4. Market Prices

A. Introduction.

Every market valuation of generation resources and every forecast of generation-related revenue requirement is significantly influenced by the underlying forecast of wholesale market prices. The commodity nature of the wholesale electric market anticipates that reasonable, well-informed parties will possess different market expectations. The challenge of this resource plan process is to find a path that best achieves the identified objectives irrespective of the exact level of market prices in the future. To help meet this challenge, PacifiCorp presents a range of valuation estimates and revenue requirement forecasts using three market price sensitivities.

B. Electric Forecast Prices.

Wholesale electric market prices and natural gas prices are currently at high levels relative to the recent past. Market theory supports the expectation that gas and electric prices may settle into a more typical level after several thousand megawatts of new generation and a significant amount of new gas production comes on line. After reaching a more balanced supply level, the fully embedded cost of new gas generation should set a cap on electric market prices. The Resource Plan is based on the assumption that the valuation occurs on January 1, 2003. Resource valuations are based on the gas price forecast and electric price forecasts after 2003.

Using its market clearing price model, PacifiCorp prepared two sets of plausible market price forecasts, named to reflect the relevant gas price assumption. At the behest of participants in the resource plan public process, PacifiCorp also included a third-party forecast developed by the Northwest Power Planning Council (NWPPC). See Exhibit 4-1 for a graphical comparison of these forecasts.

The major assumptions of the $2.00 Gas Case are:

- By 2004, natural gas prices decline to the $2.00/mmbtu (in $2000) full cycle cost which escalates at 2% nominally.
- Load growth in the Western Systems Coordinating Council averages 1.87% compounded annually, although it is higher in some faster growing areas like the Desert South West and Utah.
- Combined cycle plant capital costs are $545/kW (in $2000) and escalate at 1.6% nominally. The costs projections are consistent with expectations regarding GE's new "H technology" machines which are expected to come on line by 2004 and have heat rates of ~6,400 Btu/kWh high heating value.
- Technology improvements hold down capital costs and escalation.

The major assumptions of the $3.00 Gas Case are:

- Gas prices are tied to the forward gas markets as of May 2000.
- Gas prices do not decline as much as in the $2.00 gas case.
- Load growth rate is 0.25% higher than in the $2.00 gas case.
- Combined cycle costs are $570/kW, reflecting higher demand for gas generation.

The major assumptions of the NWPPC Base Case can be found in Appendix A, Data & Assumptions used for the Resource Development Forecast. The study name is Northwest Power Supply Adequacy/Reliability Study Phase 1 Report, Council Document 2000-4, March, 2000; http://www.nwppc.org/enrgissu.htm.

Exhibit 4-2 presents the $2.00 and $3.00 case gas price projections. Exhibit 4-3 provides a more complete comparison of the market clearing price model assumptions for the $2.00 and $3.00 cases.

C. Market Clearing Price Model.

PacifiCorp's market clearing price model is a dispatch model that essentially allows prices to reach a level where total operating costs and capital costs of new combined cycle gas generation can be recovered using a 6.7% real (9.7% nominal) weighted average cost of capital. The representation includes all WSCC loads, thermal and hydro generation and the interconnected transmission system. Loads and resources are divided up into twenty load centers that reflect where transmission constraints occur. The model optimizes use of all thermal and hydro generation and transmission to minimize market prices. Other features are described below:

- Solves three seasons – winter, summer, spring.
- Seven load points per season.
- Coal costs assigned to individual units.
- Median hydro representation.
- Pancaked transmission wheeling until RTOs commence, then $1.00/MWh cost to move between RTOs.

The model determines market clearing prices for each load center reflecting fuel prices, transmission capabilities and wheeling rates. The model determines a supply curve for each load center, including imports from adjacent load centers, and determines the unit on the margin for each of the twenty-one price points that it solves. Additionally, the model estimates the value of capacity determined by multiplying the maximum hourly price by factors that essentially determine reserve margin. During the summer peak, for example, the value of capacity is quite high. The capacity value is added to cost of the unit on the margin and provides the total market price.

