Exhibit No. ___ (APB-10)
Docket Nos. UE-050684 and UE-050412
Witness: Alan P. Buckley

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, Complainant, v. PACIFICORP, d/b/a Pacific Power & Light Company, Respondent.	DOCKET NO. UE-050684
In the Matter of the Petition of PacifiCorp, d/b/a Pacific Power & Light Company for an Order Approving Deferral of Costs Related to Declining Hydro Generation	DOCKET NO. UE-050412

EXHIBIT TO TESTIMONY OF

ALAN P. BUCKLEY

For
STAFF OF
WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION

PacifiCorp's 2004 Update:
"PacifiCorp IRP Update for WUTC"
(October 7, 2004)

November 3, 2005

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IRP Update for WUTC

October 7, 2004

Agenda

- Major Inputs & Assumptions
- Load and Resource Balance
- Portfolios Results
- Next Steps

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Inputs & Assumptions

Review Major Inputs & Assumptions

- Load Forecast
- Gas & Electric Price Forecast
- Environmental Assumptions
- Other Major Assumptions

Load Forecast - Total Energy Growth

		Mar-03	Feb-04
State	1992-2002	2005-2015	2005-2015
Oregon	0.7%	1.6%	1.7%
Utah	3.4%	3.9%	3.7%
Washington	1.1%	2.0%	1.7%
California	1.3%	1.4%	1.4%
Idaho	0.9%	1.0%	1.3%
Wyoming	-0.5%	1.5%	1.2%
Total	1.5%	2.6%	2.5%

» Current forecast average load growth projected at 2.5%, down from 2.6% for same period

» Growth in all states increasing from historical period

Load Forecast - Summer Coincident Peak Growth

		Mar-03	Feb-04
State	1992-2002	2005-2015	2005-2015
Oregon	0.6%	1.8%	1.9%
Utah	4.5%	4.6%	4.5%
Washington	1.2%	2.6%	2.3%
California	2.5%	1.7%	1.8%
Idaho	5.2%	-0.4%	-0.2%
Wyoming	-1.2%	1.4%	1.1%
Total	2.1%	3.1%	3.0%

- Current forecast summer peak growth projected at 3.0%, down from 3.1% for same period
- Total system growth increasing from historical period

Load Forecast - Winter Coincident Peak Growth

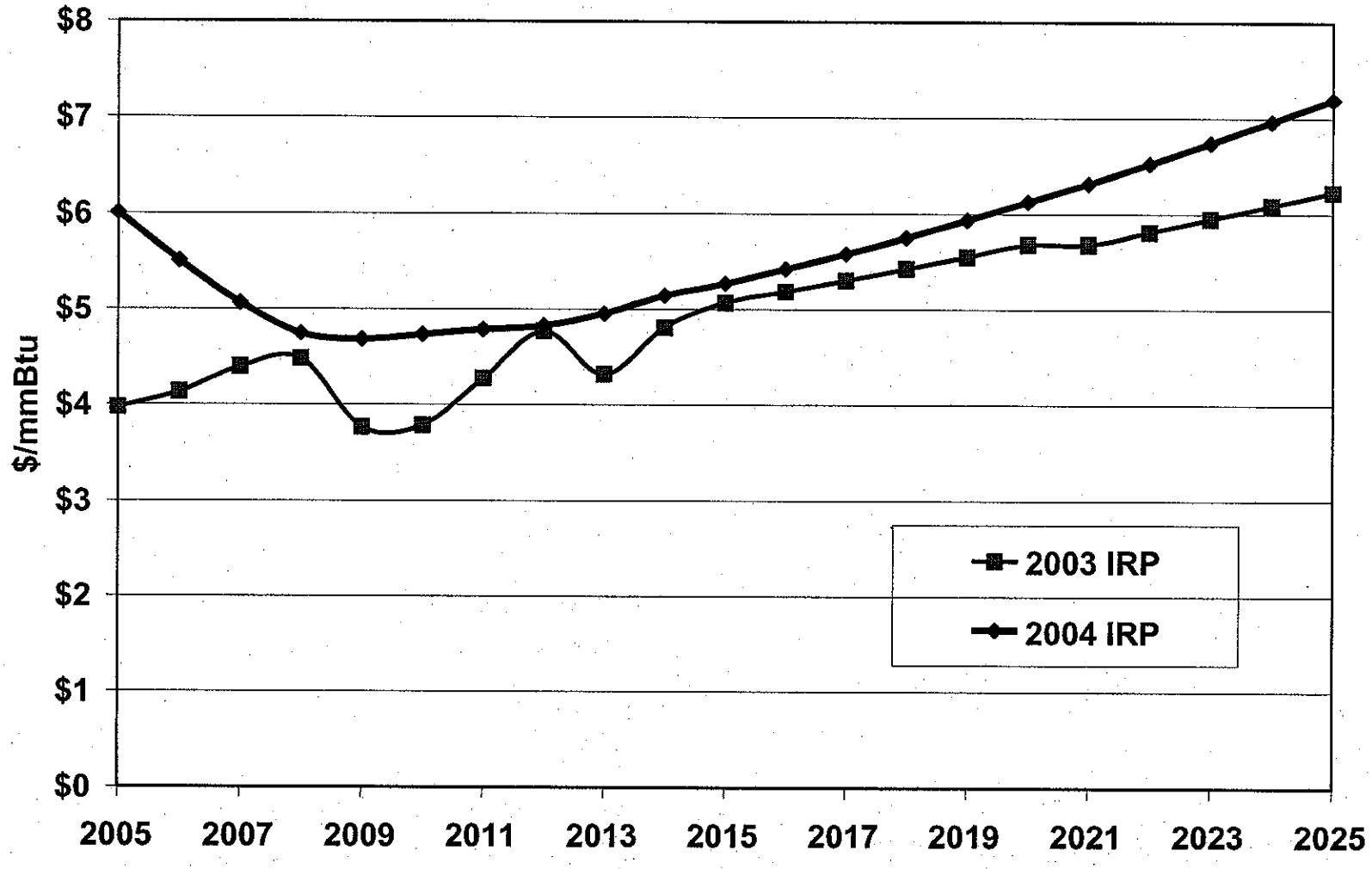
State	1992-2002	Mar-03 2005-2015	Feb-04 2005-2015
Oregon	-0.3%	0.5%	0.5%
Utah	4.6%*	4.3%	4.1%
Washington	0.2%	1.0%	0.7%
California	-2.2%	0.4%	0.4%
Idaho	1.6%	0.9%	1.2%
Wyoming	-1.0%	0.6%	0.4%
Total	1.1%	2.2%	2.0%

» Current forecast winter peak growth projected at 2.0%, down from 2.2% for same period

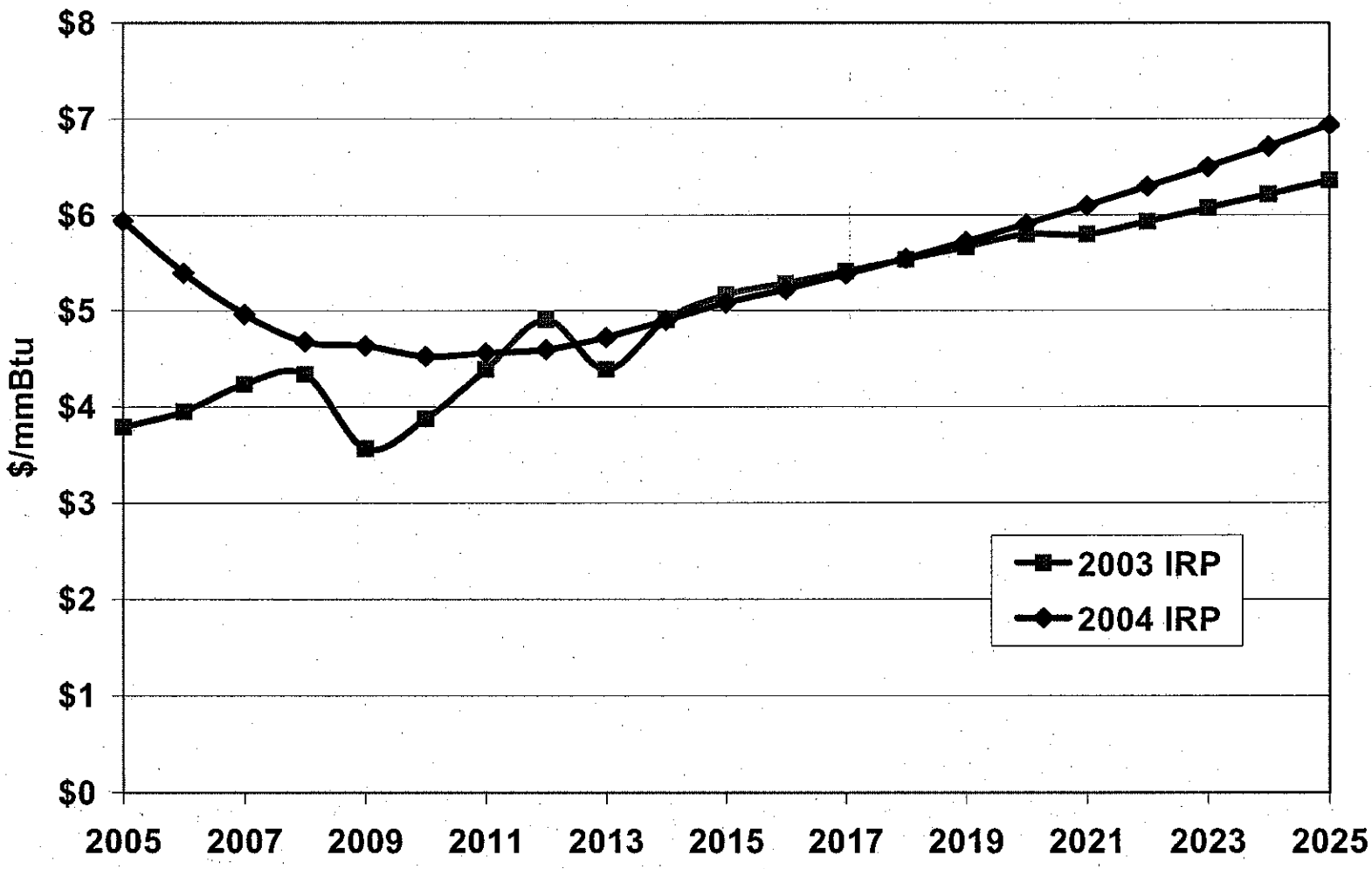
» Total system growth increasing from historical period

