

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

LC 70

In the Matter of
PACIFICORP, dba PACIFIC POWER,
2019 Integrated Resource Plan.

OPENING COMMENTS OF SWAN
LAKE NORTH HYDRO, LLC

I. INTRODUCTION

Swan Lake North Hydro, LLC (“Swan Lake”) hereby submits opening comments to the Oregon Public Utility Commission (the “Commission”) addressing the 2019 Integrated Resource Plan (“IRP”) filed by PacifiCorp, dba Pacific Power (“PacifiCorp”) on October 18, 2019, including the October 25, 2019 Errata. In a ruling issued to this Docket on December 13, 2019, Administrative Law Judge Rowe suggested that stakeholders may want to address the following issues:

1. Do PacifiCorp's IRP filings contain design, scoring methodology, and associated modeling process as described in OAR 860-089-0250(2)(a)?
2. Does PacifiCorp plan to address specific RFP design items in its IE selection docket?
3. Do stakeholders seek specific RFP design items in the IE selection docket?
4. Does PacifiCorp's RFP design information allow for long-lead time resources?

With respect to the fourth question, Swan Lake urges PacifiCorp to consider resource procurement outside of its proposed 2020 – 2023 action plan window to ensure non-emitting, but long-lead time capacity resources, like pumped hydro storage, can be available to meet a portion of PacifiCorp’s clearly identified need for flexible resources to maintain long-term system reliability.

II. BACKGROUND

In its 2019 IRP, PacifiCorp has undertaken a comprehensive analysis of its future resource needs while simultaneously re-evaluating the cost-effectiveness of its existing coal-fired generation fleet. The resulting preferred portfolio, after accounting for over 2,700 MW of incremental energy efficiency, calls for the addition of almost 11,000 MW of wind and solar resources during the twenty years ending in 2038. The preferred portfolio also includes almost 1,000 MW of new natural gas peaking capacity through 2038, with the first addition in 2026. Over this same time period, PacifiCorp has identified nearly 4,500 MW of coal unit retirements.

To maintain the reliability of the grid as it increases its reliance on variable energy resources, PacifiCorp’s preferred portfolio includes just over 2,800 MW of storage capacity. More than half of this total is assumed by PacifiCorp to be batteries co-located with solar photovoltaic projects selected by its System Optimizer model, with the remainder being stand-alone batteries added to meet reliability needs identified by its Planning and Risk (PaR) model. Additional capacity to meet PacifiCorp’s remaining resource needs is provided through front-office transactions (FOTs) assumed to supply up to 1,375 MW during the summer period. Annual additions through 2030 and totals through 2038 are summarized below in Table 1.

Table 1. Summary of Storage and Gas Turbine Capacity Additions and FOTs in Preferred Portfolio¹

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031 - 2038	Grand Total
PAC-East												
Storage												
Paired with Solar	40	16	1	226	0	0	0	0	0	0	352	635
Stand-alone	0	0	0	0	0	0	0	0	0	0	390	390
Total	40	16	1	226	0	0	0	0	0	0	742	1,025
Gas Turbine	0	0	0	0	0	185	0	0	0	370	0	555
Cumulative Total	40	56	57	283	283	468	468	468	468	838	1,580	1,580
FOT - Summer	0	0	0	0	0	0	0	88	300	199	272	
Total Capacity + FOT	40	56	57	283	283	468	468	556	768	1,037	1,852	
PAC-West												

¹ PacifiCorp – 2019 IRP, Table K.15.

Storage												
Paired with Solar	0	0	0	312	0	0	0	0	90	0	399	801
Stand-alone	0	0	0	0	0	0	0	180	435	0	360	975
Total	0	0	0	312	0	0	0	180	525	0	759	1,776
Gas Turbine	0	0	0	0	0	0	0	0	0	0	443	443
Cumulative Total	0	0	0	312	312	312	312	492	1,017	1,017	2,219	2,219
FOT - Summer	493	503	498	131	126	191	264	1,075	1,075	1,075	1,063	
Total Capacity + FOT	493	503	498	443	438	503	576	1,567	2,092	2,092	3,282	
PAC-Total												
Storage												
Paired with Solar	40	16	1	539	0	0	0	0	90	0	751	1,436
Stand-alone	0	0	0	0	0	0	0	180	435	0	750	1,365
Total	40	16	1	539	0	0	0	180	525	0	1,501	2,801
Gas Turbine	0	0	0	0	0	185	0	0	0	370	443	998
Cumulative Total	40	56	57	595	595	780	780	960	1,485	1,855	3,799	3,799
FOT - Summer	493	503	498	131	126	191	264	1,163	1,375	1,274	1,335	
Total Capacity + FOT	533	559	555	726	721	971	1,044	2,123	2,860	3,129	5,134	

