BEFORE THE PUBLIC UTILITY COMMISSION

OF OREGON

LC 73

In the Matter of PORTLAND GENERAL ELECTRIC CO., 2019 Integrated Resource Plan.	COMMENTS OF SWAN LAKE NORTH HYDRO, LLC AND THE GOLDENDALE ENERGY STORAGE PROJECT ON PORTLAND GENERAL ELECTRIC CO.'s 2019 IRP UPDATE

The companies working to develop the Swan Lake and Goldendale pumped hydro storage projects ("Swan Lake and Goldendale") appreciate Portland General Electric Company's ("PGE") work that went into preparing its 2019 Integrated Resource Plan Update, which was filed in the above-referenced proceeding on January 29, 2021, and supplemented on February 5, 2021 (collectively, the "IRP Update").[1] The assigned Administrative Law Judge of the Oregon Public Utility Commission ("Commission") issued a memorandum on February 1, 2021 adopting the procedural schedule for this proceeding (the "Scheduling Memorandum").[2] The Scheduling Memorandum set March 4, 2021 as the deadline for participant comments. In accordance with the deadlines established in the Scheduling Memorandum, Swan Lake and Goldendale are filing these comments.

I. PGE's IRP Modeling of Pumped Storage

Swan Lake and Goldendale would like to begin by commending PGE for its hard work in developing a robust model (its Sequoia model) that fairly evaluates pumped storage resources.

[1] All citations herein are to the January 29, 2021 filing, unless otherwise indicated.

[2] *In the Matter of Portland General Electric Co., 2019 Integrated Resource Plan*, Memorandum, Docket LC 73 (Feb. 1, 2021), available at: https://edocs.puc.state.or.us/efdocs/HDA/lc73hda164940.pdf.

PGE should also be commended for doing this hard work to develop the Sequoia model in-house, as doing so is relatively unique, particularly when compared to its peer utilities in the Pacific Northwest. Most other utilities rely on third-party consultants to develop these models.

Swan Lake and Goldendale have a team of consultants assisting with the development of their projects. This consultant team has reviewed hundreds of IRP models throughout the country. These same consultants believe PGE's Sequoia model is amongst the most accurate models in the country for purposes of fairly, accurately, and honestly evaluating the ability of various types of resources to contribute to PGE's future capacity needs in a realistic and meaningful manner.

One of the most significant ways in which the Sequoia model fairly evaluates these various types of resources' capacity contributions is by attributing pumped storage an appropriate effective load carrying capability ("ELCC") value. For example, the IRP Update suggests an eight-hour pumped storage resource would have an ELCC value in the range of 88.5% to 94.0%, depending on the size of the resource (ranging from 100 MW to 400 MW).[3] Swan Lake and Goldendale have consistently argued that pumped storage resources provide an extremely high capacity value to utilities. As such, PGE's ELCC values for pumped storage align with the expected operating characteristics of these significant capacity resources.

Swan Lake and Goldendale commend PGE for its hard work to develop the Sequoia model. The way in which PGE's model evaluates pumped storage is exemplary. Swan Lake and Goldendale wish that other utilities in the Pacific Northwest were as committed as PGE to fairly and robustly modeling pumped storage resources.

[3] IRP Update Appendices, Sec. D, "IRP Update ELCC Tables" at Table 16.

II. Pumped Storage Timing Considerations

While Swan Lake and Goldendale appreciate PGE's robust evaluation of pumped storage resources, Swan Lake and Goldendale continue to have concerns that, if PGE does not take early action to send market signals to construct a pumped storage resource, pumped storage will not be available when PGE needs significant capacity in 2026 and beyond.

