

The Role of Energy Efficiency in Could (and Should) Play in Montana's Future

Insights from the 5th Northwest Power and Conservation Plan

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Presented October 18, 2005

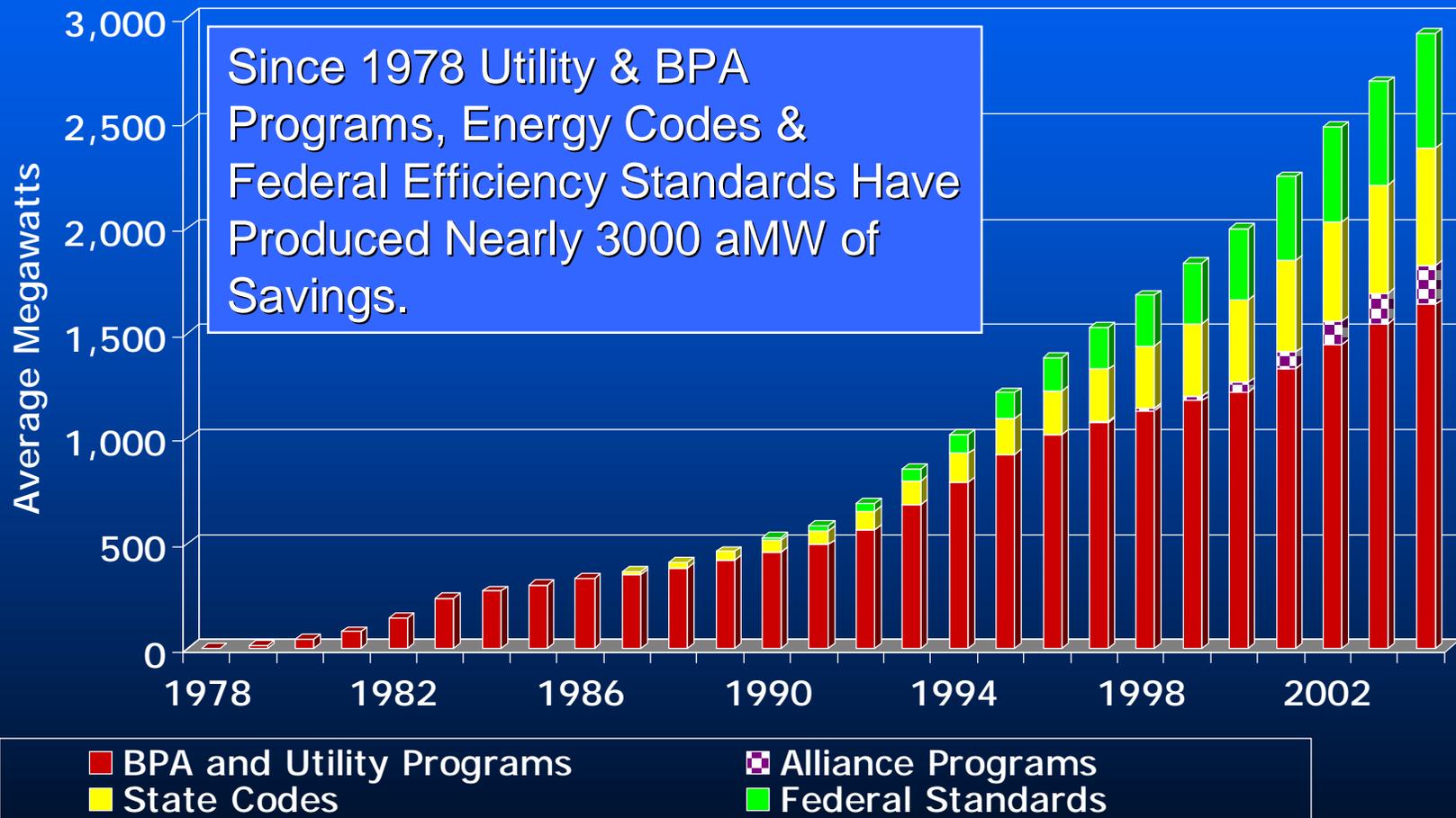
Montana Energy Futures Conference



What You're About To Hear

- n Energy Efficiency in the Region's Current Resource Mix
- n Regional Efficiency Goals
 - What These Might Mean for Montana
- n What's Behind the Goals
- n The Challenges Ahead

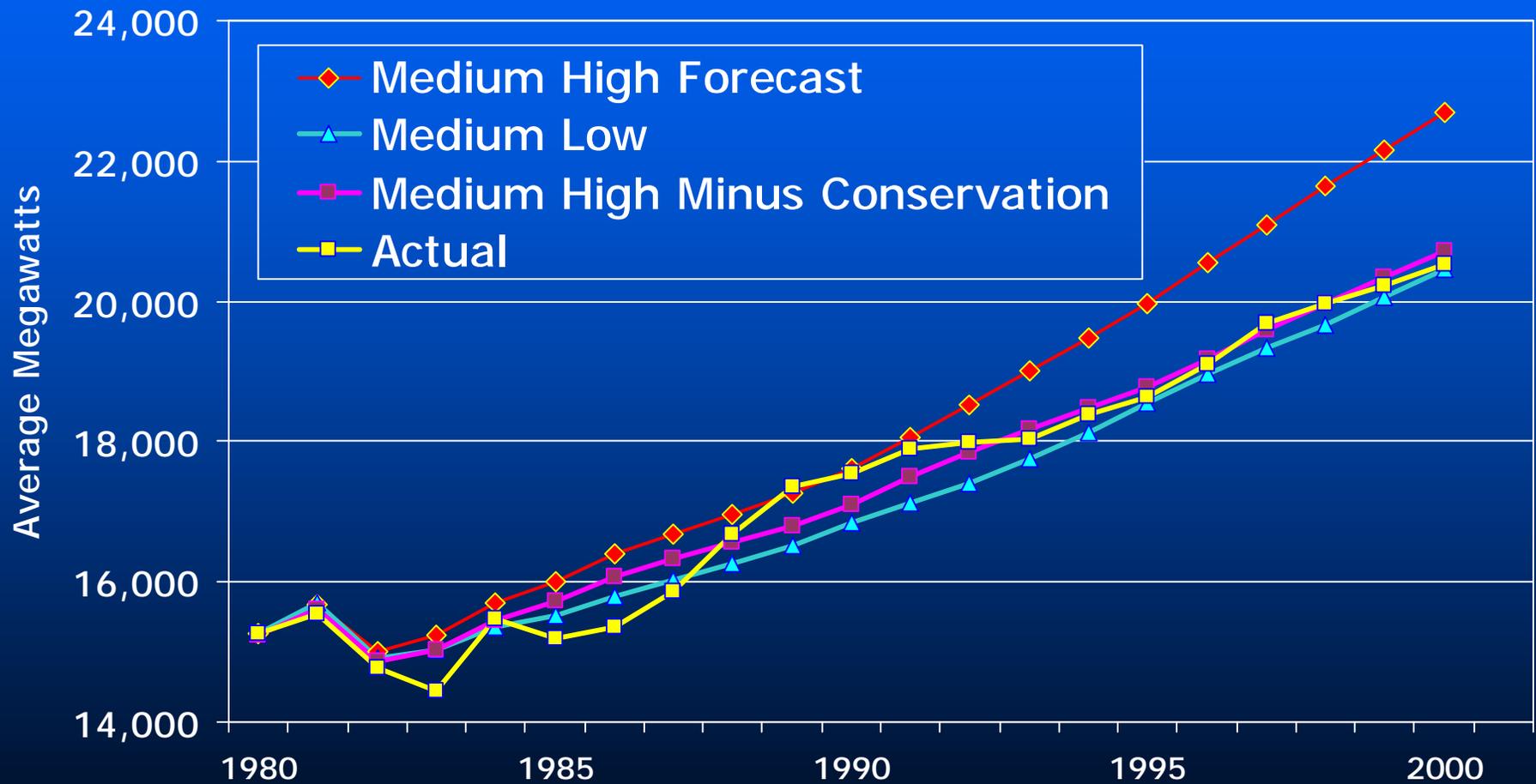
PNW Energy Efficiency Achievements 1978 - 2004



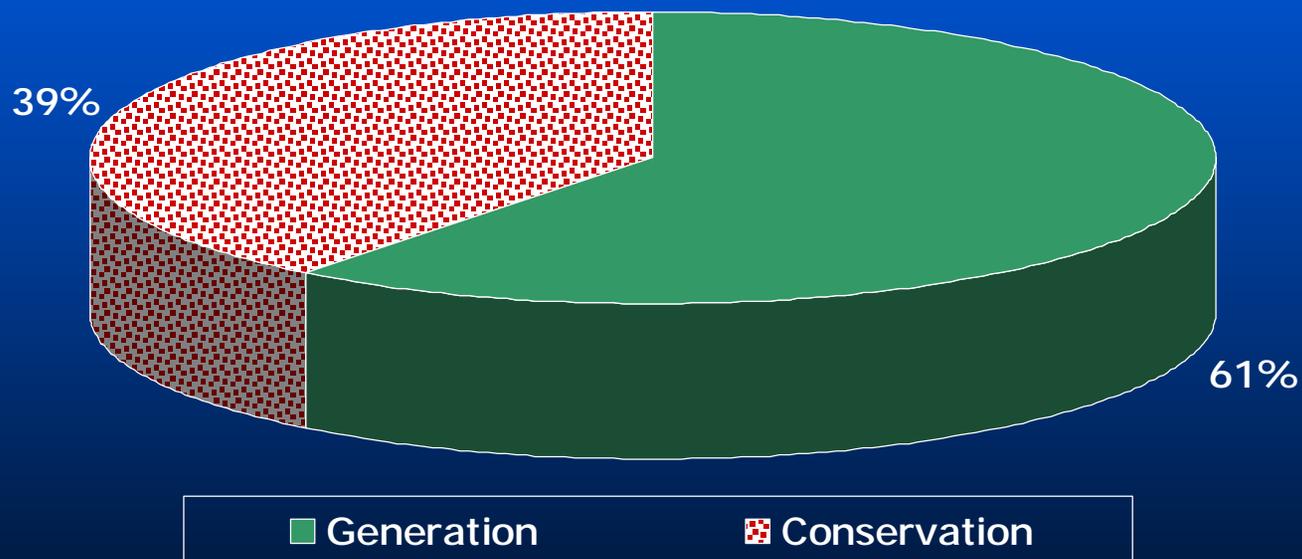
So What's 3000 aMW?

- n It was enough electricity to serve the entire state of Montana, plus 60% of Idaho in 2004
- OR -
- n It was enough electricity to serve the entire state of Idaho plus Western Montana in 2004
- n It Saved the Region's Consumers Nearly \$1.25 billion in 2004

Energy Efficiency Resources Significantly Reduced Projected PNW Electricity Sales

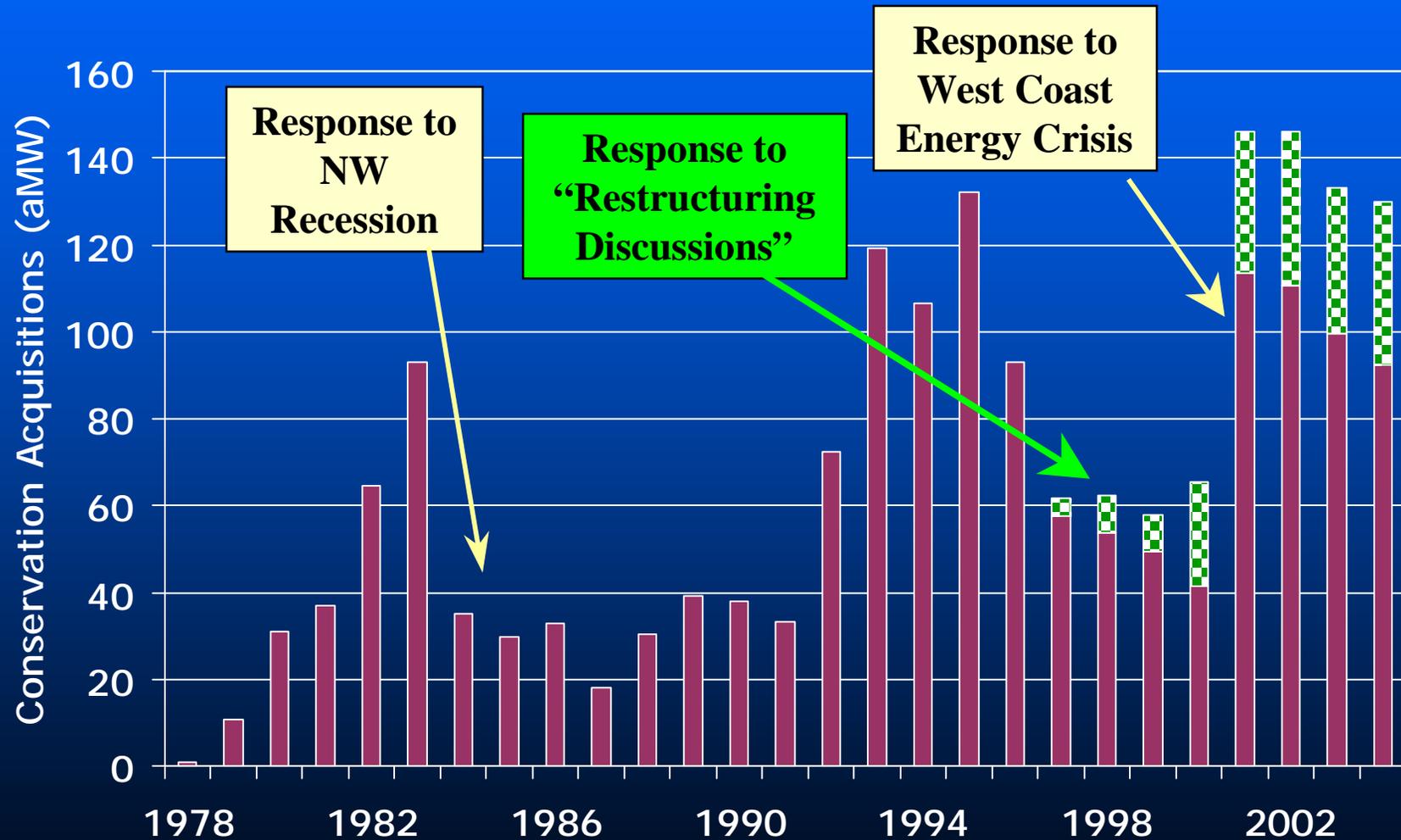


Energy Efficiency Met Nearly 40% of PNW Regional Firm Sales Growth Between 1980 - 2003

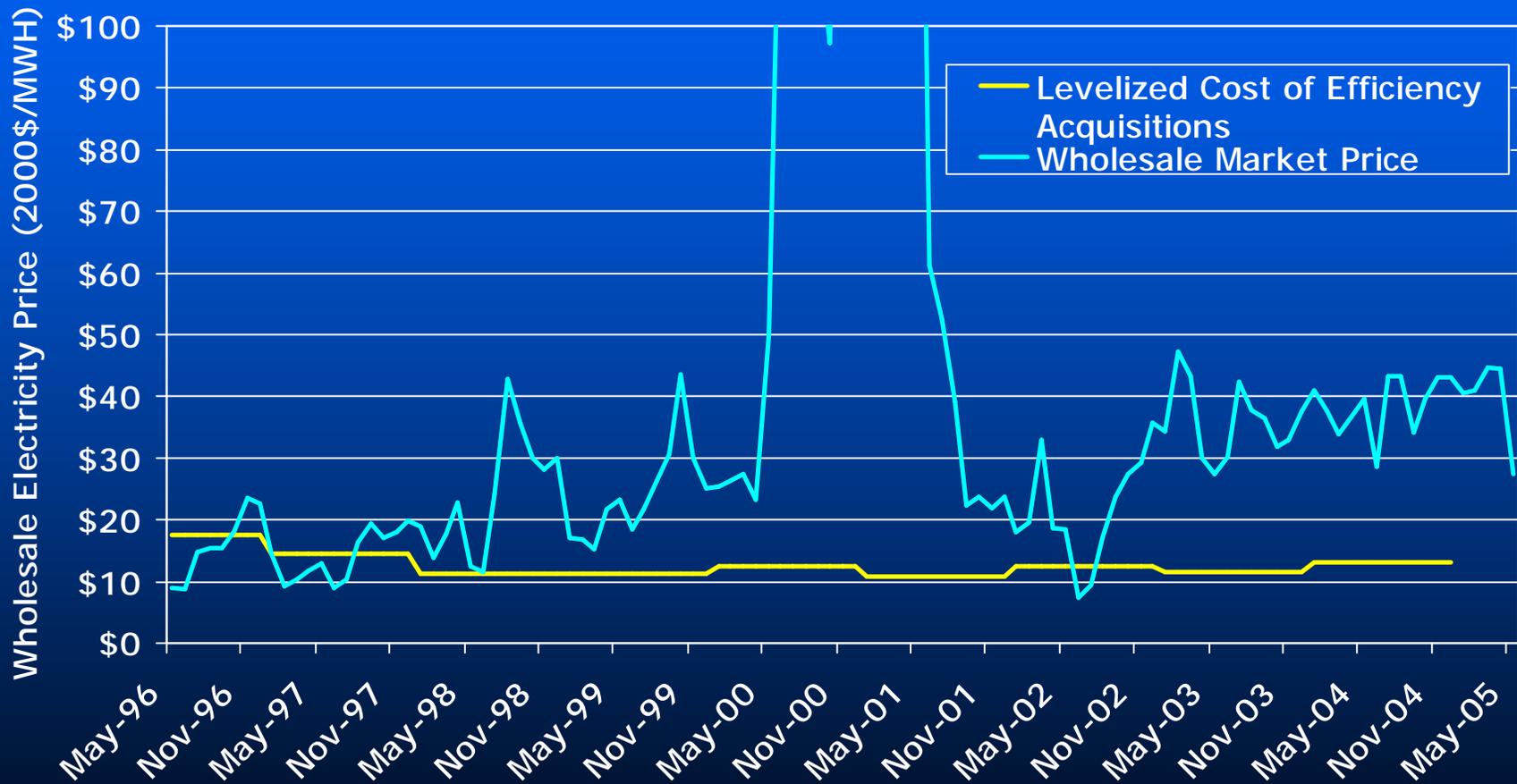


Regional Utility Conservation Acquisitions Have Helped Balance Loads & Resources

Creating Mr. Toad's Wild Ride for the PNW's Energy Efficiency Industry

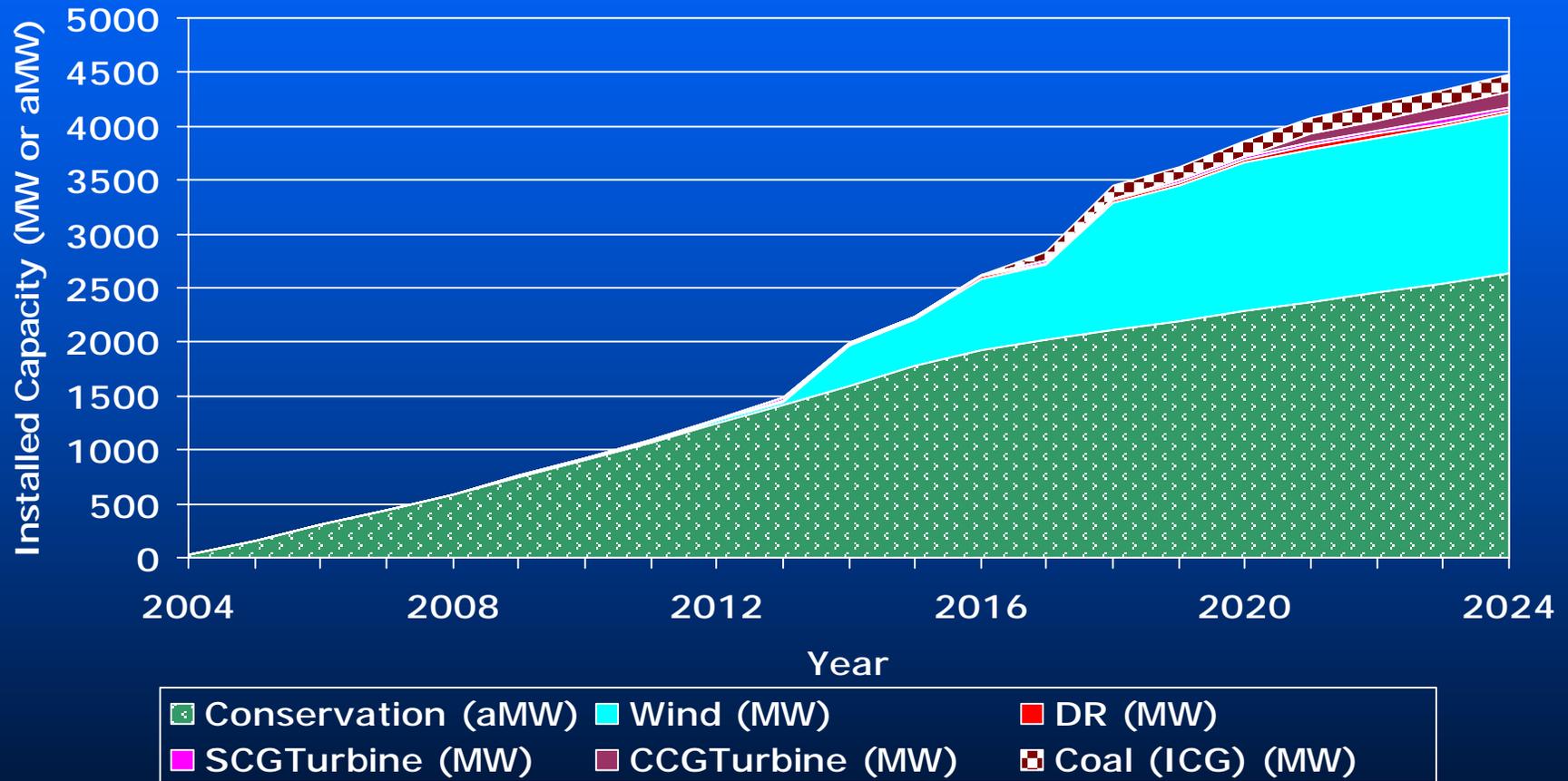


Utility Acquired Energy Efficiency Has Been A BARGAIN!



