

W. Bill Booth
Chair
Idaho

James A. Yost
Idaho

Tom Karier
Washington

Dick Wallace
Washington



Bruce A. Measure
Vice-Chair
Montana

Rhonda Whiting
Montana

Melinda S. Eden
Oregon

Joan M. Dukes
Oregon

January 6, 2010

MEMORANDUM

TO: Power Committee

FROM: Charlie Grist and Tom Eckman

SUBJECT: Presentation on Conservation Methodology

Staff will review the conservation methodology used in the Power Plan at the January 8, 2010 web conference. A PowerPoint presentation is attached that summarizes the methodology. The discussion of the methodology in Appendix E is also attached.

Staff is aware that the description of the methodology that was added to Appendix E since the draft plan needs some editorial improvement. We will undertake that after the Power Committee discussion.

Attachments

Conservation Methodology Review

Power Committee
January 8, 2010

Overview



Build Supply Curves Cost & Quantity



- Calculate Costs & Benefits per Unit
 - Capital, Financing, Labor, Program, O&M, Reinstallation, Deferred Distribution Expansion Other Non-Electric (Gas & Water)
 - Adjust Costs for 10% Regional Act Credit
 - NPV All Costs levelized over 20-year period
 - » (\$ per MWh comparable to market purchase or generation)
- Calculate Electric Savings per Unit
 - Annual Energy, Line Losses, and Shape of Savings
- Calculate Number of Units Available

PROCOST Model

The Basic Formula for Cost



All Costs & Benefits Per Unit

Capital, Financing, Labor,
Program Admin, O&M,
Reinstallation Cost, Deferred
Distribution Expansion, Other
Non-Electric (Gas & Water)

In the year they occur

Levelized Cost Per Unit

- Net Present value of All Costs (TRC)
- Levelized over 20-year period
- Reduce Costs for 10% Act Credit
(10% of NPV of Electric Value)

Result: \$ per MWh comparable to
market purchase or generation cost

The Basic Formula for Quantity

Achievable Potential =

Number Units * kWh per Unit * Market Penetration

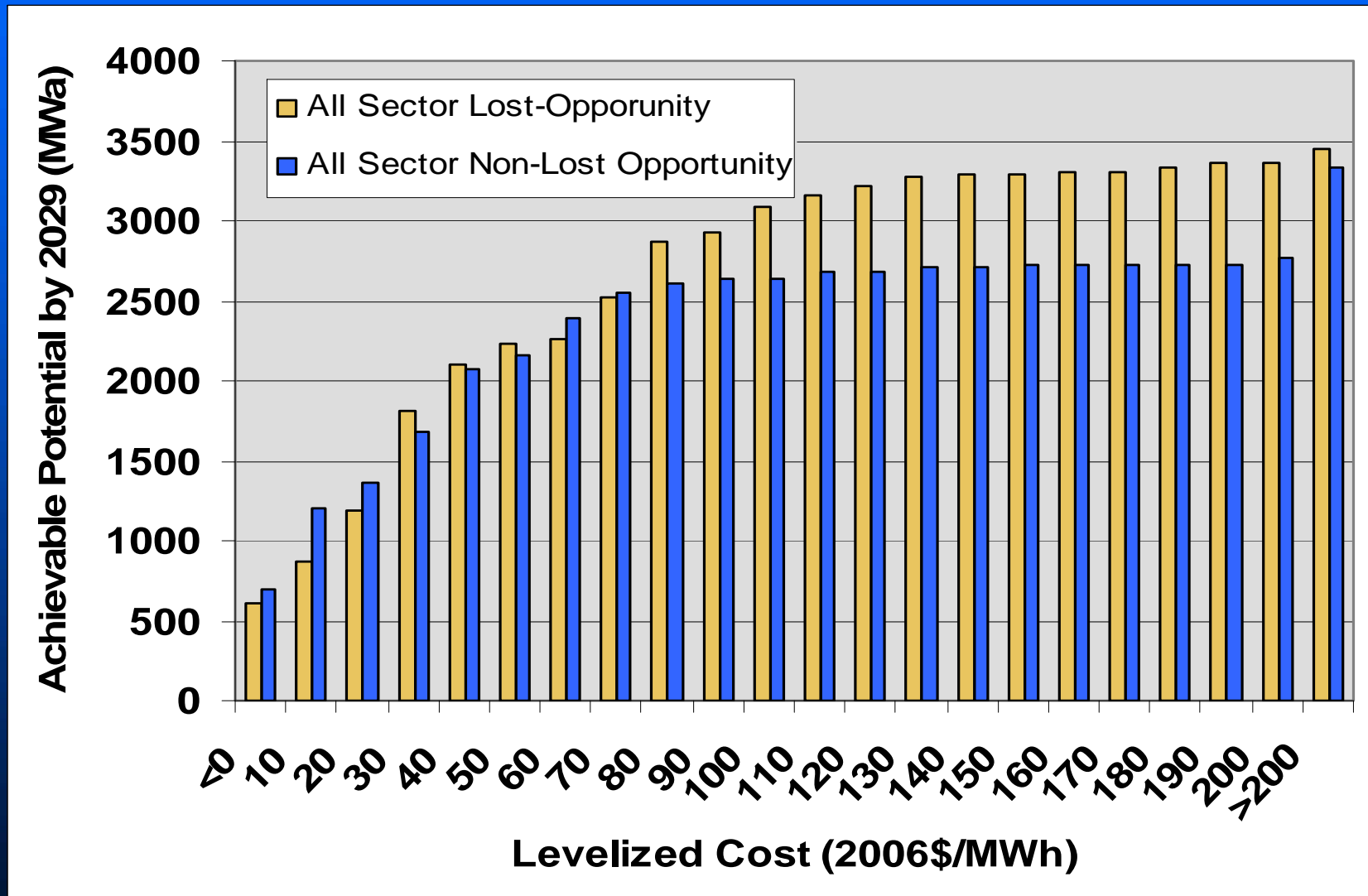
Number Homes
Floor Area of Retail
Number of TVs
Acres Irrigated
Pounds Steel

