CHAPTER VII. ELECTRIC PORTFOLIO ANALYSIS AND RESULTS

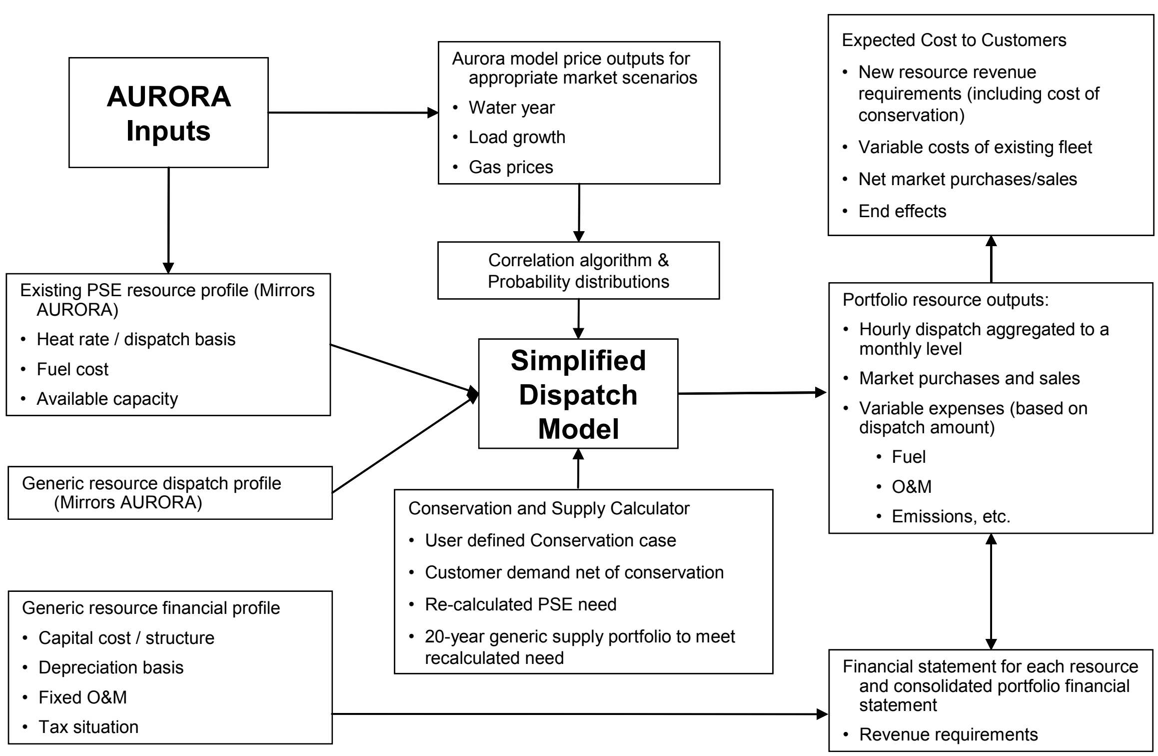
Historically, conservation has been dealt with as a “plug assumption” in the analysis of supply resources for least-cost planning purposes. PSE’s April 2003 Least Cost Plan utilized this approach. In this update, PSE has integrated conservation analysis with the supply resource analysis presented in the April 2003 LCP submittal. This chapter will detail the approach, assumptions, and methodology used in the updated analysis of PSE’s electric-supply portfolio and will finish with a summary of the results of the analysis. Appendix B provides additional details associated with the assumptions and the analysis logic.

A. Modeling Approach for Simultaneous Assessment of Conservation and Supply Resources

The integration of the conservation and electric-supply resource utilizes the Portfolio Screening Model from the April 2003 LCP as the analysis platform. Exhibit VII-1 provides an overview of how the conservation analysis is integrated into the Screening Model:

Exhibit VII-1

Conservation and Supply Resource Analysis Flow Chart



This section will detail the approach, assumptions, and methodology used in adapting the Portfolio Screening Model to the analysis of the optimum level of conservation. We will begin with a discussion of the key changes in the assumptions and methodologies used in this update as they differ from the April 2003 LCP. Next will be a description of the process used to develop supply portfolios based on the level of conservation. Finally is a discussion of the way in which the Screening Model treats the level of conservation assumed in particular cases, vis-à-vis supply resources, from both a dispatch and a financial perspective.

