

CHAPTER I. EXECUTIVE SUMMARY

A. Introduction

This report is an update to the Least Cost Plan that Puget Sound Energy (PSE) issued on April 30, 2003. The April 2003 Least Cost Plan examined PSE's energy resource needs during 2004-2023, addressed key issues that influence resource-planning decisions, and used a new analytical framework to evaluate resource-adequacy standards and develop the Company's long-term energy resource strategy. The electric resource strategy set forth in the April 30 Least Cost Plan identifies a diverse mix of new resources to meet the future needs of PSE's retail customers, including renewable resources, conservation resources and thermal generating resources.

The April 2003 Least Cost Plan included a proxy assumption that PSE would acquire 15 average megawatts (aMW) per year of new electric conservation resources, resulting in a total of 150 aMW of planned new conservation over the next 10 years. This Least Cost Plan Update report provides the results of an in-depth assessment of available conservation resources, along with a fully integrated load resource portfolio analysis that evaluates conservation and supply-side resources on a side-by-side basis. Certain other key assumptions, including projections of customer loads and market prices for natural gas and power, have also been updated and included in the load resource portfolio analysis. As a result of this analysis, PSE has revised its electric resource strategy, including both the amounts and mix of planned new conservation and generation resources.

PSE has continued to work with Washington Utilities and Transportation Commission staff and consult with various stakeholders throughout the process the Company has followed in preparing this Least Cost Plan Update. The Company has held several joint meetings of the Least Cost Plan Advisory Group and the Conservation Resource Advisory Group. In addition, various informal meetings and communications have taken place. As was the case during development of the April 2003 Least Cost Plan, these interactions have continued to provide extremely useful information, ideas, and perspectives for the August 2003 Least Cost Plan Update, making PSE's integrated resource-planning process more effective and its results more useful.

B. Scope and Emphasis for this Update

While amounts and mixes of electric supply-side resource technologies were determined as the result of integrated load resource portfolio analyses for the April 2003 Least Cost Plan, the 15 aMW-per-year amount of electric conservation shown at that time was an assumed decrement to load, rather than an analytically derived result. This assumption was noted in the April 2003 Least Cost Plan report, along with a commitment by PSE to prepare a Least Cost Plan Update by August 31, 2003, to provide a more complete and integrated analysis of conservation resources.

Accordingly, a primary purpose for this Least Cost Plan Update is to provide the results of a detailed assessment of the long-term conservation resource potential available to PSE and an updated electric load resource portfolio analysis that incorporates the results of the conservation resource assessment. For this Least Cost Plan Update, PSE has applied a fully integrated, analytical approach to its electric load resource portfolio analysis that treats conservation resources and supply-side resources on a comparable basis and that has resulted in an updated resource strategy.

PSE is using the results of its conservation resource assessment and the results of the load resource portfolio analysis (i.e., the amounts of conservation identified in the updated resource strategy) as key inputs to its conservation program planning for implementation of specific conservation acquisition efforts during 2004 and 2005. As such, this Least Cost Plan Update provides strategic direction for PSE's conservation program planning, but does not commit the Company to acquiring specific conservation measures or specific amounts of such measures. Similar to supply-side resource acquisitions that are based on specific opportunities and near-term considerations, specific determinations about actual conservation acquisitions are made in PSE's conservation program planning process.

In addition to the conservation resource assessment, several other revisions have been made for this Least Cost Plan Update. Some of the changes are to key analytical inputs such as long-term forecasts of market prices for natural gas and power. Other changes include revisions to the electric load forecast and updated assumptions about certain existing electric resources in PSE's portfolio.

Relationship of this Update to the April 30 Least Cost Plan

It should be noted that much of the information and analysis presented in the April 2003 Least Cost Plan remains unchanged. This August 2003 Least Cost Plan Update report is not intended to be comprehensive or to entirely supersede the April 2003 Least Cost Plan report. Rather, this Update focuses on development of new information about conservation resources and use of the conservation resource assessment in a fully integrated load resource portfolio analysis that updates the Company's long-term resource strategy.

This Least Cost Plan Update is not intended to address all the items identified in the Two-Year Action Plan provided in the April 30 Least Cost Plan.

C. Highlights and Key Findings

This section provides highlights and key findings that are provided in this Least Cost Plan Update. Summary information is provided, along with references to chapters that provide greater detail.

Electric Load Forecasts

PSE has prepared an interim update to its electric energy sales and peak forecasts for use in this Least Cost Plan Update. A detailed description of this update is provided in Chapter III.

The updated electric sales forecast used for this Least Cost Plan Update shows a 1.6 percent annual average rate of growth (before conservation). This compares to the electric sales forecast used for the April 30 Least Cost Plan, which also showed a 1.6 percent annual average rate of growth (before conservation). The updated forecast grows from 2,232 average megawatts (aMW) in 2004 to 2,957 aMW in 2022. These results are slightly lower than the 2,257 aMW amount in 2004 and 3,030 aMW amount in 2022 shown in the April 30 Least Cost Plan.