(kWh/Unit at Current Efficiency – kWh/Unit at Improved Efficiency)

Current Efficiency is adjusted for adopted codes & standards and stock turnover (Frozen Efficiency)

Fraction realistically achievable over time

Supply Curves Cost & Quantity



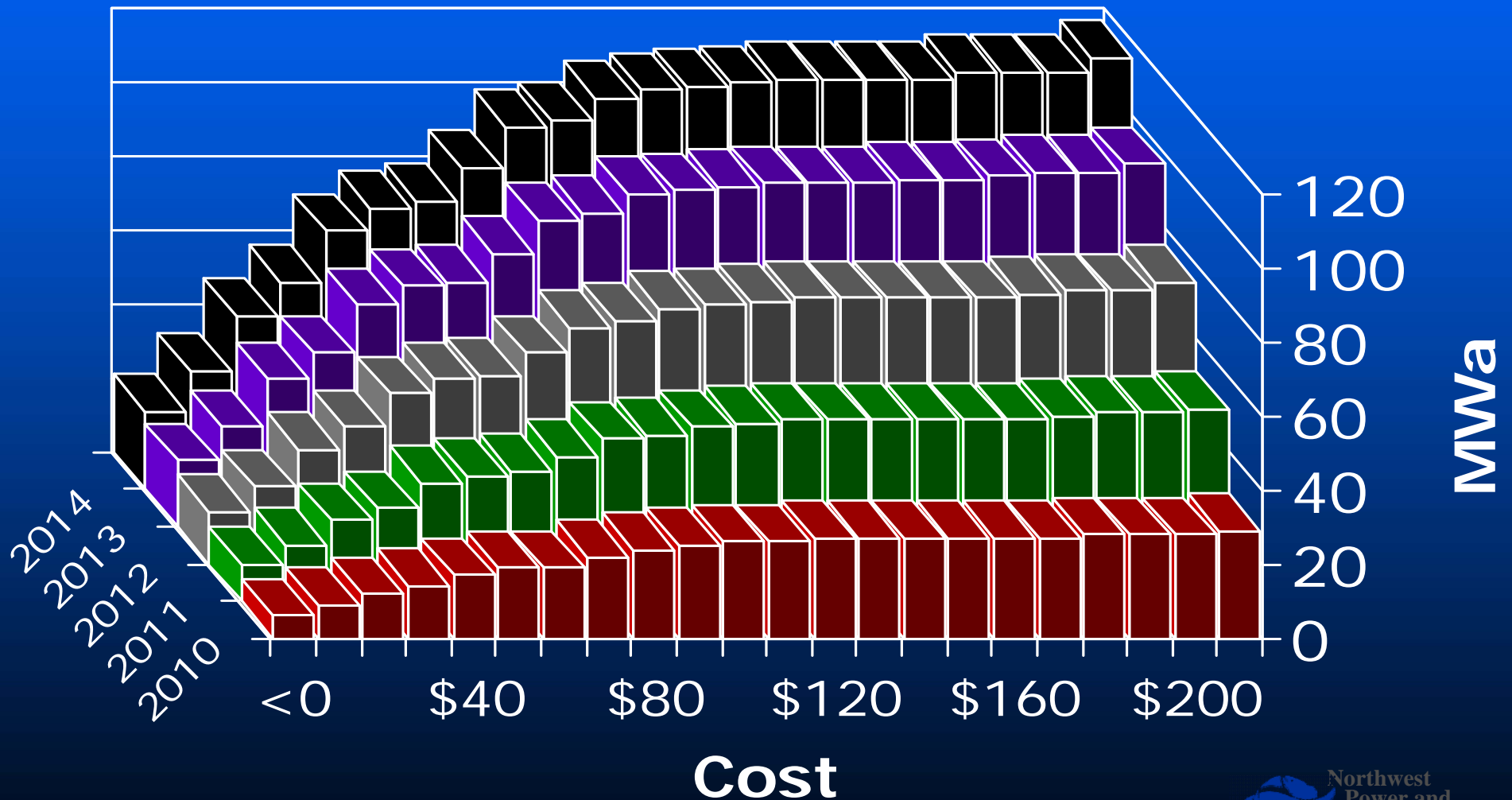
Availability Over Time



- Number of Units the Measure Applies To
- Maximum Achievability
 - Up to 85% Achievable
- Lost-Opportunity Measure (LO)
 - Limited to fraction of annual new or replacement units
 - Increasing penetration over time up to 85%
- Non-Lost Opportunity (NLO or Retrofit)
 - Limited to 85% of remaining stock in 2029
 - Annual deployment limitations (MWa per Year)

