

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION STAFF
RESPONSE TO DATA REQUEST

DATE PREPARED: January 31, 2011
DOCKETS: UE-111048/UG-111049

WITNESS: David Nightingale
RESPONDER: David Nightingale
TELEPHONE: (360) 664-1188

REQUESTER: Public Counsel

PC-6 Please identify the data requests issued by Mr. Nightingale that address PSE's economic analysis supporting the Company's decision to construct LSR 1 early.

RESPONSE:

Please see Staff Data Request Nos. 155, 156, 200, 202, and 203. Mr. Nightingale also reviewed the Company's responses to data requests from other parties that addressed PSE's economic analysis supporting the decision to construct LSR Phase 1 early, as well as the direct and rebuttal testimony of witnesses Norwood, Seelig, and Garratt.

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DATE PREPARED: January 31, 2011
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REQUESTER: Public Counsel

PC-9 RE: Exhibit No. DN-2T, p. 6, lines 2-3.

Please confirm that Mr. Nightingale believes that an error which overstates total expected portfolio cost by approximately \$600 million (NPV), and overstates the net portfolio benefit of adding wind early by approximately \$163 million (NPV) is "inconsequential."

RESPONSE:

As explained by Mr. Nightingale at Exhibit No. DN-2T at 12:12-13:2, "inconsequential", refers to the fact that the modeling error, when corrected in a subsequent modeling run, did not significantly change the results of the analysis regarding the most beneficial options. Furthermore, as explained throughout Mr. Nightingale's Exhibit No. DN-2T, Mr. Norwood's analysis relies inappropriately upon estimates made during the more theoretical IRP planning process and modeling exercises leading up to but not including the RFP analysis of actual proposed resources. Evaluating the financial analysis from the RFP decision-making process, where real options are offered from the marketplace, is more important than projections estimated during the IRP planning process. Mr. Norwood's testimony and the dollar values he suggests are based on the IRP analysis and largely ignores the results of the RFP analysis and decision-making process.

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REQUESTER: Public Counsel

PC-10 RE: Exhibit No. DN-2T, p. 6.

Does Mr. Nightingale believe, based on his review of PSE's economic analyses provided in this case in support of constructing LSR 1 early, that there were no other significant errors in the in these analyses.

RESPONSE:

Yes.

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PC-11 Does Mr. Nightingale believe that, in light of the market, regulatory and economic uncertainty that existed in April, 2010, it was possible to model PSE's system production costs within a margin of 1% or less over a 50-year study period? If so, provide the basis for this belief.

RESPONSE:

No.

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PC-12 Has Mr. Nightingale reviewed any benchmarking studies performed by PSE to establish the accuracy of its PSM I, PSM II or PSM III models, including the end effects algorithms of these models? If not, please explain how Mr. Nightingale is confident that these models accurately predict production costs of PSE's system. If so, please provide any such benchmarking analyses.

RESPONSE:

No, because the PSM model inputs are not based on formally published benchmarking studies, but rather on a large combination of factors brought together into a simulation of the PSE system and its interaction with the larger western grid. This information is extensive and includes inputs from the Aurora dispatch modeling software, transmission constraints, economic forecasts, and recent market intelligence on equipment, construction, and fuel prices. In providing inputs to the model, the Company applies professional judgment of recent, current and projected market conditions as well as PSE's unique mix of existing generation resources, energy market forecasts including emission costs, and projections of conservation portfolios under various scenarios.

Many of the key inputs are reviewed by the IRP Advisory group. To the extent market information is available from reliable industry sources, it is incorporated by the Company into the model, but other inputs rely on recent trend data and analysis of econometric consultants, for instance, for gas price forecasts.

A drawback of over-reliance on benchmarking studies is that they involve looking outside the electric system of the Company to find comparable prices and resources. Benchmarking includes estimates that reflect systems that differ from PSE's service territory and therefore the results are limited in application to the PSE system. That said, PSE does consider available information in constructing the inputs to the PSM model. For example, during this acquisition process the Company used updated heat rate values for thermal resources, updated market costs for generic resources, as well as evaluating wind production claims of proposals with third party engineering firms.

Mr. Nightingale did review the end effects calculations used by the Company. The end effects calculations are typical and allow accounting for the net present value of cumulative cash flows that exceed end of planning horizon period remaining book value.

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PC-13 RE: Exhibit No. DN-2T, p. 6, lines 15-18.

Is it Mr. Nightingale's understanding that the estimate of the net portfolio benefit of adding LSR 1 early, which was presented in the May 5, 2010, Board Meeting, was derived using the "very detailed optimization analyses"? If so, please identify and provide the PSE model that was used to derive the LSR net portfolio benefit that was presented at the May 5, 2010 board meeting.

RESPONSE:

No. The portfolio benefit metric is an output of the screening modeling PSM I and is less detailed than the system optimization analyses in the PSM III modeling tool. The more detailed optimization analysis is performed in Phase 2 during the RFP evaluation process. Please see Exhibit No. DN-3.

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REQUESTER: Public Counsel

PC-15 RE: Exhibit No. DN-2T, p. 7.

Is it Mr. Nightingale's testimony that the data and methods used by PSE for calculating end effects associated with LSR 1 and other resources were reasonable and consistent? If so, please identify the specific data and models reviewed by Mr. Nightingale in reaching this conclusion regarding PSE's end effects calculations.

RESPONSE:

Yes. In PSM I version 14.2, PSM IIA, and PSM III versions 13.6 and 13.9, each model contains an EndEffects tab where the calculations occur. This method and these calculations are reasonable and consistent. For instance, in PSM III version 13.6 the end effects calculation for LSR Phase 1 is performed in cells W897 through W927. This same set of calculations is shown in column W of the EndEffects tab for any new selected resource added to the portfolio by the PSM III optimization model runs.

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PC-16 Has Mr. Nightingale ever performed an end effects calculation? If so, provide documentation supporting such calculations and claimed expertise.

RESPONSE:

Mr. Nightingale has not independently performed an end effects calculation.

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PC-20 RE: Exhibit No. DN-2T, p. 13, lines 11-14.

Does Mr. Nightingale agree that under the PSE/SCE REC sale contract, PSE was not obligated to sell RECs to SCE and SCE was not obligated to buy RECs from PSE, until the CPUC approved the contract, and such approval had not been obtained before the May 5, 2010, Board Meeting. If not, please explain.

RESPONSE:

Yes. However, it is Mr. Nightingale's expectation that the REC sales agreement was executed in good faith by PSE, which could believe reasonably that the contract would not be denied by CPUC. Therefore, it was reasonable for the Company to assume that the sale would be approved and that the associated RECs would not be available for other purposes. This is consistent with the Commission's test that prudence is determined in part by what a reasonable management and board would be expected to do. Furthermore, the value of potential RECs sales to another party would still provide benefits to ratepayers.

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PC-21 RE: Exhibit No. DN-2T, p. 13, lines 19-22.

Was PSE's decision to invest in LSR 1 not prudent because it was based on speculation regarding anticipated future carbon taxes, which at the time of the 2010 RFP analysis, had not been enacted by law?

RESPONSE:

No. The Company and IRP Advisory Group discussed various approaches to accounting for the prospect of carbon prices to capture the range of future possibilities. Page 8 of the August 19, 2008 IRP Advisory Group Meeting (Attachment) shows the range of projected CO2 prices. From that discussion, the Company modeled a range of CO2 prices to examine the possible impact on the portfolio choices. These modeling assumptions were carried through the RFP process, as seen on Exhibit No. _ (AS-3HC), page 165, including the Business As Usual (BAU) scenario. The BAU scenario modeled no significant carbon price, but other scenarios modeled a number of different price curves for carbon. Even with minimal carbon prices assumed in the 2010 BAU run, the RFP optimization model chose LSR Phase 1 as soon as it was available, in 2012. See also Attachment, pages 6, 12 and 13.

The context under which the IRP Advisory Group and the Company's RFP process existed also needs to be considered, as chronicled by the cross-answering testimony of NWECC witness Decker at pages 14-15. At the time of the IRP and RFP, it was widely assumed that a carbon bill would be passed by Congress. Modeling is always context sensitive. The Company worked with its advisory group and made reasonable choices in modeling future scenarios and later used the same modeling decisions in the subsequent RFP analyses.

