Electric
Integrated Resource Plan

Twelfth Public Involvement Meeting

May 16, 2008

PNM Alvarado Square

Welcome & Introductions

Evelin Wheeler

Director, Integrated Resource Planning

Schedule

Today

- Risk Analysis
- Break
- Energy Efficiency

Draft Report

Next Meeting: June 16

Electric Integrated Resource Plan

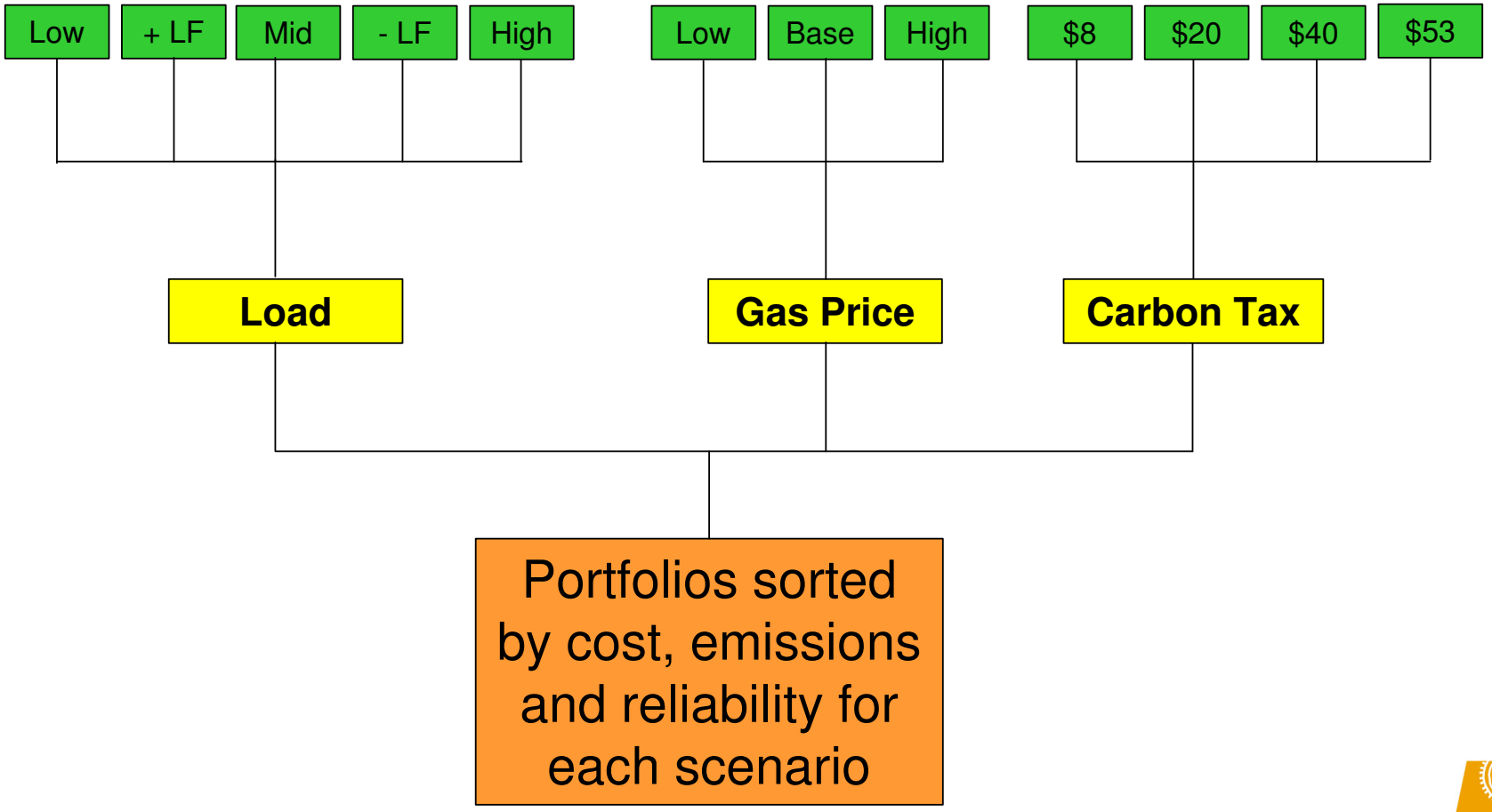
Cindy Bothwell

Manager of Integrated Resource Planning

Types of Analysis

- Scenario Analysis
  - Generation of portfolios by:
    - Least Cost
    - Lowest CO_2
    - Most Reliable
- **Quantitative Risk Analysis**
  - **Testing top portfolios**
- Qualitative Analysis