*Growth is 3.8% when measured on a comparable basis

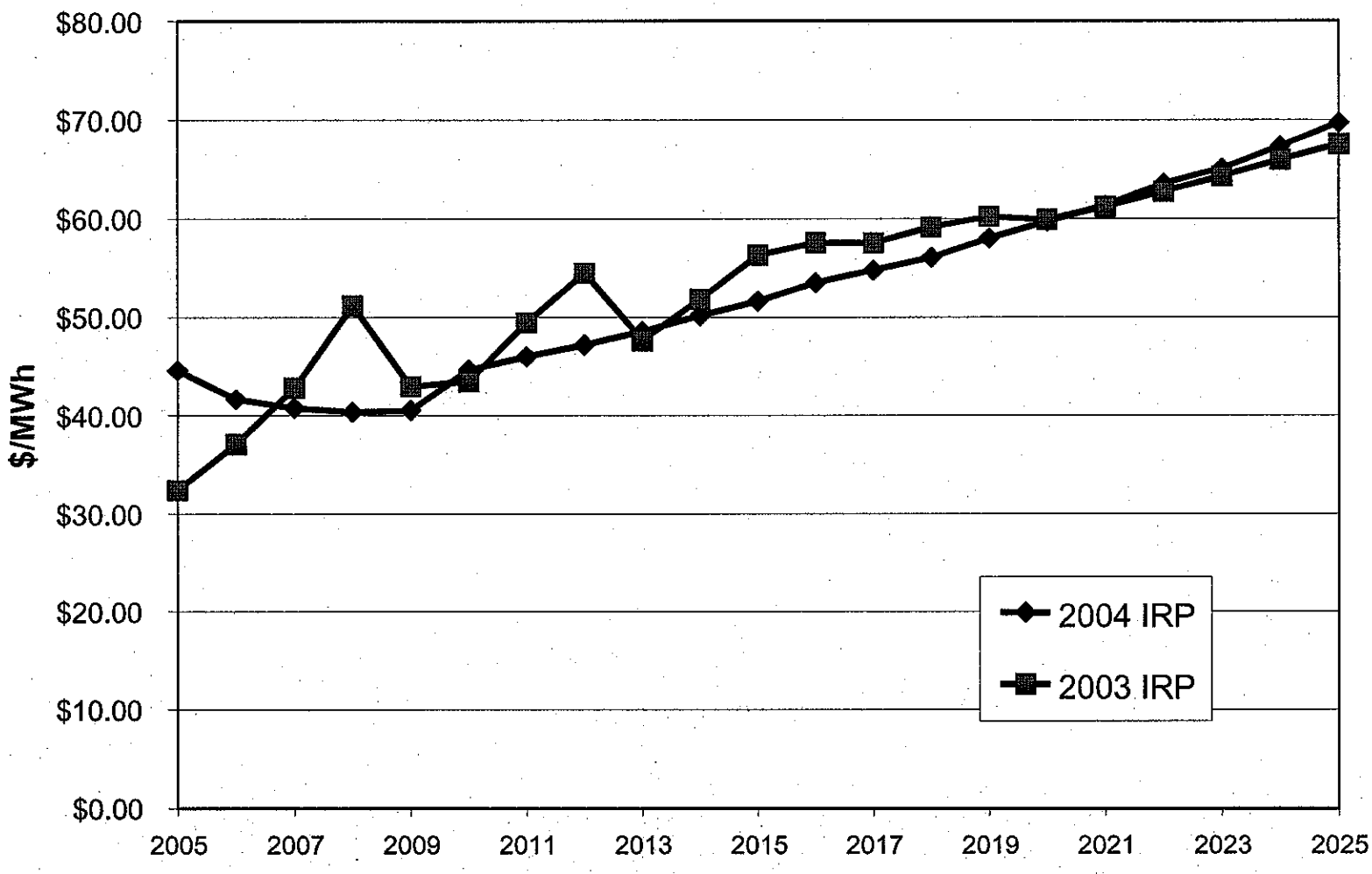
West - Natural Gas Prices



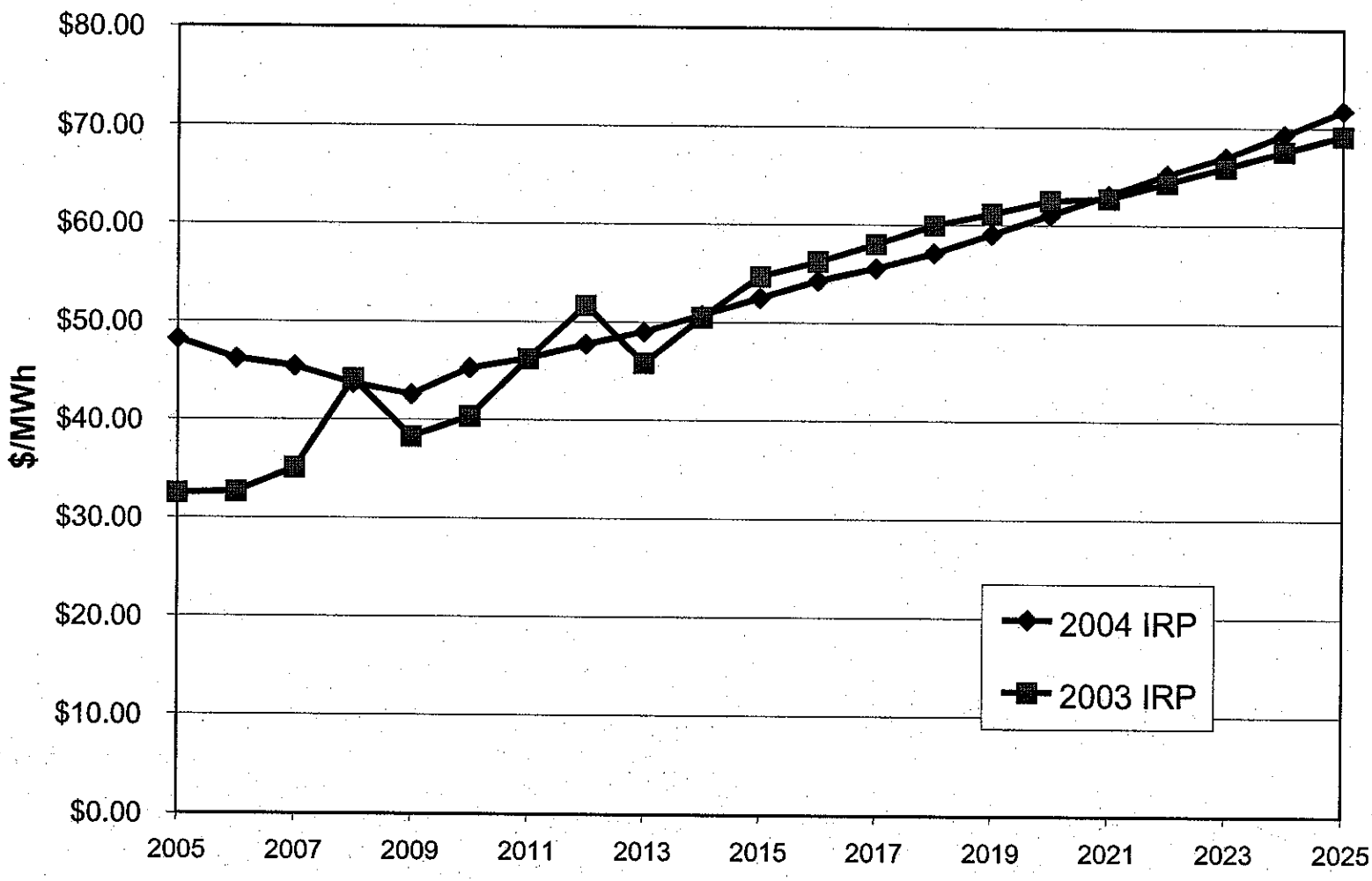
East - Natural Gas Prices



Mid-C 7x24 Calendar Year Average



Palo 7x24 Calendar Year Average



Environmental Costs

	SO_2 ($/ton)	NO_x ($/ton)	Hg ($/lb)	CO_2 ($/ton)
CY2005	395	-	-	-
2006	481	-	-	-
2007	559	-	-	-
2008	648	-	-	-
2009	753	-	-	-
2010	877	2,105	40,934	4.19
2011	899	2,158	41,958	6.45
2012	921	2,210	42,965	8.80
2013	944	2,265	44,039	9.02
2014	967	2,321	45,140	9.25
2015	997	2,393	46,539	9.54
2016	1,028	2,468	47,982	9.83
2017	1,061	2,547	49,517	10.15
2018	1,096	2,631	51,151	10.48
2019	1,133	2,720	52,890	10.84
2020	1,172	2,813	54,689	11.21
2021	1,212	2,908	56,548	11.59
2022	1,254	3,010	58,527	11.99
2023	1,298	3,115	60,576	12.41
2024	1343	3224	62696	12.85
2025	1391	3337	64890	13.30
2026	1439	3454	67161	13.76

- All prices but CO2 derived from PIRA forecasts
- **SO2:** assumes tighter restrictions on emissions in 2010 leading to reduction in current national cap (~ 50% reduction)
- **NOX:** assumes western states will have a 2010 emissions cap requiring SCR on the margin
- **Hg:** 2010 cap-and-trade mercury policy hitting inflation adjusted $35k backstop
- **CO2:** delayed timing (little activity since last IRP) and probability weighted prices in 2010 - 2011

Other Major Assumptions in Base L&R

- Planning Period:
  - Calendar Year: April 2005 to March 2026
  - Fiscal Year: 2006 to 2026
- Planning Margin: 15%
- Spot Market Size: Limited by firm transmission
- 1,400 MW of Renewable Generation included
  - 20% Planning Credit at Peak
  - Modeled after characteristics of currently owned wind generation
- Currant Creek, Lake Side, and all contracts as of May 1, 2004 are included (i.e. DG&T)
- West Valley Lease
  - For FY 2006 – FY 2008, assume either extension of West Valley or equivalent purchase
  - For FY 2009 and beyond, L&R will be not include West Valley lease
- Current DSM programs and the two new RFP Class 2 Programs
- For planning purposes, there are no plant retirements in the Action Plan horizon (3-5 years)

