Avista Corporation's 2011 Electric Integrated Resource Plan
Docket UE-101482

As an electric utility operating in Washington, Avista Utilities (Avista or Company) has a fundamental responsibility to manage the risks and opportunities associated with acquiring and delivering electric energy on behalf of its customers. This responsibility is particularly important in an era of uncertain greenhouse gas (GHG) mitigation costs and wavering load growth.

Avista is required to prepare an Integrated Resource Plan (IRP) under RCW 19.280.030. The purpose of an IRP is to "develop comprehensive resource plans that explain the mix of generation and demand-side resources [utilities] plan to use to meet their customers' electricity needs in both the short term and the long term," so that utilities in the state rely on "new safe, clean, and reliable energy resources to meet demand in Washington for affordable and reliable electricity."[1]

The planning requirements specified in WAC 480-100-238 are intended to help each utility develop a strategic approach to navigate marketplace opportunities and risks based on that utility's unique attributes. Avista's 2011 Electric Integrated Resource Plan (the Plan) represents such a strategic approach. As such, it is consistent with the Utilities and Transportation Commission's (Commission) planning regulations. Below we discuss how the Plan addresses the requirements for integrated resource plans.

Load Forecast

The Company's analysis of its expected load growth and existing resources in Chapter 2 is well reasoned and substantiated by data and analysis. Avista expects an annual energy load growth of 1.7 percent compounded over the next twenty years and a peak load growth of 1.2 percent over the next ten years. The Company notes that loads declined during the current economic cycle marked by the start of a recession in late 2008, though not as much as loads declined during the 2000-2001 western energy crisis.

The Company uses the same growth rate for annual net native load growth as it did in the 2009 IRP, but the growth starts from a lower base in 2010 (rather than the relatively higher base for 2008). The assumptions in the Plan include an analysis of local and national economic trends as well as changes in usage behavior from various causes, including weather, price elasticity, conservation, and the adoption of new energy-using technologies such as electric cars.

In our comments on the 2009 IRP, we urged the Company to include a range of forecasts (high and low) for load growth, in addition to the mid-point analysis. The Company did such an analysis to test the Company's preferred resource mix, including a high load growth of 2.33% and a low load growth of 0.93%. We understand the difficulties in obtaining reliable economic data from economic consulting firms that are relevant to

[1] RCW 19.280.010.

Spokane County and its service territory, and the inherent variability in the multiple economic assumptions. We commend the Company for carrying out such a "range analysis" for load growth and its use of expertise of the Northwest Power and Conservation Council (NPCC) and other external consultants. We expect the Company to continue to include this analysis in the future.

In Table 2.1, the Company summarizes the economic assumptions over twenty years it uses from Global Insight, including a GDP growth rate of 2.7 percent, unemployment rate of 5 percent, 1.58 million housing starts per year, and a federal funds rate of 4.75%. Based on current economic conditions, these long-range assumptions seem overly optimistic to us. Therefore, we caution the Company not to place an undue reliance on these national economic assumptions, and continue to test its modeling under more conservative assumptions of economic growth.

We understand that the forecast of private housing starts is important to the Company's load analysis, since it tracks closely with the employment and population forecast data. We note that Global Insight has started to provide more granular forecasts of housing starts relevant to the Company's service territory, as shown in Figure 2.4. While this graph shows an upturn in the rate of housing starts in the 2011-2015 period, it shows a slight decline in the rate to a level similar to the average rate achieved in the 1990s. We note that the housing industry remains very stagnant both nationally and throughout the Pacific Northwest due to the slow economic recovery. We recommend the Company be cautious in relying on these forecasts of housing starts and household formation, recognizing that the housing industry in particular may have a long period that has structurally lower growth than the earlier period. Moreover, we encourage the Company to track closely near term trends in demand and the economic indicators that drive load in the Plan's projections for any lag the indicators may exhibit from the assumptions used to forecast load growth.

