

EXHIBIT NO. ___(WJE-13HC)
DOCKET NO. _____
2005 POWER COST ONLY RATE CASE
WITNESS: W. JAMES ELSEA

**BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,**

Complainant,

v.

PUGET SOUND ENERGY, INC.,

Respondent.

Docket No. UE-_____

**TWELFTH EXHIBIT TO THE PREFILED DIRECT TESTIMONY OF
W. JAMES ELSEA (HIGHLY CONFIDENTIAL)
ON BEHALF OF PUGET SOUND ENERGY, INC.**

REDACTED VERSION

JUNE 7, 2005

Quantitative Evaluation “All Source” Resource Bids Assumptions, Outputs and Key Issues

Resource Planning and Acquisition
Quantitative Analysis Team
July 26, 2004

Meeting Objectives

- Attain common understanding
 - ◆ Process and modeling tools
 - ◆ Key model assumptions
- Review preliminary resource cost analyses
- Discuss key issues regarding execution
- Provide opportunity for officer comment

Evaluation Process and Modeling

- Follow WAC rules
 - ◆ Biennial Least Cost Plan (LCP) that integrates demand forecasts and resource evaluations into a long-range plan describing the resource mix that meets current and future needs at the lowest cost to PSE and ratepayers.
 - ◆ Public involvement
 - ◆ Prudence. Documentation that shows both that the selection of the resource was necessary and reasonable and that the costs of acquisition were appropriate.
 - ◆ Assumptions regarding resource costs in the planning and acquisition stages need to be consistent with those in the ratemaking process.

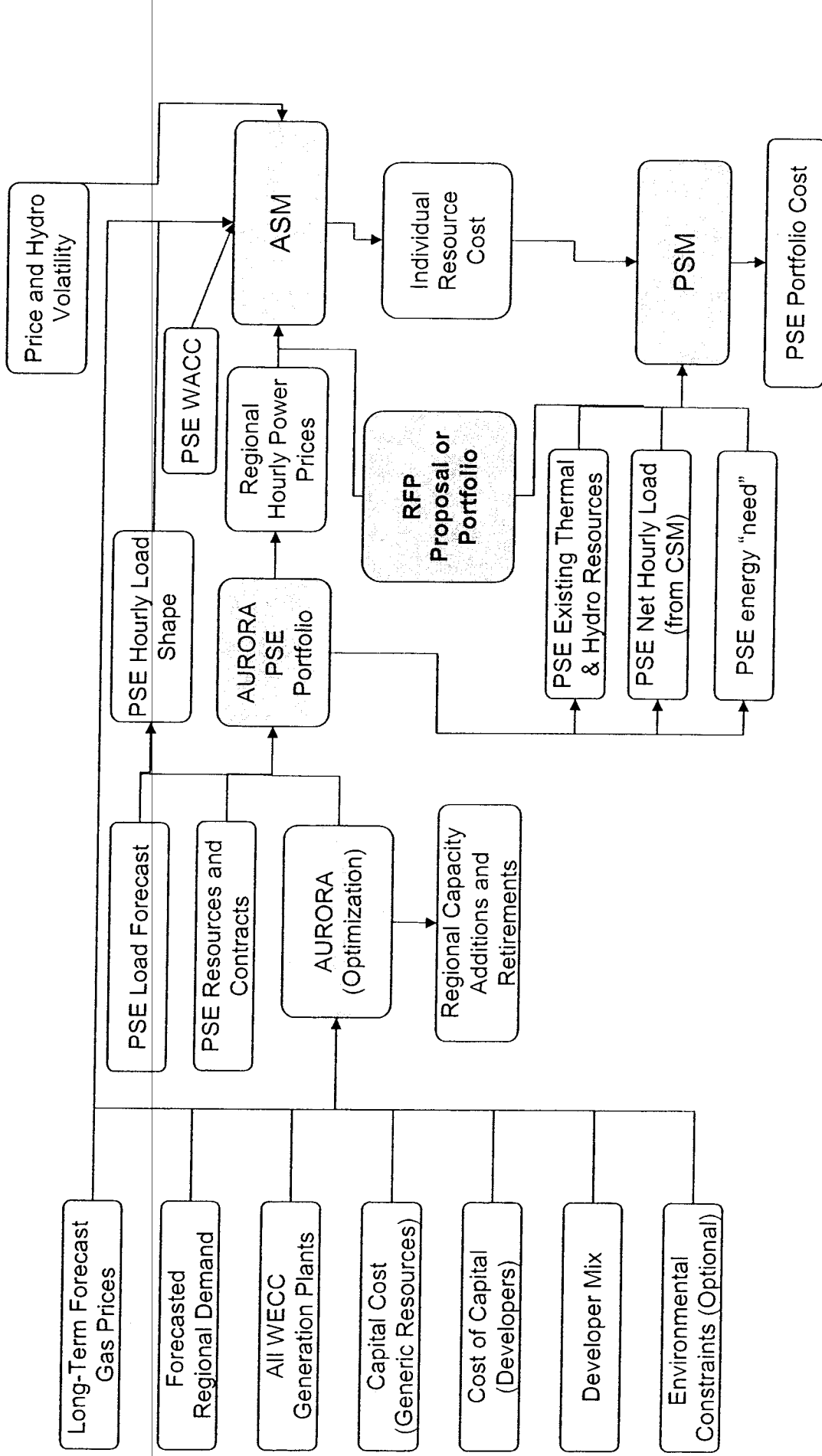
Evaluation Process and Modeling

- Process is natural progression of modeling from 2003 LCP and Frederickson analysis
- External coordination - meetings with WUTC Staff to review Portfolio and Acquisition screening models and assumptions
- Internal coordination – examples: wind integration cost analysis, variability of power and gas prices, analysis PPAs, credit, etc.

