Resource Needs and Round 1 Portfolios

Seattle City Light
IRP Stakeholders Meeting

May 2, 2006

2006 IRP

David Clement	Project Management	Janice Boman / Charlie Black	Public Involvement
Corinne Grande	Environmental Impact	Cam LeHoullier	Load/Resource Modeling
Tony Kilduff / Mary Winslow	Economic & Demand Forecasts	Steve Lush	Conservation
Don Tinker	Existing Power Supply	Marilynn Semro	New Power Supply/ Transmission

Michele Robbins Mattie Bailey Larry Vogel	Dan Kirshbaum Glenn Atwood Mike Little	David Van Holde Alex Byrne Kevin Clark	Steven Dadashi C.V. Chung Tim Cornwell

Topics

- Resource Adequacy
- Seattle City Light's Need for New Resources
- Conservation Resource Potential
- Resource Portfolios for Round 1 Analysis

Resource Adequacy:

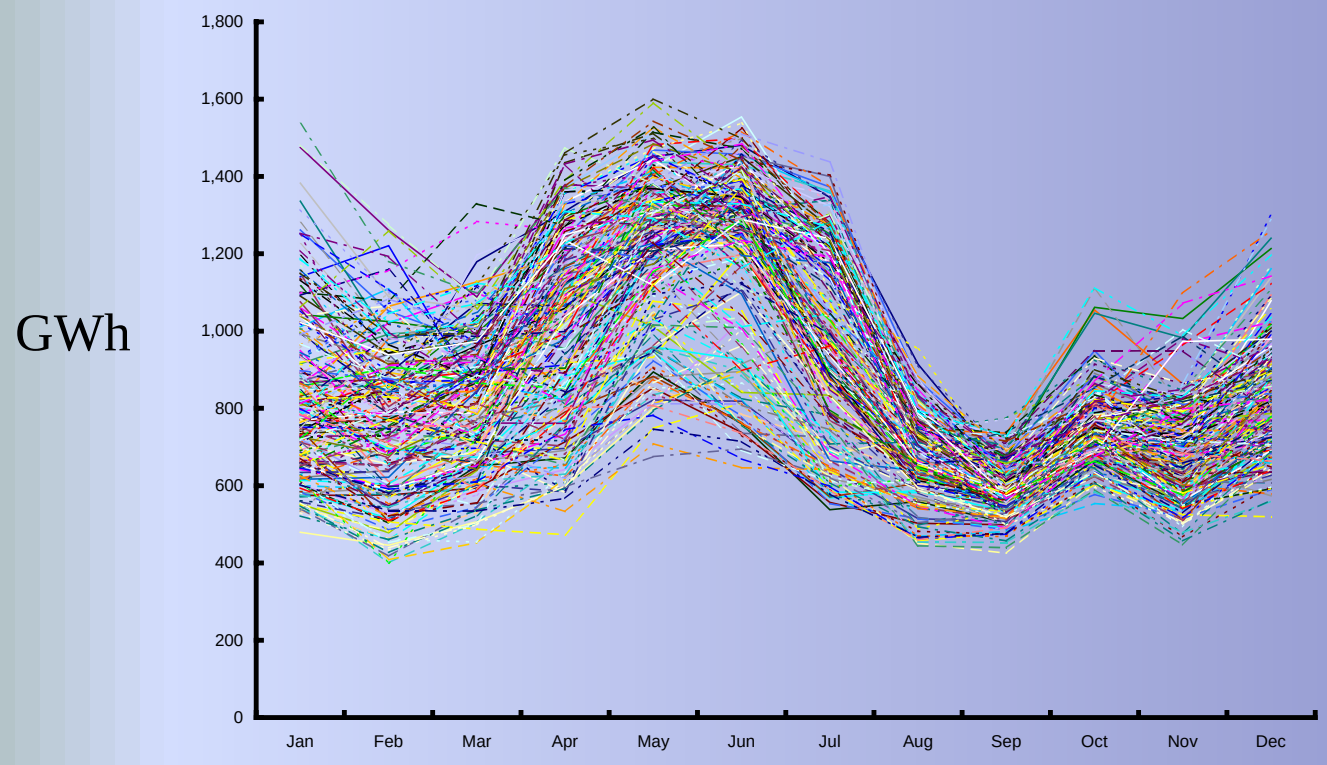
By What Measure?