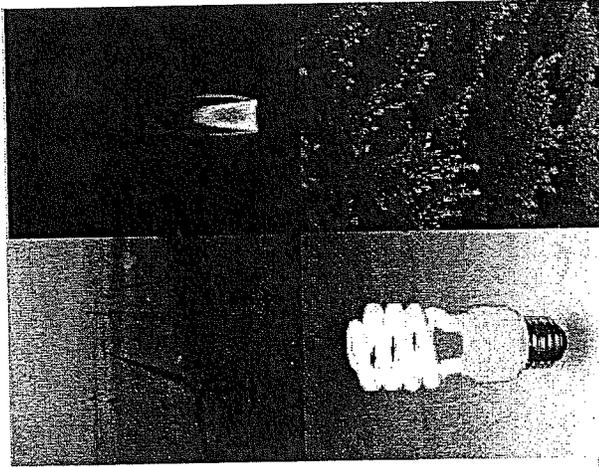
2009 IRP Advisory Group

August 19, 2008

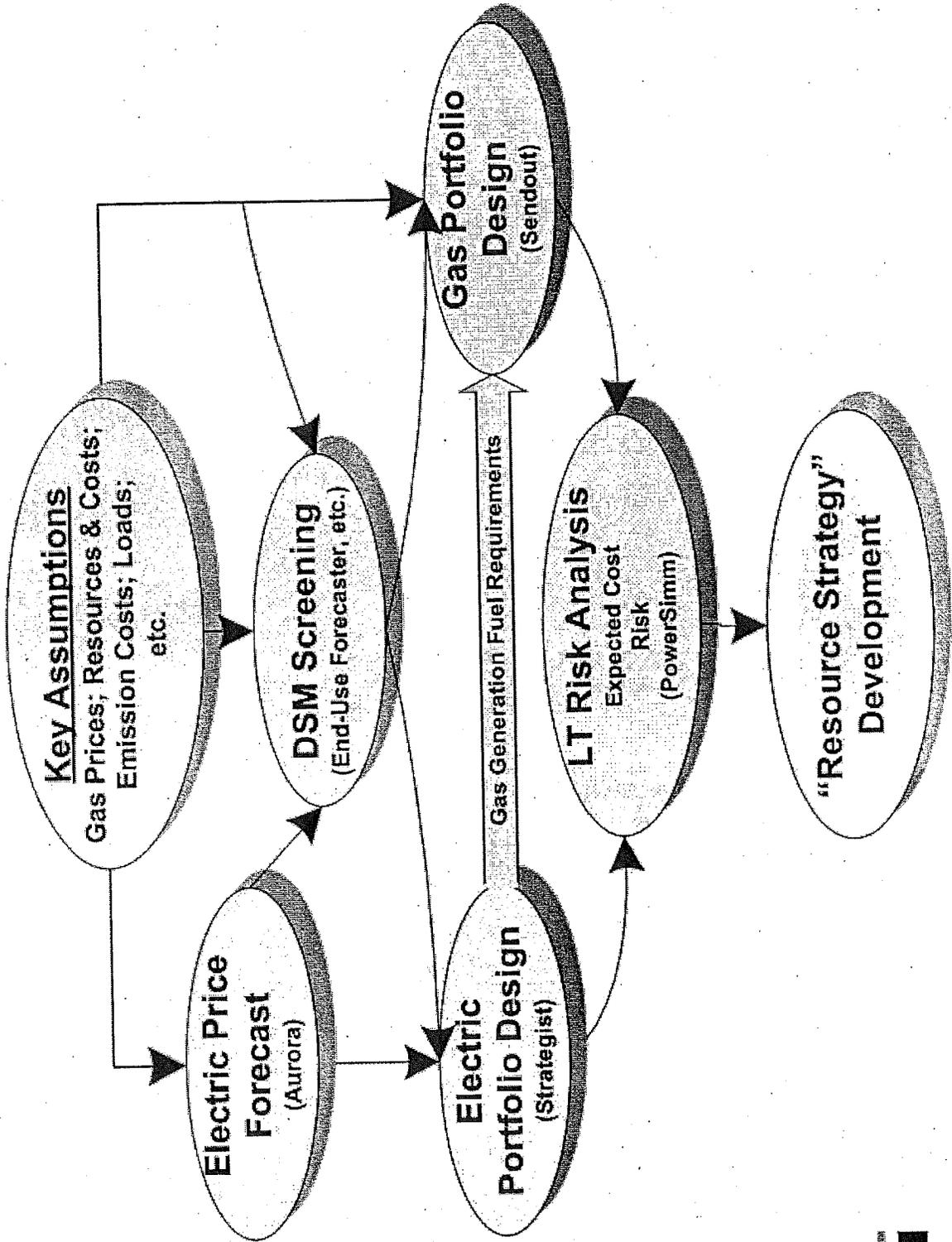


Agenda

- Introductions: 10 - 10:15 a.m.
- Kick Off: 10:15 – 10:30 a.m. *Phillip Popoff*
- Aurora Forecasts: 10:30 – 11:45 a.m. *Villamor Gamponia*
- Transmission Update: 11:45 – noon *Hugh Nguyen*
- Lunch Break: noon – 12:30 p.m.
- Wild Horse Presentation: 12:30 – 1: p.m. *Brian Lenz*
- Tour: 1:00 – 2:00 p.m.



Resource Planning Portfolio Analysis Process



VERGY
Great Things



Draft Aurora Price Forecasts Villamor Gamponia

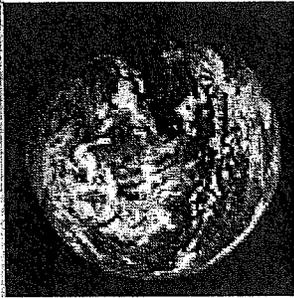
August 19, 2008



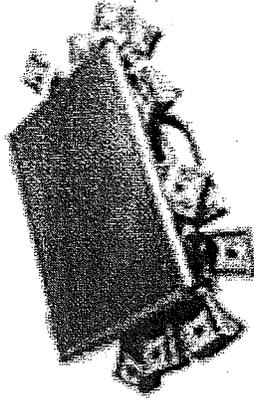
2009 IRP Scenarios



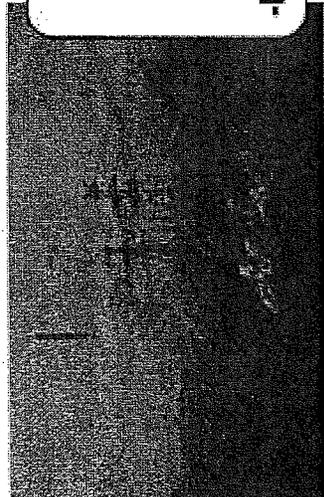
Low Growth
 -CO2 Cost Cap
 -Low Gas Price
 -Low Demand
 -Low Resource Costs



Green World
 -High CO2 Cost
 -High Gas Price
 -Low Demand
 -High Resource Costs



High Growth
 -Ref CO2 Cost
 -High Gas Price
 -High Demand
 -High Resource Costs



Backslide
 -Current CO2 Offset
 -Ref Gas Price
 -Ref Demand
 -Conv Coal Available
 -RPS Limited to First Step



Reference Case
 -Ref/Mid CO2 Cost
 -Ref/Mid Gas Price
 -Ref/Mid Demand
 -Ref/Mid Resource Costs

