Via E-Mail and FedEx

Attn: Docket Office
Public Utility Commission of Oregon
201 High St SE, Suite 100
Salem, Oregon 97301-3398

May 12, 2017

Re: Docket LC 66 – Sierra Club Final Comments on Portland General Electric's 2016 Integrated Resource Plan [CONFIDENTIAL]

Please find enclosed the original confidential version of Sierra Club Final Comments on Portland General Electric's 2016 Integrated Resource Plan in Docket LC 66. This document is being served upon party representatives who have signed the protective order for this proceeding via U.S. Mail.

Please do not hesitate to contact me if you have any questions or need other materials. Thank you.

Sincerely,

/s/ Alexa Zimbalist

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BEFORE THE PUBLIC UTILITY COMMISSION OF OREGON

LC 66

In the Matter of PORTLAND GENERAL ELECTRIC COMPANY, 2016 Integrated Resource Plan	**SIERRA CLUB FINAL COMMENTS [REDACTED]**

Sierra Club submits the following reply comments on Portland General Electric's (PGE or Company) 2016 Integrated Resource Plan (IRP). These comments were prepared with technical assistance from Tyler Comings, Dr. Ariel Horowitz, and Kenji Takahashi of Synapse Energy Economics, Inc. They focus on PGE's reply comments, filed on March 31, 2017. Our primary finding is that PGE has failed to rectify most of the weaknesses we identified in our initial comments (and those of other parties). The IRP, as it stands, remains highly flawed.

PGE did not provide an updated IRP document in response to initial comments. Instead, PGE's reply comments consist mostly of defending its initial portfolio analysis, which the Company has not modified. Therefore, the IRP as-filed remains the document of record. Rather than provide an updated IRP, the Company has elected to outline a plan for procuring new capacity in its reply comments. These comments also present an updated capacity need estimate. We comment here on PGE's arguments about the IRP itself and on the proposed procurement strategy.

I. PGE 2016 IRP does not provide the Commission with a legitimate long-term plan

In our initial comments, we discussed the Company's failure to develop a legitimate plan by failing to identify a specific resource decision. We also stated that the IRP has so many deficiencies that it does not provide the Commission with an adequate basis to make a specific resource decision. The Company claimed that such a specific resource decision was not needed in the IRP and could be arrived at through the competitive RFP process. However, in its reply comments, the Company undermines this point by proposing to waive the competitive bidding requirement.[1] Because the Company has failed to evaluate specific resource options in the IRP, a future RFP process or competitive waiver request should be viewed with a similar level of scrutiny as the IRP process.

[1] PGE Reply Comments, p.12.

A. PGE failed to evaluate specific resources in this IRP

In our initial comments, we discussed how the IRP failed to provide a specific resource decision. We stated that the analysis included an "incomplete modeling methodology involving arbitrary, pre-determined portfolios of resources—many of which are 'proxy' resources."[2] The Company suggested that it sought only energy "products" or "services" in the IRP and that it would have the opportunity to settle on a specific resource to supply those services in a future RFP process. We also stated that PGE did not evaluate resources on equal footing. PGE neglected to collect sufficient information to allow it to realistically evaluate resource costs and availabilities for resources such as wind, hydro contracts, and energy efficiency.

PGE has done nothing to ameliorate these concerns in the IRP itself. The document and underlying analysis have not changed. In its reply comments, PGE responded to the claim about identifying a specific resource:

> Based on the parties' positions and the Commission's orders in PGE's most recent RFPs, PGE believed it was appropriate and desirable to draft the 2016 Action Plan so that it allowed for flexibility in any subsequent resource procurement process.[3]

We continue to disagree with PGE on the issue of whether it is appropriate to look at specific resources in the IRP. The primary problem with leaving resource options completely undetermined is that the Company may attempt to use a Commission acknowledgement of this plan to justify procuring a specific resource later. If this were to happen, the Commission and stakeholders would have no opportunity to apply the level of scrutiny appropriate to major, long-term resource commitments. The IRP rules state that the action plan should include "key attributes of each resource specified as in portfolio testing."[4] PGE has only included the key attributes (for example, emissions rates and marginal costs) of proxy resources in the IRP. Again, the IRP itself has not been changed.