Modeling and Methodology Changes from April 2003 LCP

The power-price, gas-price, and load forecasts have been updated August 2003 LCP report. For a complete discussion of these new forecasts, please refer to Chapter III. Beyond these forecast updates, there have been several changes to input assumptions and modeling methodologies that warrant discussion. Exhibit VII-2 details some of the simple input assumption changes:

Exhibit VII-2

Input Assumption Changes from April 2003 LCP

Assumption	04/30/2003 LCP	08/31/2003 Update
CCGT Capital Cost ($/kW)	645	710
CCGT Fuel Basis Differential ($/MMBtu)	0.5	0.11
SCGT Fuel Basis Differential ($/MMBtu)	0.5	0.18
Accelerated Depreciation in 2004	30%	50%

The assumption for the capital cost of a CCGT has been updated based on contemporaneous analysis of the cost of greenfield development as well as experience in looking at acquisition opportunities. The fuel basis differential is the amount added to the commodity price of the fuel for non-commodity fuel related costs. The old value of $0.5/MMBtu was developed using existing PSE gas assets as a proxy. Analysis subsequent to the April 2003 LCP submittal revealed that the fixed gas-cost assumptions for CCGT and SCGT taken from the NPCC ($15.55 and $15.74/kW respectively) already included a portion of the costs counted in the $0.5/MMBtu fuel basis differential assumption. The new values are consistent with the NPPC assessment of the fixed and variable costs associated with natural gas for CCGT and SCGT resources. The change in 2004 accelerated depreciation reflects recent changes in the tax law.

This update of the April 2003 LCP also incorporates assumptions for heat-rate improvements over time for thermal resources. The heat-rate improvements phase in through 2015 and are constant after that. Exhibit VII-3 details these new assumptions:

Exhibit VII-3

Heat Rate Efficiency Improvements (Source: EIA 2003 Energy Outlook)

Year	CCGT	SCGT	Coal
2004	6,856	10,817	8,922
2005	6,783	10,756	8,883
2006	6,711	10,695	8,845
2007	6,639	10,633	8,806
2008	6,567	10,572	8,767
2009	6,494	10,511	8,728
2010	6,422	10,450	8,689
2011	6,408	10,450	8,671
2012	6,393	10,450	8,653
2013	6,379	10,450	8,636
2014	6,364	10,450	8,618
2015	6,350	10,450	8,600

The definition of Shaped CCGT ("Joint Ownership" in the April 2003 LCP) Resources has changed since the report's submittal. Because of the changes made to the need determination (see Chapter III for a detailed discussion), May is now a deficit month. Shaped CCGT resources will therefore reflect a split of nine months (September – May) where PSE would control the resource and three months (June – August) were it would be controlled by a third party through equity ownership. The split of the capital and fixed costs for Shaped CCGT resources has been modified accordingly.

The rate-base calculation used in the determination of the revenue requirement for new generic resources has also been changed. The calculations represented in the April 2003 LCP were as follows:

Rate Base = Utility Plant in Service – Accum. Depreciation – Accum. Deferred Taxes

The accumulated depreciation assumption used in the April 2003 LCP was for year-end. This has been changed to mid-year accumulated depreciation.

Finally, improvements have been made in the analysis methodology. First, the portfolio of generic supply resources had a 10-year horizon in the April 2003 LCP. The generic supply resource portfolios have a 20-year horizon in this update. The methodology for portfolio construction has also changed but will be discussed in the next section. Next, the "load-spreading" methodology has been changed to more accurately reflect the underlying hourly PSE load used in AURORA to generate the price curves. In the April 2003 LCP, the monthly load for the 20-year evaluation period was spread to hourly load using a 2004 base-year load shape. The hourly adjustment factors associated with the 2004 base-year load shape were then adjusted for the specific day on which January 1st fell in all subsequent years. This methodology maintained the correct sequence of days, but introduced small (much less than 1% on an annual basis) differences when compared to the 20-year hourly load in AURORA. In this update, the load was spread across the load shape produced by AURORA for each of the 20 years in the analysis period, not simply the 2004 base year. Finally, the "hydro-spreading" methodology was modified in a similar fashion as the load spreading. The change in the development of these hourly representations (load and hydro) produces results that exactly mirror the representations used in AURORA to generate the hourly price forecast.