Resource Adequacy Measures Used by Other Utilities in IRPs

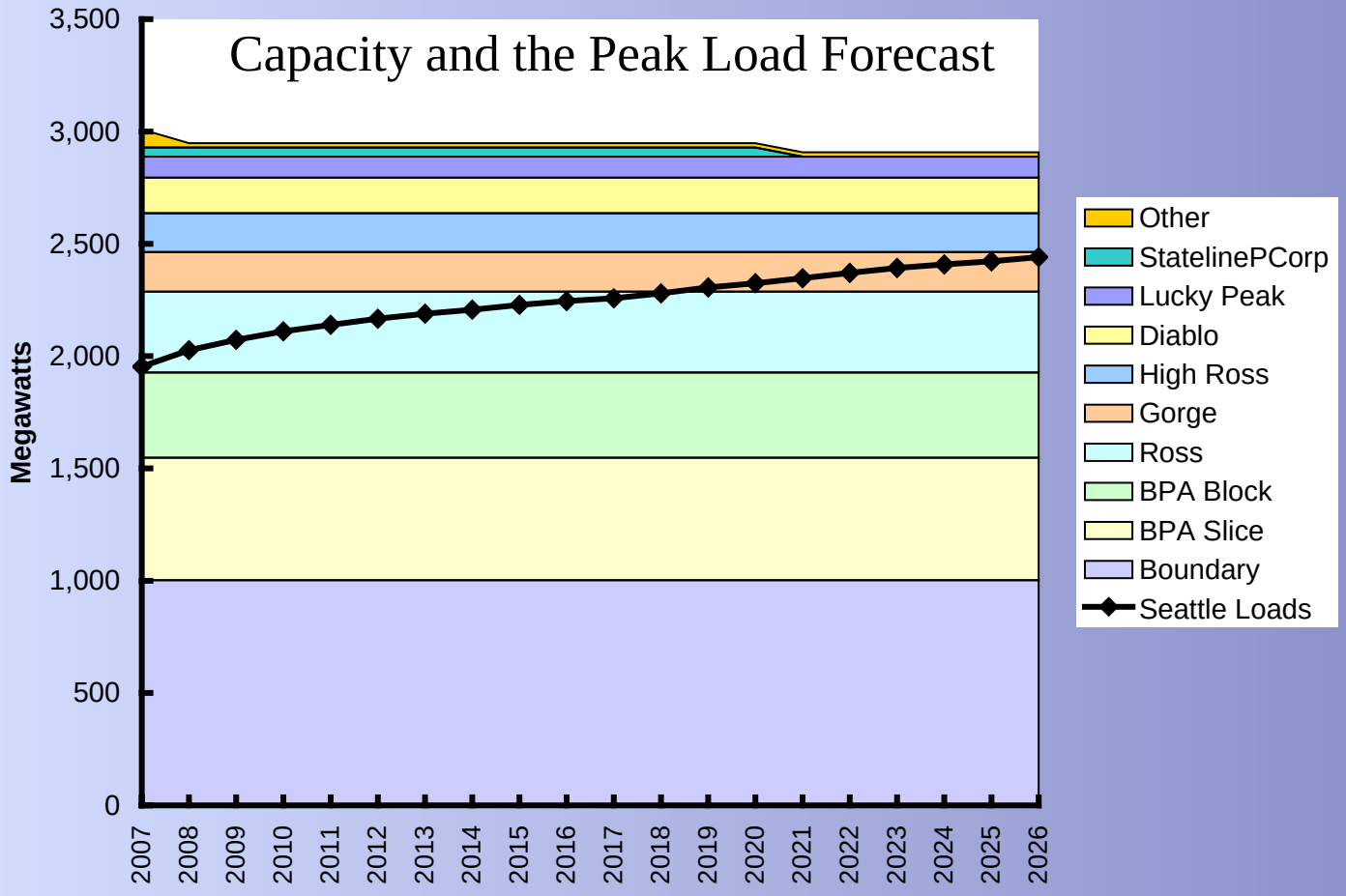
- **Capacity Reserve Margin** (*PacifiCorp 2003, Nevada Power*)
- **Forced outage of the largest single generation unit for a selected time period** (*Idaho Power 2003*)
- **Critical Hydro: Ability to meet expected load under worst historic hydro conditions** (*Northwest Power & Conservation Council 2003*)
- **Probabilistic Approach (1 day in 10 years, LOLP)** (*North American Electric Reliability Council*, *Northwest Power & Conservation Council Regional Plan 2005*, *Avista, Idaho Power IRP 2005, PacifiCorp IRP 2004)*

Hydro Volatility Creates Risk for Monthly Energy Adequacy

Total SCL Hydro Generation



City Light Has Adequate Peak Capacity Resources



Why a NERC Standard?

- Common NERC Standard: 1 day in 10 years with energy not served (ENS)
  - Power Market Daily, April 5, 2006:

"*The North American Electric Reliability Council (NERC) on Tuesday filed an application at FERC to become the electric reliability organization (ERO), in compliance with the Commission's final rules related to certification of the ERO* ***and procedures for the establishment, approval and enforcement of reliability standards*** *issued earlier this year*"