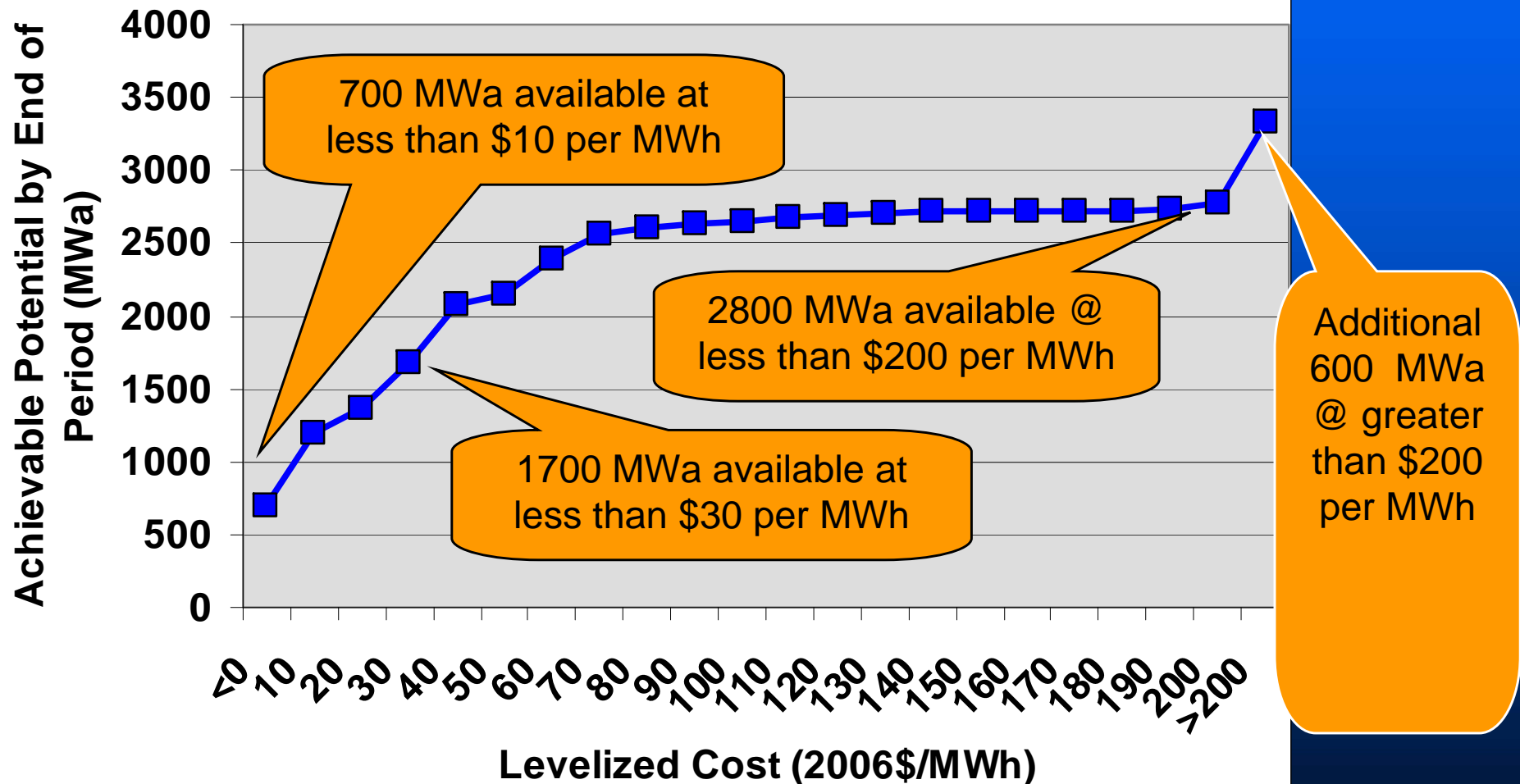
Lost-Opportunity:

New Supply Curve Each Year Based on Stock Additions, Turnover, & Program Penetration