Seven gas zones (Canada, PNW, COB, NP15, SP15, DSW and Rocky Mountains) define the delivered gas prices for each gas generator. For each gas zone, commodity prices from one of four producing basins or hubs – Sumas, Kingsgate, San Juan or Rocky Mountains – are combined with appropriate pipeline charges.

D. Forecast of Fuel Prices.

(1) Gas Prices.

Under market conditions where supply approximates demand, the projected life-cycle cost of gas-fired generation is widely considered to be the most influential factor in the development of long-term forecasts of electric wholesale market prices. This expectation is, in turn, reliant on forecasts of natural gas prices. In recognition of the need to consider the implications of the resource plan under a range of gas price forecasts, PacifiCorp's Resource Plan includes two internally generated gas price forecasts and one that is endorsed by the NWPPC.

The $2.00/mmbtu gas case is based on an assumption that current high gas prices are not sustainable and will decrease to full cycle costs by 2004. This case assumes increased drilling and exploration and a resulting increase in supply. Historically, high gas prices are followed by an over supply period and prices could potentially fall below full cycle costs. A $2.00/mmbtu full cycle cost (exploration, development, production, gathering and local pipeline costs to get to a major pipeline) is also indicative of a significant amount of potential gas production in Western Canada and the Rocky Mountains.

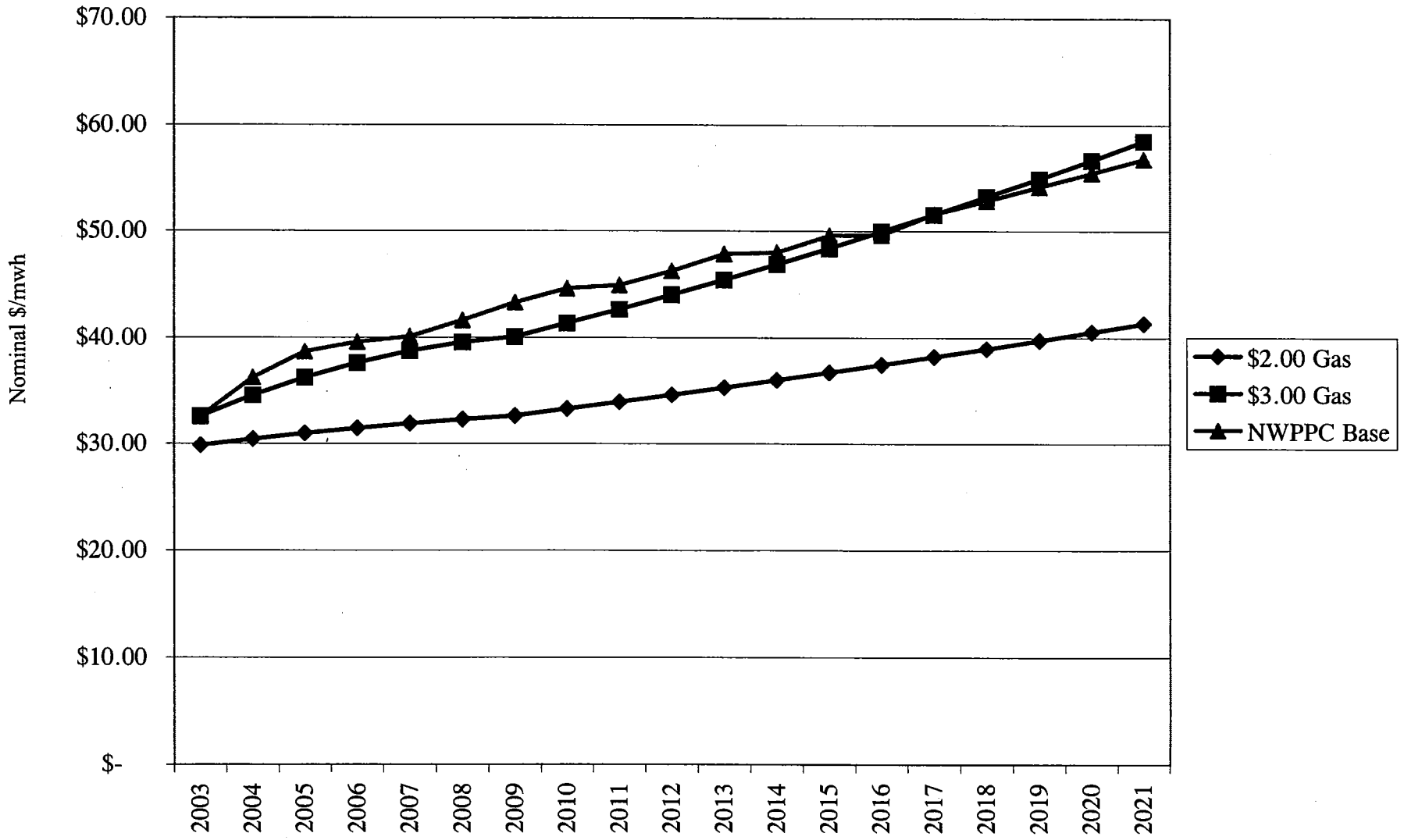
The $3.00/mmbtu gas case was based on a market "snapshot" of the forward gas markets in May of this year. This was compiled by contacting brokers to estimate a market price for natural gas over a three-year period. PacifiCorp escalated the results by approximately 3.2% annually.

