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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Northwest Power and Conservation Council

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Montana Energy Futures Conference

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What You're About To Hear

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

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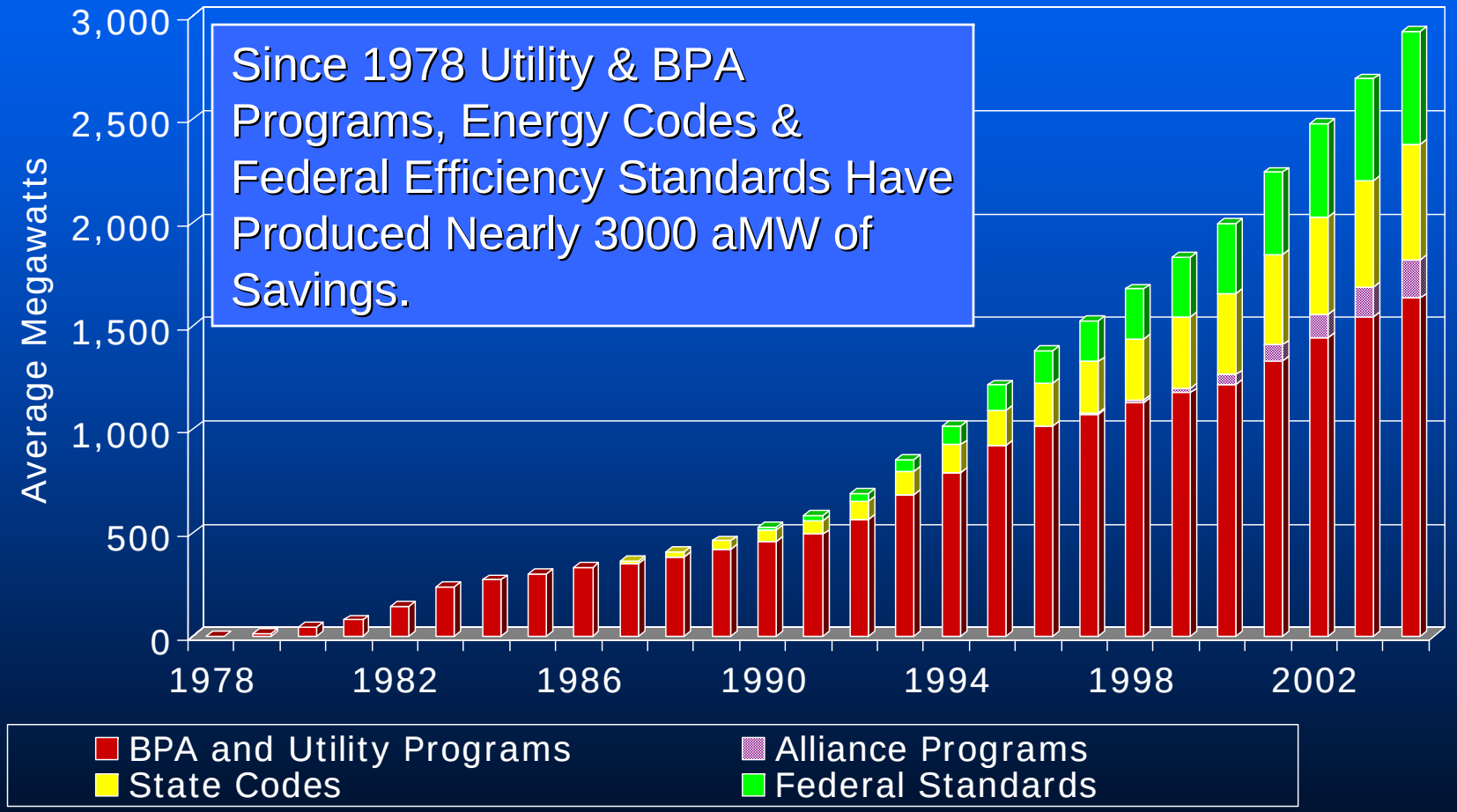
PNW Energy Efficiency Achievements 1978 - 2004



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So What's 3000 aMW?

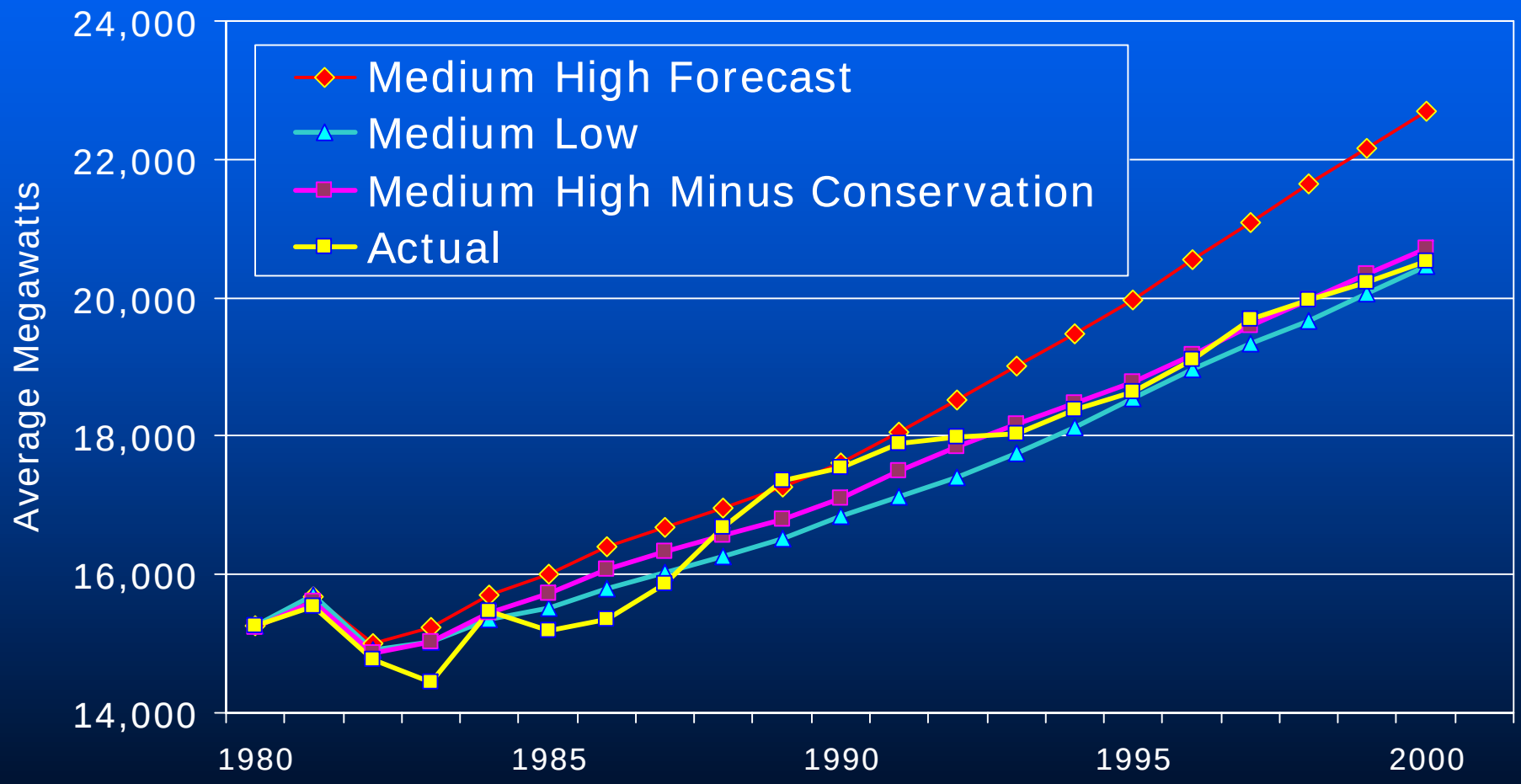
- It was enough electricity to serve the ***entire*** state of Montana, ***plus*** 60% of Idaho in 2004