PacifiCorp’s action plan calls for these new renewable and storage resource to be procured through an all-source request for proposals (RFP). Specifically, Action Item 2b states that in Q1 2020, PacifiCorp will issue an all-source RFP to procure resources that can achieve commercial operations by the end of December 2023 after entering into definitive agreements with PacifiCorp in Q2 2022. PacifiCorp’s IRP does not address plans to procure identified capacity needs beyond its selected 2023 action plan window, nor does it indicate how it plans to accommodate resources like pumped storage that, while eligible to participate in an “all-source” RFP, cannot be developed within such a narrow action plan window that provides just 18 months between contracting and commercial operating dates. As discussed in our comments below, a resource procurement action plan that effectively limits the pool of resources able to compete in an RFP, and that does not address growing capacity needs just outside of that plan window, unnecessarily exposes PacifiCorp customers to cost and operational risks associated with overreliance on technologies that are assumed to be able to be deployed quickly, but are not yet proven at the scale being contemplated, and purchases from a tightening wholesale market.

Swan Lake is proud to partner² in the development of the two most promising pumped storage projects in the Pacific Northwest: the Swan Lake pumped storage project in southern Oregon (the “Swan Lake Project”)³ and the Goldendale energy storage project in southern Washington.⁴ Both of these projects are located near high voltage transmission corridors and will utilize environmentally-friendly, “closed-loop” technology to provide unmatched flexibility needed to integrated variable renewable resources being added to the electric supply system, as well as stacked energy, capacity, and other reliability and economic benefits to the region.

Other benefits of pumped storage generally and the Swan Lake Project in particular include:

- The ability to provide energy arbitrage;
- The potential to enhance and optimize the deployment of current and planned renewable facilities;
- The ability to allow existing generation plants to maintain optimal set points to minimize cycling and operations and maintenance costs;
- Intra-hour flexibility, allowing a utility participating in the California Independent System Operator’s Energy Imbalance Market (“EIM”) to maximize value in that market;

² Swan Lake is a joint venture between an affiliate of National Grid USA (“National Grid”) and an affiliate of Rye Development, LLC (“Rye”), which was formed for the joint ownership and development of the Swan Lake Project.

³ The Swan Lake Project is a 393.3 MW, closed-loop pumped storage facility located near the California-Oregon border. Swan Lake recently received its Federal Energy Regulatory Commission license for this project and is proceeding towards development. It is feasible that Swan Lake could be operational as soon as 2025, at a total estimated cost of approximately \$800 to \$850 million. Swan Lake will have up to 9.5 hours of storage capability.

⁴ The Goldendale project is expected to be a 1,200 MW, closed-loop pumped storage project located near Goldendale, WA, along the Columbia River at the former Columbia Gorge Aluminum smelter site. National Grid and Rye currently have a Preliminary Permit to develop the Goldendale site, and recently submitted their Draft License Application with FERC as they continue to work through the regulatory approval process. National Grid and Rye estimate that Goldendale could be operational by 2028. Goldendale would have up to 12 hours of storage capability in the preferred configuration, although National Grid and Rye have also modeled this project with storage durations of both 8 hours and 20 hours, as further explained in the documents supporting their Preliminary Permit.

- The ability to leverage existing transmission and rights and provide for a more optimized use of transmission facilities;
- Other “portfolio effects” across PacifiCorp’s generation fleet;
- Life-cycle cost benefits due to the long lifespan of pumped storage assets; and,
- High degree of adaptability to many “use cases” over time and ability to provide many essential grid services, due to unparalleled flexibility.

We appreciate having had the opportunity to provide information about these projects during PacifiCorp’s 2019 IRP public stakeholder process and for the information that PacifiCorp provided about its IRP modeling approach, input assumptions and results during that 18-month process. It is evident that PacifiCorp’s IRP team has put a great deal of effort into improving its modeling approach for this IRP cycle and into developing a robust analysis of its preferred resource plan. We appreciate the opportunity to provide these comments on that plan.

III. COMMENTS

PacifiCorp has identified growing needs for new firm capacity on its system to accompany the significant additions of solar and wind energy resources and retirement of existing coal-fired capacity called for in its preferred resource plan. While PacifiCorp’s modeling has produced estimates of the magnitude and timing of new resource needs, PacifiCorp is careful to indicate that its preferred resource plan does not prescribe what specific technologies will be procured, where they will ultimately be located, or even their exact quantities. These decisions will be based on additional modeling performed after receipt of bids submitted into its all-source RFP, where estimated costs and technology characteristics used for the IRP will be replaced by actual bid data.

By offering up to 400 MW of firm, flexible, long-duration storage capacity, the Swan Lake Project can play a significant role in meeting PacifiCorp’s capacity needs identified in

Table 1, but only if PacifiCorp's resource planning and procurement process is modified to provide adequate lead time for this large, capital intensive project to secure financing and be constructed.