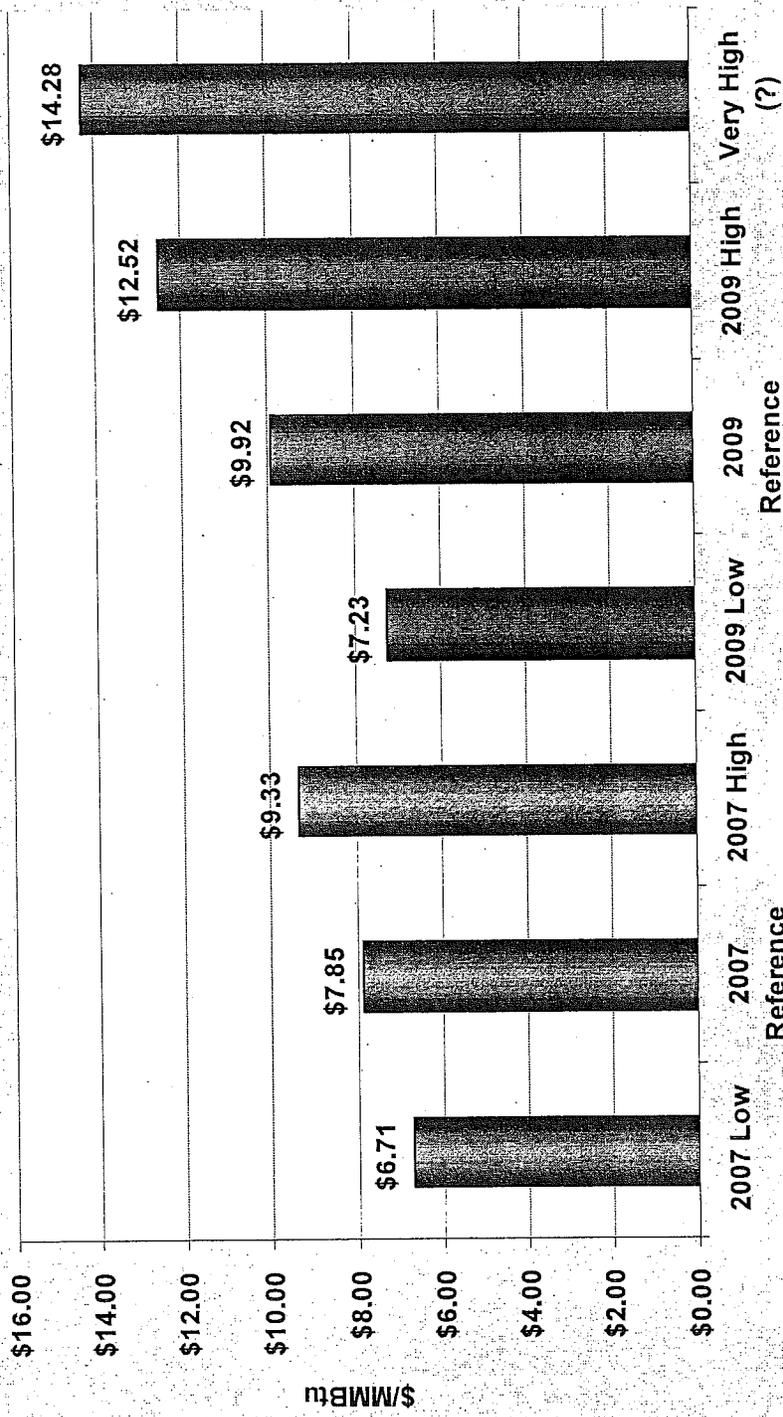
Key Assumptions for Planning Scenarios

	Reference	Green World	Low Growth	High Growth	Backslide
Theme	Best estimate of current resource costs, characteristics, fuel prices, state and federal environmental legislation	Support for stronger environmental legislation at the federal level, with continuation of state level RPS	Lower regional demand growth based on lower long-term economic growth.	Higher regional load growth based on related long-term economic growth.	Impact of carbon regulation and RPS on resource strategy
WECC Demand	Reference (1.8%)	Low Growth (1.6%)	Low Growth (1.6%)	High Growth (2.0%)	Reference
Gas Price	Forward marks for 2010-2013, and Global Insight's base forecast	Global Insight's high forecast	Global Insight's low forecast	Global Insight's high forecast	Reference
Emissions (Nominal \$/Ton)	Lieberman-Warner (L-W) Bill (EPA) Start in 2012 2012: \$37 2020: \$67 2029: \$130	Wood Mackenzie Start in 2012 2012: \$55 2020: \$129 2029: \$150	L-W Bill (cap, internat'l offset) Start - 2012 2012: \$27 2020: \$49 2029: \$95	Reference	RCW 80.70 - Carbon Mitigation Plan 250 MW or greater \$1.60/ton for 20% of total CO2
Generic Resource Cost (\$/KW) Escalation	PSE market based estimates	High Resource Costs	Low Resource Costs	High Resource Costs	Reference
RPS	Meet current state RPS through 2029	Reference	Reference	Reference	Only meet first level of state RPS
Production Tax Credits for Wind (\$/MWh)	\$20:2010 \$20: 2011-2013	\$20:2010-2015 \$10: 2016-2020	Reference	Reference	No PTC extension
Build Constraints (AURORA)	Limited coal and IGCC builds due to CO2 laws. No new nukes.	Reference	Reference	Reference	Higher amount of Coal and IGCC builds allowed. No new nukes.