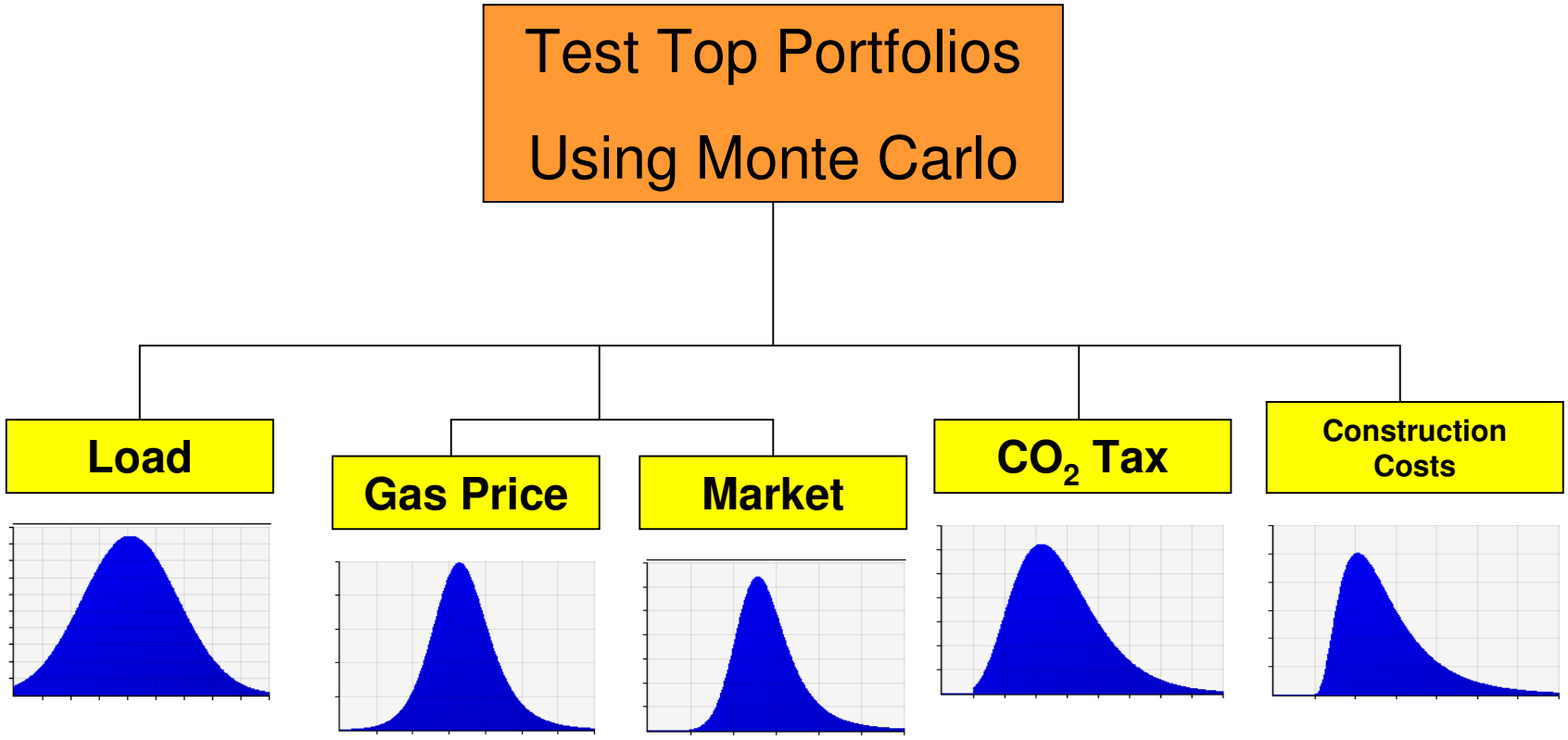
Last Time: Portfolio Results



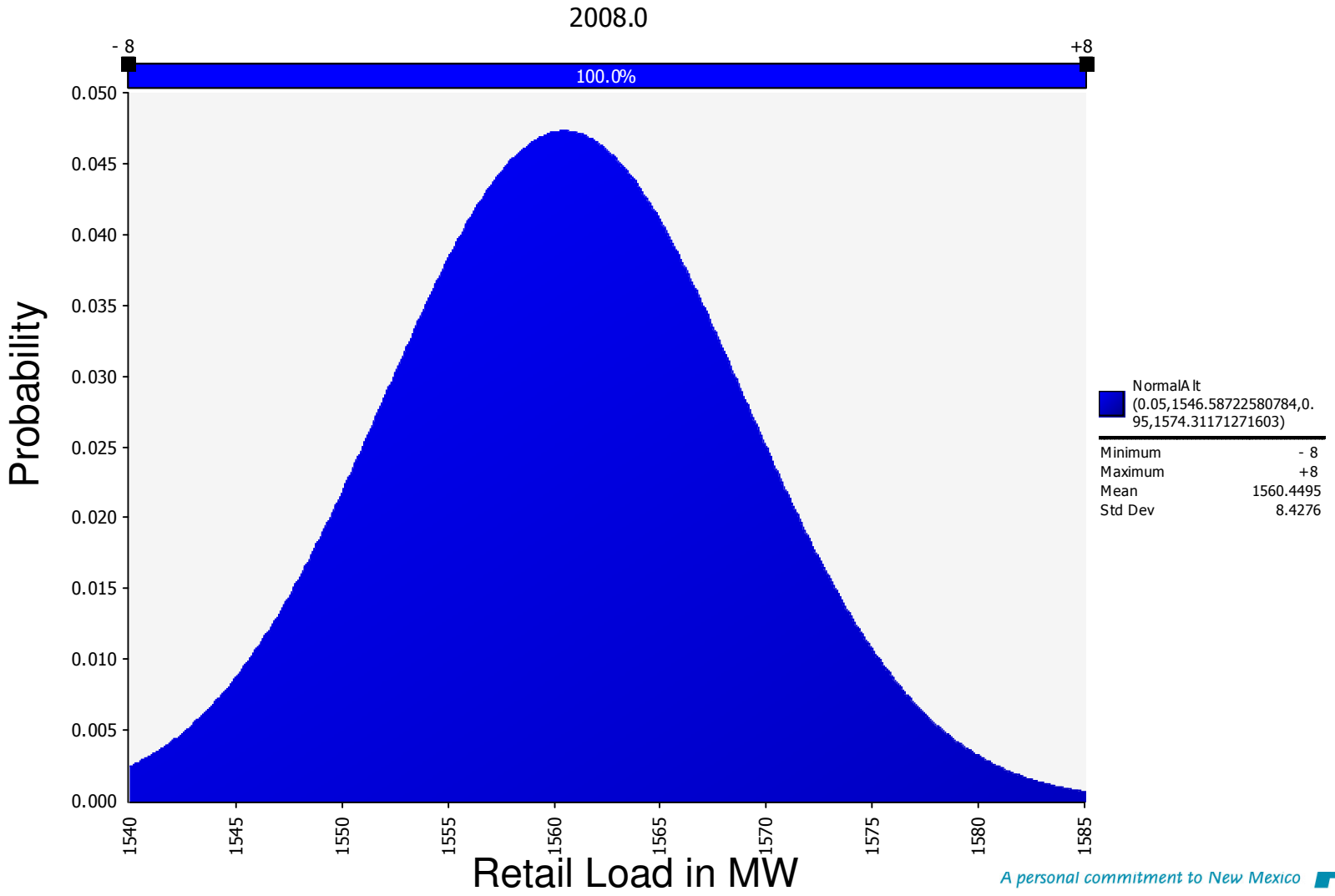
Risk Overview

- Why perform Monte Carlo analysis on selected portfolios?
  - Want to make sure that ***portfolios*** chosen perform well under a broad range of conditions. **Robustness**.
  - Balance of individual resources within a portfolio to mitigate overall system risk. **Resource Diversity**.

Portfolio Risk Analysis



Load Distribution 2008

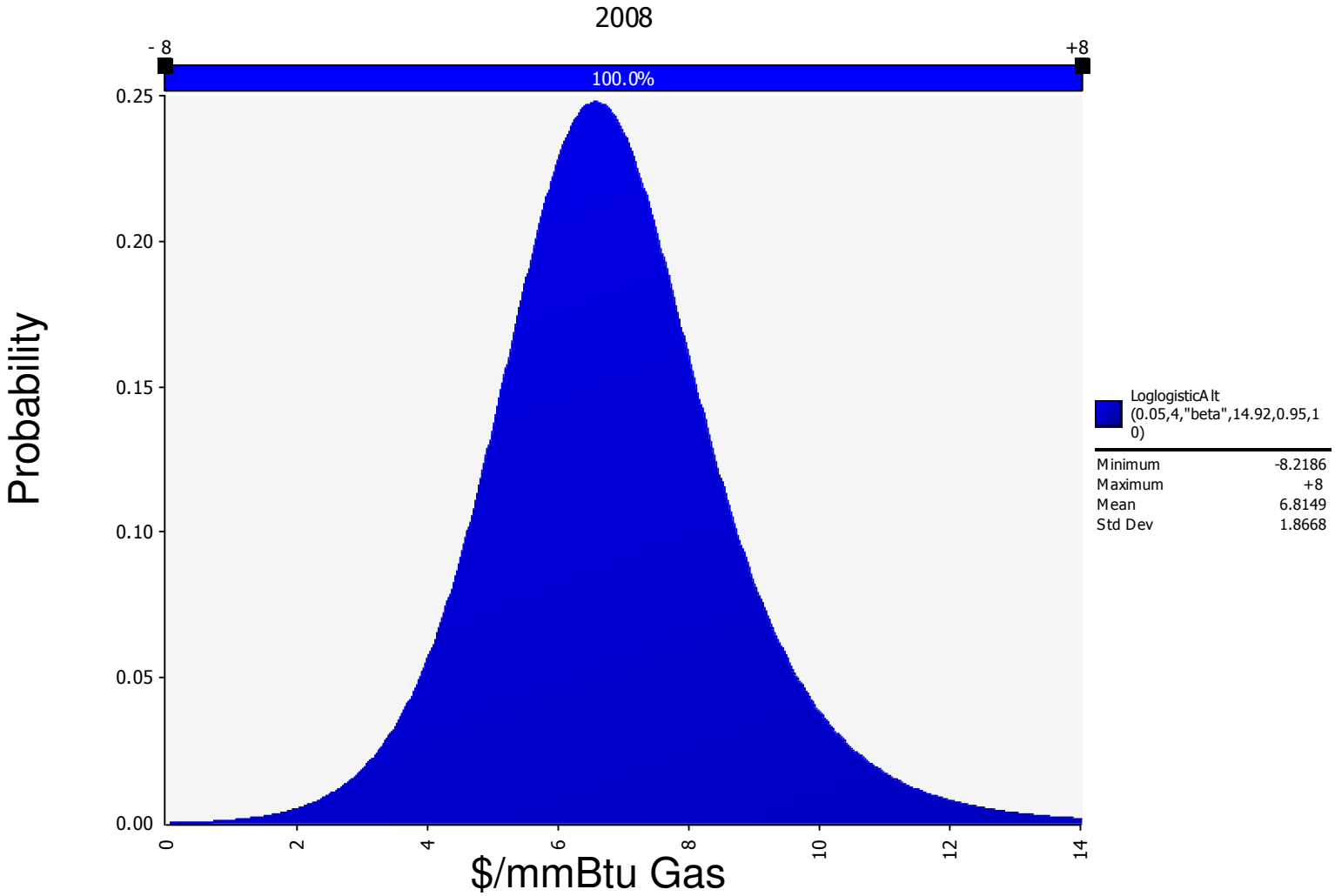


Load Assumptions

- Normal Distribution with the low forecast and high forecast setting the upper and lower bounds of distribution over the planning horizon.
- Growth distribution on PNM retail load not wholesale load.

- **Goal:** to test portfolios built under a low load scenario in a high load environment and vice versa.