Resource Needs

Avista's electrical system remains primarily a winter peaking system. For an 18-hour winter peak event, Avista's modeling anticipates a native load of 1,648 MW based on the year 2012, slightly more than the 1,500 MW the Company anticipates in its modeling for an 18-hour summer load peak event.[2]

The Plan concludes that Avista has adequate existing generation assets to meet both winter and summer peaking loads for capacity needs until the 2019-2020 timeframe. When determining its planning reserve margin, the Company first calculates its operating reserve requirements (on-system generation, load regulation, and wind integration), and then adds either 14 percent (summer) or 15 percent (winter) of that operating reserve to determine the planning reserve margin. The results of this analysis are show in Figures 2.14 and 2.15. As one example, the analysis produces a reserve margin of 233 aMW for the year 2012. We concur that this is the appropriate reserve to utilize for planning purposes for peak loads, which is consistent with other regional utilities. We believe this

[2] Avista 2011 IRP, 8-39 and 8-40.

is an improvement over the planning analysis it used in the 2009 IRP, when it used a 15 percent reserve margin for the Company's peak loads in winter and summer.

We encourage the Company to continue to use this analysis and participate in the Resource Adequacy Forum hosted by the NPCC, where these important issues of resource capacity, reliability, and regional surpluses are considered. We also request that the Company analyze in the next IRP whether the use of this reserve margin analysis is the most cost-effective way to meet the goals of adequate resource capacity, ensuring reliability, and providing the most affordable energy to its end-use customers.

Turning from capacity to energy planning issues, Avista will generate from its existing resources, or acquire in the market, 1,441 aMW of energy in 2012.[3] This will consist of approximately 52 percent baseload thermal production (natural gas and coal-fired generation), 36 percent hydro generation, and 11 percent firm power purchases. The energy planning also assumes a 90 percent planning margin for hydroelectric availability (based on historical water years) and the contract risk of the return to BPA of the energy from WNP-3 during the planning horizon. We consider both of these planning assumptions to be reasonable. The Plan concludes that these existing resources and short-term market supply provide adequate energy to Avista through 2019. Although we are somewhat cautious on the reliance on market transactions based on the expected regional surplus, we consider the analysis to be sound and the final annual forecast of annual energy loads to be reasonable.

Under Washington's renewable portfolio standard (RPS), Avista must acquire 3 percent of its annual load from renewable resources starting in 2012, 9 percent starting in 2016, and 15 percent starting in 2020. Table 2.16 clearly and concisely illustrates the requirements the Company faces going forward to meet with RPS standards. Avista states it can generate 17 aMW of qualifying renewable generation from incremental upgrades to its hydro facilities in 2011 which it intends to carry forward into the first compliance year. Avista shows the output from the incremental upgrades increasing to a 28 aMW by 2015 and leveling off at 22 aMW thereafter.

The 17 aMW of renewable generation in 2011 fall slightly short of Avista's estimated 19 aMW of renewable generation needed for the first year of compliance in 2012. The Company sets forth its plans to both use banked renewable energy credits (RECs) from 2011 and market purchases of 6 aMW of RECs to cover this shortfall. Avista's analysis identifies the estimated shortfall starting in 2016 at 20aMW, which then increases to 50 aMW in 2019 and 94 aMW in 2020. However, the IRP (both in Chapter 2 and in the Action Plan) does not clearly set forth Avista's plans to fill these shortfalls.

Table 2.6 also includes a "REC reserve requirement (95^{th} percentile)" that varies from 7 to 13 RECs over this planning horizon, but it is difficult to understand the method by which Avista calculates this reserve and the role of the reserve in the Company's planning for compliance.

[3] Avista 2011 IRP, table 2.9, page 2.29.

- The Company should provide a clear and cogent analysis of how it intends to meet the higher RPS standards from 2016 going forward, for example, through the acquisition of a wind resource based on the resource's estimated generation capacity, in addition to the use of banked or purchased RECs.

- Also, the Company should provide a detailed analysis of how it determines its necessary REC reserve requirement.

We note the Company does not include any discussion of the various types of electric storage technologies in its Plan or in the detailed appendices. We are concerned with the absence of a discussion of any study by the Company, since electric storage technologies are increasingly being considered by electric utilities in resource portfolios either for purposes of firming intermittent generation resources or for meeting peaks in load. Although these technologies may be viewed to be too expensive or lack commercial maturity, we believe the Company's next plan would be well served by a discussion of electric storage technologies and why they may or may not fit into the Company's resource portfolio.