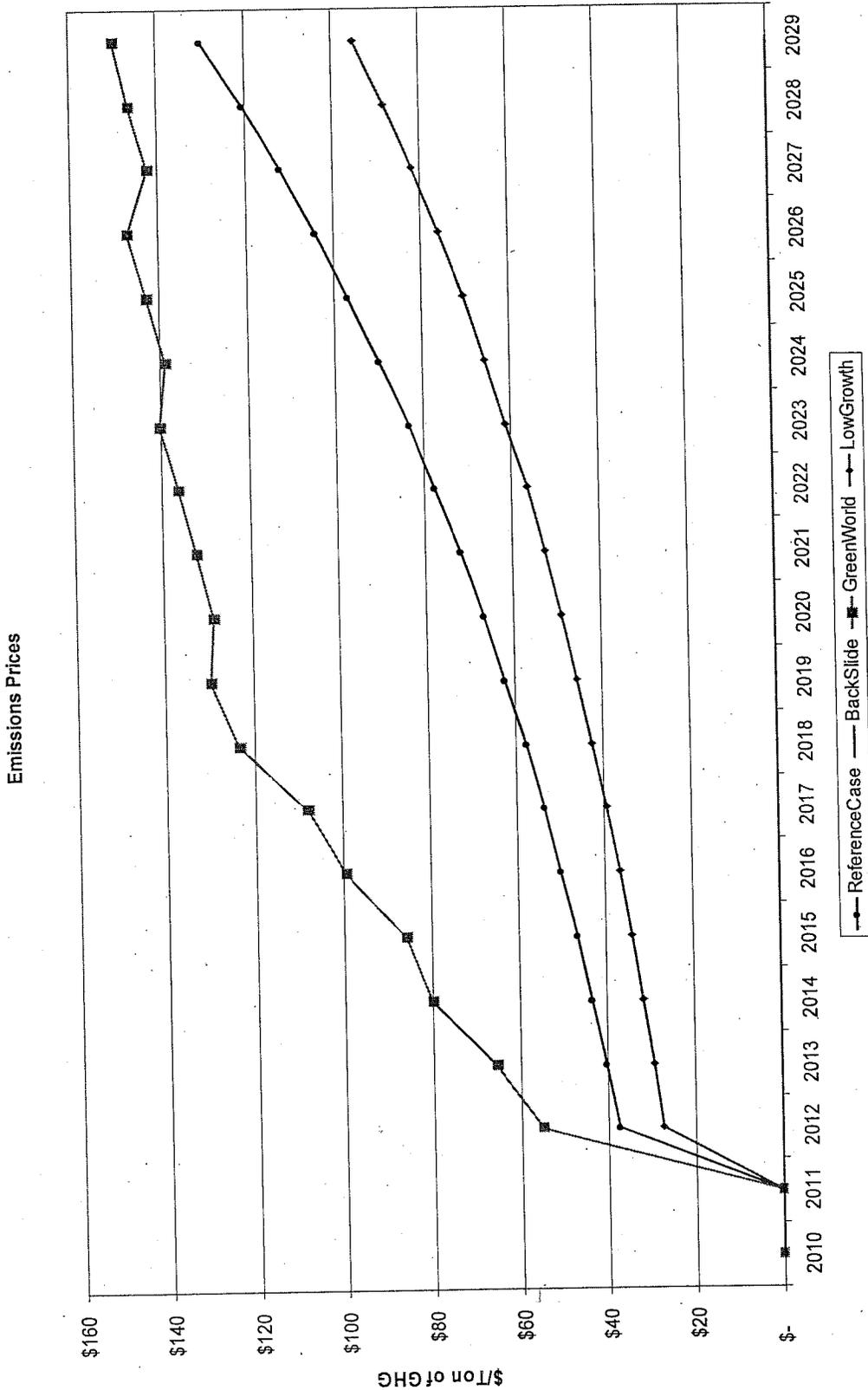


Sumas Gas Price Forecasts

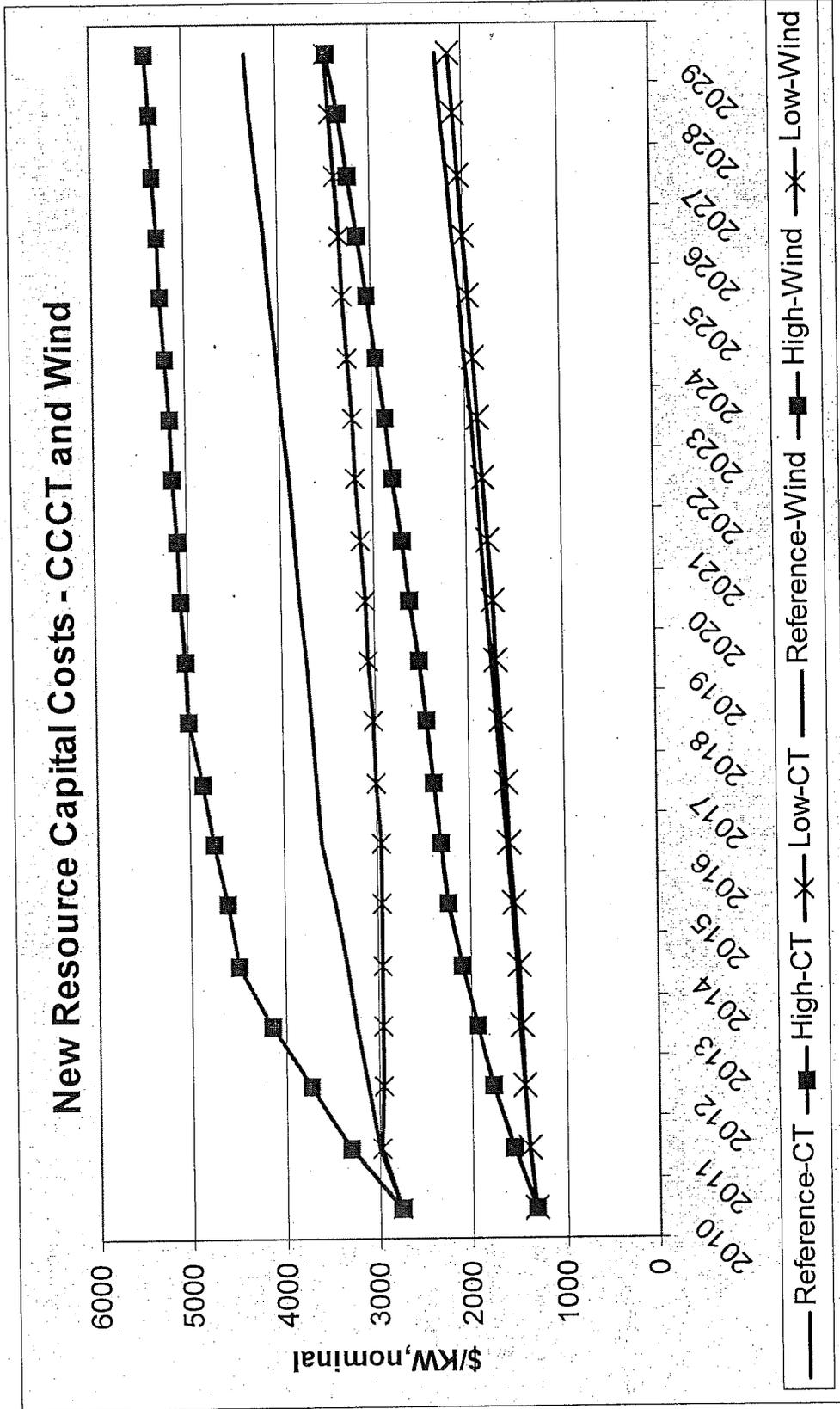
Comparison of Gas Price Scenarios - 2007 & 2009 IRPs
 (20-Year Levelized Sumas Prices - nominal \$)



