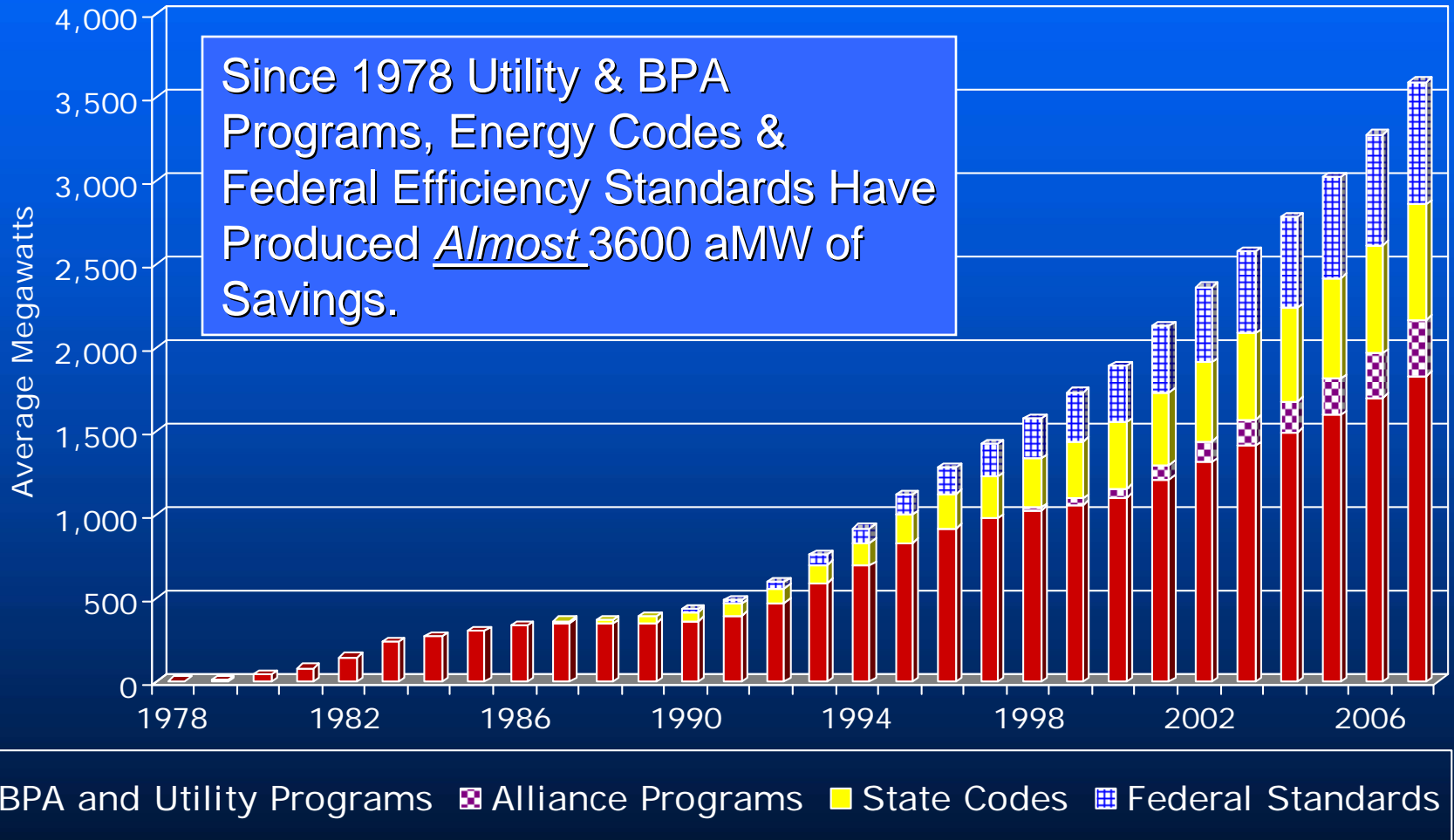


# NW Regional Conservation Potential: Moving from the Fifth Power Plan to the 6th

Presentation to  
NEEA Energy Efficiency Roundtable

November 12, 2008

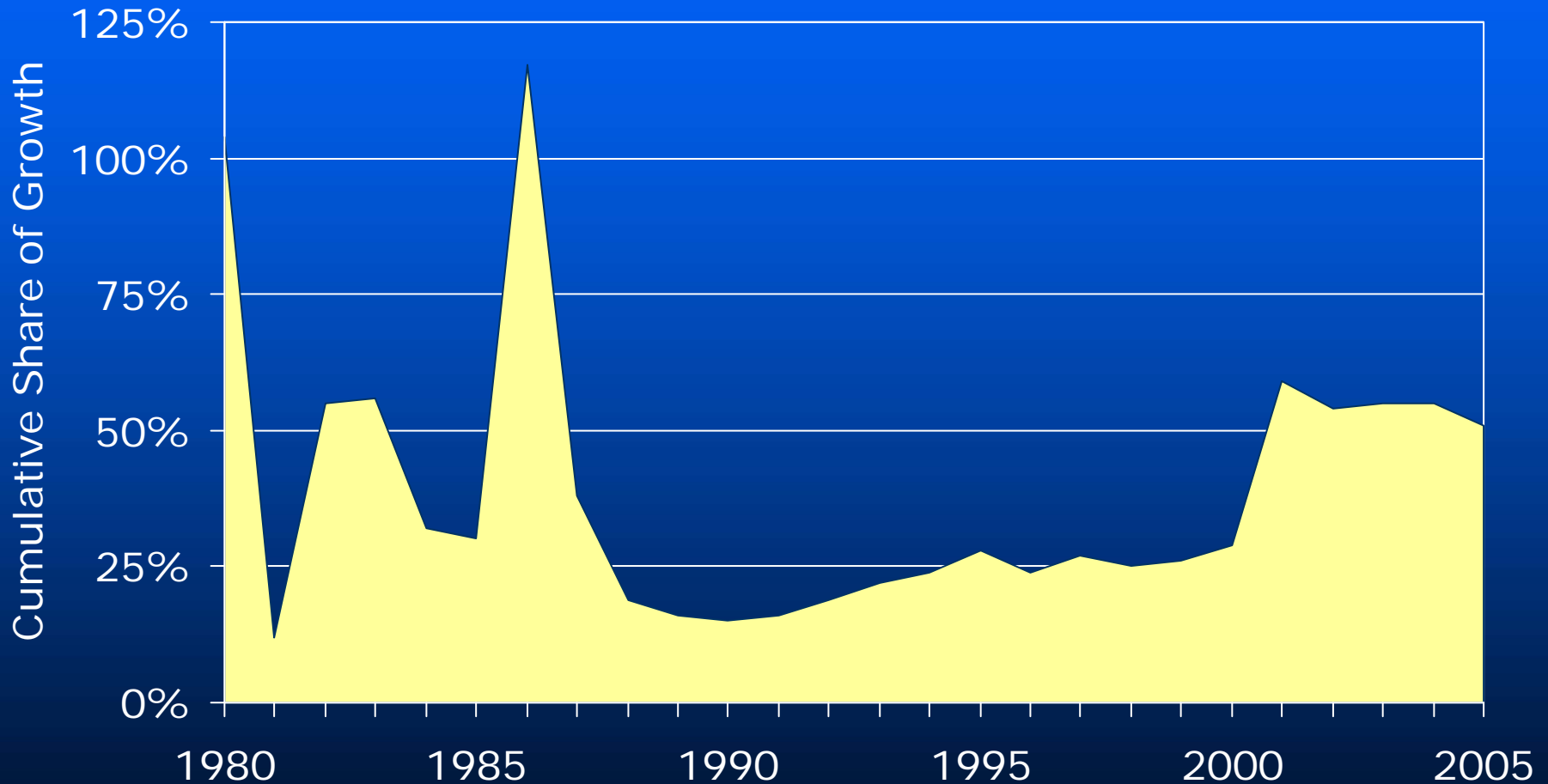
# To know where you're going..... It helps to know where you've been



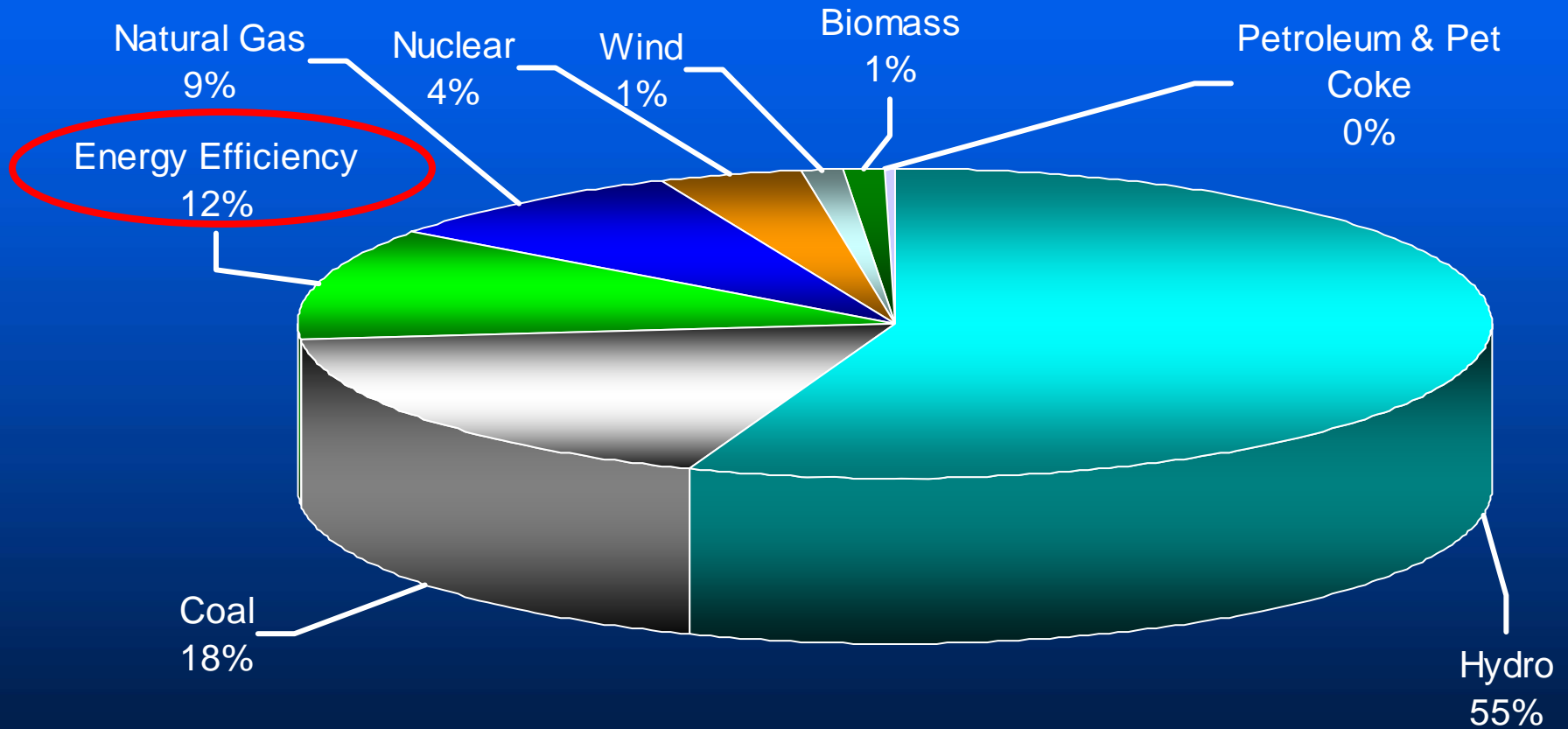
# So What's 3600 aMW?