A. PacifiCorp's Limited Procurement Window May Not Be Prudent

PacifiCorp's IRP identifies significant and growing resource needs over the next decade. However, PacifiCorp's action plan only calls for procurement of capacity resources that can be online by the end of 2023. Given the proposed schedule of issuing an all-source RFP in Q2 2020, with selection and contracting complete by Q2 2022, only those resources with a development timeline of 18-36 months or less can effectively participate in the proposed solicitation. If the procurement window for longer lead-time resources is not expanded to include the period outside the proposed 2020-2023 action plan window, PacifiCorp could be exposed to an over-reliance on shorter lead-time battery capacity and/or capacity market purchases to meet its future capacity needs.

a. Narrow Action Plan Window Unnecessarily Limits PacifiCorp's Options to Meet Future Reliability Needs

PacifiCorp's narrow action plan window will unnecessarily limit its capacity supply options by effectively foreclosing long lead-time resources like pumped storage from meeting PacifiCorp's future capacity need. Given the practical reality that new natural gas plants are infeasible in much of PacifiCorp's service territory, combined with the capacity market constraints described below, PacifiCorp's options to meet its near-term capacity need could be limited to expensive market purchases from emitting capacity or an overreliance on battery storage, neither of which are well-suited to meet PacifiCorp's specific needs or serve PacifiCorp's planning goals.

Long-duration storage supports resource adequacy by giving the electrical grid the ability to cope with unexpected swings in intra-day energy output and pumped storage is a clean, grid-

scale storage resource that can provide this critical function. However, PacifiCorp's limited action plan window and short procurement timeline would effectively foreclose long-duration storage projects like pumped storage from being part of PacifiCorp's future resource mix.

b. Short-Lead Procurement May Result in an Overreliance on Batteries

If PacifiCorp does not alter its procurement strategy, it will be left with little choice but to rely on one of two options: (1) a significant over-reliance on batteries or, possibly, (2) procurement of new natural gas capacity.

If new natural gas is not feasible due to factors such as clean energy mandates and political or regulatory hurdles, then the only new capacity resource that can be contracted and constructed in a one- to three-year window is lithium-ion ("Li-ion") batteries. While Li-ion batteries offer some advantages that make them the best choice of energy storage technology for certain applications, it is not clear that they should be relied on to provide 100% of PacifiCorp's near-term and long-term forecasted storage need, especially given risks and uncertainties related to whether their operating costs and lifespan meet expectations once deployed commercially.

While Swan Lake has some concerns with a procurement strategy that over-relies on batteries, the reality is that pumped storage and batteries are complementary products. A more prudent procurement approach would be to diversify across both technologies so that PacifiCorp has both very fast ramping and charging resources for one to four hours from batteries, as well as longer duration discharge and capacity resources of eight hours or greater from pumped storage. Such a diversity of discharge times, durations, and operating characteristics would ensure PacifiCorp can reliably meet the needs of its customers, while reducing the technology and operational risks that come with relying on a single type of resource to meet the entire need.

PacifiCorp’s proposed procurement plan could effectively limit PacifiCorp’s options for capacity resources to only one of these storage technologies—batteries. Narrowing the field of bidders available to PacifiCorp in this manner will unduly reduce competition, while undermining a key opportunity to achieve needed system flexibility through the procurement of capacity resources from a well-established, reliable, large-scale technology like pumped storage that is strategically located close to PacifiCorp and its customers.

Pumped storage resources like the Swan Lake Project are complex and require more lead time than a natural gas plant or lithium-ion battery storage system. One of the primary reasons for this is that certain components take a very long time to manufacture and deliver. For example, as discussed above, Swan Lake expects to use a variable speed reversible pump-turbine at the Swan Lake Project to provide the highly flexible operation demanded on the electric system as other sources of firm, flexible supply are displaced by variable resources.

The current estimate from the manufacturer of these turbines is that it takes up to five years to design the pump-turbine generators and place them into service. While Swan Lake has an excellent relationship with its expected turbine manufacturer, and has received numerous assurances regarding timing for delivery of its turbines, these parts are very complex, custom-designed for the site, and take much longer than most other resources to procure, particularly in comparison to wind or solar projects, which rely on more standardized, “off-the-shelf” equipment.

In order to provide the Commission and PacifiCorp with a clearer picture of the rationale for expanding PacifiCorp’s action plan window, Swan Lake has provided a high-level schedule for Swan Lake as Appendix A to these Comments. If, for example, Swan Lake were to be targeted to compete to serve PacifiCorp’s capacity needs beginning in 2026, a definitive power purchase agreement or ownership agreement would have to be finalized by the end of Q3 2021,

which would allow enough time for Swan Lake to conduct geotechnical investigations, perform preliminary functional design, procure necessary equipment, contract for detailed design engineering, obtain financing, construct the project, and achieve commercial operation in time to meet PacifiCorp's 2026 capacity need. For this reason, pumped storage resources do not easily fit within the Commission's typical IRP/RFP process.