- OR –

- It was enough electricity to serve the ***entire*** state of Idaho ***plus*** Western Montana in 2004

- It Saved the Region's Consumers Nearly ***$1.25 billion*** in 2004

Energy Efficiency Resources Significantly Reduced Projected PNW Electricity Sales



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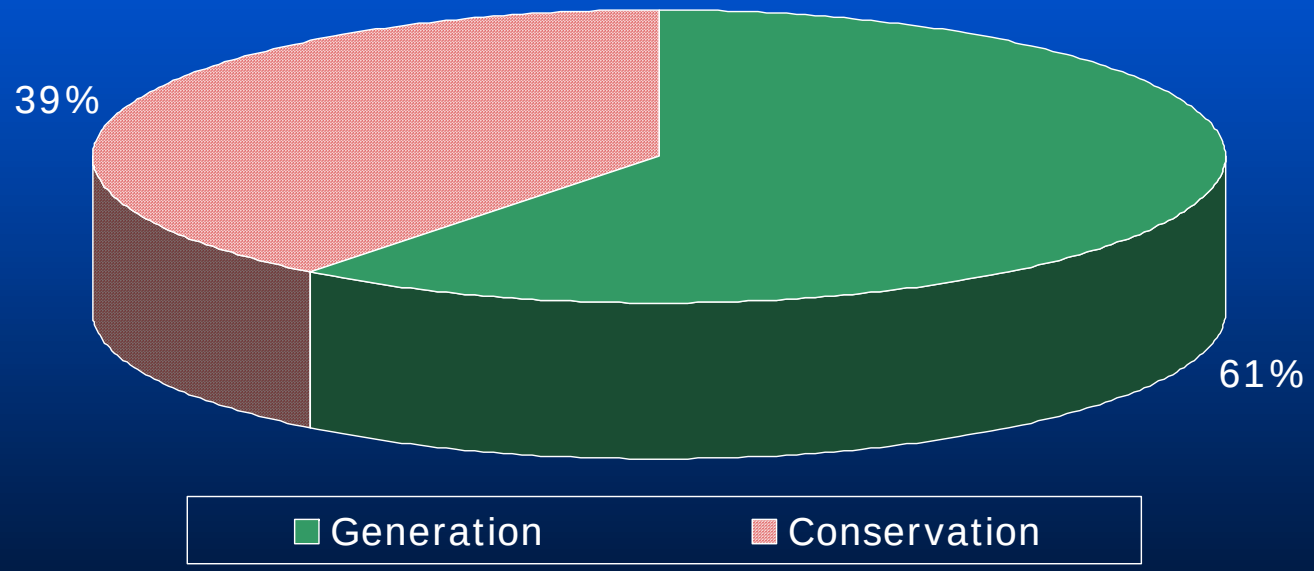
Energy Efficiency Met Nearly 40% of PNW Regional Firm Sales Growth Between 1980 - 2003



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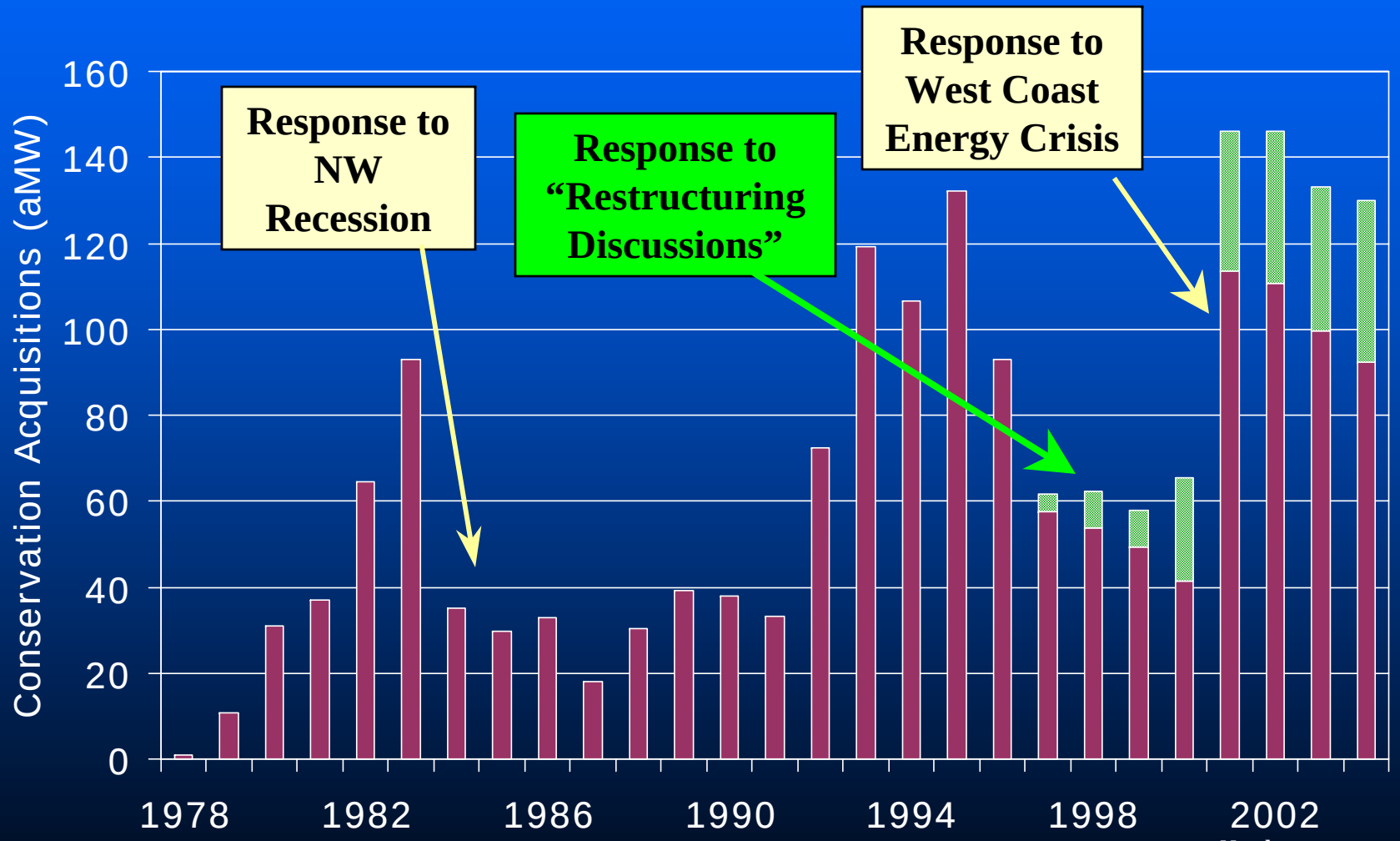
Regional Utility Conservation Acquisitions Have Helped Balance Loads & Resources