We remain concerned about PGE's claims that the IRP allows for flexibility and that specific resources will be determined through "the issuance of RFP's to meet renewable and capacity needs identified in the IRP."[5] We prefer that such an analysis take place during the IRP, in accordance with best practices. However, because that has not been performed in the IRP, a competitive RFP process could provide a forum for evaluating a specific resource. As mentioned above, PGE undermines this point by asking for a competitive bidding waiver after it negotiates with "existing dispatchable generation owners in the region to meet its capacity needs."[6] If such a waiver is to be granted, it should not be done in haste. Nor should it be done without significant stakeholder

[2] Sierra Club Comments on PGE's 2016 IRP, p.2.
[3] PGE Reply Comments, p.8.
[4] OPUC Order No. 07-047, p.5.
[5] PGE Reply Comments, p.7.
[6] *Id*. p.12.

engagement. Most importantly, stakeholders should be as informed as the Company on issues such as bid amounts, contract length, and other terms.

B. Any future specific resource decisions should be based on transparent stakeholder involvement

In our initial comments, we stated that if the Company were to make a specific resource decision, it should not be based on the IRP. The three primary barriers to making such a decision were:

> PGE's portfolios are not optimized; PGE relies too heavily on proxy resources; and, as a result of these decisions, portfolio cost results depend largely on PGE's assumptions regarding proxies and the market.[7]

None of these concerns have been addressed in the Reply comments. The Company maintains that it has done nothing incorrect.

We recommended that the Company conduct capacity expansion modeling of its system in order to optimize resource selection rather than rely on pre-determined portfolios. PGE responded with the following:

> PGE acknowledges that there is a degree of discretion inherent in the construction of portfolios and that additional clarification regarding portfolio construction may be helpful in interpreting the results of the 2016 IRP.[8]

PGE has not addressed our concerns nor have they rebutted our claim. We continue to recommend that capacity expansion modeling is conducted.

We initially recommended that the Company evaluate specific resource decisions instead of only using proxy resources (represented by natural gas combined-cycle (CC) and combustion turbine (CT) units). This precluded PGE from having to perform due diligence on a variety of options. In its reply comments, PGE claimed that "reliance on proxy resources in portfolio evaluation is consistent with common industry practice."[9] Having reviewed many IRPs from utilities throughout the United States, we strongly disagree. It is not common practice for a utility to treat the proxy resource itself as an actionable resource option and to propose committing millions of dollars of ratepayer funds based on this treatment. Utilities model proxy resources to provide a backdrop to evaluate specific resource decisions, often in the latter years of a long-term planning period. Moreover, many utilities eschew modeling proxies in favor of modeling a wide variety of specific resource options throughout the planning period, thus avoiding the uncertainty inherent in proxy

[7] Sierra Club Comments on PGE's 2016 IRP, p.4.
[8] PGE Reply Comments, p. 85.
[9] PGE Reply Comments Summary, p. 4.

resource selection. Indeed, one need only look in the Company's backyard to find a utility that models very specific resources using a capacity expansion model.[10]

We also noted that the load levels did not influence the choice of portfolio. To rectify this, we asked the Company to allow new builds to fluctuate with load expectations rather than remain fixed. Otherwise, the inclusion of differing load forecasts would not produce meaningful results. PGE responded to Staff's similar concern on this issue:

> While Staff has requested that PGE evaluate portfolios designed for different load forecasts, it is important to note that such an exercise would draw false conclusions by comparing portfolios on the basis of cost that meet fundamentally different levels of need.[11]

Changes in future load expectations should be able to change the type of capacity that is built or procured and the timing of that capacity. The IRP does not evaluate this key uncertainty. Indeed, after its reply comments were filed, PGE filed an updated capacity need analysis which showed a 258 MW reduction in capacity need. This decrease was due to re-signed contracts and lower load expectations as compared to what was modeled in the IRP. Thus, the capacity need modeled in the IRP is at least 258 MW too high. While PGE still shows a near-term capacity need, its post-hoc adjustment thereof has added an additional layer of uncertainty to its planning analysis.