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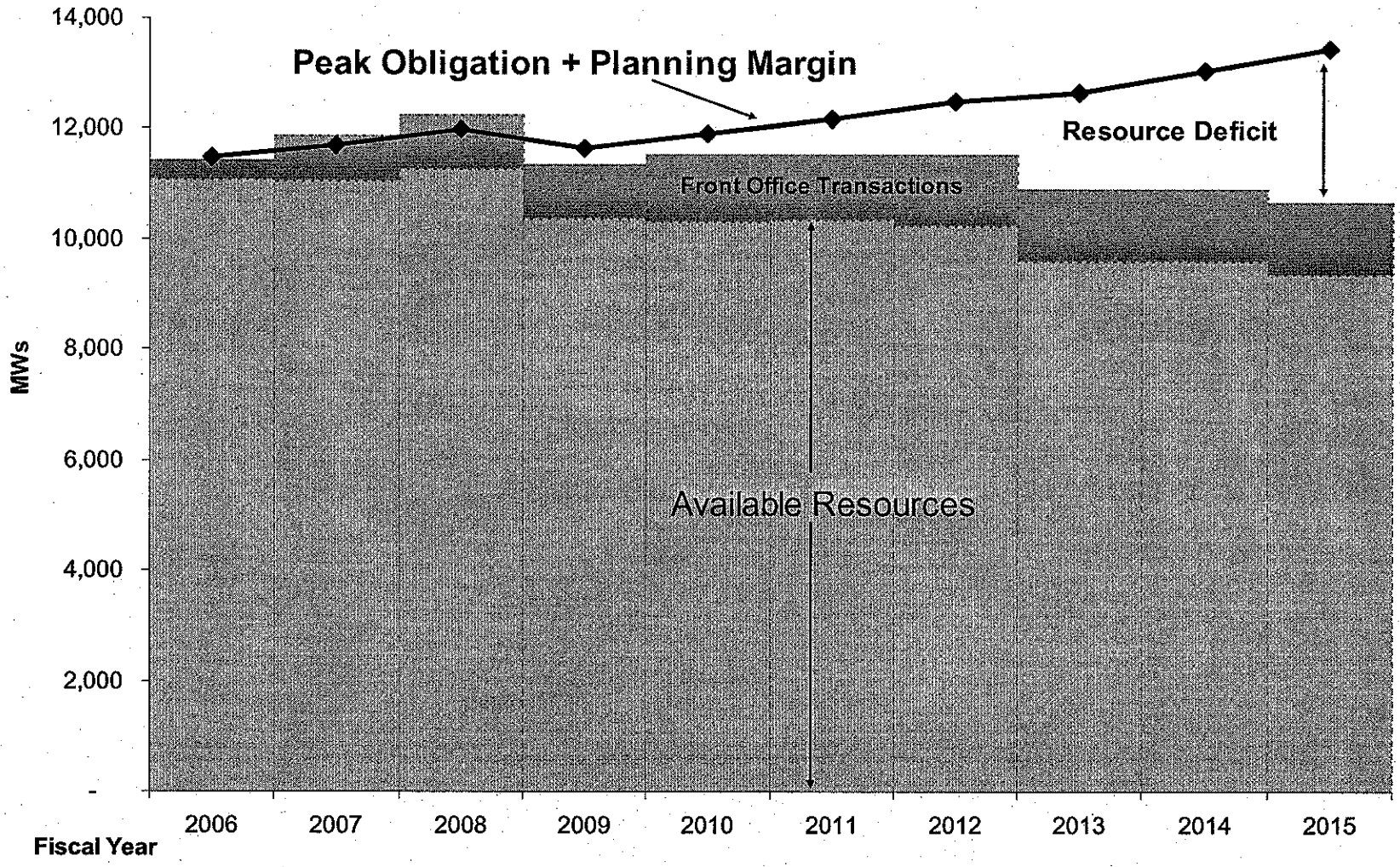
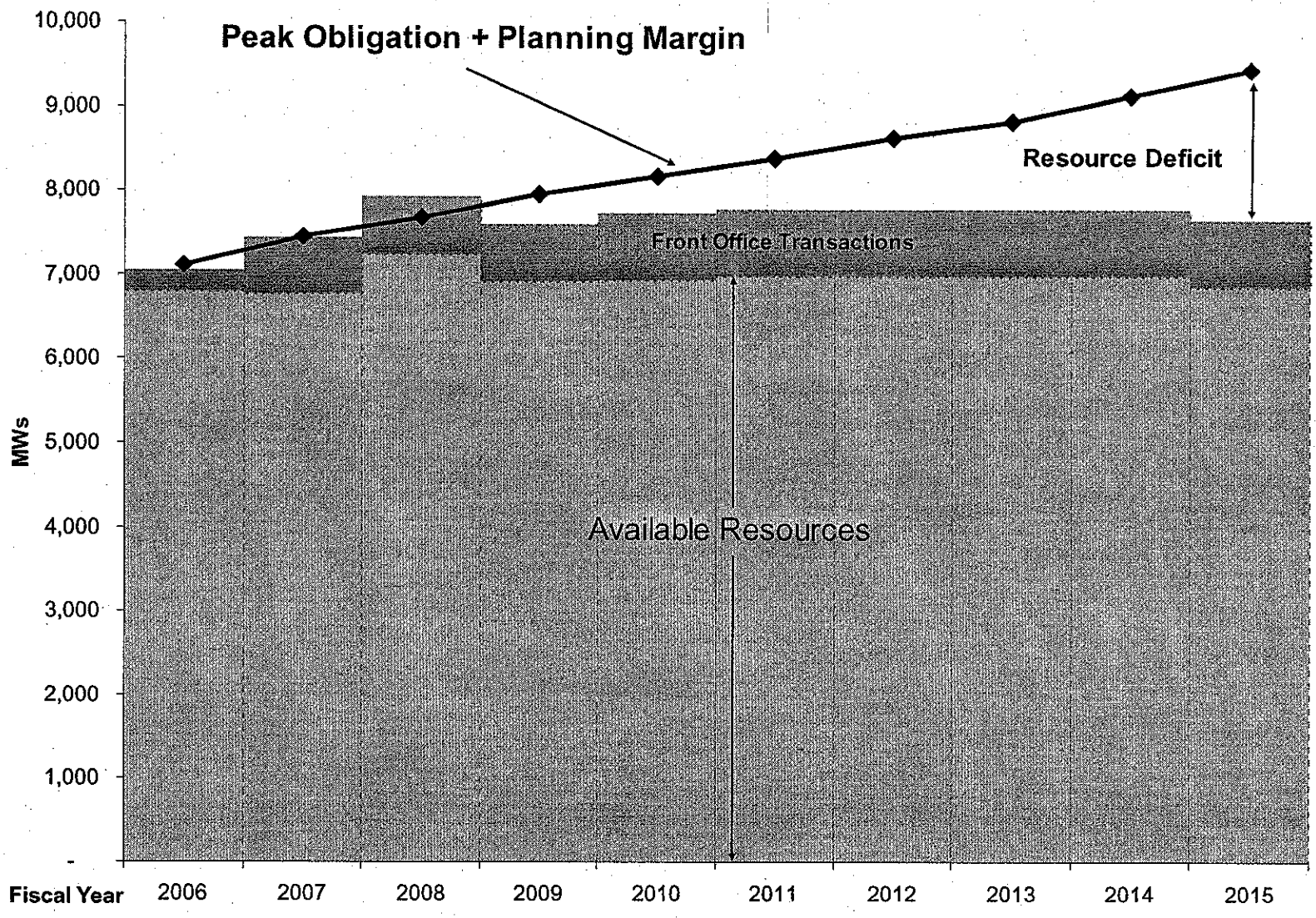
Load & Resource Balance