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



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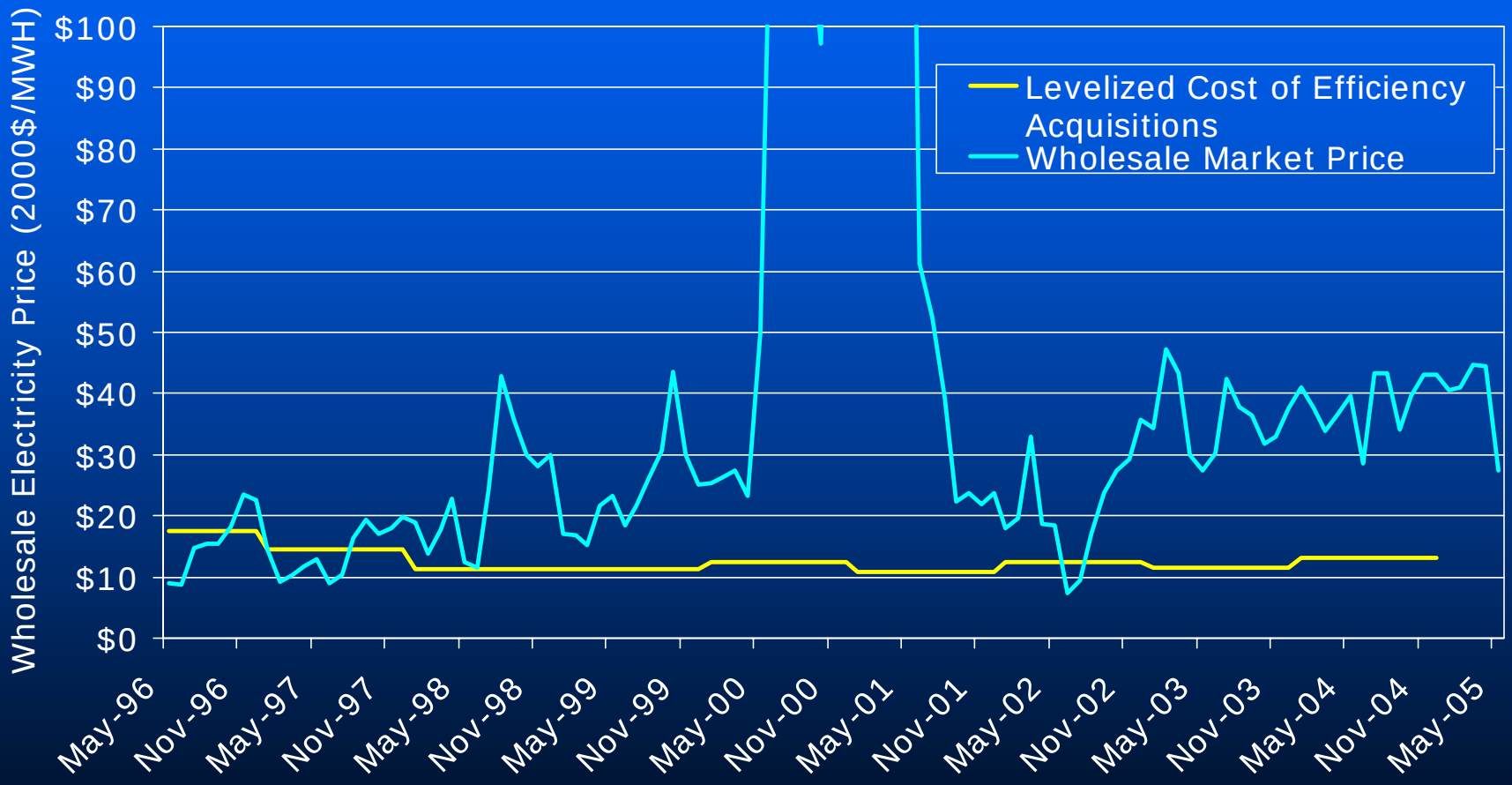
Utility Acquired Energy Efficiency Has Been ***A BARGAIN!***



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So Much for the Past, What's Ahead

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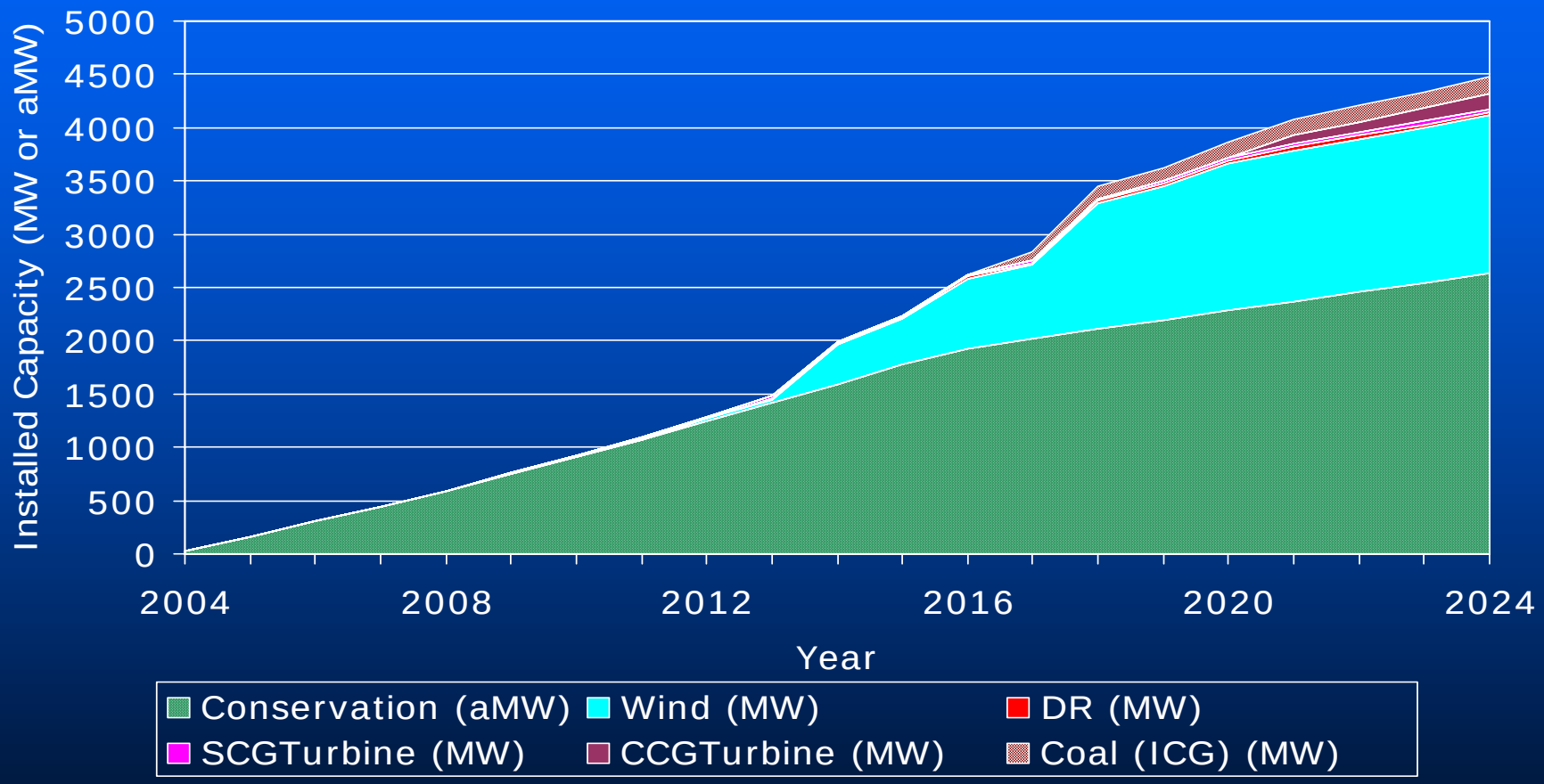
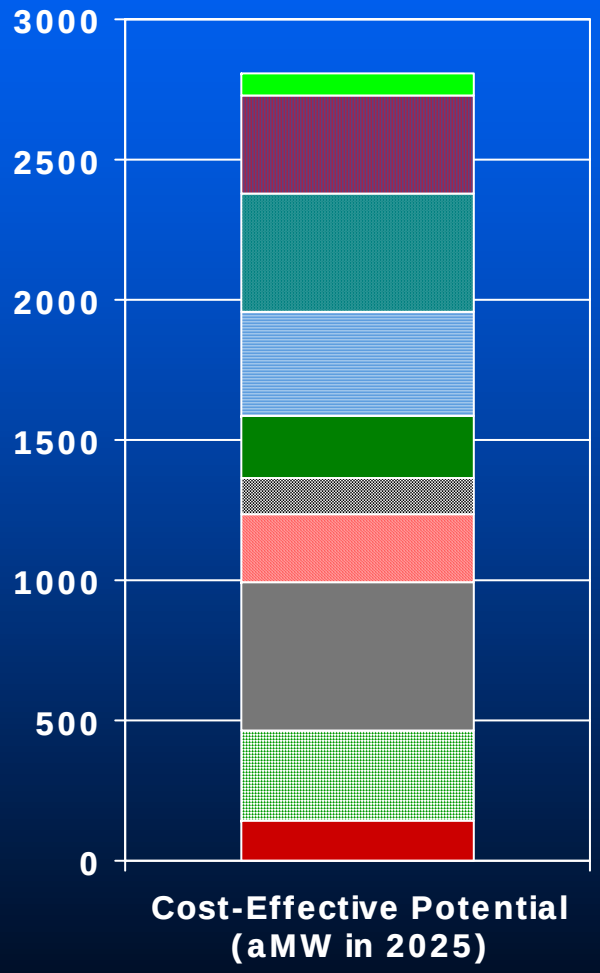
5th Plan Relies on Conservation and Renewable Resources to of Meet Load Growth*



