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February 5, 2021

Mark Johnson
Executive Director and Secretary
Washington Utilities and Transportation Commission
621 Woodland Square Loop SE
Lacey, WA 98504-7250

RE: Comments of Renewable Northwest, Docket UE-200301
Utilities and Transportation Commission's January 5, 2021, Notice of Opportunity to File Written Comments Relating to Avista's 2021 Draft Integrated Resource Plan for Electricity, Docket UE-200301.

I. INTRODUCTION

Renewable Northwest thanks the Washington Utilities and Transportation Commission ("the Commission") for this opportunity to comment in response to the Commission's January 5, 2021, Notice of Opportunity ("Notice") to File Written Comments relating to Avista Corporation d/b/a Avista Utilities' ("Avista" or "the Company") 2021 Draft Integrated Resource Plan ("Draft IRP") for Electricity, published January 4, 2021.

Renewable Northwest participated in Avista's Technical Advisory Committee ("TAC") meetings during development of the Draft IRP, and we were generally pleased with the Company's consideration of stakeholder input during its public participation phase. Still, we have noted in these comments various areas for improvement in the Draft IRP for Avista and the Commission to consider, bearing in mind the important role of this IRP to plan for compliance with the clean energy standards of Washington's Clean Energy Transformation Act ("CETA"), and as such, to inform Avista's first Clean Energy Implementation Plan ("CEIP"), set to be published later this year.[1]

In these comments, we identify areas where Avista's Draft IRP does not align with the most current resource costs and characteristics. We offer recommendations for revising Avista's flexibility analysis, resource adequacy considerations, and sensitivity analyses with the goal of nudging the Company toward a least-cost portfolio with the best likelihood of meeting CETA's clean energy standards.

[1] WAC 480-100-640

Finally, we appreciate Avista's commitment to achieving carbon neutrality in its electric operations by 2027 and to provide customers with one hundred percent carbon-free electricity by 2045.[2] We think the Company is making strides in creating a path toward meeting those goals, but we urge Avista and the Commission to consider where the Draft IRP may be hindered by traditional resource planning assumptions not relevant to an energy transformation toward a dynamic mix of non-emitting resources. We look forward to continued participation in the development of Avista's 2021 IRP.

II. COMMENTS

A. Regulatory Context

CETA broadly requires Washington utilities to achieve greenhouse gas neutrality by 2030 and to serve Washington customers with one hundred percent non-emitting and renewable electricity by 2045.[3] Utilities must identify steps to achieve these standards using the new tool of Clean Energy Implementation Plans, and those CEIPs must in turn "identify specific actions to be taken by the investor-owned utility over the next four years, *consistent with the utility's long-range integrated resource plan* and resource adequacy requirements, that demonstrate progress toward meeting the standards under RCW 19.405.040(1) and 19.405.050(1)" as well as interim targets to ensure incremental progress.[4]

The Commission worked for months with many stakeholders, including Renewable Northwest, to craft new rules aligning utility IRPs with CEIPs and CETA's substantive requirements. These new rules point to some key downstream effects of IRPs: first, "[t]he commission will consider the information reported in the integrated resource plan when it evaluates the performance of the utility in rate and other proceedings"[5]; and second, a utility's "CEIP must describe how [its] specific actions ... [a]re consistent with the utility's integrated resource plan."[6] The main takeaway of this structure is that it is important to get as much correct as possible in the IRP, as analytical missteps could have repercussions both for utility cost recovery and for achieving CETA's critically important substantive standards.

With that backdrop in mind, we offer the following comments on Avista's Draft IRP, assessing elements of the Draft IRP not only against specific provisions of the Commission's rules as

[2] Avista Connections, *available at* https://www.myavista.com/connect/articles/2019/08/this-is-clean-energy-for-the-future.
[3] RCW 19.405.040(1) & 19.405.050(1) (emphasis added).
[4] RCW 19.405.060(1)(b)(iii).
[5] WAC 480-100-238(6).
[6] WAC 480-100-640(6)(d).

appropriate, but also against the broader context of how the information in this IRP will be used in future planning, procurement, and ultimately cost recovery efforts.

B. Supply Side Resource Options

Assumptions

Avista may have rounded up its solar capital costs, judging by current estimates, but the Company should consider revising its solar capital costs to reflect the slightly lower values estimated at this time. For example, Lazard's Levelized Cost of Energy Analysis for 2020 estimates solar capital costs to lie in the range of $825 to $975.[7]

Considering Avista's assumptions for lithium-ion battery storage, we recommend the Company review the data informing the levelized cost ($/kW) for the preferred 4-hour lithium-ion battery, as there appears to be a gradual price increase after 2033 rather than a steady decline, which would be expected.[8] For example, the National Renewable Energy Laboratory's ("NREL") 2020 Annual Technology Baseline ("ATB") reports a trend of cost reductions (illustrated as $/kW in *Figure 1*) through to 2050.