The IRP Update indicates that the updated Reference capacity need is 511 MW in 2025, which capacity need balloons to 909 MW in 2026.[4] Figure 6 of the IRP Update provides a stark picture of the PGE's capacity needs over the coming decade(s).[5] Furthermore, recent events, including those that occurred in Texas, demonstrate the prudence of being proactive about constructing capacity to meet a utility's projected needs well in advance of the capacity need becoming a reality. Similarly, recent rulings out of California's IRP proceeding demonstrate that California is in dire need of a significant amount of capacity resources, primarily in the form of storage, to avoid similar capacity issues as those seen in Texas.[6]

These recent reliability incidents in Texas and California have a key feature in common—that is, they dramatically illustrate that extreme weather events are occurring much more frequently than has historically been the case. This development is affecting the entire electric utility industry with obvious implications for PGE and Oregon regulators. For example, the California Public Utility Commission ("CPUC") is now considering not only ordering California load serving entities to acquire an additional 7,500 MW of generating resources by 2025 (beyond the 3,300

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4 IRP Update at § 3.4.2.

5 *Id*. at Fig. 6.

6 *See* Fact Sheet: Administrative Law Judge's Ruling Seeking Feedback on Mid-Term Reliability Analysis and Proposed Procurement Requirements, CPUC (Feb. 22, 2021), available at: https://www.cpuc.ca.gov/General.aspx?id=6442463413 (summarizing a recent ruling by the CPUC that 7,500 MW of additional capacity resources be added by 2025, which is in addition to the 3,300 MW previously ordered to come online by 2023).

MW the CPUC ordered acquired in 2019), but also increasing its reliability planning reserve margin ("PRM") from 15 to 20.7 percent under certain circumstances.[7] This pending action is being mirrored by other WECC balancing area authorities ("BAAs"). For example, NV Energy will soon increase the PRMs for its two subsidiary utilities, Nevada Power and Sierra Pacific Power from 12 to 18 percent and from 15 to 18 percent, respectively.[8]

These events point to a need for the WECC BAAs (PGE included) to increase their near-term acquisition of additional capacity resources, especially long duration pumped storage resources like Swan Lake and Goldendale, to handle these more frequent, extreme weather events and simultaneously manage the increased planning and operational uncertainty that comes with greater penetration of intermittent renewable resources on their systems. The latter dynamic was most vividly demonstrated during the August 2020 California outages where the California Independent System Operator ("CAISO") needed to manage its early evening load, not to the traditional gross peak, but to the much less predictable net peak created by its high penetration of solar resources. With CETA for Washington State utilities, and likely future increased renewable acquisition requirements for Oregon utilities, plus retiring coal plants, Pacific Northwest utilities in general, and PGE in particular, will undoubtedly face similar reliability management challenges, particularly in the post-2025 timeframe. Such problems can only be avoided if PGE acts now to

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7 *Id*.

8 *See NV Energy's Planning Reserve Margin to Increase for Summer 2021*, California Energy Markets (Feb. 26, 2021), available at: https://www.newsdata.com/california_energy_markets/southwest/nv-energys-planning-reserve-margin-to-increase-for-summer-2021/article_6ae1f4de-787a-11eb-8bc0-2397492e670d.html; *see also Southwest Regulators Hear from Utilities in Aftermath of Texas Catastrophe*, California Energy Markets (Feb. 26, 2021), available at: https://www.newsdata.com/california_energy_markets/southwest/southwest-regulators-hear-from-utilities-in-aftermath-of-texas-catastrophe/article_e656a070-7897-11eb-9583-ab3a188c54a1.html (noting a PNM executive suggested that, "PNM is considering increasing its reserve margin and exploring how to improve forecasting.").

procure the necessary raw capacity and operational flexibility that only pumped storage can provide.

Swan Lake and Goldendale recognize that pumped storage is not in the preferred portfolio for the action plan window of the 2019 IRP, which runs through 2025.[9] However, failing to act now (or in the very near future) is likely to foreclose any possibility that a pumped storage resource will be available to meet PGE's significant, 2026 capacity needs, either. If PGE waits until the next, 2021 IRP cycle to take any action to spur pumped storage development, projects like Swan Lake, which is among the most mature in the region, may not be available until closer to 2030.

As Swan Lake and Goldendale have previously shown to PGE and the Commission,[10] pumped storage projects have significantly longer lead-times than most other resources due to the amount of time required to build the highly-technical, advanced turbines necessary for these projects. The current estimate from the manufacturer is up to five years to design the pump-turbine generators and place them into service. While Swan Lake and Goldendale have excellent relationships with their expected turbine manufacturers, and have received numerous assurances regarding timing for delivery of 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. Therefore, from the time a market signal is sent (*i.e.,* PGE signs a purchase agreement, selects a pumped storage project in a procurement process, etc.), a pumped storage resource can still take upwards of five years or more to build and construct.