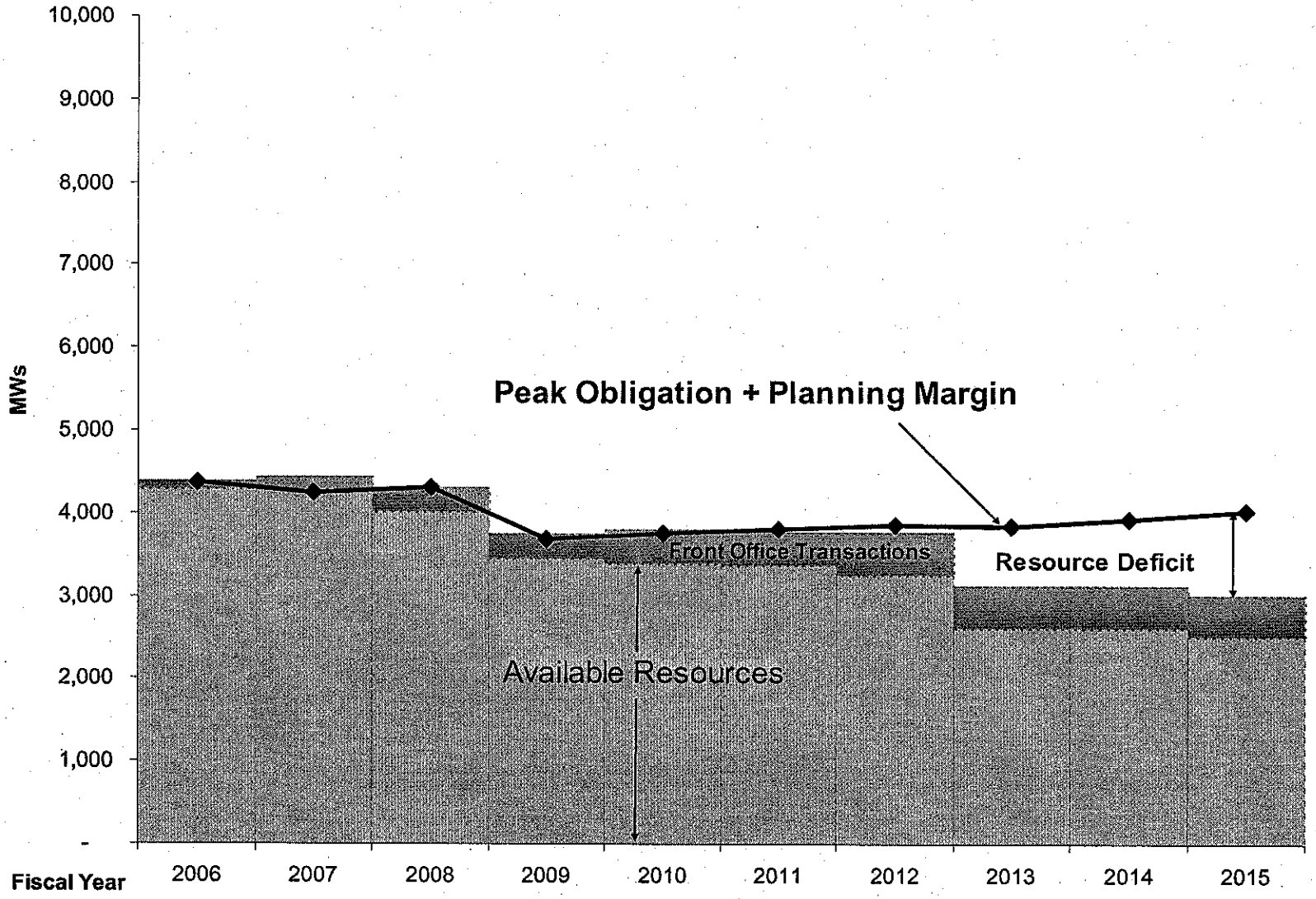
System Capacity Chart



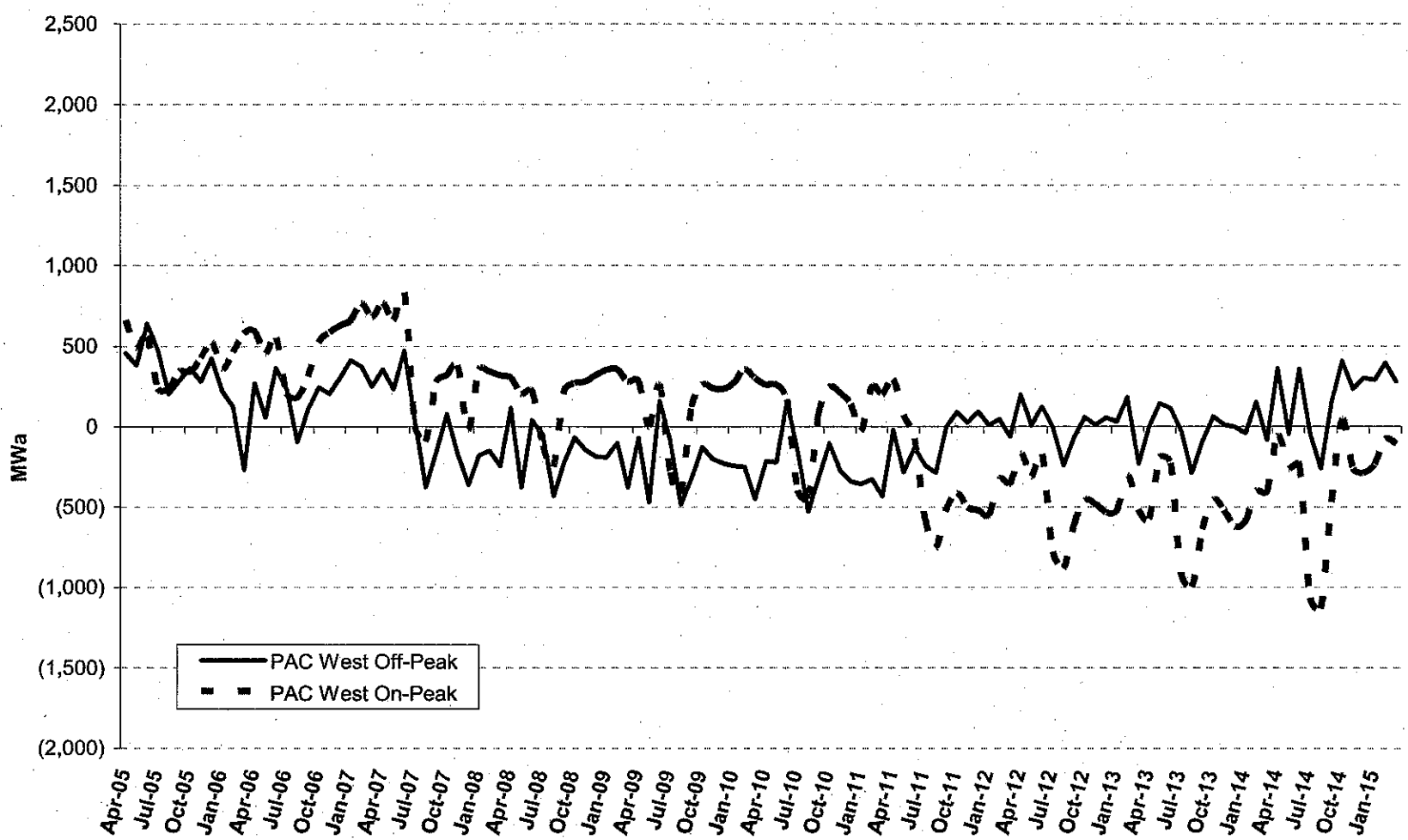
PAC East Capacity Chart



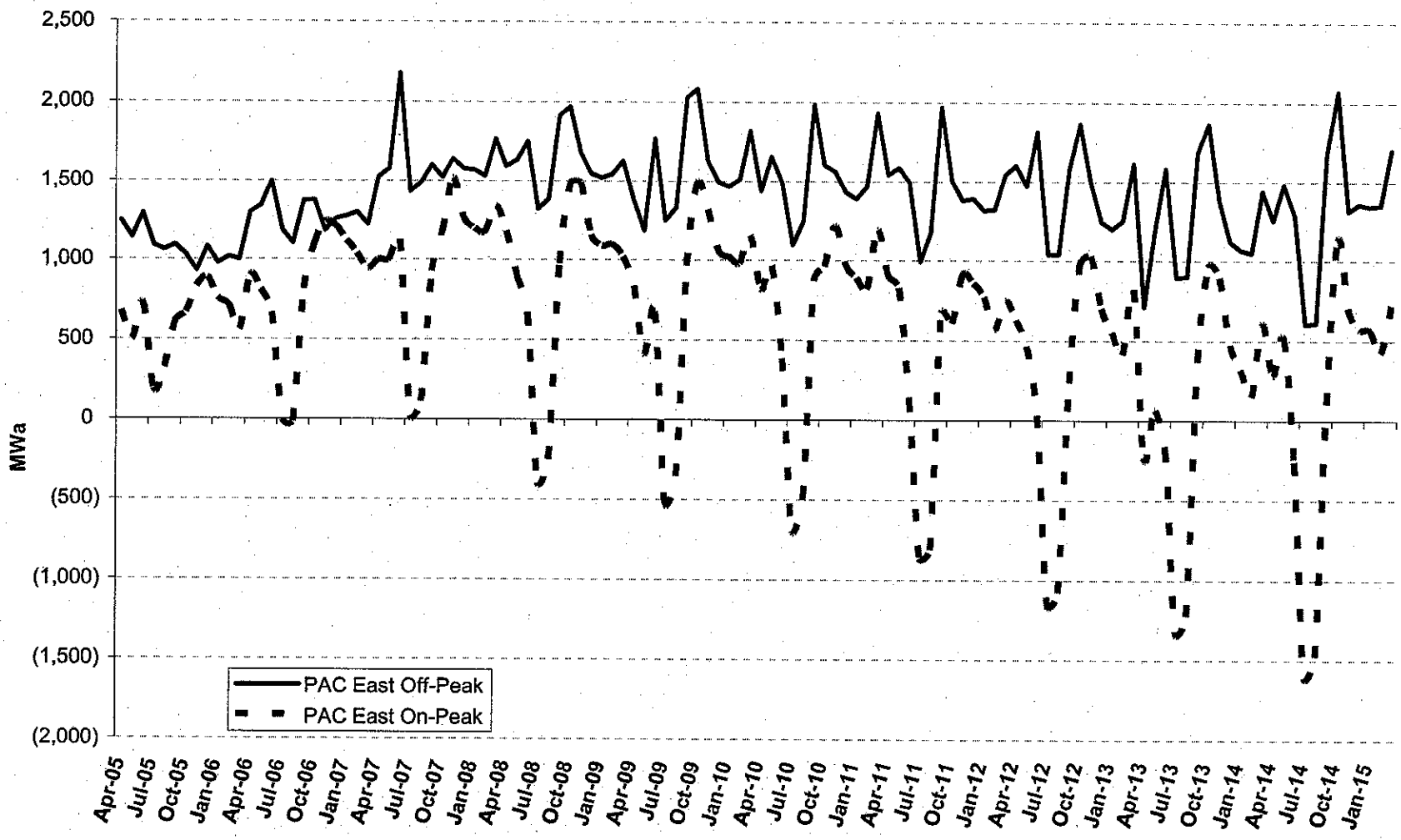
PAC West Capacity Chart



West Energy Curves



East Energy Curves



L&R Observations

- PAC West
  - Capacity – Sufficient until ~ FY 2012
  - Energy – Short in the off-peak period until expiration of BPA Peaking contract
- PAC East
  - Capacity – Deficit beginning in FY 2006
  - Energy – Off-peak length for 10 years without any resource additions. On-Peak short during summer periods beginning in the summer of 2008.

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Results of Portfolio Analysis

Portfolio Inventory

Original Portfolios:

A. Reference:
- (E) PC in Utah – FY2011
- (E) DC-CCCT – FY2009
- (E) WC-CCCT – FY2014
- (E) IGCC – FY2015
- (W) DC-CCCT – FY2013
- (W) IC Aero SCCT - FY2013

B. Remove FY2011 Utah PC, Replace w/ DC-CCCT

C. Replace FY2009 CCCT with Aeros

D. Defer FY2011 Utah PC, Replace w/ WC-CCCT

E. Replace FY2015 IGCC w/ PC Coal

F. RMATS Scenario

G. Build on East Side vs. West Side

H. Replace FY2014 CCCT with Compressed Air Energy Storage

I. Replace FY2014 CCCT with Hydro Pumped Storage

Stress Cases:

» 18% Planning Margin

» 12% Planning Margin

» Without Front Office Transactions

New Portfolios:

J. Portfolio B, with Wyoming PC Replacing IGCC

K. Portfolio C, with Wyoming PC Replacing IGCC

L. Portfolio D, with Wyoming PC Replacing IGCC

M. All Gas with CCCTs

N. All Gas with CCCTs and IC Aeros

O. Utah and Wyoming IGCC

P. CEM-selected Portfolio

Notes:

PC: Pulverized Coal

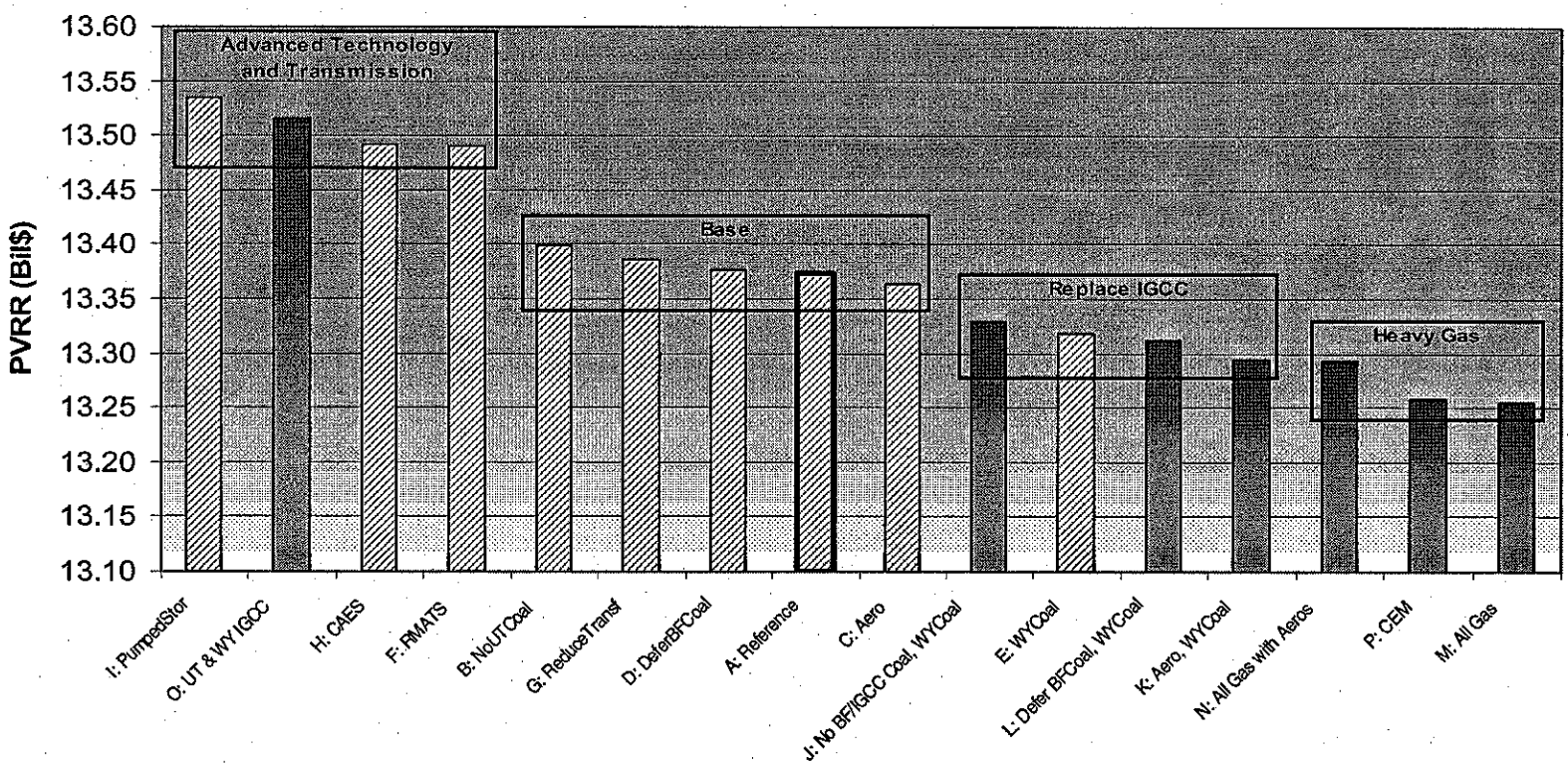
DC-CCCT: Dry-Cooled, Combined Cycle Combustion Turbine

WC-CCCT: Wet-Cooled, Combined Cycle Combustion Turbine

IGCC: Integrated Gasification Combined Cycle

IC Aeros: Intercooled Aeroderivative Simple Cycle Combustion Turbine

PVRR Rankings



- Light shaded bars represent the original portfolios A – I
- Dark bars represent the new portfolios J – P
- Bold border bar is the Reference portfolio (A)
- **All results are within 2.1% of the lowest PVRR portfolio**

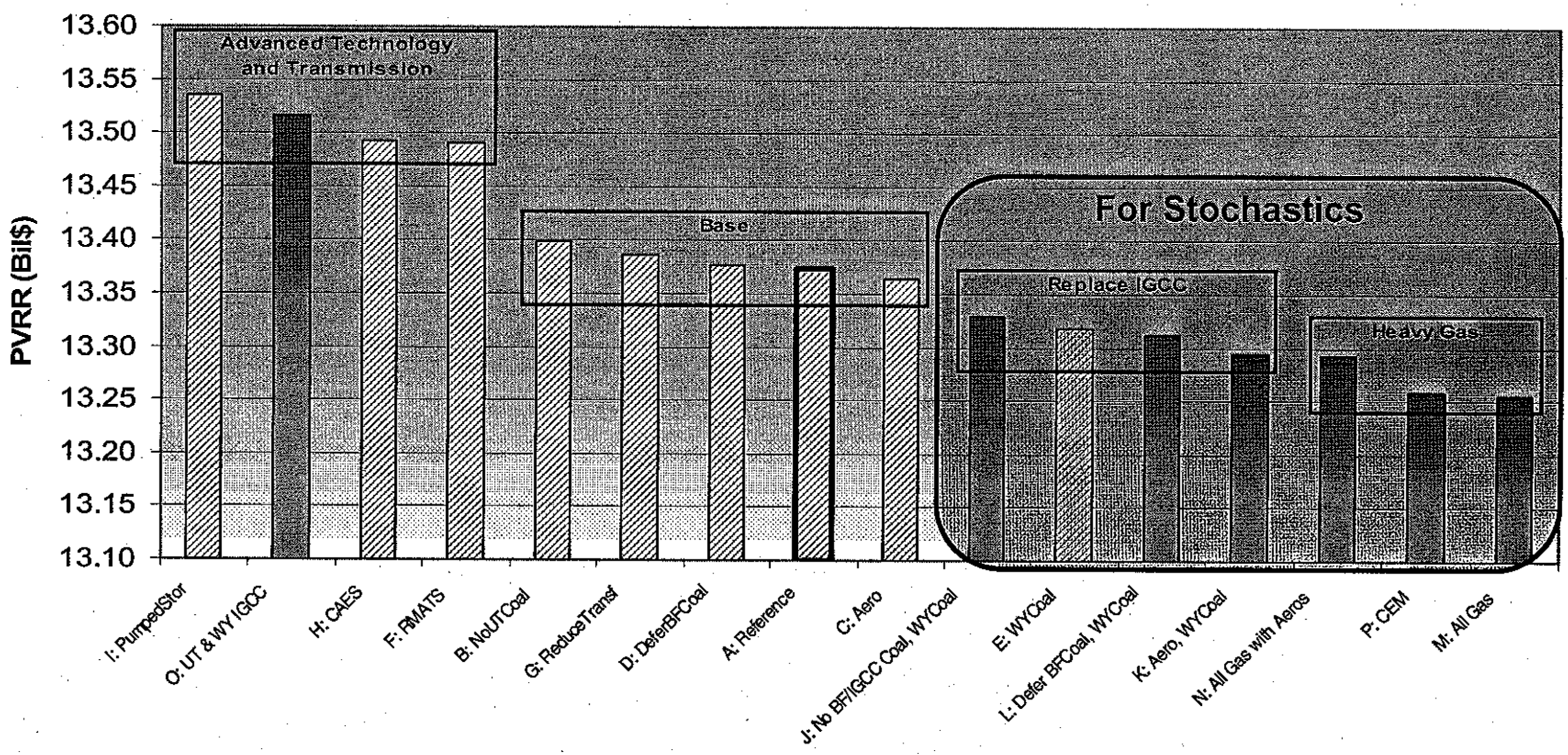
PVRR Rankings: Variable and Fixed Costs

	Net Variable Power Cost ($Bil)	Net Variable Cost Rank	Capital Cost ($Bil)	Capital Cost Rank	Overall PVRR ($Bil)	Overall PVRR Rank
A: Reference	10.94	3	2.43	14	13.37	9
B: Remove FY2011 Utah PC, Replace w/ DC-CCCT	11.51	14	1.88	4	13.40	12
C: Replace FY2009 CCCT with Aeros	11.02	5	2.35	11	13.36	8
D: Defer FY2011 Utah PC, Replace w/ WC-CCCT	11.11	9	2.27	8	13.38	10
E: Replace FY2015 IGCC w/ PC Coal	10.90	1	2.42	12	13.32	6
F: RMATS Scenario	11.18	10	2.31	9	13.49	13
G: Build on East Side vs. West Side	10.94	2	2.45	15	13.39	11
H: Replace FY2014 CCCT with Compressed Air Energy Storage	11.07	8	2.42	13	13.49	14
I: Replace FY2014 CCCT with Hydro Pumped Storage	11.05	6	2.48	16	13.53	16
J: Portfolio B, with Wyoming PC Replacing IGCC	11.47	13	1.86	3	13.33	7
K: Portfolio C, with Wyoming PC Replacing IGCC	10.97	4	2.33	10	13.29	4
L: Portfolio D, with Wyoming PC Replacing IGCC	11.06	7	2.25	7	13.31	5
M: All Gas with CCCTs	11.68	15	1.58	2	13.26	1
N: All Gas with CCCTs and IC Aeros	11.76	16	1.54	1	13.29	3
O: UT & WY IGCC	11.32	12	2.19	6	13.52	15
P: CEM-selected Portfolio	11.29	11	1.97	5	13.26	2
12% Planning Margin	11.05		2.09		13.14	
18% Planning Margin	10.92		2.64		13.56	
Front Office Transactions	10.99		3.18		14.17	

- Lower variable cost portfolios tend to have higher capital costs and vice-versa
- Capital costs are estimates. Engineering studies will be required to determine actual costs

Conclusions

- The top 7 portfolios are within 0.466% of least cost
- The top performing portfolios will be run stochastically (with 12% and 18% portfolios), which are the following:



Incorporating Risk in 2004 Portfolio Analysis

» Step 1: Starting Point

⇒ Subset of selected portfolios based on deterministic results

» Step 2: Risk Analysis

⇒ Two big risk drivers: Gas prices and carbon tax

⇒ Two Views: **Stochastic** Potentially eliminate 'Risky' portfolios

Scenario Deterministic look at changed future assumptions

» Step 3: Determine preferred least cost portfolio with acceptable risk exposure

» Step 4: Perform DSM and Stand-By generator evaluation

» Step 5: Apply path analyses to final portfolio

Step 2 Risk Analysis Review

» Stochastic Risk Analysis

- Review variances of entire distribution for differences between portfolios
- View Risk/Cost tradeoff between average of 95th percentile tail and total portfolio cost

1) All stochastic variables

⇒ An extreme look, but possible

2) Gas and electric only

⇒ Gas presents highest risk

⇒ Gas and electric are highly correlated

» Scenario Risk Analysis

- Test a range of carbon tax scenarios
- Test high gas prices

Two Types of Stochastic Runs Applied to Portfolios

» 1) All five stochastic parameters considered variable: load, hydro, gas price, power price, and forced outages.

» 2) 'Spark Spread' analysis: considers only power prices, gas prices, and forced outages as stochastic processes.