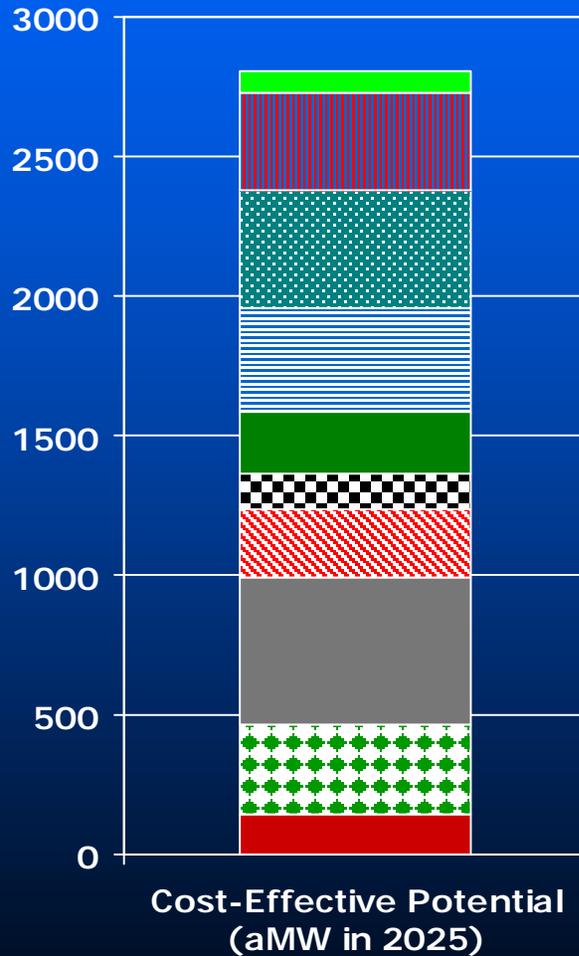
So Much for the Past, What's Ahead

5th Plan Relies on Conservation and Renewable Resources to Meet Load Growth *



*Actual future conditions (gas prices, CO2 control, conservation accomplishments) will change resource development schedule

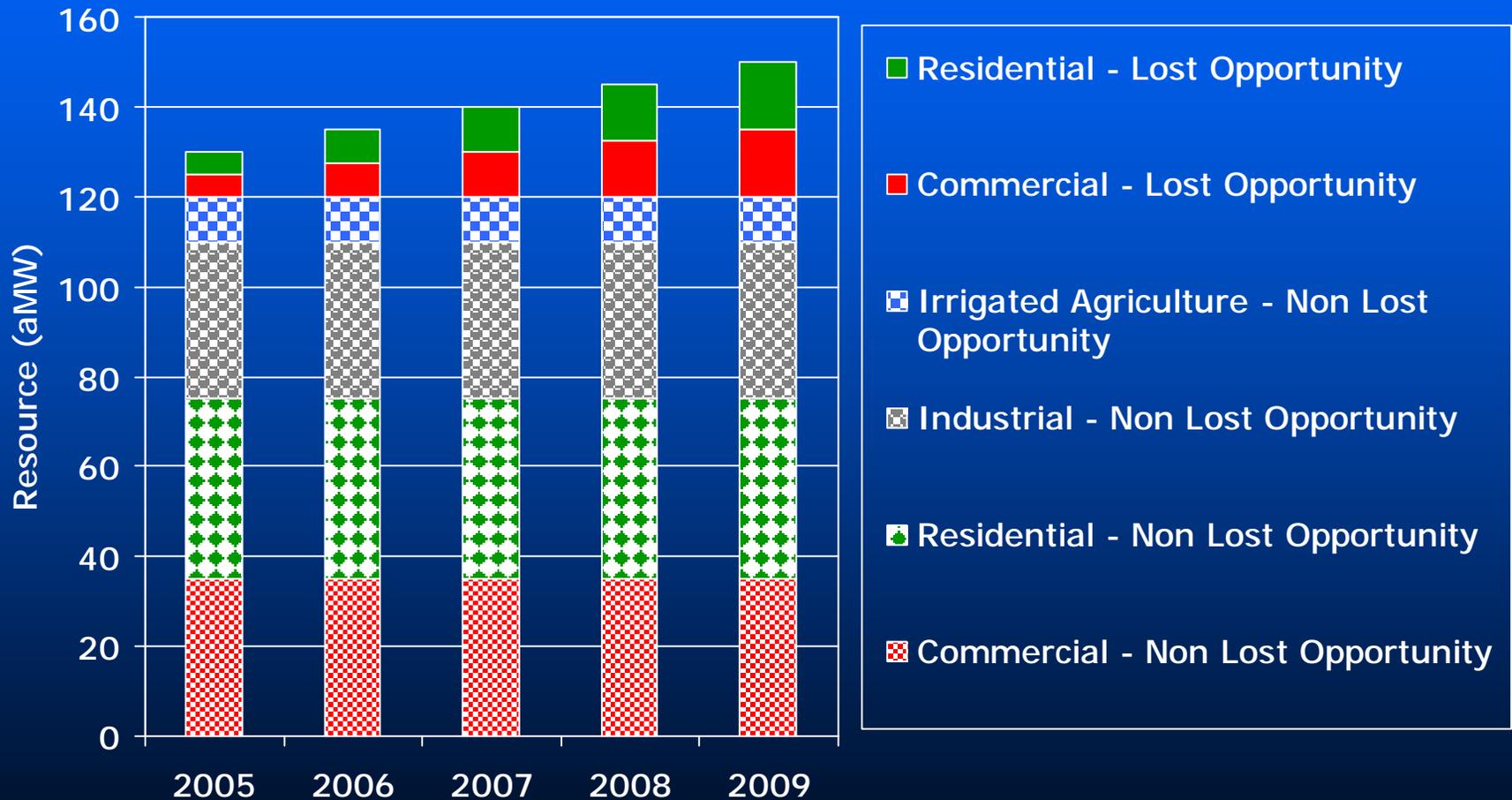
Cost-Effective and Achievable Conservation Should Meet Over 45% of PNW Load Growth from 2005-2025*



- Agricultural Sector - 80 aMW
- Non-DSI Industrial Sector - 350 aMW
- Commercial Sector Non-Building Measures - 420 aMW
- HVAC, Envelope & Refrigeration - 375 aMW
- New Commercial Building Lighting - 220 aMW
- Existing Commercial Buildings Lighting - 130 aMW
- Residential Space Conditioning - 240 aMW
- Residential Lighting - 530 aMW
- Residential Water Heating - 325 aMW
- Residential Appliances - 140 aMW

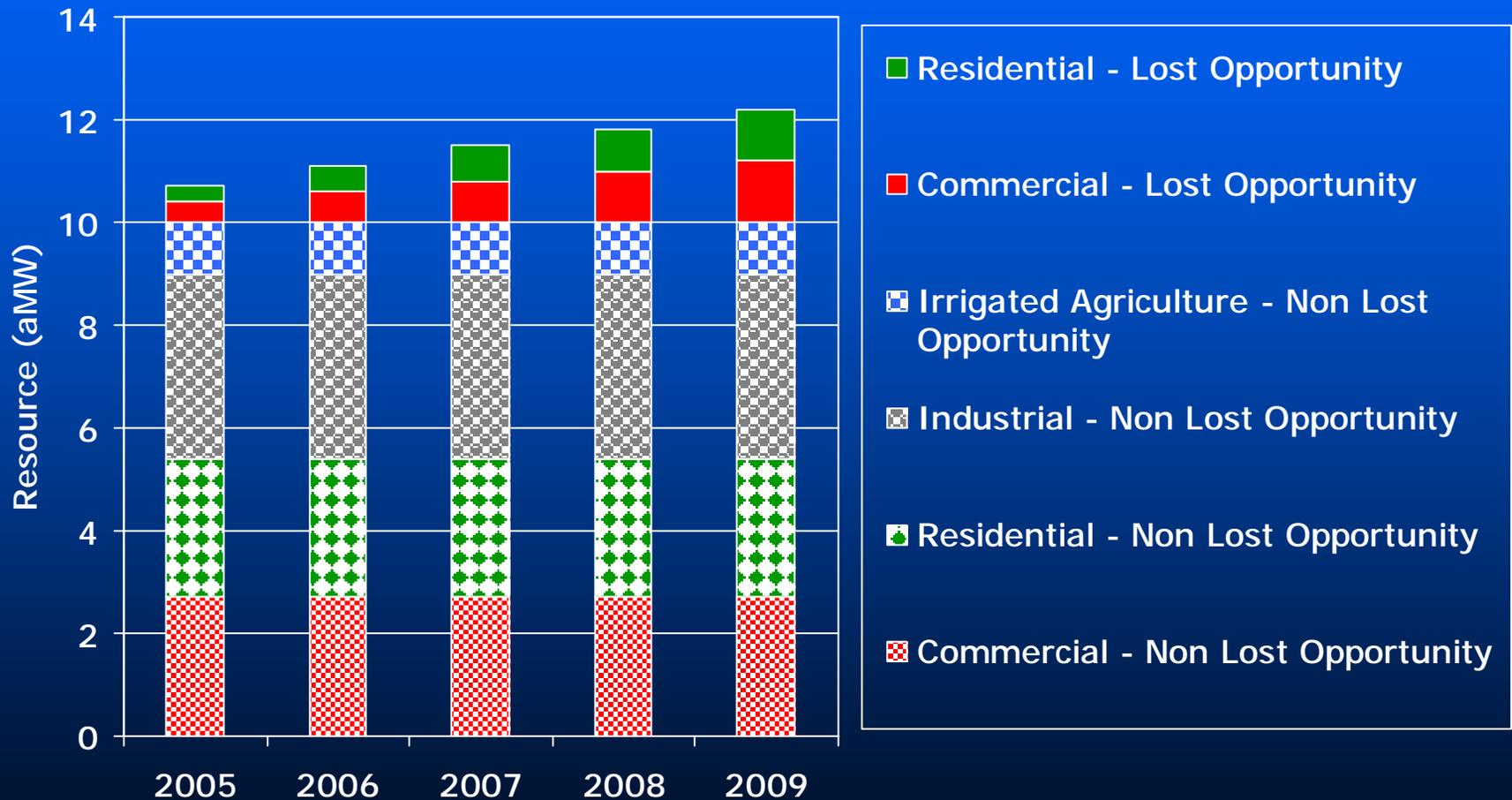
*Medium Load Forecast
Loads & Market Prices

Regional Near-Term Conservation Targets (2005-2009) = 700 aMW



Montana's Share of Near-Term Conservation Targets (2005-2009)

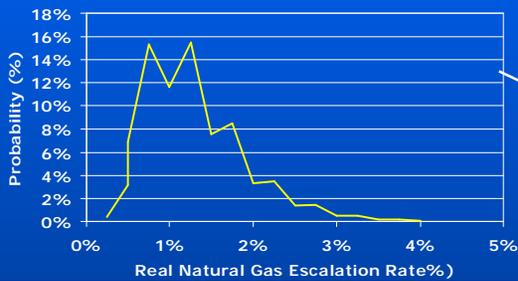
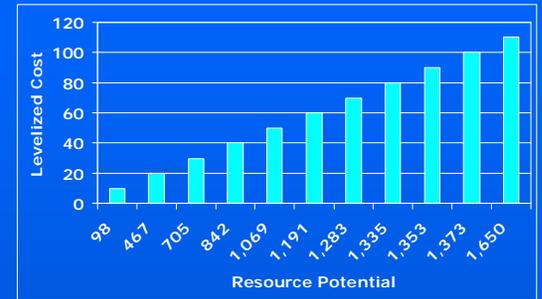
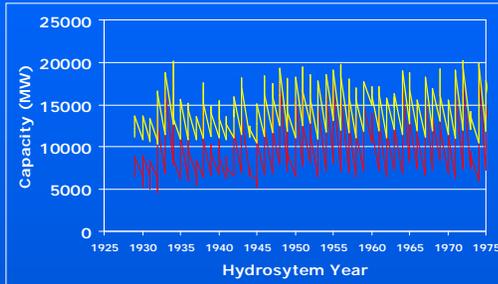
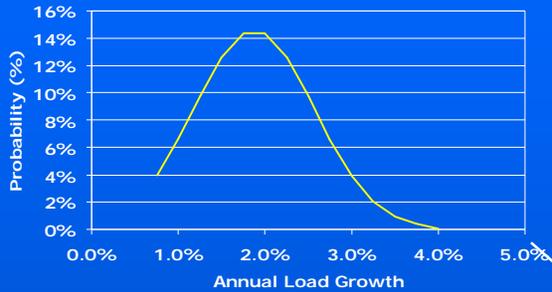
= 57 aMW



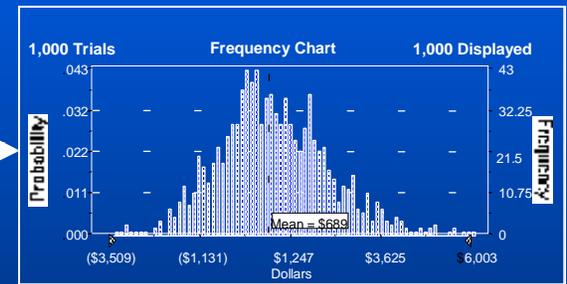
Why Should We?

**What's Behind the 5th Plan's
Conservation Targets?**

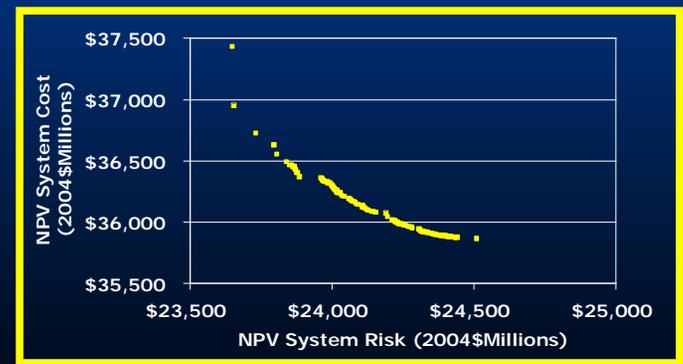
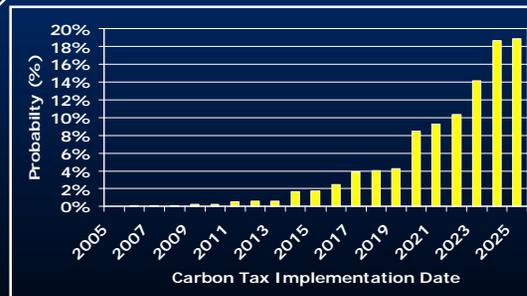
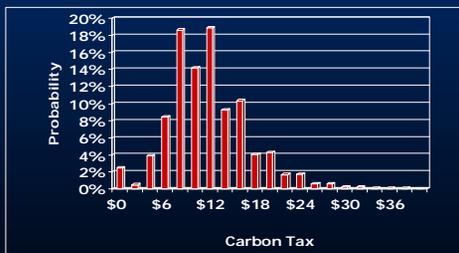
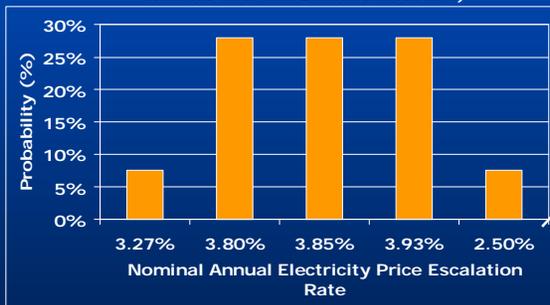
PNW Portfolio Planning – Scenario Analysis on Steroids



Portfolio Analysis Model

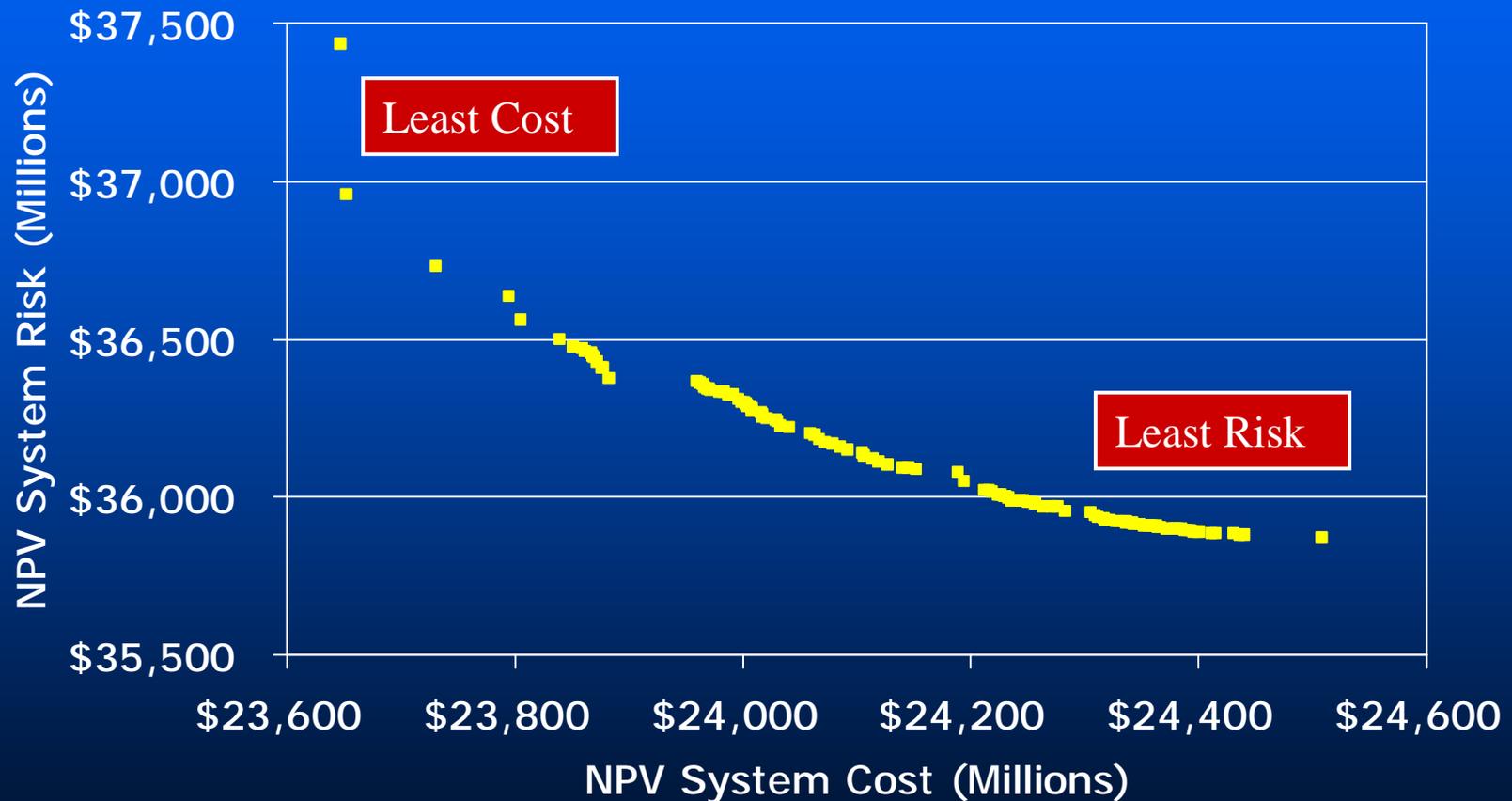


NPV System Cost



Efficient Frontier

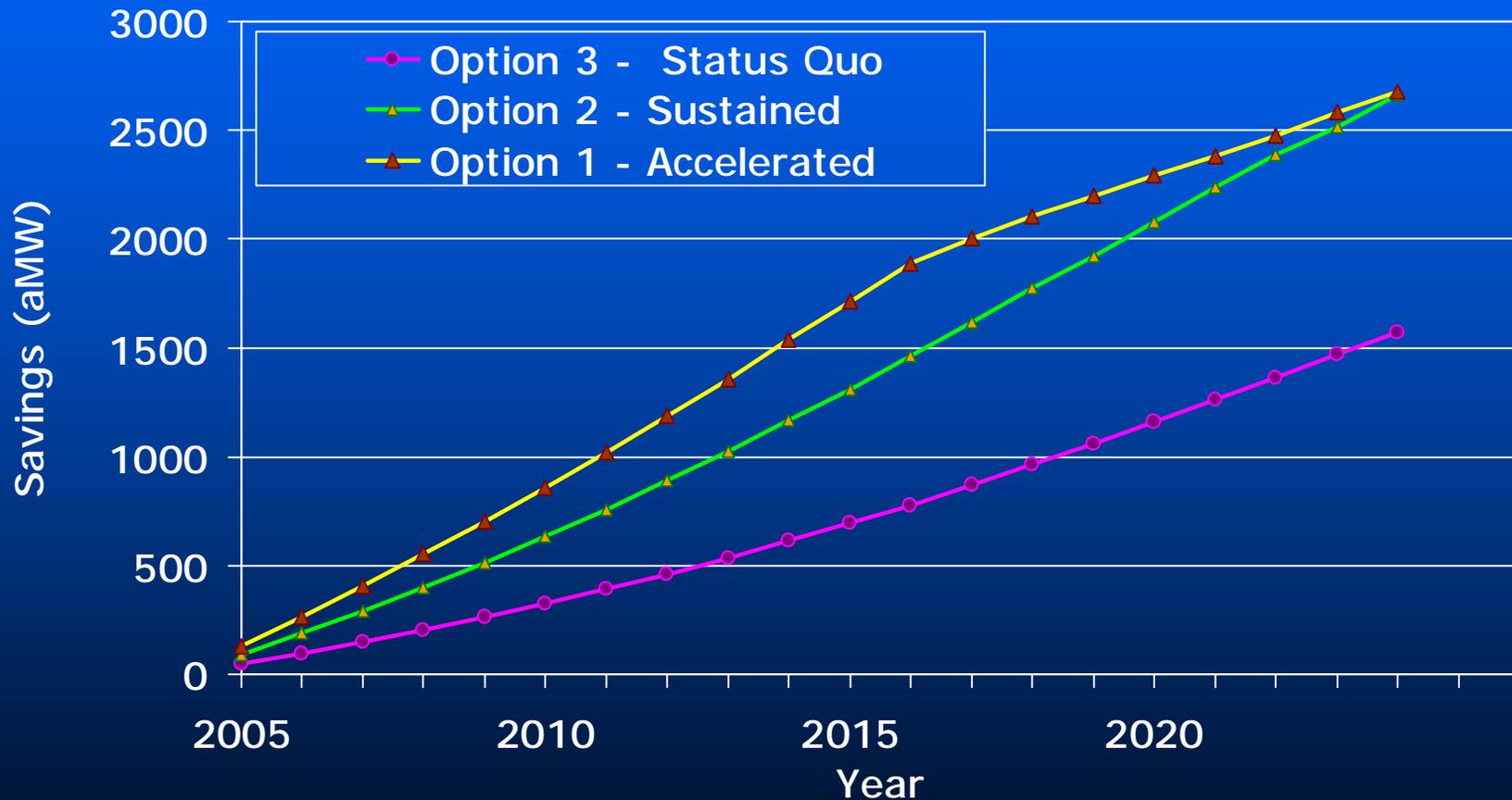
Plans Along the Efficient Frontier Permit Trade-Offs of Costs Against Risk