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9 *See id*. at § 6.1, Fig. 19.

10 Swan Lake previously provided an example project schedule to the Commission in this docket. *See In the Matter of Portland General Electric Company, 2019 Integrated Resource Plan*, Opening Comments of Swan Lake North Hydro, LLC at Appendix A, Docket LC 73 (filed Oct. 9, 2019), available at: https://edocs.puc.state.or.us/efdocs/HAC/lc73hac15838.pdf.

Thus, in order for a project developer to take the risk of putting down the significant capital necessary to begin the turbine acquisition process, developers need a market signal that suggests such capital is not unnecessarily being put at risk. Starting a procurement process now would send such a market signal, thereby allowing project developers to begin the procurement process, which will also ensure these resources can be online by 2026, when PGE will need the significant, flexible, clean capacity from pumped storage resources.

Given the longer time required to construct pumped storage resources, Swan Lake and Goldendale emphasize that the current planning paradigm adopted by the Commission is too short for pumped storage to be fairly considered in the traditional IRP process. Specifically, the Commission's IRP Guidelines state that a utility's IRP must include, "An action plan with resource activities the utility intends to undertake over the next two to four years to acquire the identified resources…".[11] While the Commission has previously stated that it does not believe "an anticipatory waiver of our RFP rules is … necessary for PGE to fully and fairly evaluate long-lead time resources," Swan Lake and Goldendale request that the Commission provide more explicit guidance to PGE (and other Oregon utilities) that planning beyond the two to four year timeframe specified in the Commission's IRP Guidelines is consistent with the Commission's rules, its IRP Guidelines, and would be a prudent planning decision. Absent more specific guidance from the Commission, utilities in Oregon will remain reluctant to plan beyond the four-year period specified in the IRP Guidelines out of concern that such planning may be found to be inconsistent with the IRP Guidelines. As Swan Lake and Goldendale have repeatedly told the Commission, such a four-year window is insufficient for pumped storage resources to ever fairly compete with resources

[11] *In the Matter of Public Utility Comm'n of Oregon, Investigation into Integrated Resource Planning*, Order No. 07-002 at 12 (Guideline 4.n), available at: https://apps.puc.state.or.us/orders/2007ords/07-002.pdf.

that do not require such long lead-times. Therefore, for pumped storage to be fairly considered in any utility's IRP process, it is imperative that the Commission provide further guidance and regulatory certainty to utilities in Oregon regarding planning beyond the four-year period specified in the IRP Guidelines.

To remedy the timing issues identified above, Swan Lake and Goldendale request that PGE, possibly at the direction of the Commission, begin a procurement process now for longer lead-time resources, like pumped storage, which are ill-suited to the timing required by the traditional IRP process.[12] Running a procurement process now for long lead-time resources does not commit PGE to any resource acquisition and has no impact on ratepayers or shareholders. Instead, starting the procurement process now allows PGE to collect accurate pricing,[13] timing, and operational information from these projects so that it can better evaluate when pumped storage can be relied upon to meet future capacity needs. Additionally, Swan Lake and Goldendale request that, to the extent PGE intends to conduct a future Request for Proposals ("RFP") as indicated in Section 2.2.2 of the IRP Update, PGE provide sufficient lead time and RFP timing parameters to allow long lead-time resources like pumped storage to fairly compete in that RFP.

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[12] Another potential pathway for PGE to acquire output from a pumped storage project like Swan Lake is via the "projects of statewide significance" determination provided for under HB 2193, which was passed in 2015. These provisions allow the Commission to waive the size limit on storage resources mandated by that bill if a storage resource is "of statewide significance" and one or more utilities participates in procuring such storage. *See* HB 2193 at Section 2(2)(B), available at: https://olis.leg.state.or.us/liz/2015R1/Downloads/MeasureDocument/HB2193/B-Engrossed.