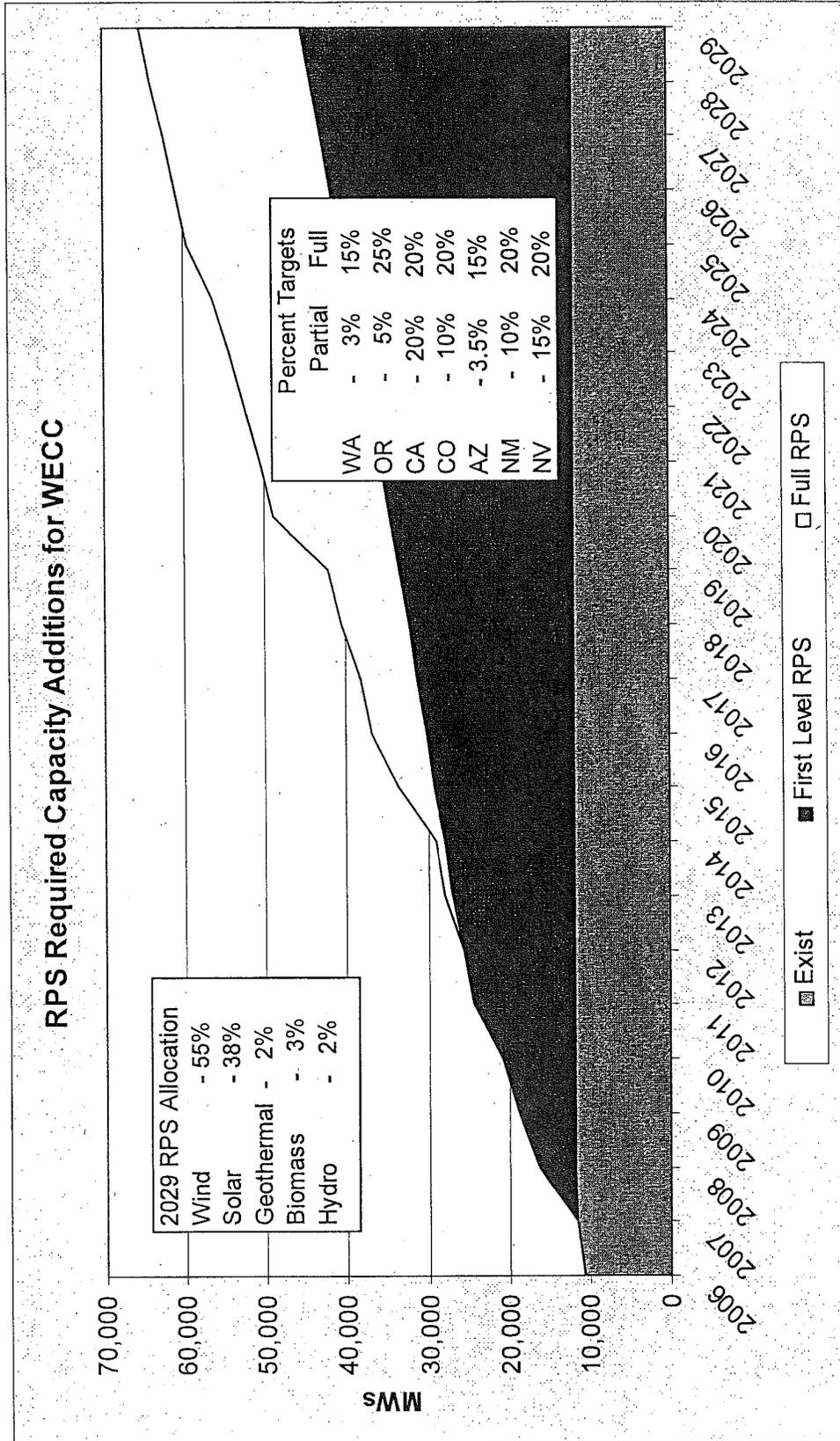
Range of Proposed CO2 Costs



New Resource Capital Cost Trends

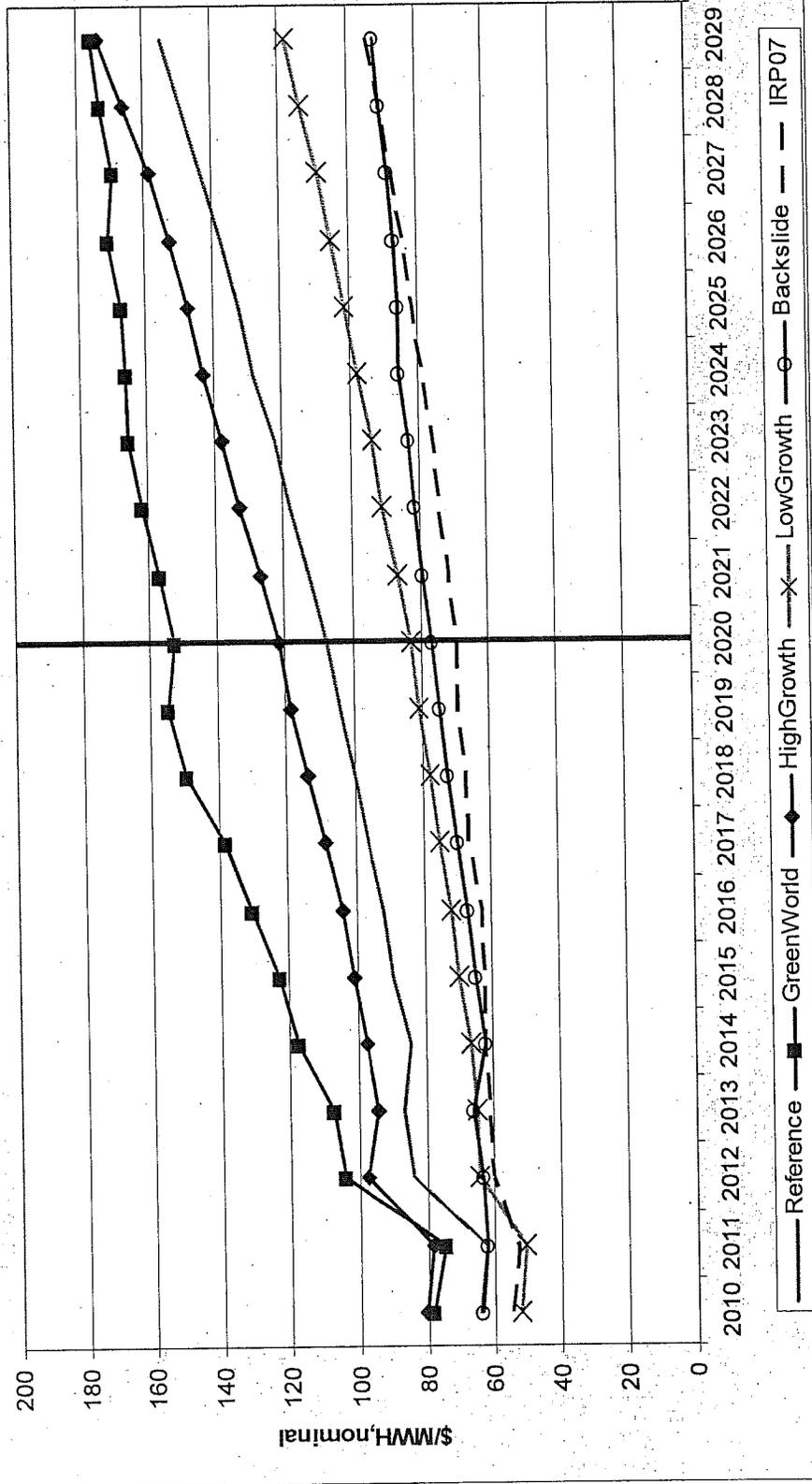


Renewable Capacity Additions for WECC RPS



Mid C Power Price Draft Forecasts

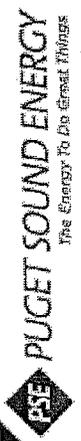
MidC Average Annual Prices



Impacts of Assumption Updates on Prices

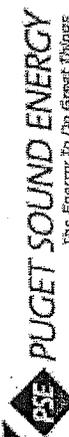
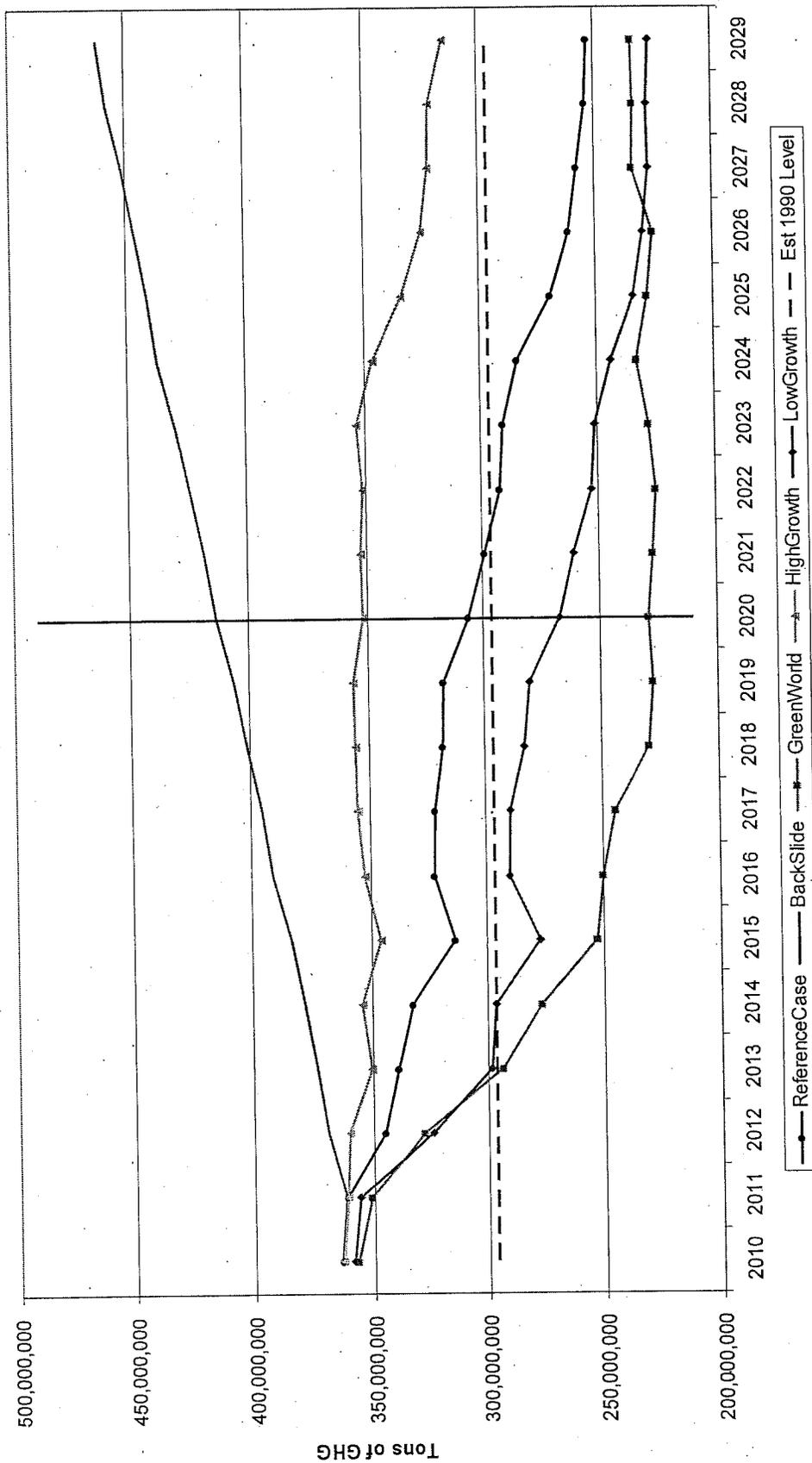
	Levelized Price(10-29) nominal	Pct Change
Revisions for Reference Case		
IRP07 - Current Trends	\$66.34	6.7%
RFP08 - (Demand, 4/30 Gas Price Updates, CO2, GRC07)	\$70.78	0.4%
Aurora Model and EPIS Database Updates	\$76.79	8.1%
Gas Price Update (7/1/08 Forwards and 5/08 Global Insight)	\$94.26	22.8%
Updated CO2 Prices - Reference Case	\$94.90	0.7%
Updated RPS, New Resource Capital Costs	\$97.00	2.2%
Other Input Changes (DRAFT PRICES for Reference Case)		
Scenarios - DRAFT PRICES		
Green World Scenario	\$128.09	32.1%
High Growth Scenario	\$110.76	14.2%
Low Growth Scenario	\$75.11	-22.6%
Backslide Scenario	\$71.36	-26.4%