PGE's reply comments fail to address any of these concerns. Instead, the Company is simultaneously defending nearly all of its decisions in developing the IRP and undermining those decisions with its proposed procurement plans. We are left with an IRP that has not been updated, even though capacity needs have changed. Instead, the Company is proposing an ad-hoc procurement strategy that is divorced from the IRP.

In the absence of a robust IRP, any near-term capacity need experienced by PGE could potentially be met with shorter-term commitments than those contemplated in the IRP (*i.e.*, construction of a new CC unit). While a "procure as needed" strategy is not the preferred outcome of a long-term planning process, PGE has left the Commission with few good options. In such a situation, it is in the interests of future ratepayers to preserve optionality over the long term rather than commit to a significant, long-term, potentially unnecessary resource investment.

[10] Pacificorp 2017 IRP. Supply-Side Resource Options. Available at: http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2017_IRP/SSR_Database_2016.pdf

[11] PGE Reply Comments, p. 86.

II. PGE's flawed analysis is biased towards building a new natural gas combined-cycle plant

A. PGE did not adequately assess risk

PGE's unorthodox portfolio methodology has been thoroughly critiqued by stakeholders and OPUC Staff during the course of this proceeding.[12] Our initial comments and those of other parties argued that PGE's scoring metrics are deeply flawed and vulnerable to distortionary effects, especially because portfolios' scores depend to some extent on the set of portfolios PGE chose to advance to the scoring phase. Moreover, PGE's scoring methodology fails to reasonably incorporate the potential for results that are lower cost than expected. This has the effect of amplifying the impact of scenarios that may lead to higher-than-expected costs. The durability metric employed by PGE is the only one that considers low-cost results, but this metric is, quite simply, poorly designed. The durability metric as calculated by PGE cannot distinguish between a portfolio that performs very well under some circumstances but very badly in others from a portfolio that never performs particularly well or particularly badly.

The Company's reply comments generally acknowledge these points. For example, PGE agrees that "the durability metric...relies on arbitrary definitions of strong and poor relative performance."[13] PGE also suggests, and we agree, that "a robust discussion on the relative importance of high-cost versus low-cost outcomes should be undertaken"[14] as part of PGE's stakeholder process in preparation for the next IRP.

Indeed, instead of rebutting stakeholders' specific critiques of its scoring methodology, PGE presents a selective analysis that purports to demonstrate the invariability of its selection of a preferred portfolio to changes in this methodology. PGE argues that "despite Parties' concerns with the scoring methodology applied in the 2016 IRP, PGE has shown that the findings in the 2016 IRP are robust"[15] because it is able to present several variations on its scoring methodology that all lead to the same outcome. This analysis is not convincing for the simple reason that counterexamples can be easily constructed. For example, all of the following weights result in the *Wind 2018 Long* scenario being tied with or selected as the preferred portfolio instead of *Efficient Capacity 2021*:

- Cost: 50%; Severity: 25%; Variability: 25%
- Cost: 50%; Severity: 33%; Variability: 17%
- Cost: 50%; Severity: 10%; Variability: 30%; Durability: 10%
- Cost: 75%; Severity: 5%; Variability: 20%
- Cost: 25%; Severity: 25%; Variability: 25%; Durability: 25%

[12] OPUC Staff Opening Comments, p. 28 – 30.
[13] PGE Reply Comments, p. 102
[14] *Id.*
[15] *Id.*, p. 107.

Note that we do not endorse any of these metric weighting schemes, in particular. Instead, these counterexamples demonstrate the dangers inherent in PGE's approach to portfolio scoring—because PGE has no way to weight the likelihood of different scenarios, its evaluation of risk metrics is arbitrary and prone to bias.