[13] For example, Swan Lake and Goldendale's pricing continues to evolve and has likely changed since PGE last updated its Sequoia model. As such, the most accurate method for evaluating real-world pumped storage projects is to collect proposals from the various project developers in the region, which proposals would include pricing, operating characteristics, etc. Given the unique nature of these facilities, and the relative lack of familiarity in the region, obtaining this information would be the best, most accurate method for actually evaluating these resources.

III. Concerns Regarding Reliance on Capacity Market Purchases

The need for early action to send market signals to pumped storage resources is further emphasized by PGE's updated market capacity availability study, which shows 0 MW of capacity available in the market as early as 2024.[14] Commission Staff's regional capacity sensitivity similarly predicts a shortage in the regional capacity market by 2024.[15] Given that there will likely be no capacity available in the regional capacity markets when PGE's capacity needs grow significantly in 2026, it is imperative that PGE take early action in order to send the appropriate market signals to large capacity resources to begin construction. Absent these signals, no new capacity will be constructed and PGE will be left with no feasible capacity options when the projected capacity need becomes reality.

Similarly, to the extent PGE is assuming in its planning that any of its existing capacity market contracts will be renewed, the Commission should direct PGE to remove that assumption from its model and, instead, assume no capacity will be available in the market. Doing so is likely to further exacerbate PGE's looming capacity needs. Assuming no capacity is available from the market is also a prudent planning decision because, even if some capacity remains available, recent articles and evidence suggest that capacity market prices are already increasing significantly.[16]

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[14] IRP Update at Fig. 5.

[15] *Id*. at Fig. 11.

[16] *E.g. Capacity, Zero-Carbon Attributes Increasingly Driving Price in Chelan PUD Slice Auctions*, Clearing Up (Feb. 26, 2021), available at: https://www.newsdata.com/clearing_up/briefs/capacity-zero-carbon-attributes-increasingly-driving-price-in-chelan-county-pud-slice-auctions/article_abce2692-786c-11eb-8418-87139fca9e90.html (quoting Janet Jaspers, Chelan PUD's energy planning and trading manager, as stating that, carbon and capacity adders "will considerably raise the floor price" for future Chelan PUD slice auctions); *see also Electric Resource Adequacy: California and the West*, Energy+Environmental Economics Presentation (Jan. 28, 2021) (noting that a "bottom-up" review of Pacific Northwest utilities' IRPs shows 9,200 MW of capacity need by 2030, but only 3,300 MW of currently-anticipate capacity additions in that same timeframe).

Thus, renewing these market contracts may not only be unlikely, but also be more expensive (*i.e.*, harmful to ratepayers) than acquiring or constructing new capacity resources.

Therefore, in order to meet future capacity needs, PGE must begin planning for and acquiring large capacity resources now, particularly those that are grid-scale, flexible, dispatchable, and otherwise provide the necessary operating characteristics to replace significant capacity resources that are retiring (like coal). Some of these resources, like pumped storage, have very long lead-times, meaning the need to act early is even more important if PGE wants to be able to rely upon these resources when it has significant capacity needs in 2026 and beyond.

IV. Significant Benefits of Pumped Storage Resources

Pumped storage resources provide significant, system-wide benefits to utilities, particularly those seeking to integrate large amounts of renewable energy. As various states in the Pacific Northwest move toward a greener future and require (via RPS requirements, etc.) more renewable energy be integrated into the electricity system, utilities will need significant storage capability and system operating flexibility in order to reliably integrate the scale of renewable resources that will be required to meet these policy objectives. As compared to any other resource currently under consideration by PGE in the IRP Update, pumped storage resources are the best suited to serve these purposes, given their capacity to absorb significant energy from renewable resources, long-discharge durations, and ability to provide the services necessary to maintain a reliable electrical system. Without significant storage capability on the scale of a pumped storage project, Swan Lake and Goldendale have concerns whether a truly clean energy future is even feasible.