Gas Distribution

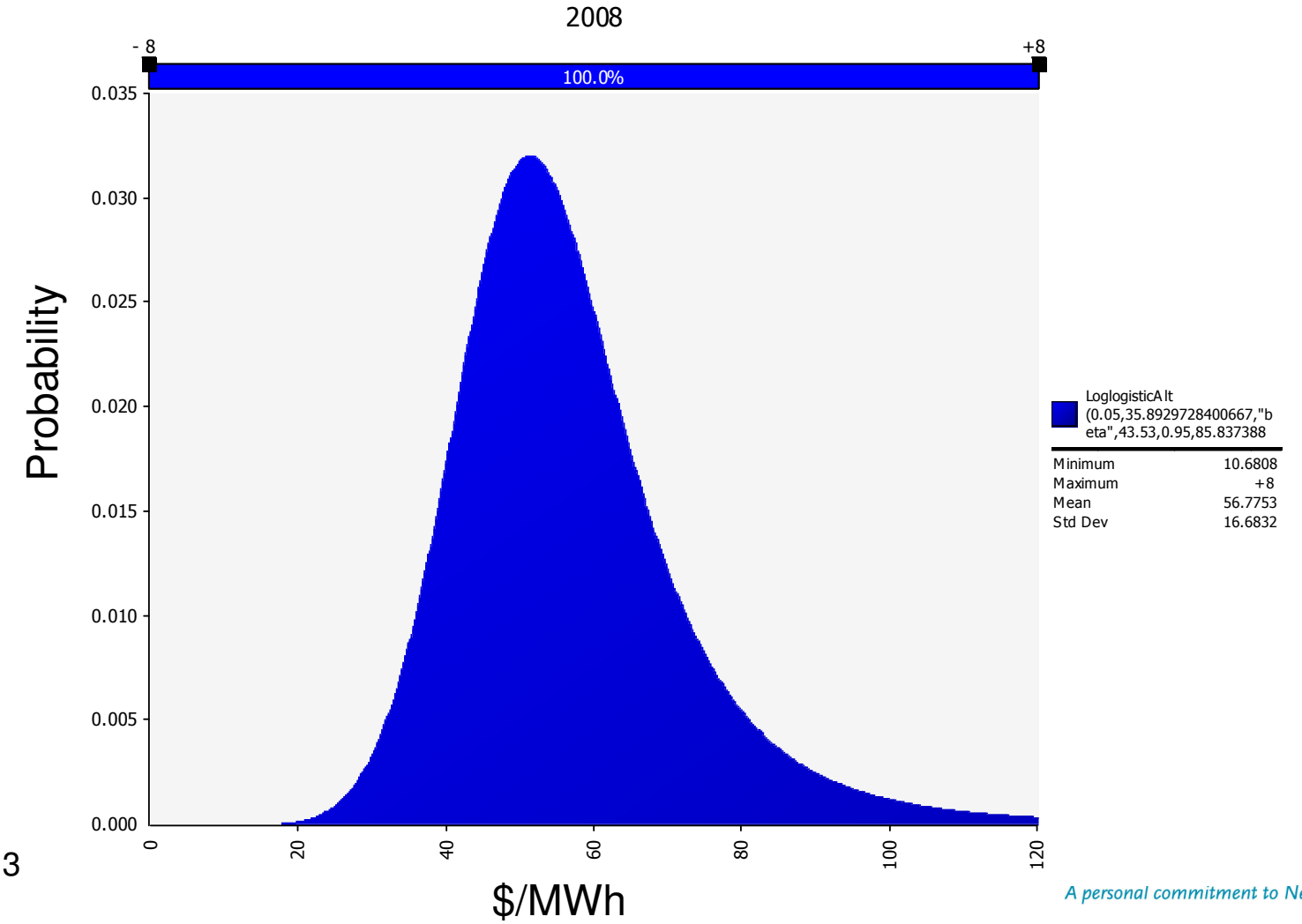


Gas Price Assumptions

- Gas distribution based upon Historical Intercontinental Exchange (ICE) Historical El Paso Permian prices.
- Evaluated gas prices based upon 2001 – 2008. All gas prices were adjusted for historical inflation to 2008$
- Correlated to Market Power Prices with a correlation factor of .6
- Log-logistic distribution adjusted to ensure for a lower gas range of 4$ and an upper gas range of 10 $.

- **Goal:** to examine how portfolios performed in low gas cases when they were optimized in high gas and vice versa.

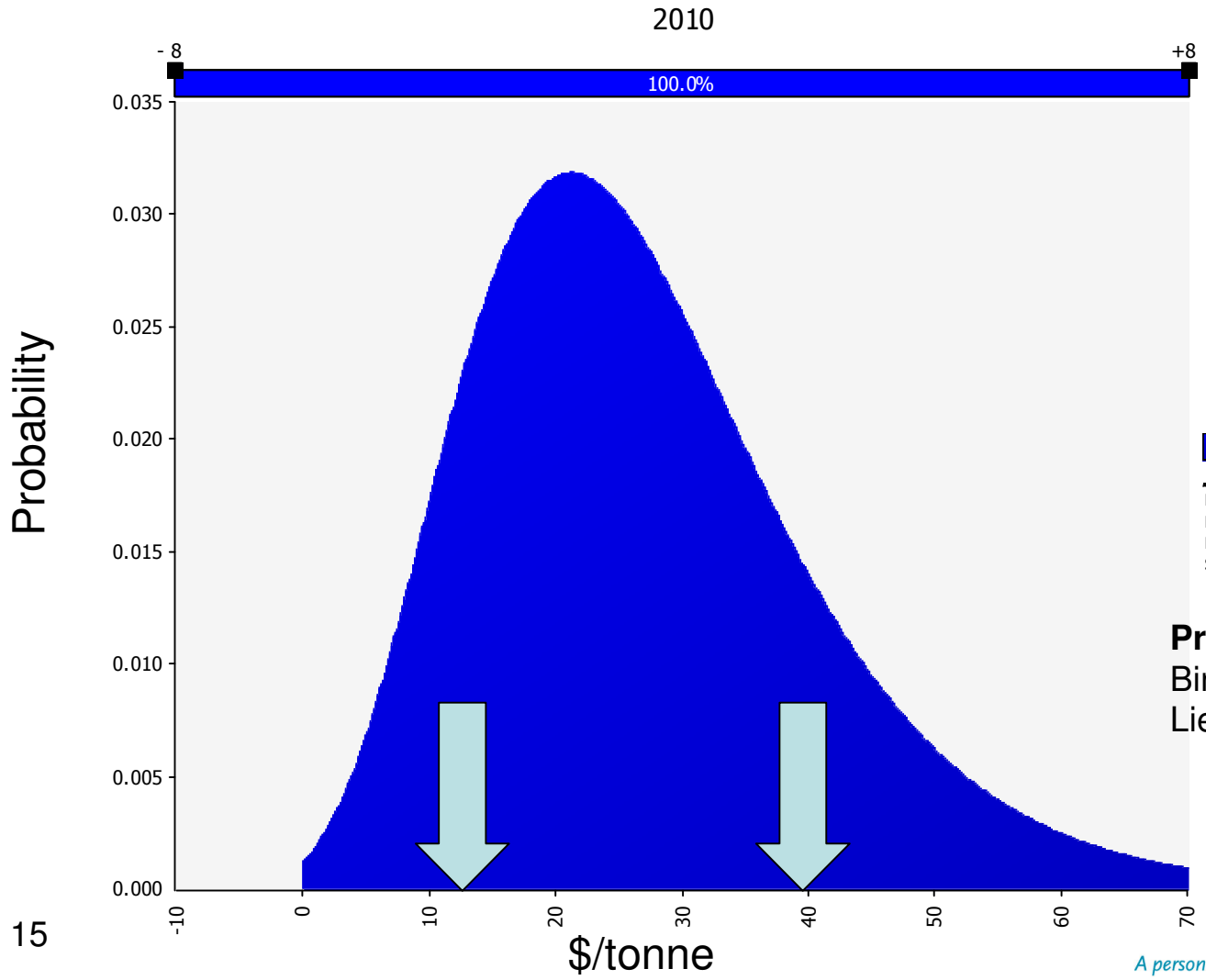
Power Price Distribution



Market Price Assumptions

- Based upon Historical Intercontinental Exchange (ICE) Historical Palo Verde day ahead Power Prices.
- Evaluated power prices based upon 2001 – 2008. All gas prices were adjusted for historical inflation to 2008$.
- Correlated to Gas with a correlation factor of .6
- Log-logistic distribution. Has right hand tail with sharp declining slope. Similarly lower and upper power price bounds were selected based upon lower and upper gas scenarios based upon a implied market heat rate.

