CHAPTER II. CONCEPTUAL OVERVIEW OF ELECTRIC RESOURCE ANALYSIS

A. Introduction

This chapter provides an overview of the approach that PSE has used to prepare the electric resource analysis and strategy development for the August 2003 Least Cost Plan Update. As noted in the Executive Summary, the primary emphasis for the August 2003 Least Cost Plan Update is to:

- Develop an assessment of the long-term conservation resource potential available to PSE;
- Use the results from the conservation resource assessment in an integrated load resource portfolio analysis; and
- Update PSE's long-term integrated resource strategy for both conservation and generation resources.

B. Review of A Traditional Approach

Before describing the approach that PSE has followed for this August 2003 Least Cost Plan Update, it is useful to review one of the common methods that electric utilities have traditionally used to incorporate conservation resources in their integrated resource plans. A more traditional approach to resource planning was typically conducted as follows:

1. Develop an estimate of the utility's avoided cost for new resources (e.g., based on the cost of power from a new generating resource or a forecast of wholesale market prices for energy supplies).
2. Determine what amount of conservation resources is available at costs up to the avoided cost and deem this the amount of "cost-effective" conservation to be acquired under the utility's long-term resource strategy.
3. Reduce or decrement the utility's load forecast by the amount of "cost-effective" conservation.
4. Plan generation resources to meet the remaining need as indicated by the conservation-decrement load forecast.

At a broad level, this approach is arguably an integrated resource planning methodology. Performing a second iteration through the four steps listed above can ensure further integration

and consistency if marginal costs from the fourth step of the first iteration are used to update the avoided costs in step one of the second iteration, and then to refine the determination of the amount of "cost-effective" conservation in step two of the second iteration.

However, the avoided-cost, load-decrement approach described above has several shortcomings. First, it does not address issues related to the seasonal "shape" of the utility's need for new resources. Second, the method described above does not fully recognize risks that may be created by dividing the analyses of conservation resources and generation resources into separate steps.

For example, if the utility's resource portfolio already has surplus energy resources during the summer and a shortage of energy resources in the winter, the approach described above could lead to a conclusion that the utility still should emphasize acquiring conservation resources that produce more energy savings during the summer rather than during the winter. In addition to pushing the utility's resource portfolio further out of seasonal balance, this strategy would create added volatility and risk as the utility becomes more exposed to fluctuations in market prices because of the increased surplus-power sales needed to dispose of the larger summer surpluses.

Therefore, for the August 2003 Least Cost Plan Update, PSE has implemented an alternative analytical approach that allows a more fully integrated analysis of conservation resources and generation resources on a direct, side-by-side basis within PSE's overall electric resource portfolio. Such an approach also provides a more effective means of addressing seasonal balancing needs and improved analysis of risks.

C. Approach for August 2003 Least Cost Plan Update

For the electric portion of the August 2003 Least Cost Plan Update, PSE has implemented an approach that includes two major analytical components. The first part of the analytical approach focuses on assessing conservation resources, and the second part focuses on integrated resource portfolio analysis.

Conservation Resource Assessment

The following four steps summarize how PSE has assessed its electric conservation resource potential, developed conservation supply curves, and created scenarios for conservation

acquisition. Further detail on implementation of the concepts described here is provided in Chapter IV.

1. Developed a detailed assessment of the amount of conservation resource potential that is available to PSE. This assessment first identified the amount of conservation that is technically available and then determined how much of the technical potential is actually achievable.
2. Aggregated the achievable potential for multiple conservation measures that have similar characteristics (e.g., comparable load-shape impacts for the energy savings) into 17 "bundles" of achievable conservation potential.
3. For each "bundle" of achievable conservation potential, created a conservation "supply curve" that identifies how much of the achievable conservation could be acquired at each of four specified cost levels, per unit of conservation. (At lower cost levels, a smaller amount of the achievable potential is available, and at higher cost levels a larger amount of the achievable potential becomes available.)
4. Created three scenario cases for the achievable conservation supply curves. The cases include a "constant rate of acquisition" case that assumes conservation is acquired in equal annual amounts during the 20 years of 2004-2023. In addition, two "accelerated acquisition" cases assume that a larger proportion of the total achievable conservation potential is acquired during the first half of the 20-year resource-planning horizon.

Integrated Resource Portfolio Analysis

The following four steps summarize the integrated resource portfolio analysis, using results of the conservation resource assessment to determine how much conservation is cost-effective as part of an overall resource strategy that includes both new conservation resources and new generation resources. Further details on implementation of the concepts described here are provided in Chapter VII.