As an example of how pumped storage resources are best suited to provide PGE with the flexible storage capacity it needs, Swan Lake and Goldendale would note that PGE's analysis of

storage resources suggests that, as other storage technologies (*e.g.*, batteries) increase their penetration into PGE's system, their ELCC values degrade significantly. Table 16 shows that batteries, regardless of their storage duration, suffer from ELCC degradation by up to 50% as larger and larger amounts of batteries are added to the system.[17] In comparison, despite increased penetration, pumped storage resources suffer from very little ELCC degradation (just over 5%).[18] This analysis demonstrates that pumped storage is best suited storage resource to provide the significant capacity needed, without suffering from ELCC degradation, to integrate large amounts of renewable resources across all resource sizes.

Another significant benefit of pumped storage is that it is uniquely well-suited to reduce the risk that PGE will be short on capacity when it is needed in 2026 and beyond. As alluded to above, the capacity shortage issues are real and should not be ignored, particularly in light of recent events in Texas and findings by the California PUC. Similarly, given pumped storage resources' ability to better integrate renewable resources, Swan Lake and Goldendale strongly believe that these resources will have a portfolio maximizing and optimizing effect, meaning they will allow utilities to maximize the efficiency of their renewable resources and optimize these resources output, thereby ensuring they are getting the greatest capacity contribution possible from renewable resources. Thus, on that basis, pumped storage resources also ensure utilities maximize the benefits of their investment in significant renewable resources, which is a significant benefit to ratepayers, as well.

Swan Lake and Goldendale would also note that, should the Commission be concerned that an investment by a utility like PGE could expose PGE and its ratepayers to significant risk, that

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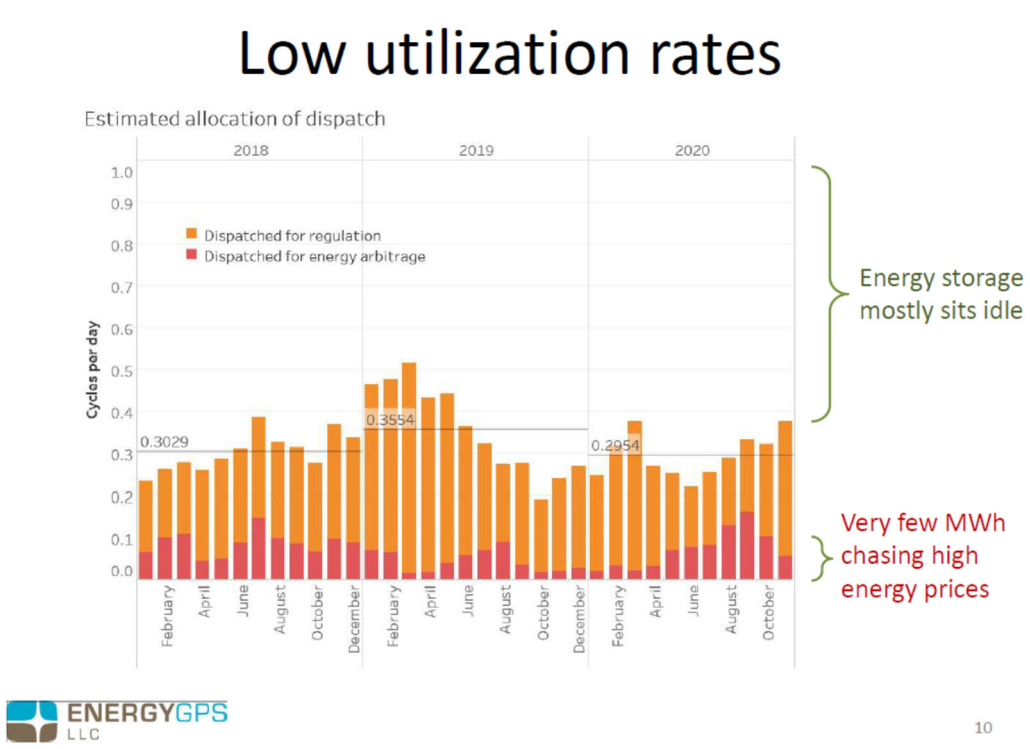
17 IRP Update, Appendices Sec. D, "IRP Update ELCC Tables" at Table 16.