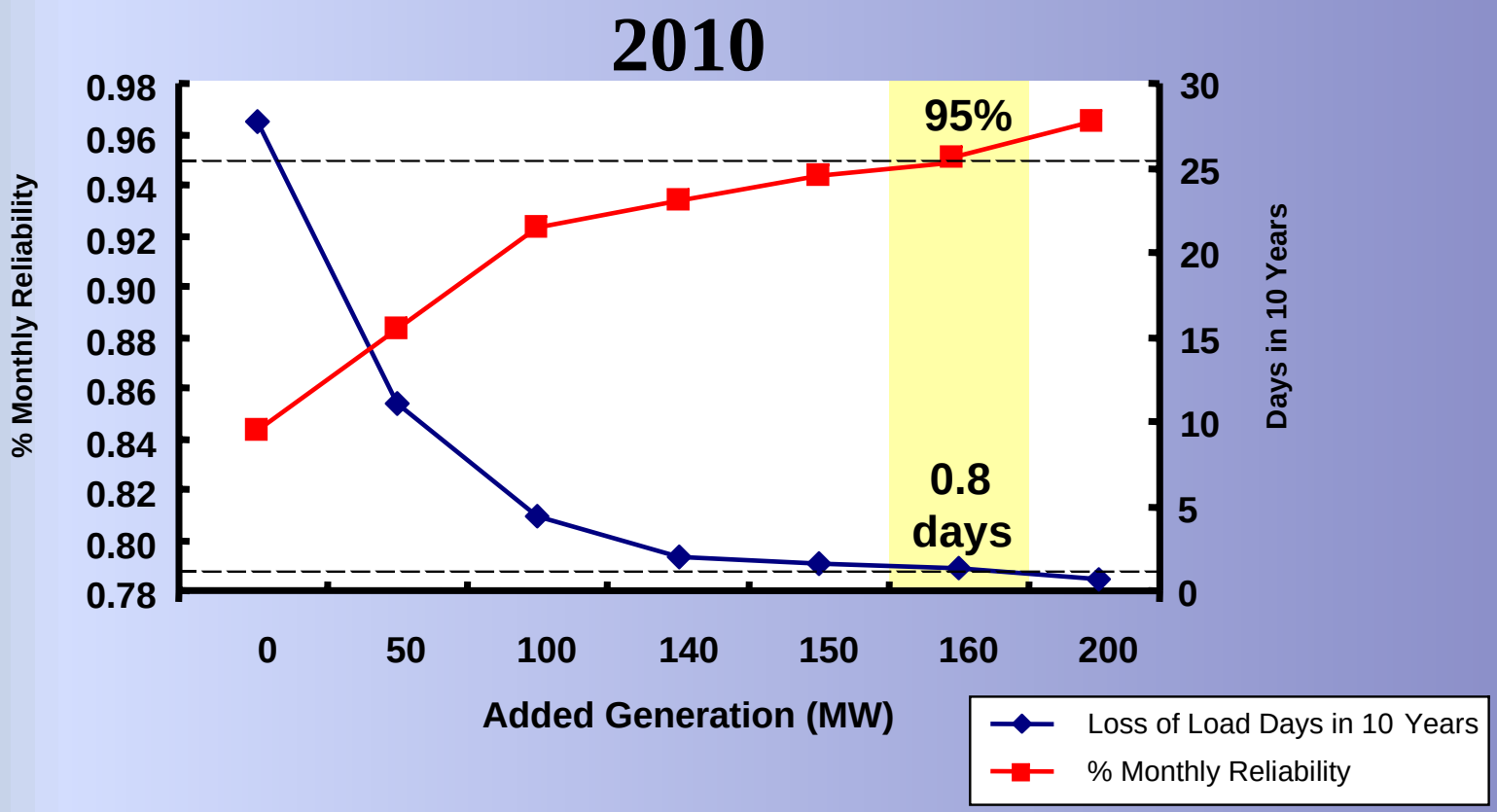
Ten NERC Regions, Two Reliability Measures

(See note below)	WECC	MAPP	SPP	ERCOT	MAIN	ECAR	FRCC	NPCC	SERC	MAAC
Planning Margin	Not Specified	15%,10% If hydro system Planning Margin	12%,9% if 75% hydro Planning Margin	12.5% Planning Margin	15-20% Planning Margin	0.1 day/yr LOLE	15% Planning Margin	Not Specified	Varies by member system	Based on LOLE criterion
Regional Resource Adequacy Criteria	Not Specified	1-in –10yr LOLE	1-in –10yr LOLP	Not Specified	1-in –10yr LOLP	Use of Supple-mental Capacity 1 day/yr.	1-in–10 yr LOLP	LOLE by Discon-necting Firm load Due to Resource Deficien-cy no more than 0.1	No uniform criterion for entire region	LOLE of 1 Day/10 Years or 0.1 day/yr
Methodo-logy	Not Specified	Margin Derived Using LOLE 1-in-10	LOLE analysis	Reserve Margin Based on LOLE studies	1 to 10 days DSCR Consistent With LOLE 1 in 10 yr	Based on LOLP and LOLE Studies	Periodic Analysis of LOLP for Reserve margin	Based on LOLP and LOLE Studies	Not Specified	PIM Approval of the Required margin

Why a Percentage Reliability Measure?