Supply Portfolio Construction

The supply resource portfolios analyzed in the April 2003 LCP generally were developed "by hand" by adding 25-MW blocks of various resource technologies in amounts necessary to meet the need defined by the various planning standards considered in the analysis. This was the preferred method given that even with the range of technology mixes and portfolio standards assessed, the total number of portfolios assessed in detail was less than 100. For reasons that will be detailed later, the number of conservation scenarios, and associated unique supply portfolios vastly exceeds the capacity of the previous methodology for developing the supply resource portfolios. Practically speaking, literally thousands of conservation scenarios have been analyzed in this update, many of which have only subtle differences in aMW of conservation. In order to address the volume of cases, the supply portfolio construction has been automated and integrated into the Portfolio Screening Model. To address the issue of subtle differences in aMW of conservation between conservation scenarios, the supply resource portfolios are developed to exactly meet the need remaining after the level of conservation in a particular case is taken into account. The following rules are applied in the automated supply resource portfolio construction:

- 10% of PSE's demand will be met with renewable resources by 2013 and maintained thereafter (goal from the April 2003 LCP). The wind resources are added in a staggered fashion beginning in 2005.
- If there is no need greater than 50 MW in the months of June through August and there is need in the other months, then need from the remaining months will be met with Shaped CCGT MW.
- When need arises in the summer months, it will be met with a mix of thermal resources (50% CCGT, and 50% coal).
- Whenever a CCGT resource is added (either full or Shaped CCGT), an additional 13.5% of the CCGT capacity is added in the form of duct firing
- Portfolios will be developed to meet the B2 planning standard; energy is added to meet the highest deficit month and capacity is added to meet the 16-degree-day standard at Sea-Tac.
- SCGT capacity is sold forward from May thru October.

Several steps are involved in accounting for the level of conservation in a particular conservation scenario and in developing the associated supply portfolios. A conservation scenario is defined by including any combination of the 65 bundle/price points. As detailed in Chapter IV, there are 17 bundles: 8 residential, 8 commercial, and one industrial. Generally, there are four price points associated with each of the 8 residential and commercial bundles, with the exception of 12, and only one price point associated with the industrial bundle, totaling 53 unique bundle/price point combinations. The number of potential conservation scenarios is, therefore, practically infinite. This is the source of the scenario-volume issue discussed earlier in this section, and while exhaustive enumeration is clearly impossible, many more scenarios than were considered in the April 2003 LCP will be necessary to explore the optimal level of conservation.

Once a conservation scenario is defined, the 20-year annual MWhs associated with the selected bundle/price points are rolled up to the bundle level and grossed up for 6.5 % line losses. These rolled up annual MWhs are then spread across the appropriate hourly load shape for each particular bundle. The hourly load shapes are for a 2004 base year. The 20-year hourly impact based on the 2004 base year of each bundle is then totaled to form the 20-year total conservation impact. The last step in developing the 20-year total hourly conservation impact is to adjust each year for the specific day of the week on which January 1 falls.

The 20-year hourly total conservation impact is then subtracted from the PSE 20-year hourly total demand forecast. This net-of-conservation demand forecast is then rolled up to a monthly aMW level and is used to recalculate PSE's 20-year energy need on a monthly basis. This monthly need is the basis upon which the supply resource portfolios are constructed. The capacity need is adjusted for the conservation scenario by taking the average of the maximum hour of conservation in the months of December through February and netting it from the no-conservation peak-demand forecast.

Conservation Treatment in the Screening Model Dispatch

Once the supply resource portfolio is constructed, the Screening Model automatically assigns it for use as the dispatch case. In a similar fashion to how the no-conservation total demand is adjusted to facilitate the construction of the supply resource portfolios, the 20-year total conservation impact is subtracted from the net demand (total demand minus current PSE PPAs) in the Screening Model. This is equivalent to treating conservation like any of the other must-run resources (e.g., non-dispatchable portions of the NUGs, hydro resources, and wind resources) in the Screening Model. Regardless of cost, the conservation is "dispatched" simply because it has been included in the conservation scenario. The financial impact of the dispatch of the existing PSE fleet and the portfolio of new supply resources against the AURORA market-price forecast is the same as it was in the April 2003 LCP submittal, and is detailed in Appendix B.

Financial Treatment of Conservation

The financial impact of the conservation bundles/price points included in the conservation scenario is consolidated annually and flows directly to the revenue requirement in the expected cost-to-customer calculation, with no return component. For each bundle/price point, there is an associated cost and duration of the benefit. The cost is adjusted down by 10% to reflect the environmental benefit of conservation in lieu of fossil supply resources. The cost is spread or "amortized" over the duration of the benefit rather than "expensed" up front. If the duration of the benefit for a particular bundle/price point is less than 20 years, then there is an assumed 100% "re-up rate" for however many times are necessary to fill the 20-year evaluation period. Exhibit VII-4 details this series of calculations.