*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

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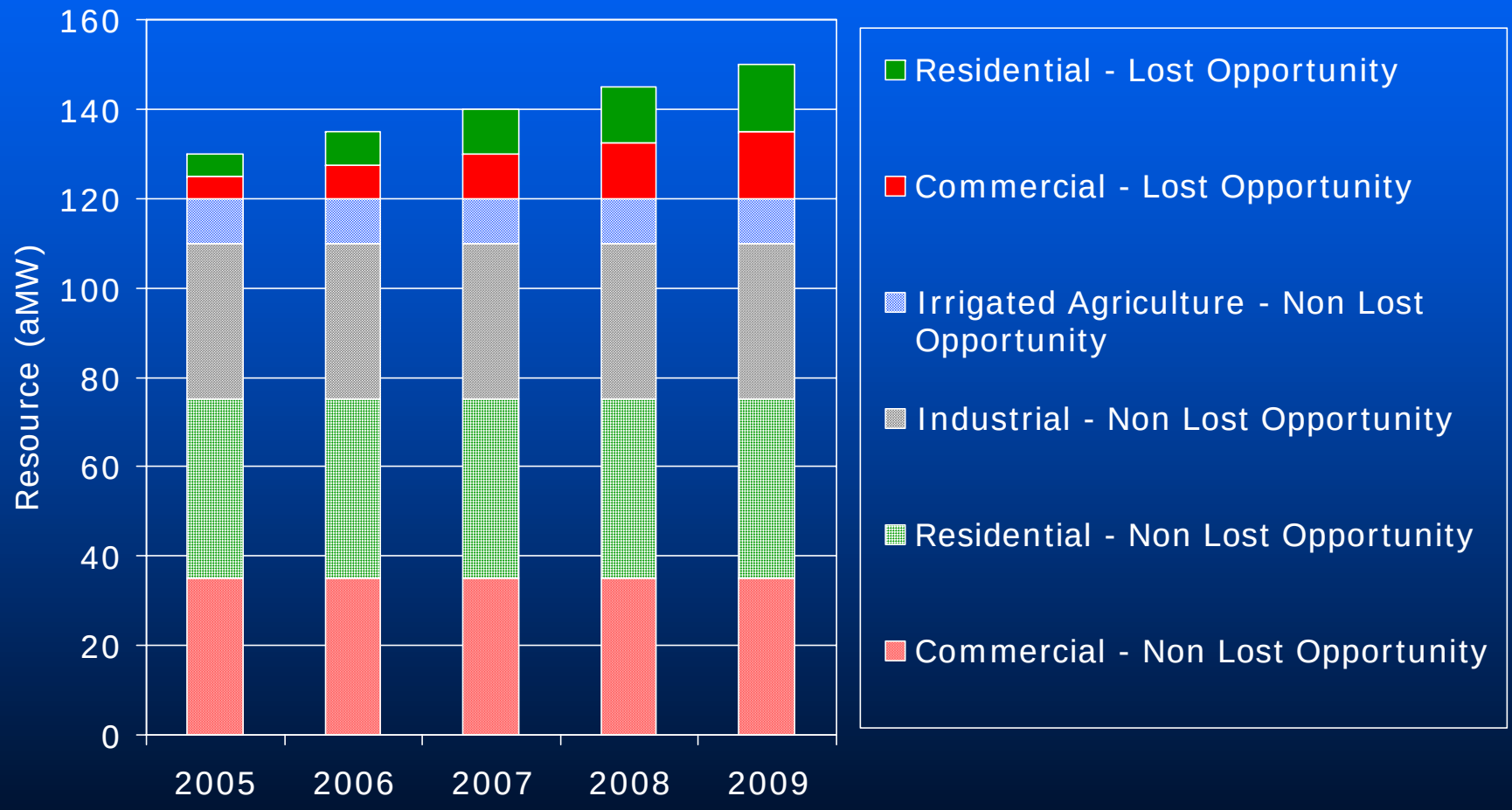
Regional Near-Term Conservation Targets (2005-2009) = 700 aMW