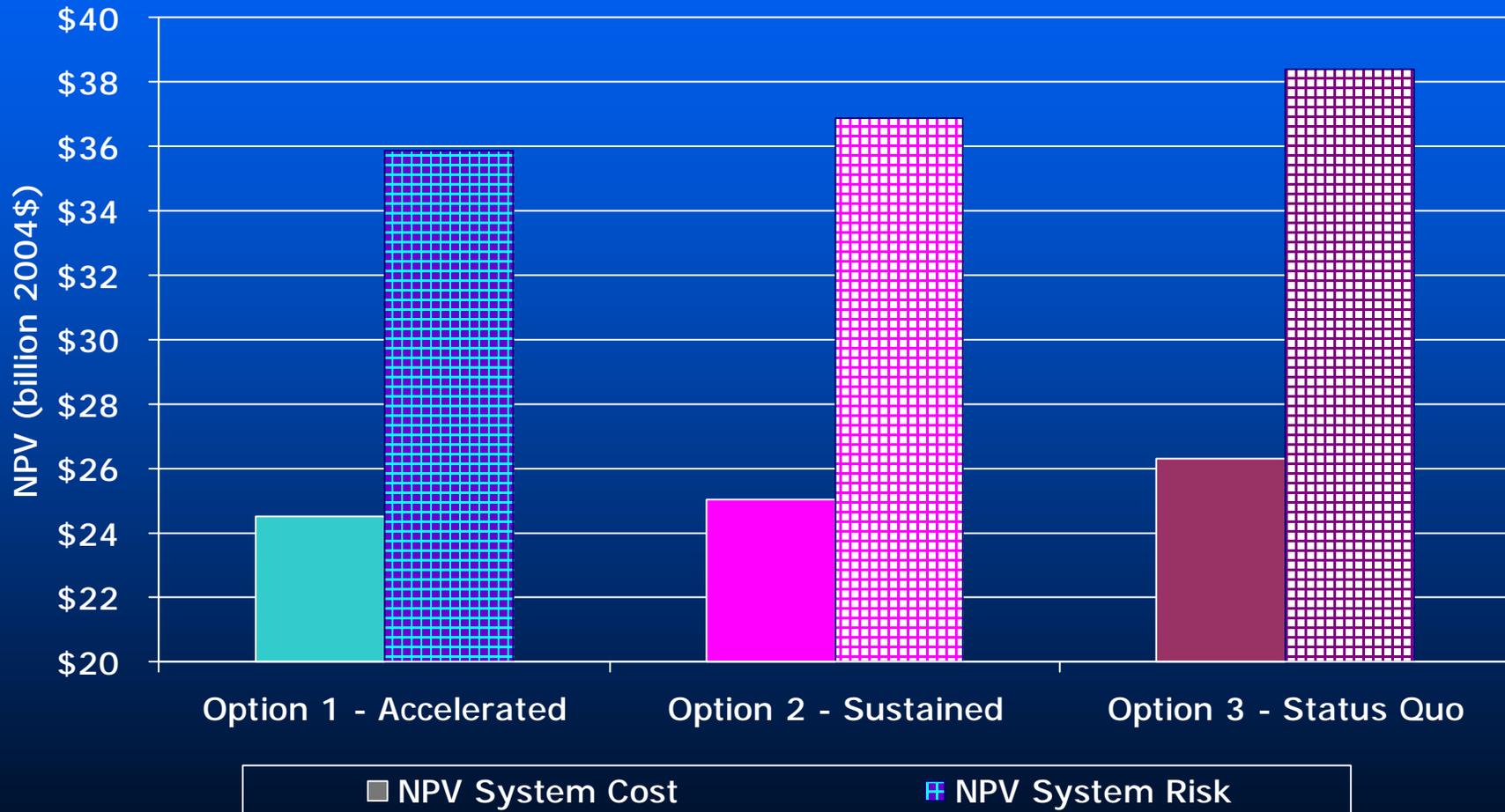
Three Conservation Options Tested

- n **Option 1: Accelerated** – Similar to the “best performance” over the last 20 years
 - Non-lost opportunity limited to 120 aMW/year
 - Ramp-up lost-opportunity to 85% by 2017
- n **Option 2: Sustained** - Similar to typical rates over last 20 years
 - Non-lost opportunity limited to 80 aMW/year
 - Ramp-up lost-opportunity to 85% by 2017
- n **Option 3: Status Quo** - Similar to lowest rates over last 20 years
 - Non-lost opportunity limited to 40 aMW/year
 - Ramp-up lost-opportunity to 85% penetration by 2025

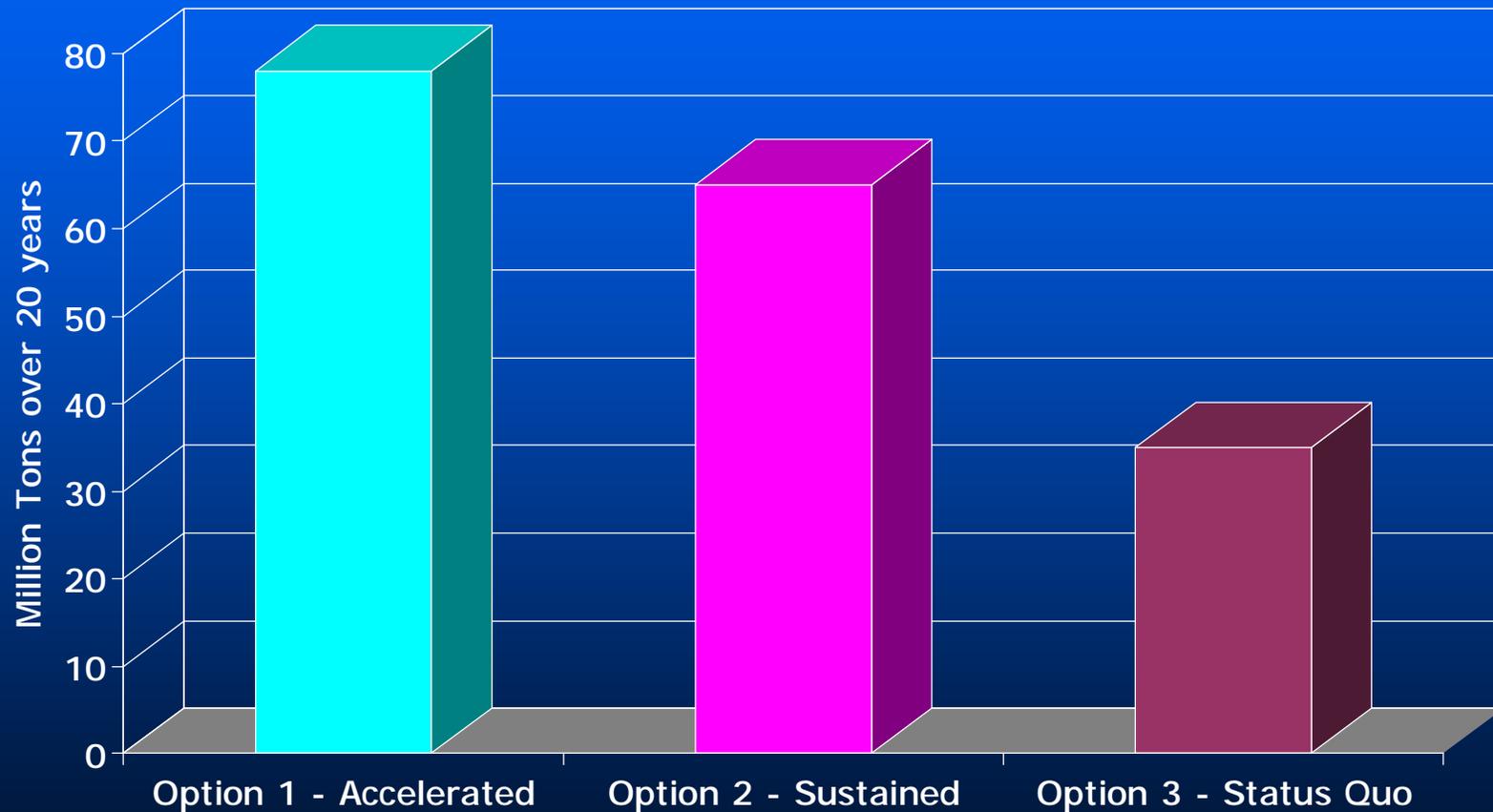
Average Annual Conservation Development for Alternative Levels of Deployment Tested



Accelerating Conservation Development Reduces Cost & Risk



WECC Carbon Dioxide Emissions Reductions for Alternative Conservation Targets



Why Energy Efficiency Reduces NPV System Cost and Risk

- n It's A Cheap (avg. 2.4 cents/kWh TOTAL RESOURCE COST) Hedge Against Market Price Spikes
- n It has value even when market prices are low
- n It's Not Subject to Fuel Price Risk
- n It's Not Subject to Carbon Control Risk
- n It's Significant Enough In Size to Delay "build decisions" on generation

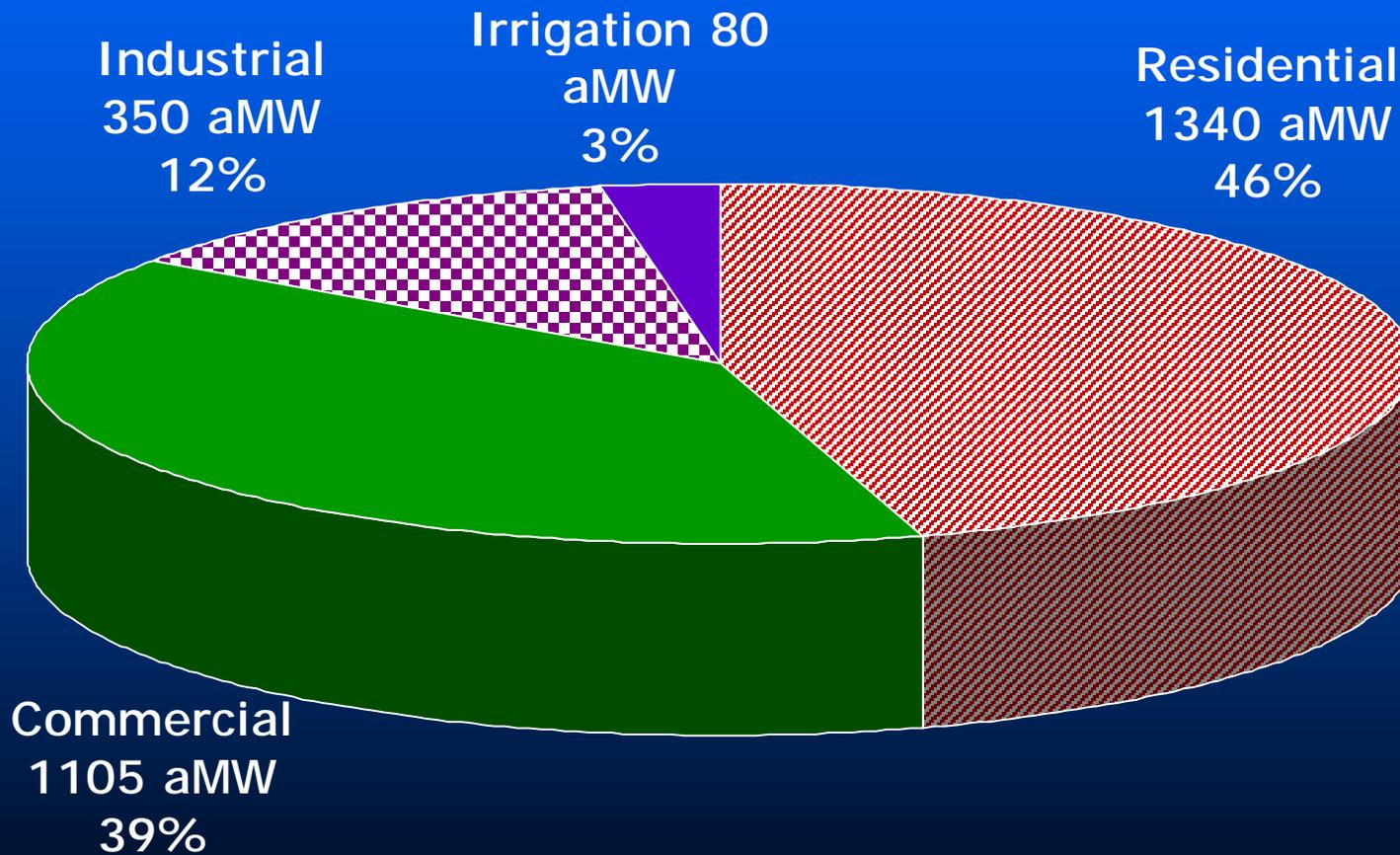
The Plan's Targets Are A Floor, Not a Ceiling

When we took the “ramp rate” constraints off the portfolio model it developed

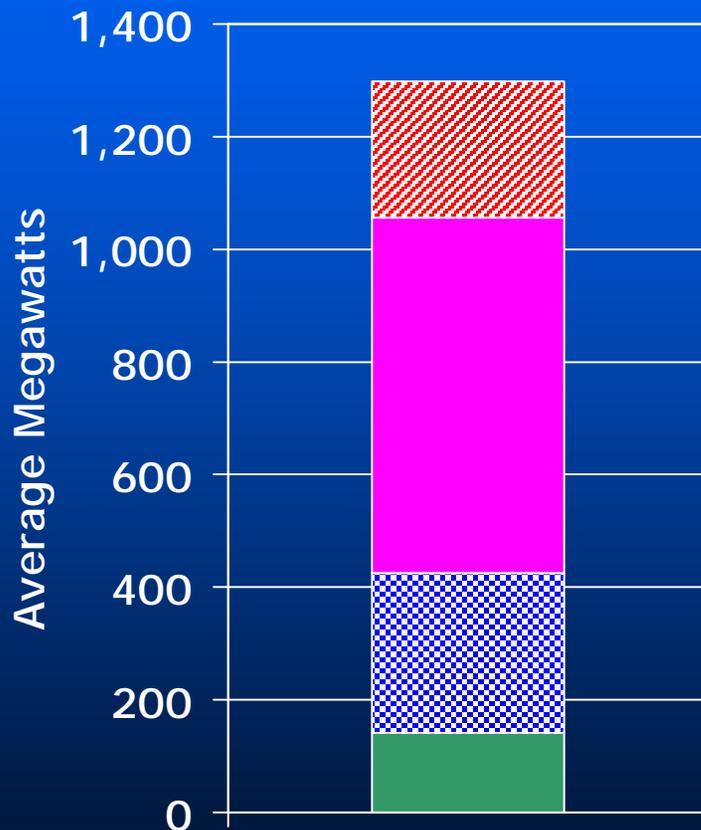
1500 aMW
of Conservation in 2005

Where Are The Savings?

Sources of Savings by Sector

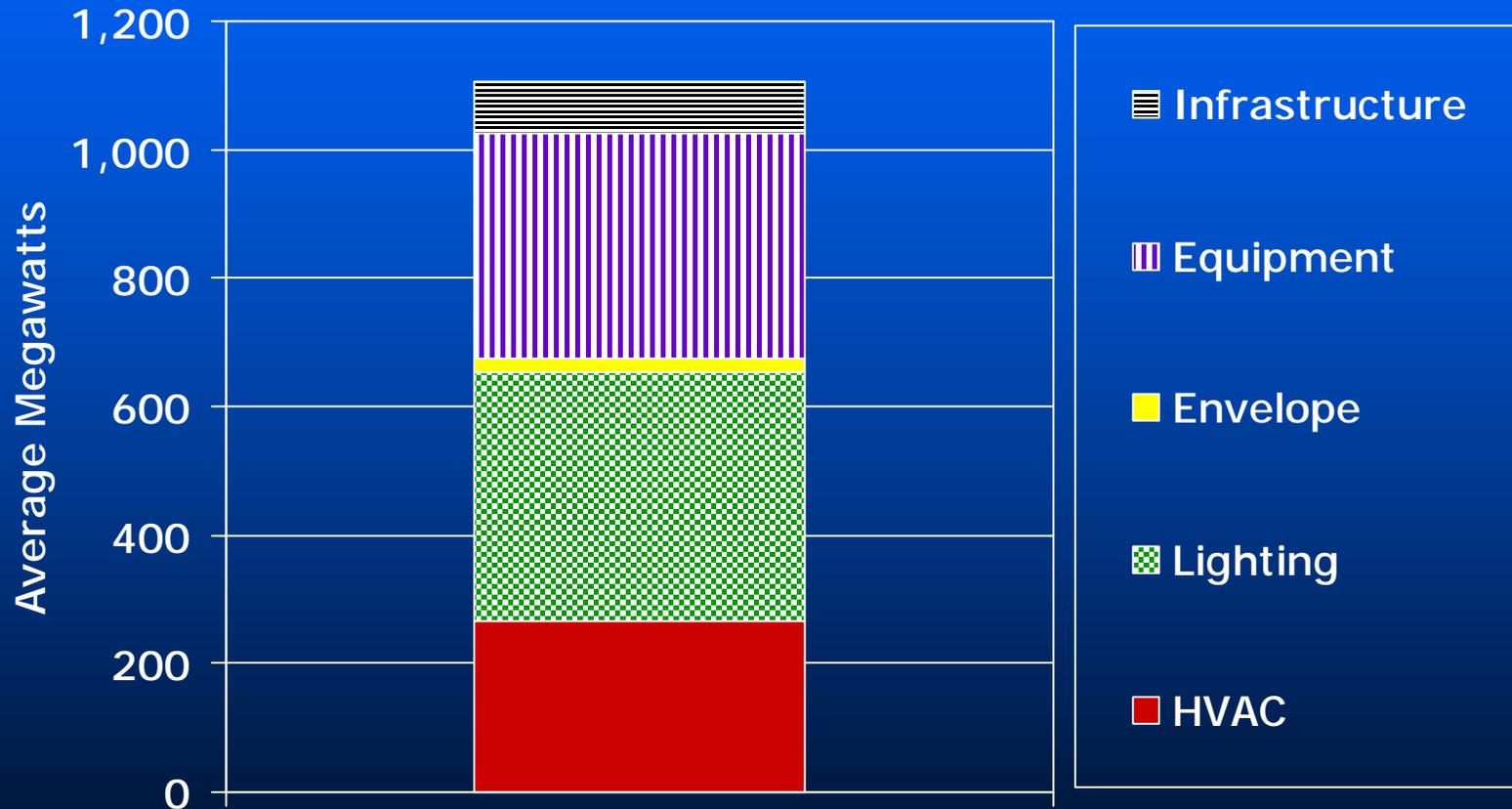


Residential Sector Target = 1340 aMW

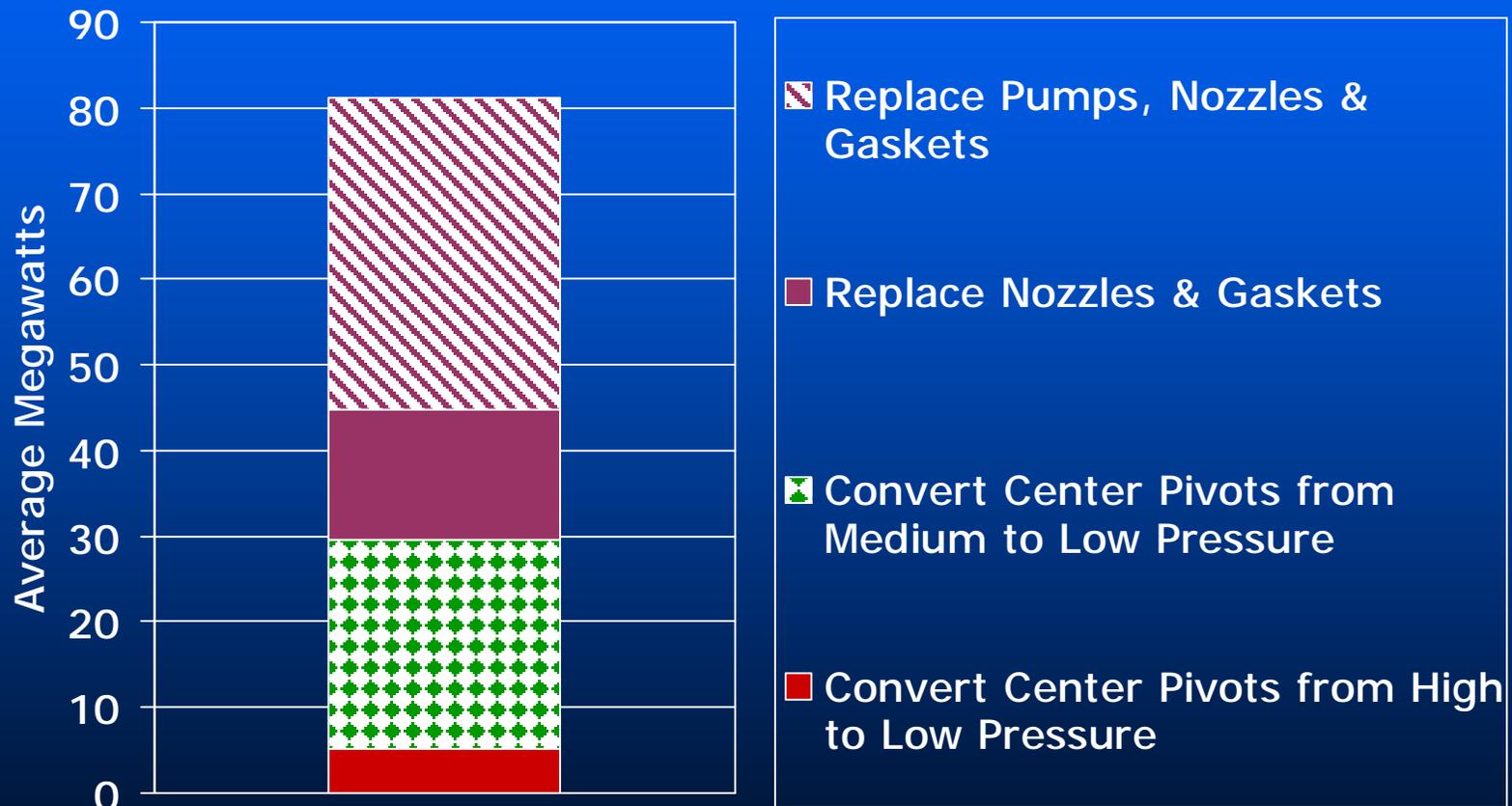


- Residential Space Conditioning - 245 aMW
- Residential Lighting - 630 aMW
- Residential Water Heating - 285 aMW
- Residential Appliances - 140 aMW