Pct vs.
Reference



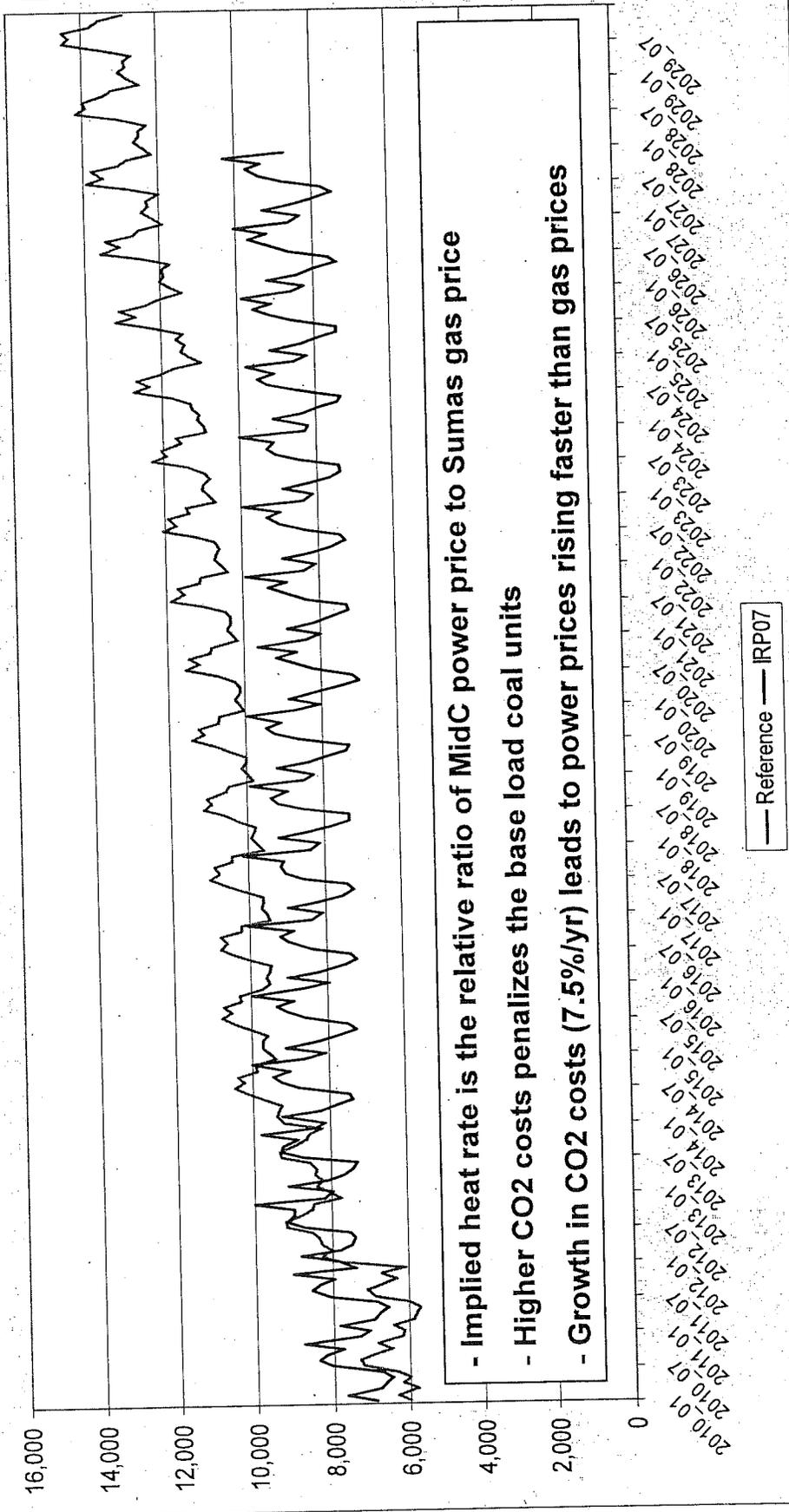
Impacts on WECC CO2 Emissions

AURORA WECC Emissions

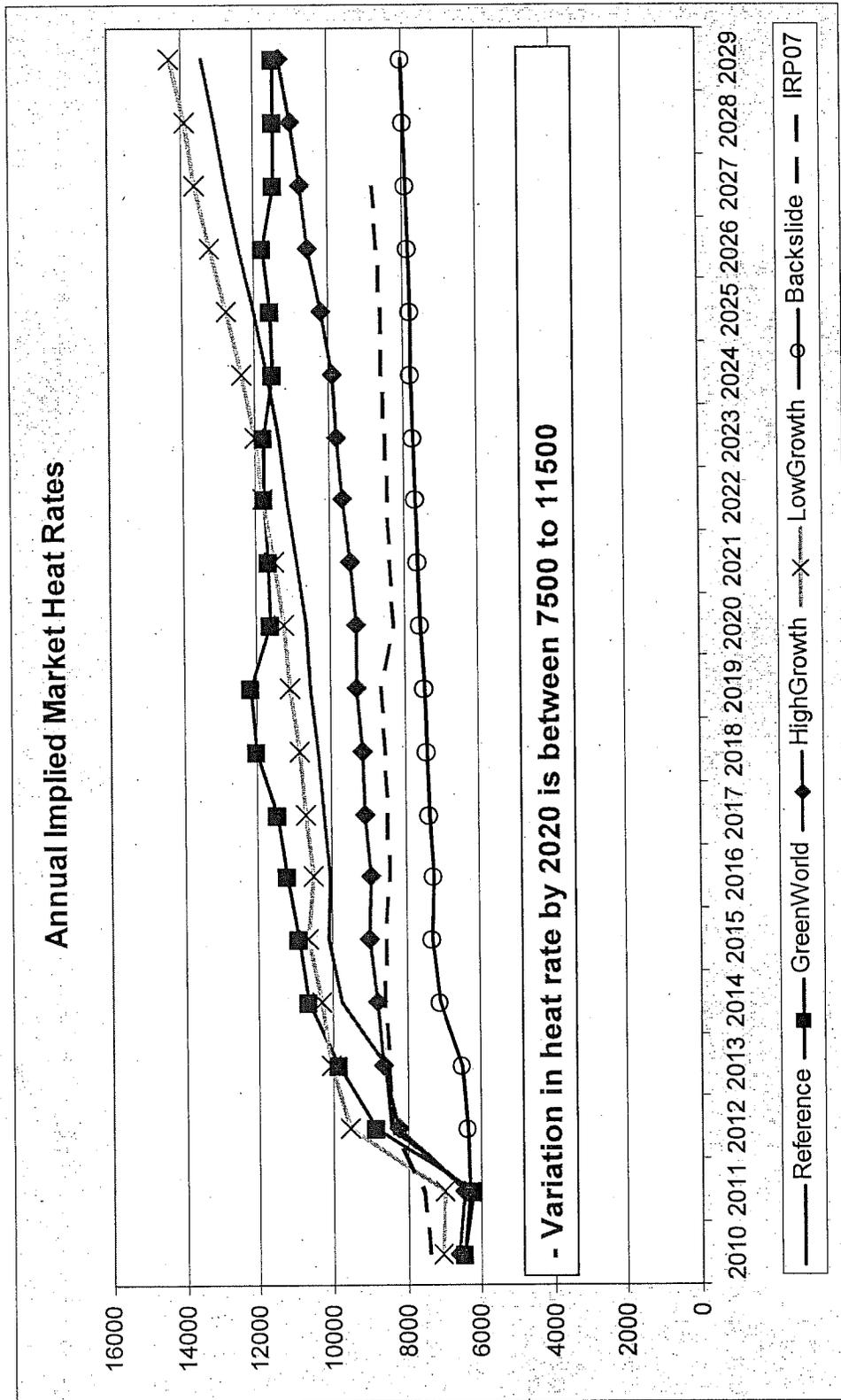


Implied Heat Rates – IRP09 vs. IRP07

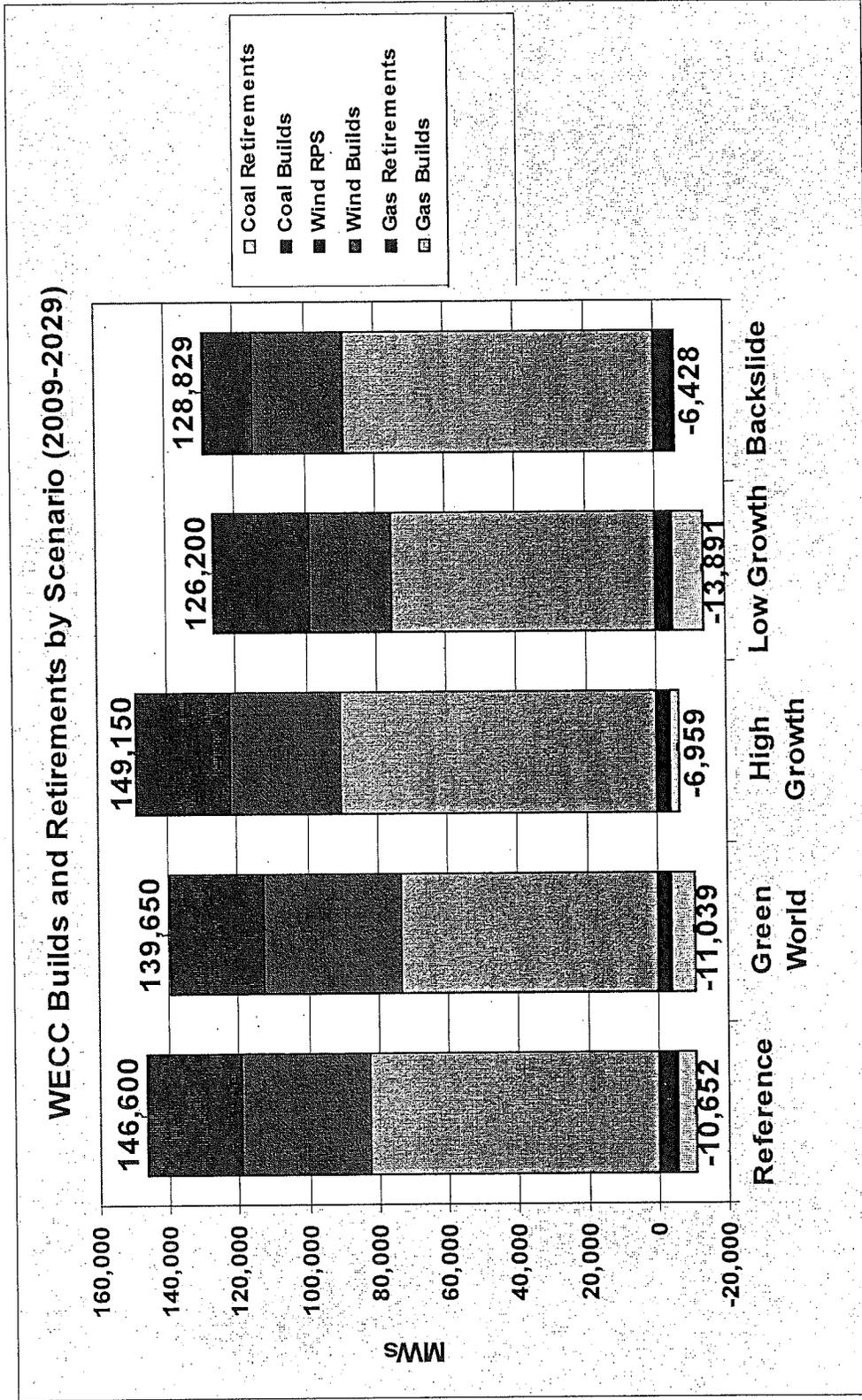
Implied Market Heat Rates - Average Prices for Reference Scenarios



Implied Heat Rates – All Scenarios



WECC Capacity Builds and Retirements



Generic Resource Costs - Draft

	Capacity		FOM*	VOM*	FOR	Heat Rate
	MW	\$/KW				
(2008 \$)						
CCCT	275	\$1,257	\$24.04	\$2.85	5%	7,000
CCCTwCCS	250	\$2,470	\$36.22	\$7.59	5%	8,378
SCCT	100	\$1,199	\$10.56	\$4.62	5%	9,100
Recip Engines	80	\$1,240	\$27.46	\$1.40	2%	8,700
Coal	250	\$2,878	\$139.83	\$10.44	10%	8,949
IGCC	250	\$3,326	\$158.11	\$8.14	15%	8,526
IGCCwCCS	250	\$4,758	\$169.34	\$10.23	15%	10,487
Wind	100	\$2,433	\$84.19	\$10.32	70%	N/A
Long Haul Wind	100	\$3,272	\$104.20	\$18.50	64%	N/A
Solar CST	50	\$4,950	\$98.62	\$1.83	72%	N/A