3. Alternatives to Extending the Action Plan Window

If PacifiCorp still believes its currently proposed action plan window is the most prudent after considering these comments, Swan Lake requests PacifiCorp, with input from the Commission, consider other alternatives that would allow procurement of long lead-time projects like pumped storage to meet identified future needs. Swan Lake proposes two such alternatives. First, adding a specific Action Plan item to the IRP allowing procurement of pumped storage to meet identified needs falling outside of the action plan window. Second, seeking clarification from the Commission as to whether pumped storage may be procured pursuant to a waiver of the Commission's Competitive Bidding Rules.⁵

a. *PacifiCorp Could Add an Action Plan Item Allowing for Early Procurement of Long Lead-Time Resources*

PacifiCorp could begin the procurement process for longer lead-time resources, like pumped storage, within this IRP by adding an Action Plan item to the IRP that would allow for acquisition of these unique resources by commencing a long-lead time resource procurement to meet identified needs that fall outside the procurement plan window.

Adding an early-procurement Action Plan item for a portion of the post-2023 capacity need shown in PacifiCorp's IRP would: (1) capture portfolio diversity benefits that PacifiCorp

⁵ *In the Matter of Rulemaking Regarding Allowances for Diverse Ownership of Renewable Energy Resources*, Docket No. AR 600, Order No. 18-324 (Aug. 30, 2018).

might otherwise miss out on due to timing concerns for pumped storage; (2) ensure PacifiCorp has access to a the deepest possible pool of capacity sources when its additional capacity needs arise; and (3) reduce PacifiCorp's exposure to future capacity market risk.

Such a strategy need not exclude other, shorter lead-time resources. Rather, earlier procurement of long lead-time resources could be used to meet a portion of PacifiCorp's capacity need and ensure a diverse resource mix is available, resulting in increased reliability of PacifiCorp's system. For shorter lead-time capacity resources, PacifiCorp's proposed procurement approach could remain in place and allow them to participate via PacifiCorp's all-source request for proposals for resources that can achieve commercial operations by the end of December 2023.

A benefit to this alternative is that it would allow the Commission to provide input on the terms under which PacifiCorp would be permitted to pursue these longer lead-time resources, which the Commission could use to ensure a fair, robust, and impartial process that is substantially similar to the traditional RFP process.

b. PacifiCorp Could Seek a Waiver of the Commission's Competitive Bidding Rules for Longer Lead-Time Resources

Another alternative for potentially acquiring longer lead-time resources like pumped storage would be through the Commission's waiver process found at OAR 860-089-0100(3). In relevant part, the Commission's waiver rules provide:

(3) An electric company is not required to comply with the competitive bidding requirements to acquire a resource otherwise subject to section (1) of this rule when:

...

(b) There is a time-limited opportunity to acquire a resource of unique value to the electric company's customers;

(c) An alternative acquisition method was proposed by the electric company in the IRP and explicitly acknowledged by the Commission;⁶

Long lead-time resources like pumped storage could fall into either of the above-listed categories for a waiver from the Competitive Bidding Rules, and Swan Lake respectfully requests PacifiCorp and/or the Commission clarify whether they believe this is a viable alternative.

Looking first at subpart (b), pumped storage is “a time-limited opportunity to acquire a resource of unique value” to PacifiCorp’s customers. These resources are time-limited due to their longer lead-time, which means that they cannot effectively participate in procurement processes driven by a narrow action plan window such as that proposed by PacifiCorp in this IRP. Pumped storage is also “a resource of unique value” due to its long-duration storage capability. The concept of unique value could be studied further, potentially including additional modeling using data provided by PacifiCorp in its IRP. Swan Lake is confident that these resources would outperform other storage resources on the basis of cost, reliability, flexibility, storage duration, capacity value, safety, and/or environmental impacts.

Given that it appears that long lead-time resources like pumped storage could be candidates for the waiver process, Swan Lake requests that PacifiCorp and the Commission provide some additional guidance on whether they believe this is a viable alternative for procuring these types of resources. Without a way to allow for earlier procurement of these longer lead-time projects, resources like pumped storage simply will not be available to meet PacifiCorp’s identified capacity need, despite the IRP’s analysis demonstrating both a future capacity need and the ability of these resources to meet that need.

B. PacifiCorp’s Capacity Estimates Could Threaten Long-Term Resource Adequacy

⁶ OAR 860-089-0100(3)(b), (c).