PSE has also updated its electric peak-load forecast. The new peak-load forecast has been prepared with a re-estimated equation using an expanded estimation period. As a result, the expected peak-load forecast (at 23 degrees Fahrenheit and without conservation) for 2004 is now 4,508 megawatts (MW), compared to the April 30 Least Cost Plan forecast for 2004 of 4,874 MW. Similarly, the new peak-load forecast (at 23 degrees) for 2022 is 5,948 MW, compared to the forecast for the April 30 Least Cost Plan of 6,535 MW. At 16 degrees

Fahrenheit and without conservation, the peak load forecast for this Least Cost Plan Update has been revised to 4,720 MW for 2004 and 6,228 MW for 2022.

Natural Gas Load Forecasts

The analysis for this Least Cost Plan uses the same natural gas-sales and -peak forecasts that were used for the April 30 Least Cost Plan. PSE is in the process of updating these forecasts. While the updates have not been completed, PSE expects the new results for the natural gas-sales forecast to be lower than were used in the April 30 Least Cost Plan.

Other Forecast Updates

PSE's long-term base-case forecast of market prices for wholesale natural gas supply has been revised. The new gas-price forecast is higher than the forecast used for the April 30 Least Cost Plan. PSE's long-term base-case forecast of market prices for wholesale power has also been revised to reflect the new gas-price forecast and updates to other assumptions. The new gas- and power-price forecasts and the underlying assumptions are described in Chapter III.

Revised Need for New Electric Resources

For this Least Cost Plan Update, PSE is continuing to use the "B2" electric resource adequacy standard that was established in the April 30 Least Cost Plan. However, as a result of the electric load forecast revisions and changes to assumptions about existing resources described above, PSE's need for new electric capacity resources, at the B2 Standard, has been revised. The revised need for energy resources has not changed significantly, except that it has decreased by 188 aMW for 2007 and remains somewhat lower through 2011. In addition, the need for new peak-capacity resources has decreased significantly throughout the 20-year planning period, including a 447 MW reduction for 2004: from a 1,403 MW need shown in the April 30 Least Cost Plan to a 956 MW need in 2004 in this Least Cost Plan Update. One major reason for the lower need for peak-capacity resources is a reduction in the peak-load forecast. See Chapter V for details, including a comparison of the need for new electric energy and peak-capacity resources as identified in the Least Cost Plan Update and in the April 30 Least Cost Plan.

Electric Conservation Potential

Detailed analysis of the long-term electric conservation resource potential in PSE's service area has resulted in identification of a total of 1,016 aMW of cumulative conservation *technical*

potential. Out of this total of technical potential, there is an estimated *achievable* potential of 328 aMW of cumulative electric savings. 266 aMW of the cumulative achievable electric savings is for existing vintage and the remaining 62 aMW is for new construction expected to occur during the 20-year planning period. See Chapter IV and Appendix A for details on the assessment of electric conservation potential.

Natural Gas Conservation Potential

Detailed analysis of the long-term natural gas conservation resource potential in PSE's service area has resulted in identification of a total of 45,708,939 decatherms of 20th year cumulative conservation technical potential. Out of this total, there is an estimated *achievable* potential of 10,788,029 decatherms of cumulative natural gas savings. 7,676,052 decatherms of the cumulative achievable potential is existing vintage and the remaining 3,111,977 decatherms is for new construction expected to occur during the 20-year planning period. See Chapter IV and Appendix A for details on the assessment of natural gas conservation potential.

Results of Integrated Electric Resource Portfolio Analysis

PSE used its portfolio-screening model to evaluate two scenarios for acquiring new electric conservation resources. The first scenario would acquire conservation at a constant rate over all 20 years of the planning horizon (the "Constant Rate of Acquisition Case"). The second scenario PSE evaluated would accelerate acquisition of conservation resources during the first part of the planning horizon (the "Accelerated Lighting Case"). For each scenario, the portfolio analysis identified how much of the total 328 aMW of achievable electric conservation potential would be cost-effective within PSE's overall electric resource portfolio, including new conservation resources and new generation resources.

The results of the integrated portfolio modeling for the Constant Rate of Acquisition Case indicate that a cumulative amount of 276.84 aMW of conservation would be cost-effective over the 20-year period from 2004 through 2023. This translates to acquisition of 13.84 aMW of new electric conservation during each of the 20 years.

The results of the integrated portfolio modeling for the Accelerated Lighting Case indicate that a cumulative amount of 273.33 aMW of conservation would be cost-effective over the 20-year period from 2004 through 2023. This includes 15.34 aMW during 2004, increasing to

22.02 aMW per year during 2007-2013, and decreasing to 5.32 aMW per year during 2016 through 2023.

Details on the integrated modeling analysis of PSE's electric resource portfolio are provided in Chapter VII.

Conservation Implementation Issues

PSE has identified several conservation implementation issues for acquiring new conservation resources. Some of these issues are not easily addressed by integrated resource portfolio-modeling analysis. Examples of such issues include uncertainties regarding consumer acceptance and ability to participate in utility-sponsored conservation programs, and practical considerations involved in aggressively ramping conservation-acquisition efforts up and down. These conservation-implementation considerations need to be considered when selecting PSE's long-term resource strategy as part of this Least Cost Plan Update. They also need to be considered in greater depth in PSE's near-term conservation program planning. Chapter VIII provides a more complete discussion of conservation-implementation issues.

