



STATE OF WASHINGTON

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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October 3, 2003

Steve Reynolds, President and CEO
Puget Sound Energy
P. O. Box 97034 Mail Stop: 15
Bellevue, Washington 98009-9734

Re: Puget Sound Energy 2003 Least Cost Electricity and Natural Gas Plans
Docket No. UE-030594 and UG-030595

Dear Mr. Reynolds:

Puget Sound Energy (PSE or Company) filed its 2003 Least Cost electric and natural gas plans (entitled 2003 Electric Integrated Resource Plan) with the Washington Utilities and Transportation Commission (Commission) on April 30, 2003. As part of our review of the plans, the Commission provided a period for public comment and held a public meeting at Bellevue Community College on July 21, 2003.

The comments received fall in three categories:

- 1) The conservation section is not complete nor is the fuel switching research;
- 2) Numerical errors are identified of indeterminate effect;
- 3) Assumptions made by PSE that differ than those of the commenters.

Despite these and other concerns and criticisms, the Commission finds that, overall, the plans meet this jurisdiction's minimum requirements as set out in WAC 480-100-238 and WAC 480-90-238. Nevertheless, PSE should carefully consider implementing recommendations in the appended report. The



Steve Reynolds, President and CEO

October 3, 2003

Page Two

Commission emphasizes that this finding does not pre-approve for ratemaking any expenditures for resources or actions identified in the filing or its integrated

Action Plan. The Commission will consider the information, analysis, and strategies contained in the plan, along with other pertinent information during any evaluation of PSE's services and rates.

The Commission is concerned about the delay in completing and submitting the plans. Our August 8, 2000, acknowledgement letter for PSE's 1999 Least Cost Plans clearly specified that the next LCPs were due by the end of 2001. Instead, the Company did not begin serious preparatory work until mid-summer 2002. Draft work was distributed in December 2002. PSE finally filed its plans in April 2003 – nearly four years after submitting its previous Least Cost Plan. Even so, PSE's electric plan was not complete – PSE amended to its electric plan on August 29, 2004.

We remind PSE that Commission regulations specify Least Cost Plans are to be completed every two years. The regulatory goal, to obtain useful information, requires that Least Cost Plans be reasonably current. Accordingly, PSE should complete and file its next LCPs on or before May 1, 2005.

More detailed comments regarding PSE's plans are attached. If you have any questions please call Nicolas Garcia at 360-664-1346.

Sincerely,

A handwritten signature in cursive script, reading "Carole J. Washburn". The signature is written in black ink and extends across the width of the page.

Carole J. Washburn, Executive Secretary
Washington Utilities and Transportation Commission

Attachment

Attachment

The final April 30, 2003, filings contain the minimum elements specified in the Commission's Least Cost Planning regulations, WAC 480 100 235 (electric least-cost planning) and WAC 480 90 235 (gas least-cost planning). Every least-cost plan has imperfections, and the Commission generally joins requests for correction, refinement, or improvement with each plan acknowledgement. There is ample room for reasonable differences of opinion regarding modeling inputs and estimation techniques. Nevertheless, these plans generally meet only the minimum standards of the Commission's Least Cost Planning regulations and do not include the desirable degree of detail and completeness for many elements.

That said, the level of effort since the beginning of this year in the forecasting, modeling, and data gathering is impressive. As expected, the electric plan indicates a need for new supply resources while the gas plan does not. The widely known fact of contract expiration portended that result. However, PSE could use existing resources and the current set of contracts more intensively to cover anticipated energy needs. The electric plan focuses on strategies for addressing this problem.

As discussed below, two changes deserve further attention:

- the planning standard has changed from a critical hydro standard to an average hydro standard; and
- the gas design day standard has been lowered.

Review

In the section on planning standards, the Company discusses at length its assumptions for managerial decisions. This is a useful illustration of business processes and amounts to a discussion of the tradeoffs between risk and cost. The discussion shows that the choice of standards is not arbitrary. A discussion of the allocation of risk between ratepayer and investor would be an improvement. This is important because shareholders and ratepayers often face divergent risks from utility decisions.

The modeling of system costs is complex and includes many important variables, including information on market prices for electricity and natural gas, planning standards, and simulation of resource acquisition. It requires judgment to construct the potential portfolios for analysis. This approach does not guarantee that every viable portfolio is actually analyzed or that the best portfolio is analyzed. Better modeling tools could remedy this lack of surety. For example, capacity expansion models often use dynamic programming and nonlinear programming to find a general solution over a long time horizon and/or to refine the analysis of the leading resource portfolio. This approach is analogous to the judgment-based screening PSE used, but with a more rigorous structure.