Models and Applications

- AURORA
 - ◆ Least Cost Plan
 - ◆ Resource Acquisition
 - ◆ Power Costs for Rate Case
 - ◆ 5 Year Financial Plan
- Acquisition Screening Model (ASM)
 - ◆ Resource Acquisition
- Portfolio Screening Model (PSM)
 - ◆ Resource Acquisition
 - ◆ Least Cost Plan
- KW3000
 - ◆ Gas & Power Position and Risk Analysis in near term
 - ◆ Energy Portfolio Costs
 - ◆ Hedging Decisions

Models and Data Flows



Compare AURORA and KW3000

	<i>KW3000</i>	<i>AURORA</i>
FOCUS	Portfolio Specific	Market Region
PRIMARY USES	Detailed portfolio position/reporting, P&L (basis for Outlook), risk analysis	Fundamental structural analysis of bulk power markets, hourly price forecasts, long-term portfolio cost forecasting.
MARKET DATA	Gas and power prices input as fundamental driver	Gas prices input, power prices are output.
MODEL APPROACH	Simulation of multiple scenarios (100 presently). Scenario input data includes gas prices, power prices, loads, hydro runoff, etc. "Expected" outcome is based on the average of all scenarios.	Simulation of single scenario involving dispatch of resources within selected market regions to develop hourly market clearing price. This market clearing price is employed against our portfolio to determine portfolio costs.
UNCERTAINTY (RISK) ANALYSIS	100 scenarios with varying inputs for load, hydro, temp, prices, etc per scenario—user defined correlation. Allows user to test strategies to minimize risk.	Monte Carlo analysis of load, hydro and fuel prices—linear correlation.
CORE GAS MODEL	Captures full core gas portfolio	None
RESULTS / OUTPUT	Resource and contract operations and costs for 100 scenarios. Mark to market for all resources, contracts, options and other transactions. Profit at risk for portfolio.	Market area prices, resource operations & costs, portfolio energy and cost. Long-term resource additions & retirements.
PSE PORTFOLIOS	Includes both power and core gas portfolios. Database includes all future transactions.	Power only. Database does not include short-term purchases and sales.
TIME RESOLUTION	Daily for gas, hourly for power	Monthly for Gas, hourly for power
TYPICAL TIME HORIZON	2 years	Up to 20+ years
MODEL RUN TIME	4 hours for simulation + 5-6 hours for report generator.	5-15 min. per year.