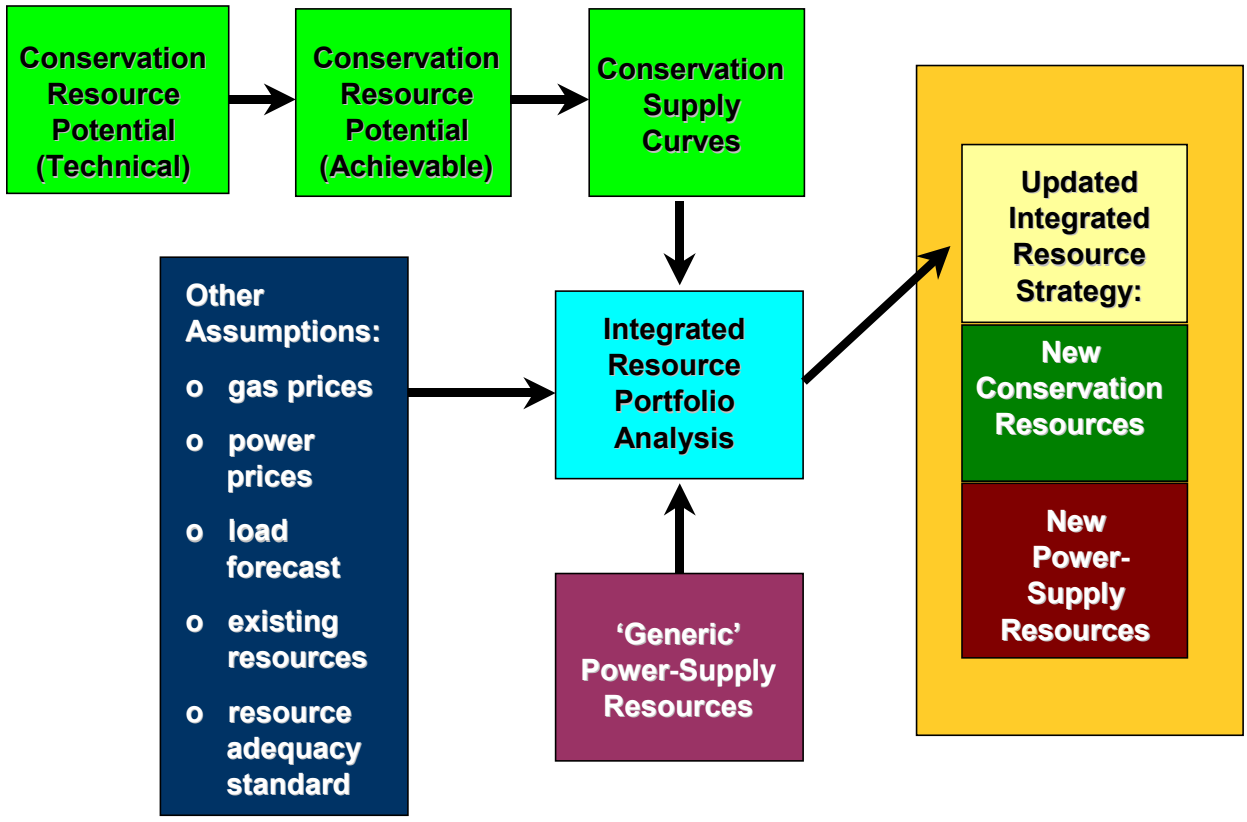
1. For the "constant rate of acquisition" case and one of the two "accelerated acquisition" cases, PSE created a number of alternative portfolios of resources, including portfolios that vary the amount of new conservation resources, using different combinations of cost-quantity points taken from the conservation "supply curves." Depending on the amount of conservation included in each portfolio, the remaining need for new resources was met with new generation resources. In other words, each portfolio includes a combined amount of

new conservation resources and new generation resources to meet the B2 standard for resource adequacy that was adopted in the April 2003 Least Cost Plan.

2. PSE used the portfolio screening model to analyze the large number of alternative portfolios of resources created in step 1, then tabulated the overall cost results for each portfolio.
3. Results from the screening model analyses of the various resource portfolios were compared to identify how the overall portfolio's costs change as increasing amounts (and varying combinations) of conservation are added to the portfolio. The analysis then identified which portfolios of new resources result in the lowest overall cost.
4. PSE updated its long-term resource strategy, including identification of amounts and types of conservation resources, as well as the corresponding amounts of new thermal generating resources that are needed to meet the remaining need for new resources.

The following flow chart illustrates major components in the analytical process.

Key Elements in the Process



D. Additional Assumptions

The construction of alternative portfolios of resources for analysis in the August 2003 Least Cost Plan Update was based on the following assumptions:

- PSE's need for new electric energy and capacity resources has been revised to reflect updated forecasts of energy loads and winter-peak loads, as well as changes to assumptions about existing generating resources in PSE's electric resource portfolio. (For additional details, see Chapters III and V)
- All portfolios include renewable resources (represented as wind power) sufficient to serve 10 percent of PSE's retail-customer electric energy loads by 2013, consistent with the April 2003 Least Cost Plan.
- As the amount of conservation resources is increased or decreased from one portfolio to the next, the amount of thermal resources included in the portfolio is adjusted in the opposite direction (i.e., so that each portfolio meets the B2 planning standard).
- A Total Resource Cost approach is used – i.e., total costs for conservation resources are used (rather than addressing how costs might ultimately be divided into a utility-funded portion and a participant-funded portion) – and readily quantifiable non-energy benefits are included.
- A 10 percent environmental benefit for conservation resources is included, along with recognition of savings for avoided transmission and distribution losses, and recognition of savings for deferred investment in new transmission and distribution facilities.

E. Result: Integrated Load Resource Portfolio Analysis

PSE has designed the analytical approach described above to produce a more dynamic, fully integrated and consistent load resource portfolio analysis. This approach enables PSE to objectively evaluate the costs and risks – from a comprehensive, integrated portfolio perspective – associated with a variety of portfolios having different amounts and types of conservation resources and generation resources. In turn, this analytical approach allows the results for each alternative portfolio of resources to be more directly compared with other portfolios. PSE believes this methodology is preferable to a traditional approach that relies on avoided-cost estimates to determine deemed amounts of "cost-effective" conservation that then become static decrements to load forecasts that feed into generation-only resource portfolio analyses.