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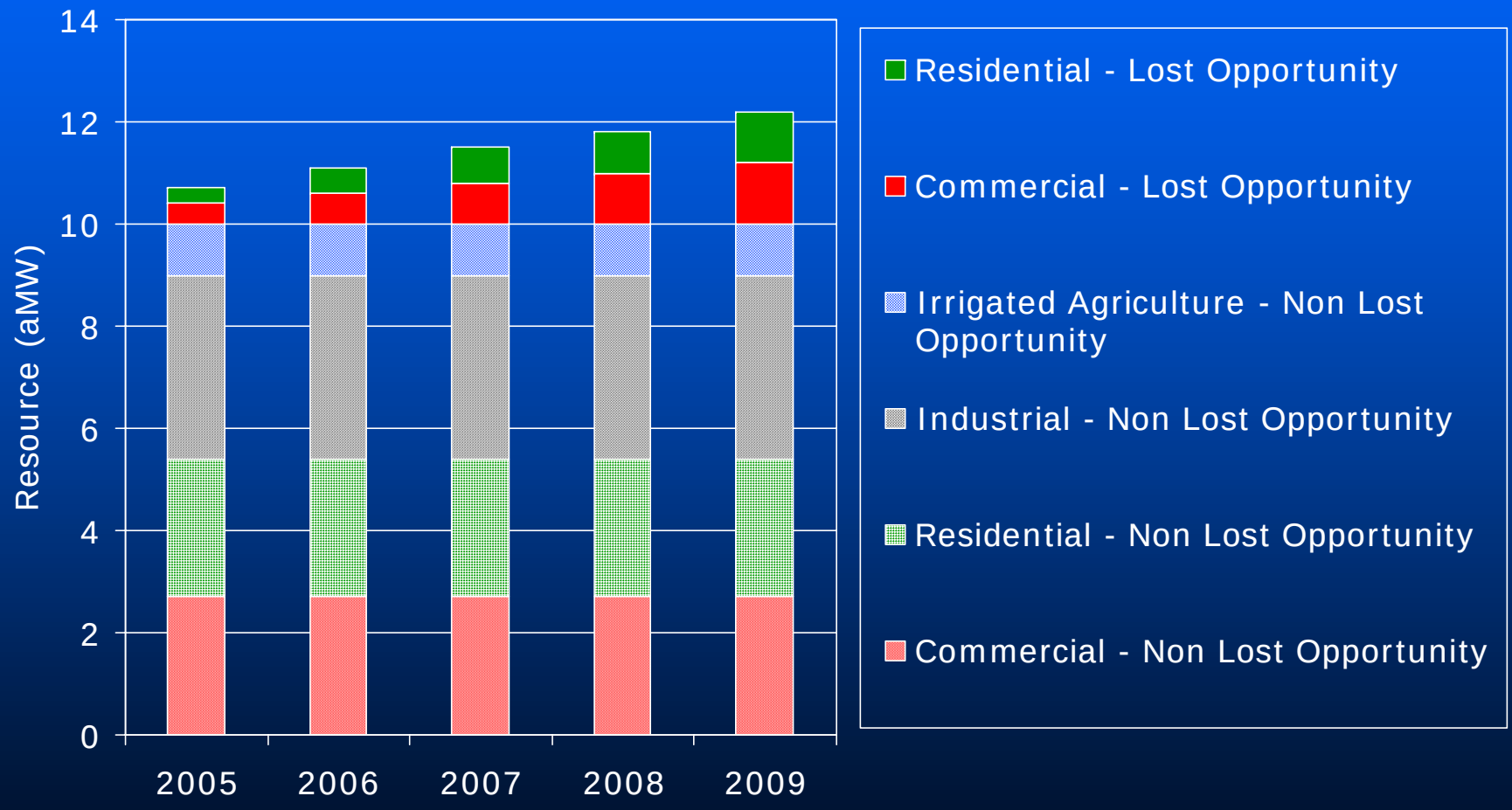
Montana's Share of Near-Term Conservation Targets (2005-2009) = 57 aMW



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Why Should We?

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

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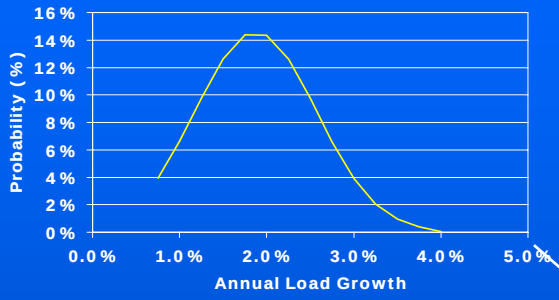
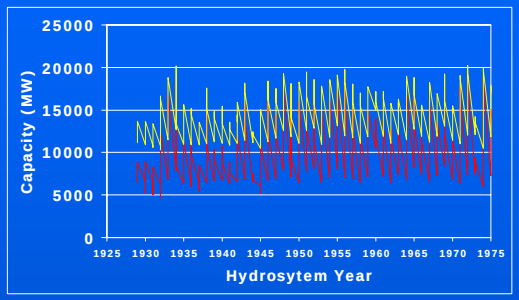
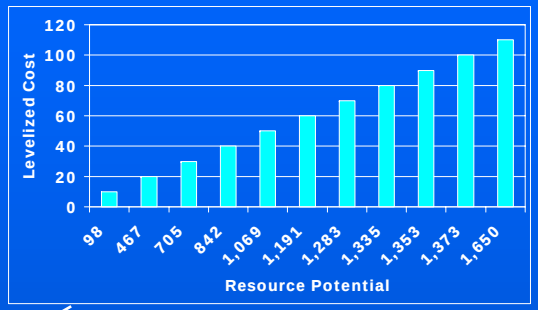
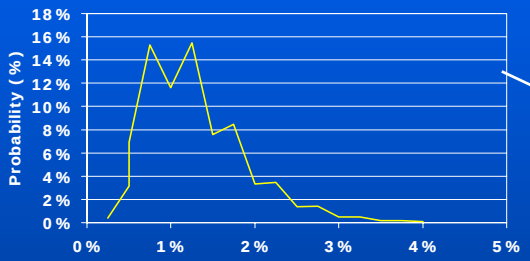
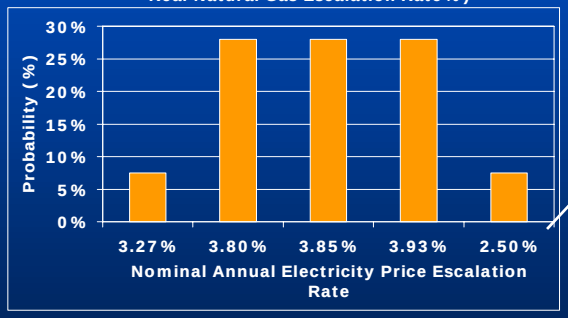
PNW Portfolio Planning – Scenario Analysis on Steroids