Exhibit VII-4

Conservation Cost Calculation Example

Bundle 12A	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
New MWh/Year	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237	15,237
Renewal MWh/Year	-	-	-	-	-	-	15,237	15,237	15,237	15,237	15,237	15,237	30,473	30,473	30,473	30,473	30,473	30,473	45,710	45,710
Cost ($/MWh)	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Duration (years)	6																			
Annual Cost ($1,000's)																				
2004	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	-	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-	-	-	-	-
2006	-	-	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	262	262	262	262	262	262	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	525	525	525	525	525	525	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787	787	787	787	-	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787	787	787	787	-
2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787	787	787	787
2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787	787	787
2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787	787
2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	787	787	787
2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,050	1,050
2023	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,050
Total	262	525	787	1,050	1,312	1,575	1,837	2,100	2,362	2,625	2,887	3,150	3,412	3,675	3,937	4,199	4,462	4,724	4,987	5,249

The example shown is for the Level A cost point of the Residential Existing Construction lighting bundle. The duration of the benefit is six years, the average cost is $17/MWh, and the incremental conservation realized per year is 15,237 MWh (this is for the Constant Rate of Acquisition Case). The total cost of the 2004 conservation in this example is $1,574,803 (six years x $17/MWh x 15,327 MWh/year). This total cost is amortized over the six-year duration of the bundle for an annual "accrued" cost of approximately $262,000. The total annual cost, therefore, increases by an equal amount each year reflecting the 100% "re-up" rate and the 0% escalation.

End effects are dealt with in a similar fashion as the end effects of supply resources. In the example shown in Exhibit VII-4, the end effects will take into consideration the residual amount of conservation that extends beyond year 20. Exhibit VII-5 shows the cost associated with the residual conservation from Exhibit VII-4.

Exhibit VII-5

Residual Conservation Cost from Exhibit VII-2 Example

Bundle 12A	2023	2024	2025	2026	2027	2028
New MWh/Year	15,237					
Renewal MWh/Year	45,710					
Cost ($/MWh)	17					
Duration (years)						
Annual Cost ($1,000's)						
2004	-	-	-	-	-	-
2005	-	-	-	-	-	-
2006	-	-	-	-	-	-
2007	-	-	-	-	-	-
2008	-	-	-	-	-	-
2009	-	-	-	-	-	-
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	-	-	-	-	-
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	-	-	-	-	-	-
2016	-	-	-	-	-	-
2017	-	-	-	-	-	-
2018	787	-	-	-	-	-
2019	787	787	-	-	-	-
2020	787	787	787	-	-	-
2021	787	787	787	787	-	-
2022	1,050	1,050	1,050	1,050	1,050	-
2023	1,050	1,050	1,050	1,050	1,050	1,050
Total	5,249	4,462	3,675	2,887	2,100	1,050

The market benefit of the residual conservation from year 2024-2050 is calculated by subtracting the total cost of conservation from the market value of the conserved MWhs. The market value of the conserved MWhs is calculated by taking the 2023 average market price generated by AURORA and escalating it by 2.5%. This generates a strip of average annual market prices on a per-MWh basis to apply to the annual residual MWh of conservation. This market value is discounted back to year 1 and raises or lowers the expected cost based on the attractiveness of the conservation scenario.

B. Analytical Results

The analytical results will be presented in three sections. First are details of the results of the Screening Model / conservation integration using the Constant Rate of Acquisition Case and Accelerated Lighting Case. Following is a discussion of the emissions impact of the optimal level of conservation in the Accelerated Lighting Case with the 10% renewable goal. Finally, the potential benefit of cold-weather-event peak clipping will be explored.

Screening Model / Conservation Analysis Results

The results of the Screening Model / conservation-integration analysis for the Constant Rate of Acquisition Case and Accelerated Lighting Case are presented in Exhibit VII-6:

Exhibit VII-6

Constant Rate of Acquisition Case and Accelerated Lighting Results

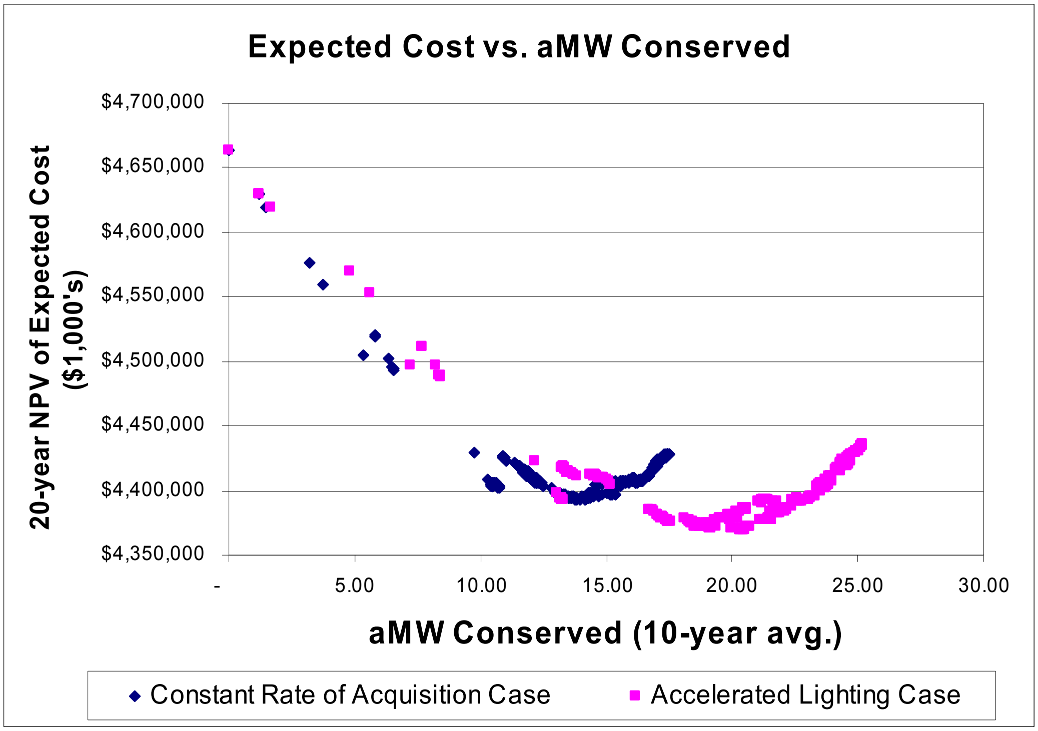


Exhibit VII-6 presents the full range of the results building up to the Achievable Potential. Clearly, there is an "optimal" conservation level from a least-cost perspective that occurs at a level somewhat less than the full Achievable Potential detailed in Chapter IV. In the Constant Rate of Acquisition Case, the minimum-cost scenario occurs at a conservation level of 13.84 aMW on a 10-year average basis. The minimum-cost scenario associated with the Accelerated Lighting Case is 20.35 aMW on a 10-year average basis. The 20-year incremental- and cumulative-conservation levels for both the Constant Rate of Acquisition Case and the Accelerated Lighting Case at the minimum-cost scenario are shown in Exhibit VII-7.

Exhibit VII-7

Incremental and Cumulative Conservation in Base and Accelerated Lighting Cases

Year	Accelerated Lighting Case			Constant Rate of Acquisition Case	
	Yearly	Cumulative		Yearly	Cumulative
2004	15.34	15.34		13.84	13.84
2005	16.17	31.51		13.84	27.68
2006	17.84	49.35		13.84	41.53
2007	22.02	71.37		13.84	55.37
2008	22.02	93.38		13.84	69.21
2009	22.02	115.40		13.84	83.05
2010	22.02	137.42		13.84	96.90
2011	22.02	159.43		13.84	110.74
2012	22.02	181.45		13.84	124.58
2013	22.02	203.47		13.84	138.42
2014	16.45	219.92		13.84	152.26
2015	10.88	230.80		13.84	166.11
2016	5.32	236.12		13.84	179.95
2017	5.32	241.43		13.84	193.79
2018	5.32	246.75		13.84	207.63
2019	5.32	252.07		13.84	221.48
2020	5.32	257.38		13.84	235.32
2021	5.32	262.70		13.84	249.16
2022	5.32	268.02		13.84	263.00
2023	5.32	273.33		13.84	276.84

Notice that the incremental conservation in the Accelerated Lighting Case phases in over the first three years of the evaluation period and has a similar phase-out after year 10 of the evaluation period (a more detailed discussion of this can be found in Chapter IV). It is also important to note that the total cumulative conservation in the Accelerated Lighting Case is slightly less than in the Constant Rate of Acquisition Case. This is due to the increased up-front administrative costs associated with the acceleration of the acquisition of lighting conservation.

While the minimum-cost conservation scenarios shown in Exhibit VII-6 are only an approximation of the "global optimum," it is very unlikely that there is a solution significantly different from the data presented. The minimum-cost conservation scenarios associated with the Constant Rate of Acquisition and Accelerated Lighting cases are shown in Exhibit VII-8 and Exhibit VII-9 respectively.