- Most influential parameters

Summary Risk Measures

- **Average Cost:** 100 iteration average of the present value of operating cost
- **Upper Tail Average Cost:** Average of 5 highest iterations of present value operating costs
- **Standard Deviation of Upper Tail:** Expected variation of cost around the upper tail
- **Risk Exposure:** The difference between our expected stochastic operating costs and the average of the upper stochastic tail of operating costs
- **Cost Risk Trade-Off:** Net present value of revenue required (total portfolio costs) versus risk exposure

Conclusions

- Little variance in standard deviation of stochastic results due to high concentration of existing coal
- Stochastic results marginally favor diversified portfolios in terms of fuel mix (i.e. gas and coal)
- Generally, all gas portfolios performed comparatively worse
- Generation diversity (i.e. simple cycles mixed with combined cycles) gives the portfolio added flexibility which translates into lower stochastic risk

Portfolios to be Targeted

- Select lowest cost deterministic portfolios – M, P
- Select portfolios that are low cost and low risk – L, E, K
- Eliminating portfolios J and N
- Stress runs to be performed on selected portfolios
  - CO2 and High Gas

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Next Steps

Next Steps

- Perform stress analysis and DSM analysis on top portfolios
- Develop and circulate draft IRP document
- Public Input Meetings
  - November 10th
  - December 9th
- IRP filed in December/January timeframe

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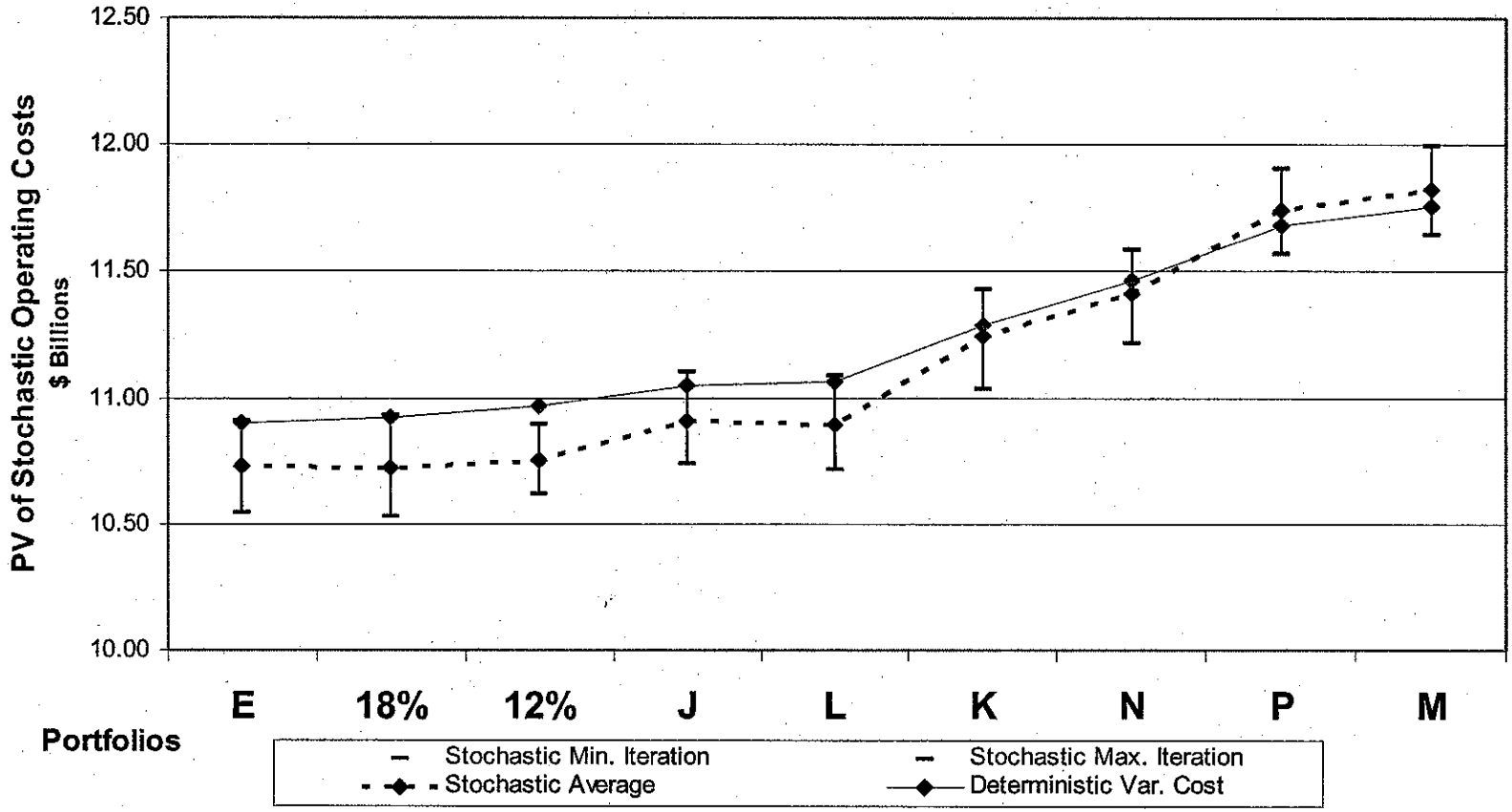
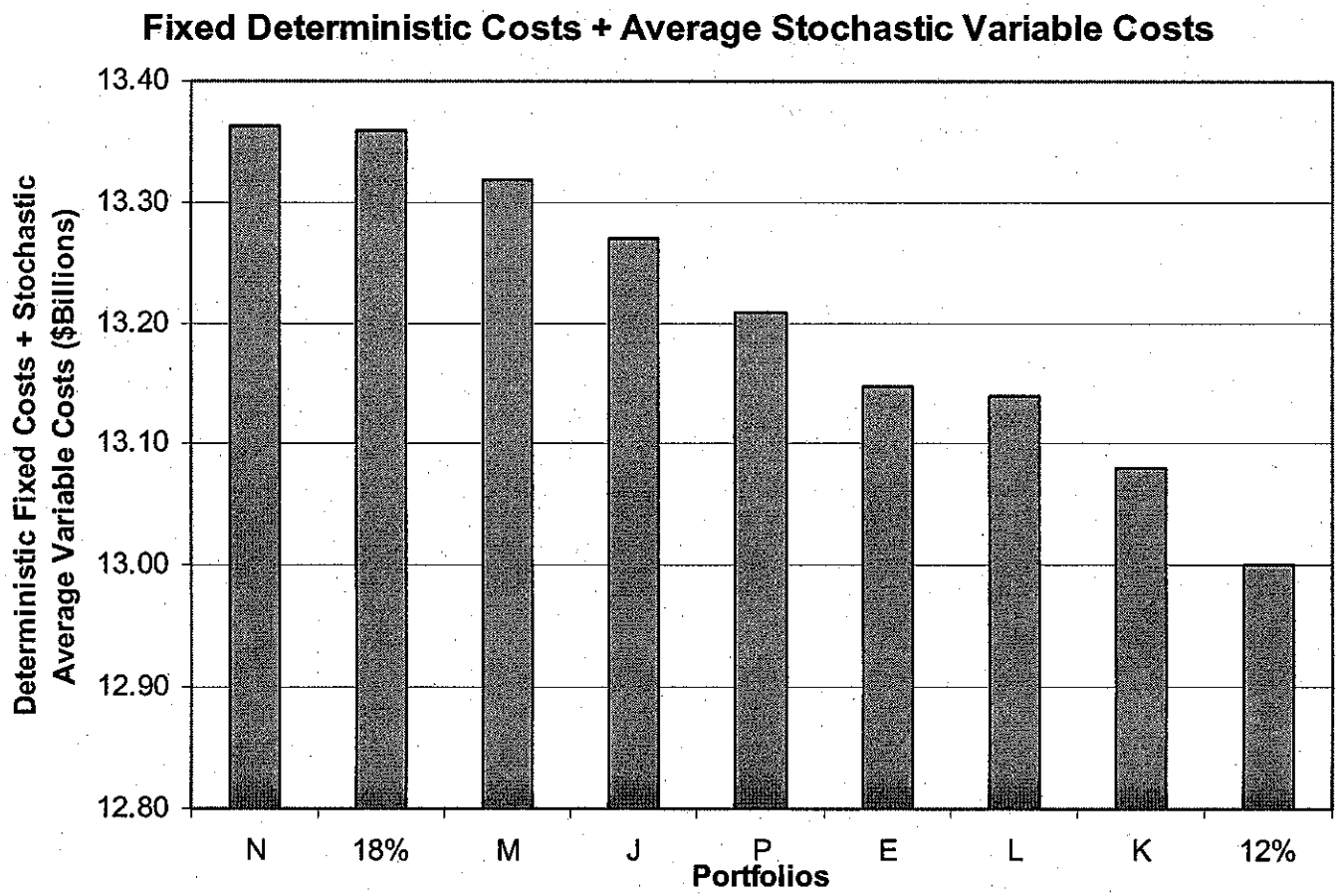
Back-Up Slides

Summary Statistics Stochastically Produced Portfolios – Variable Costs Only (100 Iterations)



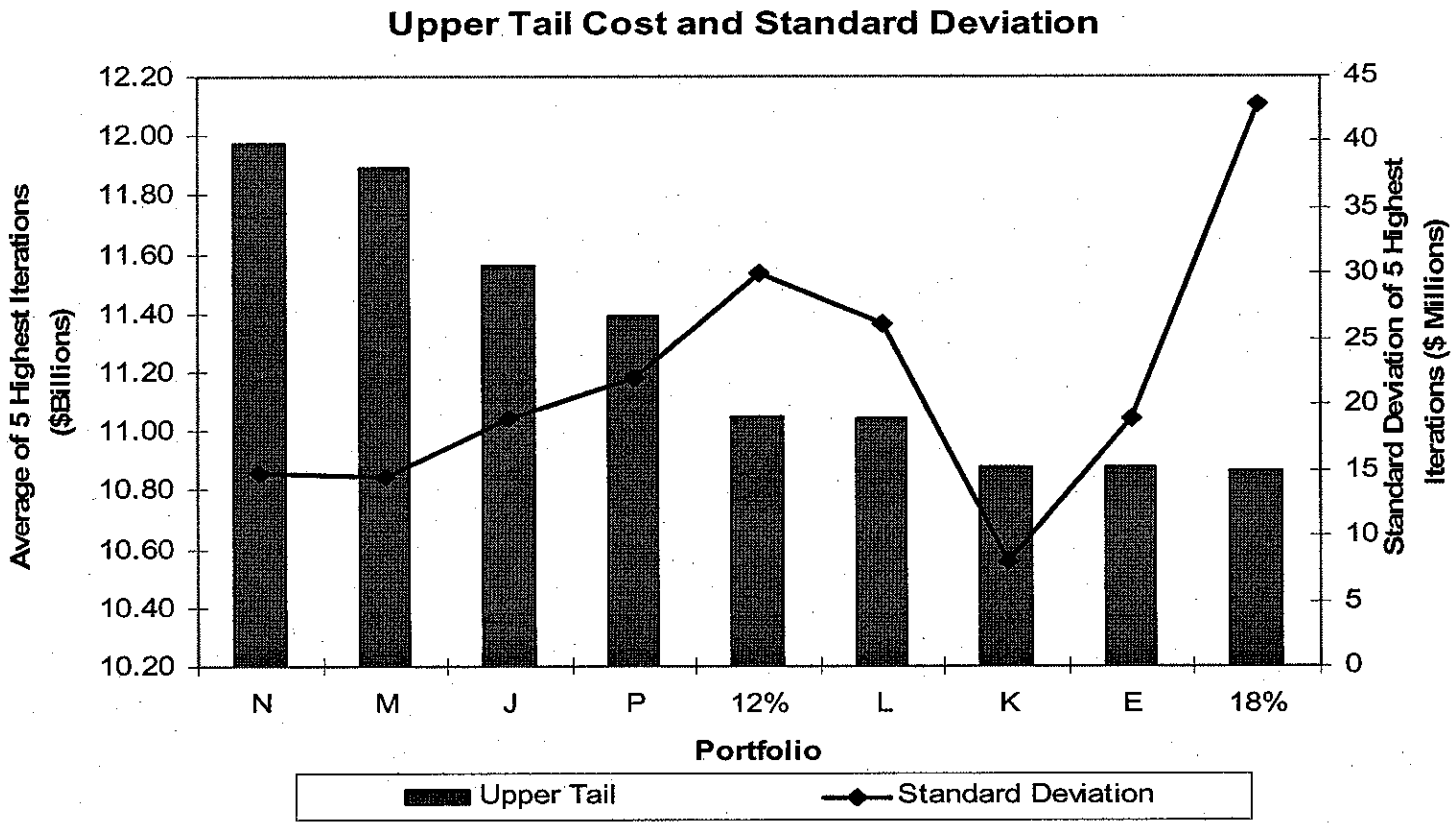
- Stochastic average ordinal ranking consistent with deterministic average variable costs
- Lowest costs are associated with fuel diversified portfolios (E, J, L, K)
- Highest cost associated with 'heavy' gas portfolios (M, N)