When planning for capacity shortages, timing is everything and PacifiCorp’s proposed timing may be off. PacifiCorp’s projected load-resource balance, prior to resource additions and assuming a 13 percent planning reserve margin, shows a summer peak capacity deficit beginning in 2028 and a winter peak capacity deficit beginning in 2029.⁷ Implicit in this forecast is the assumption that up to 1,468 MW of PacifiCorp’s capacity requirement can be met through front-office transactions (FOTs), with up to 1,159 MW available in PAC-West and 309 MW in PAC-East. Although PacifiCorp’s reliance on FOTs in the preferred portfolio declines from about 500 MW in 2021 to an average of less than 200 MW during 2024 through 2027, PacifiCorp counts on using an average of over 1,300 MW of FOTs to meet its capacity requirements beginning in 2028 through 2038.

While PacifiCorp’s planning reserve margin analysis is straightforward, Swan Lake believes it likely underestimates PacifiCorp’s future capacity need due to the forces driving the various need futures. This situation will be compounded by the fact that Western electricity markets will face unprecedented capacity shortages beginning in the mid-2020s. Simply put, the availability of capacity—and more specifically a lack of availability—may lead PacifiCorp to increasing capacity deficits over the next decade or more. That is because PacifiCorp’s IRP does not appear to reflect several capacity market factors likely to result in very tight supply within the next decade, as suggested by information provided by the Northwest Power and Conservation Council (“NWPC”), Energy and Environmental Economics (E3), the California Independent System Operator (“CAISO”), and others.

1. The IRP Significantly Underestimates Future Capacity Supply

⁷ IRP at Table 5.12.

PacifiCorp's IRP does not adequately address recent predictions about the size of the impending regional capacity shortfall. Several market factors point to a looming capacity shortage in the Western energy market in the mid-2020s.

- a. *PacifiCorp Relies on NERC's Assessment of Anticipated and Prospective Reserve Margins to Support its Market Availability Assumptions, but Ignores More Granular Studies of Resource Adequacy*

Consistent with its own load-resource balance described above, PacifiCorp relies on NERC's planning reserve margin approach in its assessment of market resource sufficiency to support its reliance on up to 1,465 MW of FOTs to meet its capacity needs. Since the bulk of the FOTs are assumed to be sourced on the west side of PacifiCorp's system, which is dominated by highly variable hydroelectric power supply, it would benefit PacifiCorp to consider resource assessments specifically designed to capture such variability.

The NWPCC performs such an assessment each year, forecasting resource adequacy for the region over a five-year period. The most recent Northwest Power Supply Adequacy Assessment for 2024 (the "NWPCC Power Supply Assessment") shows the existing Northwest power supply becoming inadequate by 2021. NWPCC's analysis estimates the Loss-of-Load Probability (LOLP) in 2021 to be 7.5 percent compared to a standard that defines resources to be sufficient at a LOLP of 5 percent.⁸ The estimated LOLP grows to 8.2 percent in 2024 and 17 percent by 2026. After accounting for the coal plant retirements proposed by PacifiCorp, the estimated LOLP in 2026 increases from 17 percent to 26 percent.⁹

⁸ *Pacific Northwest Power Supply Adequacy Assessment for 2024*, Northwest Power and Conservation Council, October 31, 2019, at p. 5, available at: <https://www.nwcouncil.org/sites/default/files/2024%20RA%20Assessment%20Final-2019-10-31.pdf>.

⁹ NWPCC Power Supply Assessment at 6.

Based on the amount of firm capacity needed to bring the region to a 5 percent LOLP, NWPCC projects a capacity shortfall in the Pacific Northwest of 800 MW in 2024, which could be as much as 2,800 MW depending on load forecasts and import constraints.¹⁰ The Northwest Power Pool (NWPP) reviewed the work performed by NWPCC and others¹¹ and concluded “by the mid-2020s, the region may face a capacity deficit of thousands of megawatts.”¹² E3’s analysis cited by NWPP suggests the deficit could be as much as 8,000 MW by 2030.¹³

As PacifiCorp and other utilities in the region procure new resources, the expected capacity shortfall identified by NWPCC and NWPP will be reduced. PacifiCorp However, to the extent that PacifiCorp plans to rely on front office purchases from a tightening capacity market, and the region as a whole fails to address the need for new capacity, PacifiCorp’s customers may experience drastic price increases and potentially unavailable supply, especially during years with low hydroelectric supply. Alternatively, as described above, PacifiCorp may wind up heavily relying on batteries to meet its capacity needs, which would expose PacifiCorp’s customers to a separate set of risks.

c. Additional Coal Retirements Will Result in Loss of Capacity

PacifiCorp’s IRP also underestimates the impact that additional retirements of fossil-fuel generation, primarily coal plants, will have on PacifiCorp’s ability to secure capacity. Portland General Electric commissioned a regional capacity study by E3 that estimated that as much as

¹⁰ NWPCC Power Supply Assessment at 11.