- It is intuitive (e.g. 95% means 95 out of 100 times there will be no unserved energy)
- Ease of comparison for examining different levels of reliability and risk (e.g. 85%, 90%, 95%) as targets
- Seattle City Light has used a 95% confidence interval criterion for other purposes

Near Equality of 95% and 1 Day in 10 years



Resource Adequacy Standard Selected

- Focuses on adequacy of energy
- Probabilistic approach
- 95 percent probability of no unserved energy in any month

Other Assumptions Needed for Round 1

- *Emergency Drafting of Reservoirs Below Operating License?*
  - This can happen when a regional "hydro emergency" is declared
- *Borrowing From Future Months?*
  - It is possible to draft down some reservoirs with the intention of replacing the water later
- *How Much Access to Market Under Critical Water Conditions?*
  - SCL purchased between 100 MW and 400 MW in peak demand hours during 2001 and during the 2004 Arctic Express
  - The NPPC equivalent assumption would be about 65 MW

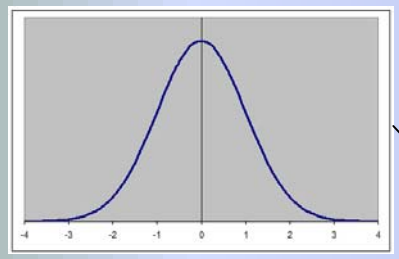
Base Case Assumptions for Round 1

- *Emergency Drafting of Reservoirs Below Operating License?*
  - Not for Resource Planning Purposes
- *Borrowing From Future Months?*
  - Not for Resource Planning Purposes
- *How Much Access to Market Under Critical Water Conditions?*
  - 100 Megawatts

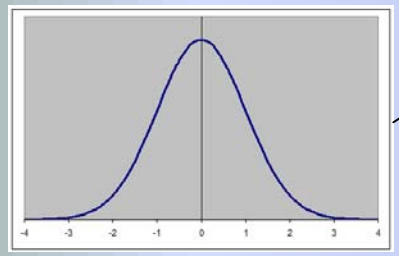
What is Seattle City Light's Need for New Resources?

Resource Adequacy Calculation

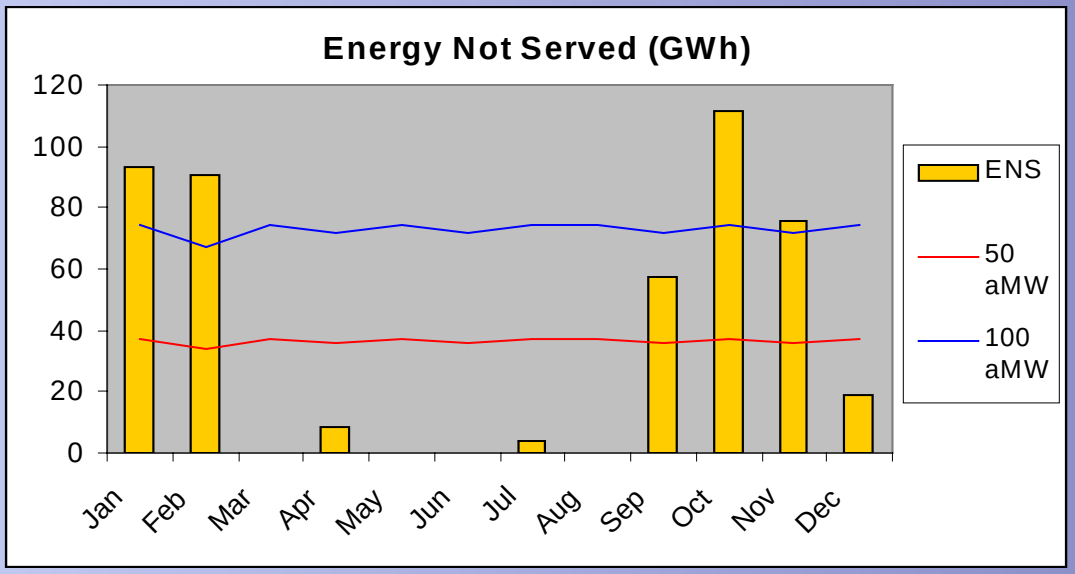
Generation (h)



Load (h)