Fixed Deterministic with Stochastic Variable Costs



- E, L, K and 12% are lower cost portfolios
- Highest cost still associated with 'heavy' gas portfolios (M, N)

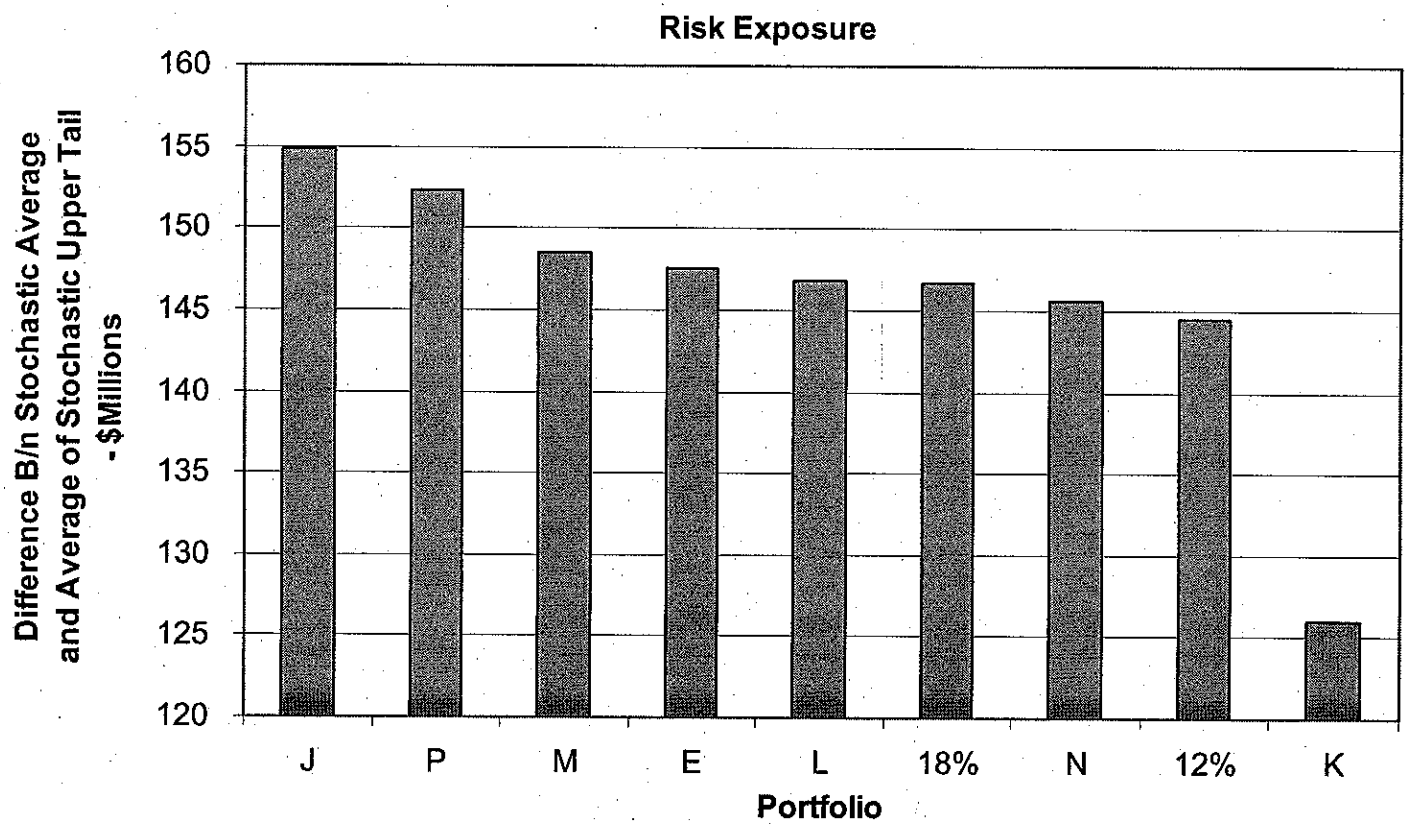
Upper Tail Average Costs



- K and E have lowest combination of upper 'tail' risk, and variability around that risk
- Although 18% and 12% portfolios appear to have relatively low upper 'tail' risk, the standard deviation is higher than all other portfolios
- 12% has the highest proportion of ENS contributing to overall cost
- 12% has 80% higher ENS costs than portfolio with next highest ENS costs

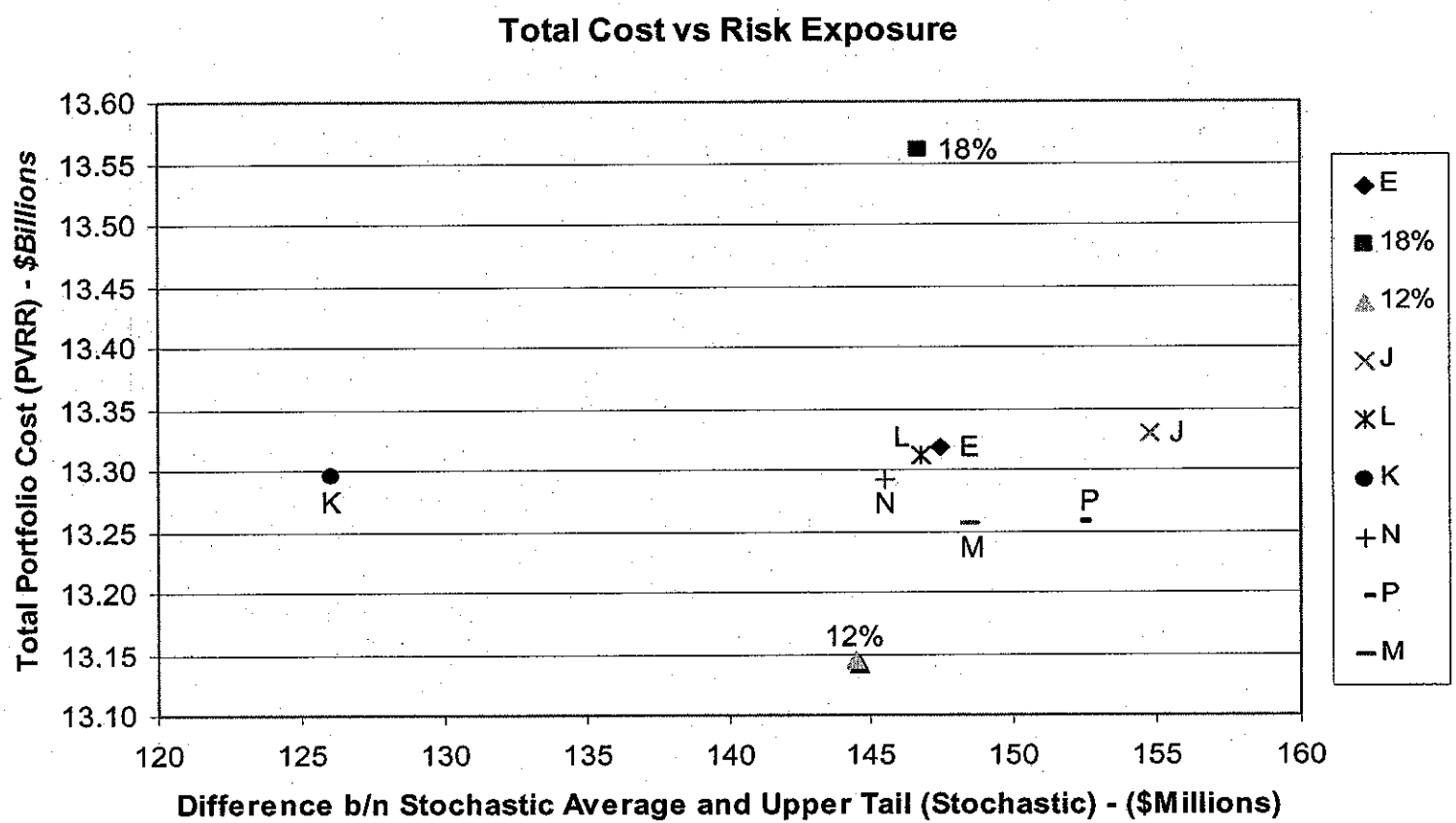
Overall Risk Exposure

Difference between stochastic average with average upper tail cost



- K exhibits least potential risk: combination of fuel diversity, and generation diversity
- J exhibits highest potential risk