Updated Electric Resource Strategy

For this Least Cost Plan Update, PSE has adopted an integrated electric resource strategy that includes the following major components:

1. Establishment of a long-term goal to acquire conservation at levels consistent with the Accelerated Lighting Case, including a total of 203 aMW of savings during 2004-2013, and a total of 273 aMW of savings over the entire 2004-2023 planning period.
2. Affirmation of PSE's goal, established in the April 30 Least Cost Plan, to acquire renewable resources to meet 10 percent of annual customer energy loads by 2013.
3. A diversified mix of thermal generation resources to meet the remaining need for new electric resources. These resources include combined-cycle gas-fired combustion turbine (CCGT) generation, single-cycle gas-fired combustion turbine (SCGT) generation, and coal-fired generation. Natural gas-fired resources meet a larger proportion of the overall need, particularly during the earlier part of the planning horizon. Starting later in the first half of the 20-year resource-planning horizon, coal-fired generation is also added to meet a portion of the need.
4. New resources, including gas-fired generation, are "shaped" seasonally as needed to reduce the costs related to holding surplus resource capability during summer periods.

PSE's updated electric resource strategy, including new conservation and renewable resources, offers significant environmental benefits. These environmental benefits include reduced air emissions compared to an approach that does not include conservation and renewable resources.

Chapter IX provides further details on PSE's updated electric resource strategy and environmental considerations associated with the updated strategy.

Winter Peak-Shaving Demand Response

For the April 30 Least Cost Plan, PSE's resource portfolio analysis assumed that new SCGTs would be added to provide additional capacity to meet peak loads on winter days when the minimum-hour temperature at Sea-Tac Airport is as low as 16 degrees Fahrenheit. However, it was also noted in the April 30 Least Cost Plan that other, less costly forms of peak-capacity resources may be available.

For this Least Cost Plan Update, PSE has conducted a preliminary analysis of one possible application of customer demand response as a potential resource to help meet a portion of PSE's need for electric peak-capacity resources during cold winter temperatures. Initial results of this analysis indicate that there may be enough potential for demand response among PSE's electric customers to reduce PSE's overall electric peak loads by several hundred MW during cold winter weather events. It is important to note that demand response programs can provide a number of benefits that are not addressed in this analysis, which focuses only on one possible form of demand response.

PSE has also performed an analysis using its portfolio screening model to estimate the resource portfolio costs that may be avoided if the utility can rely on peak demand response (rather than SCGTs) to meet the increase in winter peak loads that would occur between a 23-degree day and a 16-degree day (i.e., a difference of roughly 200 MW). The results of this analysis indicate potential savings of between \$7 million and \$9 million per year. If a peak load-clipping program can be implemented at lower annual costs than these, such a program would be more cost-effective than relying on SCGTs to meet peak-capacity needs.

Further details on PSE's analysis of opportunities and potential savings from winter peak-clipping demand response is provided in Chapter VI and Chapter VII.

Natural Gas Resource Portfolio Analysis and Updated Natural Gas Resource Strategy

In its April 2003 Least Cost Plan, PSE utilized an assumed level of approximately 2.1 million therms of new gas-conservation savings that would occur every year during the 20-year planning horizon. With an assumed average conservation measure life of 10 years, the annual decrement to system demand in the April 2003 Least Cost Plan grows to approximately 21 million therms by year 10 and remains at that level for the remaining years of the planning period. In this August 2003 LCP Update, PSE has modified this approach by reflecting the load shapes or “supply curves” and the corresponding costs of the gas-conservation resource options described in Chapter IV’s least-cost resource-planning analysis to determine the resulting impact on the total gas-portfolio cost. Chapter X describes the approach, assumptions, and methodology used in the gas-resource analysis in more detail.

Because PSE has sufficient capacity resources to satisfy its requirements for the next several years, the cost-effectiveness of conservation resources will be driven primarily by the market price of natural gas. For this August 2003 LCP Update, PSE analyzed multiple levels of conservation resources and modeled the resulting optimum level to determine whether higher or lower projected gas prices would measurably impact the amount of cost-effective conservation resources. The conservation resources also were evaluated under high and low levels of demand growth to assess both the impact on the amount of cost-effective gas-conservation resources and the timing of new supply-resource decisions.

The results of the gas-resource analysis identified an optimum level of cost-effective gas-conservation resources to be 3.06 million therms per year, growing to an impact 61.3 million therms in the 20th year, for a total of 64.4 MMDth over the 20-year planning horizon. PSE’s current gas-resource portfolio, including the optimum level of cost-effective conservation resources, has sufficient supply deliverability resources to meet the expected demand of its firm customers through 2009. Consistent with the conclusions reached in the April 2003 LCP, PSE faces no resource-acquisition decisions related to supply deliverability for several years. In the interim, PSE faces little risk as a consequence of accelerated growth.

Chapter X provides the results of PSE’s natural gas resource portfolio analysis and the updated natural gas resource strategy.