- It's enough electricity to serve more than the entire state of Idaho and all of Western Montana
- It saved the region's consumers nearly than \$1.6 billion in 2007
- It lowered 2007 PNW carbon emissions by an estimated 14.1 million tons.

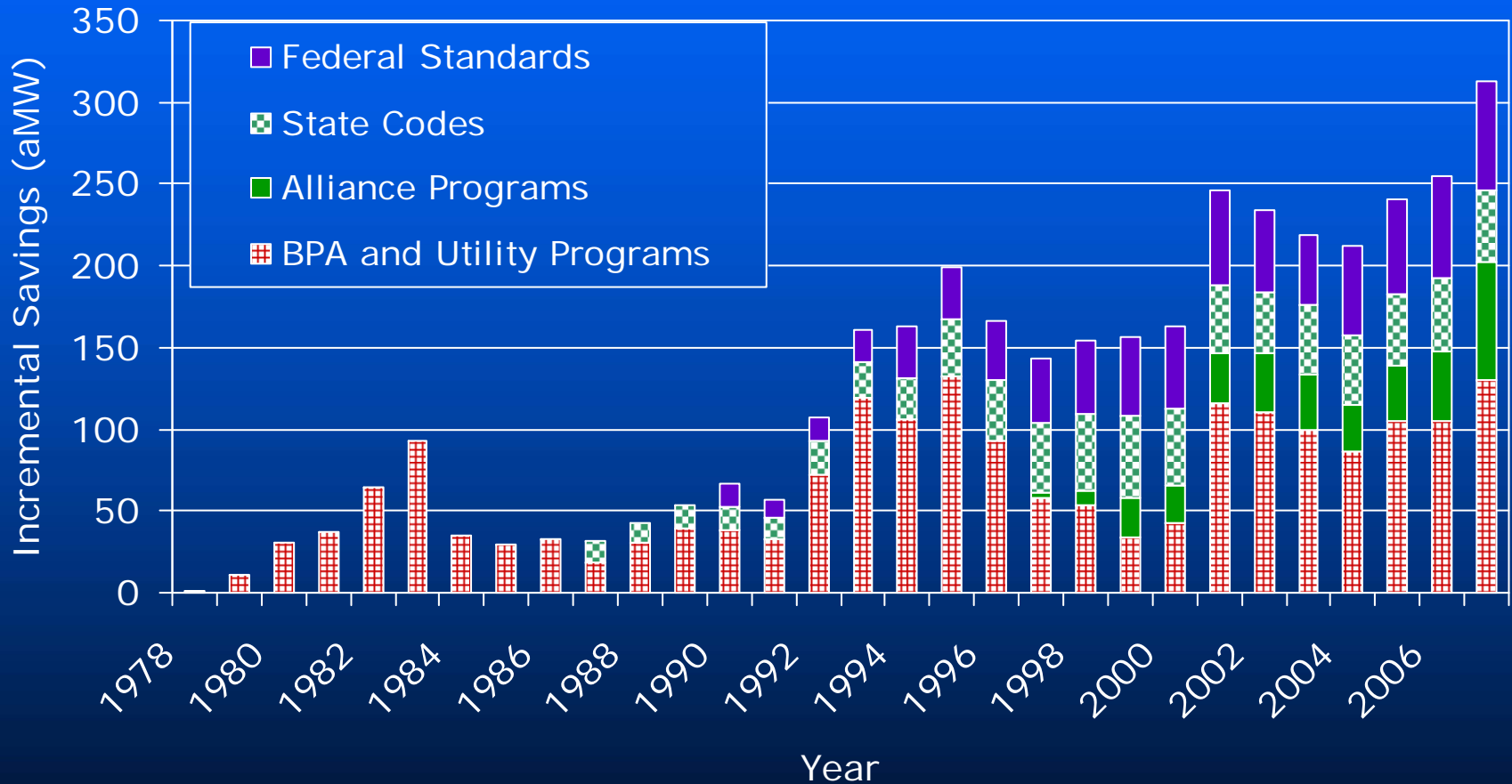
# Since 1980 Energy Efficiency Resources Met Half of PNW Load Growth



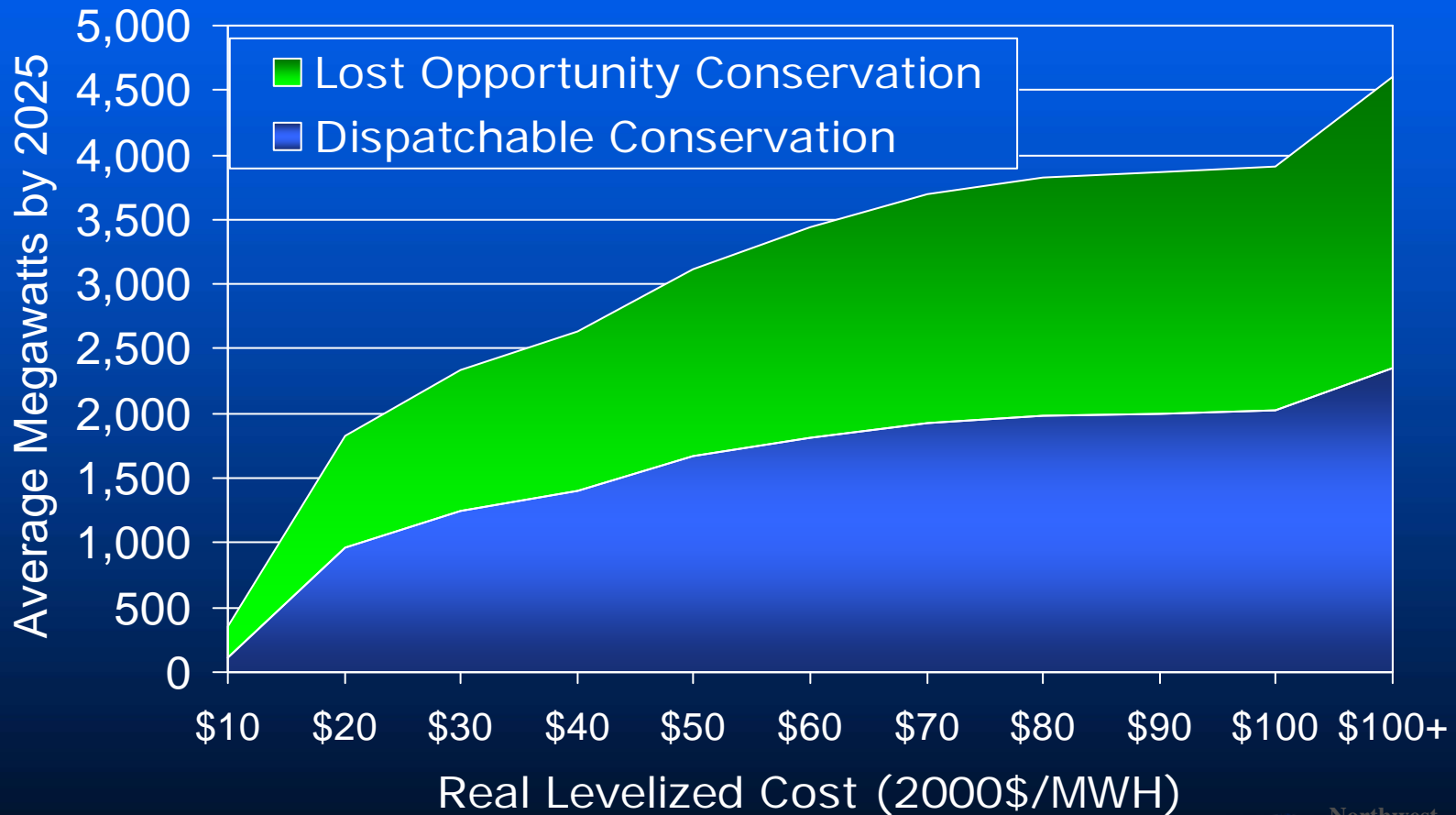
# Energy Efficiency Is The Region's Third Largest Resource