The plan replaced the practice of using a worst case planning event or "critical water" conditions to a statistical approach. The Company used Monte Carlo simulation to model system costs over a large number of historic, hydrological conditions, including critical water years. While the Commission applauds this approach, stress testing portfolios using critical hydro (and other) conditions to reveal the consequence of worst-case scenarios could add additional value.

In response to the last Commission letter, the Company considered risk through the use of simulation methods to randomly choose gas and electric prices and hydrological conditions. This improves the analyses credibility. However, the plan was vague as to how PSE used the estimated mean and variance of costs to rank each portfolio. Although the Company shows concern about large variance in portfolio cost, no discussion is provided as to why a portfolio with a low average cost and large cost variance should not be preferred to one with a higher cost and a smaller variance.

The gas commodity forecast is a combination of forward price information and a commercial product from PIRA. The product may be excellent, but it is not transparent. The data, structural assumptions, and modeling techniques are not well described. Since the gas price forecast is key to both the electric and gas plans, the plan should clearly articulate the assumptions that affect that forecast. In fact, recent gas price forecasts are higher than those presented in the April 30 Plan. (Of course, every price forecast changes with time.) The supply of and demand for gas in the region and over the US as a whole now influences the prices we see here. If the consulting and information firms used by PSE are wary

of disclosing their data and analytical processes, the Company should seek alternative providers or undertake to build such analysis in another way.

The description of gas distribution systems is adequate but does not rise to the level of the 1999 PSE Combined Least Cost Plan or the 1995 WNG Least Cost Plan. In particular, a flow analysis to determine the sites for upgrades and for analysis of alternatives for expansion of the system is not evident. The Stoner model has been a standard tool for examining gas flow problems in operational practice at PSE and should be considered in the planning work as well.

UPLAN-G remains the primary analytical model for the gas plan. While a well-known tool, UPLAN-G's optimization methods are not transparent. Other techniques are used in addition to UPLAN-G, but none seem to be stochastic models. Since random phenomena are important in the gas business, at least some level of modeling variability should be undertaken.

The electricity plan fundamentally uses an econometric methodology to forecast residential and commercial loads with some elements of judgement for industrial loads. While this approach is reasonable, variables other than temperature might explain peak growth and variation. PSE should consider enhancements to the econometric models. For example, recent adjustments to the peak forecasting method may change future load forecasts. PSE should also consider updating class load shapes using data from PSE's automated meter reading system. In addition, simulation methods could model the risk of variations in the load forecast. (Current computer models should be able to handle any increase in computational burden.) Finally, the Company should continue its standard operating procedure of annually examining the model database and structural equations.

The electricity plan examines the usual and expected supply resources: simple cycle and combined cycle gas turbines, base load coal steam turbine plants, and wind plants. Geothermal, photovoltaic, and biomass resources were screened out early in the analysis. The plan did not review new coal technologies that promise to capture by-products of combustion. Even though many of these technologies are at a prototype stage, early information from national energy laboratories and EPRI is available. The plan also did not consider reciprocating engines that may be useful in some distributed generation applications.

The discussion of wind systems is well developed. The Company researched the potential for wind energy both near the service area and in more remote locations. The advantage of wind technology is in avoiding the volatile price and the delivery constraints gas fuel. The negative side of the technology is installed cost (before any subsidies) and its value as a source of firm power. PacifiCorp's plan (and Avista's) debates this "capacity value problem." Absent data to the contrary, the intuitive view is that short-term wind currents are unpredictable and, therefore, cannot be relied on to serve peak demand. Hourly reliability studies are needed to better understand the value wind can add to meeting peak demand, be it an hour, day or season. Such studies can also aid in a general assessment of system adequacy.

Treatment of environmental externalities is descriptive and is focussed on possible future customer and investor cost increases driven by regulatory mandates. The Company's use of a scenario stress test and a "tipping point" approach satisfies its responsibility to consider the matter. However, while inclusion of externalities is not required by law, the discussion could be fuller. There are many ways to estimate the legal and actual costs of, for example, carbon dioxide, and there are many ways to model the effects as well. PSE should monitor the scientific and economic literature in an effort to expand and improve this part of the analysis.

The discussion of conservation is limited to the programs and results of existing work. This is true for both electric and gas reports. The description of these programs is a requirement for a good report just as a description of more traditional supply resources. In our letter following the 1999 LCP, we requested that the Company update its assessment of technically achievable and cost-effective demand-side management (DSM) options. Due to a lack of time the Company elected to report on this assessment and electric and gas conservation supply curves in the update it submitted on August 31, 2003. This extra time allowed the Company to utilize data from the Regional Technical Forum (RTF) as well as from other consultants. Although there has not been adequate time to thoroughly review the August update to the LCP, we recognize that the new conservation supply curves and their integration in the portfolio model are a significant improvement over past plans.