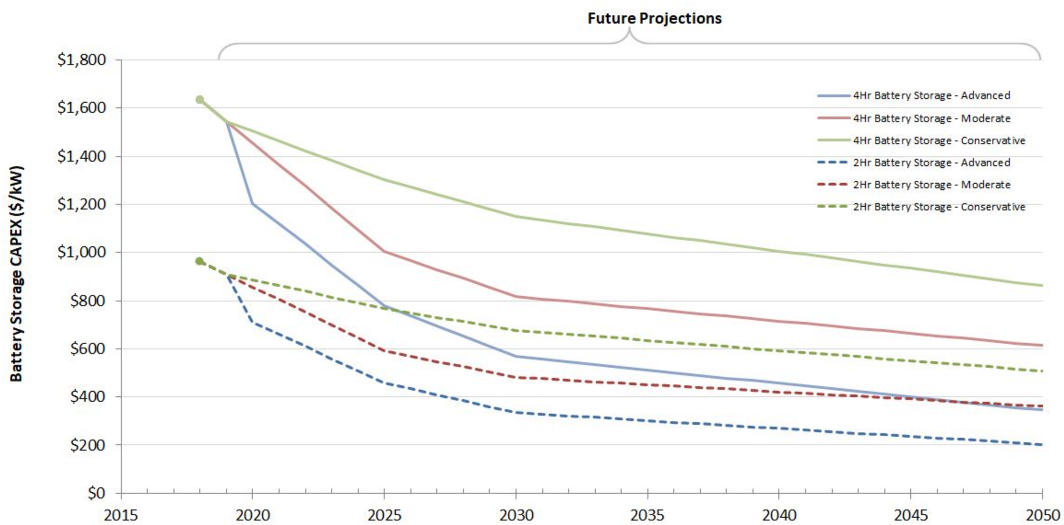

Figure 1. Li-ion battery storage projection (in $/kW) from NREL's Annual Technology Baseline 2020.[9]

[7] *See, e.g.*, Lazard's Levelized Cost of Energy Analysis (Oct. 2020), at 11, *available at* https://www.lazard.com/media/451419/lazards-levelized-cost-of-energy-version-140.pdf.
[8] Table 9.7. Lithium-ion Levelized Cost $/kW, p. 9-14
[9] Battery Storage cost values from W. Cole and A. W. Frazier, "Cost Projections for Utility-scale Battery Storage: 2020 Update," NREL/TP-6A20-75385. Golden, CO: National Renewable Energy Laboratory, *available at* https://www.nrel.gov/docs/fy20osti/75385.pdf.

Ancillary Services Value

We appreciate Avista's proactive approach in valuing ancillary services of emerging resources using sub-hourly modeling. Because there are a number of impending questions that the Company is working through, the comments provided below will shed some light on the broader concept of system flexibility and how emerging resources are able to provide the flexibility needs arising from an increasing share of renewable resources in a reliable manner.

Flexibility has always been part of power system operation because the normal demand for electricity varies significantly on a daily and seasonal basis. Traditional approaches to planning have supported flexibility that is sufficient to meet load reliably. However, increasing renewable generation sources may make traditional approaches to planning inadequate to ensure sufficient flexibility. System flexibility can be characterized along four dimensions: first, the ***absolute power output capacity*** range (in "MW"); second, the ***speed of power output change***, or ramp rate (in "MW/min"); third, the ***duration of energy levels*** (in "MWh"); and finally the ***carbon intensity*** (in "CO_2e/MWh"). Resources which have a larger range between their minimum and maximum "MW" output, such as pumped-hydro storage systems, can provide the flexibility to adjust to a wider range of power system conditions. Resources that can change their output quickly or can be easily turned on or off, including 2-, 4- & 6-hour lithium-ion, flow battery storage systems and demand response ("DR"), have a higher ramp rate and are more flexible because they adjust faster to changes in power system conditions. Resources which can deliver energy for longer durations increase flexibility because they can address prolonged disturbances or outages. Resources such as conventional combustion turbines and combined cycle can provide dispatchable power but have low capacity utilization and are emission-intensive when ramped up or down rapidly. These different dimensions are important to consider in any holistic flexibility analysis and, thus, in calculating benefits, considering not just the frequency of flex violations but their magnitude, speed, duration, and carbon intensity.