Biomass	20	\$2,704	\$83.54	\$6.54	15%	14,000
Geothermal	25	\$3,449	\$150.51	\$3.59	5%	N/A

New resources for Aurora

*Includes O&M and Transmission

Compare Resource Costs - Draft

	Capital (\$/KW)		FOM (\$/KW-yr)*		VOM (\$/MWh)*	
	2007 IRP	2009 IRP	2007 IRP	2009 IRP	2007 IRP	2009 IRP
(2008 \$)						
CCCT	\$1,050	\$1,257	\$20.50	\$20.50	\$2.85	\$2.85
CCCTwCCS	N/A	\$2,470	N/A	\$32.68	N/A	\$4.06
SCCT	\$990	\$1,199	\$7.37	\$7.02	\$3.66	\$4.62
Recip Engines	N/A	\$1,240	N/A	\$23.92	N/A	\$1.40
Coal	\$2,600	\$2,878	\$25.00	\$45.21	\$5.00	\$6.33
IGCC	\$3,001	\$3,326	\$35.00	\$63.50	\$3.00	\$4.03
IGCCwCCS	\$4,295	\$4,758	\$42.00	\$74.73	\$4.00	\$6.13
Wind	\$2,000	\$2,433	\$43.00	\$40.00	\$2.00	\$2.00
Long Haul Wind	N/A	\$3,272	N/A	\$40.00	N/A	\$2.00
Solar CST	N/A	\$4,950	N/A	\$63.00	N/A	\$0.00
Biomass	\$2,200	\$2,704	\$175.00	\$80.00	\$0.00	\$3.00
Geothermal	\$3,449	\$3,449	\$132.00	\$132.00	\$1.80	\$1.80