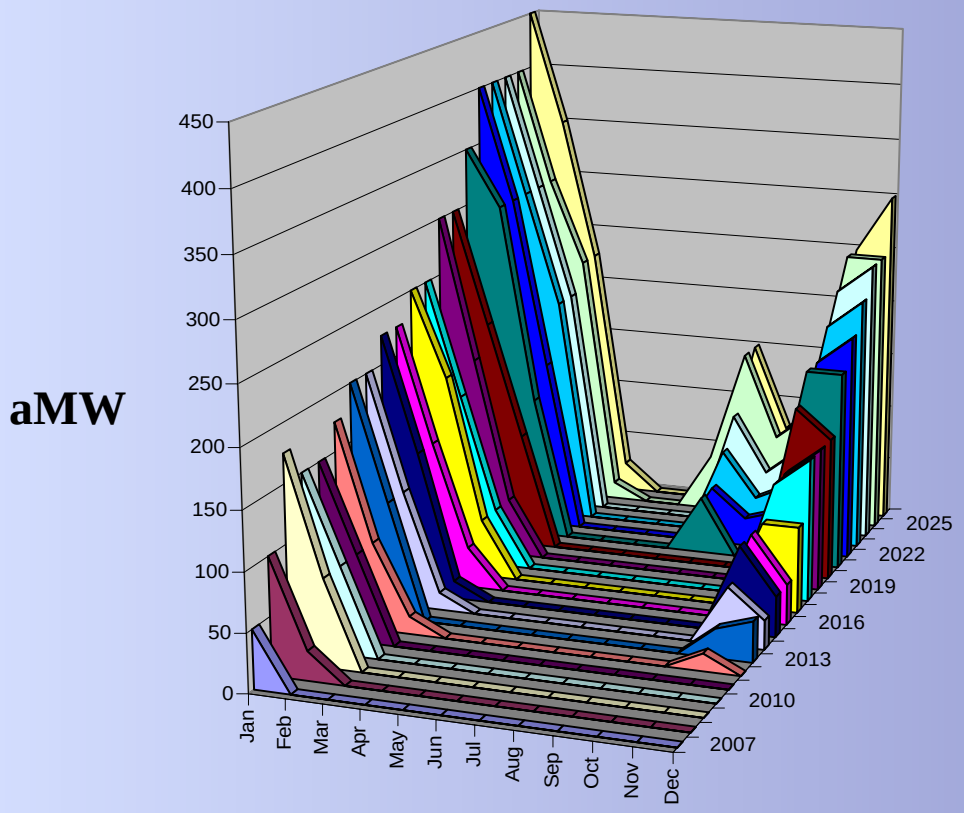


Calculation of ENS
= Sum of ENS(h) - 100 aMW for market purchases



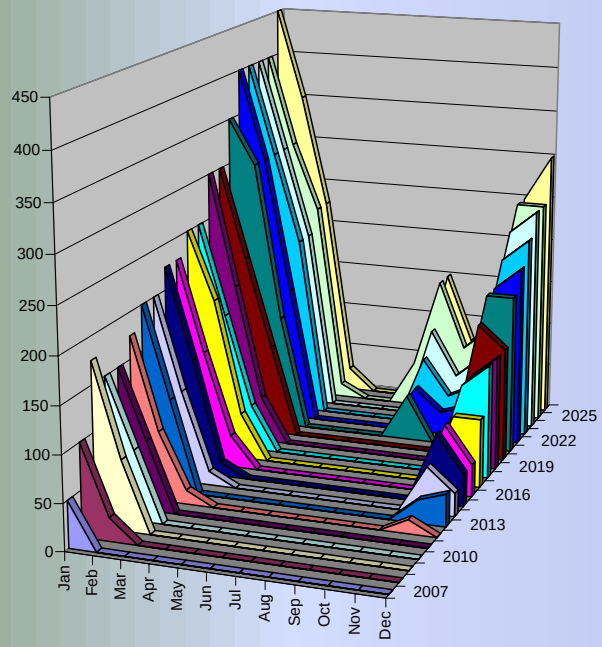
Hydro Volatility = Increased Risk

Resource Additions Meeting a 95% Criterion

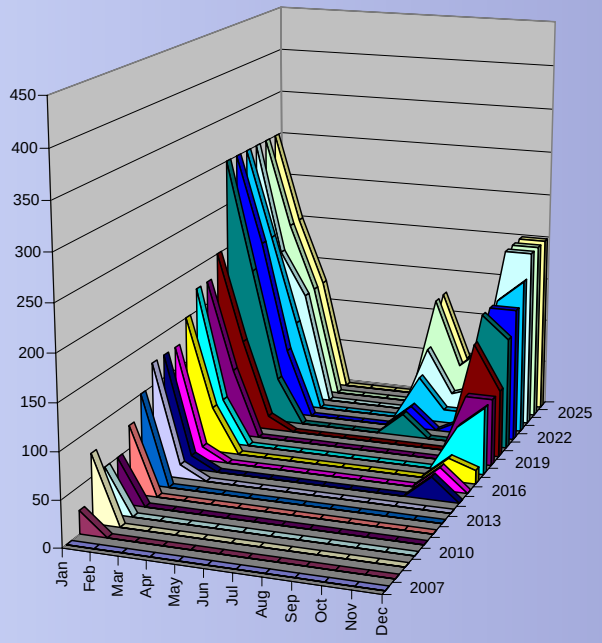