The Company's understanding of the NWPPC's assumptions and methodology is based on publicly available information from the NWPPC's website. In the public process, the parties requesting use of this price forecast acknowledged that the Company would not be expected to defend it.

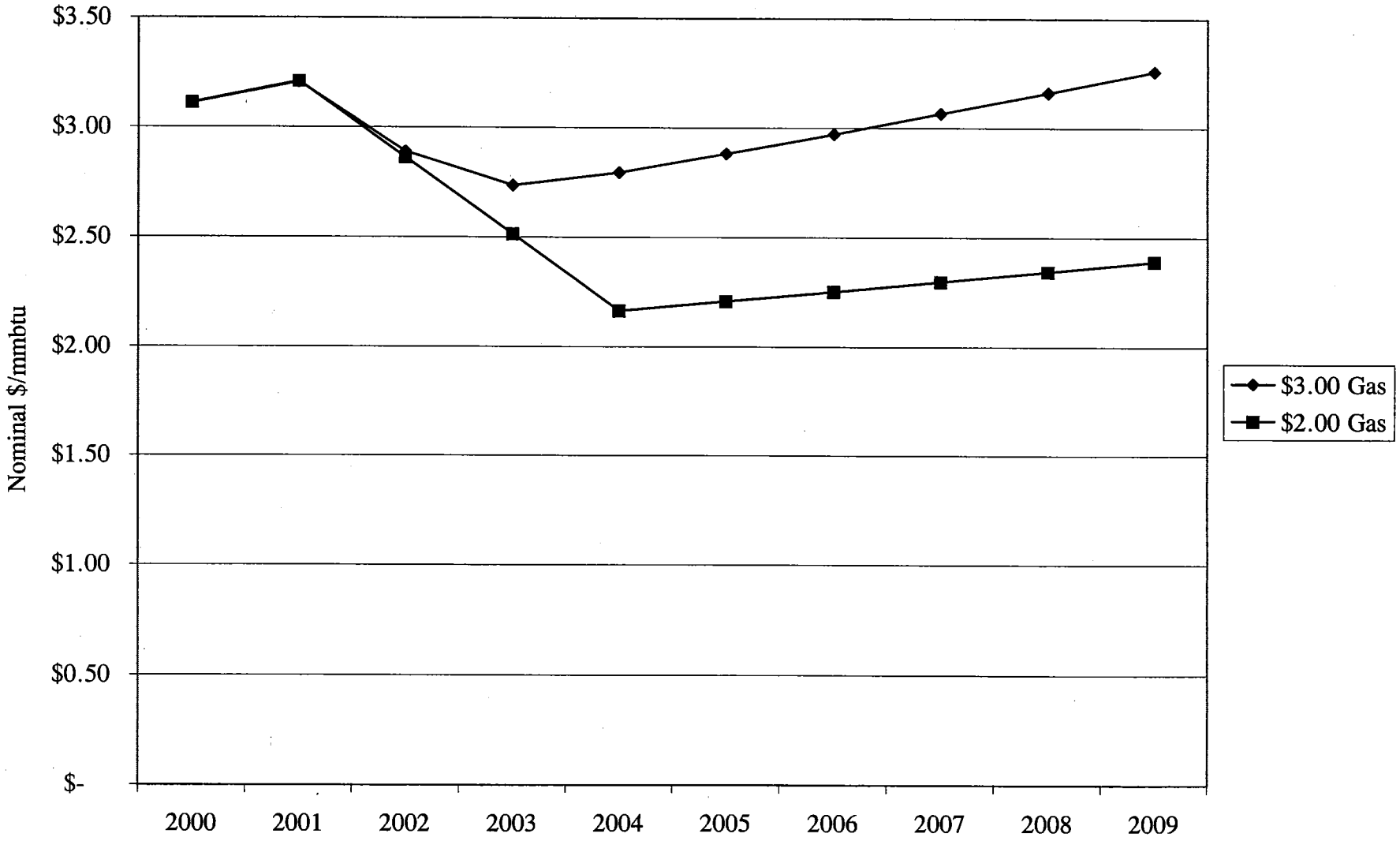
(2) Coal Prices.