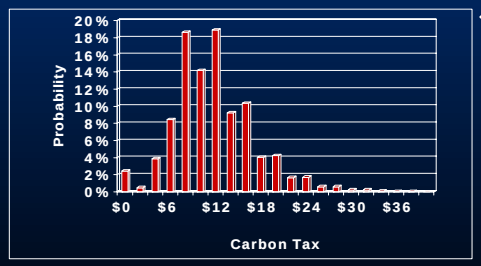


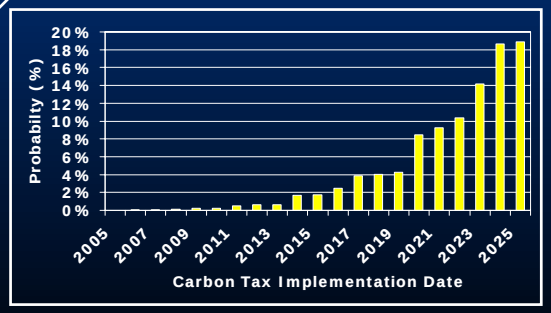




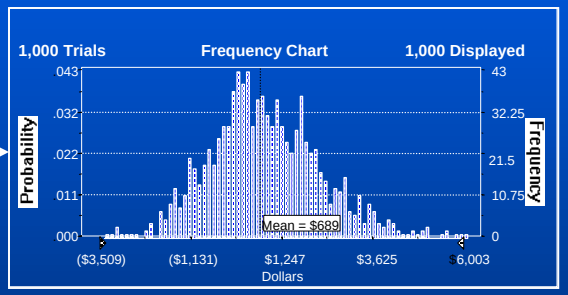




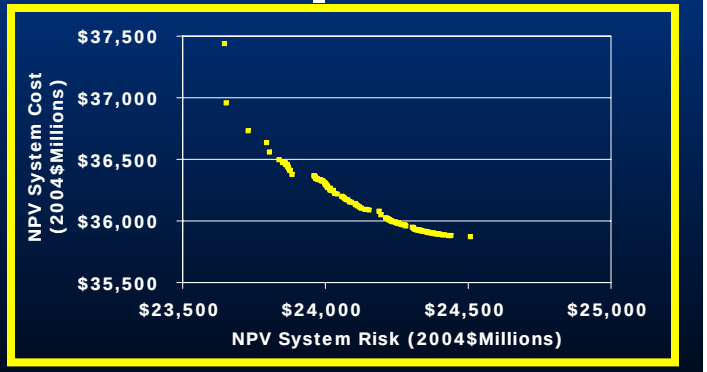




Portfolio Analysis Model

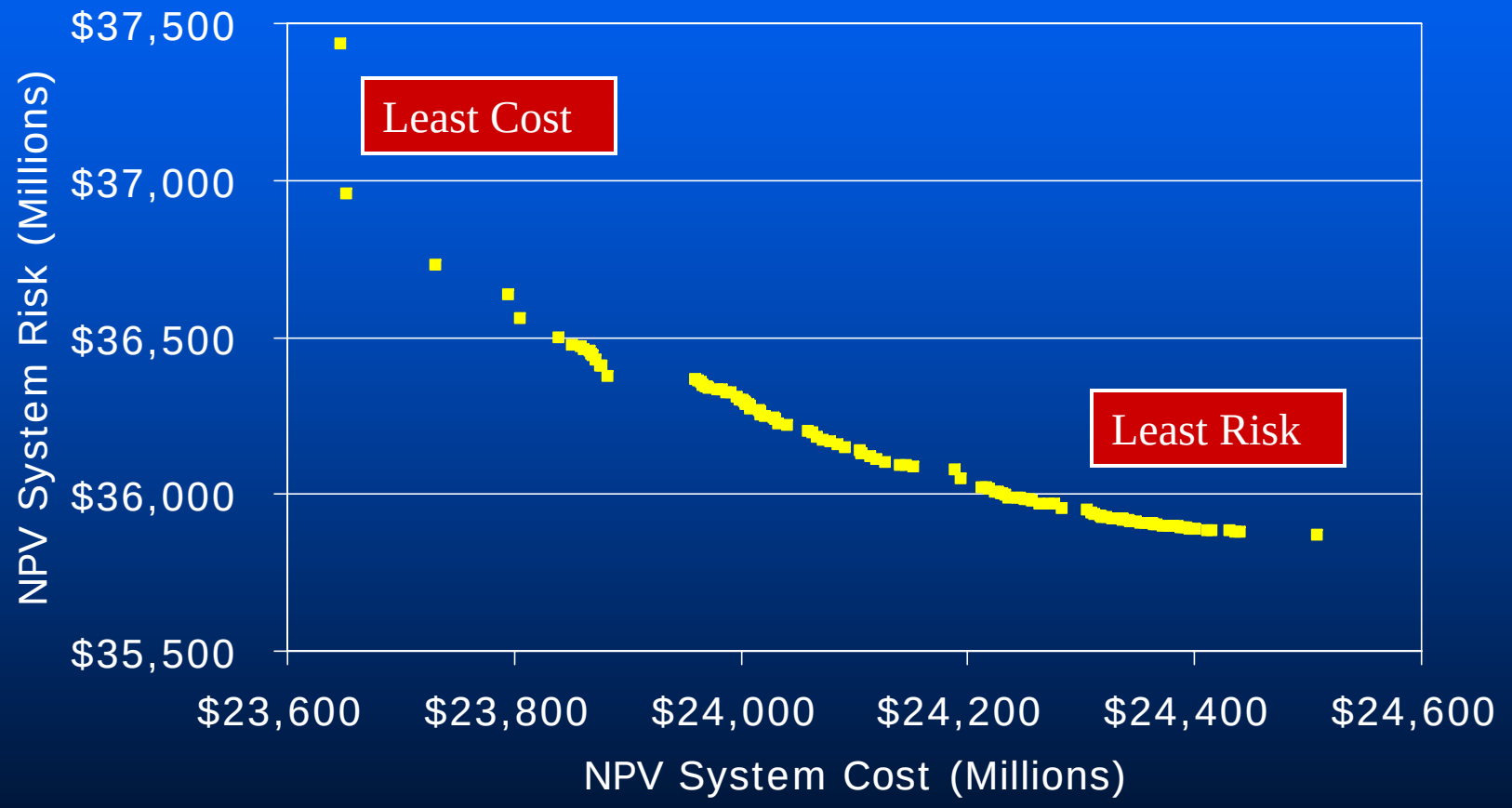


NPV System Cost



Efficient Frontier

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



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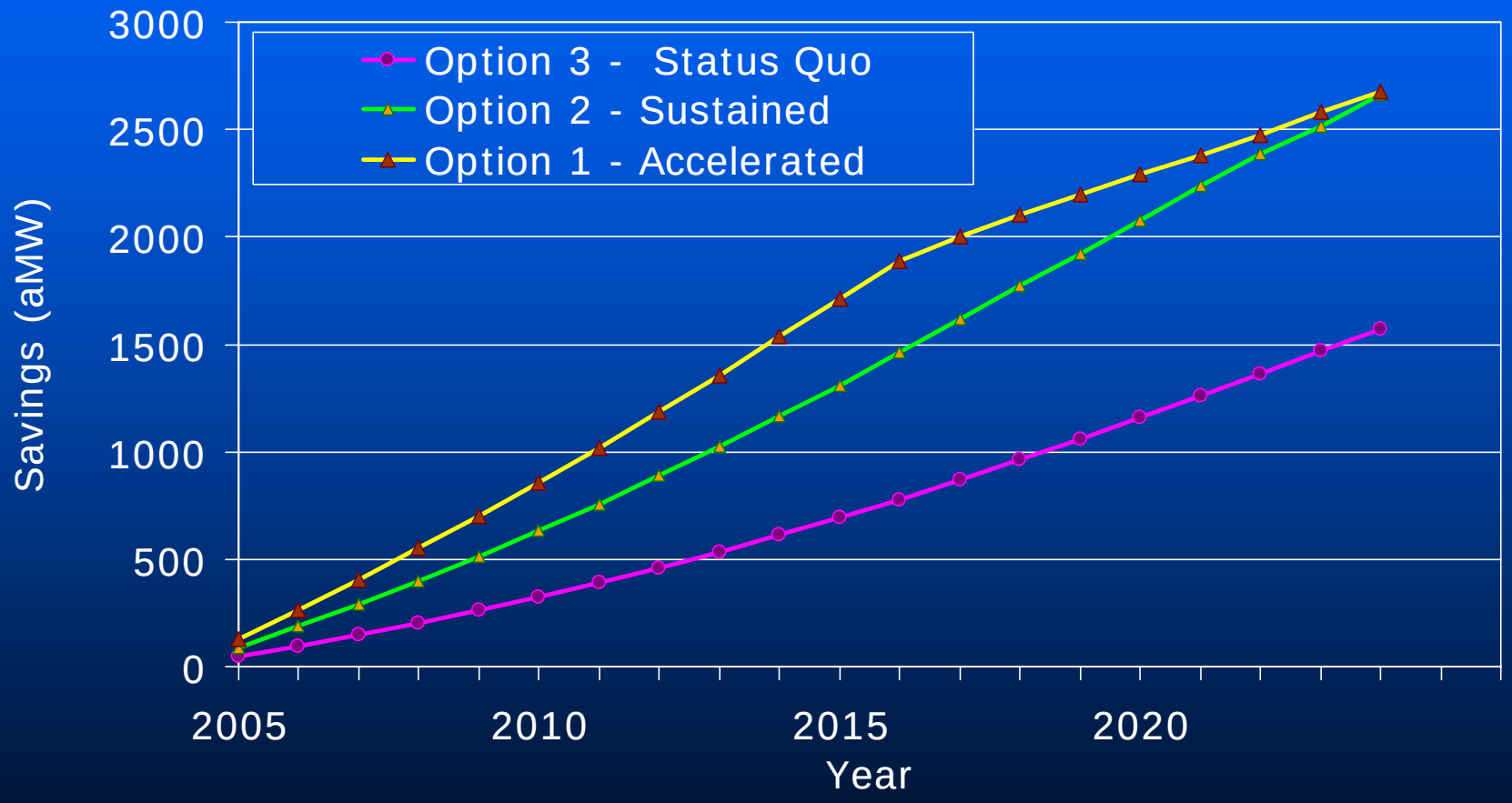