A stochastic risk analysis would have enabled PGE to form some evaluation of the relative probabilities of different outcomes. However, PGE neglected to conduct such an analysis. In response to stakeholders' comments highlighting PGE's lack of a stochastic analysis, the Company referenced comments submitted by Sierra Club and others in response to the 2009 IRP. PGE claims that these comments "agreed that scenario analysis was better suited to resource planning than stochastic analysis."[16] This is a misrepresentation of the referenced document. The 2009 IRP comments referred to by PGE state clearly that "scenario analysis should be given the *primary emphasis* in our overall portfolio risk evaluation."[17] Nowhere do they argue that scenario analysis may substitute entirely for a probabilistic evaluation of risk. Instead, the bulk of the referenced comments is devoted to a critique of PGE's stochastic analysis itself. Indeed, we continue to assert that scenario analysis should form the core of a portfolio evaluation. Importantly, these two types of analysis are not mutually exclusive. Many utilities examine both deterministic and probabilistic results in their evaluations of different resource plans because these analyses contribute complementary, rather than contradictory, results: while a deterministic scenario analysis can demonstrate the impacts of "large fundamental or structural shifts," stochastic analyses are crucial for investigating the risks posed by "great uncertainty and variations."[18]

Contrary to PGE's insinuation that the referenced comments effectively endorse the approach taken in the 2016 IRP, these 2009 IRP comments clearly assert the importance of probabilistically "shocking" the values of assumptions for which there is great future uncertainty and great potential impact on portfolio results. This assertion is apt exactly because the failure to do so may bias analyses towards a single result.[19] Notably, we see the same risk in the 2016 IRP as was discussed in these comments on the 2009 IRP—that PGE's failure to perform a stochastic analysis biased the IRP's results towards portfolios which minimize PGE's exposure to market pricing while maximizing its exposure to variations in the price of natural gas.

B. PGE dismissed lower-cost wind portfolios after failing to properly assess them

In our initial comments, we expressed concern that the Company had too easily dismissed low-cost wind portfolios—in particular, plans that included Montana wind. Despite having lower costs than the preferred portfolio, the Company excluded several wind scenarios because they could require new transmission infrastructure. For instance, the *Diverse Wind 2021* portfolio was $141 million

[16] *Id.*, p. 90.
[17] Sierra Club et al Comments on PGE's 2009 IRP, p. 25.
[18] *Id.*
[19] *Id.*

cheaper than the preferred portfolio—*Efficient Capacity 2021*.[20] However, according to the Company, this figure did not include additional transmission costs.

In its reply comments, PGE presented an analysis of existing and new transmission to serve this portfolio. It estimates that existing transmission rights for the *Diverse Wind 2021* portfolio would cost $300 to $450 million net present value.[21] Using the low and high range of these estimates, the cost of the *Diverse Wind 2021* portfolio (inclusive of transmission) would be between 0.5 percent and 1 percent higher than the cost of the preferred portfolio. Even if we were to accept the methodology and these transmission cost estimates, this puts the *Diverse Wind 2021* portfolio on nearly equal footing with the Company's preferred portfolio. If this is case, it should have been included in PGE's set of action plan-candidate portfolios. Moreover, we observe that the Company's ready ability to estimate additional transmission costs for the purposes of its reply comments suggest that it should have included these costs in the IRP in the first place. Again, in this instance PGE has attempted to justify its methods in the 2016 IRP with an argument that in fact demonstrates weakness in those methods.

Separately, there is the possibility of accessing wind near the Colstrip coal plant in Montana in the future. As we mentioned in the initial comments, there is considerable wind capacity under development in this region. The Company modeled two portfolios which had lower costs than the preferred portfolio: *Colstrip Wind 2030* and *Colstrip Wind 2035*. However, it did not assess the transmission costs even though it currently has transmission rights from Colstrip. Our concern remains that a long-term resource decision made now to fulfill a 2021 capacity need could foreclose future, lower cost options for wind near the Colstrip site. If the Company pursues a contract for capacity need in 2021, we would urge it to exercise caution and deliberation before entering a long-term deal. Ratepayers may be better served with a short-term contract now so that they can pursue lower cost options in the mid to long term.