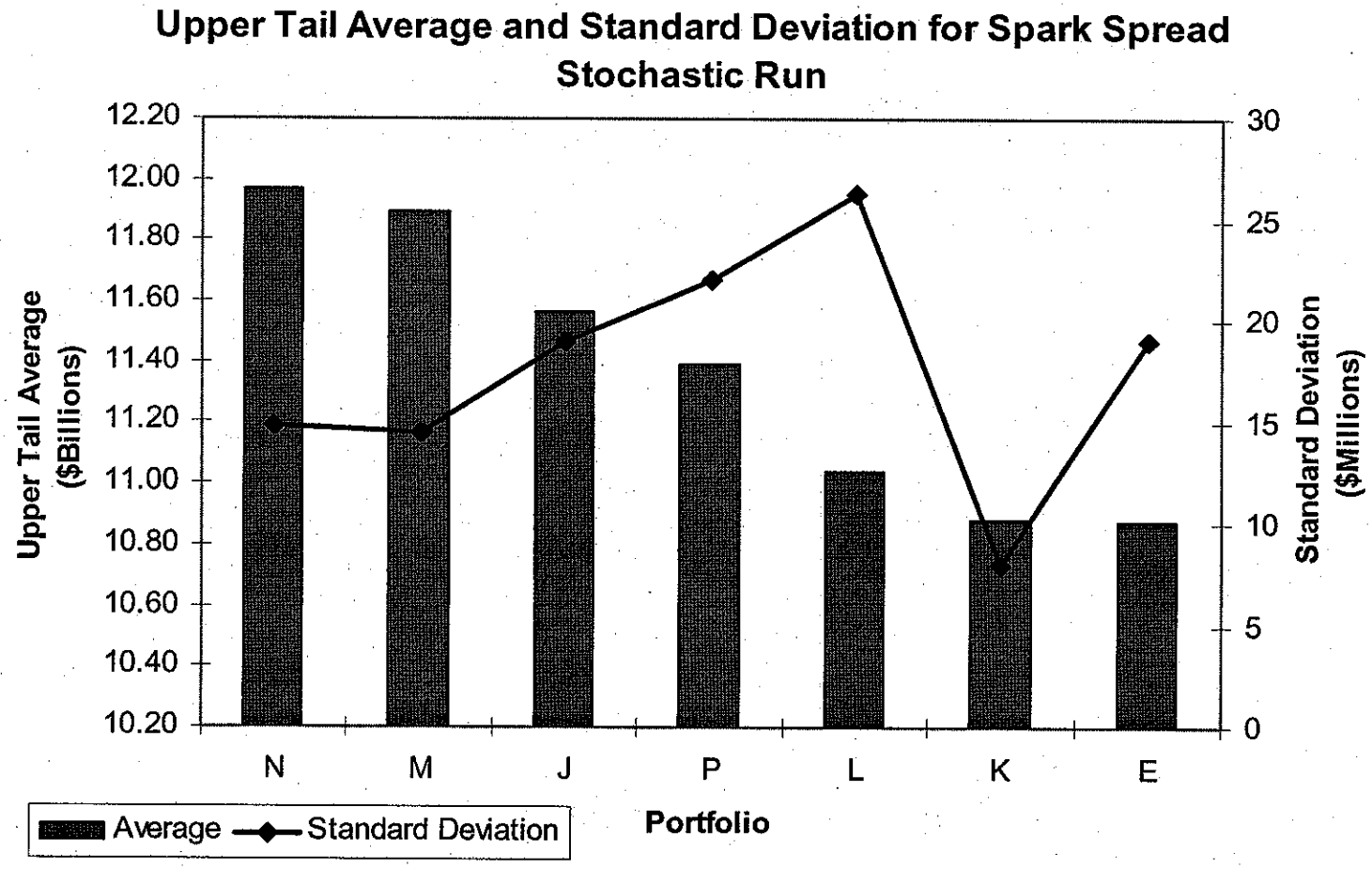
Cost vs. Risk Trade-Off



» Ideally targeting portfolios in lower left-hand quadrant.

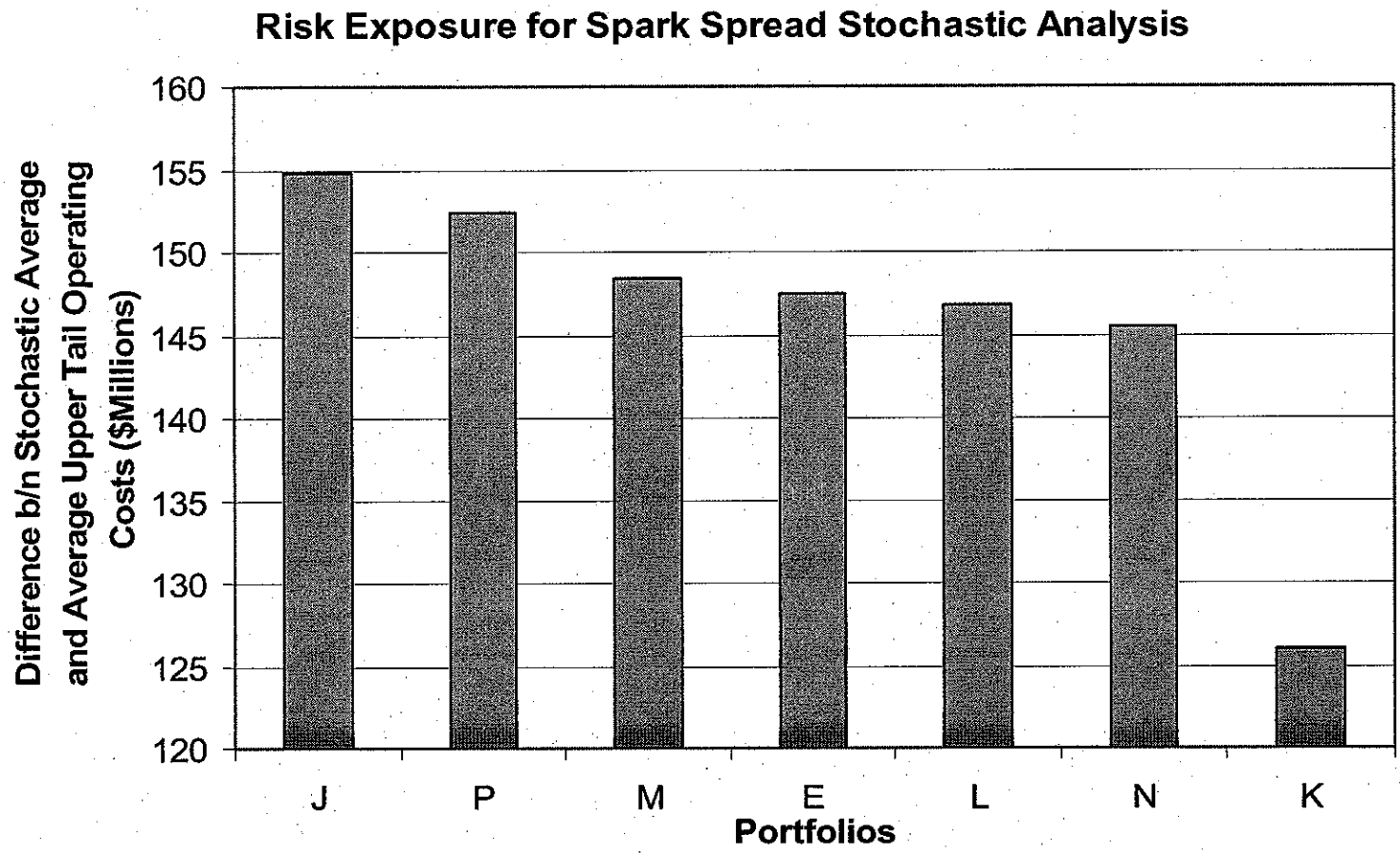
» K appears least risk relative to cost

Spark Spread: Upper Tail Average Costs



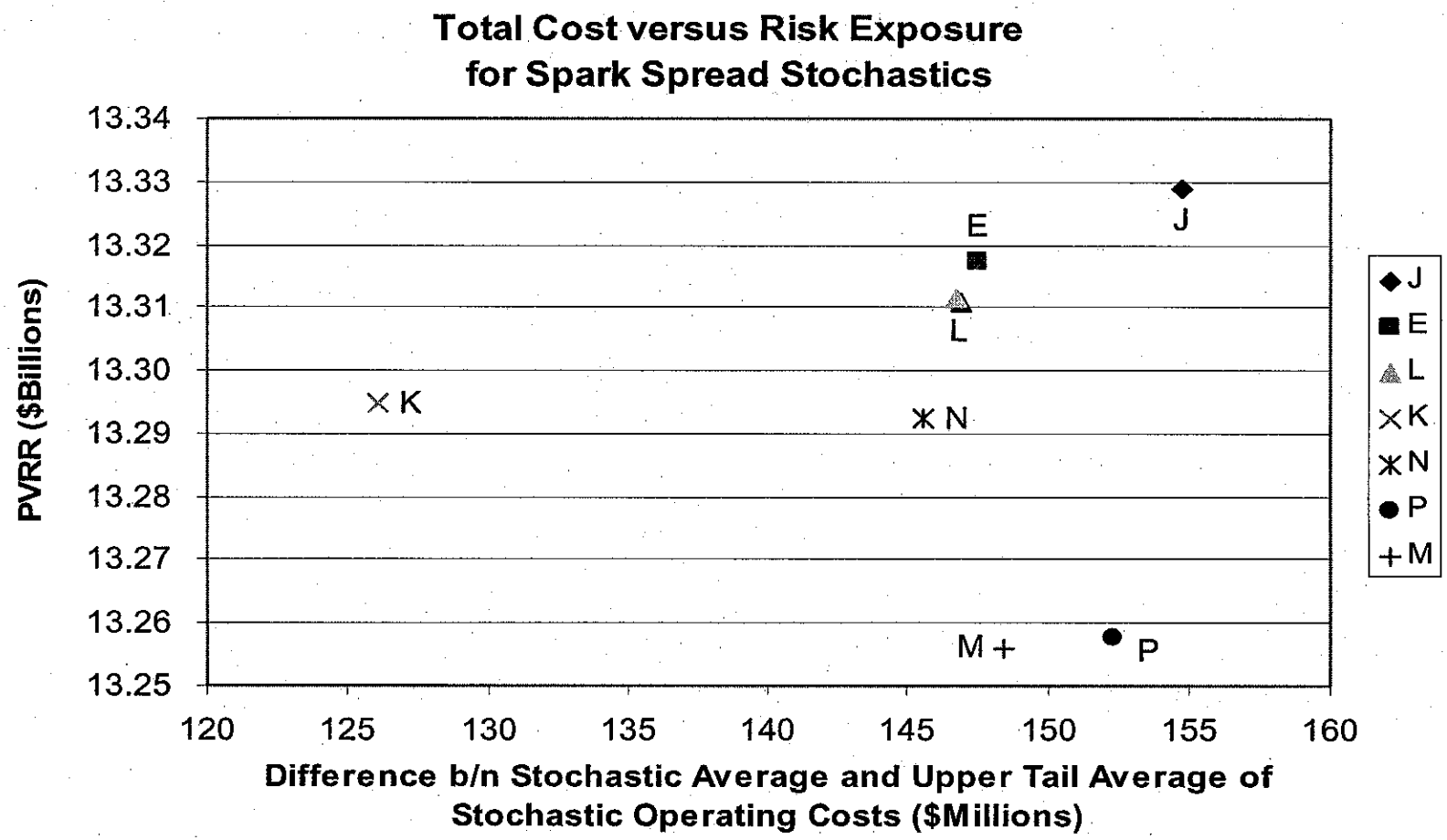
» K has lowest combination of upper 'tail' risk, and variability around that risk

Spark Spread: Overall Risk Exposure



» Ranking remains the same as the 'all variable' stochastic runs

Spark Spread: Cost vs. Risk Trade-Off



- K is least risk relative to cost, J is high risk and high cost
- Little discernable difference between other portfolios