Non-Lost-Opportunity Supply Curve

6th Plan NLO or Retrofit Supply Curve



Adjustments to NLO Curve to Reflect Program Deployment

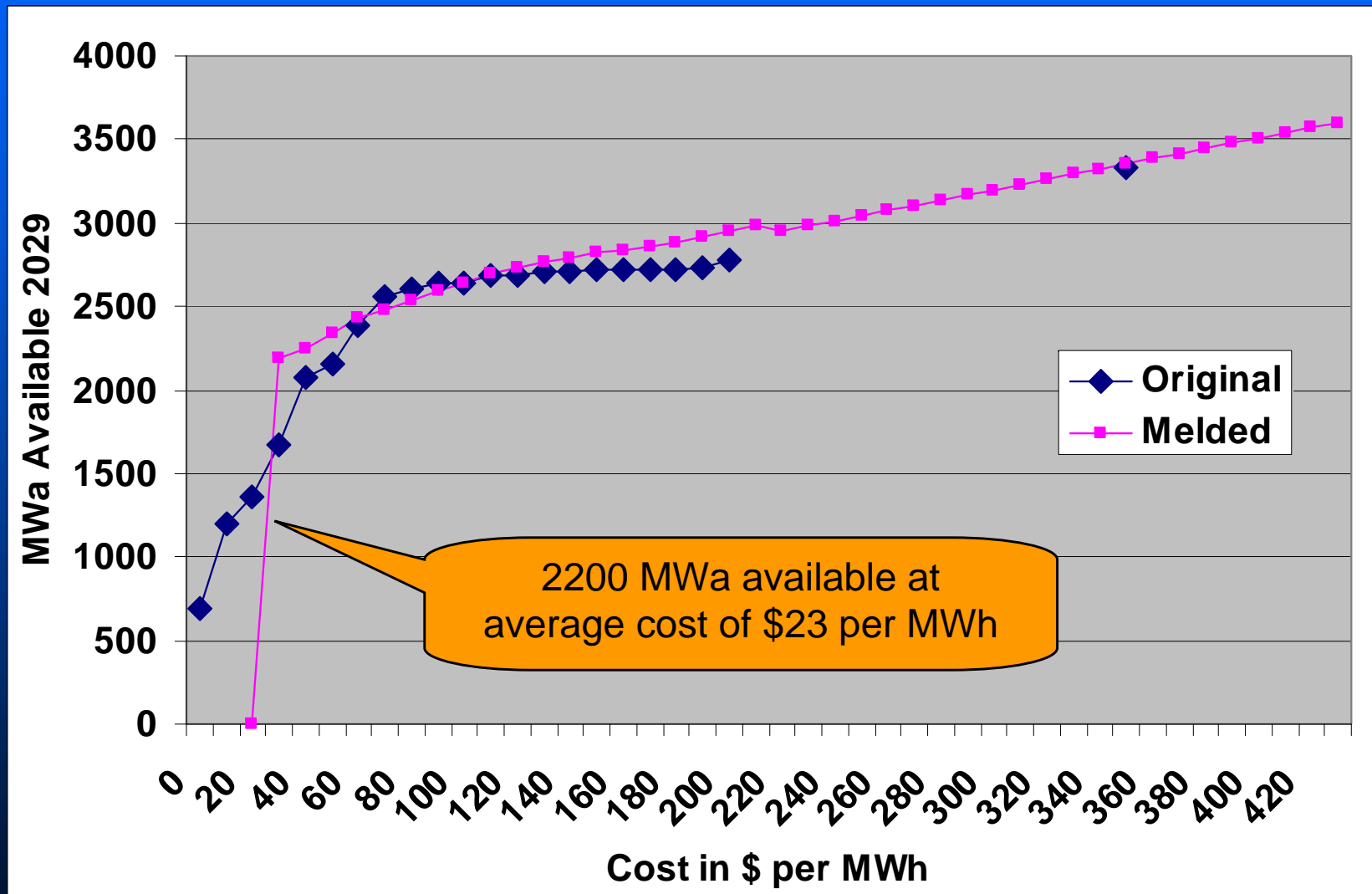
■ Pace Adjustment:

- RPM builds 2000 MWa low-cost NLO first year
- But, real-world limits to capability
- So limit RPM acquisition to 160 MWa per year

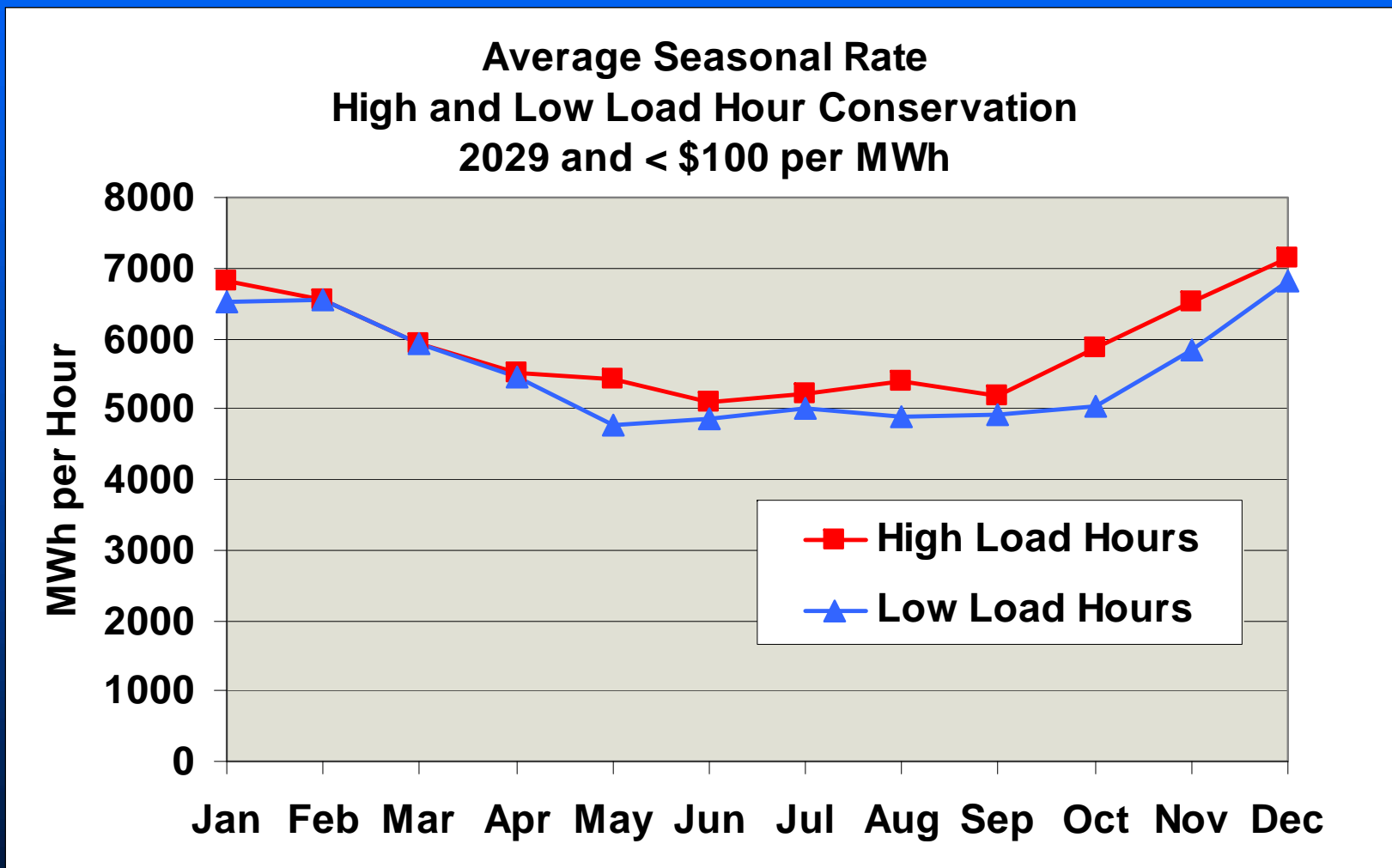
■ Cost Adjustment:

- RPM works up the supply curve lowest to highest
- But, real world programs can't acquire only the lowest cost first
- So adjust curve to meld low & higher cost

Adjust Retrofit Supply Curve to Represent Program Deployment



Shape the Savings by Season & High/Low Load Hours



Regional Portfolio Model

Conservation Inputs

Non-Lost Opportunity

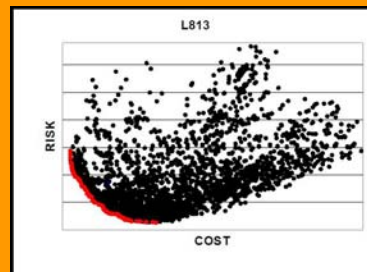
- One Supply Curve
- Max Annual Pace Limit
- No Use No Lose Rule
- Shape of Savings

Lost-Opportunity

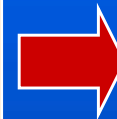
- Twenty Supply Curves
- One Each Year
- Use It or Lose It Rule
- Shape of Savings



RPM



Tests build strategies for conservation, generation, and purchases



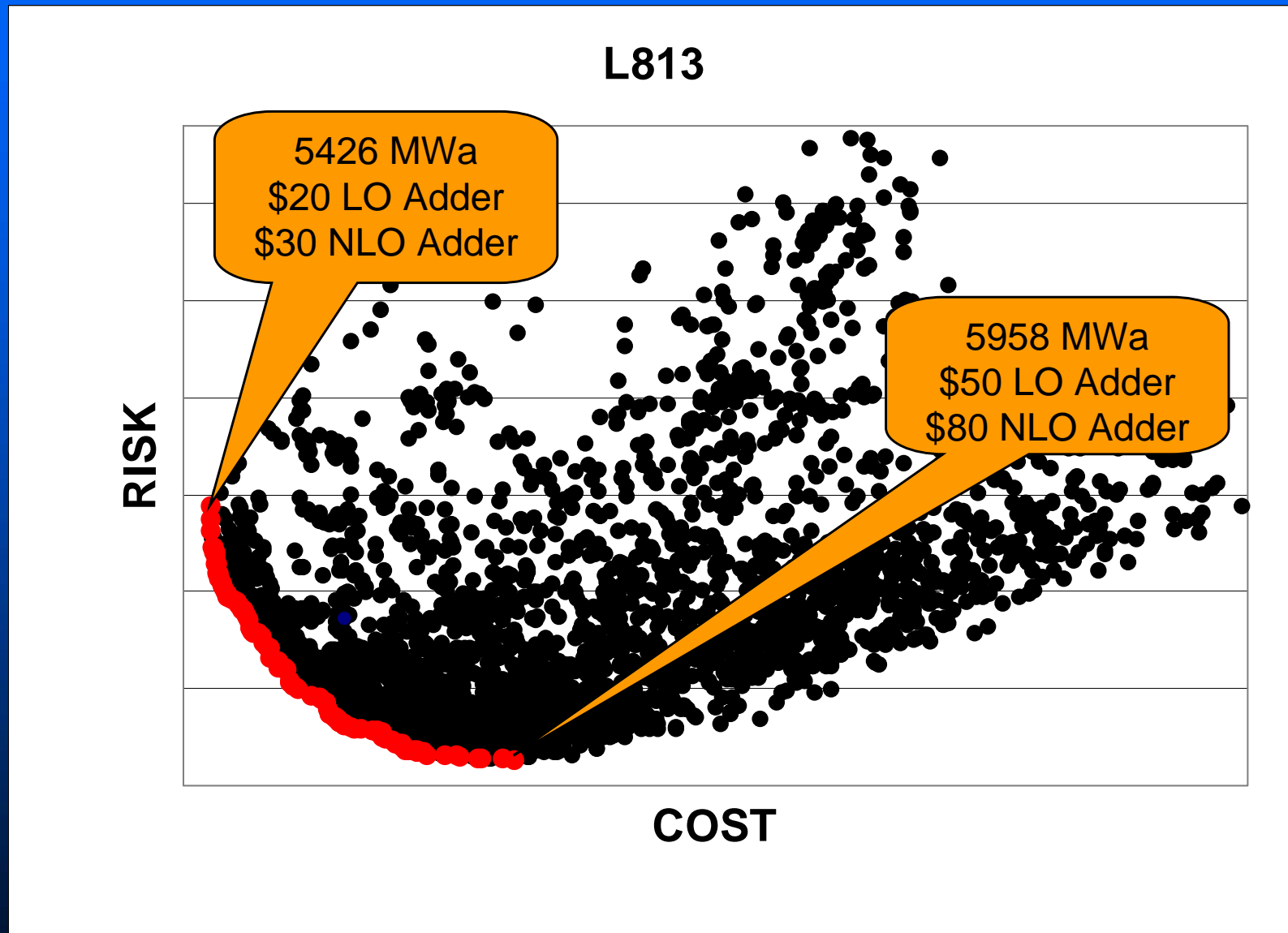
Conservation Strategy

- NLO Build Schedule
- LO Build Schedule
- Market Price Adder

Adder acts as cost-effectiveness metric for program development

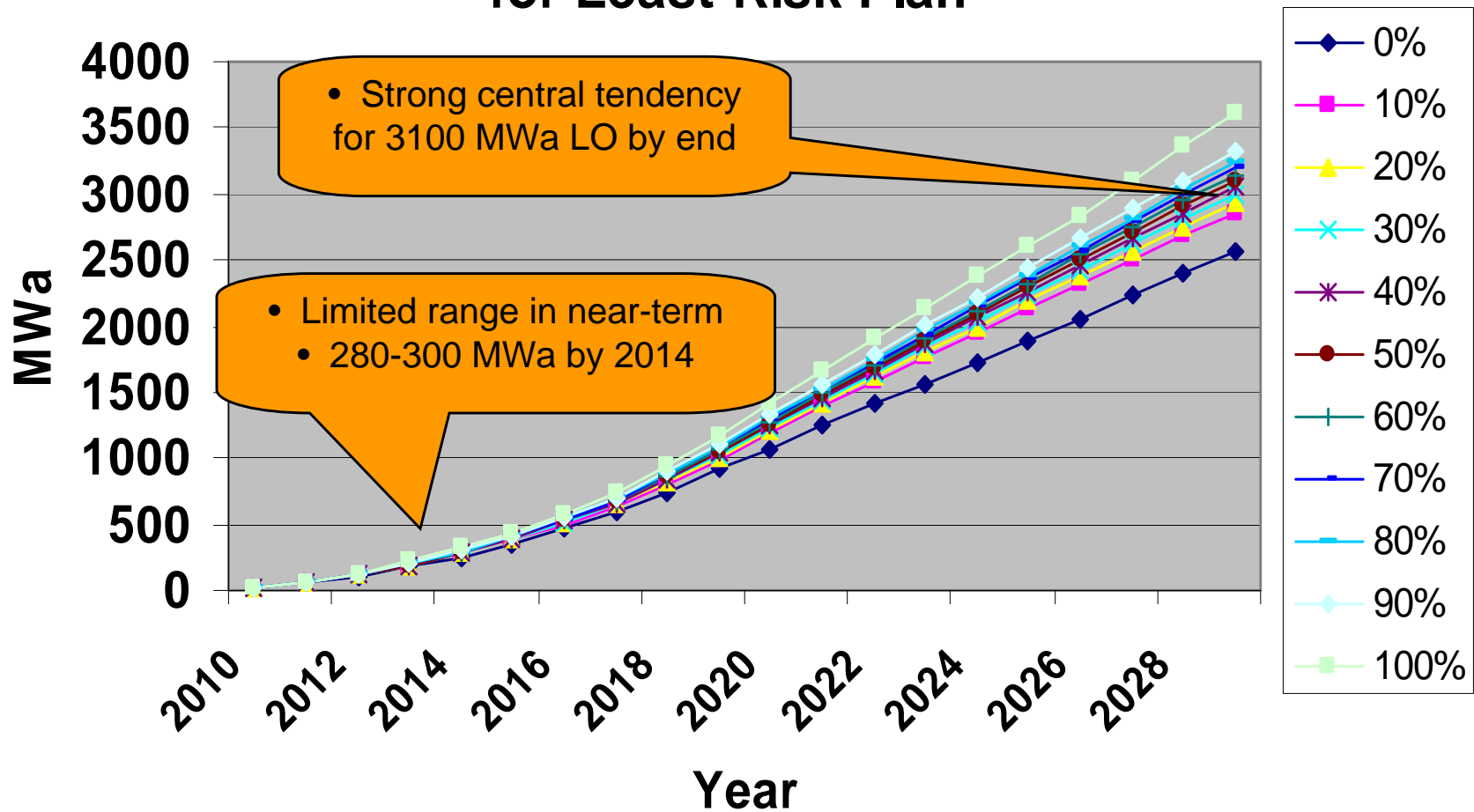
Cost-Effectiveness based on Short-Term Market Price plus Adder