Commercial Sector Target = 1105 aMW



Irrigated Agriculture Sector Target = 80 aMW



Industrial Sector Target = 350 aMW

- n Estimate of 5% of 2025 forecast loads
- n 350 aMW at 1.7 cents per kWh
- n Process controls, drive systems, lighting, refrigeration, compressed air, etc
- n Potential is a function of the ongoing changes in region's industrial mix

Implementation Challenges

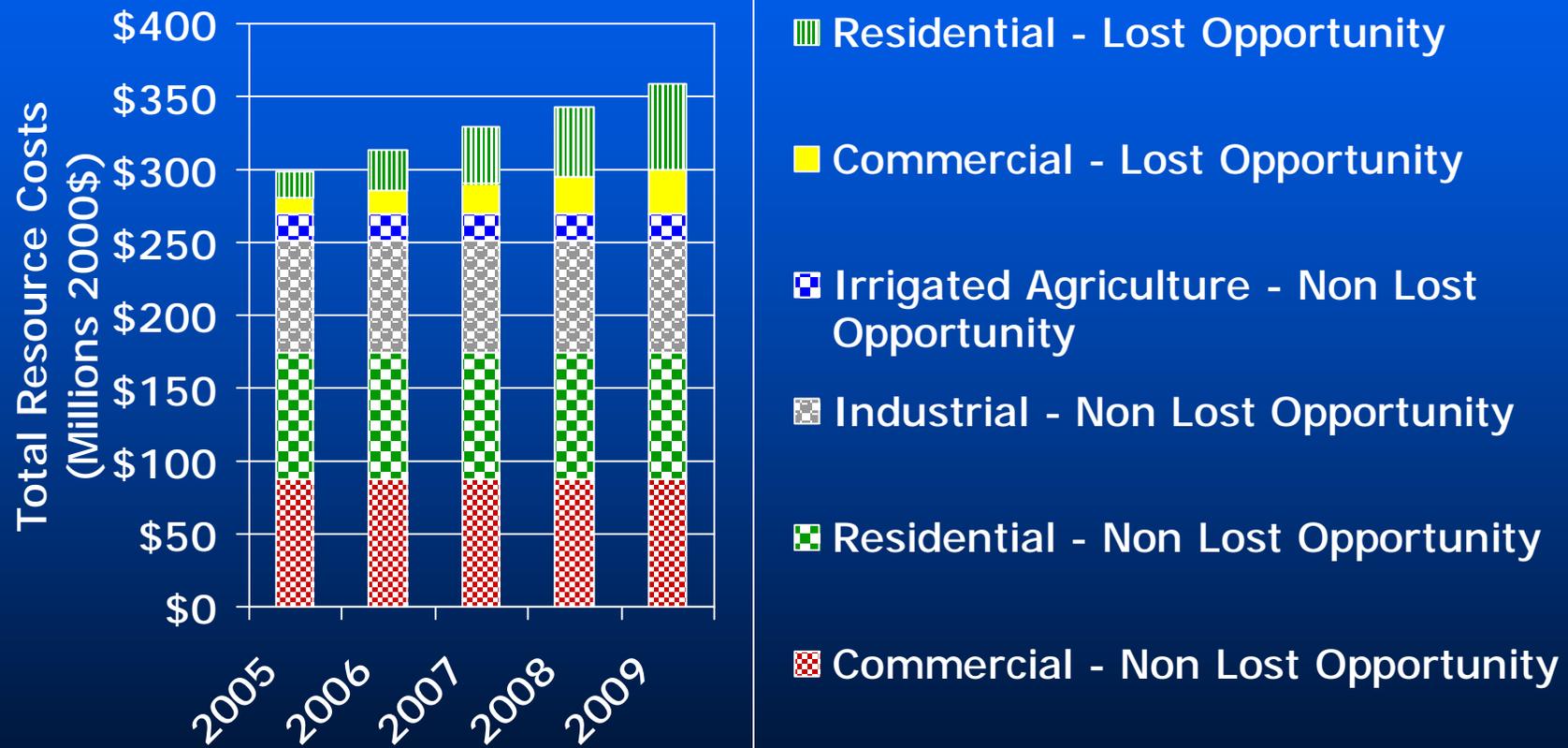


Plan

Conservation Action Items

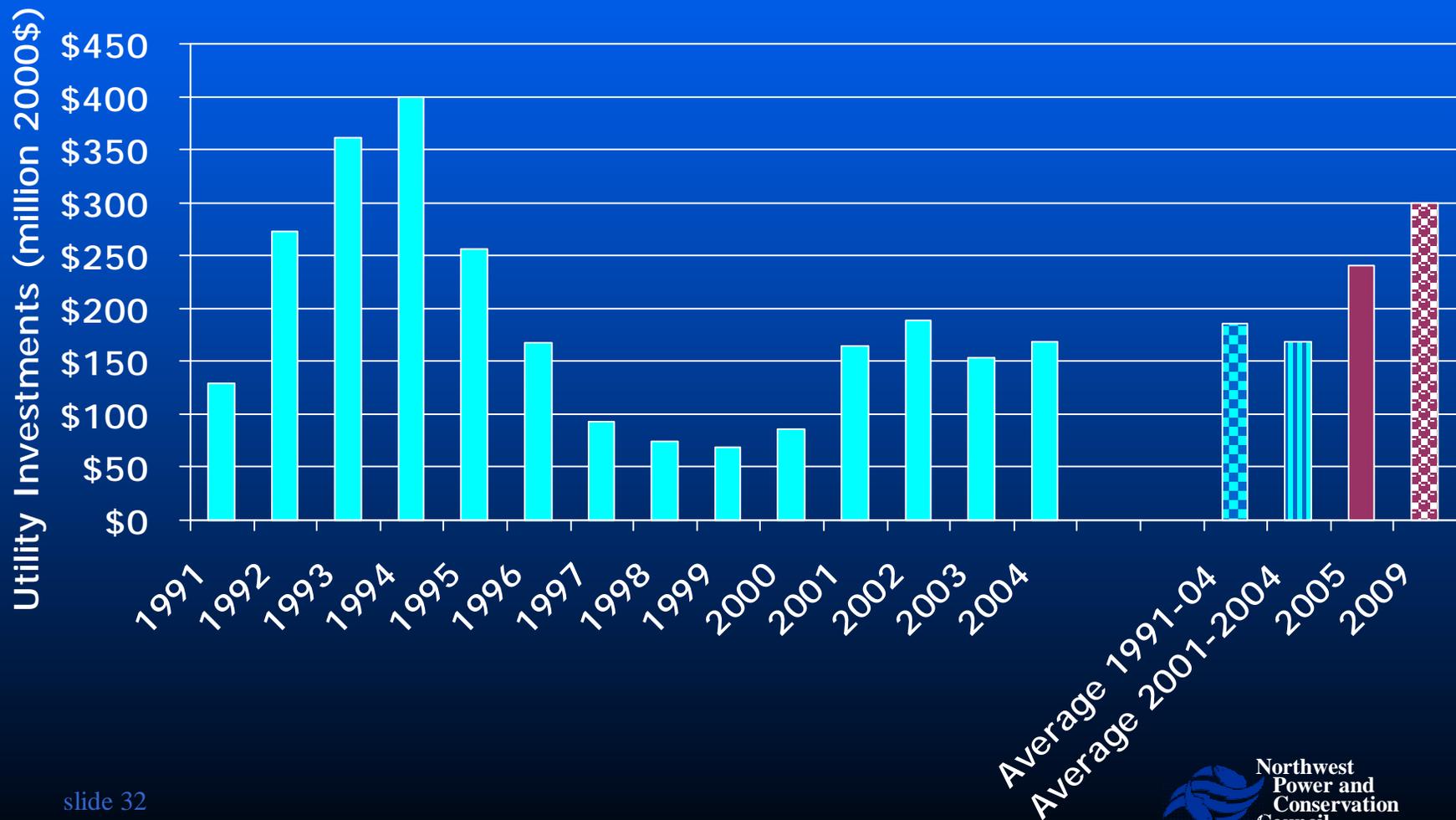
- n Ramp up “Lost Opportunity” conservation
 - » Goal => 85% penetration in 12 years
 - » 10 to 30 MWa/year 2005 through 2009
- n Accelerate the acquisition of “Non-Lost Opportunity” resources
 - » Return to acquisition levels of early 1990’s
 - » Target 120 MWa/year next five years
- n Employ a mix of mechanisms
 - » Local acquisition programs (utility, SBC Administrator & BPA programs)
 - » Regional acquisition programs and coordination
 - » Market transformation ventures

The Total Resource Acquisition Cost* of 5th Plan's Conservation Targets 2005 – 2009 = \$1.64 billion



*Incremental capital costs to install measure plus program administration costs estimated at 20% of capital.

Meeting the Plan's Efficiency Targets Will Likely Require Increased Regional Investments



Although, The Share of Utility Revenues Required is Modest



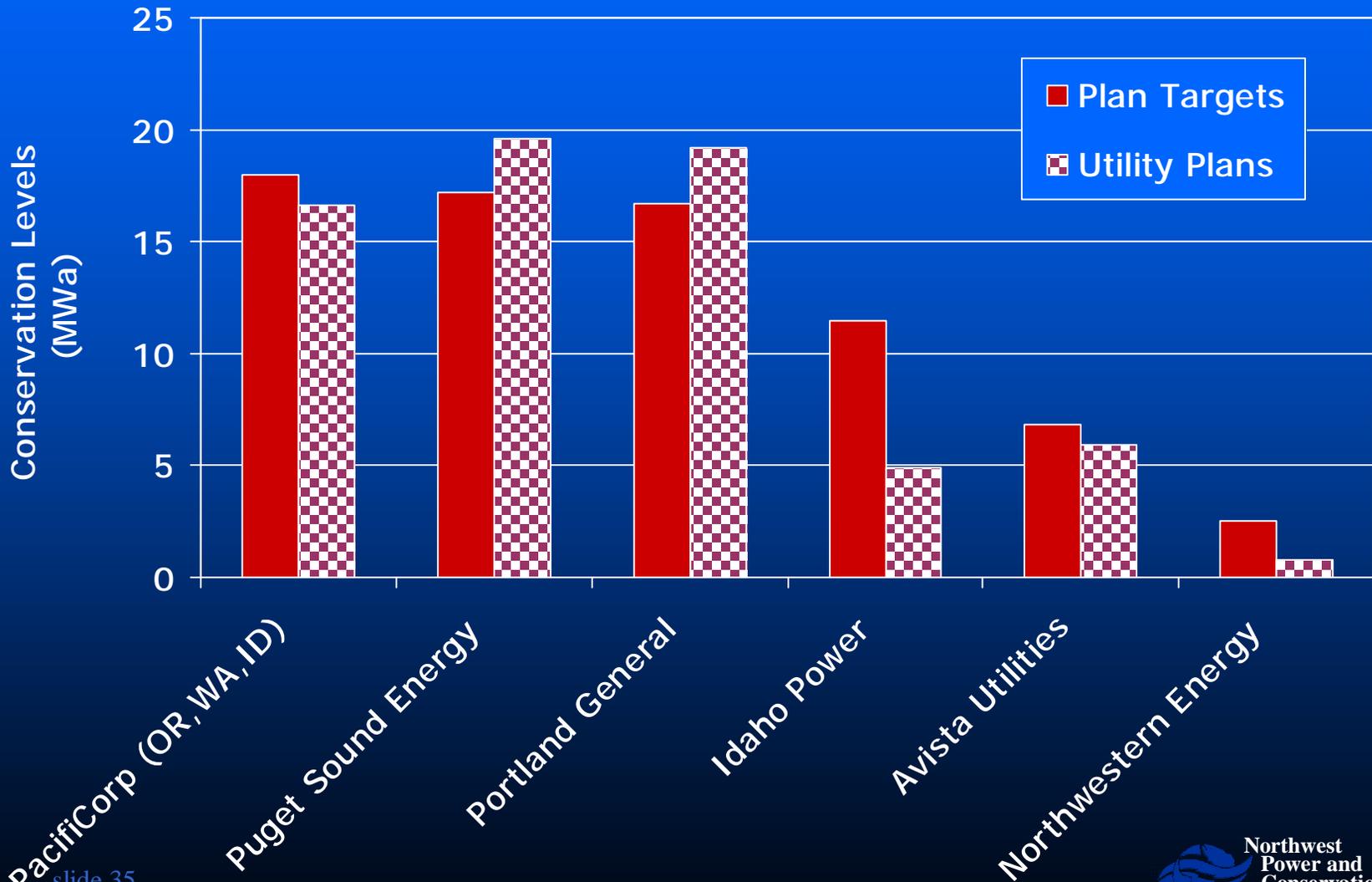
Regional Average Revenues/kWh will need to increase by \$0.000006/kWh

Utility* Efficiency Acquisition Plans for 2005 Are Close to 5th Plan Targets

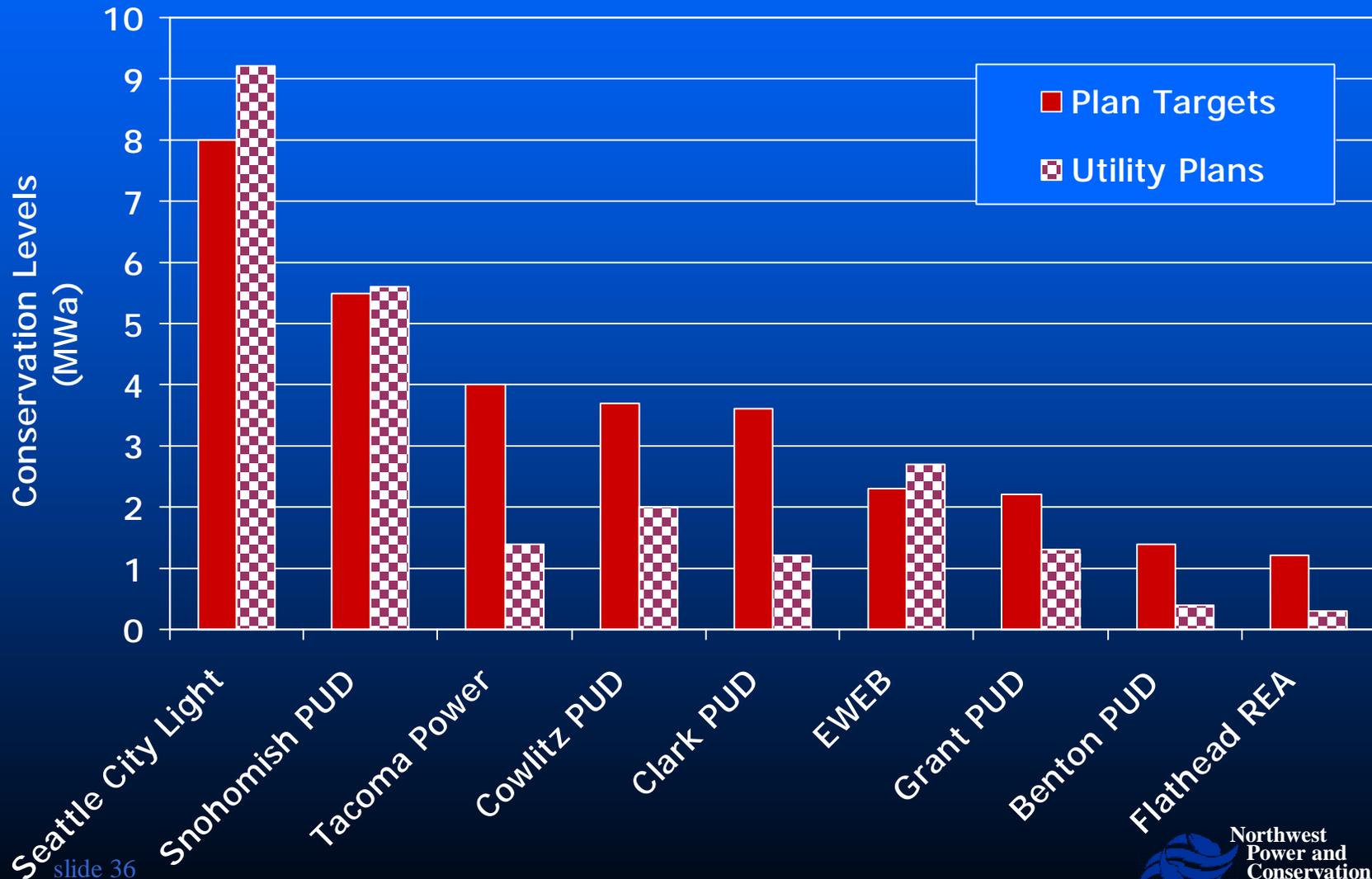


*Targets for 15 Largest PNW Utilities. These utilities represent approximately 80% of regional load.

Most IOU Efficiency Plans are Close to 5th Plan's Targets



However, Several Large Public Utility Efficiency Plans Are Well Below 5th Plan Targets



Summary

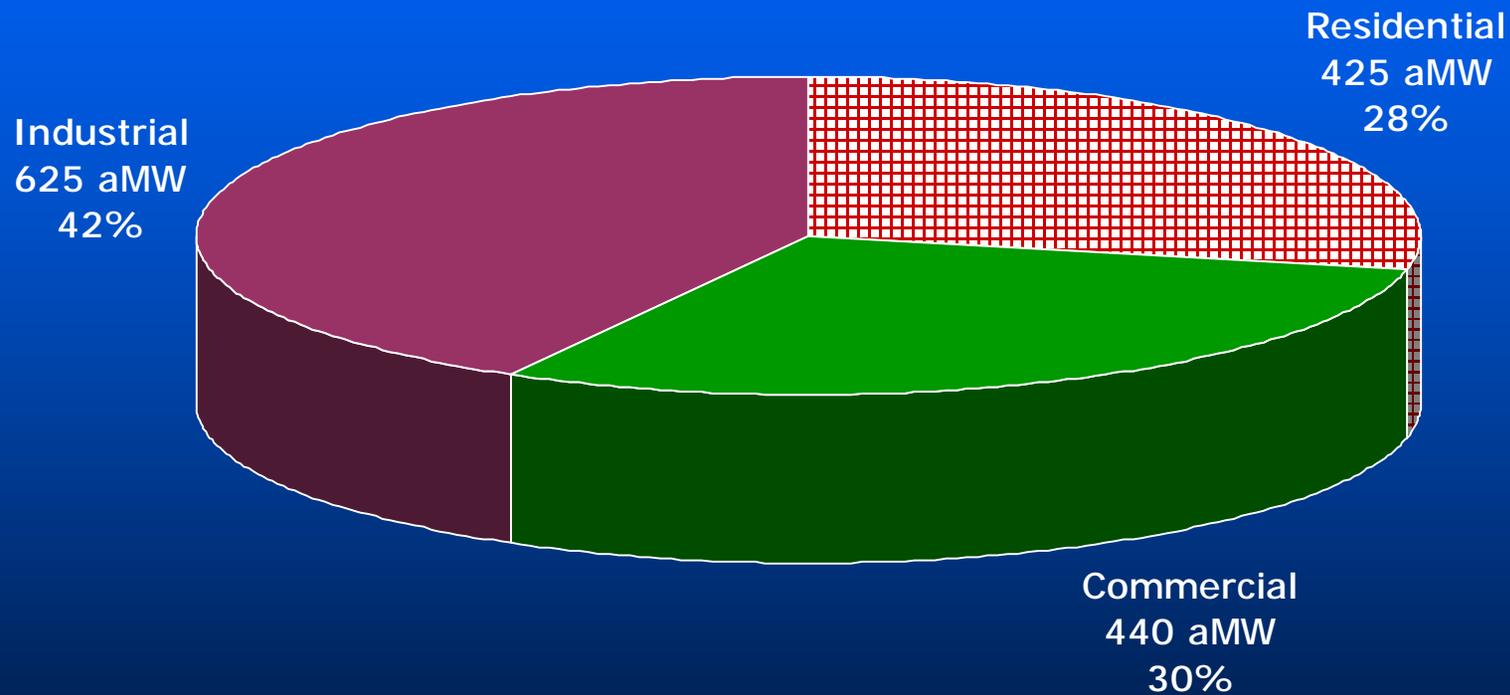
n The 5th Plan's Goal Is To Make The Inefficient Use of Electricity . . .