Accepting A Higher Level of Risk Reduces Need for New Resources

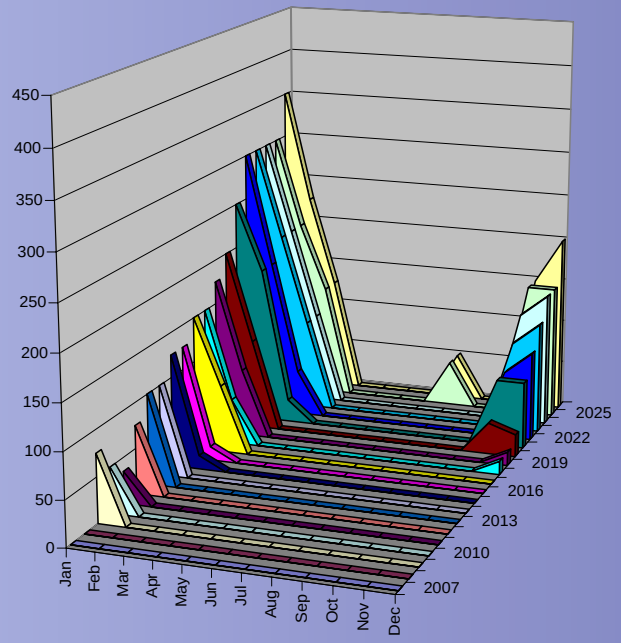
95%, 100 MW Market



90%, 100 MW Market



95%, 200 MW Market



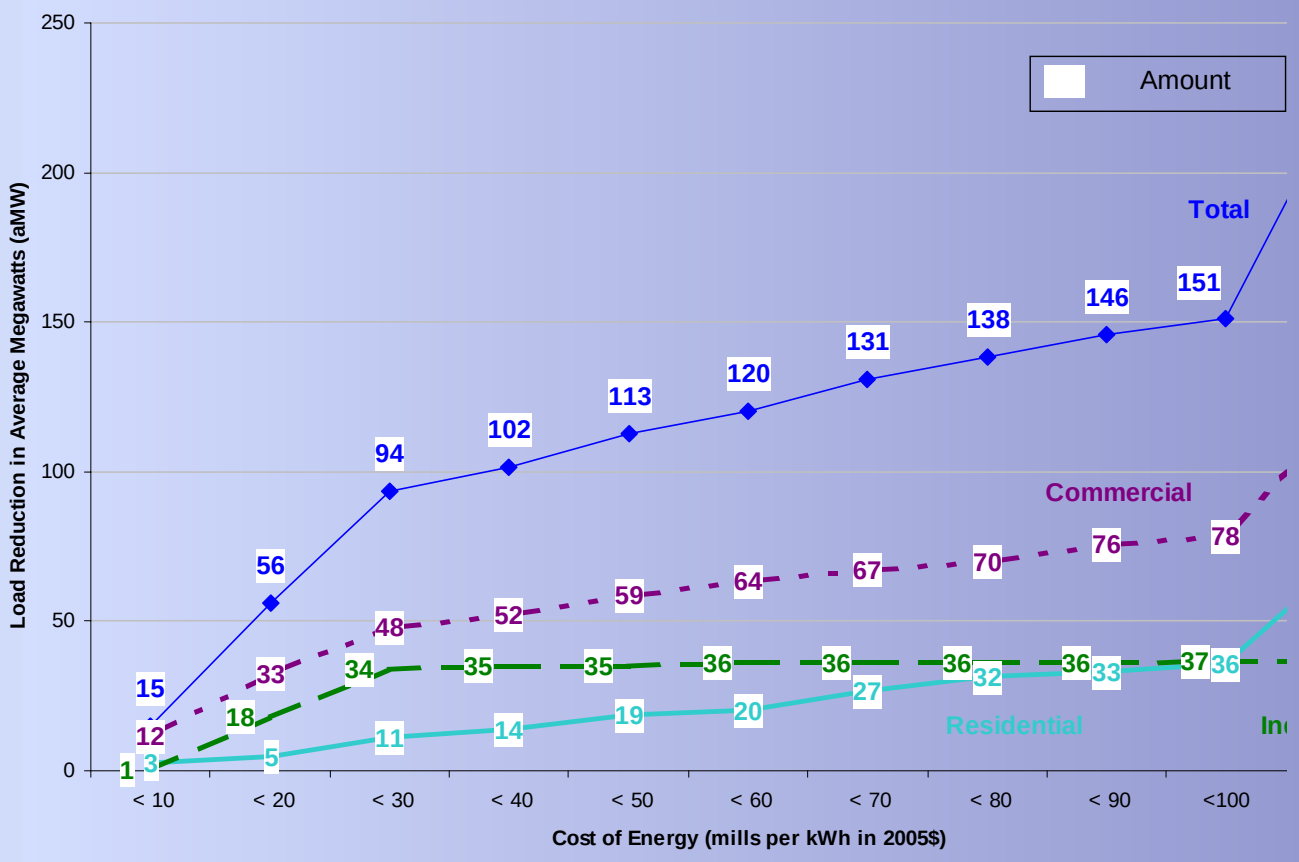
Potential Responses to Seasonal Supply Risk