Conservation Strategies Least-Cost & Least Risk Plans



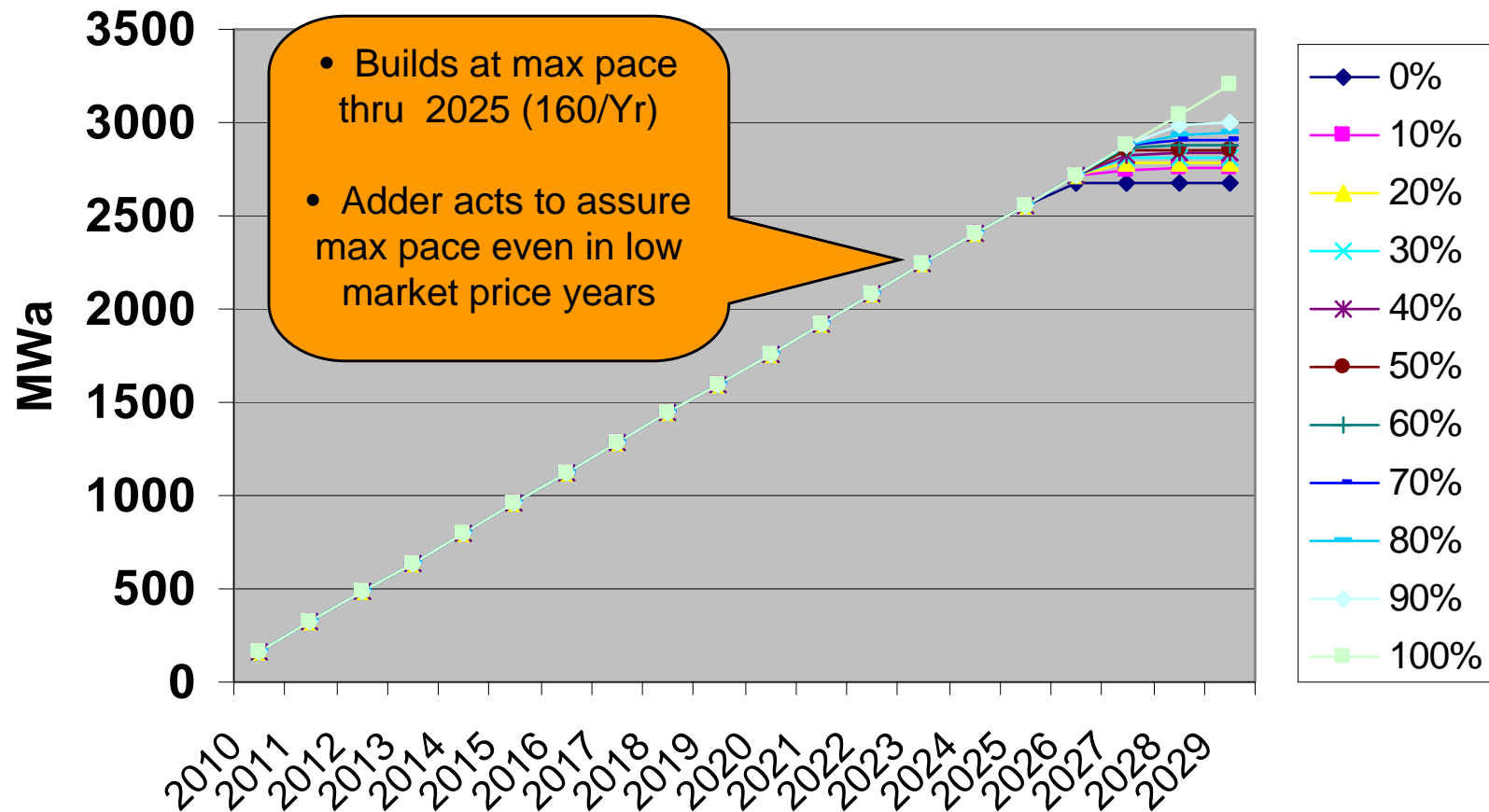
RPM Lost-Opportunity Build-Out for 750 Futures

LO Conservation Build Out for Least-Risk Plan



RPM Retrofit Build-Out for 750 Futures

NLO Conservation Build Out for Least-Risk Plan



RPM Market Price Adders

(Cost-effectiveness Limit for Programs)

- Lost Opportunity (\$50 / MWh adder)
 - Informative and well-determined by RPM
 - Trends toward long run cost of new generation
- Retrofit or NLO (\$80 / MWh adder)
 - Not as informative for near-term program strategy
 - » Much low-cost NLO (~2200 MWa at \$23/MWh)
 - » Market prices generally above \$23/MWh
 - » NLO adder has little effect until low-cost supply exhausted
 - » At 160 MWa per year it take 13 years to exhaust
 - » Until ~2026, impact of NLO adder is to maintain max annual pace of 160 MWa in low market price futures
 - Indicates high value to keep at max pace or better
 - » Provided average cost is low