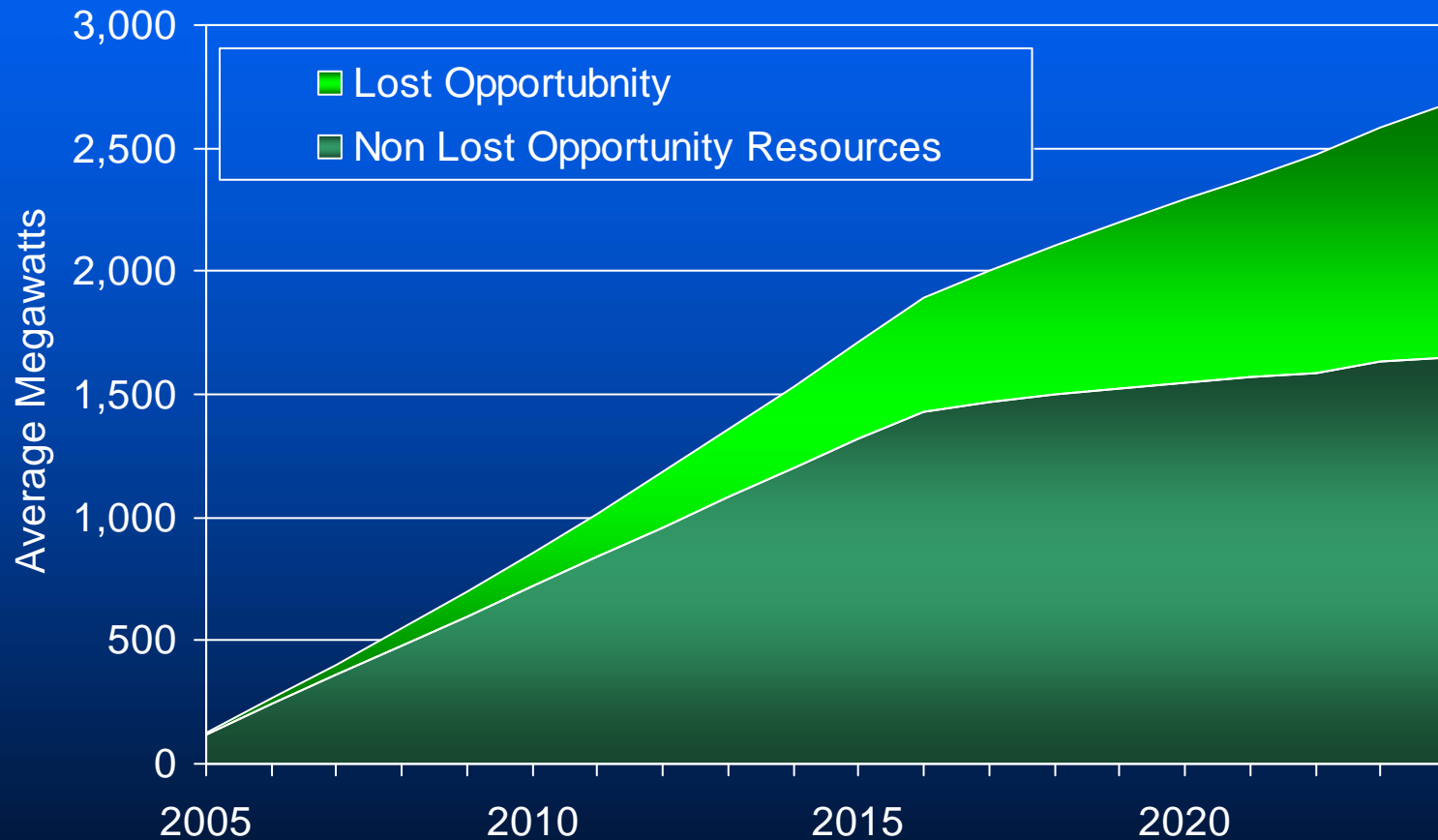
# How We Acquire These Savings Has Varied Over Time



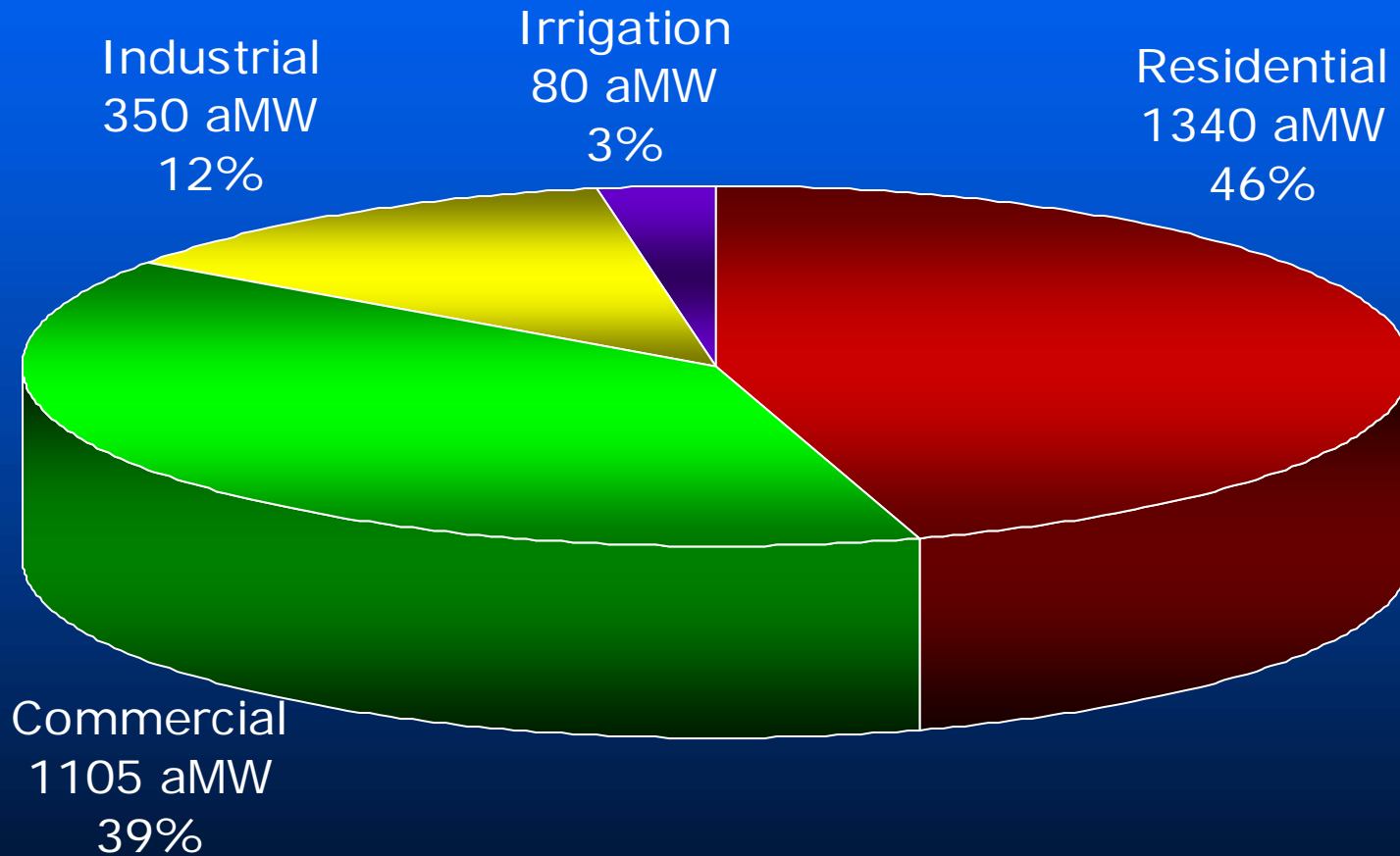
# 5<sup>th</sup> Plan Identified Nearly 4,600 MWa of "Technically Available" Conservation Potential



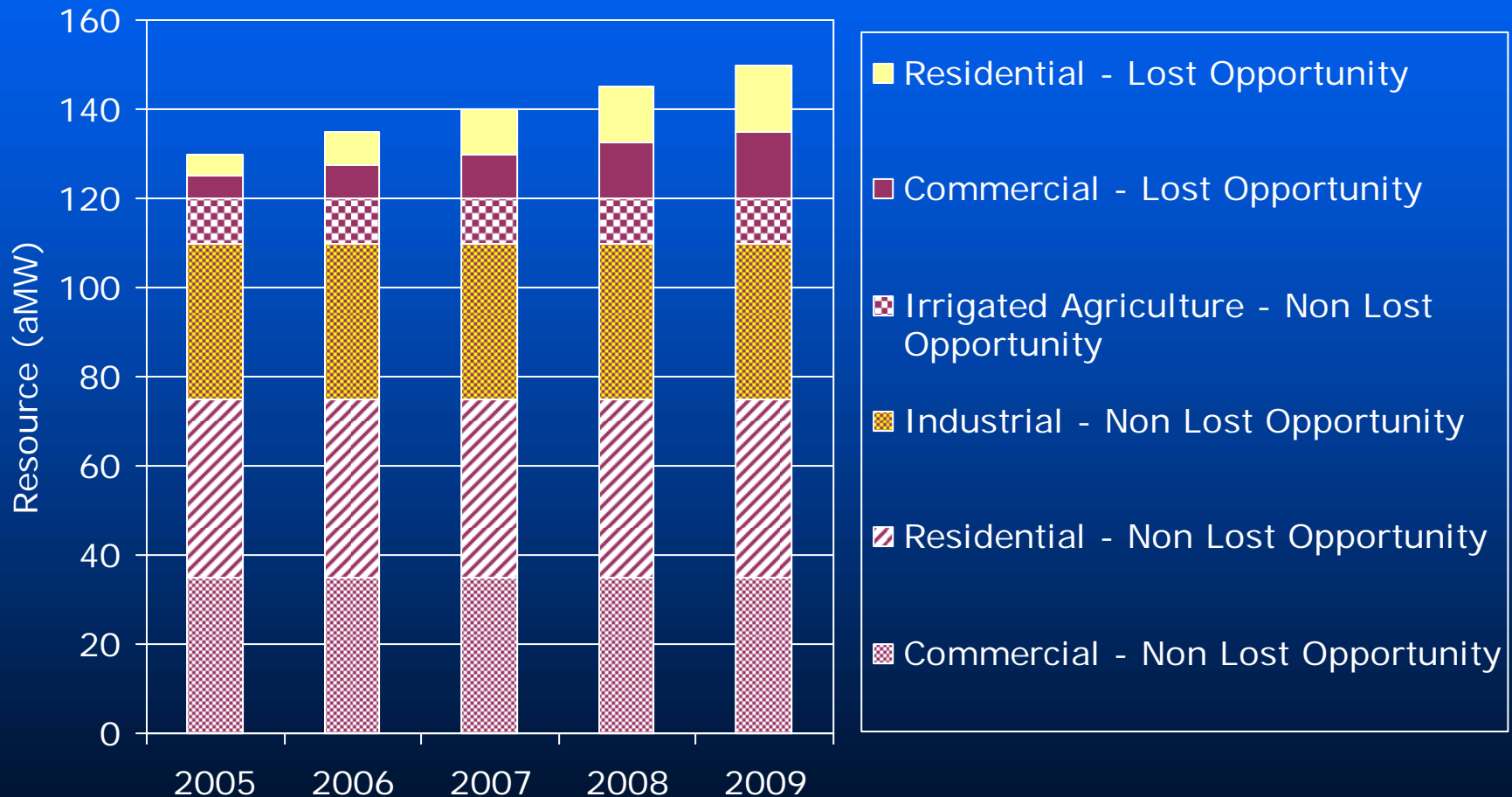
# 5<sup>th</sup> Plan Targeted 2700 MWa Over 20 Years