C. PGE's claimed avoided emissions from its preferred plan are artificially inflated

The 2016 IRP presents a set of data describing changes to the WECC (Western Electric Coordinating Council) resource fleet through 2050 in PGE's modeling. The composition of the WECC resource fleet is a crucial element of PGE's modeling, because PGE's evaluation of its candidate resource portfolios is primarily based on their differing performance vis-à-vis the WECC market. In the information presented in the 2016 IRP, PGE's modeling showed no change in WECC-wide coal capacity in different carbon price scenarios. Our comments highlighted this as a problem, as it would be unrealistic to assume the same resource mix in WECC under a high carbon price as under no carbon price at all. This assumption would also be unduly favorable to "efficient capacity" (modeled as a natural gas CC unit) as compared to a combination of "generic capacity" (modeled as a CT unit) and additional wind power because PGE claims that one of the primary

[20] PGE 2016 IRP, p. 311-313. The NPVRR for Diverse Wind 2021 is $31.178 billion. The NPVRR for Efficient Capacity is $31.319 billion.
[21] PGE Reply Comments, p. 112.

advantages of "efficient capacity" is its lower carbon emissions rate as compared to the WECC margin.

In its reply comments, PGE clarified that the information presented in the 2016 IRP was not accurate. While Table N-3[22] shows retiring coal capacity of 15.44 GW across WECC in *all* carbon price scenarios, PGE's reply comments[23] and subsequent responses to discovery[24] indicated that this value does not in fact represent the modeled change in coal capacity in *any* of the scenarios tested by the Company. Instead, PGE found coal retirements totaling between 13.2 and 16.6 GW depending on carbon price.

We note here that we can only assess the information presented by the Company, in good faith. PGE presented both incorrect data regarding coal plant retirements and an incorrect description thereof: the IRP explicitly describes the modeled retirements as "a result embedded in the Wood Mackenzie [input] data base."[25] This description suggests that the retirements were exogenous, or assumed outside of PGE's model structure. PGE's reply comments, by contrast, describe the retired capacity as "not a modeling assumption…[but] instead a modeling result."[26]

The prior statement is misleading; the latter is an exaggeration. The updated information provided by the Company does demonstrate that some amount of coal capacity was retired endogenously (*i.e.*, selected by the Aurora model for retirement as part of an optimized resource path for WECC). However, further details provided in discovery demonstrate that much of the retired capacity was in fact assumed to be retired as part of a set of inputs from Wood Mackenzie.[27] Moreover, the endogenous differences across scenarios are small—only [redacted] of the change in capacity was retired endogenously,[28] with the remainder being made up of exogenous (assumed) retirements. Even in the updated figure, the amount of coal capacity remaining in WECC in 2030 is identical across carbon price scenarios.[29] This suggests that all endogenous retirements are in the latter, least-certain years of the planning horizon. As such, it is the Wood Mackenzie assumptions, not PGE's modeling results, that bear the greatest impact on modeled market prices in the near term—and, thus, on PGE's portfolio evaluation. These assumptions apparently include the unrealistic expectation that coal capacity in 2030 will be identical under a future with no carbon price as under one with carbon prices of over $50/ton in that year.[30]

Finally, in its lengthy discussion of the actual modeled coal retirements in the 2016 IRP, PGE declined to rebut our observation that much of the value of "efficient capacity" rests on PGE's

[22] PGE 2016 IRP, p. 799.
[23] PGE Reply Comments, p. 108.
[24] PGE Response to SC 36.
[25] PGE 2016 IRP, p. 799.
[26] PGE Reply Comments, p. 108.
[27] PGE Response to SC 38.
[28] Attachment A (CONF), provided in PGE's Response to SC 38.
[29] PGE Reply Comments, p. 108.
[30] PGE 2016 IRP, p. 72.

assumed ability to "arbitrage the carbon intensity of its fleet compared to the region as a whole."[31] To the contrary, PGE reinforces this conclusion, stating:

> PGE resources generally dispatch in time periods in which their marginal costs (including emissions costs) do not exceed the market price...While the Efficient Capacity resource has a higher carbon emissions rate than the WECC-wide average emissions rate in both futures, its emissions rate is much lower than the annual average of the marginal emissions rates in each hour. This allows the Efficient Capacity resource to displace the higher heat rate and higher emitting generation that is dispatched on the margin…[32]

This explanation makes clear that, as we argued, much of the value of "efficient capacity" as compared to "generic capacity" depends on PGE's choice to model the former as a natural gas CC unit and the latter as a CT unit.

