the Renewable Portfolio Standard; and (b) facilities that generate electricity using biomass that also generate thermal energy for a secondary purpose. Given the higher cost of CBRE resources, PGE's only actions to acquire these resources should be tied to meeting this requirement at the time it takes effect.

In discovery, PGE stated that it did not include the 10% requirement from ORS 469A.210 in its capacity expansion modeling because it "has historically been on a trajectory to meet the requirement and does not need to report on the requirement until 2029."[19] Currently, 6% of PGE's aggregate capacity is being met with CBRE resources.[20] PGE's IRP addendum shows an increase in distributed solar forecast of 167 percent, an incremental nameplate capacity of approximately 330 MW.[21] Given the expected growth of CBREs absent any intervention by PGE, it is reasonable to assume that the 66 MW of CBRE resources PGE proposes to acquire by 2026 in its action plan, as well as the 155 MW it proposes to acquire by 2030, will be incremental to the 10% mandate.

[19] Attachment A (PGE Resp. to AWEC DR 032.c).
[20] *Id.* (PGE Resp. to AWEC DR 006).
[21] Assumes a 20% capacity factor.

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Yet, PGE not only proposes to acquire CBRE resources in 2026, before this mandate applies, it has also artificially constrained the proxy resources it has evaluated to meet this requirement. Specifically, PGE did not evaluate biomass resources that generate thermal energy for a secondary purpose.[22] PGE's rationale for this is that "stakeholders" in an informal community engagement process "provided direction that biomass resources should not be considered as a non-emitting resource …."[23] The resources PGE evaluates should not be dictated by the informal feedback of certain stakeholders; it should be dictated by the utility's legal options and requirements. Biomass is explicitly eligible to meet the CBRE requirements of ORS 489A.210. PGE should evaluate this resource as an option to meet this mandate and allow biomass resources to bid into any RFP it conducts as a consequence of this evaluation.

3. <u>If PGE goes forward with a CBRE RFP, above-market costs of these resources should be borne by the communities in which the CBRE resources are located.</u>

As discussed above, PGE advantages CBRE resources in its portfolio modeling in various ways. These advantages are tied primarily to the benefits a resource provides to the community in which it is located, such as community resilience, local economic benefits, and health and community wellbeing.[24] It would be inequitable and contrary to cost-causation to require all customers to pay for resources that provide these types of non-energy benefits to only a small subset of PGE's customers. Accordingly, if PGE does select such resources, the above-market cost of these resources should be borne exclusively by the communities in which they are located, which receive the benefits that offset these above-market costs in PGE's portfolio analysis, unless and until these resources become necessary to meet a statutory or regulatory

[22] Attachment A (PGE Resp. to AWEC DR 004).
[23] *Id.*
[24] PGE IRP at 140-49.

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mandate, such as the one in ORS 469A.210. This is similar to how franchise fees above a certain percentage are allocated to customers located in the community imposing the franchise fee.

III. CONCLUSION

PGE has not shown that the preferred portfolio minimizes costs or meets reliability standards. The portfolio is likely capacity deficient and may not have an appropriate monthly and daily energy shape. Transmission analysis is generic and provides no insight into which transmission paths to pursue. The plan only looks 6 years into the future. There is no forecasting of CBRE needs and PGE has not demonstrated the economic amount of incremental CBRE that it needs to acquire. The transmission action items are vague and not actionable. AWEC recommends that the Commission not acknowledge PGE's IRP or action plan.

Dated this 27th day of July, 2023.

Respectfully submitted,

DAVISON VAN CLEVE, P.C.

/s/ Deborah Glosser
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May 12, 2023

To: Jesse Gorsuch
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 003
Dated April 28, 2023

Request:

Please refer to PGE's 2023 IRP.

a. Please provide the LOLP for the preferred portfolio by month and year.

b. Please provide the hourly base case load forecast for the planning period.

c. Please provide solar, wind, and hydro generation by hour for the preferred portfolio during the planning period.

d. Please confirm that the preferred portfolio does not include a hybrid generation-storage resource. If not confirmed, identify the selected hybrid resources.

e. If the preferred portfolio does not include a hybrid storage resource, does PGE agree that a reasonable explanation for this is that PGE's renewable energy shortfall precedes a material capacity deficit?

f. Please provide a capacity expansion result using all base case IRP assumptions but assuming PGE has no pre-existing carbon emitting resources.