# Cost-Effective Savings by Sector



# 5th Plan's Five Year Target Is 700 MWa



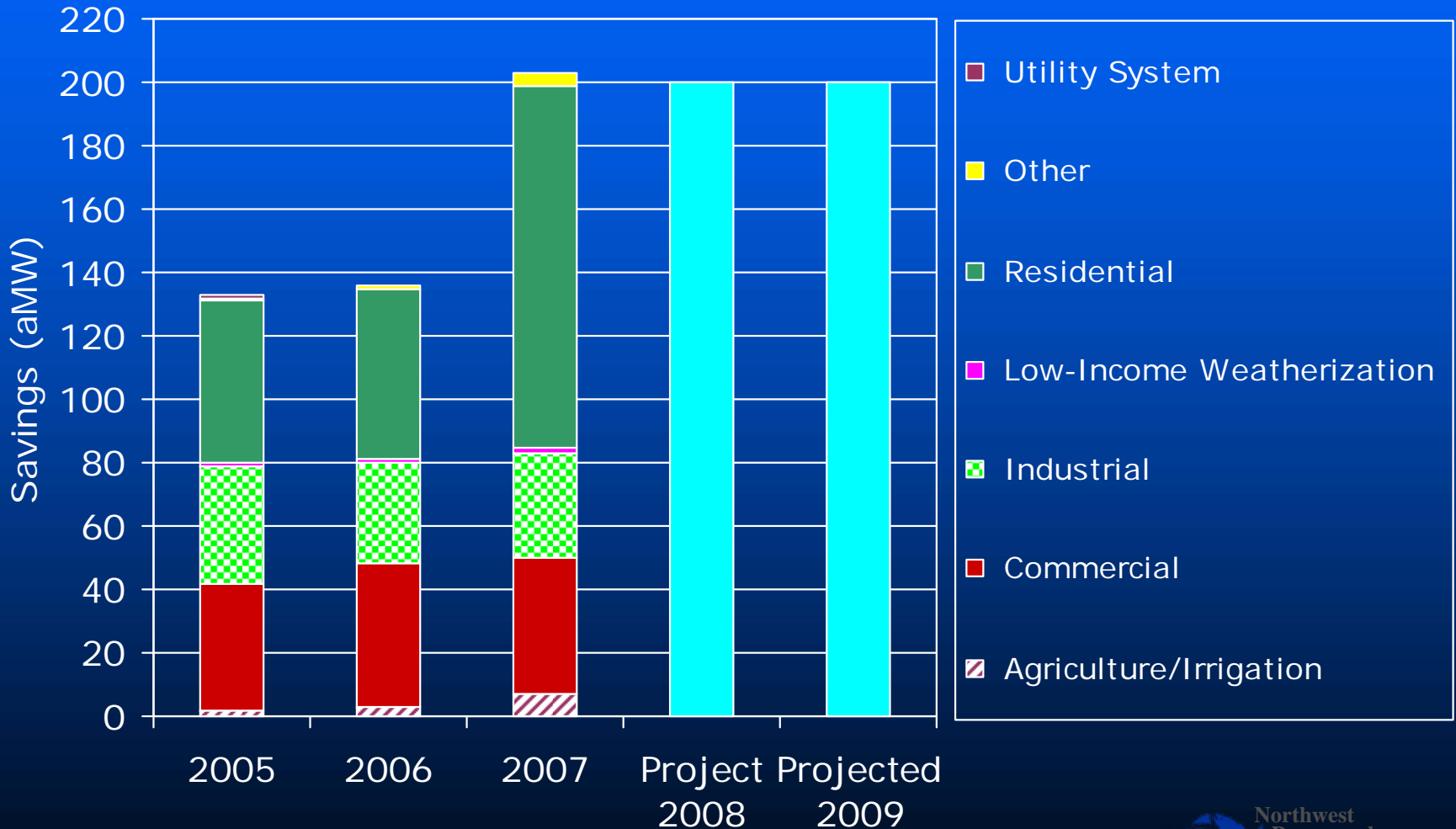
# Moving from the 5<sup>th</sup> Plan to the 6<sup>th</sup>:

## Adjustments to 5th Plan's Conservation Resource Potential

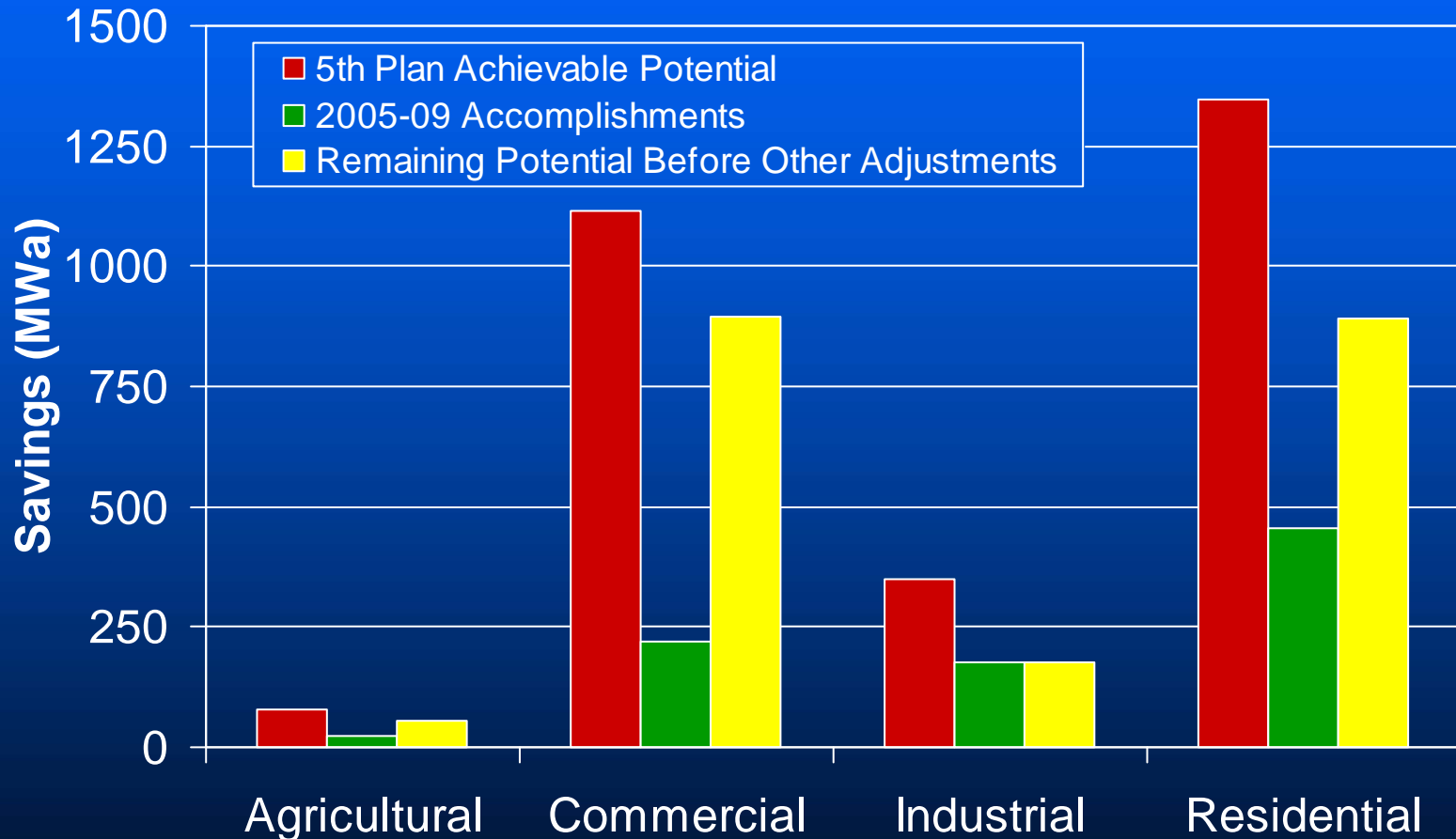
1. Achievements 2005-2009
2. State energy code changes
3. Federal standards
4. Changes in current practice "baseline"
5. Shifts in best available technology
6. New resources
7. Expanded existing resource potential
8. Emerging technologies

# Adjustment 1

## Utility Conservation Achievements – 475 MWa To Date + 400 MWa Projected



# Adjustment 1: 2005-2009 Accomplishments



# Adjustment 2 – State Codes

- Idaho – Adopted 2006 Edition of International Energy Conservation Code (IECC) effective on Jan 1, 2008
  - Residential & Commercial
- Montana – Adopted 2004 Edition of International Energy Conservation Code effective on Jan 1, 2006
  - Consider adopting 2006 IECC in Summer 2008
- Oregon – Adopted Revised Residential Code effective July 1, 2008
  - Improve residential efficiency approximately 15% over prior code
  - Slight revision in commercial
- Washington – Revised code became effective July 1, 2007
  - Improve residential efficiency approximately 10% over prior code
  - Significant improvements in commercial lighting & envelope
- Seattle - Improvements in commercial code for economizers in 2006

# Adjustment 3 – Federal Standards

- Energy Independence and Security Act (EISA) of 2007
  - Residential Lighting largest adjustment
    - » 625 MWa in 5<sup>th</sup> Plan, 70% - 80% captured by new federal standards (and market momentum)
  - Additional Adjustments for New Standards
    - » External power supplies
    - » Commercial clothes washers
    - » Commercial ice-makers
    - » Electric Motors