Exhibit VII-8

Minimum-Cost Conservation Scenario – Constant Rate of Acquisition Case

1=included, 0=not included	< $45/MWh	$45 - $60/MWh	$60 - $85/MWh	$85 - $110/MWh
Bundle	**Cost Level A**	**Cost Level B**	**Cost Level C**	**Cost Level D**
COM_EC_APPLIANCES	1	1	1	0
COM_EC_HVAC	1	1	1	0
COM_EC_LIGHTING	1	1	0	0
COM_EC_WATERHEAT	1	1	0	0
COM_NC_APPLIANCES	1	1	0	0
COM_NC_HVAC	1	1	0	0
COM_NC_LIGHTING	1	1	0	NA
COM_NC_WATERHEAT	1	1	0	0
IND_EC_GENERAL	1	NA	NA	NA
RES_EC_APPLIANCES	1	1	0	0
RES_EC_HVAC	1	1	0	0
RES_EC_LIGHTING	1	NA	NA	NA
RES_EC_WATERHEAT	1	NA	0	0
RES_NC_APPLIANCES	NA	1	0	0
RES_NC_HVAC	NA	1	1	NA
RES_NC_LIGHTING	1	NA	1	NA
RES_NC_WATERHEAT	NA	1	NA	0

COM: Commercial
IND: Industrial
RES: Residential
EC: Existing Construction
NC: New Construction
NA: No data

Exhibit VII-9

Minimum-Cost Conservation – Accelerated Lighting Case

1=included, 0=not included	< $45/MWh	$45 - $60/MWh	$60 - $85/MWh	$85 - $110/MWh
Bundle	**Cost Level A**	**Cost Level B**	**Cost Level C**	**Cost Level D**
COM_EC_APPLIANCES	1	1	1	0
COM_EC_HVAC	1	1	1	0
COM_EC_LIGHTING	1	1	1	0
COM_EC_WATERHEAT	1	1	0	0
COM_NC_APPLIANCES	1	1	0	0
COM_NC_HVAC	1	1	0	0
COM_NC_LIGHTING	1	1	0	NA
COM_NC_WATERHEAT	1	1	0	0
IND_EC_GENERAL	1	NA	NA	NA
RES_EC_APPLIANCES	1	1	0	0
RES_EC_HVAC	1	1	0	0
RES_EC_LIGHTING	1	NA	NA	NA
RES_EC_WATERHEAT	1	NA	0	0
RES_NC_APPLIANCES	NA	1	0	0
RES_NC_HVAC	NA	1	0	NA
RES_NC_LIGHTING	1	NA	1	NA
RES_NC_WATERHEAT	NA	1	NA	0

COM: Commercial
IND: Industrial
RES: Residential
EC: Existing Construction
NC: New Construction
NA: No data

Analysis of the curves presented in Exhibit VII-6 shows there are several conservation scenarios that are very close to the minimum scenario for both the Constant Rate of Acquisition and the Accelerated Lighting cases. Exhibit VII-10 shows some statistics associated with the top 50 scenarios analyzed from a minimum-cost perspective.

Exhibit VII-10

Summary of Top 50 Scenarios

Constant Rate of Acquisition Case	aMW	Expected Cost
Average Cost	14.04	$4,393,622
Minimum Cost	13.59	$4,392,483
Maximum Cost	14.34	$4,394,326
Accelerated Case	**aMW**	**Expected Cost**
Average Cost	19.95	$4,370,151
Minimum Cost	18.76	$4,369,018
Maximum Cost	20.52	$4,371,760

Notice the width of the range of aMW vs. the change in Expected Cost. There are several scenarios that are very close to each other in terms of cost. The distribution of bundle / price points included in these top 50 scenarios is shown in Exhibit VII-11.