Three Conservation Options Tested

- **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
- **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
- **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



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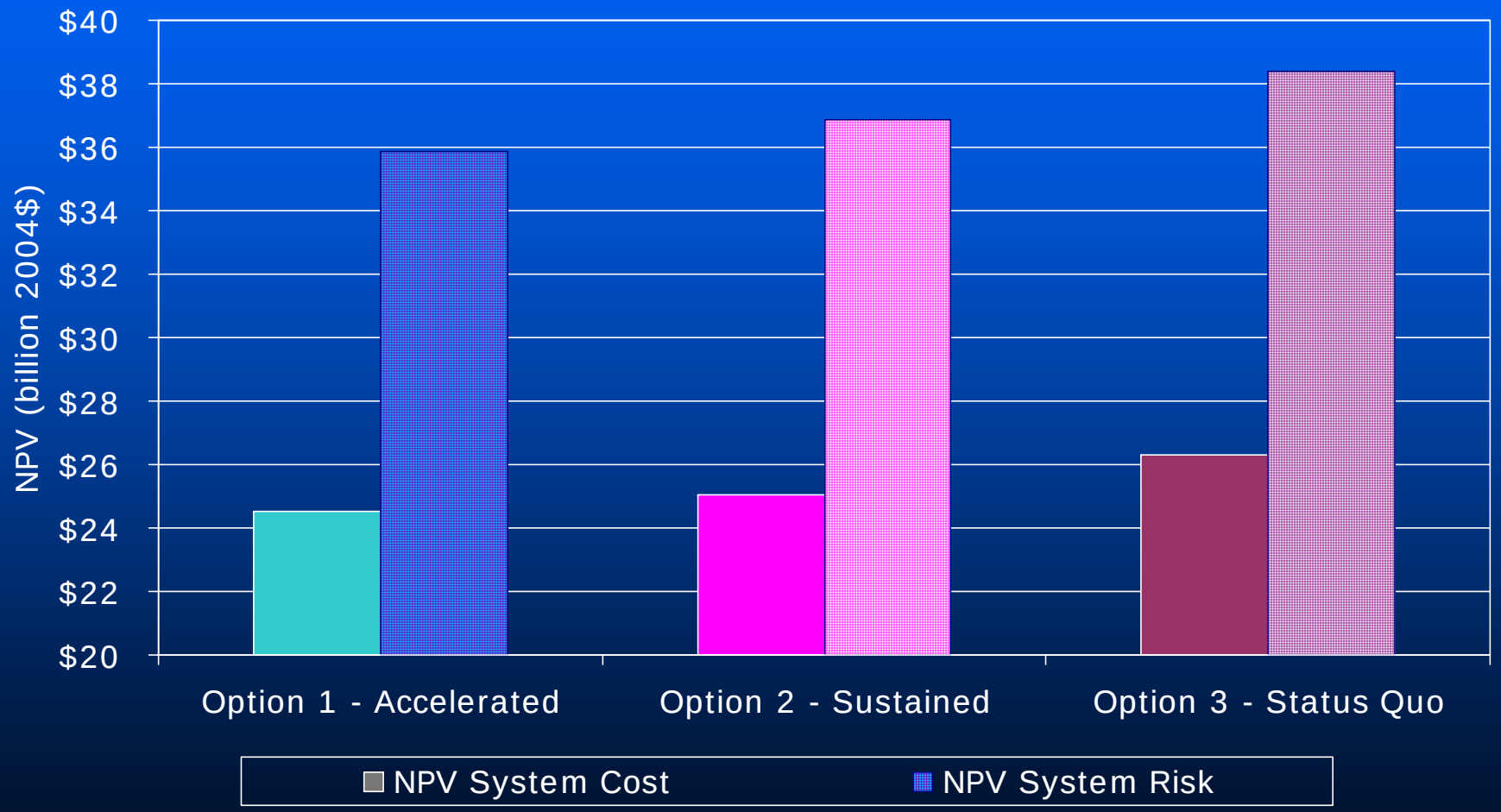
Accelerating Conservation Development Reduces Cost & Risk