¹¹ Specifically, the Bonneville Power Administration (BPA), the Pacific Northwest Utilities Conference Committee (PNUCC), and consulting firm Energy & Environmental Economics (E3).

Northwest Power Pool, Exploring a Resource Adequacy Program for the Pacific Northwest, October 2019, p. 7.

¹³ *Id.* at p. 22.

19,000 MW of fossil-fuel generation capacity in the region could come offline by 2030.¹⁴ Such a large amount of retiring fossil fuel capacity is due, in part, to recent clean energy laws in the region. For example, Washington State’s recently passed clean energy legislation phases out coal from utilities’ resource portfolios by 2025.¹⁵ As a result of this legislation, there is a real risk that Colstrip will retire by 2025, rather than in 2027 as contemplated in PacifiCorp’s Colstrip sensitivities.¹⁶

Thus, even without *any* load growth in PacifiCorp’s service territory, the risk of relying on capacity markets for supply grows exponentially over the next decade, particularly after 2025 when so much coal capacity will be disappearing from the market. Furthermore, these retirements are only the currently announced or very likely ones. Other coal plants could be closed early, which would further exacerbate the capacity deficit in the mid-2020 timeframe. The clear market trend suggests that earlier-than-anticipated retirement should be carefully considered, if not expected.

¹⁴ PGE IRP at § 2.4.2.

¹⁵ *Inslee Signs 100% Clean Energy Bill in Midst of 2020 White House Bid*, Utility Dive, updated May 8, 2019, available at: <https://www.utilitydive.com/news/washington-100-clean-energy-law-only-a-signature-from-inslee-away/552627/>.

¹⁶ Because both Puget Sound Energy, Inc. (“Puget”) and Avista Corporation (“Avista”), which are co-owners of Colstrip with PacifiCorp, will be prohibited by state law from including their share of the Colstrip capacity in their rate base after 2025, there appears to be a very real possibility that Colstrip will be closed earlier than the 2034 date PacifiCorp uses in the Reference Case of its IRP. For example, at Puget’s IRP stakeholder meeting in January 2019, Puget conducted a straw poll of its stakeholders regarding the most important issues for their upcoming IRP. Among the most important issues for Puget’s stakeholders was a strong desire for closure of Colstrip Units 3 and 4 by 2025. *See 2019 TAG Meeting #4: System Planning (Transmission and Distribution), Portfolio Sensitivities, and Load Forecast*, Puget Sound Energy Presentation at slide 37, Jan. 9, 2019, available at: https://www.pse.com/-/media/PDFs/001-Energy-Supply/001-Resource-Planning/03_IRP_01_09_19_TAG_Meeting_4_Slide_Deck_FINAL.pdf. Similarly, in separate materials handed out at this meeting, Colstrip retirement by 2025 was the second most important issue to Puget’s stakeholders, when the votes were weighted by importance. *See Sensitivity Ranking by Weighting Ranked Votes*, available at: https://www.pse.com/-/media/PDFs/001-Energy-Supply/001-Resource-Planning/04_Sensitivity_Ranking_Handout_for_TAG_4.pdf.

Many of these retirements are driven at least in part by state clean energy legislation. In Oregon, it remains unclear whether the state will move to a 100 percent renewable portfolio standard in the near future, or if the recent cap and trade efforts will result in state legislation making emitting resources more expensive. In either scenario, there is a risk of sooner-than-anticipated closure of generating resources that produce significant emissions, or that these resources will at least become more expensive to operate. PacifiCorp may soon need to find additional or more economic capacity to replace these resources. This uncertainty is not well-captured in the IRP, nor is it shown as a “capacity need” in the IRP modeling.

d. CAISO Forecasts Capacity Deficits and Possible Increased Demand

An additional market risk that is not adequately captured in PacifiCorp’s IRP, but that will have a significant impact on the Pacific Northwest capacity market, is the impending capacity deficit in the California energy markets. CAISO recently filed comments stating that it will need several *thousand* MWs, as early as 2020, in order to meet its resource adequacy and reliability obligations. Specifically, CAISO states:

CAISO refined its operational analysis presented in opening comments. These refinements indicate a greater operational **deficiency reaching maximums of 2,300 MW, 4,400 MW, and 4,700 MW in 2020, 2021, and 2022, respectively.** The CAISO recommends that the [California Public Utilities Commission] take immediate action on the basis of these deficiencies to ensure short-term resource adequacy sufficiency.¹⁷

Furthermore, in its comments, CAISO goes on to note that these numbers may still be overly conservative. Specifically, CAISO explains that its analysis does not account for the wide