Exhibit VII-11

Summary of Conservation in Top 50 Scenarios

	< $45/MWh	$45 - $60/MWh	$60 - $85/MWh	$85 - $110/MWh
Bundle	**Cost Level A**	**Cost Level B**	**Cost Level C**	**Cost Level D**
COM_EC_APPLIANCES	100%	100%	58%	0%
COM_EC_HVAC	100%	100%	72%	0%
COM_EC_LIGHTING	100%	100%	72%	0%
COM_EC_WATERHEAT	100%	100%	60%	0%
COM_NC_APPLIANCES	100%	100%	48%	0%
COM_NC_HVAC	100%	100%	36%	0%
COM_NC_LIGHTING	100%	100%	24%	NA
COM_NC_WATERHEAT	100%	100%	14%	0%
IND_EC_GENERAL	100%	NA	NA	NA
RES_EC_APPLIANCES	100%	100%	0%	0%
RES_EC_HVAC	100%	100%	0%	0%
RES_EC_LIGHTING	100%	NA	NA	NA
RES_EC_WATERHEAT	100%	NA	0%	0%
RES_NC_APPLIANCES	NA	100%	2%	0%
RES_NC_HVAC	NA	100%	16%	NA
RES_NC_LIGHTING	100%	NA	30%	NA
RES_NC_WATERHEAT	NA	100%	NA	0%

COM: Commercial
IND: Industrial
RES: Residential
EC: Existing Construction
NC: New Construction
NA: No data

The percentages shown in Exhibit VII-11 are indicative of the percentages of the 50 cases in which the bundle / price point is included. This table also is applicable to both the Constant Rate of Acquisition Case and the Accelerated Lighting Case. Clearly, measures that are less than $60/MWh are always included, but more importantly, several of the cost Level C bundles are included in a fraction of the cases as well. This should lend a greater degree of flexibility in program development.

The 20-year supply resource portfolios associated with the Constant Rate of Acquisition and Accelerated Lighting cases are shown in Exhibit VII-12 and 13.

Exhibit VII-12

Supply Portfolio Associated with Minimum-Cost Constant Rate of Acquisition Case

Year	Shaped CCGT	CCGT	Coal	Wind	SCGT	Duct Fired
2004	442	-	-	-	490	57
2005	-	-	-	150	12	-
2006	-	-	-	-	53	-
2007	-	-	-	200	66	-
2008	-	-	-	-	36	-
2009	105	-	-	200	343	14
2010	56	-	-	-	226	8
2011	87	-	-	200	109	12
2012	-	261	266	-	19	34
2013	-	71	73	150	73	9
2014	-	23	24	-	34	3
2015	-	17	17	25	48	2
2016	-	22	22	-	39	3
2017	-	49	50	25	-	6
2018	-	48	49	-	53	6
2019	-	19	19	30	50	2
2020	-	25	26	-	40	3
2021	-	19	19	35	59	2
2022	-	26	27	-	46	3
2023	-	23	24	35	56	3
Total	690	605	616	1,050	1,855	167

Exhibit VII-13

Supply Portfolio Associated with Minimum-Cost Accelerated Lighting Case

Year	Shaped CCGT	CCGT	Coal	Wind	SCGT	Duct Fired
2004	441	-	-	-	488	57
2005	-	-	-	150	9	-
2006	-	-	-	-	47	-
2007	-	-	-	200	53	-
2008	-	-	-	-	22	-
2009	65	-	-	200	329	9
2010	39	-	-	-	214	5
2011	85	-	-	200	106	11
2012	-	256	261	-	17	33
2013	-	67	68	150	68	9
2014	-	21	21	-	34	3
2015	-	18	18	25	51	2
2016	-	27	28	-	41	4
2017	-	54	55	25	-	7
2018	-	55	56	-	58	7
2019	-	24	25	30	53	3
2020	-	30	31	-	42	4
2021	-	24	25	35	61	3
2022	-	32	32	-	48	4
2023	-	27	28	35	61	4
Total	630	635	647	1,050	1,805	165

It is important to note that the differences between these two portfolios of supply resources are more differences of timing than of total amount. This is due simply to the fact that the total conservation at the end of the evaluation period is virtually the same in both the Constant Rate of Acquisition Case and the Accelerated Lighting Case. Supply resource additions therefore are really just deferred to the extent that the conservation is accelerated.

Emissions Impact of Conservation and Renewables Goal

The emission impact of the renewable goal laid out in the April 2003 LCP and that of the optimal conservation scenario in the Accelerated Lighting Case over a 20-year period is shown in Exhibit VII-14.