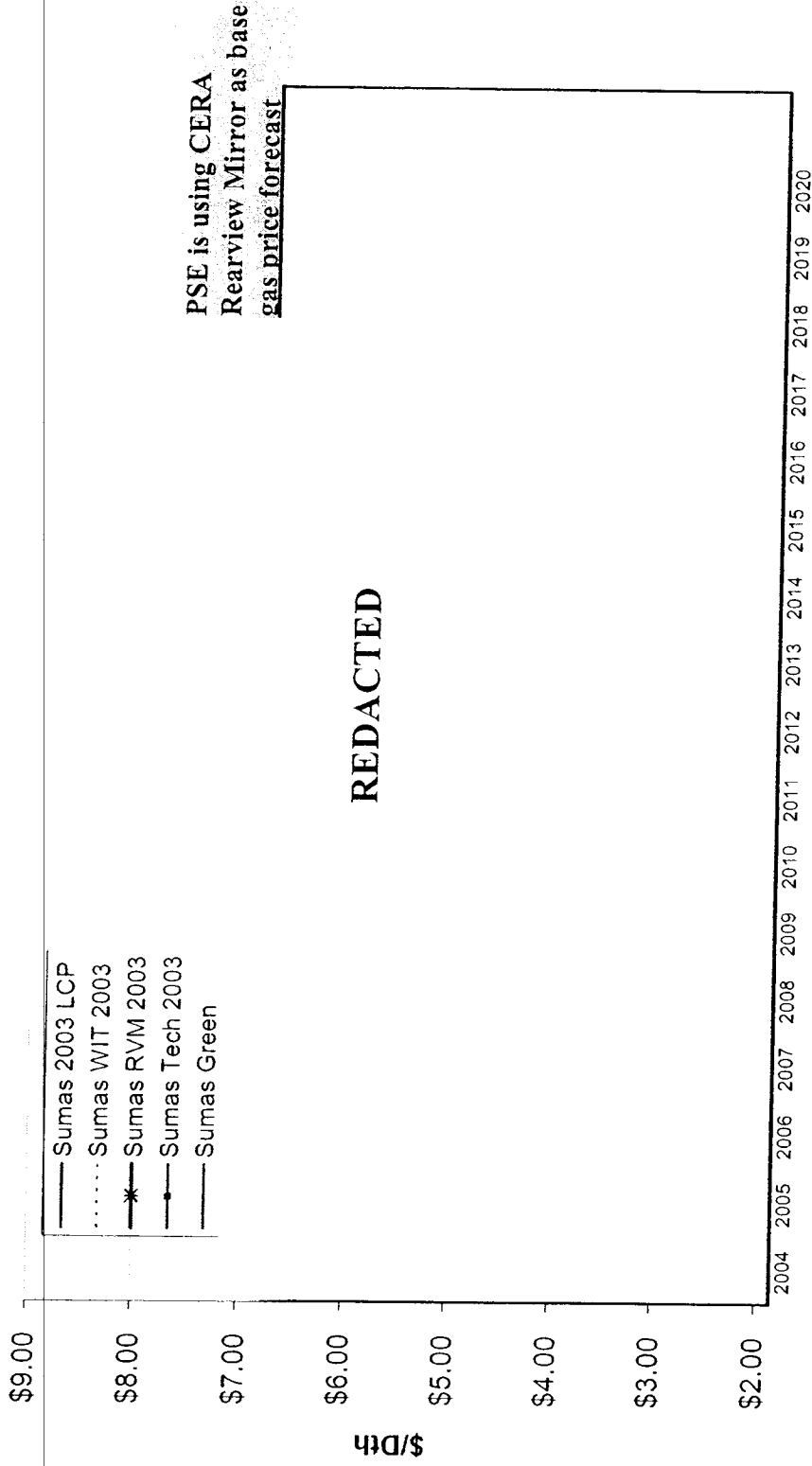
AURORA Model

AURORA 6 Assumptions

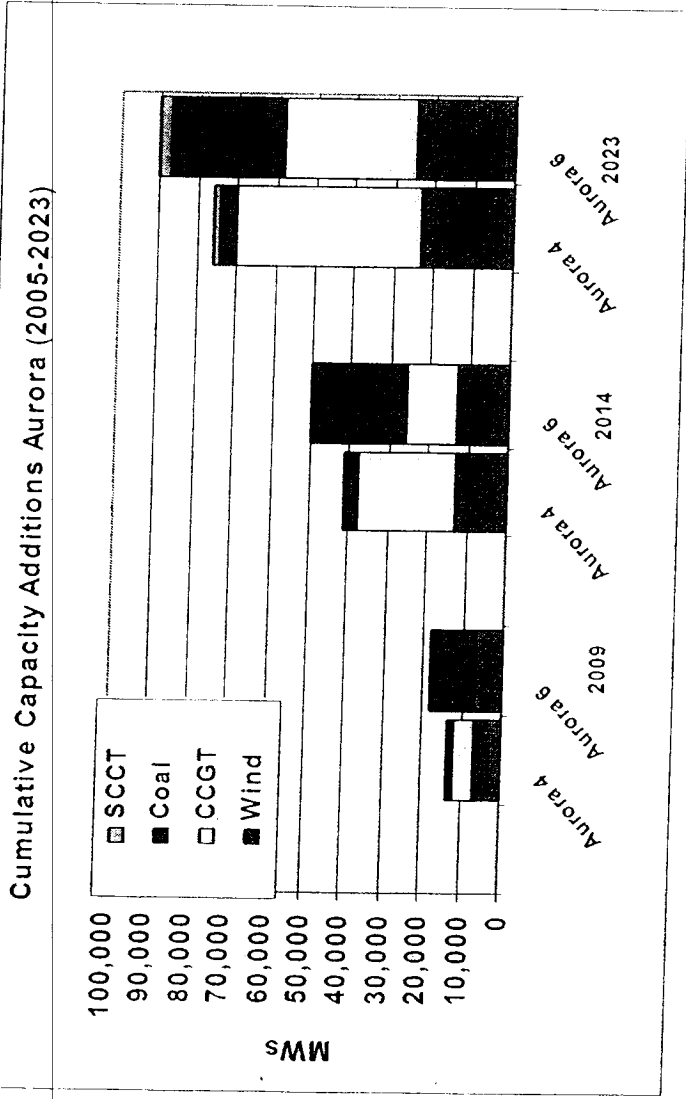
- **Gas Price**
 - ◆ The 2005-2006 prices are from the average of forward market prices (periodically updated)
 - ◆ The 2007 – 2024 prices from CERA “Rearview Mirror” forecast dated October 2003
- Most other assumptions unchanged from LCP
- Updated wind farm cost using information from RFP
- New CO2-mitigated coal plant (EIA)
 - ◆ For WA/OR, CA2, CA3 (2009)
 - ◆ \$1,500/KW vs \$2,500/KW
- **Base coal plant**
 - ◆ Size limits decreased from 900MW to 600 MW
 - ◆ Limits raised from 1/year to 4/year

Updated Gas Forecast

Natural Gas Forecast Price Comparisons - CERA 2003



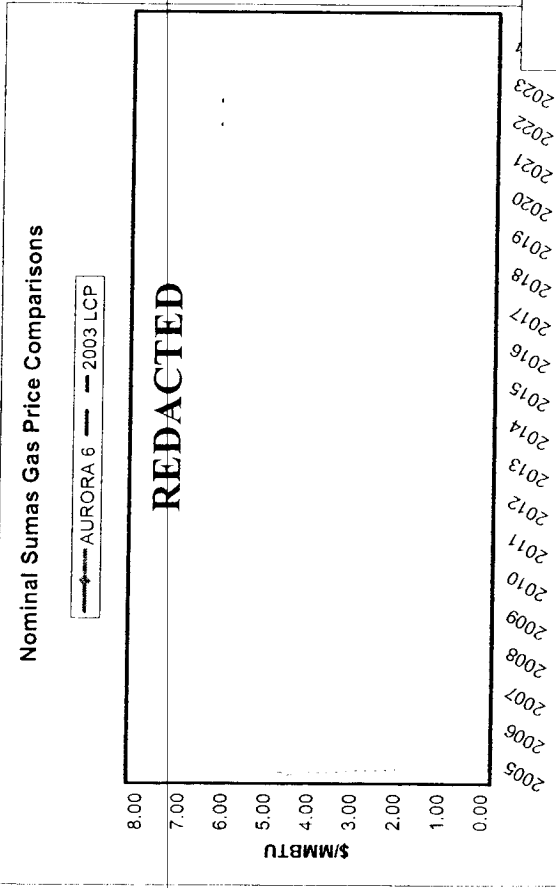
Aurora 6 – WECC New Resource Additions and Replacements



- With higher gas prices AURORA 6 optimization selected a higher percentage of coal plants to meet need
- EIA Annual Energy Outlook 2004 Base Case shows ~40 GW of coal addition by 2023
- PacifiCorp Planning Assumptions. "There are 9,000 MW of new coal plants that are in the planning process, and we assume that any coal plants that retire will be replaced by new ones over time."

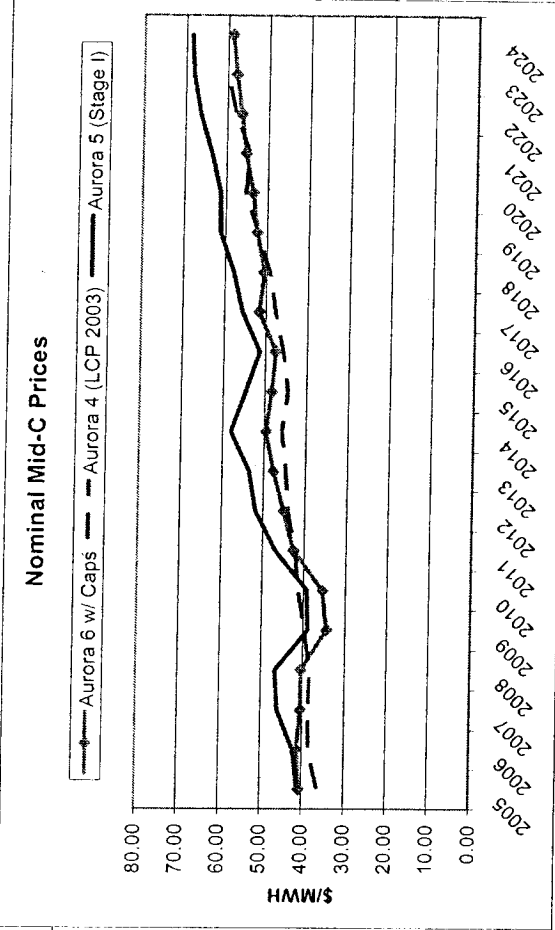
Note: Higher level of capacity additions in AUORA 6 resulted from higher retirement levels of inefficient generation plants. No change in demand forecast.

Aurora 6 Prices vs. Prior Forecasts



- Aurora 6 gas prices average 19% higher (levelized 16% higher)
- Current closing marks from Friday July 23rd are \$5.66 in 2005 and \$5.19 in 2006.