# Adjustment 3 – Federal Standards (cont)

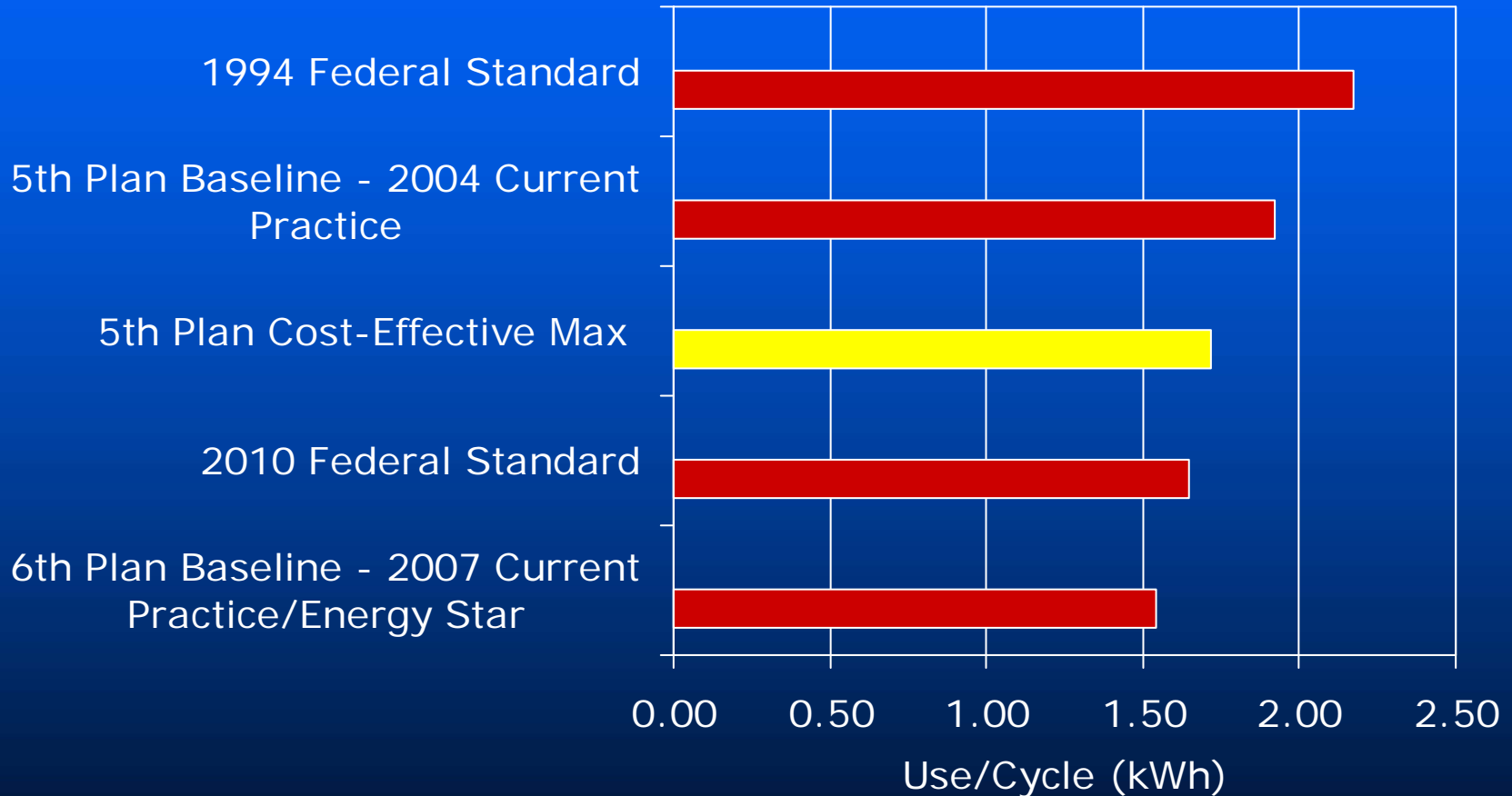
## ■ Additional Adjustments

- » Distribution Transformers (medium voltage, dry-type and liquid immersed)
- » Commercial heat pumps and air-conditioners
- » Commercial refrigerators
- » Single-Package Vertical Air Conditioners and Heat Pumps
- » Walk-In Coolers and Walk-In Freezers
- » Fluorescent Lamp Ballasts
- » Metal Halide Lamp Fixtures

# Adjustment 3 – Federal Standards (cont)

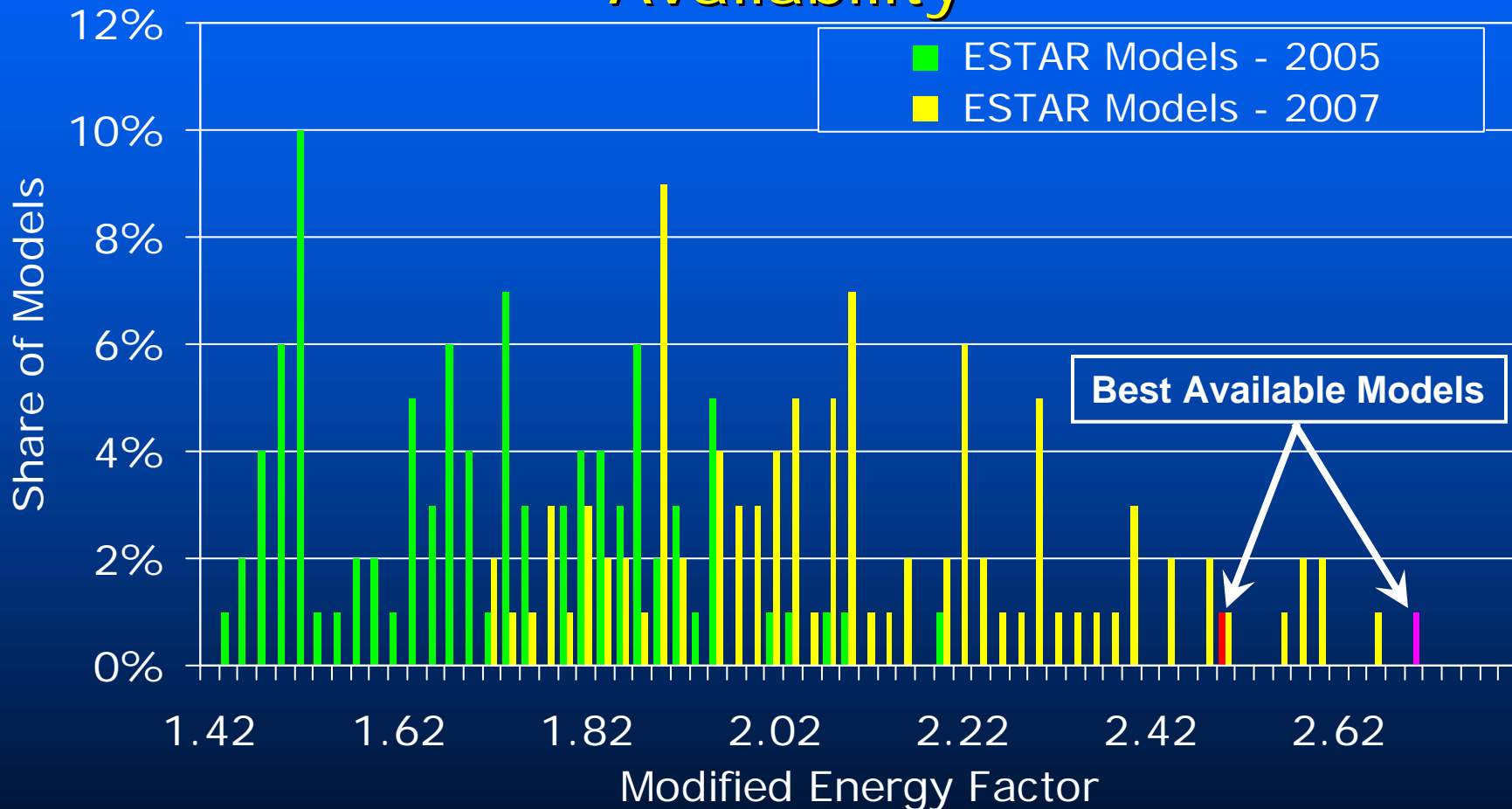
- Additional Potential Adjustments Standards Under Revision
  - Battery chargers and external power supplies
  - Residential Clothes Dryers
  - Commercial and Residential Clothes Washers
  - Residential Dishwashers
  - Pool heaters
  - Residential Ranges, Ovens and Microwaves
  - Beverage Vending Machines
  - Residential Central Air Conditioners and Heat Pumps
  - Residential Furnace Fans
  - Commercial and Residential Refrigerators and Freezers
  - Room Air Conditioners
  - Walk-in Coolers and Freezers
  - Fluorescent lamps and ballasts
  - Residential Water Heaters