CO_2 Distribution

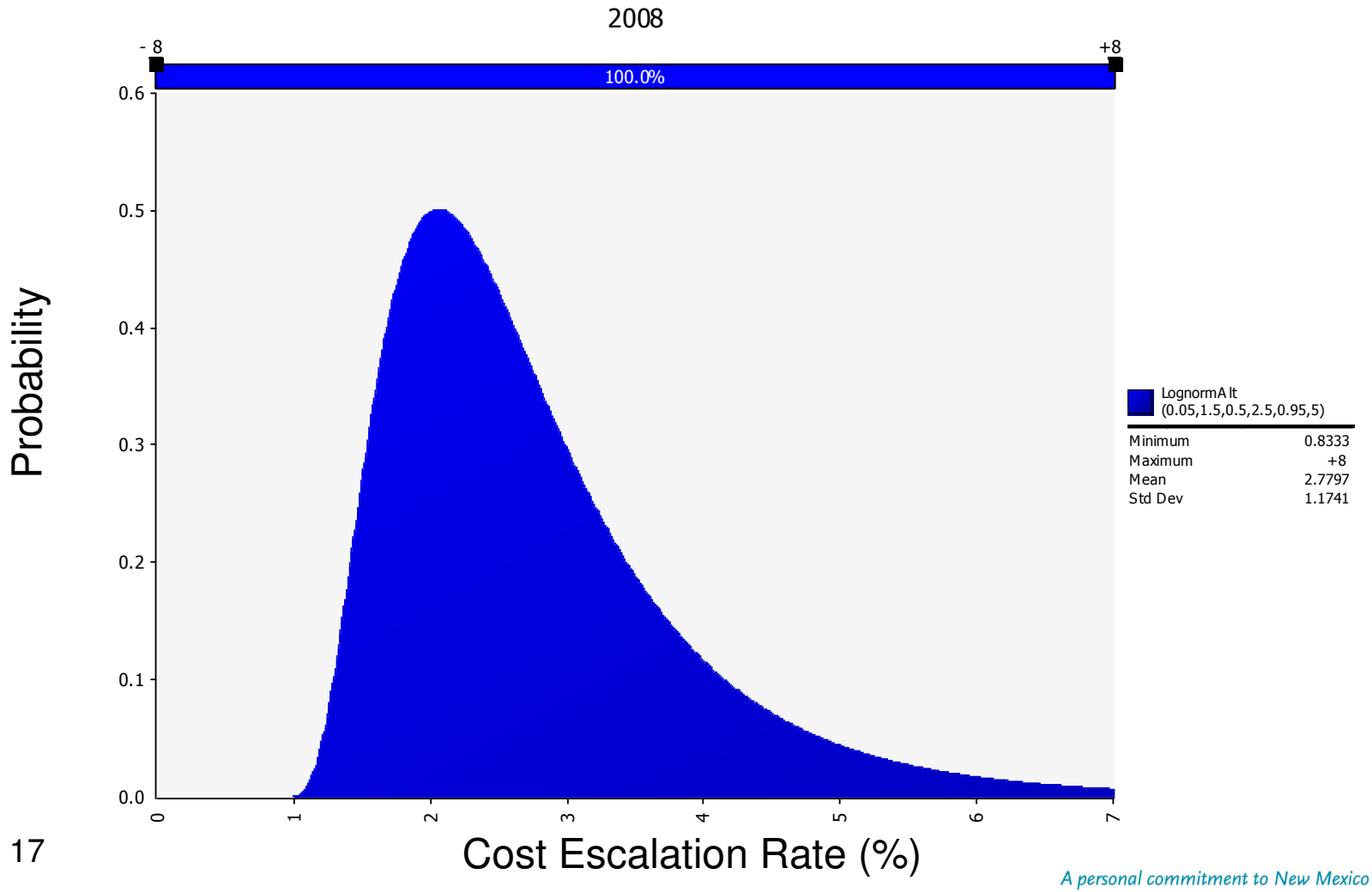


Proposed Legislative Levels:
Bingaman – Specter $11
Lieberman – Warner $40

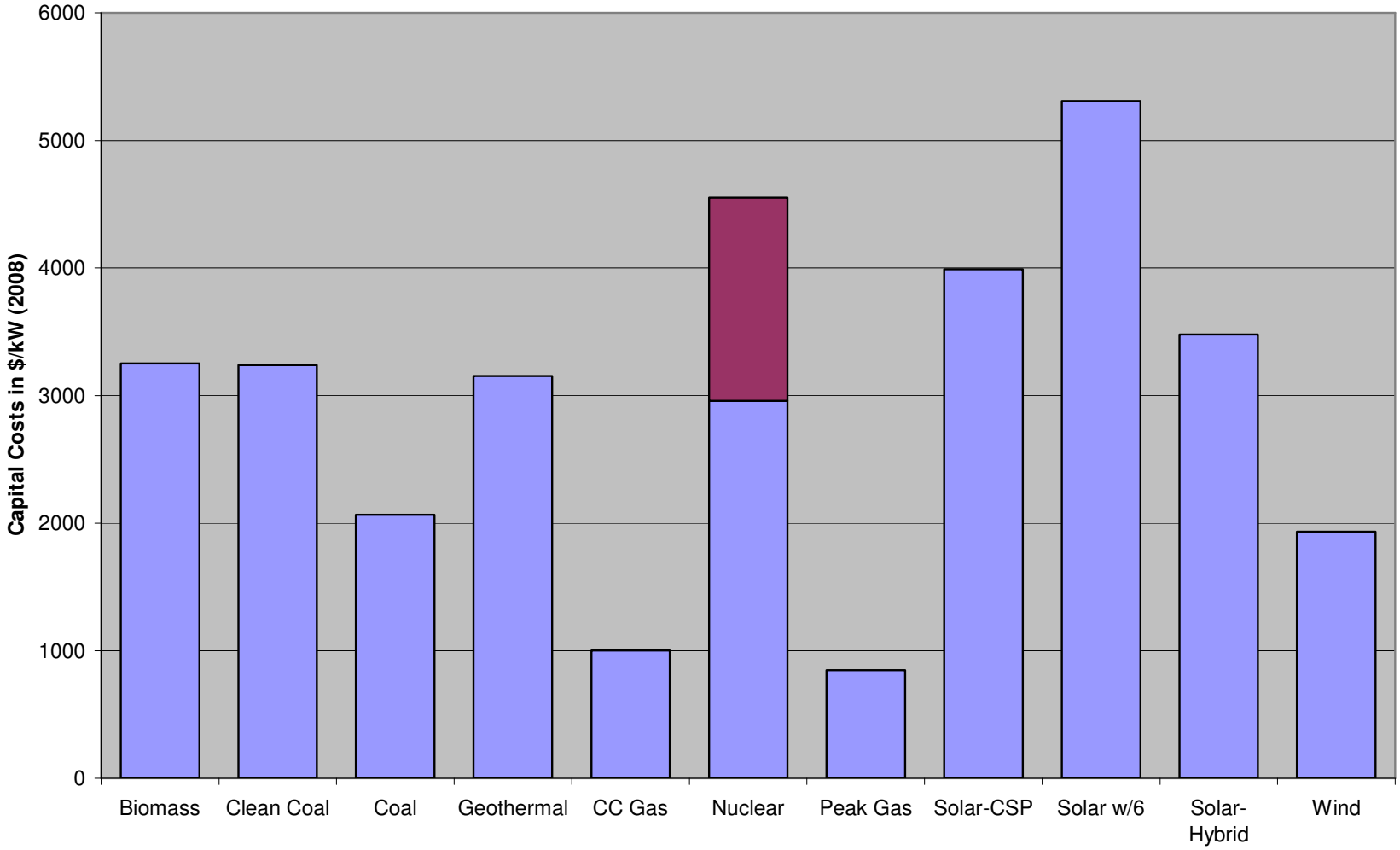
CO_2 Tax Assumptions

- CO_2 Tax Distribution was lognormal. Lower bounds of 8$ and an upper bound of 53$ in 2010.
- Distribution was truncated (redistributed) so that prices could not go below 0$.

Construction Cost Distribution



Comparison of Capital

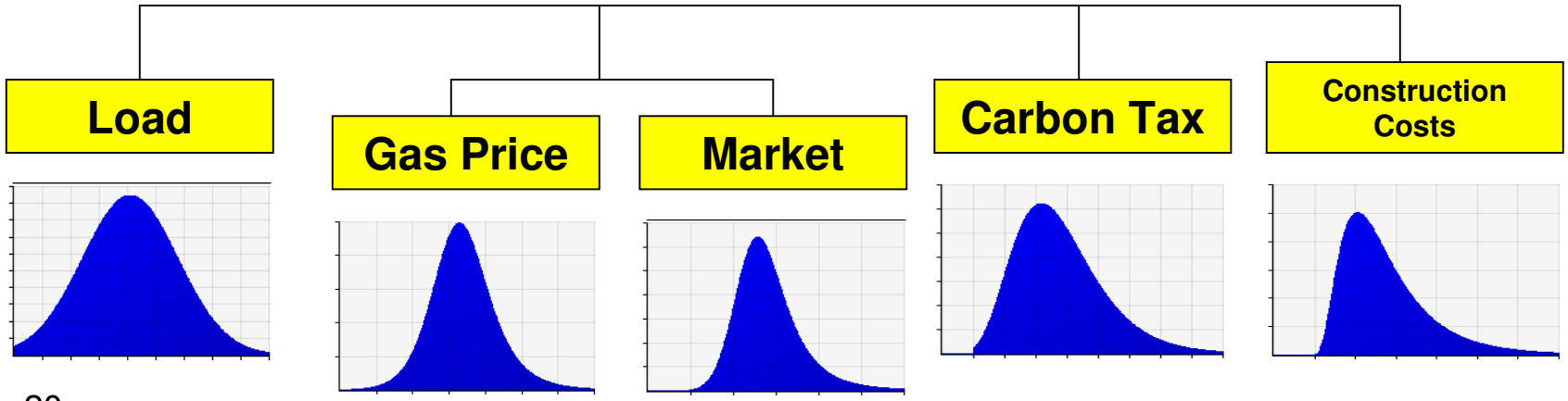


Construction Cost Risk

- Represented as a function of total construction capital escalation. Base escalation = 2.5%
- Lognormal Distribution with a median distribution of 2.5% with a low end at 1.5% (5% low end tail) and a high end of 5% (95% high end tail).

Monte Carlo Draws

- Each portfolio had random 300 draws.
- The 300 draws were identical for all portfolios in the Monte Carlo runs. i.e. Each portfolio was tested under the exact same conditions as every other portfolio.