- Aurora 5 was our All source Stage 1 curve.
- Aurora 6 contains re-optimized new mix of coal and gas resources.
- Price cap \$250 / MWh adjusts model bias for on/off-peak spreads of over \$80 in August



Portfolio Screening Model

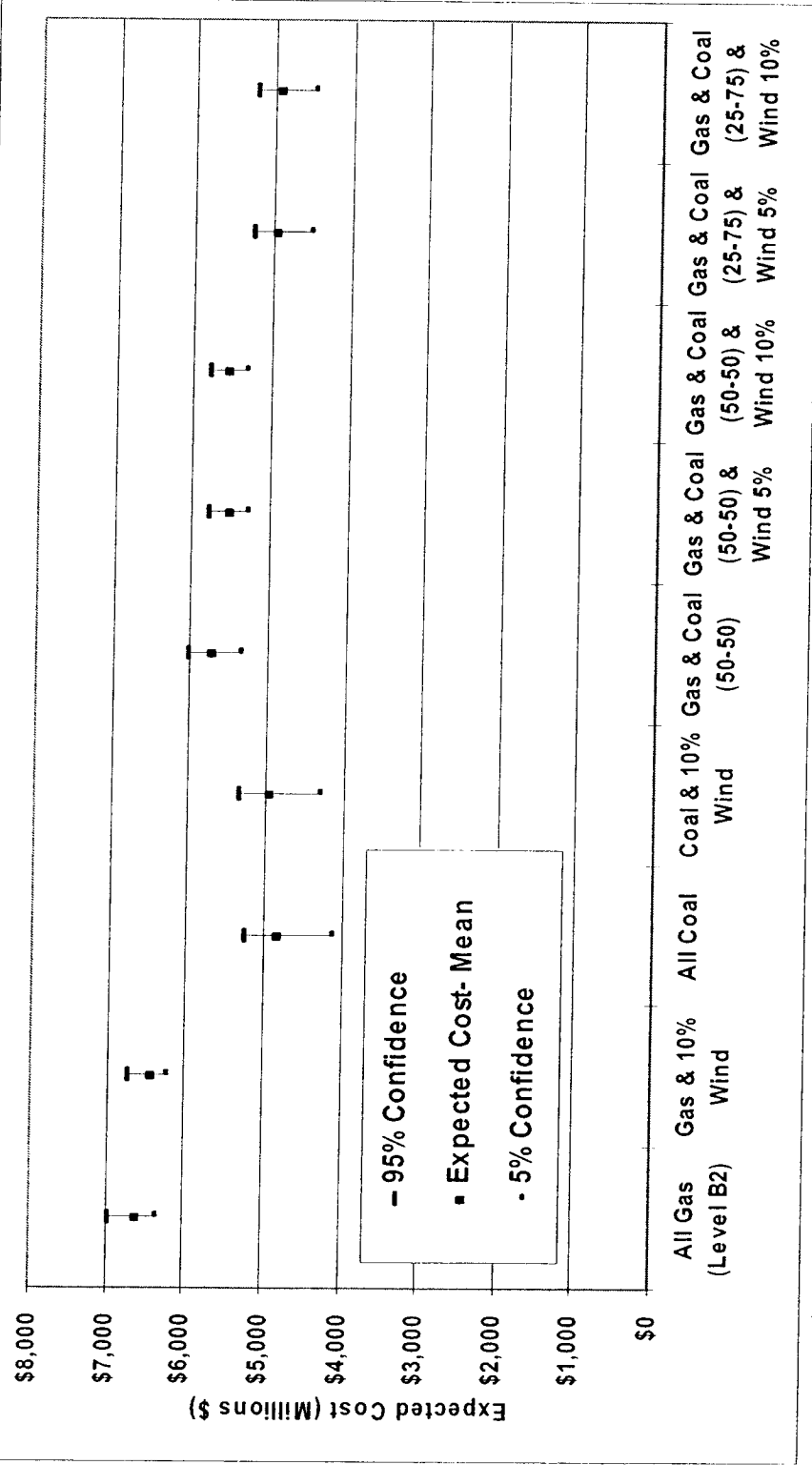
Generic Resource Portfolios

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Resources assumed to meet planning standard in future years

- Keep the Conservation program
- Remove the Shared Gas Resource (seasonal) as not realistic alternative
- Consider 9 generic portfolios
 - ◆ All Gas
 - ◆ Gas + 10% wind
 - ◆ All Coal
 - ◆ Coal + 10% wind
 - ◆ 50/50 Coal/Gas + 0% wind, 5% wind, 10% wind
 - ◆ 75/25 Coal/Gas + 5% wind, 10% wind

PSE Generic Resource Portfolio Results



Portfolio Screening Model All Source RFP - Stage II

- Aurora 6 Prices with \$250/MWH cap
- Generic Resources (to fill the need beyond each test portfolio)
 - ◆ 10% wind by 2013
 - ◆ 50% coal and 50% gas for remainder of need beginning in 2009
- Price Volatility Update

Aurora 6 Gas and Electric Price Volatility

- LCP 2003 price volatility applied to AURORA5 prices yielded unusually high capacity factors and option valuations for gas resources
- PSM6 annual price volatility based upon historical annual volatility - with guidance from ERM

Annual Power Price Volatility	Annual Gas Price Volatility	Annual Correlation
30%	22%	.887

- Aurora 6 prices have reasonable daily volatility when compared with historical daily volatility
- PSM6 annual and daily volatility tested with KW3000 prices yields similar option valuation. PSM6 volatility and AURORA6 prices are a reasonable basis to evaluate All Source generation bids

PSM6 Option Valuation

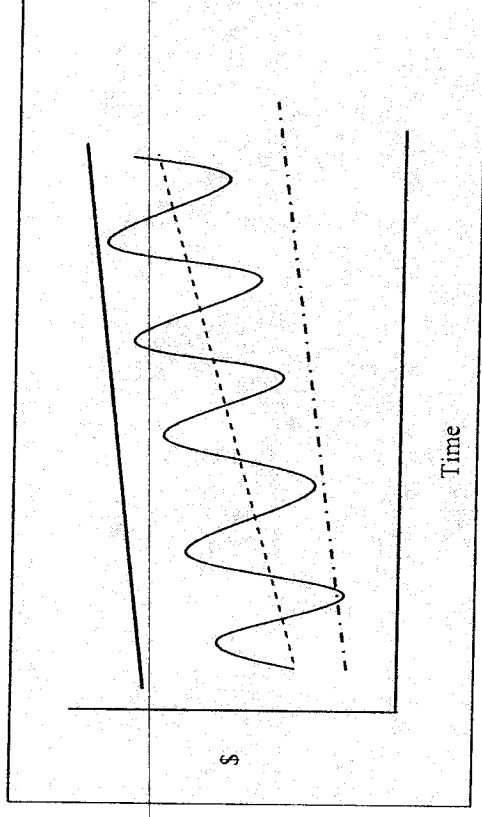
approximately equal to KW3000

- PSM6 assumes (30% Annual Power Volatility, 22% annual gas volatility, .887 correlation)
- KW3000 scenarios (approx 15% Annual Power Volatility, 16% annual gas volatility and .767 correlation)
- Both models with same annual gas and power prices

Margin Value of 7,200 HR Tolling Option with \$2.00 / MWh O&M	ASM/PSM (w/ KWI prices) power=30% gas=22% correlation =.88	KW3000 (~March 28, 2004)
# Iterations / # Scenarios	100	100
Capacity factor of option %	58.6%	59%
Maximum Option Value \$000	\$ 33,225	\$ 12,139
Minimum Option Value \$000	\$ 64	\$ 2,718
Average Option Value \$000	\$ 5,849	\$ 5,585

Scenarios for PSM

- Base scenario = AURORA 6 gas and electric prices with \$250 / MWh price cap.