In addition to the ADSS system, we recommend the use of the PLEXOS model to simulate generation on a sub-hourly timescale to calculate the balancing reserve requirements and the associated system costs and benefits to meet those intra-hourly dispatch requirements, as legally enforced through NERC's BAL series standards. As defined in BAL-005.5, each Balancing Authority Area is required to have Automatic Generation Control ("AGC"), calculate Area Control Error ("ACE"), and deploy balancing reserves to balance resources and demand. It is important to recognize that with the changing supply-and-demand paradigm, flexibility needs are changing as system variability migrates from load to generation. With Avista's participation in the Energy Imbalance Market ("EIM"), it has the ability to tap into the diversity benefits of multiple resources to balance their demand and supply.

At the same time, new technologies (such as controllable solar and wind power plants, battery storage systems, pumped-hydro systems, and demand response resources) and operational practices provide new options for flexibility. These emerging needs and solutions increase the benefit of a transparent flexibility value, which can help system operators efficiently maintain reliability and enable market participants to make informed investments. Controllable solar and wind power plants have the ability to respond to dispatch instructions much more quickly than conventional generators, in addition to having a zero variable cost. "Flexible solar" not only contributes to solving operating challenges related to solar variability but can also provide grid services, essentially creating dispatchable renewable power plants.[10] A similar study was conducted by Avangrid, NREL, and GE showing that a utility-scale wind power plant can provide regulation-up, regulation-down, and other grid services.[11] Since the flexibility benefit is calculated based on the difference between "day-ahead" and "intra-hour" dispatch, resources with zero variable cost and fast response times, like controllable renewable, battery storage, demand response and pumped-hydro, would generate much higher values than conventional thermal resources.[12] In addition, it has also been proven through many studies that geographical resource diversity and aggregation reduce the need for reserve requirements by reducing short-term variability.[13]

In conclusion, we appreciate the effort Avista has put into modeling ancillary services and providing draft results to stakeholders, but we recommend additional considerations to (i) operational flexibility (both up & down) offered by controllable solar and wind power plants, (ii) detailed analysis of multiple lithium-ion battery durations to the flexibility resource options, (iii) the modeling of sensitivities around the nameplate capacity of flexible resources, and (iv) the draft value of "diversity savings" from participation in the EIM. In addition, it would be useful to see different dimensions of the flex violations and how they are being addressed using the fleet of resources modeled in the flex analysis conducted using PLEXOS. We are also interested to view the flex benefit results coming out of the modeling for pumped-hydro and DR resources, which we believe would be higher than conventional solutions to provide the necessary intra-hourly supply and load flexibility.

Resource ELCC Analysis

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[10] Investigating the Economic Value of Flexible Solar Power Plant Operation First Solar & E# Study. October 2018. https://www.ethree.com/wp-content/uploads/2018/10/Investigating-the-Economic-Value-of-Flexible-Solar-Power-Plant-Operation.pdf

[11] Avangrid Renewables: Demonstration of Capability to Provide Essential Grid Services.. http://www.caiso.com/Documents/WindPowerPlantTestResults.pdf

[12] Determining Utility System Value of Demand Flexibility From Grid-interactive Efficient Buildings. https://pubs.naruc.org/pub/2E1DDEEC-155D-0A36-3137-0FC3D941B1A4

[13] Ancillary Service and Balancing Authority Area Solutions to Integrate Variable Generation. Available at: https://www.nerc.com/files/ivgtf2-3.pdf

While we appreciate the detailed analysis that Avista has conducted and the provision of peak capacity credit values for different supply side resource options, we are concerned that these values significantly under value storage and hybrid resources.

To start, the Draft IRP references an E3 report in stating that, “4-hour duration storage can provide high levels of resource adequacy in small quantities because it has other resources to assist in its re-charging; but as its proportion gets larger, there is not enough energy to refill the storage device for later dispatch.”[14] This statement is confusing and misrepresents operating characteristics and values of energy storage systems. As we know, reliability should be valued during the times when the system is in stress (i.e. hours with the highest probability of loss of load). As Avista mentions, 4-hour duration storage can provide high levels of resource adequacy. The quantity of adequacy depends on the operating characteristics of the power plant and how it is being operated to meet the reliability risks. In addition, storage capacity can be easily refilled during off-peak hours when solar and wind are usually curtailed (mid-morning for solar and late night for wind), either directly or indirectly, from the grid. It is also worth noting that hybrid resources are not physically restricted to charge from the renewable component since the Federal Investment Tax Credit (ITC) is a financial not a physical restriction. Thus, a power plant operator may choose to charge the storage partially from the grid to ensure that it meets the capacity requirement during critical periods.