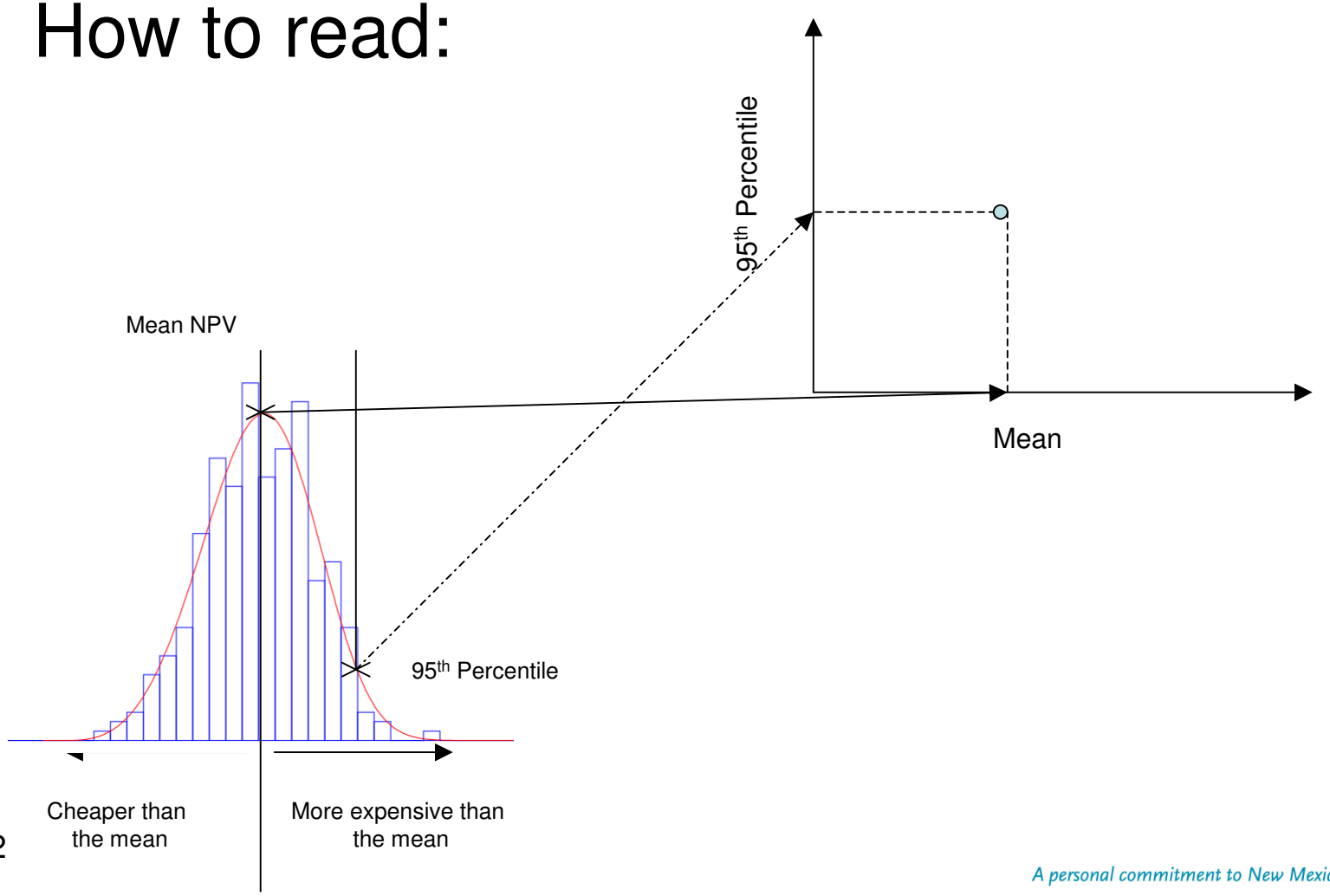


Risk Overview

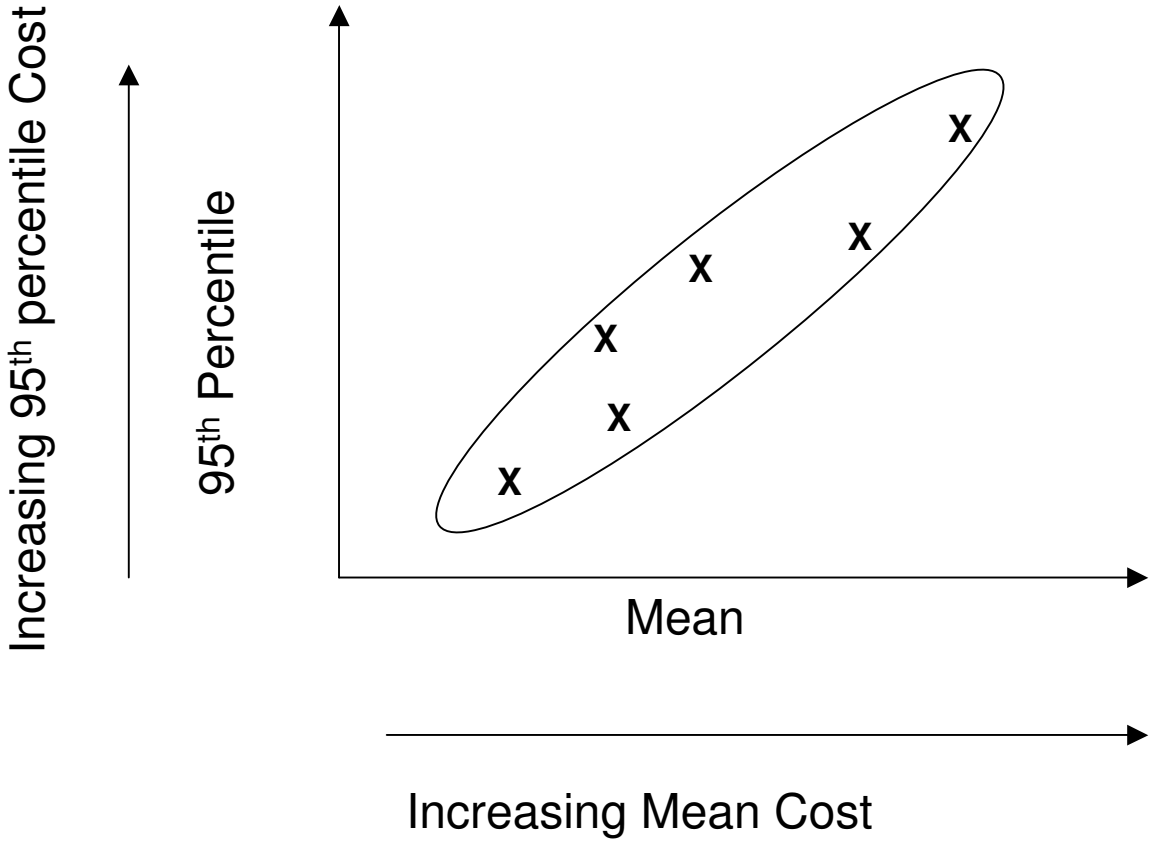
- Interpretation of results:
  - Interpretation by a relative comparison of total portfolio, not individual resources.
  - Causation difficult to determine due to multiple moving variables.
  - Results indicate a robust portfolio, not necessarily an ideal portfolio. Mitigates uncertainty.
  - **Quantitative** analysis must be combined with **Qualitative** analysis.

Risk Plot Basics

- How to read:



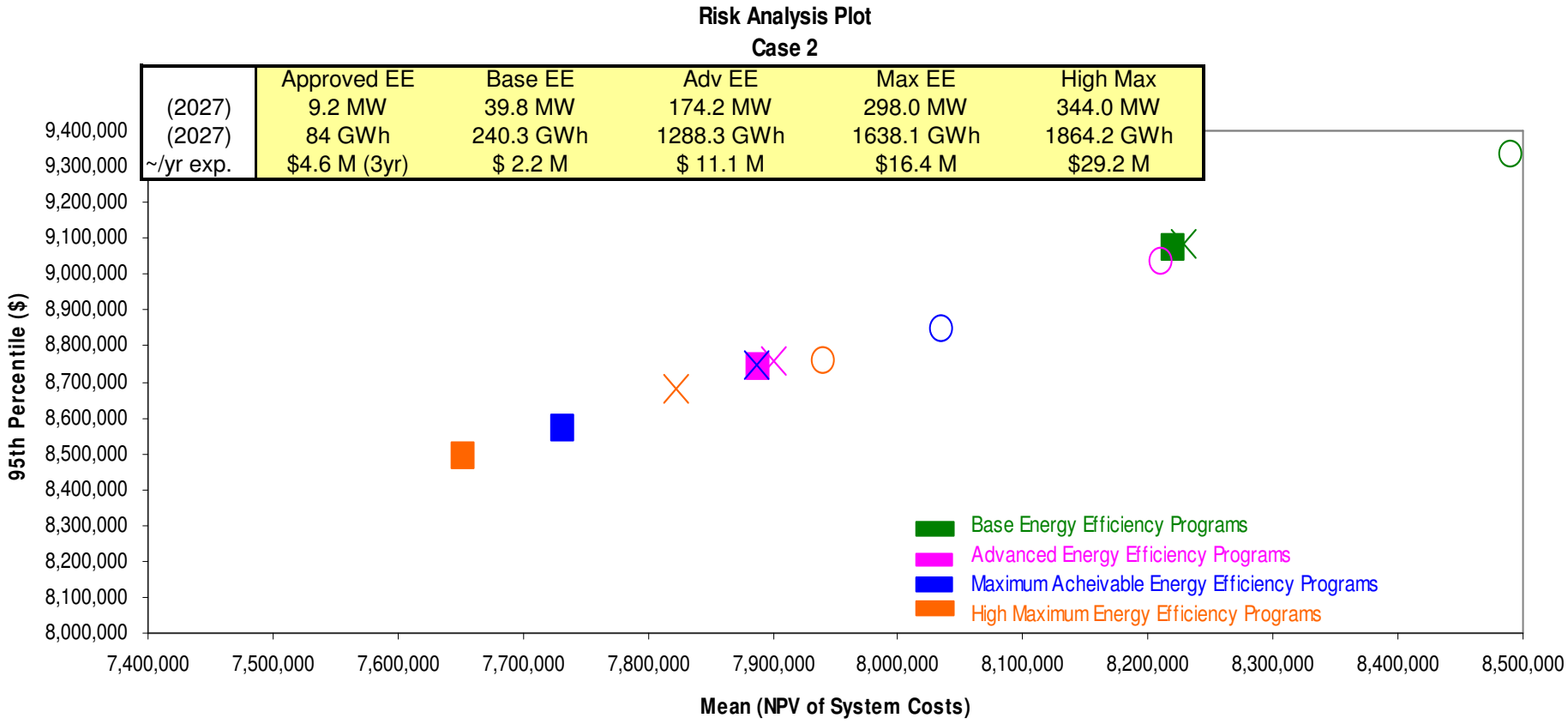
Risk Plot Example



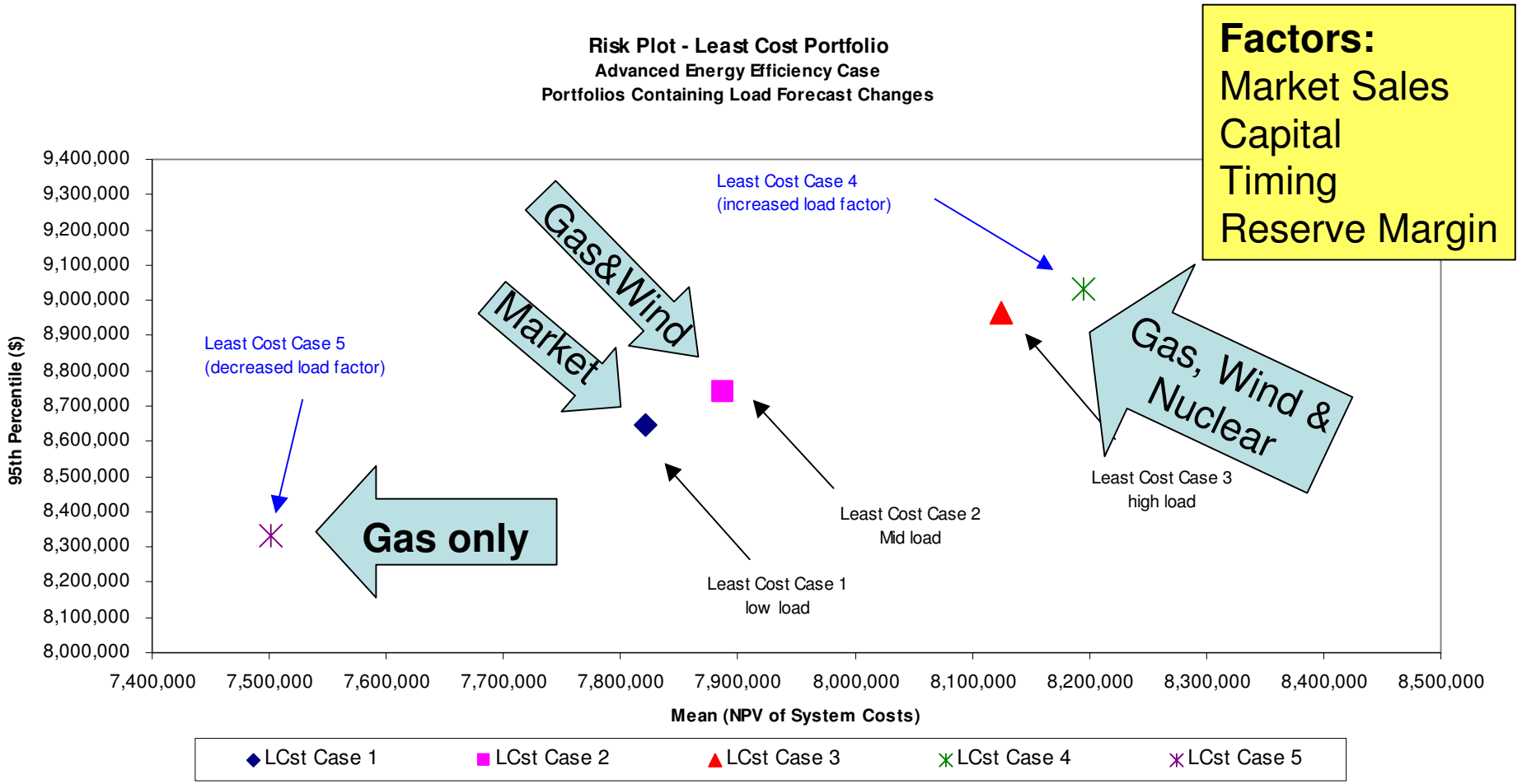
Risk Results Overview:

- Trends….
  - Least cost portfolios generally have the lowest Mean (lower left)
  - Least carbon and most reliable portfolios generally have more expensive capital technologies and are generally higher up in the risk plot.
  - Load has the greatest impact on risk.
  - Lowest risk is the decreasing load factor – early build.