¹⁷ *In the Matter of Rulemaking to Develop an Electricity Integrated Resource Planning Framework and to Coordinate and Refine Long-Term Procurement Planning Requirements*, R.16-02-007, Reply Comments of the California Independent System Operator Corporation at p. 2, filed Aug. 12, 2019, available at: <http://www.caiso.com/Documents/Aug12-2019-ReplyComments-PotentialReliabilityIssues-IRP-R16-02-007.pdf> (emphasis added).

range of wind generation actually observed during the hours in which it will be capacity short and also assumes any new resources will be online by their stated in-service dates, *i.e.*, that there will not be any project delays during development.¹⁸ Both of these assumptions are questionable, meaning CAISO's capacity need could be even higher than those noted in its comments.

The California Public Utility Commission (CPUC) has responded by requiring its jurisdictional load-serving entities to procure 3,300 MW of incremental resource adequacy (RA) capacity beyond the amounts identified as baseline resources in the RA studies used to identify the resource needs.¹⁹ Half of the incremental capacity must be operating by August 1, 2021, with 25 percent more by 2022 and the remainder by 2023. The CPUC allows incremental imports, such as from existing resources in the Northwest, to count towards up to 20 percent of the procurement requirement if the imported power: 1) is tied to a specific and identified generation resource that is dynamically transferred or pseudo tied to the CAISO system; 2) is tied to a contract of at least three years in length and 3) meets all of the other resource adequacy requirements associated with imports.²⁰ Given this increased demand for capacity imported into California, Pacific Northwest capacity markets may be short on capacity as early as next year.

A related market risk that is not well accounted for in PacifiCorp's analysis is recent changes to California's IRP rules that are likely to require Community Choice Aggregators ("CCAs") to begin purchasing additional capacity in the near future. When the rule changes are finalized regarding resource adequacy obligations of CCAs, CCAs will likely need to acquire significant, additional, clean capacity throughout the Western Interconnection. Given that the

¹⁸ *Id.* at p. 11.

¹⁹ CPUC Decision 19-11-016 at p. 3, available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M319/K825/319825388.PDF>

²⁰ *Id.* at pp. 31-32.

CCAs now represent approximately 44,000 GWh of annual load, which is approximately one quarter of the total load in California,²¹ this is a significant change that would dramatically increase the demand for capacity from existing non-emitting resources in the region.

C. Although PacifiCorp Conducted a Transparent Stakeholder Process, Its Models are Opaque and Rely on Some Seemingly Arbitrary Assumptions

Swan Lake appreciates PacifiCorp's efforts at providing transparency by conducting a robust public stakeholder process. In many ways, this need for a transparent stakeholder process was necessitated by the fact that PacifiCorp uses proprietary models and treats many of the inputs and outputs of the model as confidential. As such, stakeholders such as Swan Lake must rely on PacifiCorp to explain its process, how it developed and used various input assumptions, and why certain adjustments were made to the modeling based on unanticipated results, while being unable to do their own deep dive into the models used by PacifiCorp to identify and test the variables driving results. Swan Lake understands that PacifiCorp is protective of this information because it uses the same models for evaluating resources in its RFPs, but it makes for a suboptimal planning exercise that relies on public participation.

Some of the assumptions made by PacifiCorp seem arbitrary and have the effect of disadvantaging resources like pumped storage. For example, PacifiCorp has assumed for the purpose of modeling and resource selection that all resources are utility owned, adding certain owner's costs and an allowance for funds used during construction (AFUDC) to the installed costs estimated by its third-party consultant. PacifiCorp's calculation of AFUDC is considered confidential, so it is difficult to assess whether the cost-adder for pumped storage is reasonable. However, any discrepancy between the assumptions made by PacifiCorp and the actual financing

²¹ See California CCA Website, available at: <https://cal-cca.org/cca-impact/> (containing table showing total annual load, map with current or planned CCAs, etc.).

costs incurred by a developer like Swan Lake (and reflected in bid for a PPA or build-transfer), would disproportionately affect the assumed costs of long-lead resources like pumped storage and may be at least partly responsible for System Optimizer selecting batteries as its preferred storage resource.