- **Immoral**
- **Illegal**
- **Unprofitable**

If We Fail Both **Costs** and **Risk** Will Be Higher

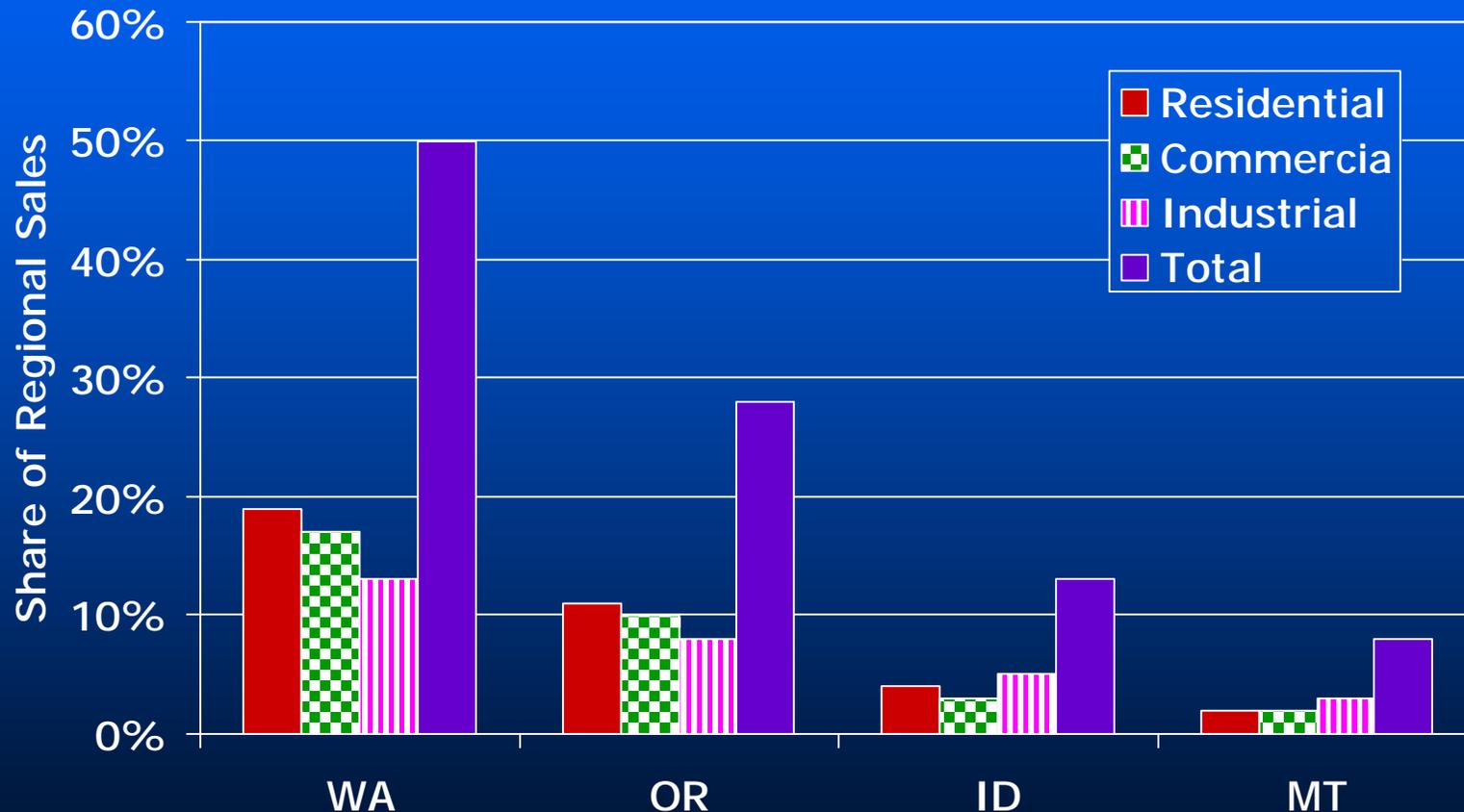
Backup Slides

Montana Electric Sales 1,490 aMW in 2004



Source: US DOE/EIA

Montana Electricity Sales Represent 8% of Regional Sales Across All Sectors

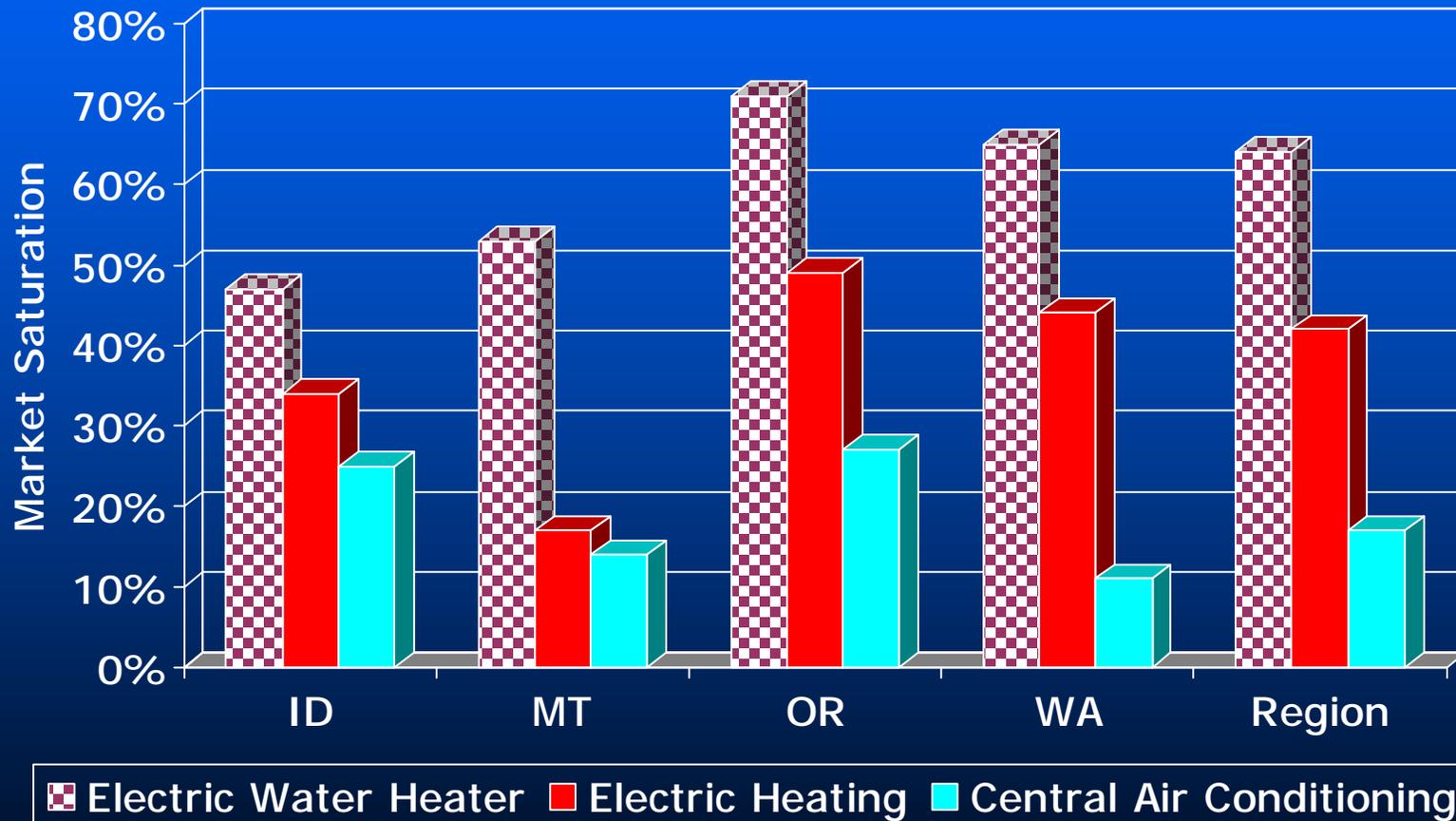


Residential Sector Results

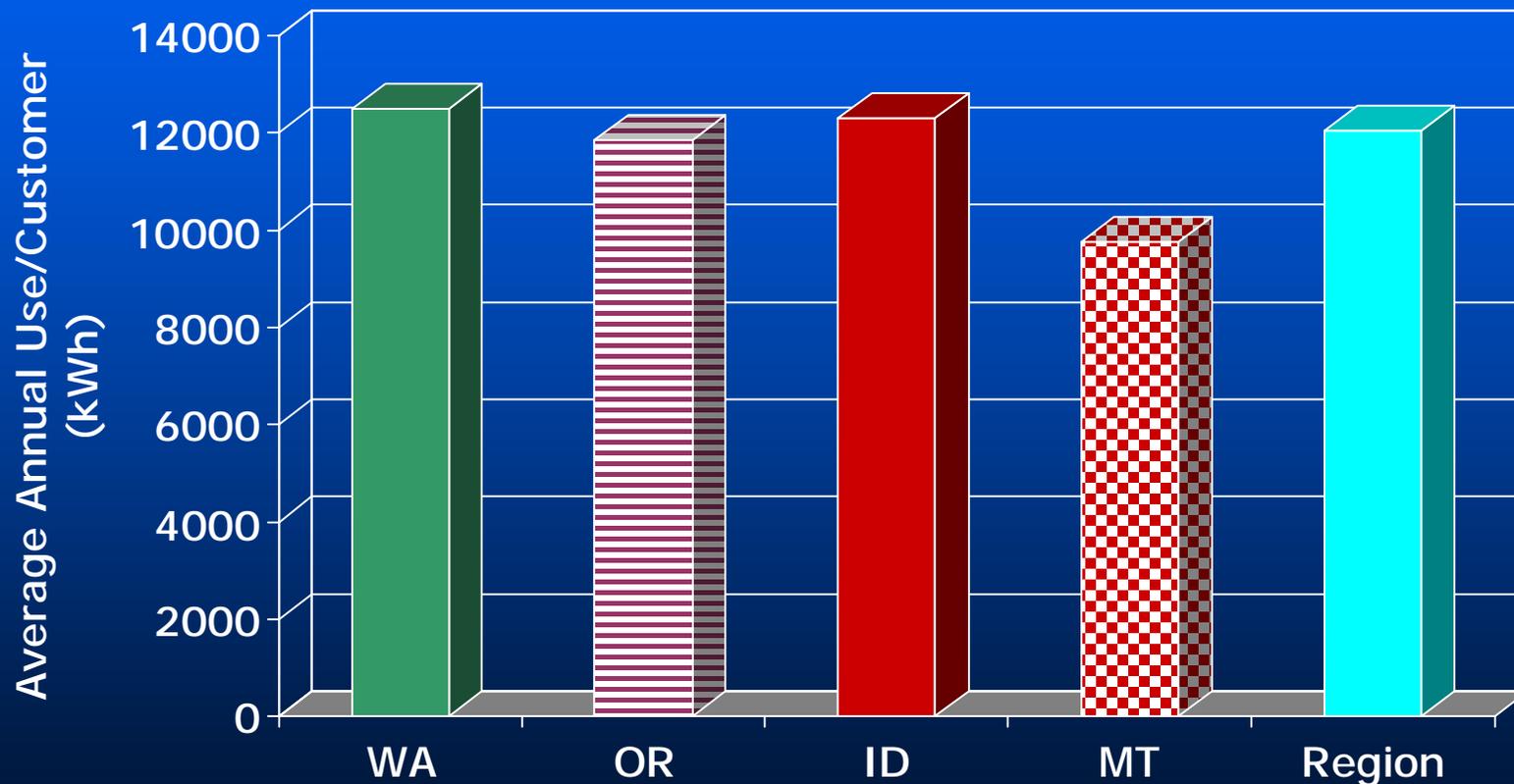
*What's Left To Do At
Home?*

65 Average MW

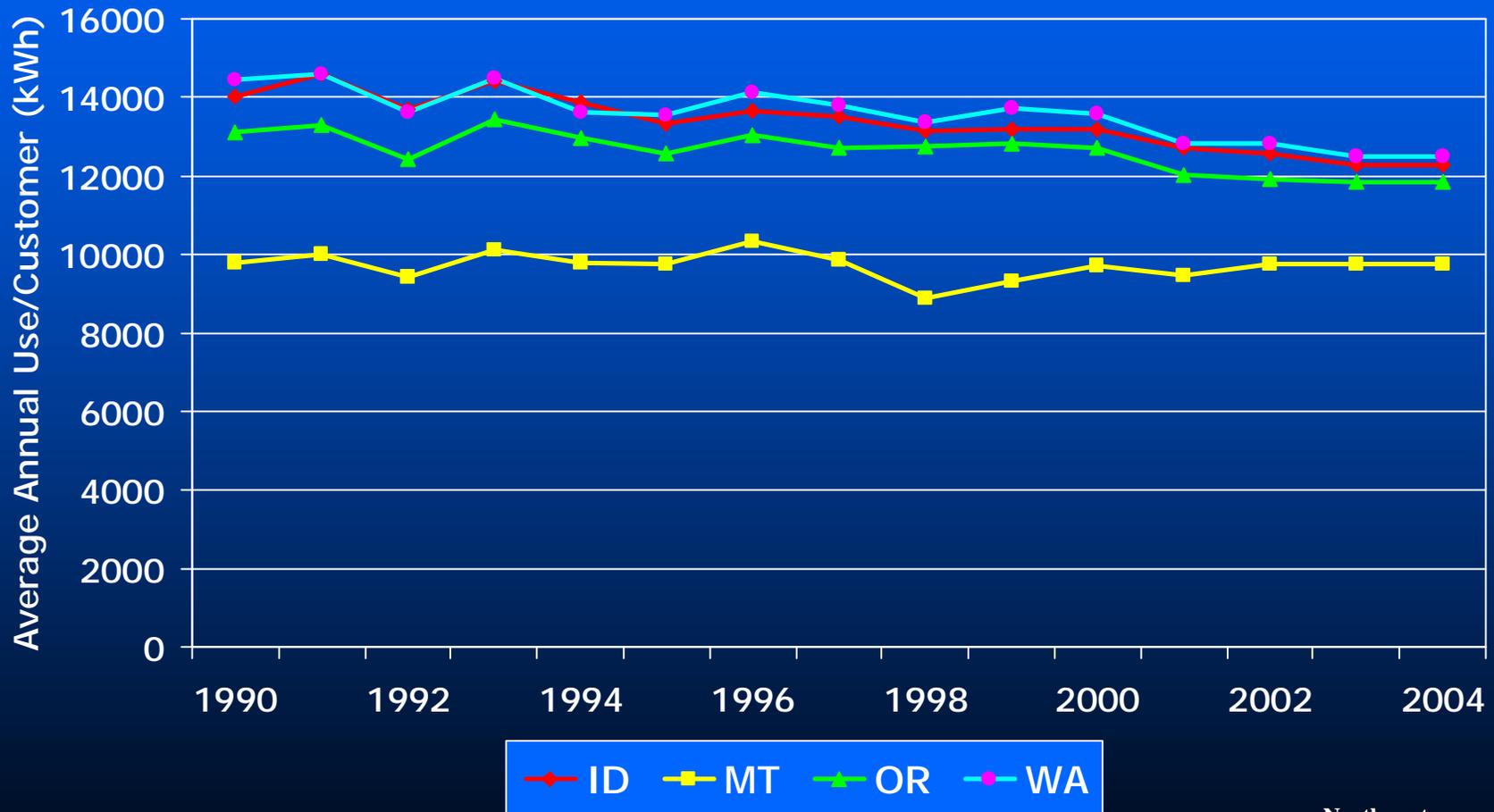
Montana Has The Region's Lowest Market Shares of Electric Water and Space Heating



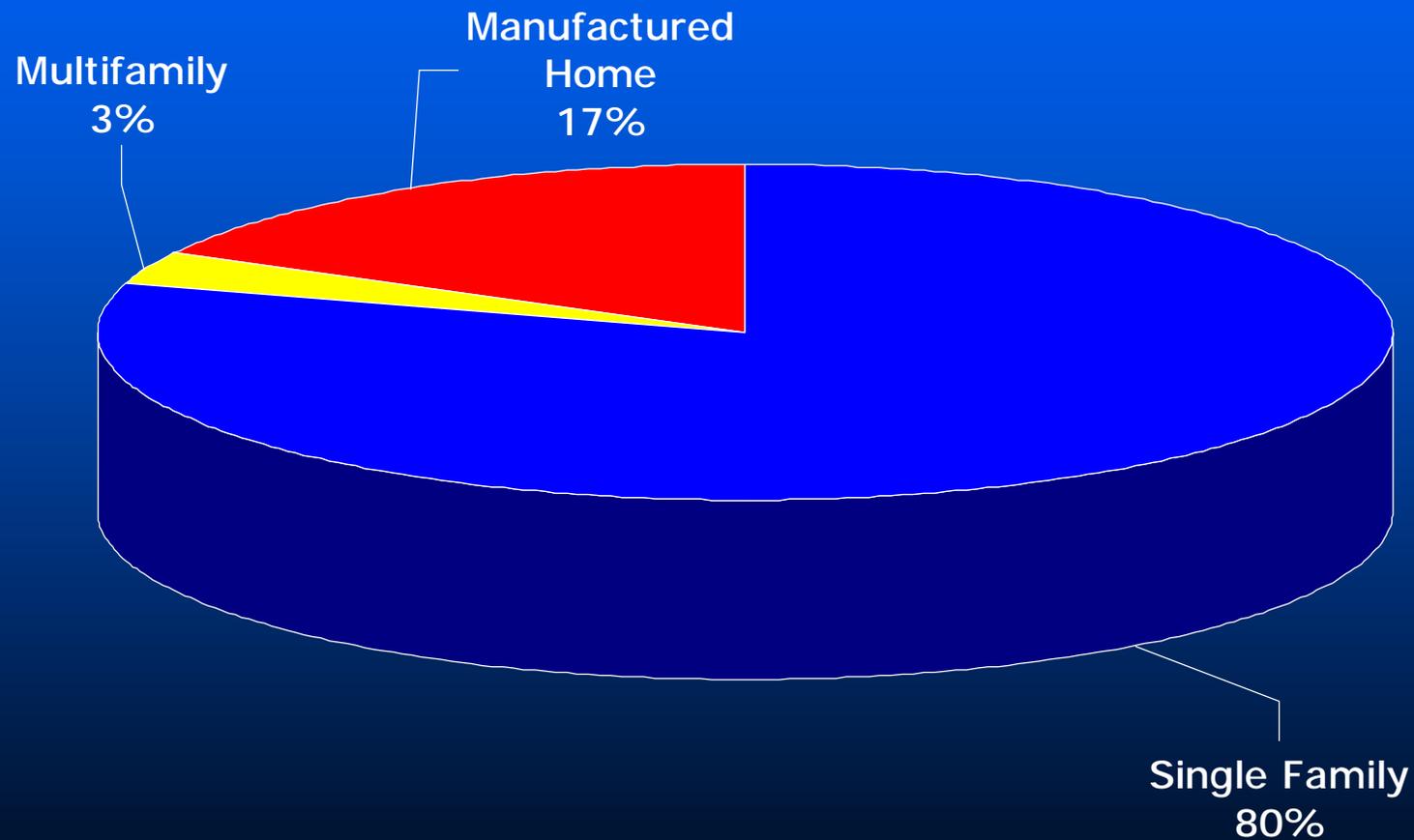
Montana's Average Electricity Use/Residential Customer Is The Lowest in the Region



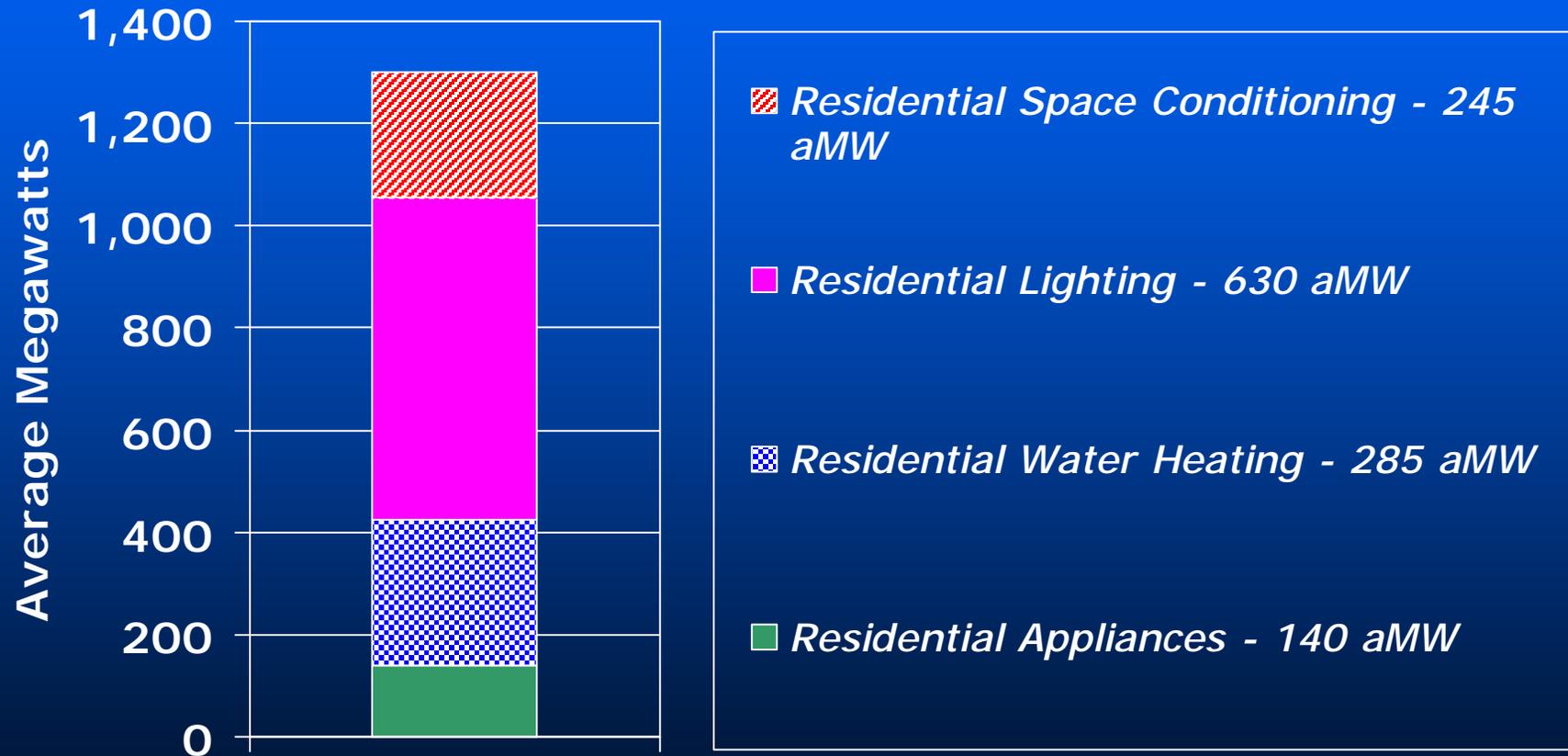
But Residential Customer Use Has Not Declined Since 1990, While Use in Other PNW States Has