- Wait until we need energy on an annual basis
- Rely on our power marketers to cover it with short term market purchases each year
- Build/contract for new firm resources to cover the gap
- Work to seasonally “shape” the resource portfolio to better fit our risk profile
- Some combination of the above three

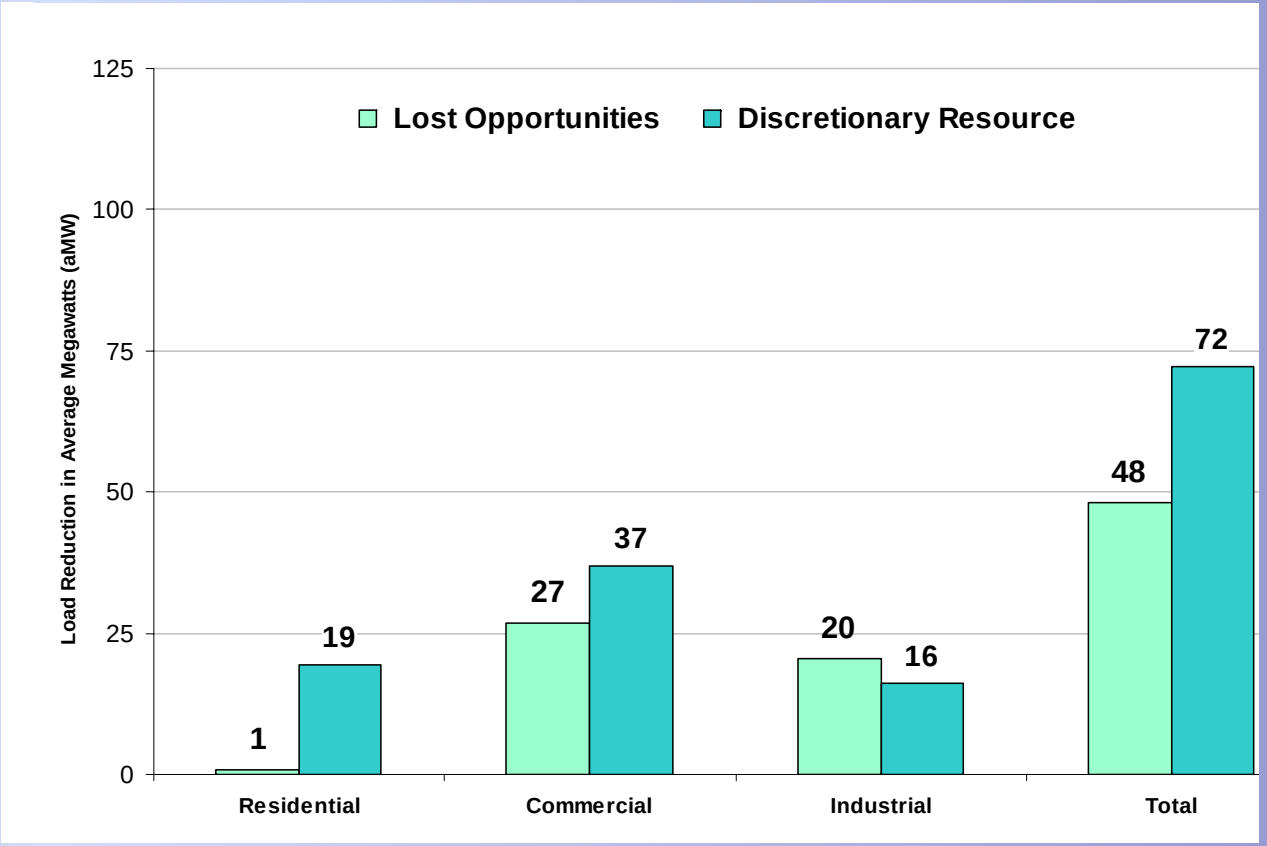
Approach: Focus on responses that include shaping resources to improve the portfolio’s seasonal load-resource balance

Conservation Resource Potential: How Much is Available?