The last letter to Puget requested a reconsideration of fuel switching. As the RTF and others have pointed out, moving customer loads from electricity to natural gas can have a positive effect on energy requirements, especially peak-season heating-driven loads. Puget has essentially committed to a pilot study of fuel switching in this plan. While this certainly qualifies as a "reconsideration," PSE has already done empirical work on fuel switching in a 1999 conservation proposal. That effort showed that the potential benefits are circuit-specific.

Future Plans

Modeling: The Company should refine its modeling techniques using information quarried from journals of economics, operations research, and optimization as well as the software market. A better set of software tools may emerge to aid the industry in dealing with increasing price and market risk. In particular, we encourage exploration of a system built upon a foundation of mathematical programming instead of human judgement and simulation alone. PSE should also continue to invest in the human capital necessary to successfully carry out its planning effort.

We anticipate further research and thought in the area of decision-making. The balance of risk between ratepayer and investor clearly affects the resource strategy the Company favors. It also is implicit in the modeling assumptions used. Thus, a continued emphasis is needed on the assessment and balancing of risk throughout managerial decision-making.

We want greater transparency in the underlying data, assumptions, and mechanisms modeled in the forecast of natural gas prices at the major Northwest delivery points. If current consultants cannot provide details on the construction of its forecast, then other consultants should be selected.

Electricity: Although PSE annually updates and frequently reviews its demand forecast, the synthetic assumptions regarding component load shapes is a shortcoming. Some empirical work on component load shapes could make a significant improvement. PSE should explicitly consider some additional load research and end-use modeling.

Gas and electric plans both strongly depend on the forecast of natural gas prices. Better price forecasts would improve both. Price forecasts should be transparent to the reader and should provide sufficient detail to reveal assumptions and methodology. The presentation or accompanying technical appendices should include macroeconomic assumptions, the effects of likely gas pipeline operations, the differences in gas demand in regions of the US, and the process of exploration, development and operations of gas wells. The plan should explicitly describe any underlying models and statistical format. These would include, among others, R-squared, t-statistic, D-W statistic.

The supply alternatives considered cover the major fuel types. However, a longer list of resources would be preferable. The Company should consider specific current technologies at their offered prices, more generic alternatives, and new technologies reasonably close to commercialization. Of course, the option of purchasing new contracts to replace those that expire should be included in the supply alternatives.

The research on wind power is very helpful. Additional work should concentrate on reliability issues to determine what extra capacity reserve is needed for adequate system reliability. In this matter, we encourage cooperation with other electric utilities and regional bodies.

Natural Gas: The gas planning model used by PSE is respected in the field. However, the model appears to have limited ability to assess and model risk. PSE should carefully consider whether these capabilities can be added to the current model or if a search for new tools should be made.

A gas design day is a "stress case" which represents an extreme for which planned Company operations will be adequate. In past plans, the Company used a 1-in-50-year standard of extreme weather events, a 55 heating-degree-day observed in 1949-1950. This plan used a 51 heating-degree-day as design day, a 1-in-20-year standard of protection. This change will make PSE's current system capacity, built for 1-in-50-year standard, adequate for a longer period of time. It will also allow more capacity to be available for capacity release activity.

Although the change does not seem great in magnitude, the plan was silent as to the effect of this change. The Company has said that the 1-in-20-year is closer to

the industry standard. Nevertheless, a study of the benefits and costs of the change, including an assessment for the likelihood of re-light events is needed. PSE should analyze and defend the new gas design day standard in its next plan. For guidance, PSE may want to revisit work done in the TAC meetings surrounding the 1995 Washington Natural Gas Least Cost Plan.

The Company should explore opportunities for obtaining gas supply contracts at fixed prices for duration's of a decade or more. This exploration should be in collaboration with other LDCs in Washington State and the region.

The area of distribution planning should have contained discussion of the Everett-Delta project as well as the Whidbey LNG facility as examples of detailed specific events for discussion.

Conservation: The Company expanded its consideration of conservation alternatives in its August 31 filing. As PSE expands its conservation efforts, we urge the Company to supplement information from the NWPPC database with data and expertise from other organizations and consultants.

Conclusion

The information gathered through the Least Cost Planning process supports but does not control resource supply decisions (including conservation programs). These programs are themselves subject to review for prudence at the time of general rate cases. Decisions made using the analysis in these plans must be judged on the best data and method available to the decision makers at the time of decision, not at the time the plans were written. Therefore, the Commission emphasizes that its finding that this Plan complies with current regulatory requirements does not pre-approve for ratemaking any expenditures for resources or actions identified in the Plan. The Commission will consider the information, analysis, and strategies contained in the plan along with other pertinent information during any evaluation of PSE's services and rates.