The Draft IRP also mentions that “[h]igher levels of penetrations for renewables may lower their effect on resource adequacy.” While this statement is true due to diminishing marginal ELCC from increasing penetration of renewables, it is also true that the capacity credit of storage increases with increasing penetration of renewables since they are complementary resources, by changing the shape of net demand patterns and effectively shifting delivery of energy to meet the reliability needs.[15] An analysis conducted by Astrape Consulting commission by joint IOUs in California showed that solar paired with 4-hour storage provides greater than 95% ELCC on average including analysis and values pertaining to the BPA region.[16] Avista’s value provided in Table 9.12 shows a 17% value which is extremely low based on recent IRP filings and technical reports in the region. Therefore, we recommend Avista study for its final IRP the different operational configurations and characteristics of hybrid resources and standalone storage to correctly evaluate the resource ELCC value.

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[14] P. 9-27

[15] The Potential for Battery Energy Storage to Provide Peaking Capacity in the United States. Denholm et al, 2019. Available at: https://www.osti.gov/biblio/1530173-potential-battery-energy-storage-provide-peaking-capacity-united-states

[16] 2020 Joint CA IOU ELCC Study Report 1. Astrape Consulting. August 2020. Available at: https://www.astrape.com/2020-joint-ca-iou-elcc-study-report-1/

C. Preferred Resource Strategy

To begin, we request that Avista incorporate the results of its 2020 Renewable RFP in the preferred resource strategy ("PRS") for its final IRP, including how Avista's improved knowledge of current market prices may adjust resource assumptions informing the 2021 IRP model.

We appreciate Avista's transparency in revealing that the early economic contractual exit from Colstrip Units 3 & 4 would benefit its Washington and Idaho customers. If the joint owners of this resource were to agree on the terms of early exit from or retirement of these units, it would in part be because of this modeling effort by Avista. However, we recognize the complexity of exiting a jointly-owned resource, and we understand Avista's decision to maintain the 2025 Colstrip exit date in its PRS.

As indicated above, Avista may be undervaluing storage and hybrid resources, especially considering Washington's and the entire region's transition away from fossil resources, thus increasing the penetration of renewables on the grid and the capacity credit of storage. Avista does note their intention to study additional benefits of storage by modeling additional scenarios including price and renewable penetration.[17] We hope Avista will conduct these analyses to inform the PRS of the final IRP, as we urge the Company and the Commission to acknowledge that traditional methods of resource planning -- especially those driving standards for determining resource adequacy -- will likely continue to favor new natural gas builds and delay the clean energy transition.

Avista mentions throughout the Draft IRP that upon exit from coal contracts by 2025, limited capacity options are available as replacement. For example, Avista notes, "With the exit of Colstrip and the expiration of the Lancaster PPA in the fall of 2026, the PRS adds 211 MW of natural gas-fired CTs. The 2020 IRP assumed the capacity lost from Colstrip and Lancaster could be met with long duration pumped hydro, but the updated cost and construction schedule information for pumped hydro caused this resource to not be selected in this IRP."[18] For the Commission and stakeholders to better understand why Avista's capacity needs can only be met with new natural gas peaking capacity, we recommend that Avista provide at its upcoming TAC meeting or publish in its final IRP a projected loss-of-load event, displaying by hour where there is a deficiency in available capacity. This could be in the form of a 12x24 matrix of the peak demand or hours with the highest loss of load probability which were used to calculate the ELCC values for all resources.[19]

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[17] P. 9-26
[18] P. 11-5
[19] *See, e.g.,* Energy+Environmental Economics (E3), "Capacity Value Framework & Allocation Options," Oregon

D. Portfolio Scenario Analysis

While there is certainly value in many of Avista's twenty modeled sensitivities, we recommend the Company conduct one additional analysis to better understand how policy-driven changes in Avista's resource mix should impact the way the Company plans for meeting demand reliably and at least cost. For example, especially considering our previous comments regarding pricing and ELCC values for storage resources, a sensitivity analysis of must-take storage (not limited by resource type or duration characteristics) combinations in place of new natural gas peaking plants would inform Avista how much current storage technologies would change levelized portfolio costs. Avista's Portfolio #5 -- "Clean Resource Plan (2027)" -- does not prohibit new gas procurements, and Portfolio #6 -- "Clean Resource Plan (2045)" -- does prohibit new gas procurements but curiously allows Colstrip to exit at any time.[20]

III. CONCLUSION

Renewable Northwest thanks Avista and the Commission for its consideration of this feedback. We are optimistic that the changes and additional analysis we have recommended above will help Avista to identify a least-cost portfolio that also puts the Company on a path to achieving CETA's clean energy standards and the company's own emission reduction goals. We look forward to continued engagement as a stakeholder in this 2021 IRP process.

Sincerely,

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Public Utilities Commission (UM 2011) at slide 39 (Jul. 9, 2020), *available at* https://edocs.puc.state.or.us/efdocs/HAH/um2011hah17397.pdf.

[20] P. 12-6