18 *Id*.

concern is substantially mitigated by the capacity market dynamics noted in Section III above and in PGE's own studies. Given that virtually every projection for the Pacific Northwest capacity markets is that supply will cease to exist as soon as next year, or by 2024 at latest, any utility that elects to acquire or construct renewable, dispatchable, flexible capacity resources like pumped storage would have the advantage of access to invaluable capacity that could easily be resold at a premium in the capacity market, should that utility not yet need the capacity or in the even that its resource needs shift causing some portion of the capacity to become excess. The premium that will likely be commanded for that clean, dispatchable, flexible capacity would likely allow a utility like PGE to not only recover its investment, but return a significant, financial benefit to its ratepayers by offsetting the utility's other generation costs.

Furthermore, pumped storage is best-suited to meet PGE's significant capacity needs because other storage technologies are largely unproven for this purpose, or ill-suited to meeting these needs. What little evidence that does exist for grid-scale batteries suggests these resources are largely dispatched for regulation services (*i.e.*, ancillary services) rather than to provide energy or capacity. For example, a recent Energy GPS presentation included the following table looking at how batteries in California are being utilized, which supports the conclusion that these resources should not be relied upon for capacity.[19]

[19] Energy GPS, "The Next Technology – Batteries," Webinar, December 17, 2020.



Finally, while Swan Lake and Goldendale commend PGE for its modeling of pumped storage, Swan Lake and Goldendale suggest that PGE reconsider some of the assumptions in its Sequoia model for batteries. In particular, the IRP Update did not change the assumed useful life for batteries. The 2019 IRP, filed in this docket, used 20 years as the expected useful life for a battery resource,[20] which far exceeds the useful life of what Swan Lake and Goldendale have seen in other utilities' IRPs and in real world applications. Based on Swan Lake and Goldendale's experience, a battery useful life in the range of 10-15 years is more appropriate.[21] Thus, PGE's

[20] *See* 2019 IRP at External Study D, Report 2, HDR Engineering, "Renewables and Battery Options," available at: https://assets.ctfassets.net/416ywc1laqmd/1yrBOOSoA6TCKmBvnTSlcV/854069996cdc225fd86a60307a9e2290/sso-wind-solar-batteries-hdr-2018-excel.xlsx.

[21] For example, a joint publication by National Rural Electric Cooperative Association, National Rural Utilities Cooperative Finance Corporation, CoBank, and NRTC on battery storage suggests lithium-ion batteries with up to 6 hours of discharge capability, have a service life of approximately 10-15 years. *See* Battery Energy Storage Overview, April 2019, available at: https://www.cooperative.com/programs-services/bts/documents/reports/battery-energy-storage-overview-report-update-april-2019.pdf. Similarly, a

presumed useful life of 20 years exceeds even the upper range of the common, marketplace estimates. As such, in order to ensure pumped storage resources are fairly considered in future IRPs against other storage technologies under consideration, Swan Lake and Goldendale recommend that PGE update the useful life for batteries to better align with industry experience and operational performance expected of these resources.

V. Conclusion

Swan Lake and Goldendale appreciate the work PGE has put into developing a robust model that fairly evaluates pumped storage resources. However, Swan Lake and Goldendale continue to have practical concerns around the timing of when PGE intends to send the necessary market signals necessary for large, grid-scale, long lead-time capacity resources like pumped storage to begin procuring the needed equipment in order to meet a 2026 capacity need. To avoid a capacity crunch in the Pacific Northwest like the one Texas recently experienced and the one California is currently experiencing, Swan Lake and Goldendale strongly urge PGE and the Commission to take early action to allow these types of resources to begin the procurement process, thereby ensuring significant, renewable, carbon-free capacity from pumped storage resources will be available when its needed in the near future.

Respectfully Submitted,

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comprehensive report entitled "Energy Storage Technology and Cost Characterization Report" produced by the U.S. Department of Energy indicates 10 years is the approximate cycle life of a lithium-ion battery. *See Energy Storage Technology and Cost Characterization Report*, U.S. Dept. of Energy, July 2019, available at: https://www.energy.gov/sites/prod/files/2019/07/f65/Storage%20Cost%20and%20Performance%20Characterization%20Report_Final.pdf.