As we stated in our opening comments, PGE has repeatedly asserted that it has made no specific resource decisions. Yet, it justifies its choice of a preferred portfolio using results that are only cogent to the question of CC versus CT, with all the attendant heat and emission rate assumptions of those resources. For example, if PGE were to enter into contracts for hydropower capacity as part of its "generic capacity" acquisitions—such as in the example acquisition strategy shown in panel B of Figure 13-2 of the 2016 IRP[33]—those resources would not be subject to emissions costs. In this case, the argument made by PGE in Figure 16 of its reply comments (that generic capacity has an emissions rate close to or exceeding that of the WECC marginal resource) would be moot. PGE's choice to present a firm statement regarding the expected emissions rates of proxy units belies its continued protestations that no specific resource decisions have yet been made.

D. PGE is now considering existing resources

In our initial comments, we recommended that the Company not ignore existing resources—especially existing hydropower contracts that could be extended. In its reply comments, the Company maintains that it did not want to speculate by assuming that these contracts would be extended. However, assuming that they would not be extended is simply another form of speculation on PGE's part. An informed analysis would have included the extension of these contracts as an option. Separate from the IRP analysis, PGE did in fact renew hydropower contracts and it submitted an updated capacity need analysis after doing so. It appears that they were incorrect in the IRP to assume that this capacity would not be available. This is yet another instance of PGE's defense of its IRP undermining the Company's own arguments.

[31] Sierra Club Opening Comments, p. 9.
[32] PGE Reply Comments, p. 109.
[33] PGE 2016 IRP, p. 345.

E. The IRP underestimates PGE's cost-effective energy efficiency potential

In our initial comments, we argued that PGE unrealistically assumed that future savings levels would decline substantially over time. We noted that PGE's projection of declining "annual incremental" energy savings—which undergo a substantial decline from about 1.7 percent today to 0.5 percent by 2033—are not supported by any historical evidence in the region. We supported this claim by showing NWPCC's historical cumulative energy savings data since 1978.[34] In its reply comments, PGE critiqued Sierra Club's use of cumulative energy savings to compare with PGE's annual incremental savings. PGE also argued that "there is no discrepancy in the information provided in PGE's comments,"[35] implying that NWPCC's historical savings data are consistent with PGE's energy efficiency forecasts.

We cited NWPCC's cumulative energy savings data given the lack of official historical data regarding incremental energy savings. The use of such data does not undermine our point, contrary to PGE's arguments. Year-on-year differences in cumulative savings—or, in other words, incremental savings by year—are clearly observable in Figure 5 of our Opening Comments. This figure therefore directly supports our conclusion: the rate at which NWPCC's historical savings have increased does not show any sign of slowing down to substantially over the past three decades. In fact, annual incremental savings had historically increased over time, and have stayed approximately constant in recent years.

We further emphasize that NPWCC's latest Power Plan found an additional 4,300 average megawatts (aMW) potential over the next 20 years despite the region's impressive historical achievements. In response, PGE argued that NWPCC's and PGE's energy efficiency forecasts were "roughly equivalent on a proportional basis."[36] We disagree. NWPCC's energy efficiency forecast of 4,300 aMW accounts for about 18 percent of its projected load while PGE's energy efficiency forecast of 408 aMW accounts for only 14 percent of its projected load. This indicates that there may be a substantial level of savings available to PGE beyond what the Company has assumed in its 2016 IRP.