Portfolio Risk Comparison

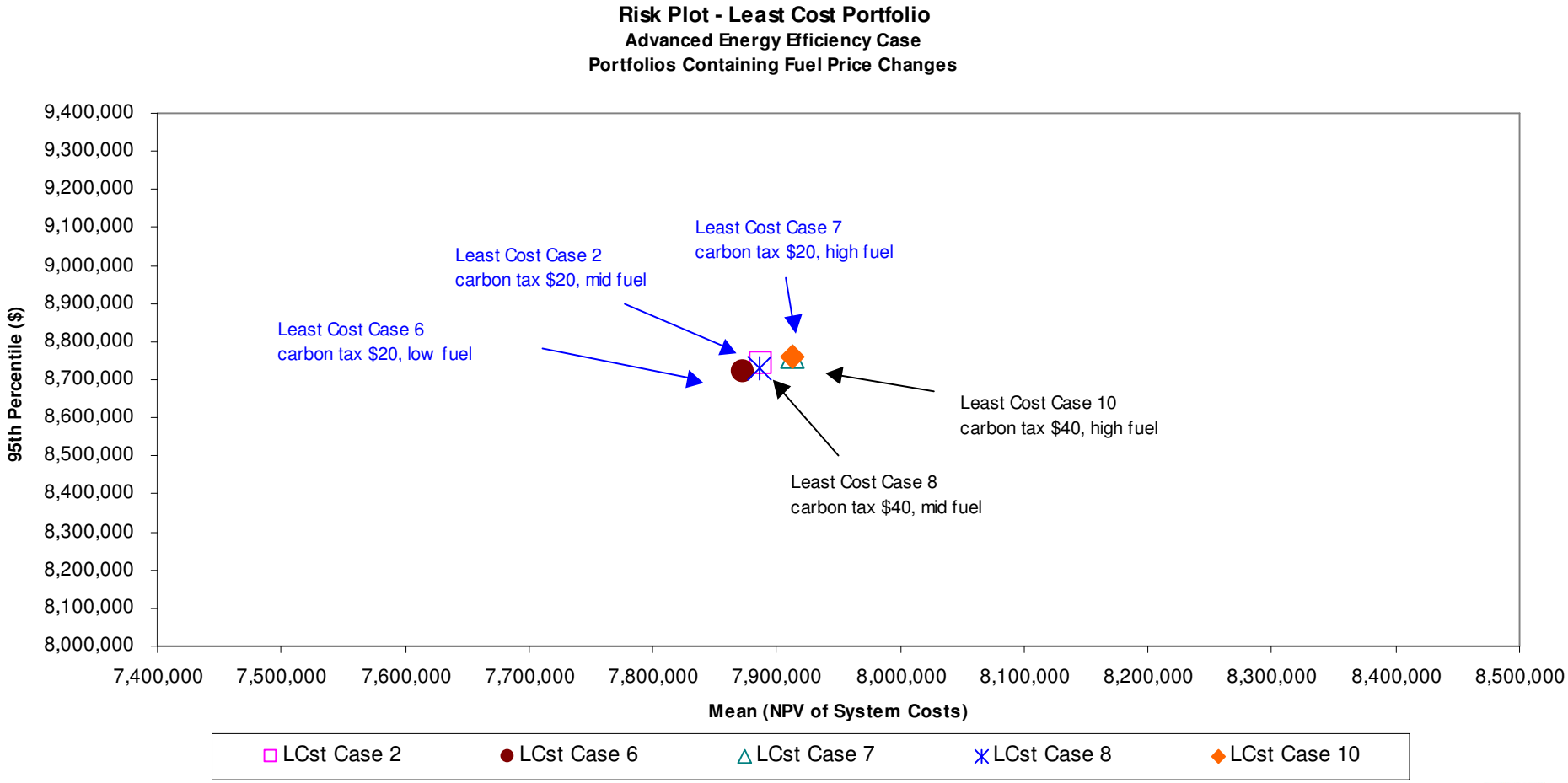


Portfolio Risk: Load

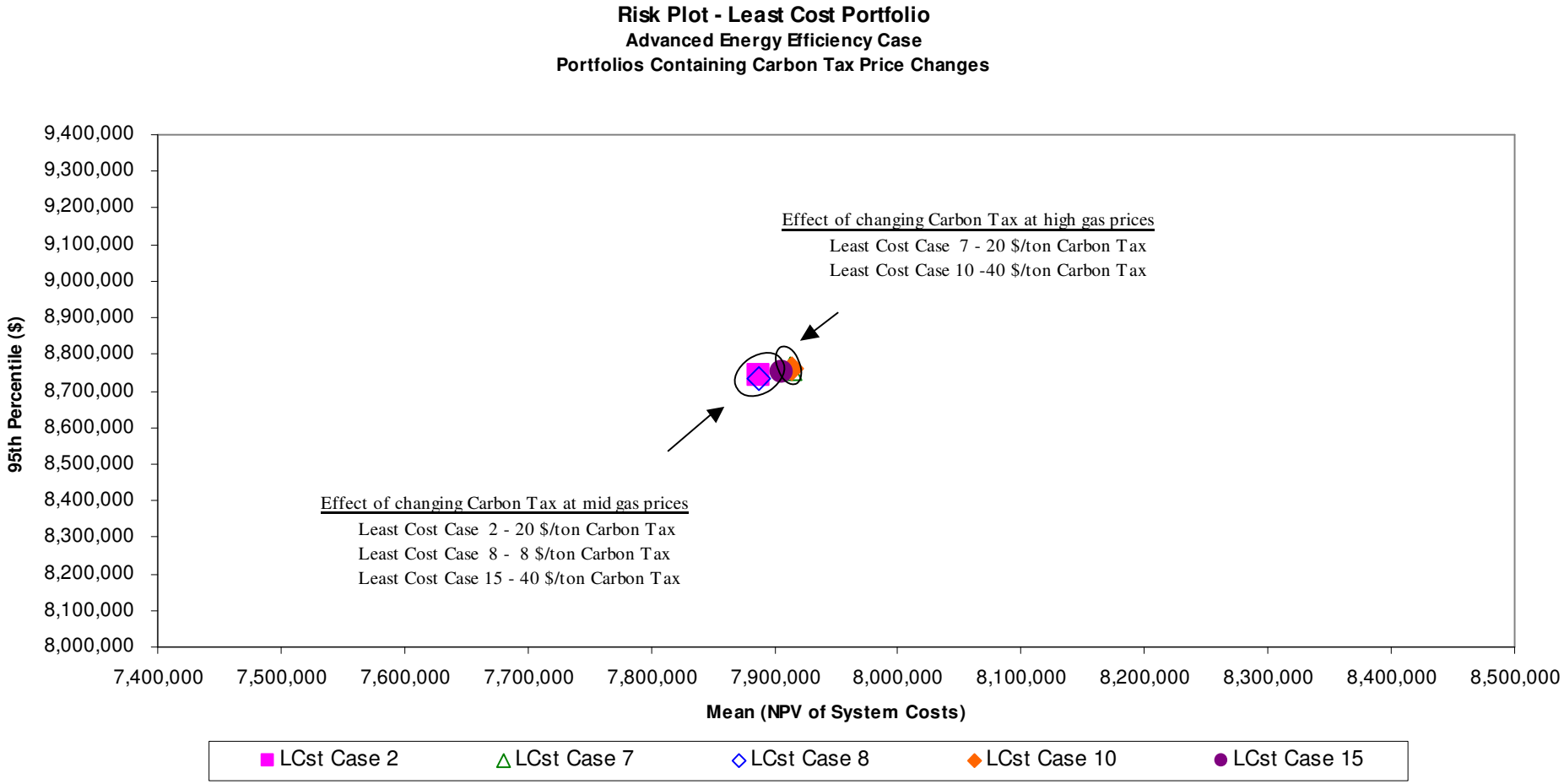


Factors:
Market Sales
Capital
Timing
Reserve Margin

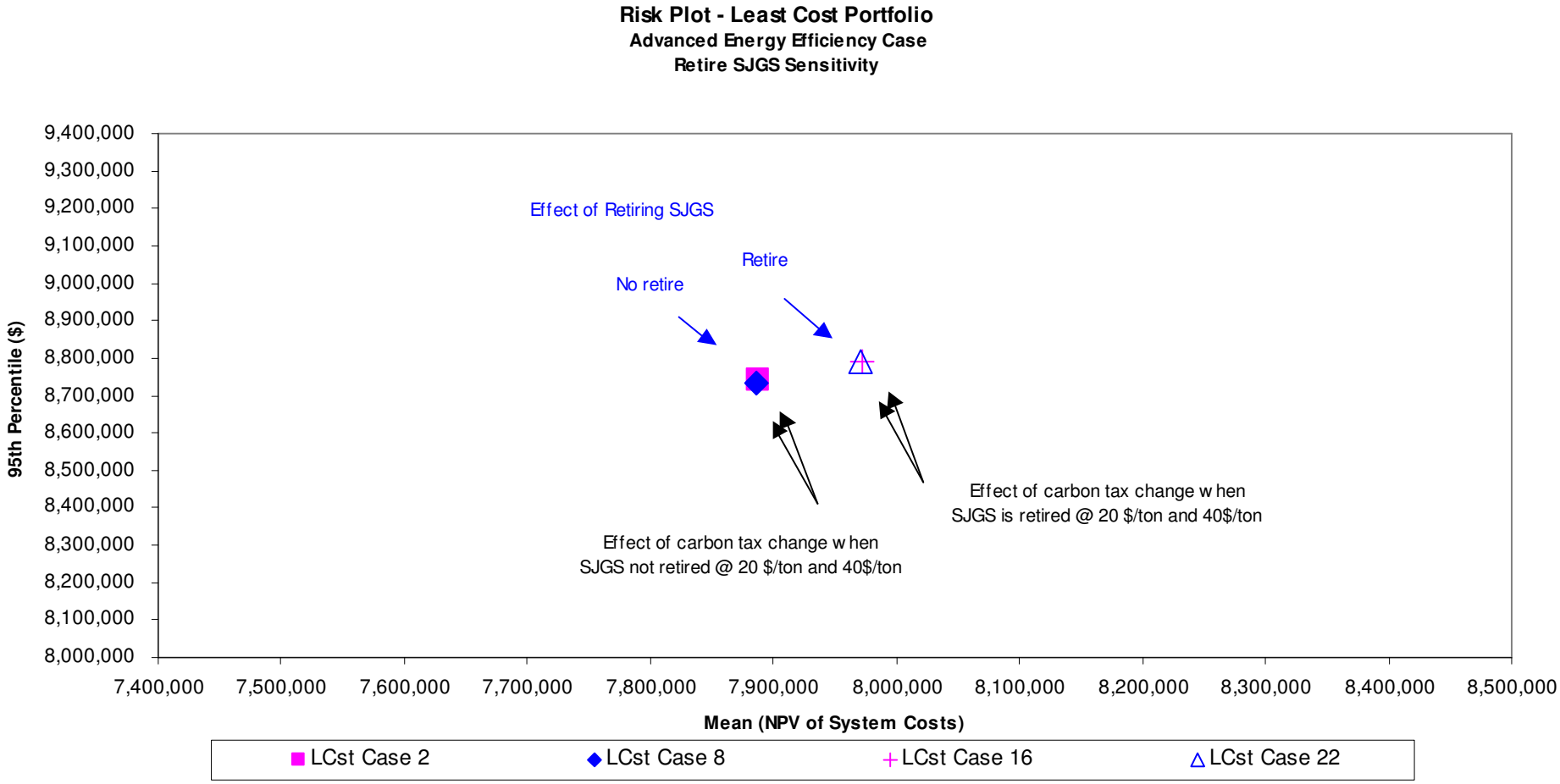
Portfolio Risk: Natural Gas Price



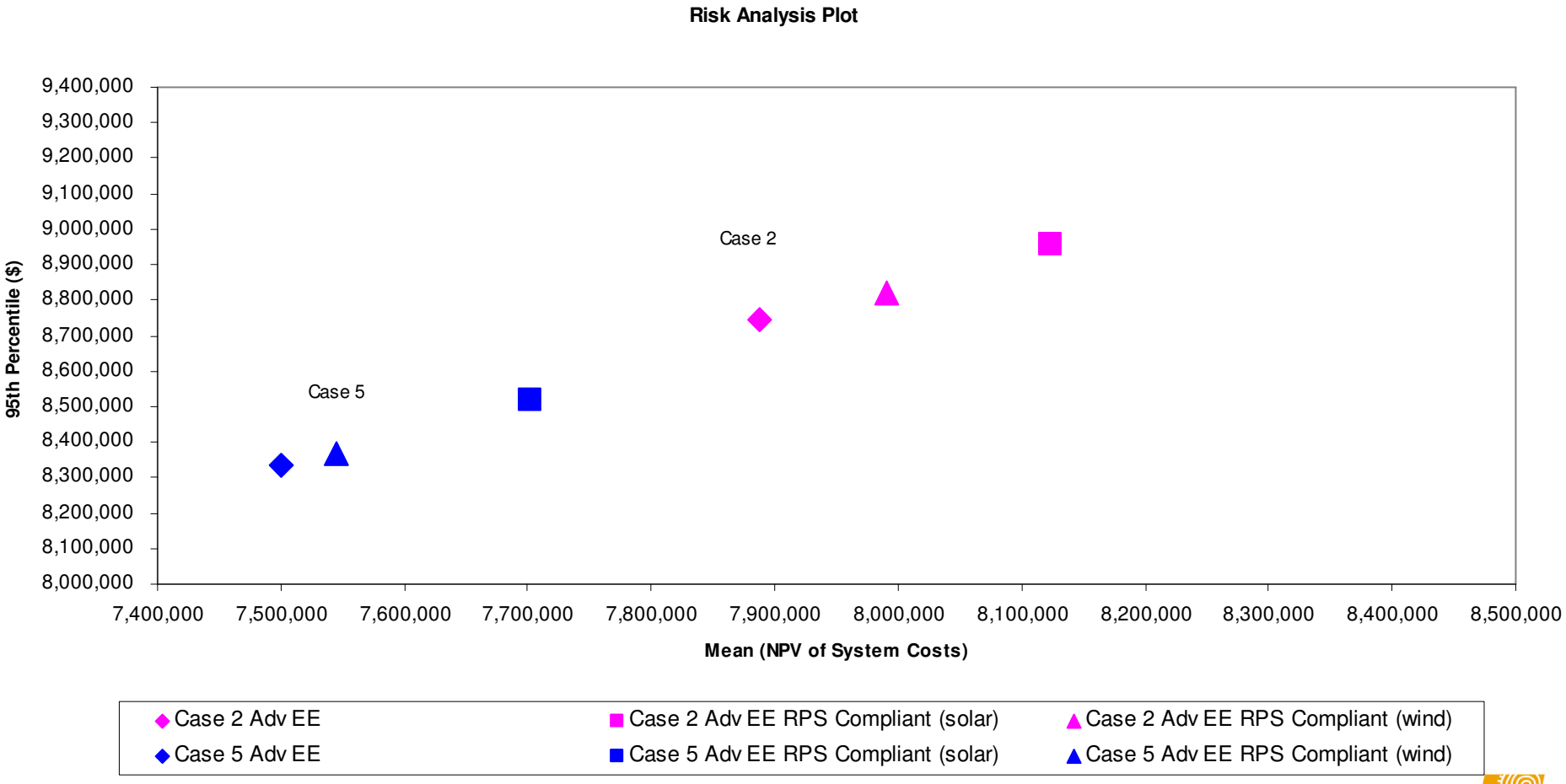
Portfolio Risk: CO_2 Tax



Portfolio Risk: Retire San Juan



Portfolio Risk: RPS Compliance



Proposed
Most Cost Effective Portfolio

NPV	$8.742 Billion
CO2	146 Million tonnes
Loss of Load	233.5 hours
2008	Advanced EE (to 174 MW)
2009	Photovoltaic DG/ Luna/ Lordsburg
2010	
2011	
2012	Natural Gas (80 MW)
2013	Biomass (25MW)/Geothermal(7 MW)
2014	Solar with 6 hr storage (100 MW)
2015	
2016	Natural Gas (140 MW)
2017	
2018	PaloVerde Acquire/ Nat Gas (140 MW)
2019	Wind (100 MW)
2020	
2021	Natural Gas (140 MW)
2022	
2023	Natural Gas (140 MW)
2024	
2025	Wind (100 MW)
2026	
2027	Nuclear (200 MW)