# Adjustment 4 – Changes in “Current Practice” Example: Dishwasher



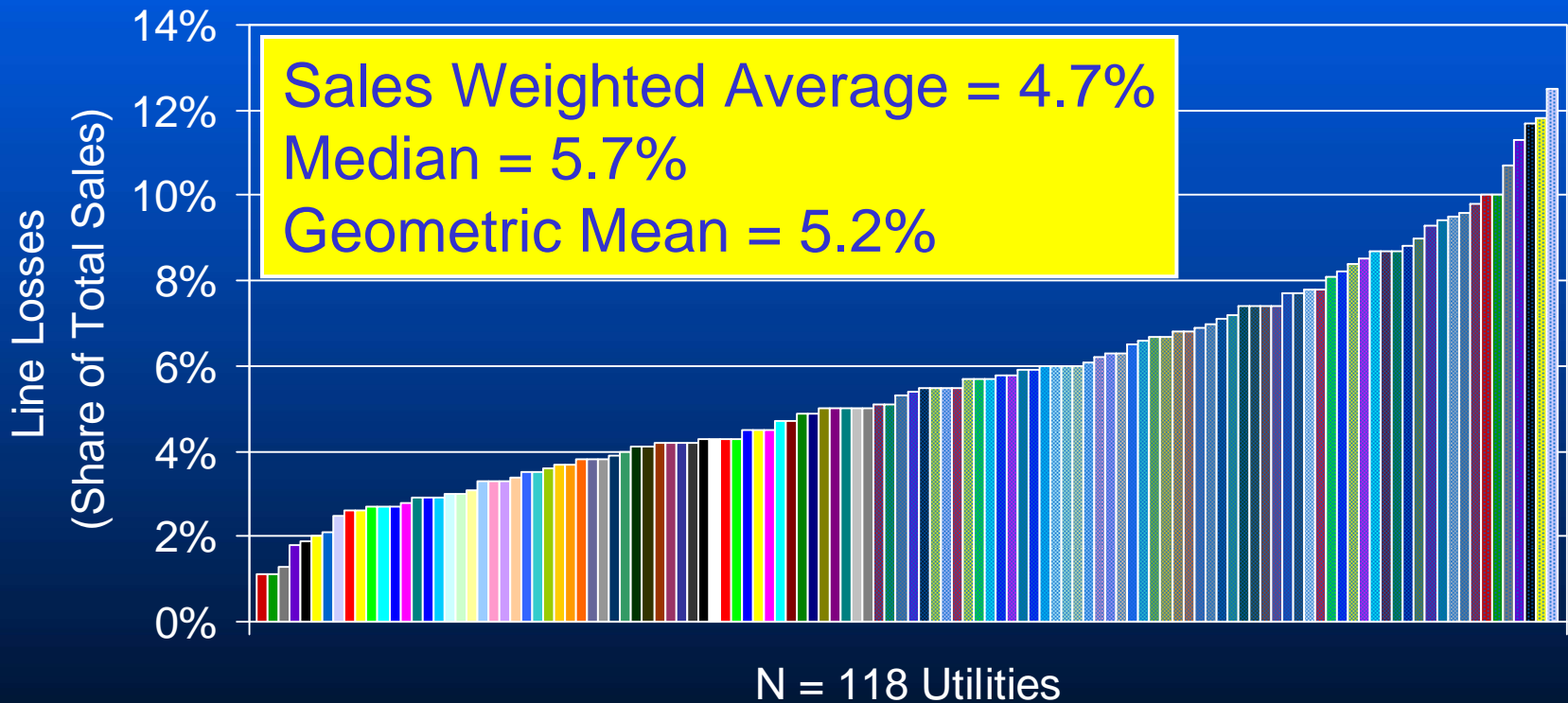
# Adjustment 5 – Best Available Technology Improvements

## Example - Energy Star Washer Product Availability



# Adjustment 6 - New Resource Potential – Distribution Efficiency

- Act's Definition of Conservation includes improvements in the efficiency of production, distribution and use



# New Resource Potential for Utility Distribution Efficiency Improvements

- NEEA contracted with RW Beck to assess the potential savings from improved distribution system efficiency upgrades
- Study concluded that regional energy savings could be between 1%-3% of regional loads at at cost up to \$70/MWH
  - Also concluded demand savings could be between 3% - 3.5% of system peak demand
- ***At current system loads, regional savings potential = 400 – 600 MWa***

# Adjustment 7 - Expanded Resource Potential – Industrial Sector

- 5<sup>th</sup> Plan Estimated Industrial Conservation Potential at 5% of 2025 Loads = 350 MWa
- Viewed as “conservative” assessments of industrial potential
  - Other regional & national studies = 10-30%
- Council, with Bonneville support, undertaking more thorough regional assessment
- ***Anticipate Industrial Sector potential could increase to 600 – 1300 MWa (7% - 15% of sector sales)***

# Adjustment 8: Emerging Technologies

## *Findings in Three Categories*

Improvements to Existing Technology. Gains in cost, efficacy, applicability or measure life.

Improved Tech

Changes to Design & Business Practices: Systematic business strategies that improve measure applicability, penetration and persistence ... Design & Operations

New & Improved Practices


New Products & Technology. Breakthrough technologies not previously considered viable. Includes both direct and enabling technologies & products.

New Tech

- Evaluating these technologies/practices for the 6<sup>th</sup> Plan
- Expand supply Curves for Commercially Available
- Identify Actions to Speed Up Commercial Readiness for Others

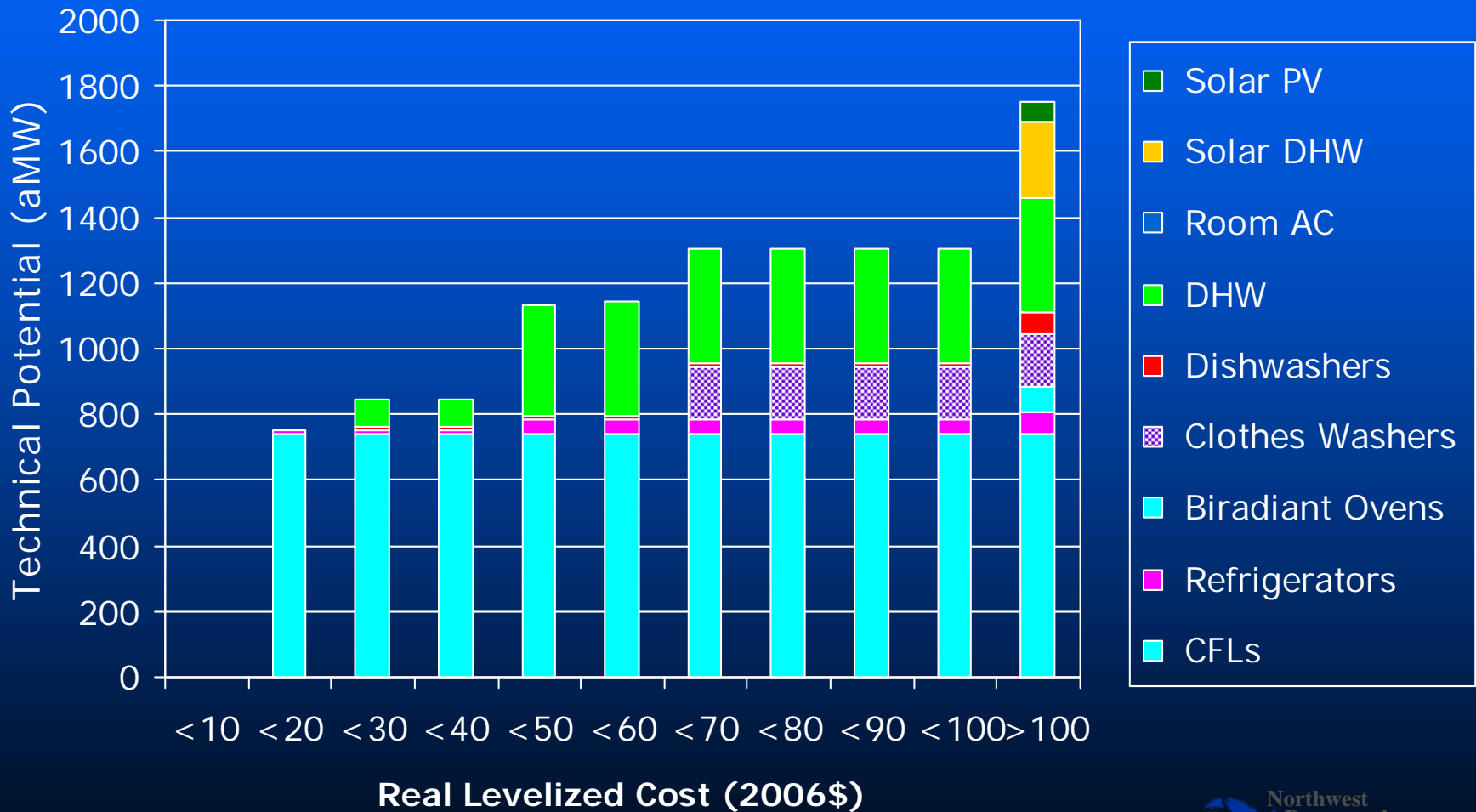
# Summary

- Currently Quantified Major Adjustments to 5<sup>th</sup> Plan's Estimate of Achievable Conservation Potential
  - Reduced by 875 MWa for program accomplishments
  - Reduce by 450 – 500 MWa for impact of codes and standards
  - Increase by 400 – 600 MWa for Utility Distribution System Efficiency Improvements
  - Increase by 250 – 950 MWa for Industrial Sector Efficiency
  
- Change –
  - Decrease load forecast by 1335 – 1475 MWa
  - Increase achievable conservation potential by 650 – 1550 MWa
  - **Net conservation potential = 1985 – 3025 MWa**
  
- Stay Tuned –
  - Final supply curves still in development
  - Five-year goals yet to be established
  - Action Plan TBD