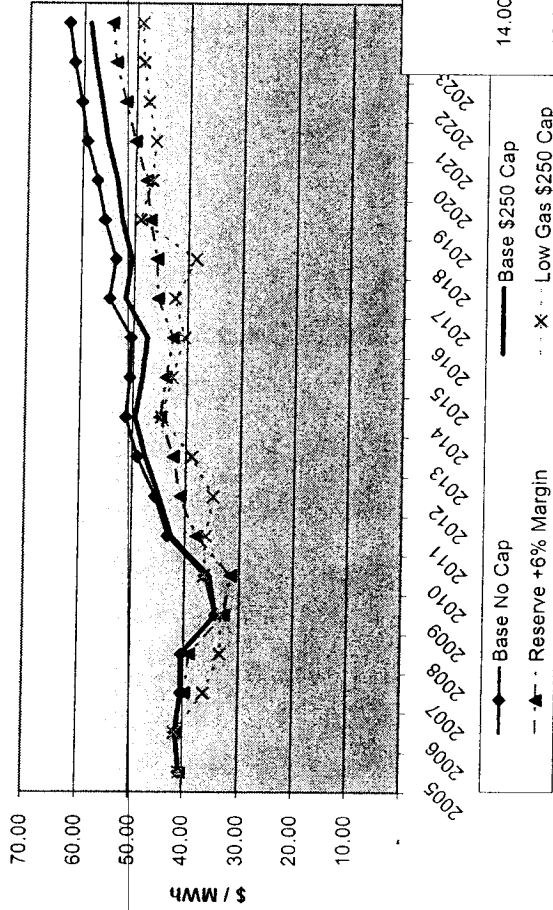
- But what is the sensitivity of base assumptions? Other Scenarios:
 - ◆ Aurora 6 Base without Price Cap
 - ◆ Reserve Margin Scenario. Re-optimized Aurora 6 with 6% increase in load. Attempt to model FERC reliability NOPR.
 - ◆ Low Gas Scenario - Aurora 6 re-optimized with CERA "World in Turmoil" gas forecast.

Scenario Prices

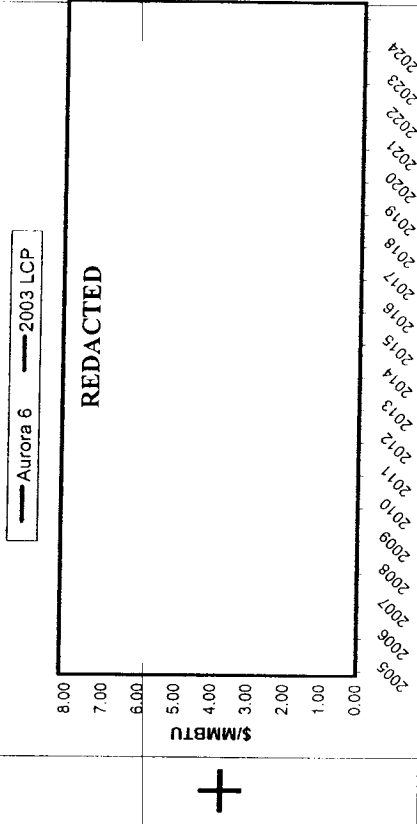
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AURORA 6 MidC Flat Power Prices

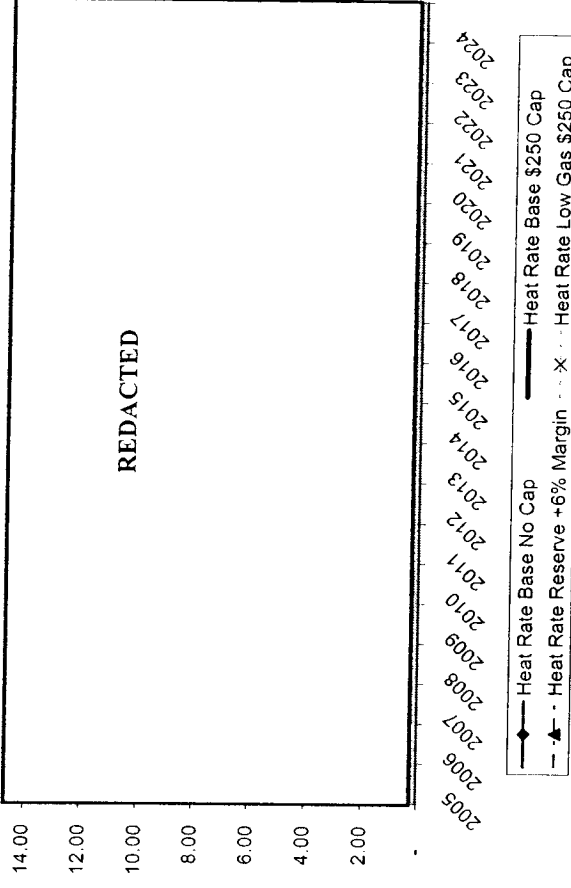


Nominal Sumas Gas Price Comparisons



+

AURORA 6 Annual Heat Rates



- Two gas price forecasts
- Four power price forecasts
- Four heat rate scenario combinations

Resource Acquisition Preliminary Cost Analysis

Stage 2 Evaluation*

Short List Summary

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PROPOSAL					ASM8
Code	Type	Owner/Developer Project Name	Proposal Option	Location	Levelized Cost (l) \$/MWh
WIND					
A03	W	RES - Hopkins Ridge	100% Ownership	Columbia Co. WA	150
A02b	W	Zlikha - Wild Horse	100% Ownership	Kittitas Co, WA	150
A06	W	[REDACTED]	100% Ownership w/ Royalty	[REDACTED]	[REDACTED]
ALTERNATE FUEL					
A39	A	ORMAT - Sumas Recovered Heat	100% Ownership	Sumas, WA	4.5
POWER PURCHASE AGREEMENTS					
A19	C	APS PPA	2-yr Centralia PPA	Centralia, WA	85
A24b	C	[REDACTED] PPA	10-yr [REDACTED] PPA	[REDACTED]	200
A30	H	[REDACTED] PPA	22-yr Seasonal On-Peak PPA	[REDACTED]	240