Response:

a. PGE objects to this request as it is overly burdensome and requires significant new work. Subject to and without waiving its objection, PGE responds as follows:

   PGE does not use a loss-of-load-probability (LOLP) metric as part of its IRP. Calculating a LOLP metric would require additional analysis and potential model changes.

b. Please find the Reference Case hourly loads used in the Aurora model in Attachment A.

c. PGE objects to this request as it is overly burdensome and requires significant new work. Subject to and without waiving its objection, PGE responds as follows:

   PGE's portfolio optimization model, ROSE-E, makes resource additions that ensure capacity adequacy on a seasonal basis and that energy needs are met on an annual basis.

ROSE-E does not operate on an hourly time-step and hourly generation of the non-emitting resources added in the Preferred Portfolio was not calculated as an output of portfolio analysis in the IRP.

d. The Preferred Portfolio does not contain any of the available conventional supply-side hybrid resources. However, PGE notes the Preferred Portfolio does contain 100 MW of the solar-storage hybrid microgrid community-based renewable energy (CBRE) resource.

e. While the Preferred Portfolio contains hybrid CBRE resources as described above in PGE's response to part (d), it is correct that no conventional supply-side hybrid resources were selected in the Preferred Portfolio. PGE does not agree that the lack of traditional supply-side hybrid resources is explained by a renewable energy shortfall preceding a material capacity deficit. This can be seen by comparing Reference Case capacity and energy needs, shown below in Table 1.

ROSE-E meets capacity and energy needs by selecting the least-cost set of additions from the available proxy resources. The optimal mix of resources is a function of the energy and capacity provided by each resource and the cost of each resource (subject to all applicable constraints). The lack of hybrid resources selected though optimization suggests that the relative economics of hybrid resources were not competitive with standalone storage and variable energy resource (VER) options.

Table 1. Reference Case Capacity and Energy Need

Year	Capacity Shortfall (MW)	Energy Need (MWa)
2024	55	0
2025	0	0
2026	430	59
2027	502	278
2028	614	504
2029	683	757
2030	1004	905
2031	1081	999
2032	1158	1109
2033	1255	1218
2034	1352	1326
2035	1461	1446
2036	1570	1603
2037	1688	1780
2038	1807	1969
2039	1926	2116
2040	3912	2235
2041	3903	2394
2042	3894	2444
2043	3885	2529

f. PGE objects to this request as it is overly burdensome and requires significant new work. Subject to and without waiving its objection, PGE responds as follows:

   PGE did not analyze a portfolio that assumes no generation from existing carbon-emitting resources in the 2023 IRP.

May 18, 2023

To: Jesse Gorsuch
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 004
Dated May 4, 2023

Request:

In developing its CBRE potential, did PGE consider facilities that generate electricity using biomass that also generate thermal energy for a secondary purpose? If not, why not? If so, please identify where.

Response:

PGE sought input on the approach to Community Based Renewable Energy (CBRE) potential analysis as part of stakeholder and community engagement informing the development of the CEP and IRP. Through that process, stakeholders provided direction that biomass resources should not be considered as a non-emitting resource due to its associated greenhouse gas emissions. Based on this input, PGE chose not to include estimates of biomass potential within the IRP portfolio modeling.

The IRP considers generic proxy resources to represent potential resource options. Resource modeling assumptions used in IRP analysis do not necessarily set constraints on procurement processes. See response to LC 80 AWEC Data Request No. 005 for more details.

May 18, 2023

To: Jesse Gorsuch
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 006
Dated May 4, 2023

Request:

What percentage of PGE's aggregate electrical capacity is currently served by "community-based renewable energy projects" as that term is used in ORS 469A.210?

Response:

PGE views the ORS 469A.210(2) provisions for small-scale renewables and certain biomass facilities as distinct from community-based renewable energy as defined in ORS 469A.400(2) and used in PGE's Clean Energy Plan.

As of December 2022, ORS 469A.210(2)-eligible biomass and small-scale renewable resources composed 6.0% of PGE's aggregate electrical capacity, per definitions in OAR Division 91.