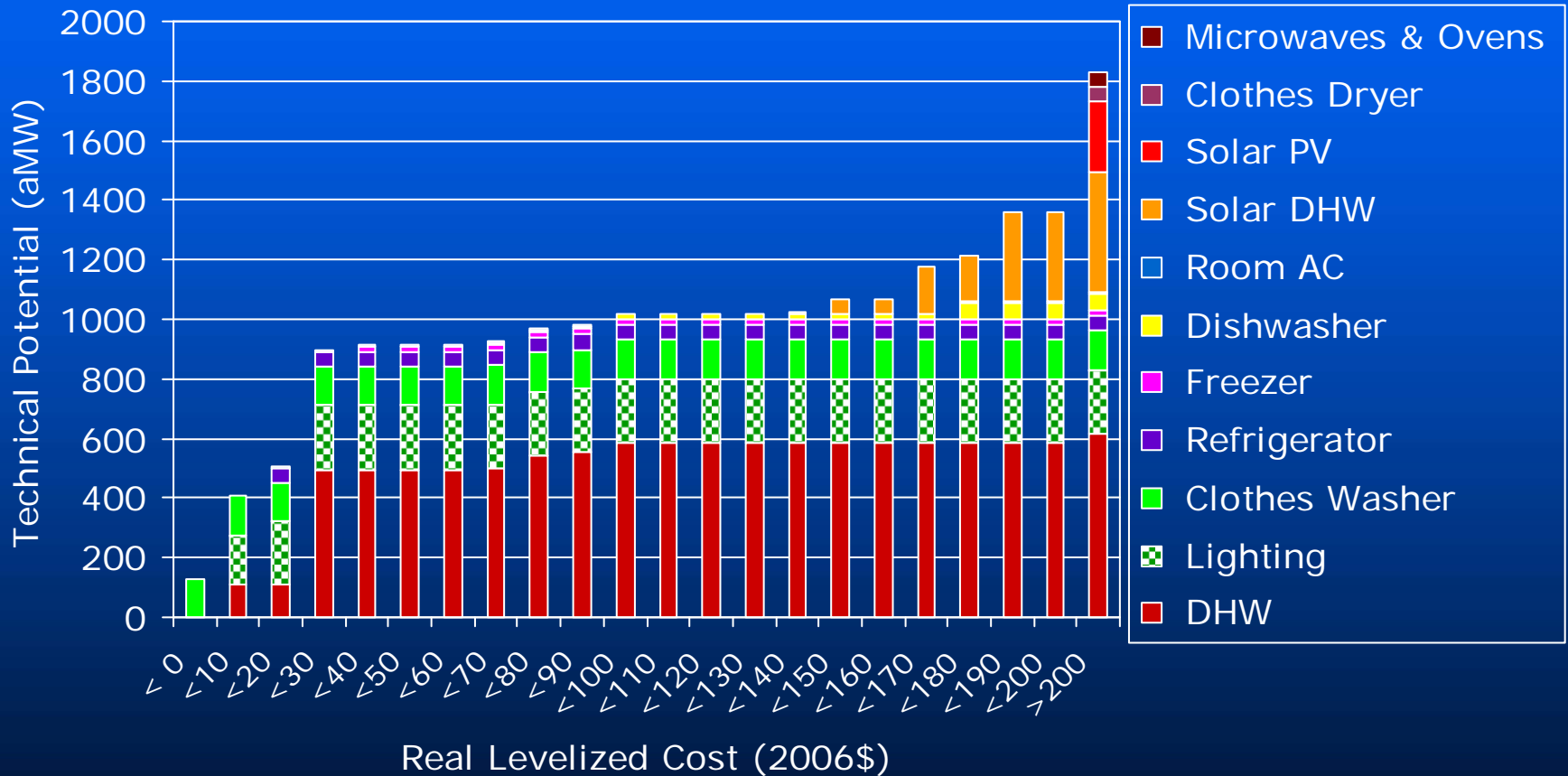
A photograph of a theater stage. The stage is framed by heavy, ornate red curtains with a scalloped top edge. A bright blue spotlight illuminates the center of the stage floor, creating a circular glow. The background is dark, suggesting a stage set or a dark room. The overall atmosphere is dramatic and anticipatory.

**COMING SOON!**

# 5<sup>th</sup> Plan Residential Water Heating, Lighting and Appliance Supply Curve



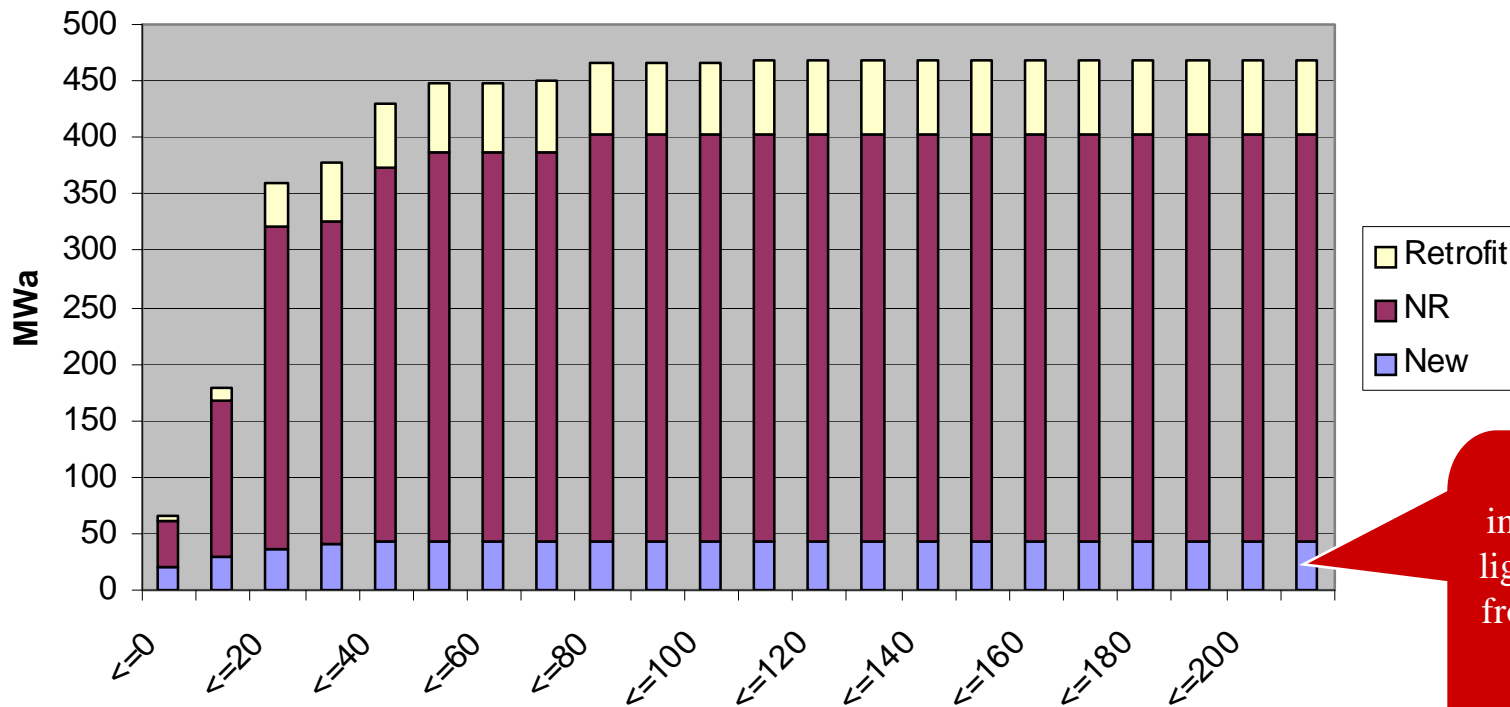
# 6<sup>th</sup> Plan Residential Water Heating, Lighting and Appliance Supply Curve\*



\*Preliminary – Subject to Revision!

# 6<sup>th</sup> Plan Preliminary Results for Commercial Lighting LPD Reductions

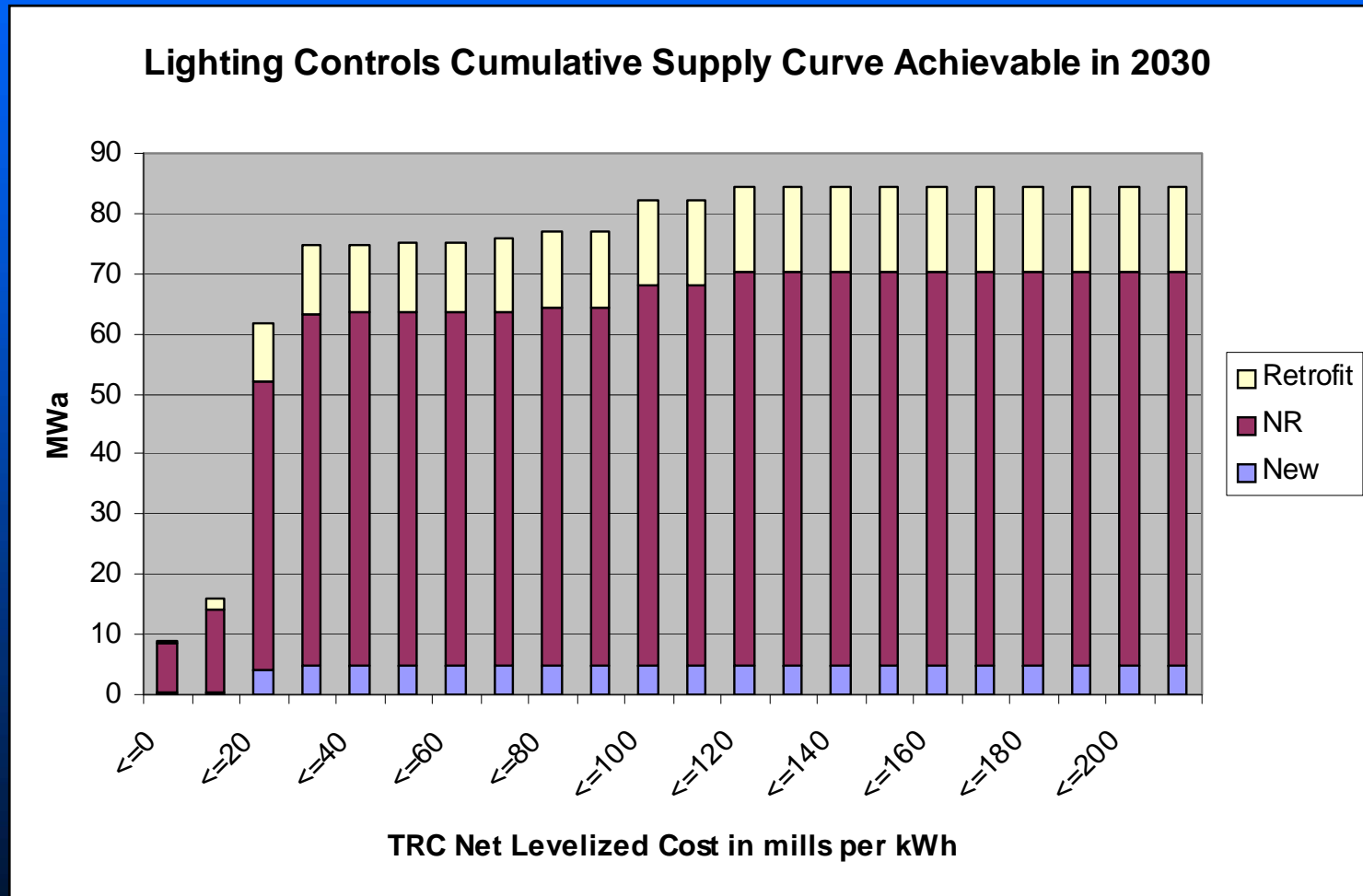
## LPD Reductions Cumulative Supply Curve of Achievable Savings in Commercial Buildings for 2030



Does not include similar lighting savings from Integrated Design measure.