Likewise, PacifiCorp effectively forced its System Optimizer capacity expansion model to select solar plus battery storage as a resource in its final preferred portfolio by removing stand-alone solar as a resource that the model could select in its optimization. While Swan Lake understands that this seemingly arbitrary decision was driven by discrepancies between System Optimizer and Planning and Risk (PaR) modeling results and the need to iterate between portfolio selection and reliability testing, it highlights deficiencies in the approach used by PacifiCorp and calls into question whether System Optimizer effectively models reliability and the ways in which different resources contribute value to the electric system. If System Optimizer needs to be “tricked” into producing the resource portfolio that PacifiCorp believes is correct, there may be other deficiencies that drive the model to produce suboptimal portfolios that have yet to be identified and corrected. Given the complexities involved in modeling storage resources, these issues are likely magnified when evaluating the costs, performance and value streams of batteries versus pumped storage. It is critical that PacifiCorp get the modeling right when switching from this planning exercise based on what PacifiCorp thinks is correct to the RFP process where bidders will provide the details to be evaluated. Moreover, the Commission, relying on an Independent Evaluator, must have the information necessary determine that PacifiCorp’s procurement choices best meet the needs of its customers when considering the quantitative measures evaluated with its models as well as the uncertainties and risks not fully captured in that assessment.

IV. CONCLUSION

Swan Lake appreciates the considerable time and effort PacifiCorp has put into improving the modeling in this IRP cycle and increasing transparency through its stakeholder process. The portfolio of new renewable and storage resources and early coal plant retirements proposed in this IRP represent the beginning of a transformation of PacifiCorp's electric system that will continue for the next decade and beyond.

Given the scope and scale of this transformation, it seems shortsighted for PacifiCorp to limit its actions coming out of this IRP to such a narrow window of time, especially when such a narrow action plan window may serve as a barrier to the timely development of longer lead-time resources like pumped storage that will play integral part in the transformation of the western electric system of which PacifiCorp is a central part. For that reason, Swan Lake requests that PacifiCorp consider procuring long-lead resources like pumped storage to meet needs identified outside of the action plan window, which will ensure these resources can be available to meet PacifiCorp's future capacity need in a timely manner, and further reduce PacifiCorp's exposure to market risk factors and capacity shortfalls that the Pacific Northwest is likely to experience in the coming decade.

If PacifiCorp or the Commission has any questions regarding these Comments, or any of the materials included herewith, please contact Nathan Sandvig or Erik Steimle at the email addresses listed below.

Sincerely,



Nathan Sandvig
Director, US Strategic Growth
National Grid Ventures
Nathan.Sandvig@nationalgrid.com



Erik Steimle
V.P. Project Development
Rye Development, LLC
Erik@ryedevelopment.com

APPENDIX A

**SWAN LAKE BLOCK SCHEDULE REQUIRED FOR
A 2026 COMMERCIAL OPERATION DATE**

Swan Lake North Pumped Storage Preliminary Project Schedule

	2019				2020				2021				2022				2023				2024				2025			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
REGULATORY AND COMMERCIAL																												
FERC Issued Final EIR	■																											
FERC Issued Final License			■	■																								
PGE IRP Proceeding before OPUC			■	■	■	■	■																					
Non-Emitting Capacity Procurement/RFP					■	■	■	■	■																			
Binding PPA/Joint Ownership Agreement Negotiations/Execution										■	■																	
INTERCONNECTION (Malin Substation Improvements)																												
Bonneville Power Administration LGIP Study Process	■	■	■	■	■	■	■	■																				
PacifiCorp LGIA Executed				■	■																							
Provide Financial Security to PacifiCorp					■																							
Interconnection Engineering & Procurement NTP								■	■																			
Interconnection Construction																						■	■	■	■	■	■	■
OWNER'S ENGINEERING ACTIVITIES																												
Award OE Contract		■	■																									
Geotechnical Investigation				■	■	■																						
Preliminary Functional Design					■	■	■																					
OE's Opinion of Cost, Schedule and Risk								■	■																			
Preparation of P-T/M-G Solicitation Documents				■	■	■																						
P-T/M-G Solicitation				■	■	■	■																					
Preparation of EPC Solicitation Documents (transmission, heavy civil)					■	■	■	■																				
EPC Prequalification (RFQ)					■	■	■																					
EPC Solicitation (transmission, heavy civil)								■	■	■	■																	
OE/EPC Project Design and updated project cost								■	■	■	■																	
BOC and FERC Design Review								■	■	■	■																	
Construction Monitoring																						■	■	■	■	■	■	■
Commissioning																											■	■
CONSTRUCTION AND EQUIPMENT SUPPLY																												
Contractor Outreach	■	■	■																									
Award EPC Contracts - Limited NTP (Design, Final Pricing)																						■	■	■	■	■	■	■
Final Engineering Design & FERC Approval																						■	■	■	■	■	■	■
Turbine Generator Equipment - Limited NTP & Model Test																						■	■	■	■	■	■	■
Turbine Generator Manufacturing & Installation																						■	■	■	■	■	■	■
EPC Construction - Heavy Civil																						■	■	■	■	■	■	■
EPC Construction - Transmission Line																						■	■	■	■	■	■	■
Initial Fill of Lower Reservoir																										■	■	
Commissioning																											■	■
Commercial Operation																												■

*Draft schedule subject to review and final approval by project Owner.