F. The IRP overstates PGE's avoided costs, thereby making energy efficiency appear less cost-effective

In Sierra Club's initial comments, we pointed out that PGE used a threshold of 5.3 cents per kWh to determine cost-effective energy efficiency.[37] We argued that this threshold number was too low for a number of reasons—for example, this cost threshold is lower than PGE's own estimate of the full levelized cost of a new natural gas CC unit (including both energy and capacity) at approximately 7.5 cents per kWh.[38] In response, PGE stated that the cost of a new natural gas CC

[34] Sierra Club initial comments, Figure 5, p. 22.
[35] PGE reply comments, p. 65.
[36] PGE reply comments, p. 64.
[37] Sierra Club initial comments, p. 24.
[38] PGE 2016 IRP, Figure 7-12.

unit would be "only relevant if a CCCT is deemed a reasonable incremental resource."[39] Given PGE's own portfolio construction, we argue that a new natural gas CC unit is clearly a reasonable benchmark for the avoided energy portion of avoided costs. Even under this type of estimate, PGE's threshold of 5.3 cents per kWh threshold is clearly too low. The levelized cost of energy only from a new natural gas CC unit in PGE's territory is approximately 6 cents per kWh.[40] This alone exceeds the cost-effectiveness threshold used by PGE for its energy efficiency forecast.

Instead of a natural gas CC unit, PGE suggests using a CT unit as the benchmark for avoided capacity cost.[41] The capacity cost of a single cycle CT is approximately $55 per kW-year per Figure 7-1 of the IRP. This would produce an avoided capacity cost of 1.1 cents per kWh.[42]

PGE also critiqued Sierra Club's recommendation for PGE to use NWPCC's avoided T&D costs, and stated in its reply comments that it "believes it is more appropriate to reflect the cost structure associated with local T&D investments when calculating the cost-effectiveness of EE."[43] PGE includes avoided costs of transmission, substation, and sub-transmission in these costs, totaling $31.28 per kW-year. This estimate inappropriately excludes any costs associated with distribution infrastructure.[44] As explained by the Regulatory Assistance Project:

> Some utilities assert that efficiency avoids no distribution costs whatsoever, whereas others look methodically at their distribution system maintenance and upgrade plans in estimating marginal distribution capacity costs. Reducing system demand will almost always reduce distribution capacity costs, however, so the correct value will rarely be zero.[45]

PGE could employ NWPCC's current avoided distribution cost, estimated at a similar value of $31 per kW-year. [46] In total, this amounts to approximately $62 per kW-year in avoided transmission and distribution costs. These together result in a levelized cost of 1.3 cents per kWh.[47]

In sum, these recommendations suggest a total cost-effective threshold far above the 5.3 cents/kWh value inappropriately employed by the Company. We reiterate our argument that PGE's cost-effectiveness threshold for energy efficiency was much too low, and that cost-effective resources were excluded from consideration in the 2016 IRP as a result. We estimate an avoided

[39] PGE reply comments, p. 65.
[40] PGE 2016 IRP, Figure 7-12.
[41] PGE Response to SC 35.
[42] Assuming a load factor of 57 percent, which was derived from PGE's T&D avoided cost calculation per SC_DR_034_Attach-A.xlsx.
[43] PGE reply comments, p. 65.
[44] PGE's current avoided transmission estimate is $31.28/kW-year (Attachment 034-A). This appears a reasonable estimate given that NWPCC uses $26 per kW-year for transmission.
[45] Lazar, Jim and Ken Colburn. *Recognizing the Full Value of Energy Efficiency*. Regulatory Assistance Project. September 2013. Available at: http://www raponline.org/wp-content/uploads/2016/05/rap-lazarcolburn-layercakepaper-2013-sept-9.pdf
[46] NWPCC 2016. Seventh Northwest Conservation and Electric Power Plan, Appendix G, p. G-15
[47] Assuming a load factor of 57 percent, which was derived from PGE's T&D avoided cost calculation per SC_DR_034_Attach-A.xlsx.

cost of approximately 10 cents per kWh.[48] This more reasonable threshold would lead PGE to pursue significantly more cost-effective energy efficiency. For instance, using PGE's energy efficiency supply curve, a threshold of 10 cents would increase cost-effective efficiency by 25 percent: from approximately 3,600 GWh to 4,500 GWh.[49]

III. Summary and recommendations

PGE has failed to address the key concerns we identified in our initial comments, including the following:

- The IRP lacks specificity in its preferred action plan.
- The IRP fails to properly assess risk.
- The IRP has not properly considered a range of specific resources that are potentially lower-cost than a new NGCC.
- The IRP modeling misrepresents carbon emission impacts of the preferred portfolio.
- The IRP diminishes potential for future energy efficiency savings and undervalues the benefits of efficiency.