- Over 500 MWa in 6<sup>th</sup> versus about 350 MWa in 5<sup>th</sup>
- New measures added exceed accomplishments

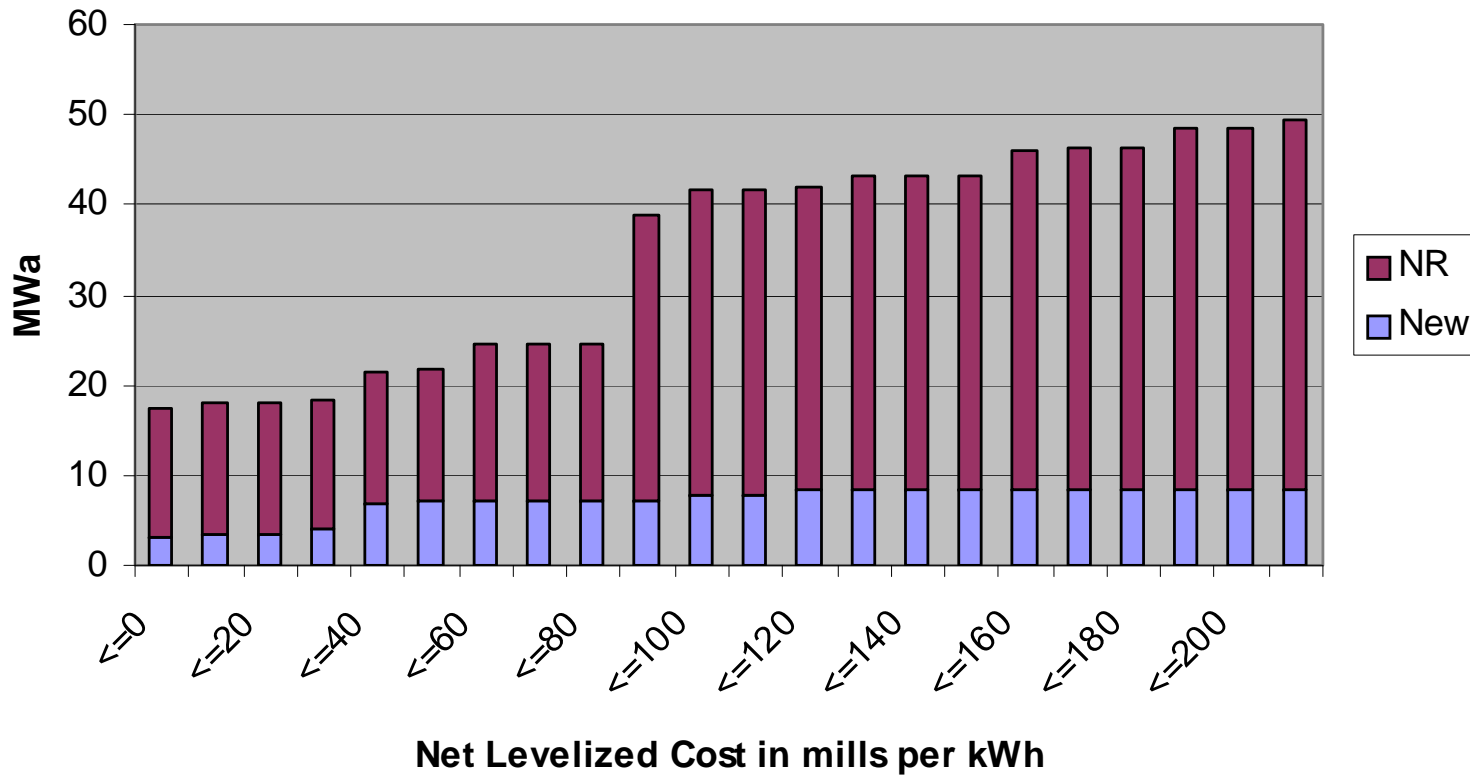
# 6<sup>th</sup> Power Plan Preliminary Results for Commercial Lighting Control Measures



These measures were not in the 5<sup>th</sup> Plan

# 6<sup>th</sup> Power Plan: Preliminary Assessment of SSL Streetlights

## Street Light Cumulative Supply Curve Achievable 2030



These measures were not in the 5<sup>th</sup> Plan

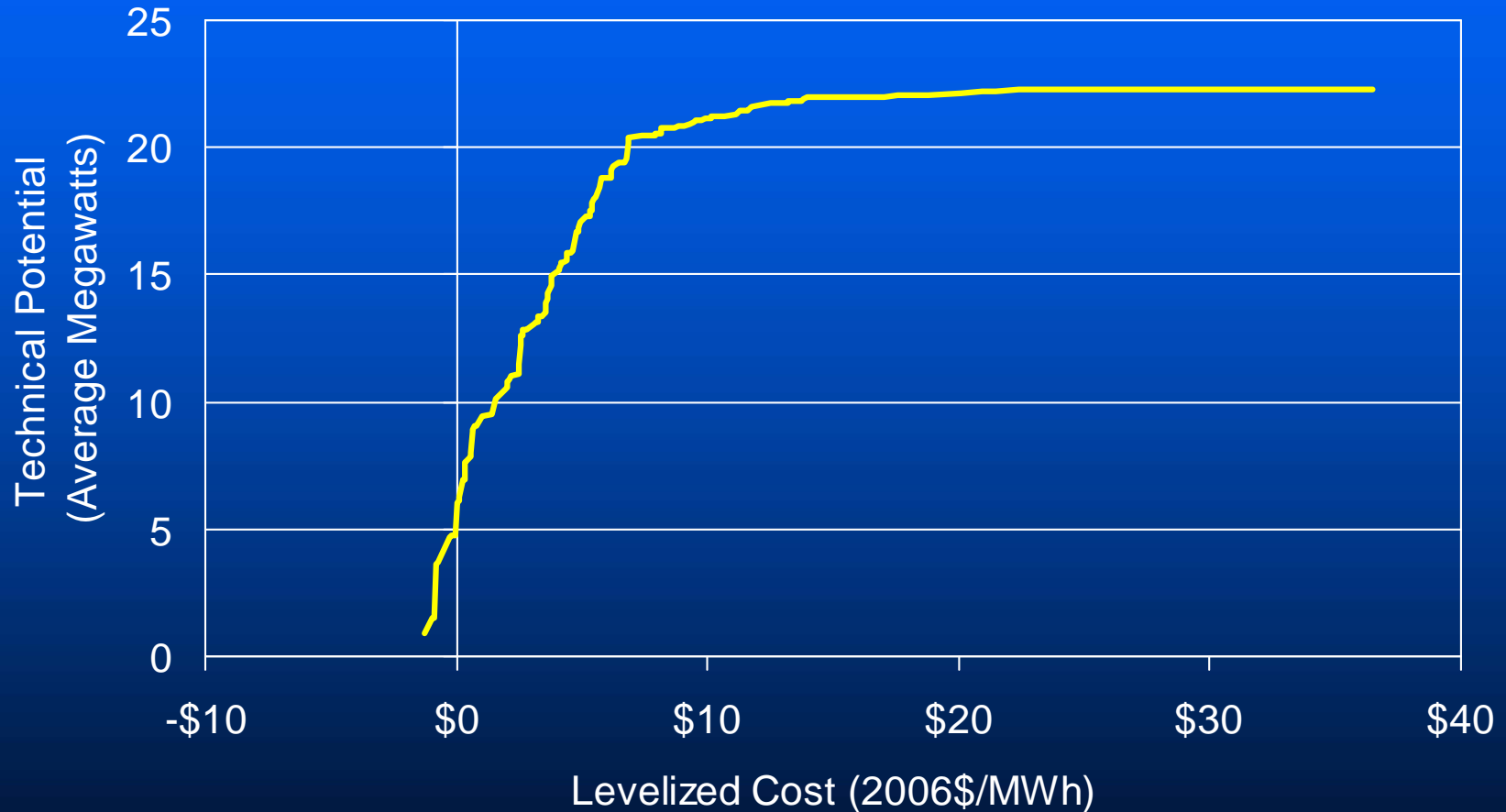
# Irrigated Agriculture - Hardware Estimated Technical Potential by State

State	Technical Potential (aMW)	2007 Sales (aMW)	% of 2007 Sales
Idaho	48	266	18%
Montana	5	13	34%
Oregon	12	109	11%
Washington	25	252	10%
PNW Region	89	647	14%

# Results: Resource Potential by Measure

Measure	Resource Potential (aMW)	Levelized Cost (Cents/kWh)
Convert wheel line systems to low pressure systems on alfalfa acreage	3	9.6
Convert hand line systems to low pressure systems on alfalfa acreage	2	6.9
Convert Center Pivots from High to Low Pressure	5	1.8
Convert Center Pivots from Medium to Low Pressure	13	1.1
Replace Nozzles & Gaskets	33	7.4
Replace Pumps, Nozzles & Gaskets	32	2.7
<b>Total</b>	<b>89</b>	<b>4.0</b>

# Irrigation Water Management Technical Potential\*



\*Includes Columbia Basin Project Area Only

# Dairy Milk Production Conservation Potential

- “On farm” dairy milk production is the largest single use of electricity in agriculture sector after irrigation
- New Measure for 6<sup>th</sup> Plan
  - Current conservation programs are targeting savings from dairies, but no regional estimate of savings potential



*Average dairy uses 800 – 1200 kWh/cow-yr*

*There are approximately 885,000 milking cows in PNW*

# Dairy Milk Production Conservation Technical Potential

State	Retrofit Potential (aMW)	Lost-Opportunity Potential (aMW)	Total Potential (aMW)
Idaho	2.6	0.4	3.1
Montana	0.3	0.0	0.3
Oregon	0.5	0.3	0.8
Washington	1.3	0.0	1.3
Total	4.7	0.8	5.5

# Total Agriculture Sector Conservation Technical Potential

State	Irrigation Hardware (aMW)	Irrigation Water Management (aMW)	Dairy (aMW)	Total (aMW)
Idaho	48	-	3	51
Montana	5	-	0	5
Oregon	12	-	1	12
Washington	25	22	1	49
PNW	89	22	5	117

# Question?