PacifiCorp's model includes incremental coal prices with the underlying assumption that fixed costs of coal are recovered during peak periods when market prices are higher. During off-peak periods, the marginal cost of coal generation frequently sets prices, since coal generation will bid incremental pricing to avoid the shutdown of a baseload unit.

WSCC Market Electric Prices - Average MidC, COB & PV



Western Canada Gas Forecast



Summary of Market Clearing Price Model Assumptions

Key Assumptions in Price Forecasts	$3.00 Gas	$2.00 Gas
1. Value Payments		
• Hourly max. capacity price	$700/MWh	$550/MWh
• Annual average capacity price	Up to ~ $19/MWh	Up to ~ $14/MWh
2. New Capacity Break-even (2000)		
• Gas CC Cap. Cost ($/kW at sea level)	570	545
• Gas CC Cap. Price Escalation	1.6%	1.6%
• Average HHV Heat rate to electric	7000	6750
• Fixed O&M ($/MW-yr) & Ongoing Capital	$36.0K	$31.0K
• Fixed O&M growth rate	1.6%	1.6%
• WACC Real (9.7% Nominal)	6.7%	6.7%
3. Demand / Supply Balance		
• Demand growth diff from WSCC proj.	+ 0.25%	0.00%
• Current capacity expansion (% thermal)	1.0%	1.0%
• Current capacity HR improvements	1.50%	1.50%
4. Natural Gas Price Growth (2004-09)		
• Northwest	3.06%	1.79%
• COB	2.95%	1.79%
• Rockies	3.28%	1.88%
• Southwest	3.08%	1.76%
• California	2.78%	1.52%
5. Coal Price Growth	2.5%	2.0%
Pre-ISO Transmission wheeling ($/MWh)	$2.00 On/$1.00 Off	$2.00 On/$1.00 Off
ISO Transfer costs ($/MWh)	$1.00 On/$1.00 Off	$1.00 On/$1.00 Off
Electricity Price Growth (2010-2025)	3.2%	2.0%