New Installed Capacity
11% Energy Efficiency
27% Renewable
49% Natural Gas
12% Nuclear

Action Items

- **2008+ EE Annual Report**
- **2008 Renewable Procurement**
- **2008 CCN Luna/Lordsburg**
- **2008 Gas Study/2009 CCN**
- **2008 PNM Renewable RFP**
- **2008 Multi-Utility RFP**
- **Ongoing Lease Evaluation**
- **Ongoing Evaluate Storage**
- **2011 File Next IRP**

Electric Integrated Resource Plan

Sue Fullen

Vice-President Marketing and Customer Service

History

- 28 Years of Utility Experience
  - Idaho Power
    - General Manager of Technology Business Services
    - General Manager of Customer Service, Customer Relations, Research, Metering, and Business Services
    - Manager of Customer Services
    - Regional Manager
      - Energy Services and Field Operations

Energy Efficiency Experience

- Established DSM Department within Idaho Power
  - Established Energy Efficiency Advisory Group
  - Developed and Deployed Programs
    - Demand Response
    - Energy Efficiency
    - Market Transformation
    - Customer Education

Electric Integrated Resource Plan

Steve Bean

Manager, Energy Efficiency Programs

Energy Efficiency Agenda

- What are the IRP EE Cases?
- What are the projected metrics?
  - How do they compare to other utilities?
- What programs will be included?

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IRP Model Cases

Approved

- Included in forecast
- EE = 3 yrs; DR = 10 yrs

1. ***Base***
   - Some programs extended beyond 3 years
2. ***Advanced***
   - *Included in preferred IRP portfolio*
3. ***Maximum Achievable***

Potential Study Results

	Average Annual Program Cost ($ 2006 Millions)	Average Annual Net MW Savings by 2016	Average Annual Net GWh Savings by 2016
Advanced	$13.4	11.0	69.3
Max. Achievable	$22.2	17.5	93.2

Advanced – rebates cover up to 80 percent of incremental measure costs

Maximum Achievable – rebates cover up to 100 percent of incremental measure costs. "Note, however, that there is very little real-world experience with sustained maximum achievable scenario funding levels."

IRP Model Cases

Advanced Case

- 2008 – 2009 = approved programs
- Funding increases 37% each year 2010 – 2013, then level
- Savings ramp up to Pot. Study Advanced level
- New programs filed in 2009 for 2010 implementation
- Savings growth primarily from new commercial programs

Maximum Achievable

- Funding increases 55% each year 2010 – 2013

IRP EE & DR Cases

IRP EE Cases	Units	2008	2009	2010	2011	2012	2013	2014
Advanced Case EE	GWh	26	55	95	145	207	279	351
Advanced Case EE	MW	3	6	11	17	26	36	46
Advanced Case DR	MW	30	45	55	63	63	63	63
Advanced Case	$	$ 7.5	$ 9.2	$12.2	$ 15.8	$ 17.7	$19.6	$ 19.6
Max. Achievable Case EE	GWh	26	55	100	161	239	332	425
Max. Achievable Case EE	MW	3	6	13	23	37	54	72
Max. Achievable Case DR	MW	30	45	55	63	63	63	63
Max. Achievable Case	$	$ 7.5	$ 9.2	$13.8	$ 19.0	$ 22.5	$26.1	$ 26.1

Energy Efficiency Agenda

- What are the IRP EE Cases?
- What are the projected metrics?
  - How do they compare to other utilities?
- What programs will be included?

National Metrics[1]

	National
Median Savings as Percent of Sales	0.4%
Median Cost per kWh (1st year)	17¢
Lifetime Cost per kWh	2¢*
Median Spending as Percent of Revenue	1.2%
**Assumming 10-15 year lifetime*	

1. Benchmarking 2005 DSM Results, Summit Blue Consulting LLC, February 2007

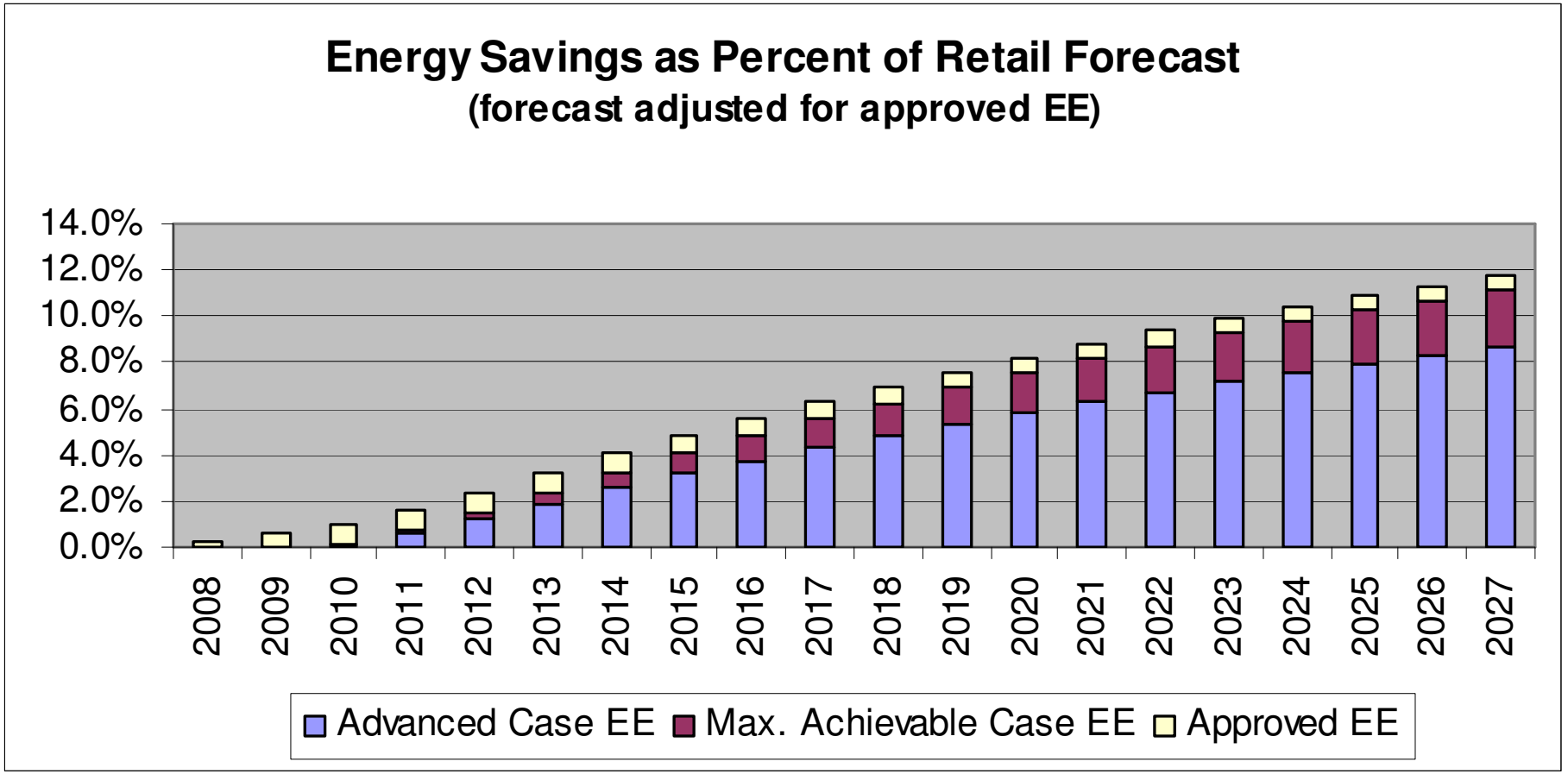
PNM Advanced Case Metrics

	National	PNM Advanced
Median Savings as Percent of Sales	0.4%	2010 = 1.0%
Median Cost per kWh (1st year)	17¢	17¢
*Lifetime Cost per kWh **	2¢	1.7¢
Median Spending as Percent of Revenue	1.2%	2010 = 1.0%
**Assumming 10-15 year lifetime*		

Efficiency Act Metrics

	PNM Advanced	PNM Max. Acheivable
2005 Retail Sales (GWH)	8,224	8,224
2014 Savings (GWH)	351	425
2020 Savings (GWH)	784	985
2014 Savings as Percent of 2005 Sales	4.3%	5.2%
2020 Savings as Percent of 2005 Sales	9.5%	12.0%

Projected Savings



Energy Efficiency Agenda

- What are the IRP EE Cases?
- What are the projected metrics?
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Residential Programs

- Lighting – CFL buy down, new construction, new tech.
- Refrigerator and freezer replacement
- Energy Star Home (or higher)
- High efficiency appliances – clothes and dish washers, pool pumps
- Water heating – high eff. Electric,
- Windows – low e, film
- Duct repair
- AC charging
- Insulation

Commercial Programs

- Lighting – CFLs, LEDs, sensors, T8/T5, HIDs
- Refrigeration measures
- Office equipment power management
- High efficiency package AC
- Variable speed fans and pumps
- Cool roofs
- EMS
- Window film

Industrial Programs

- Lighting
- Pumping
- Compressed air
- Fans
- Cooling
- Drives
- Process
- Refrigeration

Wrap-Up

Today

- Risk Analysis
- Break
- Energy Efficiency

Draft Report

Next Meeting: June 16