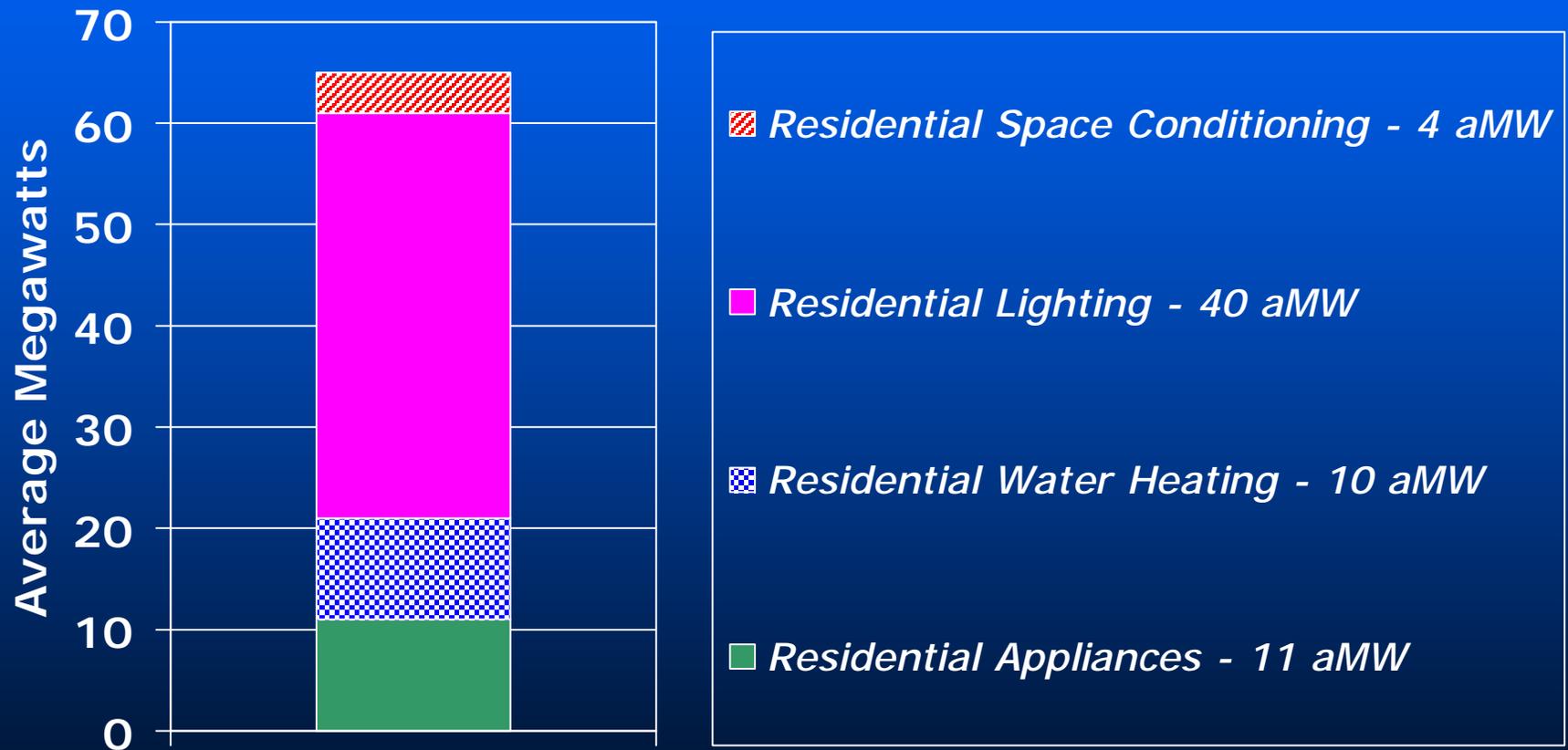
Montana's Housing Stock is Predominantly Single Family and Manufactured Homes



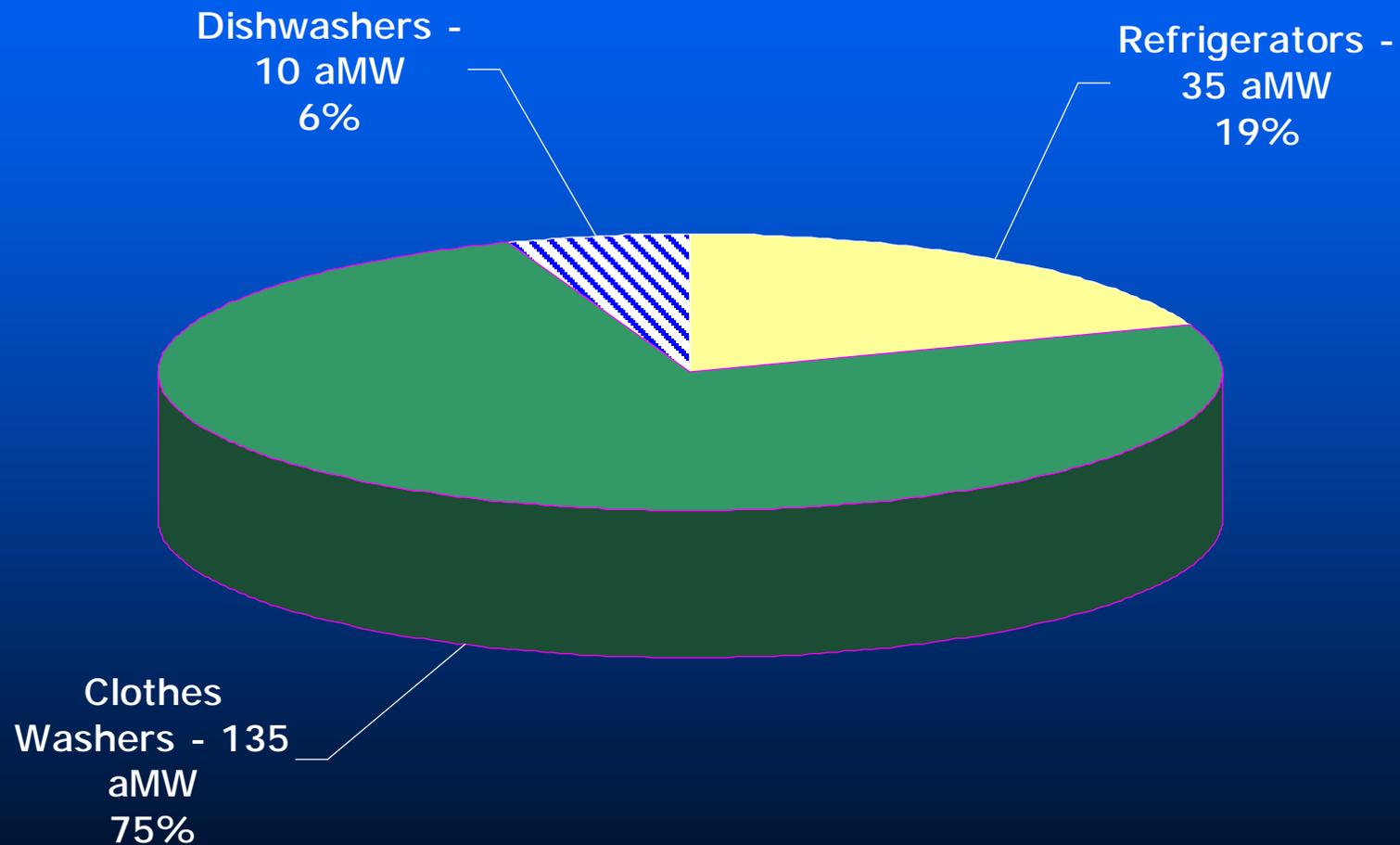
Regional Residential Sector Cost-Effective & Realistically Achievable Regional Potential = 1340 aMW



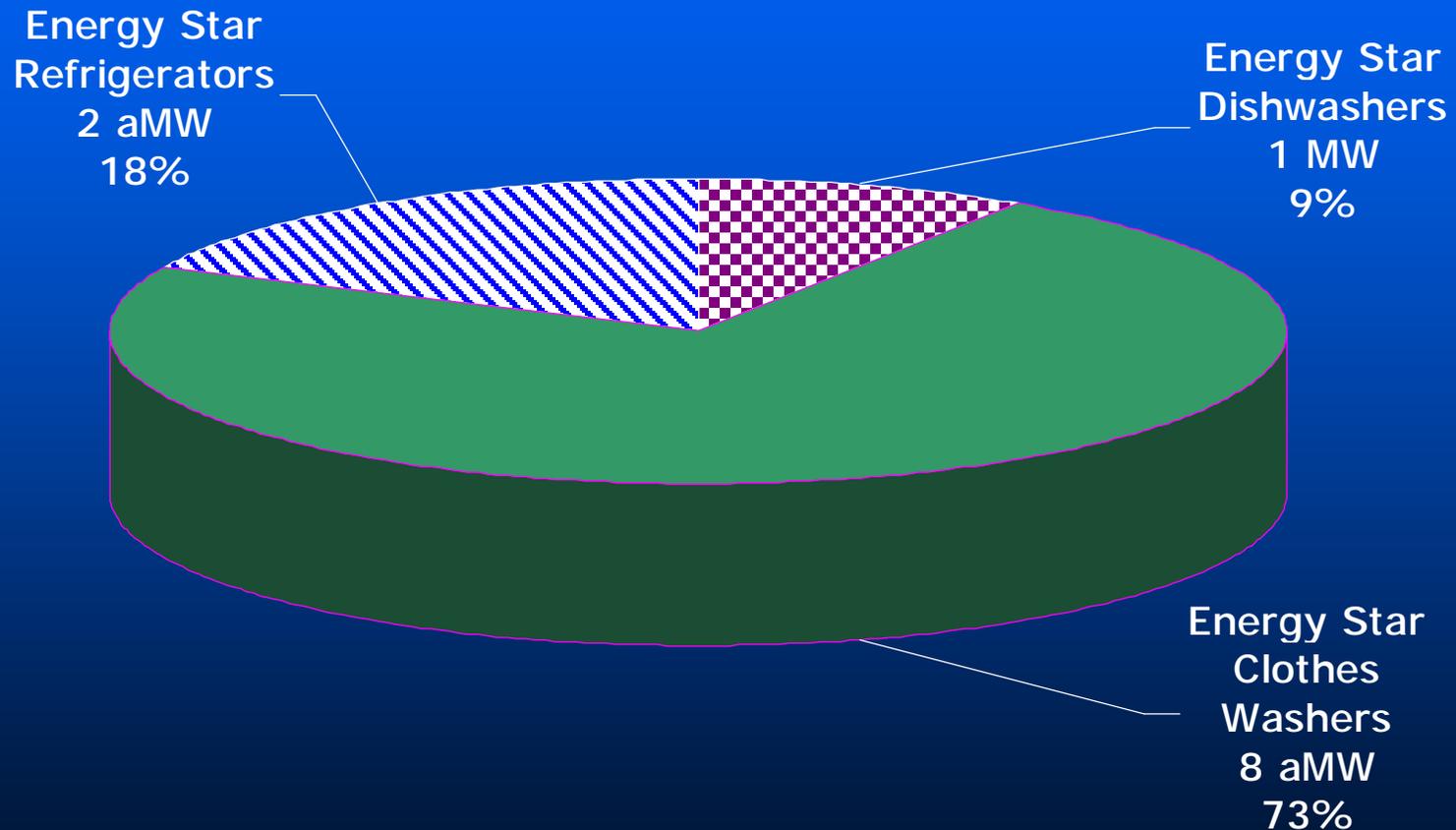
Montana Residential Sector Cost-Effective & Realistically Achievable Regional Potential = 65 aMW



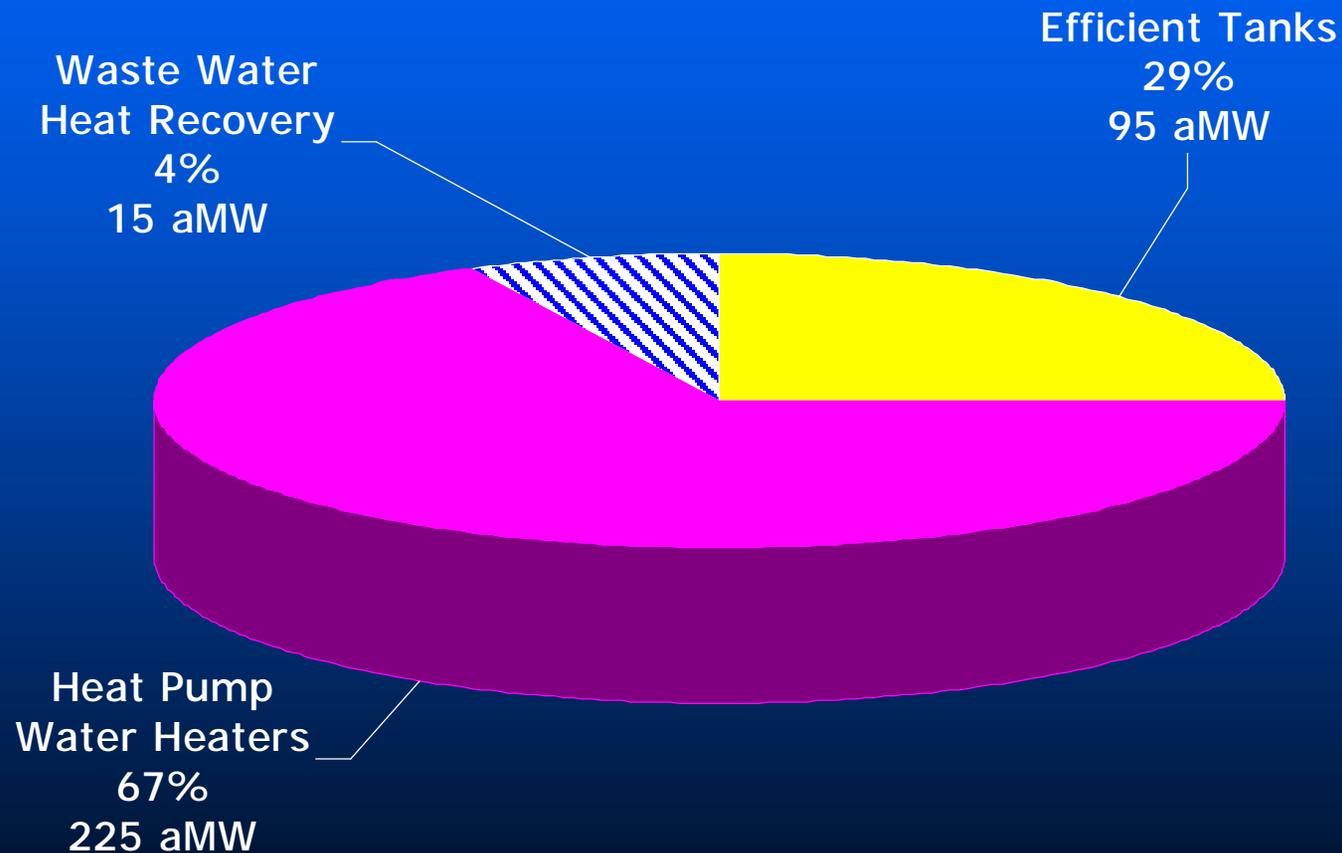
Regional Residential Sector Realistically Achievable Potential for Appliances



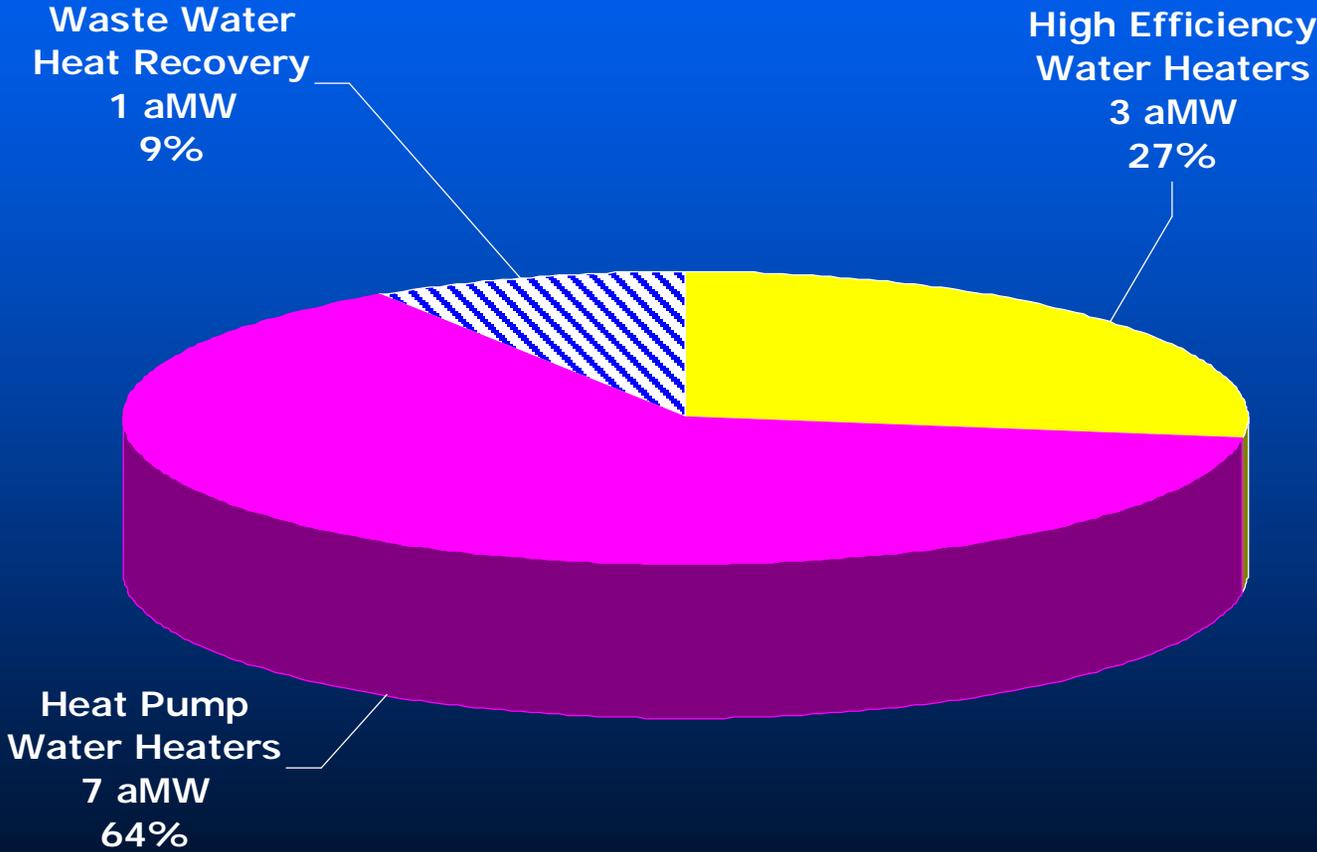
Montana Residential Sector Achievable Conservation Resource Potential for Appliances



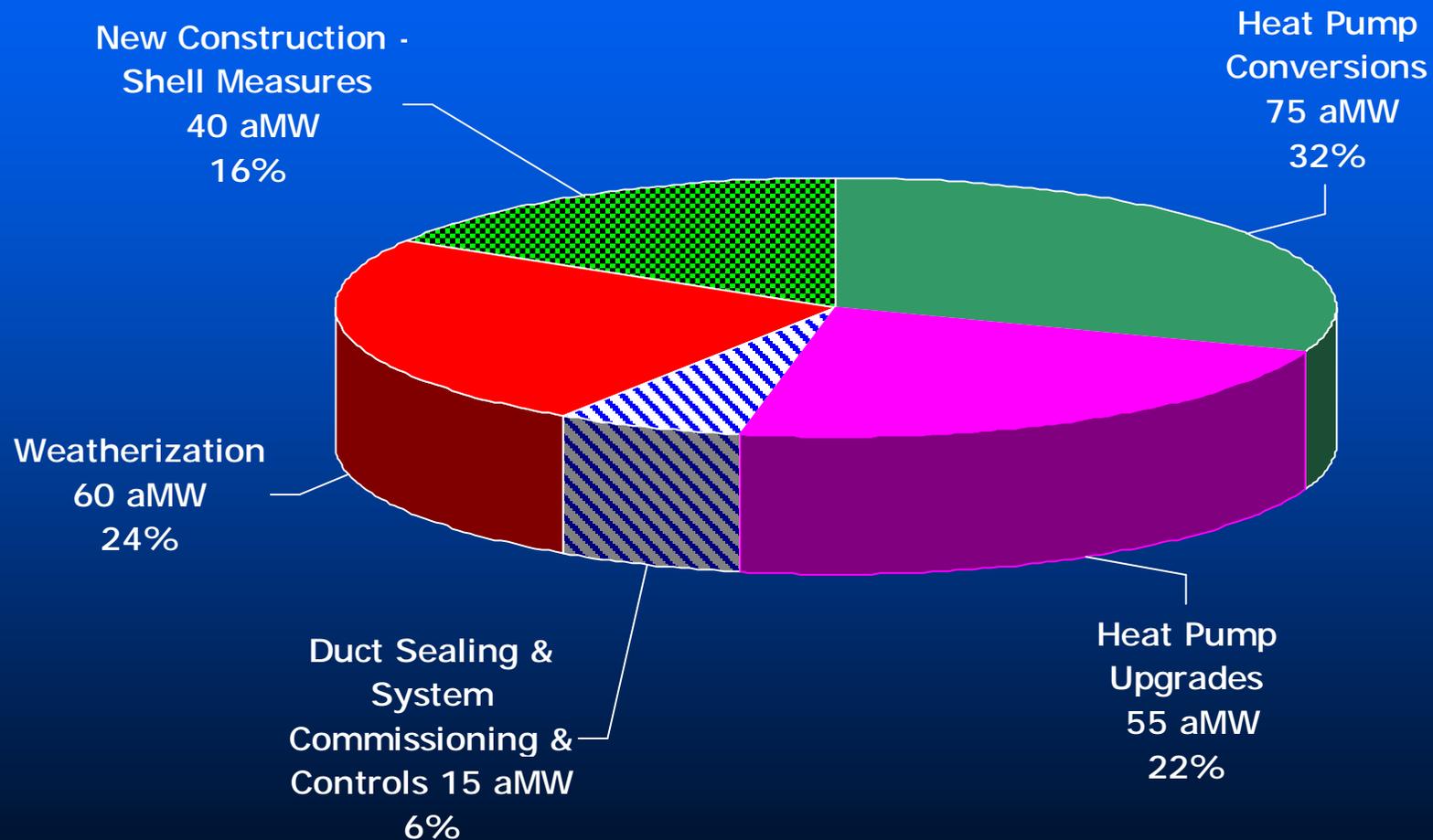
Regional Residential Sector Realistically Achievable Potential for Water Heating