The Plan also lacks an explicit discussion of the future costs and liabilities of operating Colstrip over the 20 year planning horizon. Colstrip is a significant resource, and as the Company's only coal plant, a unique resource.

- The Company should include in its next IRP a discussion of the technologies of electric storage, their cost-effectiveness, commercial availability, and proper classification compared to other forms of generation.

- The Company should conduct a broad examination of the cost of continuing the operation of Colstrip over the 20-year planning horizon, including a range of anticipated costs associated with potential U.S. Environmental Protection Agency regulations on coal-fired generation.

- The Company should model a scenario without Colstrip that includes results showing how Avista would choose to meet its load obligations without Colstrip in its portfolio, and estimates of the impact on Net Present Value (cost) of its portfolio and rates.

Demand Side Resources

Avista retained Global Energy Partners (Global) to produce a Conservation Potential Assessment (CPA) for this IRP. The CPA provides estimates over a 20-year timeframe in the following categories: a) technical potential; b) economic potential; and, c) achievable potential, which it further breaks down in maximum potential and realistic potential. While it estimates the Maximum Potential to be 9.8 aMW and to grow to 321.4 aMW by 2031, we believe it is more appropriate to focus on the realistic potential over this time horizon, which is 5.7 aMW increasing to 232.2 aMW by 2031. These results indicate the large potential in energy efficiency that the Company may pursue over this time horizon, with projected energy savings (as a percentage of the baseline energy

forecast) of 0.6% in 2012 but growing to 16.1 percent by 2031. The results of the various forecasts are concisely summarized in Table 3.1. We consider this analysis to be technically sound and to include a range of forecast assumptions that are reasonable.

In Chapter 5 (Transmission and Distribution, or T&D), the Company includes a section on energy savings which are expected to be achieved through upgrades and modernization of its transmission and distribution system. It identifies the distribution system operating at voltages between 4.16kV and 34.5 kV (with the typically size being at 13.2 kV in its urban service centers) as the size range in which it intends to pursue distribution efficiencies. Avista has received a $20 million matching federal grant called the Smart Grid Investment Grant (SGIG) to cover upgrades to feeders in the Spokane area. Avista states that the upgrades will result in large energy savings mainly through conservation voltage reduction (CVR). The Company also states that it started to pursue studies to evaluate potential energy savings to its T&D system, including feeder upgrades prior to the 2009 IRP. The Company estimates that total losses could be reduced by 6.1 aMW by the end of the planning period, which is summarized in Figure 5.2. In the two-year period of 2012 and 2013, the Company estimates the distribution loss energy savings to be 47, 293 MWh, or about 5.4 aMW. We appreciate the Company's early and systematic work on distribution energy losses, and its examination of all of its T&D system assets for further efficiencies. We expect the Company to continue to refine this analysis as it pursues the feeder upgrades it has identified (mainly re-conductoring), and continue to track the actual energy loss savings in the next IRP.

In Chapter 4, the Company describes the planning process by which Global conducted its analysis of the Company's existing programs and conservation potential, including consultation with regional bodies such as the NPCC. Avista states that its Plan uses a methodology consistent with the NPCC methodology. The chapter also describes the consultation process that Global conducted with the NPCC staff, in order to determine consistency with the 6th Power Plan methodology. Moreover, Global also modified certain assumptions, such as penetration rates. Global also made the analysis more granular to the specific end-user profiles in the Company's service territory. We judge this approach to be reasonable, and appreciate the thorough process by which Global considered these measures and consulted with the NPCC staff.

Global also conducted sensitivity analysis on changes in avoided costs to verify the base case by modeling several scenarios. The stacked supply curves are summarized in Figure 3.6 and illustrate the large potential that may be achieved through cost-effective measures. The figure also shows that the average cost of acquiring such measures increases rapidly further out on the supply curve. We find this analysis to be useful in identifying both the potential achievable over this time horizon, but also for identifying higher costs along the supply curves. We also recognize that this analysis, including consistency with the 6th Power Plan methodology, is also used by other utilities in their IRPs, and establishes a basis for a consistent evaluation of these measures under the requirements of RCW 19.285 (I-937).