Other RPM Findings

- Cost & Risk reduced with higher max pace
 - Tested 220 MWa / Yr pace for NLO in Draft
 - No change in total deployment of conservation
 - But earlier deployment reduced costs & risk
- Key Finding:
 - Go faster than 160 MWa per year if possible
 - Provided average costs remain low

Conservation Targets & Actions

- Considerations in setting 5-year targets
 - RPM Build Out: 1100+ MWa by 2014
 - » 300 MWa LO plus 800 MWa NLO
 - Value of Faster Build Rate
 - Measure-by-measure annual ramp rates:
 - » 800 MWa NLO at cost up to \$40/MWh by 2014
 - » 900 MWa NLO at cost up to \$60/MWh by 2014
 - Recent performance at 235 MWa / Year

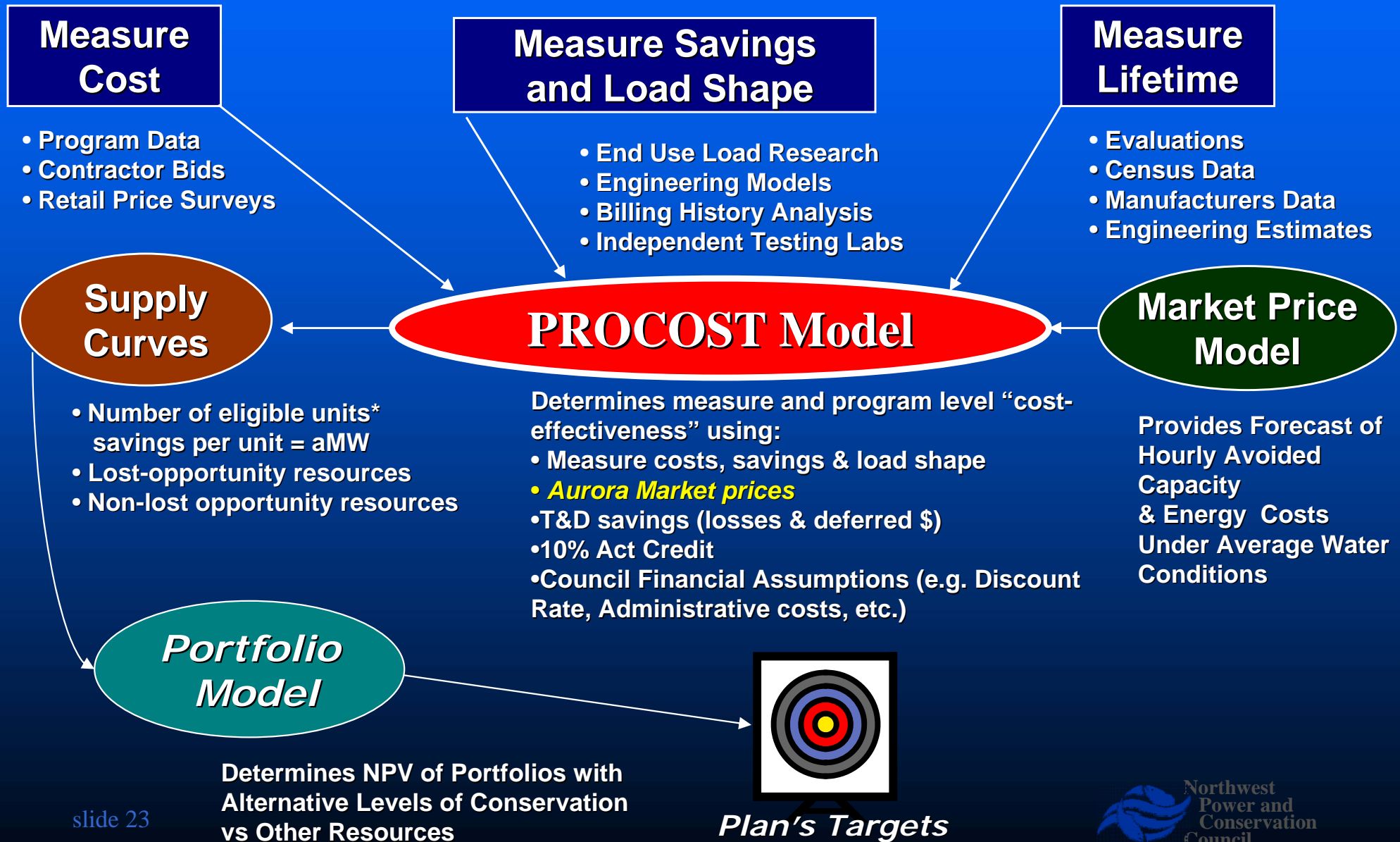
Methodology for Program Implementation

- Same as for 6th Plan RPM modeling
- Except cost-effectiveness calculated by measure
 - Reflects individual measure savings shape and lifetime
- Use B/C ratio instead of levelized cost
 - Levelized cost does not accurately capture the value of individual measures savings over a day or year
 - Example:
 - Value of Savings at Short-Term Market Price
 - Assuming No Carbon Cost and No Adders
 - » Streetlight: \$34/MWh
 - » Commercial Air Conditioning: \$42/MWh

End

Spare Slides

Generic Methodology for Estimating Conservation Resource Potential & Targets



Cumulative NLO Conservation by 2014 Based on Measure-by-Measure Ramp Rates