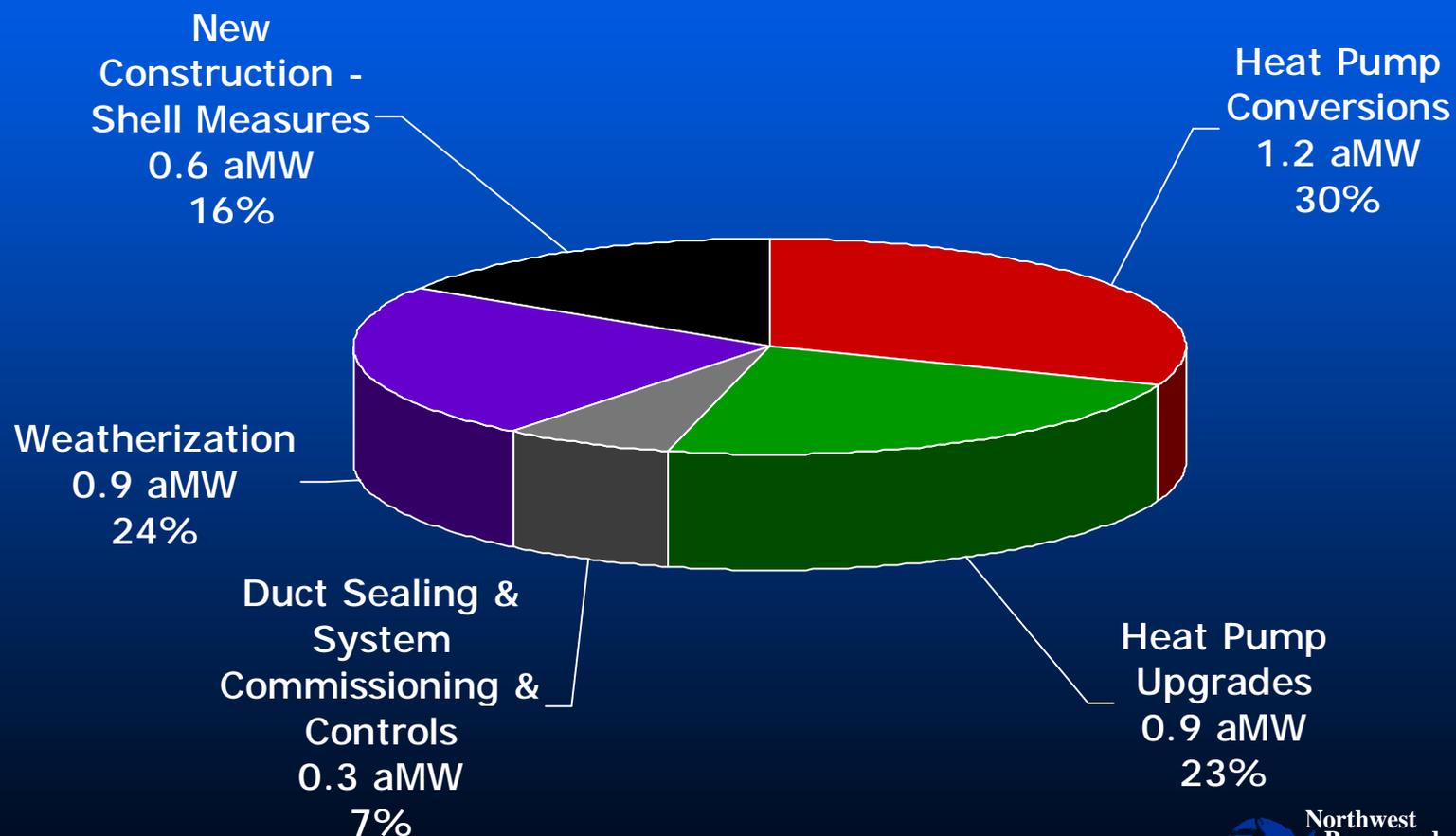
Montana Residential Sector Conservation Resource Potential for Water Heating



Regional Residential Sector Realistically Achievable Potential for Space Conditioning



Montana Residential Sector Conservation Resource Potential for Space Conditioning

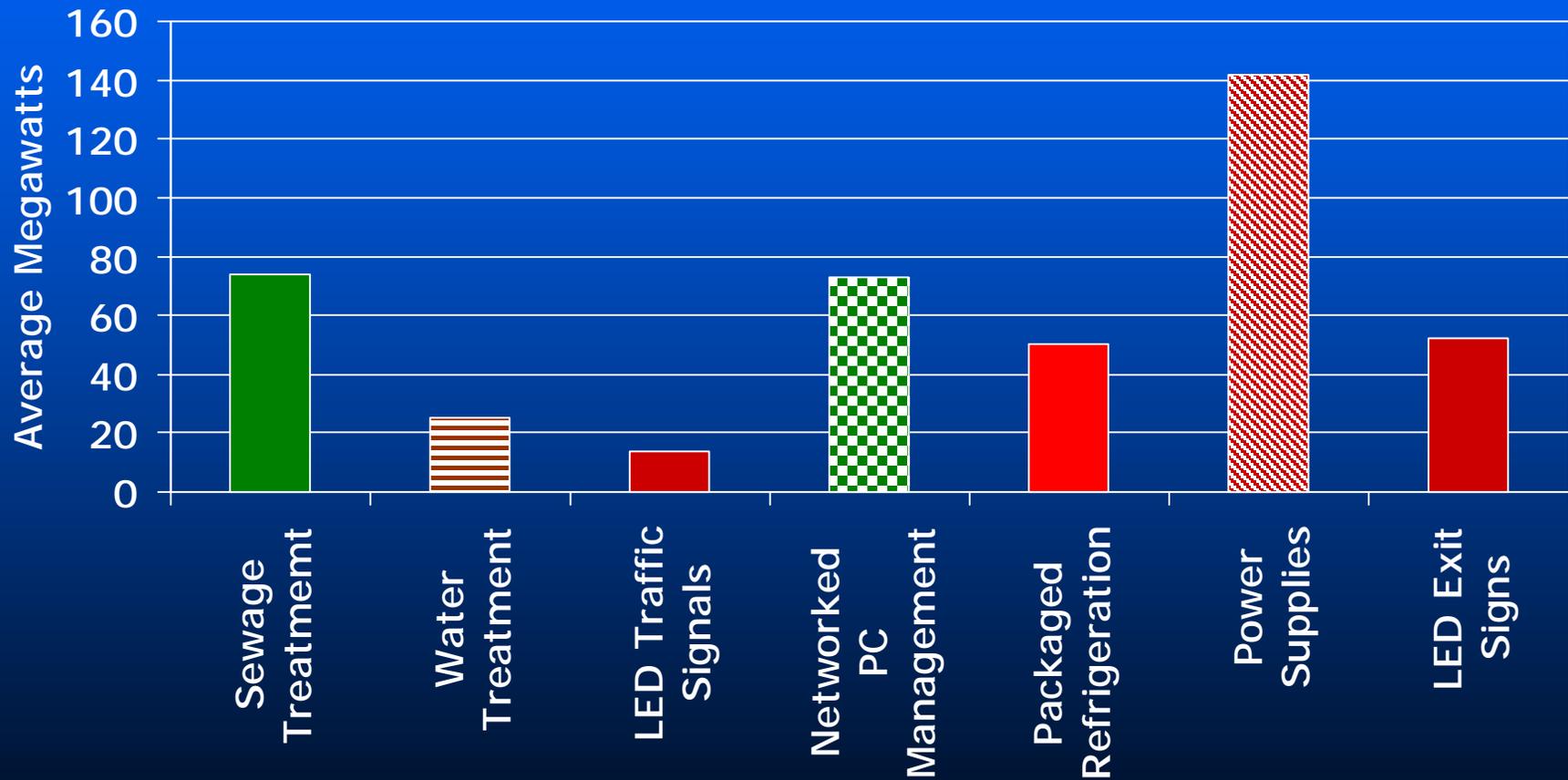


Commercial Sector Results

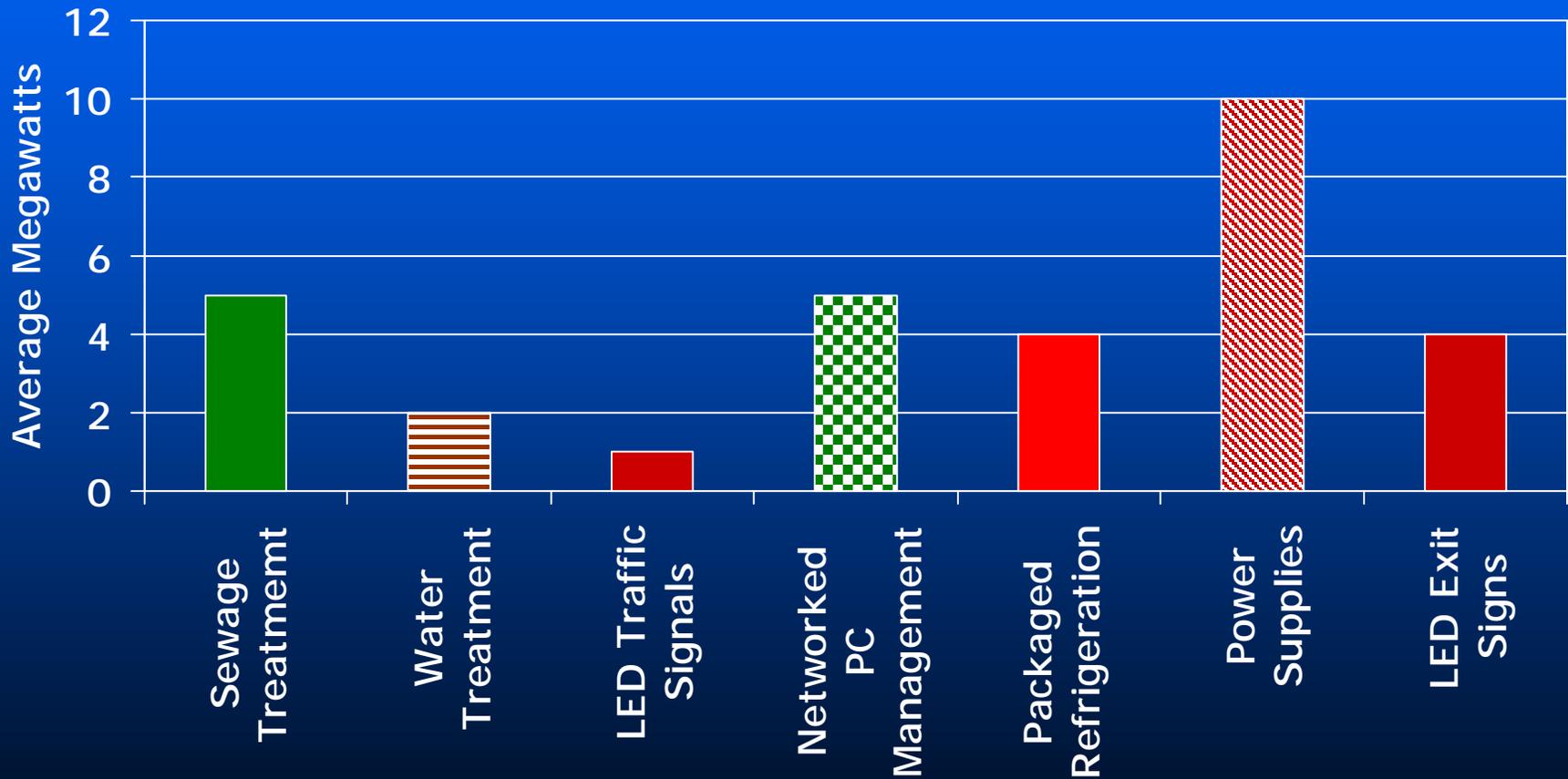
*What's Left To Do At the
Office?*

95 Average MW

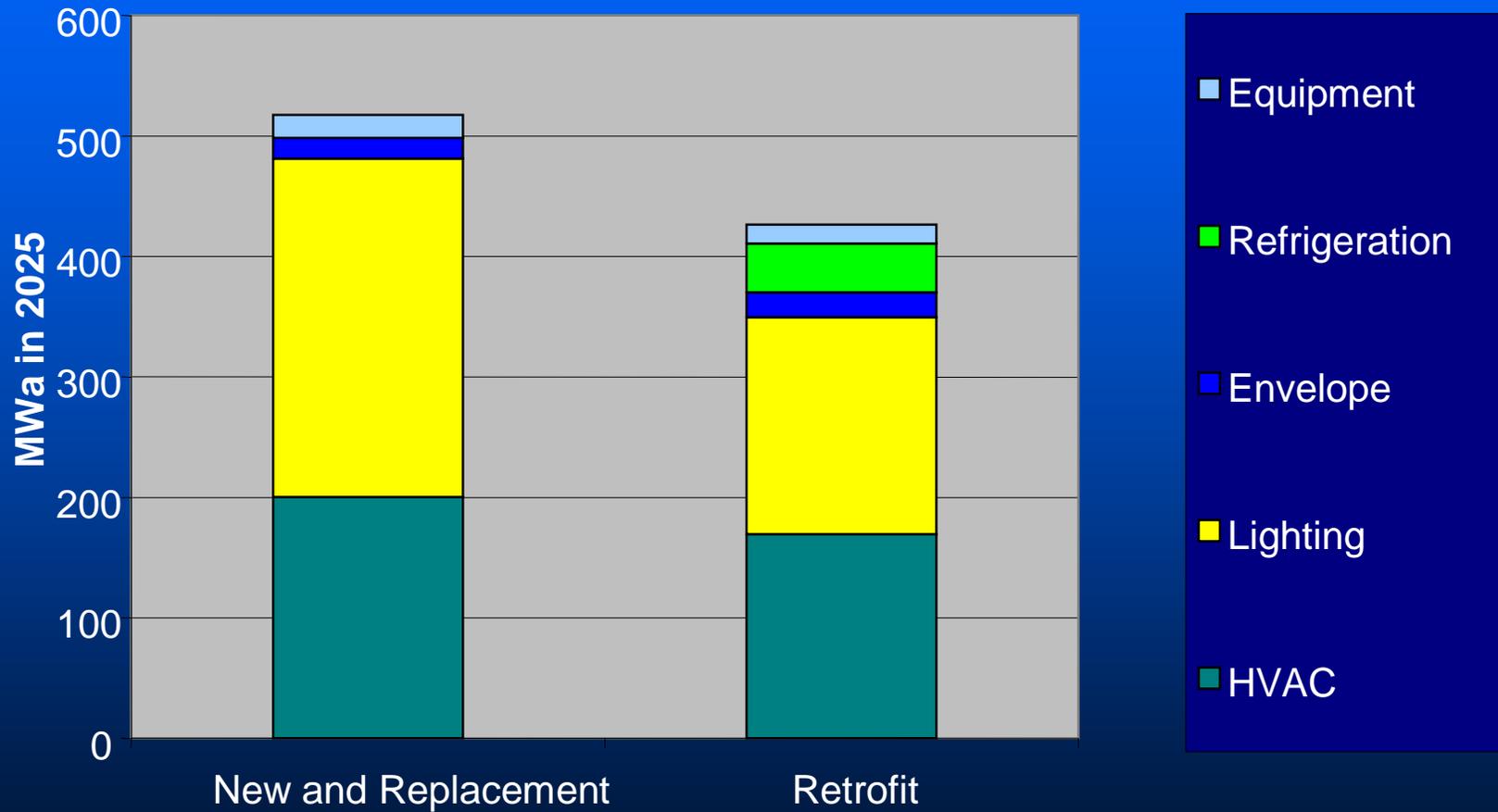
Regional Non-Building Resource Potential = 430 aMW



Montana Non-Building Resource Potential = 30 aMW



Cost-Effective Commercial Conservation Potential in 2025 For Building Lighting, HVAC & Equipment- Regional = 950 aMW / Montana = 65 aMW



Irrigated Agriculture Sector Results

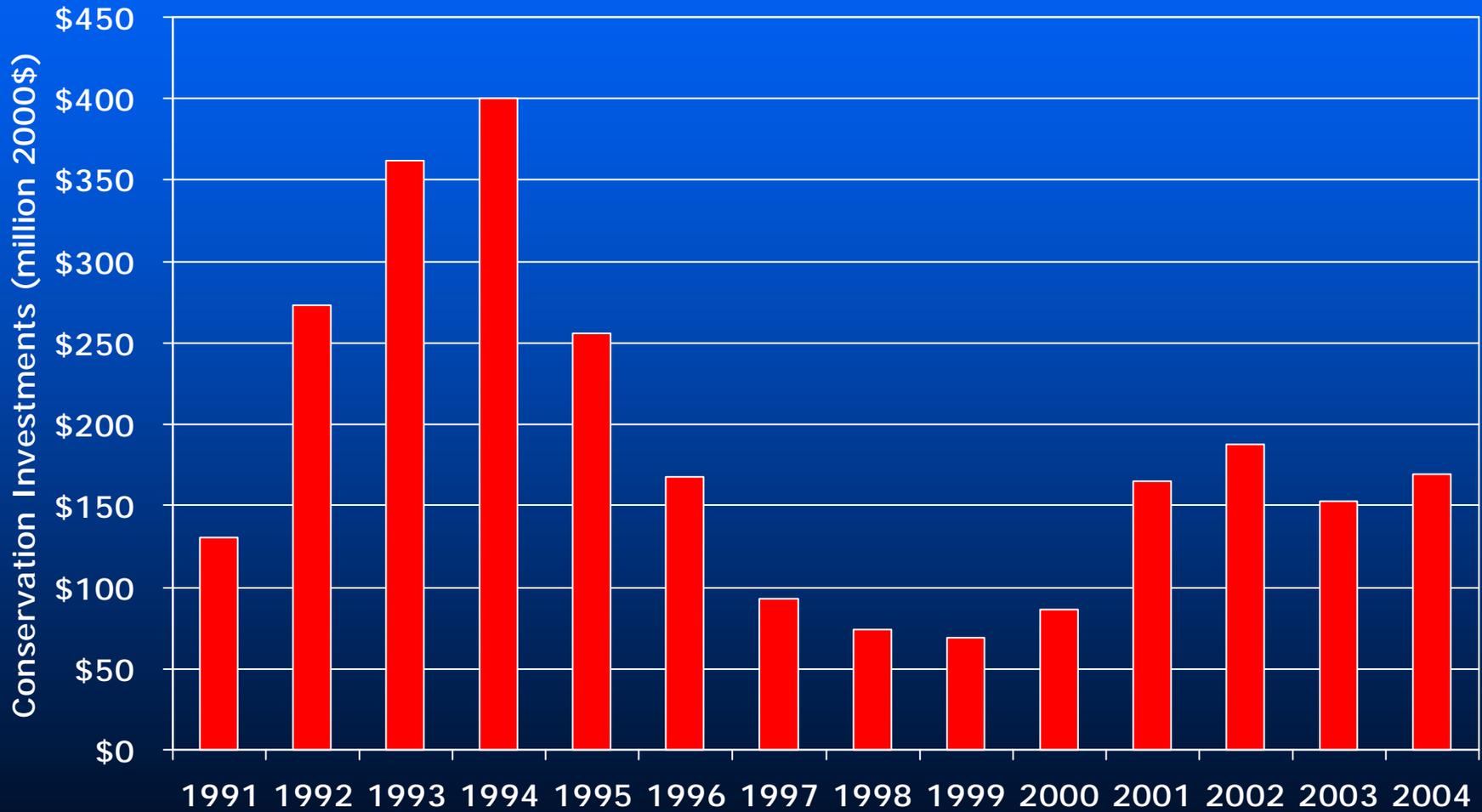
*What's Left To Do Out on the
Farm?*

>1 Average MW

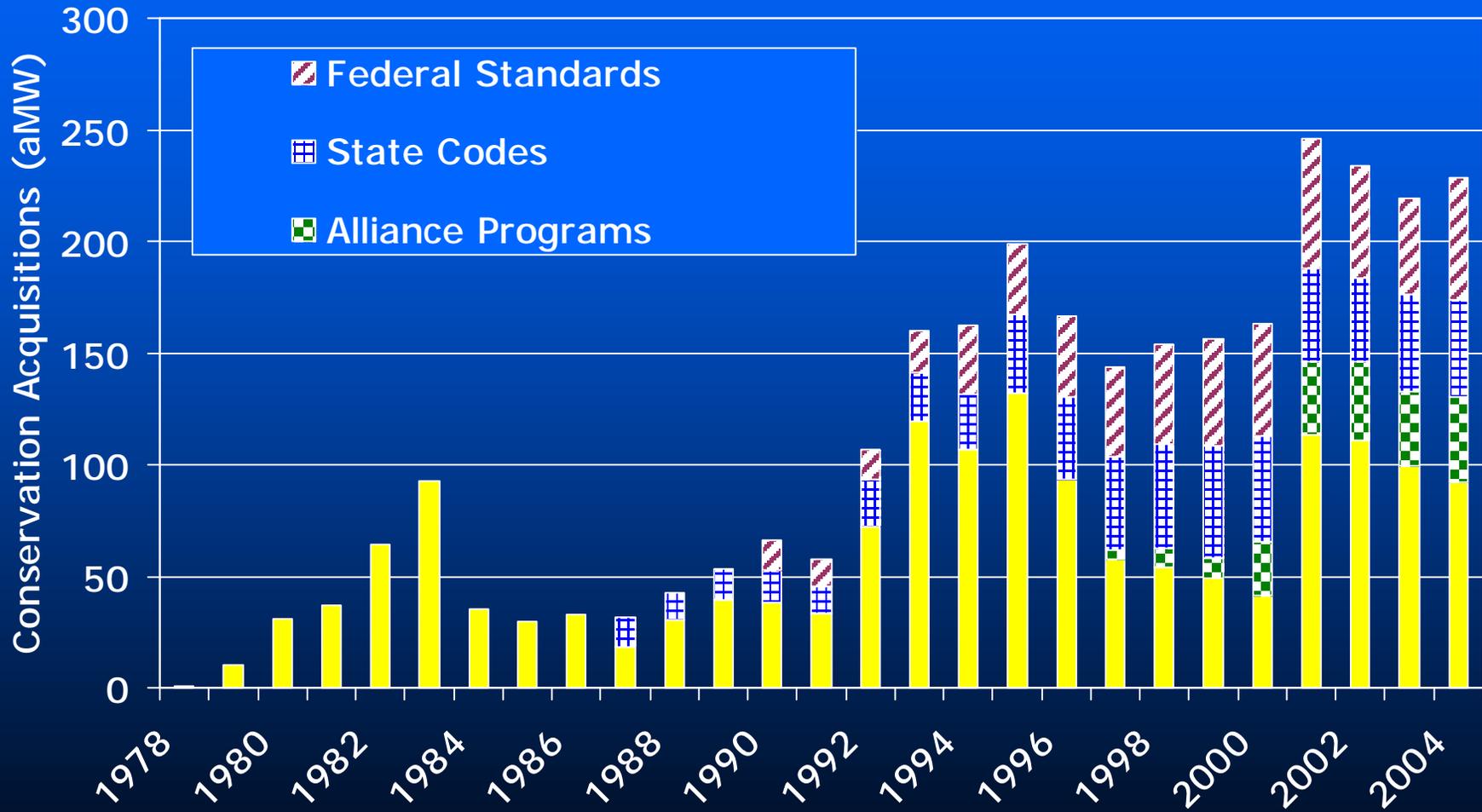
Industrial Sector Assessment

- n Fourth Plan's Estimate = 8% savings (670 aMW)
- n Fifth Plan is lower due to changing (less electrically intensive) industrial mix) = 5% of 2025 sector loads
- n Montana potential @ 5% of 2004 sales = 30 aMW