Notes:

- (1) Using mid-year MACRS instead of 1st quarter MACRS to compare with non-wind bids.
- (2) In addition to mid-year MACRS, corrected a PTC error in year 10 that moved the price down.
- (3) Based on \$59 flat price for on-peak power September through March

REDACTED

***Note: Credit costs for PPAs and gas purchases not included.**

Stage 2 Evaluation* Continuing Investigation Summary

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PROPOSAL			Proposed Option	Location	Status	MW	COD	ASM8 Levelized Cost (\$/MWh) ⁽¹⁾
Code	Type	Owner/Developer Project Name						
WIND								
A07	W	[REDACTED]	100% Ownership	[REDACTED]	Development	[REDACTED]	Oct-05	[REDACTED]
A08	W	[REDACTED]	30-yr PPA + 50% Ownership	[REDACTED]	Development	[REDACTED]	Dec-05	[REDACTED]
A01	W	[REDACTED]	100% Ownership	[REDACTED]	Development	[REDACTED]	Dec-05	[REDACTED]
CCGT								
A20	C	[REDACTED]	100% Ownership	[REDACTED]	Development	[REDACTED]	late 2008	[REDACTED]
ALTERNATE								
A24a	G	[REDACTED]	100% Ownership + 100MW PPA	[REDACTED]	Operating	[REDACTED]	Aug-02	[REDACTED]
A29	G	[REDACTED]	50.2% Ownership	[REDACTED]	Development	[REDACTED]	Dec-05	[REDACTED]
A26	G	[REDACTED]	100% Ownership	[REDACTED]	Suspended	[REDACTED]	Nov-05	[REDACTED]
A35	G	[REDACTED]	100% Ownership	[REDACTED]	Suspended	[REDACTED]	late 2005	[REDACTED]
A28	G	[REDACTED]	70% Ownership	[REDACTED]	Development	[REDACTED]	Sep-07	[REDACTED]
A32a	G	[REDACTED]	100% Ownership	[REDACTED]	Operating	[REDACTED]	Oct-03	[REDACTED]
A15	A	[REDACTED]	Joint Venture w/ PSE	[REDACTED]	Development	[REDACTED]	May-06	[REDACTED]

***Note: Credit costs for PPAs and gas purchases not included.**

(1) Using mid-year MACRS instead of 1st quarter MACRS to compare with non-wind bids.

Preliminary PSM Portfolios

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- Have looked at 30 portfolios
- For today summarized 11 portfolios
- Portfolio #1 is deferral of acquisition to 2009, assuming market through 2008. Portfolio #1 does not begin to meet the planning standard until 2009.

2. Three PPAs APS, [REDACTED]	17. One PPA (APS) and [REDACTED]
5. Three PPAs and one wind Wildhorse	23. Strategic Plan Scen. #1. Two PPAs APS & [REDACTED], two wind 2006 2007, ORMAT, and Coal in 2010
7. Entire Short List	25. APS, [REDACTED] and Wildhorse
11. Three PPAs two wind [REDACTED] and Wildhorse	29. APS, [REDACTED] and [REDACTED]
14. APS and [REDACTED] Gas Plant with 10-yr PPA	30. APS, [REDACTED] and Wildhorsd

REDACTED

Sample Portfolios vs. Need

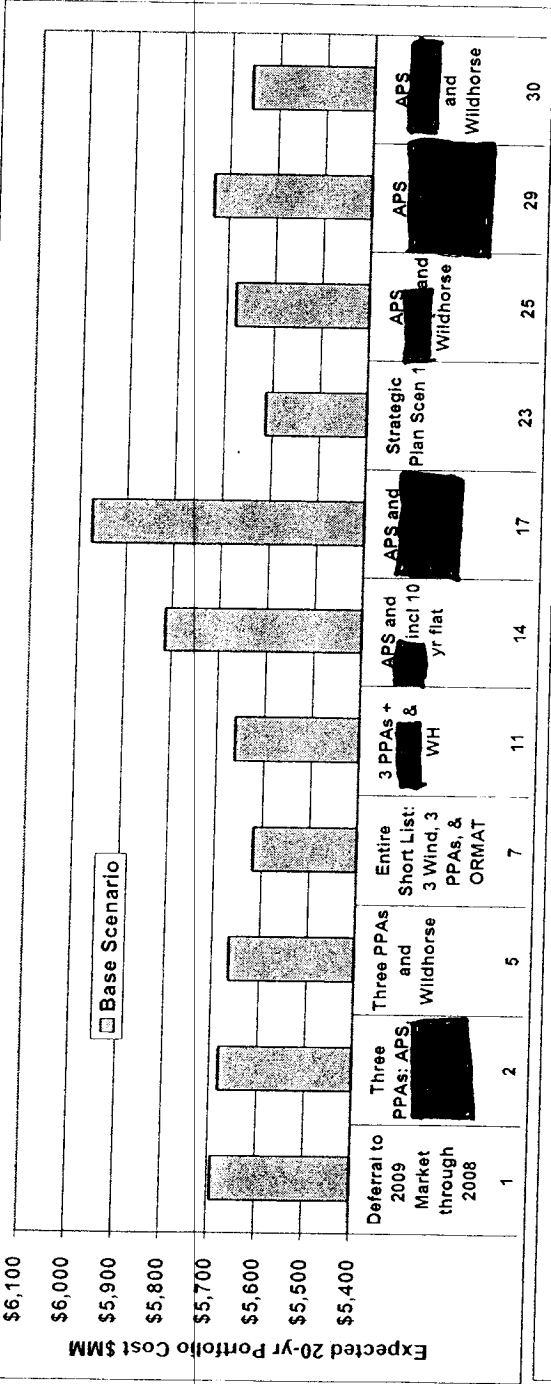
Portfolio	Project	2005	2006	2007	2008	2009	
1	Deferral to 2009						
	Market through 2008	Market through 2008, then generics					
	Sum of Acquisitions				generic start 2009 ->	423.0	
	Relative to Need (Short) Long	(299.0)	(351.0)	(370.0)	(382.0)	423.0	
2	Three PPAs						
	19 APS - Centralia 2-yr PPA						
	24b [REDACTED] 10-yr PPA						
	30 [REDACTED] 22-yr Seasonal On-Peak PPA						
	Sum of Acquisitions	233.9	325.6	320.6	320.6	423.0	
	Relative to Need (Short) Long	(65.1)	(25.4)	(49.4)	(61.4)	-	
5	3 PPAs + Wildhorse						
	19 APS - Centralia 2-yr PPA						
	24b [REDACTED] 10-yr PPA						
	30 [REDACTED] 22-yr Seasonal On-Peak PPA						
2 Wild Horse 100% Own							
	Sum of Acquisitions	233.9	351.6	346.6	346.6	423.0	
	Relative to Need (Short) Long	(65.1)	0.6	(23.4)	(35.4)	-	
7	Whole Short List						
	19 APS - Centralia 2-yr PPA						
	24b [REDACTED] 10-yr PPA						
	30 [REDACTED] 22-yr Seasonal On-Peak PPA						
	3 Hopkins Ridge 100% Own						
	6 [REDACTED] 100% Own						
	2 Wild Horse 100% Own						
39 ORMAT - Sumas Recovered Heat							
	Sum of Acquisitions	233.9	442.1	437.1	437.1	437.1	
	Relative to Need (Short) Long	(65.1)	91.1	67.1	55.1	14.1	