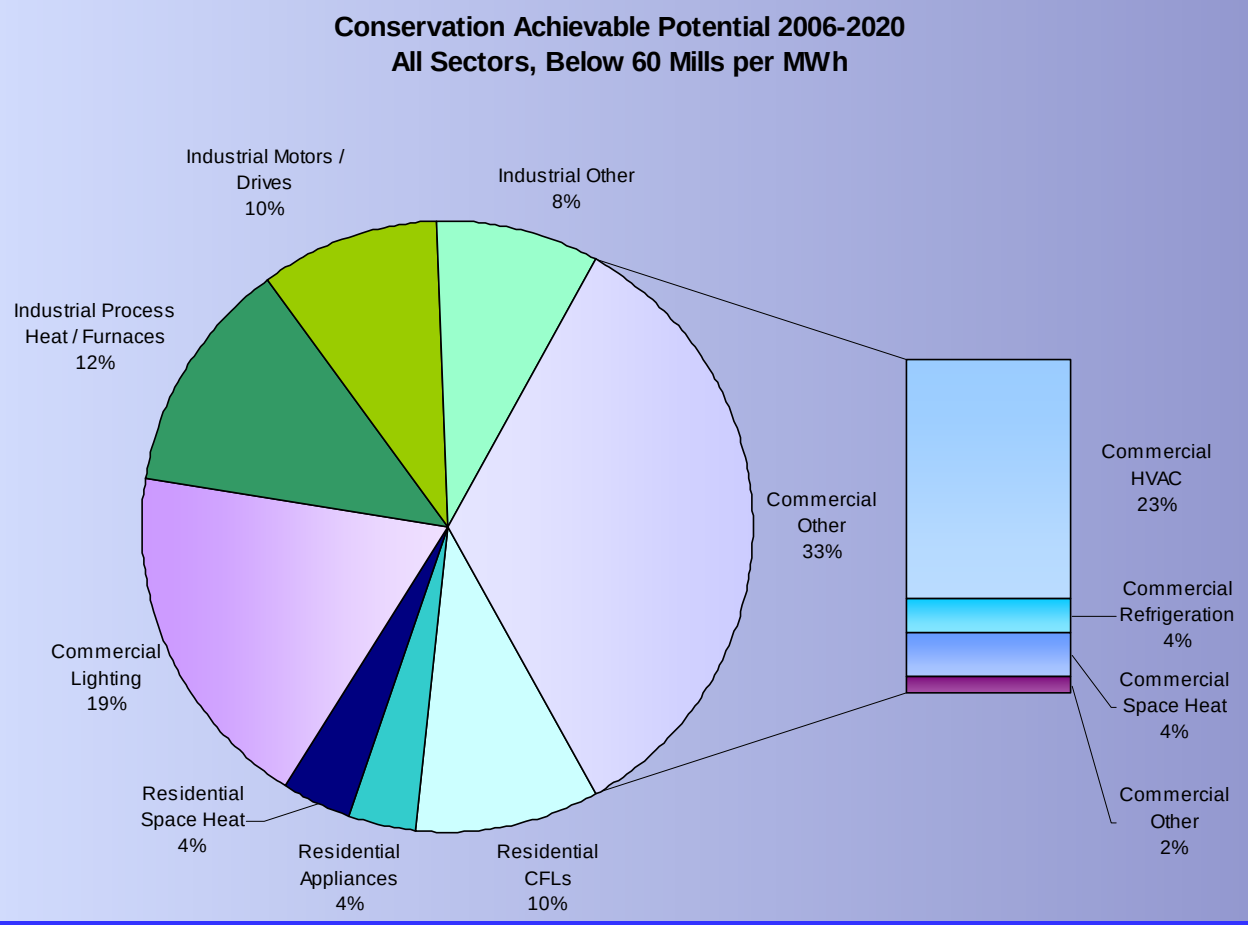
Achievable Conservation Potential 2006-2020



Achievable Conservation Potential 2006-2020



Achievable Conservation Potential 2006-2020



Analyzing Conservation in Portfolios

- Round 1 Will Include a Look at Varying Conservation Amounts Within One Portfolio
- More Analysis of Conservation Levels Between Round 1 and Round 2
- Round 2 Portfolio Analysis to Identify Recommended Conservation Amounts

Round 1 Portfolio Analysis: What Resources?

Approach to Round 1 Portfolios

- Wide Range of Portfolios
- Portfolios Include Realistic Resource Options
- Some Portfolios Include Seasonal Shaping of Resources

Approach to Round 1 Portfolios: Snapshot of 2010

Portfolio 1 Geothermal 25MW Wind Farm (coastal) 100 aMW Exchange 50 aMW Landfill Gas 25 MW Conservation Plan 1, 7aMW, 2007	**Portfolio 2** New BPA Block Unwind Old BPA Block and Slice Exchange (Jan for July) 2009-2011 100 aMW Conservation Plan 1, 7aMW, 2007	**Portfolio 3** New BPA Block Unwind Old BPA Block and Slice Exchange (Jan for July) 2009-2011 100 MW 10% of current Slice take Conservation Plan 1, 7aMW, 2007
Portfolio 4 Hydro Contract 50 aMW Exchange 100 aMW CHP 25 aMW Conservation Plan 1, 7aMW, 2007	**Portfolio 5** SCCT (50 MW) Landfill Gas 25MW Wind Farm (coastal) 75 aMW Conservation Plan 1, 7aMW, 2007	**Portfolio 6** Seasonal Resource Contract (100 MW) New BPA Block Wind Farm (50 aMW) Conservation Plan 1, 7aMW, 2007
Portfolio 7 Seasonal Resource Contract (150 MW) Conservation Plan 1, 7aMW, 2007	**Portfolio 8** SCCT (150MW) Conservation Plan 1, 7aMW, 2007	**Portfolio 9** Pulverized Coal (Montana) PRB 150 MW Conservation Plan 1, 7aMW, 2007

Questions?

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