June 8, 2023

To: Corinne Olson
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 020
Dated May 18, 2023

Request:

Please provide the actual generation by hour for each the following resources from energization date to present:

a. Wheatridge;
b. Biglow Canyon Phase 1;
c. Biglow Canyon Phase 2;
d. Biglow Canyon Phase 3; and
e. Tucannon River.

Response:

a. After discussion with AWEC, PGE's response is as follows: Hourly generation shapes for PGE's proxy resources can be found in attachment B of PGE's response to LC 80 AWEC DR 009. Simulated hourly market prices for the RRRR price future for years 2026 and 2030 are included in the highly confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF". Highly Confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF" contains highly protected information and is subject to Modified Protective Order No. 23-193.

b. After discussion with AWEC, PGE's response is as follows: Hourly generation shapes for PGE's proxy resources can be found in attachment B of PGE's response to LC 80 AWEC DR 009. Simulated hourly market prices for the RRRR price future for years 2026 and 2030 are included in the highly confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF". Highly Confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF" contains highly protected information and is subject to Modified Protective Order No. 23-193.

c. After discussion with AWEC, PGE's response is as follows: Hourly generation shapes for PGE's proxy resources can be found in attachment B of PGE's response to LC 80 AWEC DR 009. Simulated hourly market prices for the RRRR price future for years 2026 and 2030 are included in the highly confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF". Highly Confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF" contains highly protected information and is subject to Modified Protective Order No. 23-193.

d. After discussion with AWEC, PGE's response is as follows: Hourly generation shapes for PGE's proxy resources can be found in attachment B of PGE's response to LC 80 AWEC DR 009. Simulated hourly market prices for the RRRR price future for years 2026 and 2030 are included in the highly confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF". Highly Confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF" contains highly protected information and is subject to Modified Protective Order No. 23-193.

e. After discussion with AWEC, PGE's response is as follows: Hourly generation shapes for PGE's proxy resources can be found in attachment B of PGE's response to LC 80 AWEC DR 009. Simulated hourly market prices for the RRRR price future for years 2026 and 2030 are included in the highly confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF". Highly Confidential attachment "LC 80 AWEC DR 020_Attach A_HighCONF" contains highly protected information and is subject to Modified Protective Order No. 23-193.

June 1, 2023

To: Corinne Olson
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 032
Dated May 18, 2023

Request:

Please refer to PGE's 2023 IRP page 155.

a. Please identify the resources in the Preferred Portfolio that qualify as ORS 469A.210 compliant small scale renewable energy projects. Please include the nameplate capacity and resource type.
b. Please provide the percent of PGE's aggregate electrical capacity that is provided by ORS 469A.210 compliant small scale renewable energy projects by year from 2026 to 2043.
c. Did PGE include the 10 percent requirement in ORS 469A.210 as a ROSE-E model constraint? If no, why not?
d. Did PGE include a combined heat and power biomass resource as described in ORS 469A.210 2b as an option for capacity expansion? If yes, please provide the assumed costs and operating characteristics.

Response:

PGE objects to this question because it is unduly burdensome, seeks information not relevant to the proceeding, and requires new analysis. Without waiving these objections, PGE provides the following responses:

a. PGE does not specify individual project size as an attribute of proxy resources considered in CEP/IRP portfolio analysis. Resource additions considered within energy and capacity procurements, as well as Qualifying Facility sensitivities, may or may not qualify as ORS 469A.210 compliant small-scale projects.

   However, PGE has defined the CBRE proxy resources listed in Table 27 of the CEP/IRP as eligible small-scale projects. The CBRE proxy resource included in the Preferred Portfolio includes nameplate capacities of 100 MW of community resilience microgrids, 50 MW of community-scale solar and 5 MW of in-conduit hydro.

b. PGE does not calculate the percent of aggregate electrical capacity by year within CEP/IRP modeling. This is because progress toward the target is influenced by rates of QF development and renewal and scope of programs such as the Oregon Community Solar Program which are beyond PGE's control and not specifically modeled in the CEP/IRP. Two additional factors leading to uncertainty in any forecast of a small-scale renewables percentage are any small-scale adoption that occurs as a result of All-Source RFP activities and any determination made by OPUC revising the Order No. 21-464 finding that net-metered projects should not qualify.

c. No, PGE did not include the 10 percent requirement in capacity expansion modeling. PGE has historically been on a trajectory to meet the requirement and does not need to report on the requirement until 2029.

d. No, PGE did not include a combined heat and power biomass resource in CEP/IRP capacity expansion modeling.