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Example:
Portfolio 5
supplies 346 MW,
but is 35 MW less
than forecast
planning standard
need of 382 MW in
January 2008

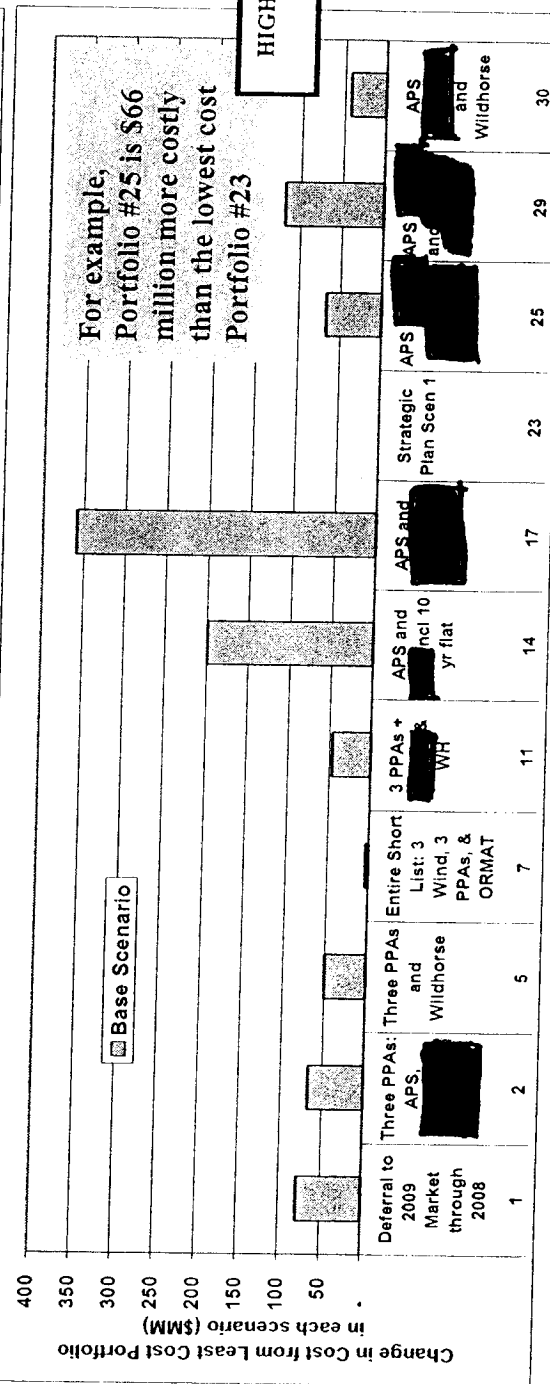
PSM - Portfolio Costs Base*



*Note:

Preliminary Results

Credit costs for PPAs and gas purchases not included.

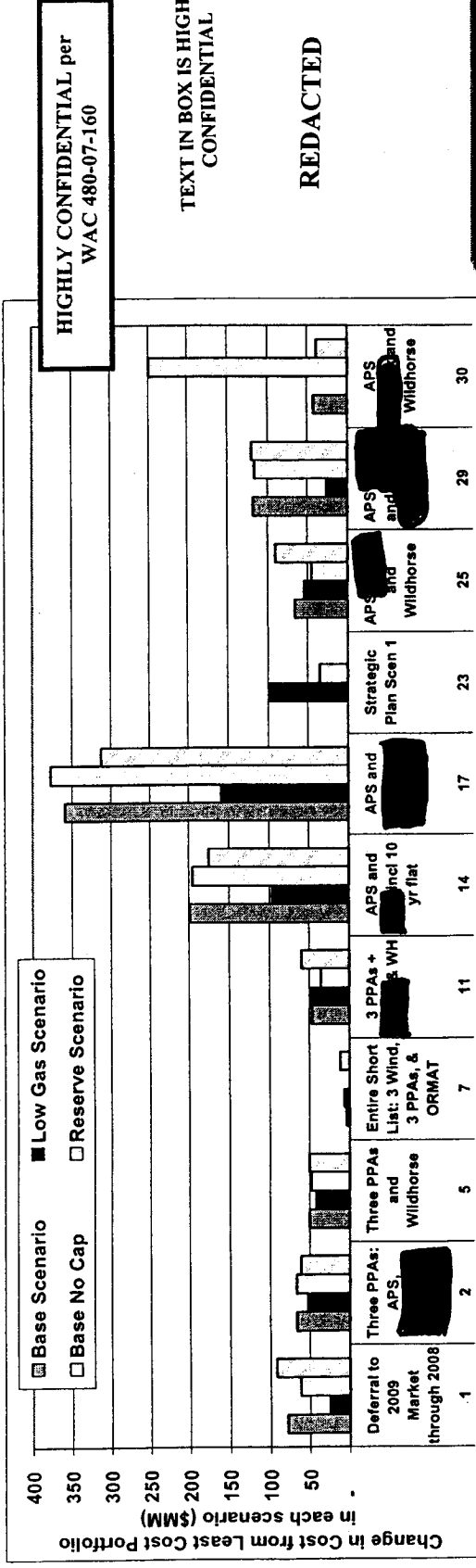
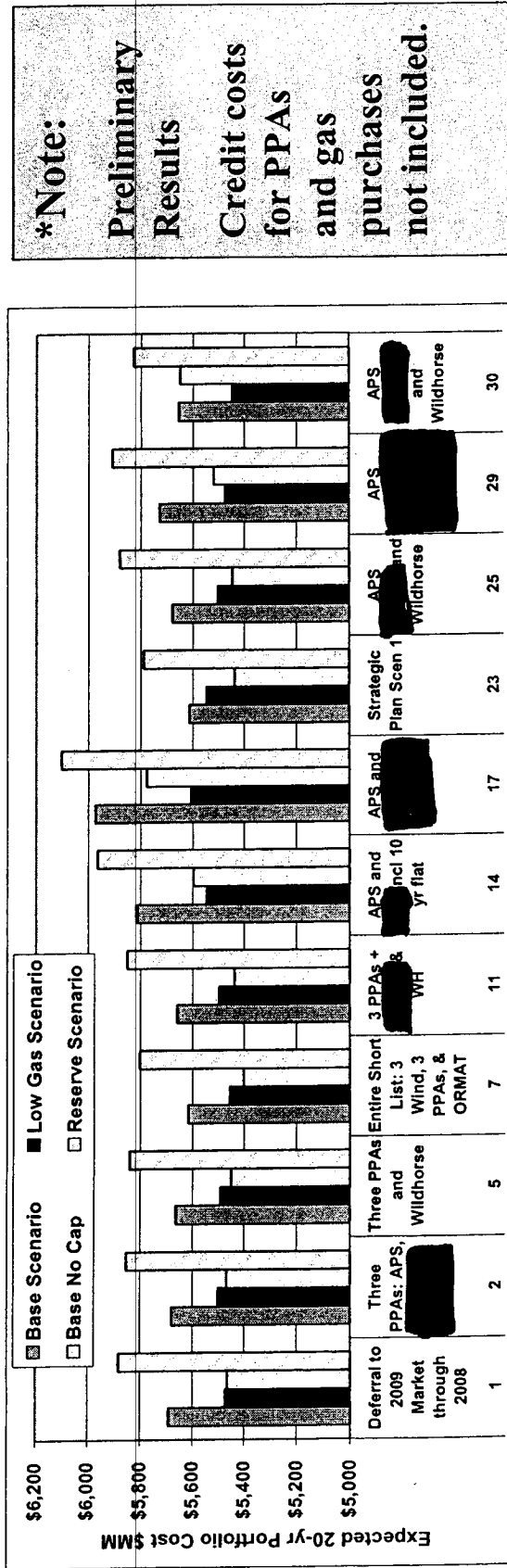