Transmission

In Chapter 5, the overview of transmission and distribution is a good summary of Company's activities in this area. The 2-year Action Plan includes several items that the Company intends to pursue in the short-term. Most of these action items are general and high level, and describe the continuation of existing efforts Avista is already pursuing. Other than the south Spokane 230 kV reinforcement project, which is planned to be fully energized in 2018, the Company does not have any other major transmission project in active planning or construction at this time.

The Company concisely summarizes in activities in the multiple for in the region that are pursuing medium and long-term transmission planning efforts, including Columbia Grid, NTTG, and the WECC. As one "action item", it states its commitment to continue to participate in these planning bodies "to facilitate long-term expansion of the regional transmission system." We appreciate the Company's active participation in these planning bodies even though the Company is not actively pursuing any transmission projects in its regional, long-term plans.

The Company also correctly notes the dominant role that the Bonneville Power Administration (BPA or Bonneville) plays in the regional transmission system, and the Company's dependence on Bonneville for delivering the output from the Company's generation facilities at Colstrip, Coyote Springs, and Lancaster to its distribution facilities. The Company describes its active and ongoing efforts with BPA in transmission planning efforts, and its participation in BPA rate cases on transmission costs.

Finally, this chapter includes a short description and a useful summary table (Table 5.1) on the currently estimated costs for integrating new resources into the Company's transmission system. We commend the Company for taking early action to identify potential costs from such new resources and transmission upgrades, and coordinating with the load-serving division within the Company (Avista-LSE). We note that these costs are estimates at this time, and will require further refinement as the next IRP is developed. We also note the ongoing work with BPA on the direct interconnection of the Lancaster plant to the Bonneville 230 kV substation at Lancaster, using the preferred alternative of looping in the Company's Boulder-Rathdrum 230 kV line directly to that substation. This direct interconnection should offer benefits to the Company in terms of reduced wheeling costs to BPA and increased reliability. We urge the Company to continue to cooperate closely with BPA to ensure that this line is completed in a timely way by the end of 2012.

Modeling Approach

The modeling and analytics Avista uses in this IRP are well developed and sophisticated. It carefully reviews inputs, model logic and function. Avista examines the model results for reality checks and contemplates all the model results to determine a Preferred Resource Strategy (PRS). Also, the generation resource options and the costs developed for input into the model are well-grounded and well-specified.

Avista relies on AURORAxmp to model the dispatch of available resources in the Western Interconnection under various scenarios. The Company performed many scenarios for this IRP, divided in to three broad categories: deterministic scenarios (e.g., low and high gas prices); stochastic scenarios (e.g., the expected case, unconstrained carbon scenario, mandatory coal retirement scenario); and portfolio scenarios (e.g., market reliance only, national renewable energy standard, wind vs. solar tipping point). We judge these scenarios to be comprehensive and well considered.

With forecasts from AURORAxmp, Avista uses PRiSM, a linear programming routine, to select resource mixes and establish an efficient frontier of resource portfolios. This enables Avista to select a preferred resource strategy (PRS) along the efficiency frontier that shows the tradeoff between cost and risk. We find this efficient frontier analysis to be informative. It allows examination of the various future scenarios in terms of the classic economic tradeoff between risks and costs of the optimal resource portfolio.

Although we believe the Company's modeling to be good, we note it includes three action items for further improvement in the next IRP, including the ongoing use of regional reliability processes and development of Avista-centric modeling for possible inclusion in the 2013 IRP. We support Avista's commitment to further refine and improve the modeling, and urge the Company to explore its thinking and strategy with the TAC (technical advisory committee) at an early date.

Preferred Resource Strategy and Action Plan

The Company describes the ultimate outcome of its analysis and modeling in Chapters 8 and 9 for the PRS and the short-term Action Plan. The description is well developed and written, and generally synchronizes well the work done under the IRP process described in the earlier chapters. For the next two years, as described above, the only new types of resource the Company intends to acquire are northwest wind, distribution efficiencies, and energy efficiency. The PRS projects Avista will add major thermal resources in the form of single cycle combustion turbines (SCCTs) in 2018 (83 MW), 2020 (83 MW), and 2029 (46 MW). The PRS adds combined cycle combustion turbines (CCCT) in 2023 (270 MW) and in 2026 (270 MW to replace the planned expiration of the Lancaster PPA).