The Company's reply comments consist mostly of defending its initial portfolio analysis, which the Company has not modified even though the capacity need has changed. Rather than provide an updated portfolio analysis, the Company has proposed a plan for procuring new capacity that includes the request for being exempted from issuing a competitive RFP. Given all of the above, our recommendations, going forward, are the following:

1. **The Commission should indicate its unwillingness to consider construction of a new natural gas plant in the near-term.** PGE's IRP portfolio analysis remains biased towards building a new natural gas plant. PGE has not justified this or any other large-scale, long-term capital investment. The IRP should not, in any manner, provide a basis for such a decision.

2. **The Commission should encourage PGE to update its estimate of potential energy efficiency savings and substantially increase the value the efficiency provides.** PGE underestimated future efficiency savings and has undervalued the avoided costs provided by efficiency when determining its cost-effectiveness.

3. **The Commission should encourage PGE to explore shorter-term commitments to fulfill any near-term capacity need.** The expected capacity need in 2021 has already decreased since the IRP was released. In the future, if load expectations are reduced and the Company more actively purses energy efficiency, future capacity needs could be even lower than the Company's current revised expectations. It is in the interests of future

[48] SC_DR_021_Attach_A.xlsx.T This includes the 10% conservation credit and premium hedge value provided in PGE's avoided cost calculation.
[49] PGE 2016 IRP, Figure 6-3.

ratepayers to preserve optionality over the long term rather than commit to a significant, long-term, unnecessarily large resource investment.

4. **If PGE pursues a contract for capacity need in 2021, we would urge the Company and the Commission to exercise caution and further deliberation before entering a long-term deal.** Ratepayers may be better served with a short-term contract now so that they can pursue lower cost options in the mid to long term. A long-term resource decision made now to fulfill a 2021 capacity need could foreclose future, lower cost options—such as wind near the Colstrip site.

5. **The Commission should encourage PGE to issue an RFP in the near term as applicable wind subsidies will soon lapse.** However, the amount procured need not be set at 175 aMW.

6. **Since the IRP did not properly look at specific resources, PGE's competitive RFP process should provide for similar transparency, stakeholder access, and a level of rigor as an IRP proceeding.** Stakeholders should be similarly involved if a waiver from the competitive process is pursued**.**

7. **The Commission should insist that PGE do the following in future IRPs:**

    - The IRP should be based on capacity expansion modeling of the Company's own system (in addition to the WECC region).
    - If a capacity need is identified in the short-term, the IRP must test specific, rather than generic resources to fulfill that need.
    - The IRP should use a reasonable cost-effectiveness threshold for energy efficiency.
    - The IRP should consider future resources agnostically and without bias.
    - The IRP should allow for endogenous retirements (*i.e.,* model selection) of existing generation, except for announced retirements.
    - The IRP should include a probabilistic analysis, whereby not every scenario is equally weighted.
    - The IRP scoring metric for "durability" should be removed.
    - The IRP scoring metric for "variability" should include lower-cost portfolios, not just higher cost portfolios.
    - The IRP scoring metric for "severity" should either be removed or kept merely as a screening tool.

- The IRP stakeholder process should allow for more proactive engagement, such as allowing other parties (besides the Company) to present at stakeholder meetings.

Dated: May 12, 2017

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on this 12th day of May, 2017 I caused to be served the foregoing **CONFIDENTIAL Sierra Club Final Comments on Portland General Electric's 2016 Integrated Resource Plan** upon all party representatives on the official service list who have signed the protective order for this proceeding via U.S. mail.

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Dated this 12th day of May, 2017 at Oakland, CA.

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