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Portfolio Costs* - 4 Scenarios



***Note:**
Preliminary Results
Credit costs for PPAs and gas purchases not included.

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Key Issues

Imputed Debt on PPA Obligations

- S&P Methodology
 - ◆ 50% of contract payment
 - ◆ Discount at 10% to PV
 - ◆ Multiply by 30% risk factor
 - ◆ Calculate equity offset
 - ◆ = equity ratio * (imputed debt / (debt ratio))
 - ◆ Cost penalty
 - ◆ = equity offset * 16.92% (Pre-tax 11% ROE)
- Declines each year of forecast as current year of contract payment rolls off

Credit Support PPAs & Gas Supply

- Interest cost on Letter of Credit
 - ◆ Shared credit facility could save
- Possibility of imputed debt on letter of credit
 - ◆ When might S&P start this?
 - ◆ What will be S&P methodology?
 - ◆ risk factor?
 - ◆ Will S&P look at MTM limit or to LOC amount?
- Gas purchases
 - ◆ Power and gas positions would determine optimal hedge quantities
 - ◆ Should we assume that optimal quantity is hedged?

Credit Cost - 10-yr PPA preliminary analysis

	Nominal \$000	NPV \$000	Levelized \$/MWh
A Contract Payments (no transmission)	633,446	414,510	43.50
B Transmission	11,348	7,353	0.77
C Imputed Debt Equity Offset	41,831	32,276	\$3.39
SUBTOTAL			\$47.66
D LoC Interest - PSE	14,375	9,718	\$1.02
E LoC Interest - TEMUS includes in PPA	14,375	9,718	\$1.02
F LoC Imputed Debt Equity Offset	190,385	124,156	\$13.03
SUBTOTAL Credit			\$15.07
TOTAL Levelized Cost			\$62.73

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LOC Assumptions:

- ◆ Rate = 1.15%
- ◆ Amount = \$125 million
- ◆ S&P = 100% risk
- ◆ S&P imputes debt first year

given:	2005 Debt start year S&P Assigned Risk			given:	100% S&P Risk		
	25%	50%	100%		1	2	3
\$65,000	\$2.75	\$4.45	\$7.84	\$65,000	\$7.84	\$6.93	\$6.10
\$85,000	\$3.60	\$5.82	\$10.25	\$85,000	\$10.25	\$9.06	\$7.97
\$105,000	\$4.45	\$7.19	\$12.66	\$105,000	\$12.66	\$11.19	\$9.85
\$125,000	\$5.30	\$8.55	\$15.07	\$125,000	\$15.07	\$13.33	\$11.73
\$145,000	\$6.14	\$9.92	\$17.48	\$145,000	\$17.48	\$15.46	\$13.60
TOTAL Levelized Cost				TOTAL Levelized Cost			
\$65,000	\$50.41	\$52.11	\$55.49	\$65,000	\$55.49	\$54.59	\$53.76
\$85,000	\$51.26	\$53.48	\$57.91	\$85,000	\$57.91	\$56.72	\$55.63
\$105,000	\$52.11	\$54.84	\$60.32	\$105,000	\$60.32	\$58.85	\$57.51
\$125,000	\$52.96	\$56.21	\$62.73	\$125,000	\$62.73	\$60.99	\$59.38
\$145,000	\$53.80	\$57.58	\$65.14	\$145,000	\$65.14	\$63.12	\$61.26

Sensitivity
Of credit cost →

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Regulatory Treatment

- Imputed debt
 - ◆ Existing PPA imputed debt is covered by the requested 45% equity ratio
 - ◆ Incremental PPA's require additional equity ratio granted in a GRC
- Credit
 - ◆ LOC interest would require accounting order to include in PCA – or GRC
 - ◆ Equity cost offset to LOC imputed debt would require additional equity ratio in a GRC

Recovery of Equity Offset Costs resulting from LOC imputed debt

Approximate...

LoC Imputed Debt Equity Offset							
Key Assumptions:							
LoC Posted Amount	\$ 125,000						
Yr LoC put on Balance Sheet	2005	or year S&P imputes debt on Letter of Credit					
S&P Risk Factor	100%						
	2005 GRC Year-end Estimate \$ 000			S&P LoC Imputed Equity Offset			
Debt	\$2,440,398	55.0%	\$2,440,398		53.8%		
Equity	\$1,996,690	45.0%	\$ 102,273	\$2,098,962	46.2%	1.2%	incremental equity ratio
	\$4,437,088	100.0%		\$4,539,361	100.0%		

- This increase in allowed equity ratio is in addition to the increase needed to recover the equity offset for the imputed debt related to PPA payments.

Other Execution Issues

- Production Tax Credits
- Transmission
- Permitting