New resources for Aurora

* Does not include the cost of transmission

Transmission Updates

Hugh Nguyen

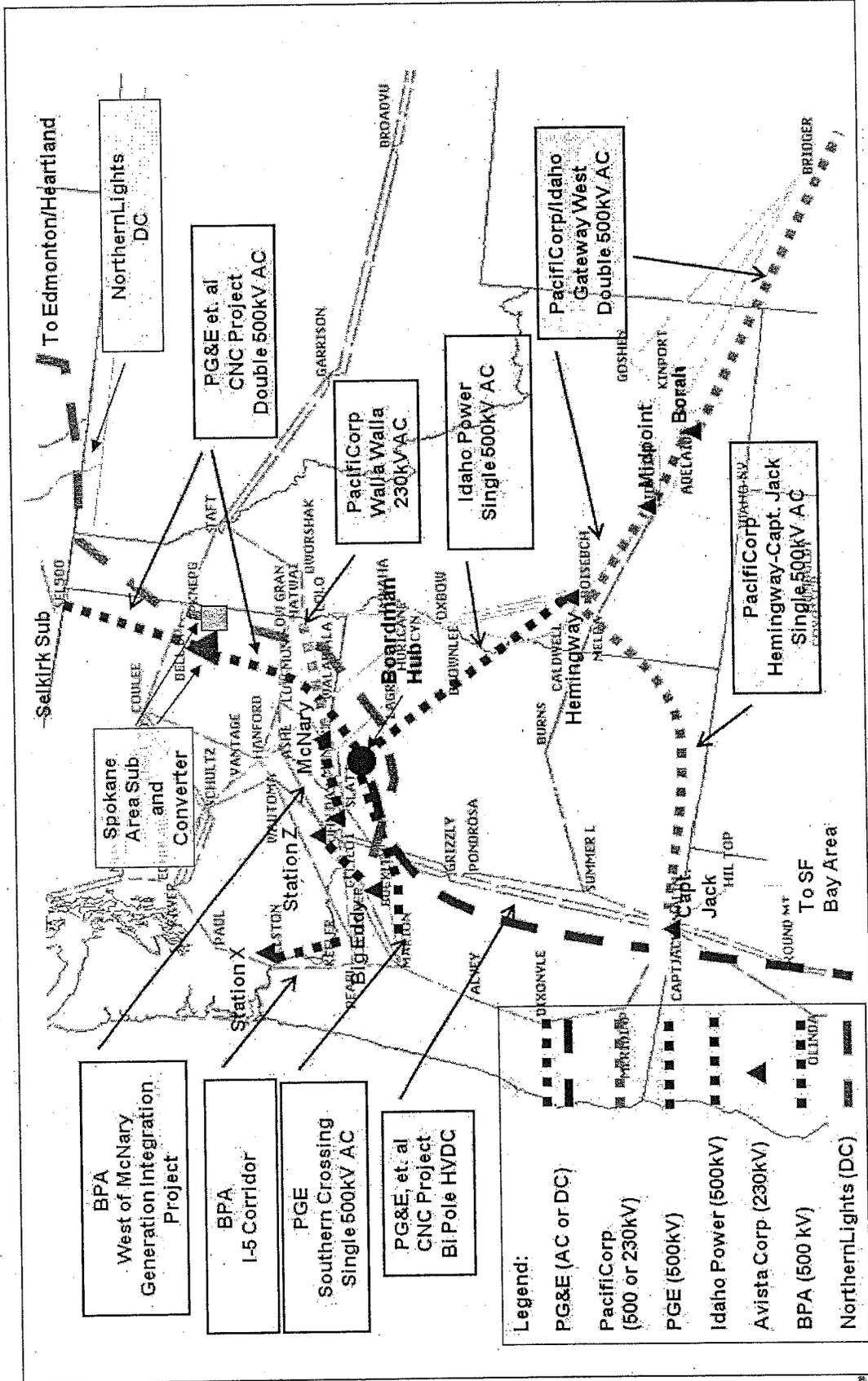
8/14/2008



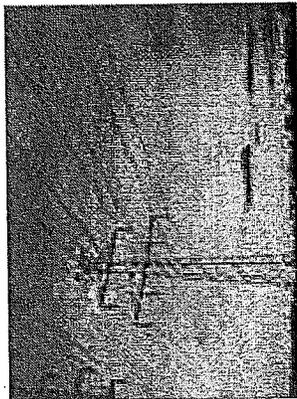
Overview of Big Tent Projects

- ◆ Project Information
 - ◆ Ten transmission projects
 - ◆ I5 Corridor, West of McNary, Canada – Northern CA, Spokane Tap, Northern Lights, Walla Walla, Gateway West, Hemmingway – Boardman, Hemmingway – Capt. Jack
 - ◆ Project names and sponsors
 - ◆ BPA, PG&E, TransCanada, PGE, Avista, PacifiCorp, Idaho Power
 - ◆ Location shown on Northwest map

New Transmission Projects in the Northwest Planned Operation: 2010 – 2015



BPA Network Open Season Update



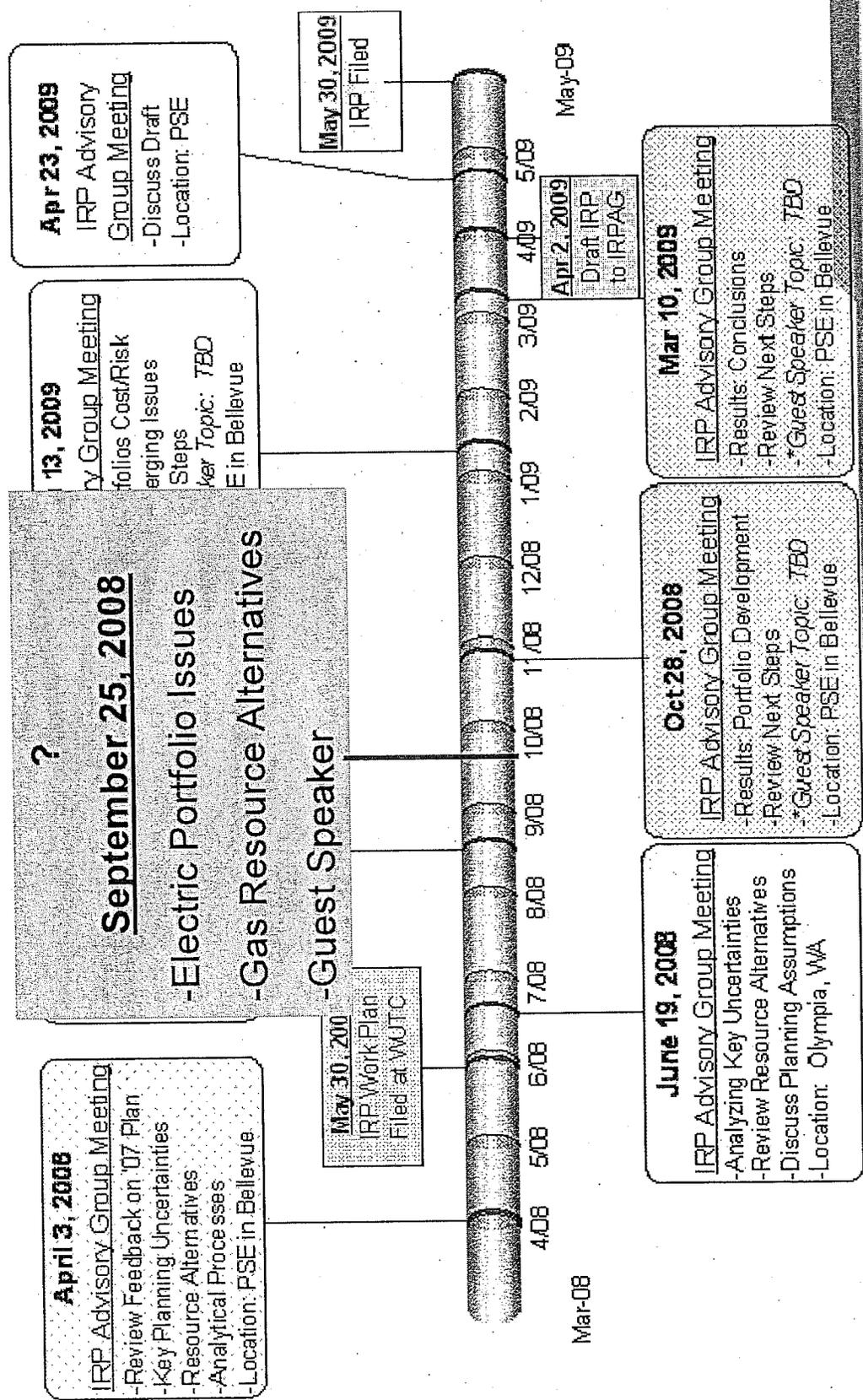
- ◆ Ensure adequate infrastructure
- ◆ Meet planning, expansion, and reliability obligation
- ◆ Encourage resource development

Detail	Final Summary (June 27)
Number of Precedent Agreements	153
Number of Total MW	6,410 MW
Participating Customers	28
Puget Breakdown	
PSE signed up for	780 MW
PSE Security Deposit	\$12.2 Million

Network Open Season Cluster Study Area

- ◆ West of McNary
- ◆ I-5 Corridor
- ◆ Harney Area
- ◆ Little Goose Area
- ◆ Walla Walla Area
- ◆ McNary Area
- ◆ West of Cascades North
- ◆ West of Cascades South

Puget Sound Energy 2009 Integrated Resource Plan Public Participation Timeline



Questions/Remaining Issues?



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PC-25 RE: Exhibit No. DN-2T, p. 15, lines 10-11.

Please provide any independent analysis performed by Mr. Nightingale of the information on page 410 of Exhibit No. AS-3HC that he has cited as support for his testimony that, even with LSR Phase 1, PSE will still need to acquire additional renewables or RECs beginning in 2020.

RESPONSE:

Mr. Nightingale did not perform independent analysis, but did examine the PSM III model to verify values and calculations that support page 410 of Exhibit No. AS-3HC. The details of the RFP 2010 Trends PSM III version 13.6 verifies the chart on page 410. Specifically, in the LPPProblem tab, starting at cell AV43, a chart that shows a large acquisition of new wind in 2012, representing the acquisition of LSR Phase 1 (343 MW Capacity) plus additional renewable resources. LSR represents about two-thirds of the total selection of optimal renewables acquisition in 2012. The total RECs generated from those new resources plus the existing renewable resources amounts to about 3.1 million RECs in 2012 as shown on the chart and at cell AZ13 in the LPPProblem tab. The chart also shows a line representing the REC need per year to be in compliance with the RPS. The REC need line exceeds 3.5 million RECs in the year 2020, which is significantly above the RECs provided by all the 2012 renewable resources, existing and newly acquired in 2012.

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PC-26 RE: Exhibit No. DN-2T, p. 15, lines 19-22.

Please identify the specific PSM I and PSM III model runs and results that Mr. Nightingale reviewed to support his testimony, which states "that there were no more cost-effective and less risky resource options available at the time the decision was made to commence construction of LSR Phase 1."

RESPONSE:

Model runs reviewed by Mr. Nightingale were PSM III versions, 13.6 and 13.9, PSM IIA and PSM I version 14.2 to review the qualitative analyses. An important additional evaluation of the qualitative analysis performed by the Company was needed to examine the risk of available options.

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REQUESTER: Public Counsel

PC-27 Reference Exhibit Nos. DN-2T and Exhibit No. DN-3T :

Please provide Mr. Nightingale's workpapers for his cross-answering testimony,
Exhibit Nos. DN-2T and DN-3T.

RESPONSE:

There are no workpapers for Mr. Nightingale's Exhibit Nos. DN-2T and DN-3.