Exhibit VII-14

Emission Impact of Accelerated Conservation and Renewable Goal

20-Year Cumulative Emissions (Tons)	**CO2**	**NOX**	**SO2**
No Conservation / No Renewables	281,526,755	262,466	167,402
No Conservation / 10% Renewable Goal	252,156,204	253,224	157,658
Optimal Accel. Conservation / 10% Renewable Goal	229,451,371	248,098	153,160
Savings From 10% Renewable Goal	29,370,551	9,242	9,744
Savings from Optimal Accel. Conservation	22,704,833	5,126	4,498
Conservation and Renewable Goal Addition/(Reduction)	(52,075,384)	(14,368)	(14,242)
Percentage Addition/(Reduction)	-18.5%	-5.5%	-8.5%

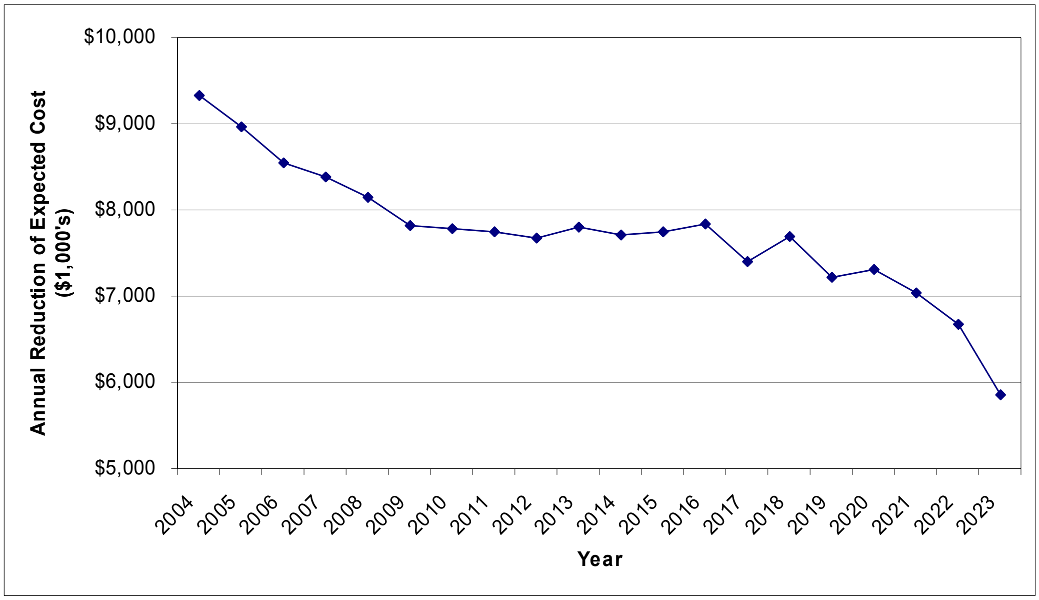
It is important to note that in the absence of conservation and/or renewables, PSE's need is compensated for with a mixed thermal strategy, as discussed in the portfolio-construction section of this Chapter.

Impact of Cold Weather Event Peak Clipping

In this LCP update, PSE has developed an analysis to assess the potential benefit of cold-weather-event peak-clipping programs. The analysis presented in this section represents only the benefit side of the equation in an attempt to give an indication of the bounds within which the cost of potential peak-clipping programs must fall. The approach used in this analysis was to compare the savings associated with building SCGT resources to meet the 23-degree capacity-planning standard and the 16-degree capacity-planning standard, implying that the peak-clipping programs would make up the difference. The optimal level of conservation in the Accelerated Lighting Case is assumed as well. Exhibit VII-15 shows the annual savings associated with the reduced SCGT resources in the 23-degree capacity-planning scenario.

Exhibit VII-15

Annual Expected Cost Potential Benefit



A summary of the 20-year NPV and SCGT capacity reduction is shown in Exhibit VII-16.

Exhibit VII-16

20-Year Expected Cost NPV and Capacity Reduction

($1,000's)	23 Degree Planning Standard	16 Degree Planning Standard	Delta (Potential Benefit)
20-Year Cumulative Installed SCGT (MW)	1,488	1,805	317
Gross Revenue Requirement	$3,982,133	$4,077,084	$94,951
Emissions - Fleet	$14,945	$14,945	$0
Variable Costs - Existing Fleet	$940,576	$940,576	$0
Revenue from Power Sales	($1,045,364)	($1,066,212)	($20,848)
Cost of Power Purchase	$391,910	$391,609	($302)
End Effects	($15,692)	$11,017	$26,709
Expected Cost	$4,268,508	$4,369,018	$100,510

On an annual basis, the potential savings range from around $7 million per year to more than $9 million per year, on a nominal basis. The reduction in SCGT capacity is 317 MW over 20 years, with 235 MW in the first year alone. On an NPV basis, including end effects, the potential benefit exceeds $100 million. This analysis provides an indication of the range within which peak-clipping programs would have to fall to be a least-cost alternative to SCGT resources in meeting the 16-degree capacity-planning standard.