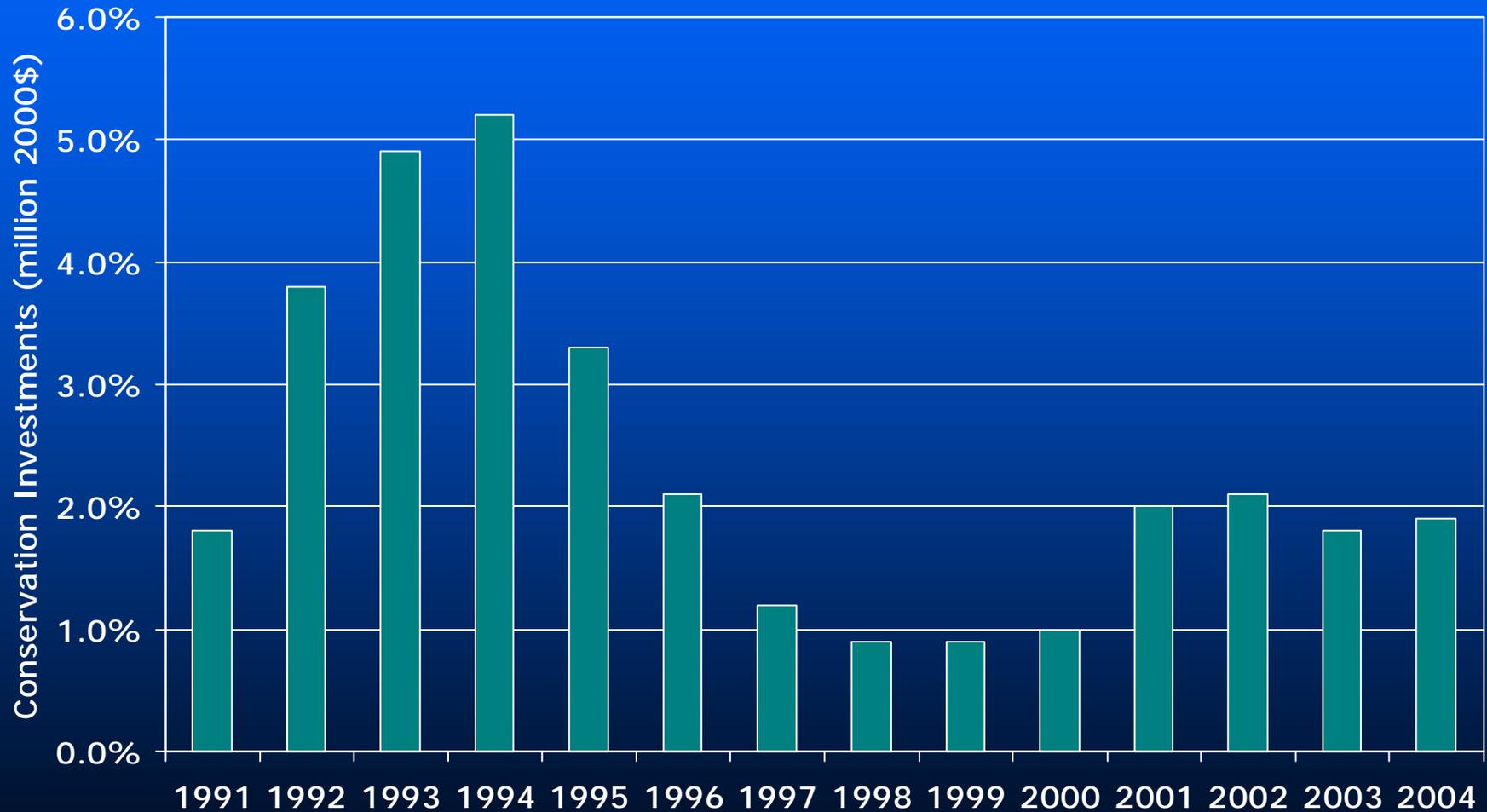
While PNW Annual Utility System Investments in Energy Efficiency Have Declined Since the Early 1990's



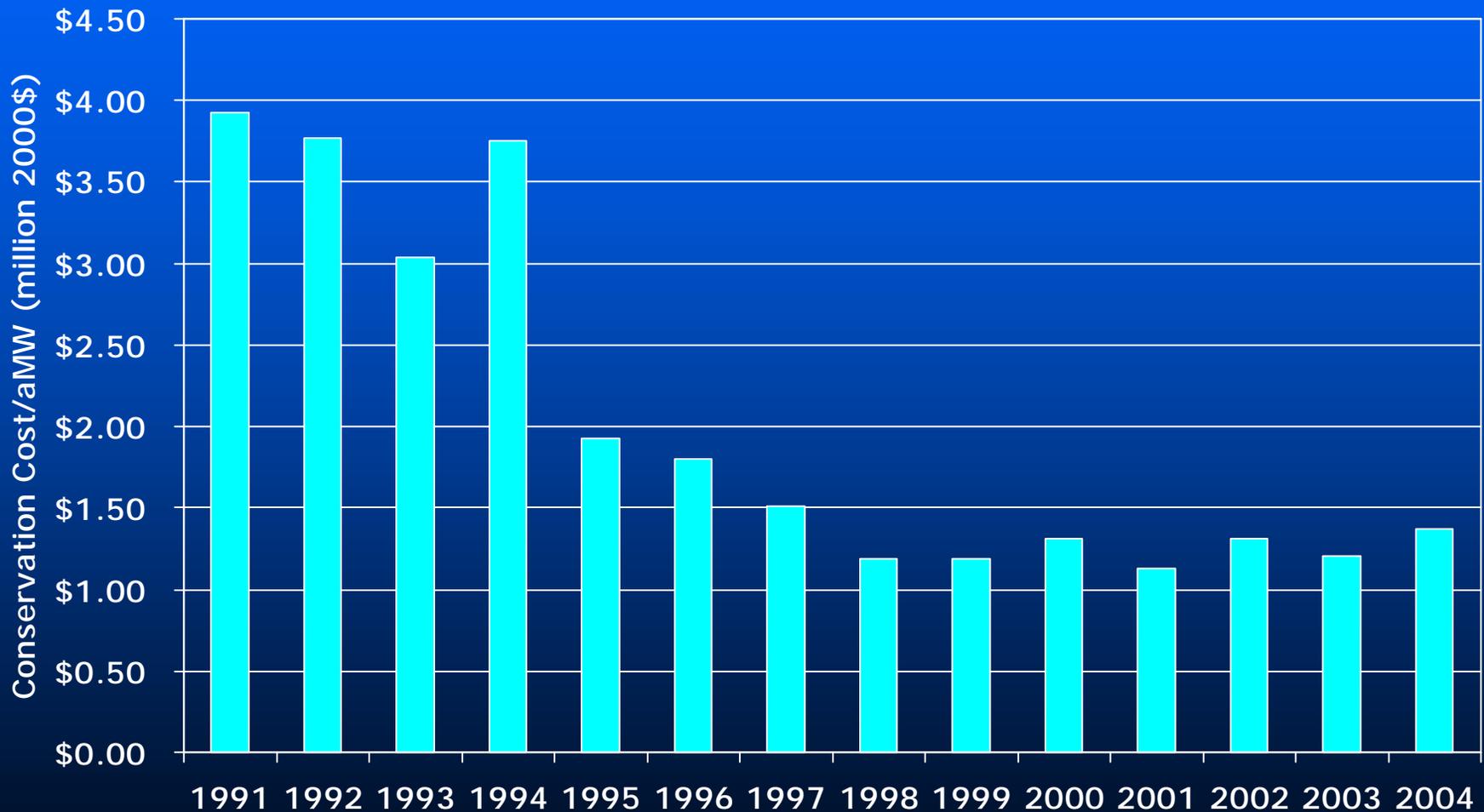
Total PNW Annual Energy Efficiency Achievements Have Been Growing, Largely Due To The Impact of Energy Codes and Standards



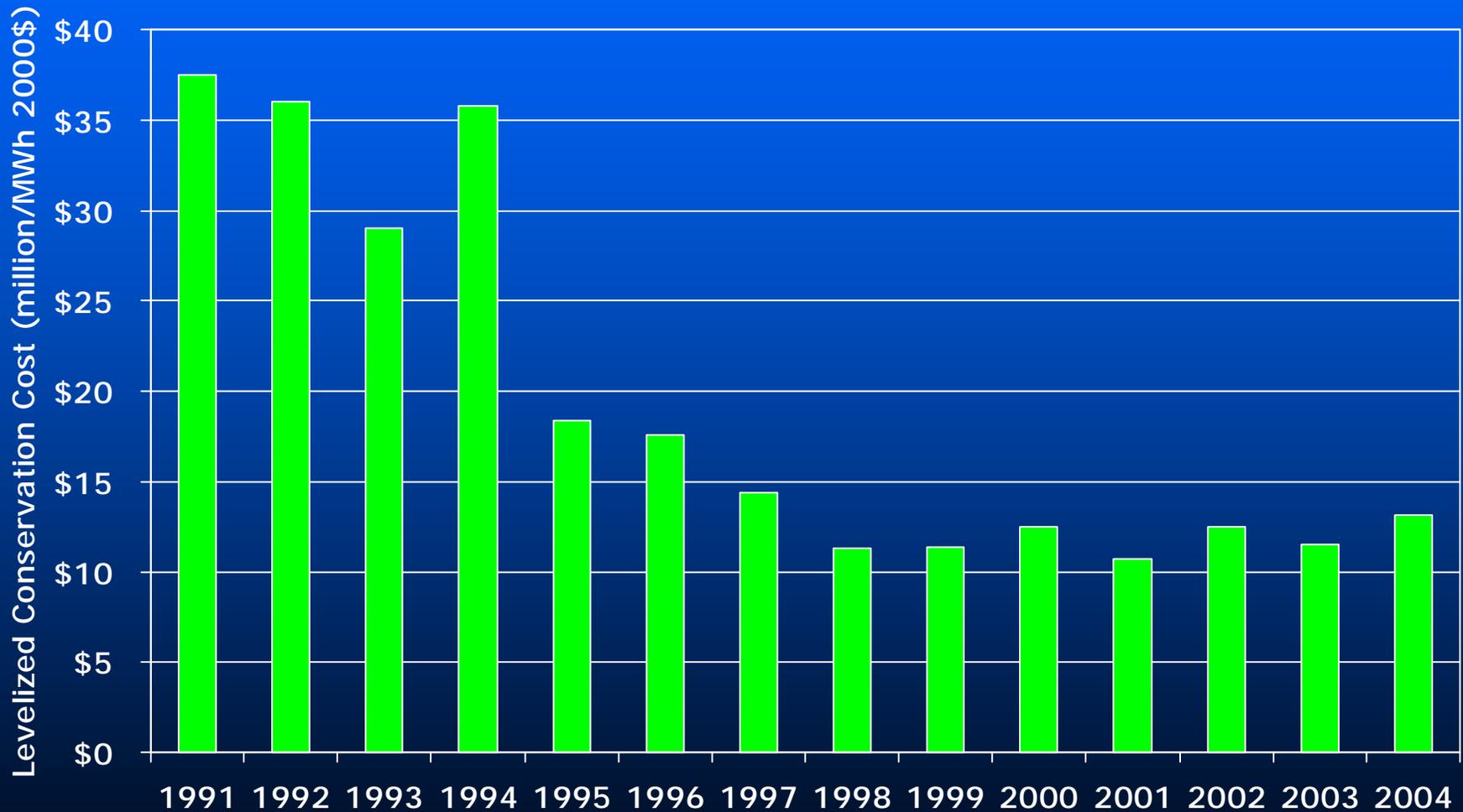
PNW Utilities Now Invests Less Than 2% of Their Retail Sales Revenues in Energy Efficiency



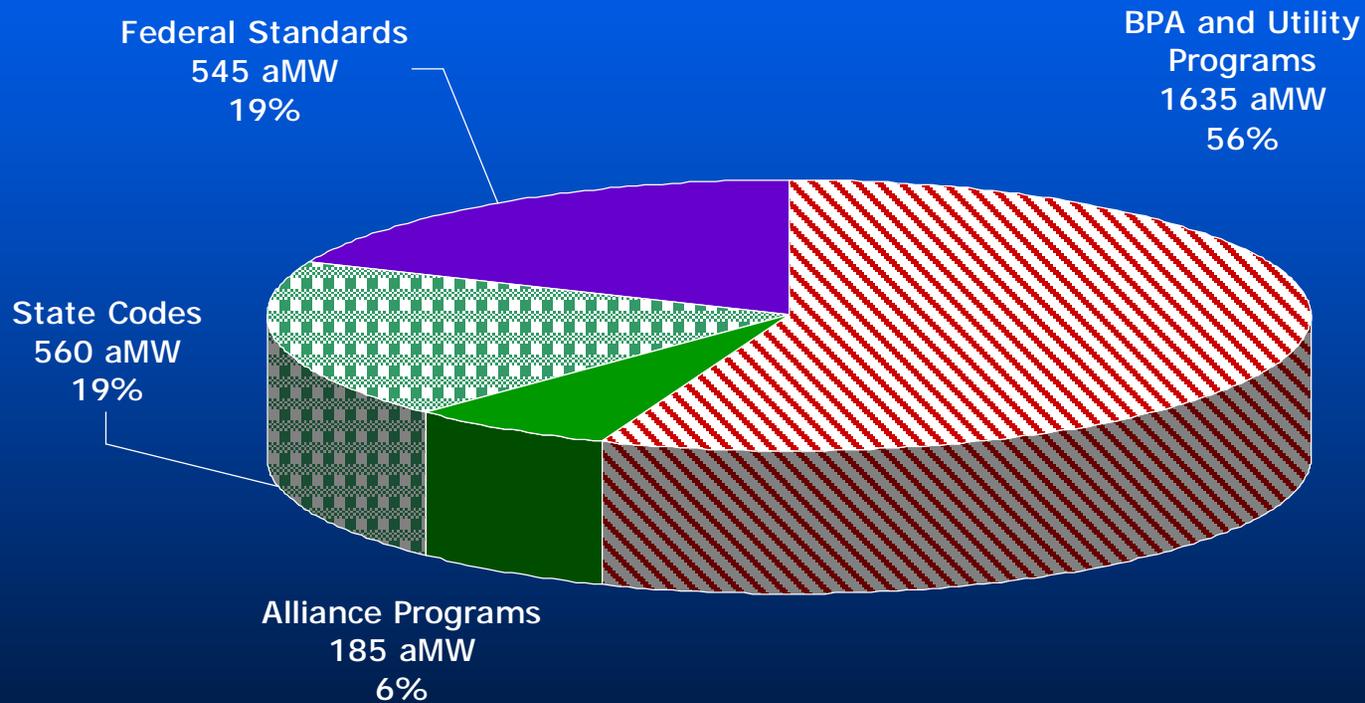
Fortunately . . . The "First Year" Cost (\$/aMW) of Utility Acquired Energy Efficiency Has Declined



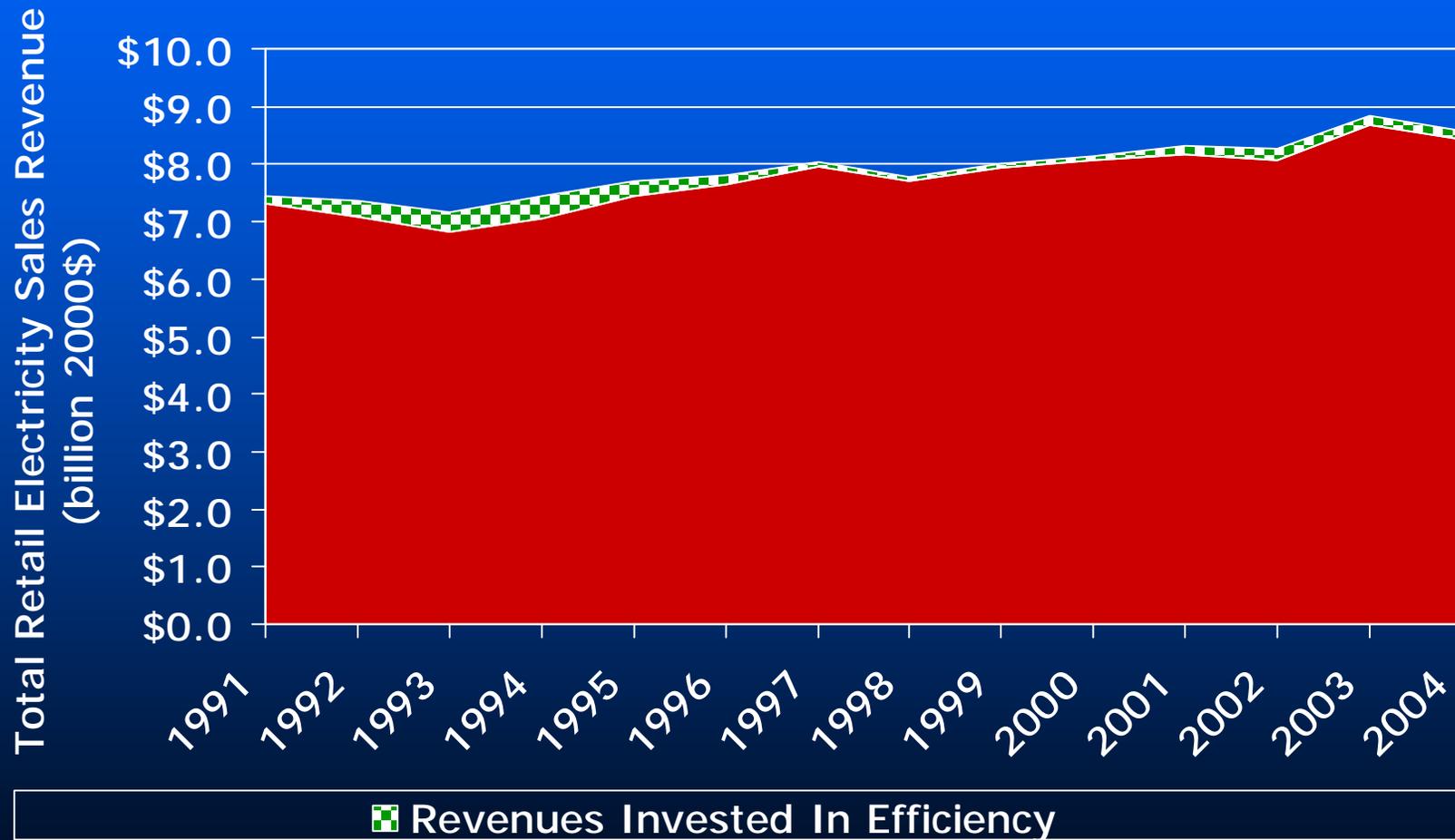
PNW Utilities Have Gotten More Efficient at Acquiring Energy Efficiency - Cost Are Now Below \$15 MWh



Cumulative 1978 - 2004 Efficiency Achievements by Source



The Share of PNW Retail Electricity Sales Revenues Invested In Energy Efficiency Has Declined Since The Early 1990's



Utility Acquired Energy Efficiency Has Been Cost-Competitive with Market Purchases