July 13, 2023

To: Jesse Gorsuch
Alliance of Western Energy Consumers

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to AWEC Data Request 039
Dated July 11, 2023

Request:

Please provide all workpapers supporting PGE's Addendum Filing filed on July 7, 2023.

Response:

All tables and figures (containing quantitative information) from the July 7th Addendum are included in LC 80_AWEC DR 039_Attachment_A.

Additionally listed in the table below are the different models and their confidentiality designation and description of component that changed in the July 7th Addendum. There are two attachments (LC 80_AWEC DR 039_Attachment_B, LC 80_AWEC DR 039_Attachment_C) that corresponded to non- confidential and highly confidential, respectively, with all applicable work files contained in a zip file for each model. Highly Confidential Attachment 039-C contains highly protected information and is subject to Modified Protective Order No. 23-193. The models, their level of confidentiality, and component(s) changed in the Addendum are listed below. Models that are not listed below (e.g., LUCAS) are not included in this DR as they have not been changed from the filed 2023 CEP/IRP.

Model	**Confidentiality**	**Addendum Change**
DER forecast	Not confidential	June 2023 updated DER forecast. Reflects updated Transportation Electrification, Solar PV, and Building Electrification market forecasts. No changes to Demand Response forecast, including distributed storage.
Load forecast	Not confidential	June 2023 corporate load forecast

Model	**Confidentiality**	**Addendum Change**
QFs	Not confidential	New snapshot date of June 2023.
Sequoia	Highly Confidential	Light load hour correction, new load forecast, update to 2021 RFP resources, update to QF resources, update to DER forecast, changes to resulting outputs.
Aurora	Highly confidential	Corrected thermal characteristics for select PGE plants which led to different thermal outputs for those plants.
Intermediary GHG	Not confidential	New Aurora inputs, minor adjustment to non-PGE resource balancing, all resulting outputs are changed.
ROSE-E	Not confidential	Updated system need inputs, hybrid and pumped storage settings, Aurora thermal dispatch costs and revenues, RPS obligation (from change in load forecast), REC generation (from changes in portfolio of existing resources), and existing system costs (from changes in portfolio of existing resources). Updated portfolio analysis for all portfolios.
ART	Not confidential	Updated portfolio analysis inputs, iGHG inputs, 2021 RFP inputs, price impact projections

June 22, 2023

To: Sudeshna Pal
Public Utility Commission of Oregon

From: Erin Apperson
Assistant General Counsel III

Portland General Electric Company
LC 80
PGE Response to OPUC Data Request 067
Dated June 1, 2023

Request:

Please explain if and how PGE's dispatch simulation takes into account transmission constraints and GHG emissions constraints

Response:

PGE's resource dispatch model used for evaluating existing and incremental PGE resources (the PGE zone model or "PZM") assumes a single zone and thus does not consider transmission constraints. Incremental transmission actions are considered in PGE's portfolio capacity expansion model ROSE-E. PGE's resource adequacy model, Sequoia, also takes transmission quantity and product type (firm vs. conditional firm) into consideration.

In "High Carbon" price futures, a non-zero price for CO_2 emissions is applied. As described in Section 4.5.3 of PGE's 2023 CEP/IRP, this price is the social cost of carbon defined by the United States Environmental Protection Agency and other federal agencies; 2.5 percent is used as the discount rate in intergenerational discounting. Please also see PGE's Response to OPUC DR 065. The input price per CO_2 ton is provided on the "Annual" worksheet in Highly Confidential Attachment 065-A. Note that dollar values in PGE's 2023 CEP/IRP configuration of Aurora are input as 2020$. The output price (nominal) of CO_2 emissions is provided in PGE's Response to OPUC DR 066 Highly Confidential Attachment 066-A.

Additional GHG emissions constraints are not applied in the PZM. Rather, GHG emissions constraints related to HB 2021 are considered in PGE's "intermediary GHG model." Please refer to Section 5.3.1 of PGE's 2023 CEP/IRP for a discussion of the "intermediary GHG model."