In terms of capacity needs for peak loads, the Company will seek to meet its 18-hour summer peak deficits from 2012 to 2016 by using a share of the region's excess generating capacity. The Company also projects the first winter peak deficit without conservation would occur in 2020 (delayed until 2022 with energy efficiency measures). However, the summer peaking loads show a need for a capacity resource in 2019.

The PRS results in a nominal levelized cost of $84.64 for supply side resources and $88.39 for demand side resources. For resources that reduce load at the meter, such as energy efficiency measures, the nominal levelized avoided cost is $104.37. We carefully reviewed the avoided cost used for demand side resources, and find them to be well-grounded and reasonable.

In this chapter, the Company further describes the efficient frontier analysis as the "backbone" of the PRS. It summarizes the efficient frontier, Figure 8.10, as "all capacity, energy, and RPS requirements met with sets of intermediate portfolios between the least risk and least cost options."[4] We find this analysis to be useful in exploring the trade-offs between costs and risks over a long-term time horizon and in the Company's determination of its ultimate choice of preferred resources.

The Company carries out several sensitivities on the PRS to determine what would constitute the "tipping point" to change a selected preferred resource in the portfolio. The Company specifically includes a sensitivity analysis of solar capital costs versus wind costs (which determined that solar capital costs must be reduced by 53 percent to $2,020 per installed kW); a comparison of CCCT capital costs versus simple-cycle turbines, which constitutes the earliest acquisition of a thermal resource in 2018 as mentioned above; and, two alternatives to the base case load forecast. We find this analysis to be well done and informative.

We find the high and low load growth cases provide the outer bounds of uncertainty. As mentioned above in the load forecast section, we have urged the Company to include a high and low forecast for future load growth, instead of a single-point forecast. The Company sets the upper and lower load growth changes at 50 percent. This results in changes in the base case forecast of 0.19 percent for the low load case, and 2.4 percent for the high load case. However, after reviewing the results of this analysis, we conclude that setting the low and high load growth forecast to 50 percent of the expected load growth appears to us to be too far from a probable future load to be useful as a tipping point analysis. Understandably, it causes dramatic changes in the portfolio in the outer years.

We urge the Company to further refine this tipping point analysis for load growth forecasts in its 2013 IRP. During this extended period of low economic growth and accompanying slow load growth, it is especially important for the Company to monitor these developments for their effects on the selection of resources in the PRS and the timing of acquisitions. During this period of faltering load growth, the Company should

[4] Avista 2011 IRP, 8-14.

perform load growth variances that result in incremental changes to the PRS, such as the delaying the acquisition of the 2018 SCCT.

By comparison, we found useful the tipping point analysis of CCCT versus SCCT capital cost to be informative and useful. As the Company states, although CCCTs were the lowest cost option for a thermal resource in the 2009 IRP, the simple cycle turbines have displaced the combined cycle units in this IRP as the most cost-effective resource for nearest-term acquisitions. Conditions in the wholesale electricity markets and the costs of building such units have both changed sufficiently causing this reversal of places in this PRS. This analysis indicates that the capital costs of CCCTs would need to be reduced by 22 percent today to be competitive with the single cycle units. The 22 percent relative price reduction is large but alerts Avista to the possible thresholds that would require the Company to re-assess the Plan's PRS.

Regarding the items in the 2011 IRP Action Plan, we find them to be presented well and to be well grounded in the modeling and analysis. Though they are described in general terms, they provide a useful guide on how the Company intends to implement the actions described under this IRP over the next two years. The other action items under "resource additions" mostly describe monitoring and collaborative activities, and activities of a longer-range focus. Since economic conditions are constantly changing, we urge the Company to closely monitor the actual results of load growth and developments in the marketplace so that it can update its action plan when necessary. In the 2013 IRP, the Company should take into account these new developments and information and update both the PRS and the action plan.

Conclusion

The Commission acknowledges that Avista's 2011 Electric IRP complies with WAC 480-100-238.