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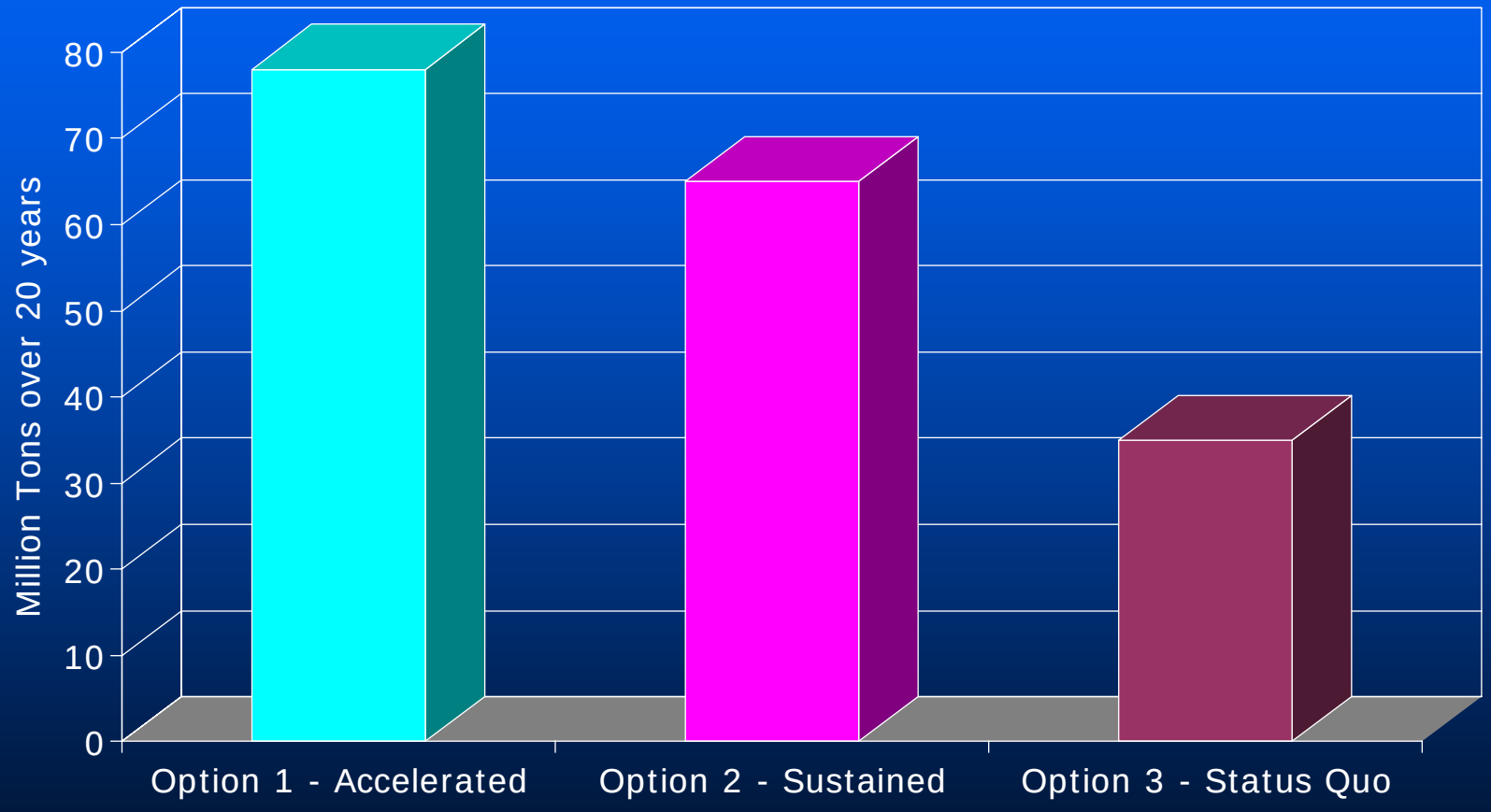
WECC Carbon Dioxide Emissions Reductions for Alternative Conservation Targets



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Why Energy Efficiency Reduces NPV System Cost and Risk

- It's A Cheap (avg. 2.4 cents/kWh TOTAL RESOURCE COST) Hedge Against Market Price Spikes
- It has value even when market prices are low
- It's Not Subject to Fuel Price Risk
- It's Not Subject to Carbon Control Risk
- 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?

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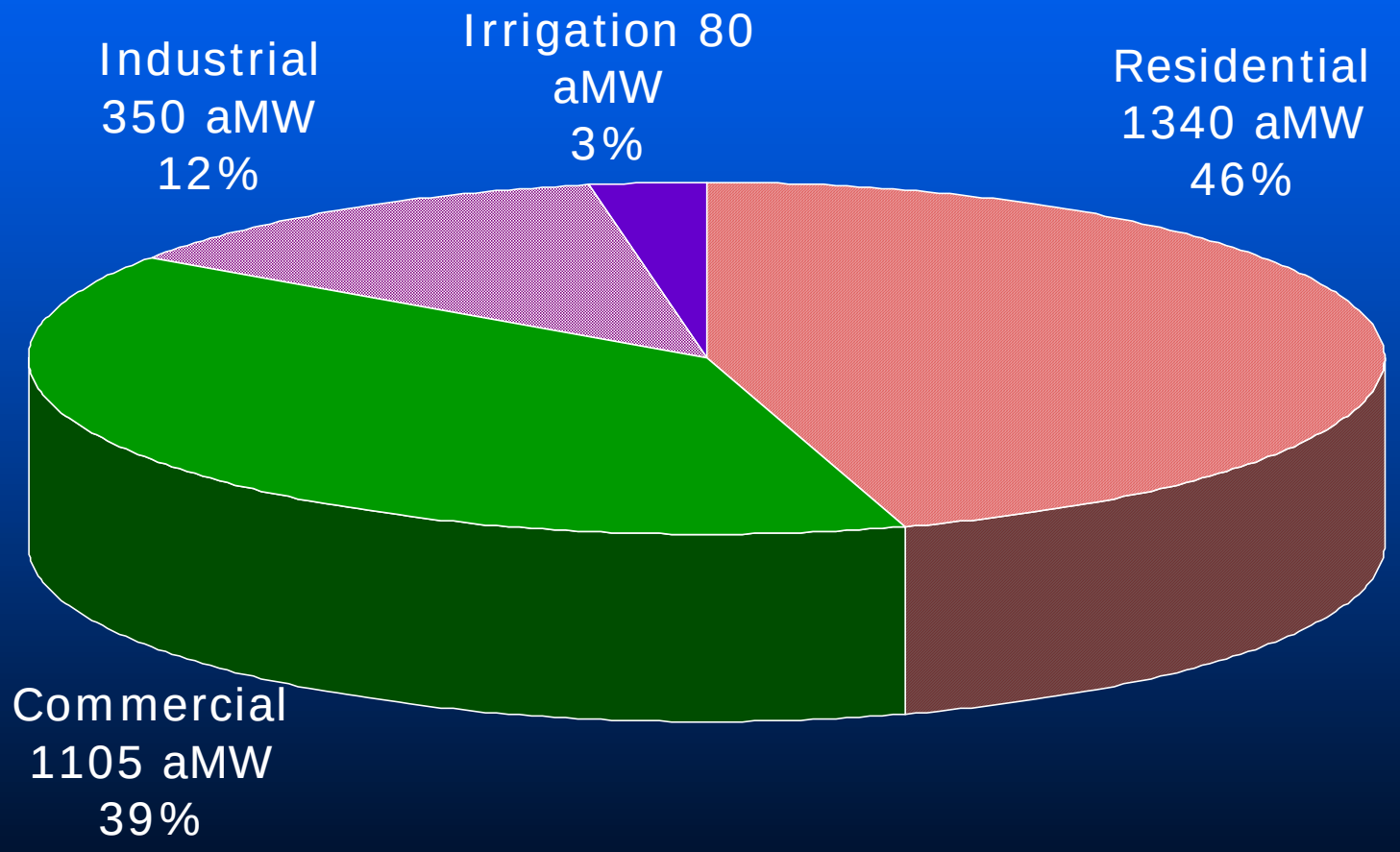
Sources of Savings by Sector



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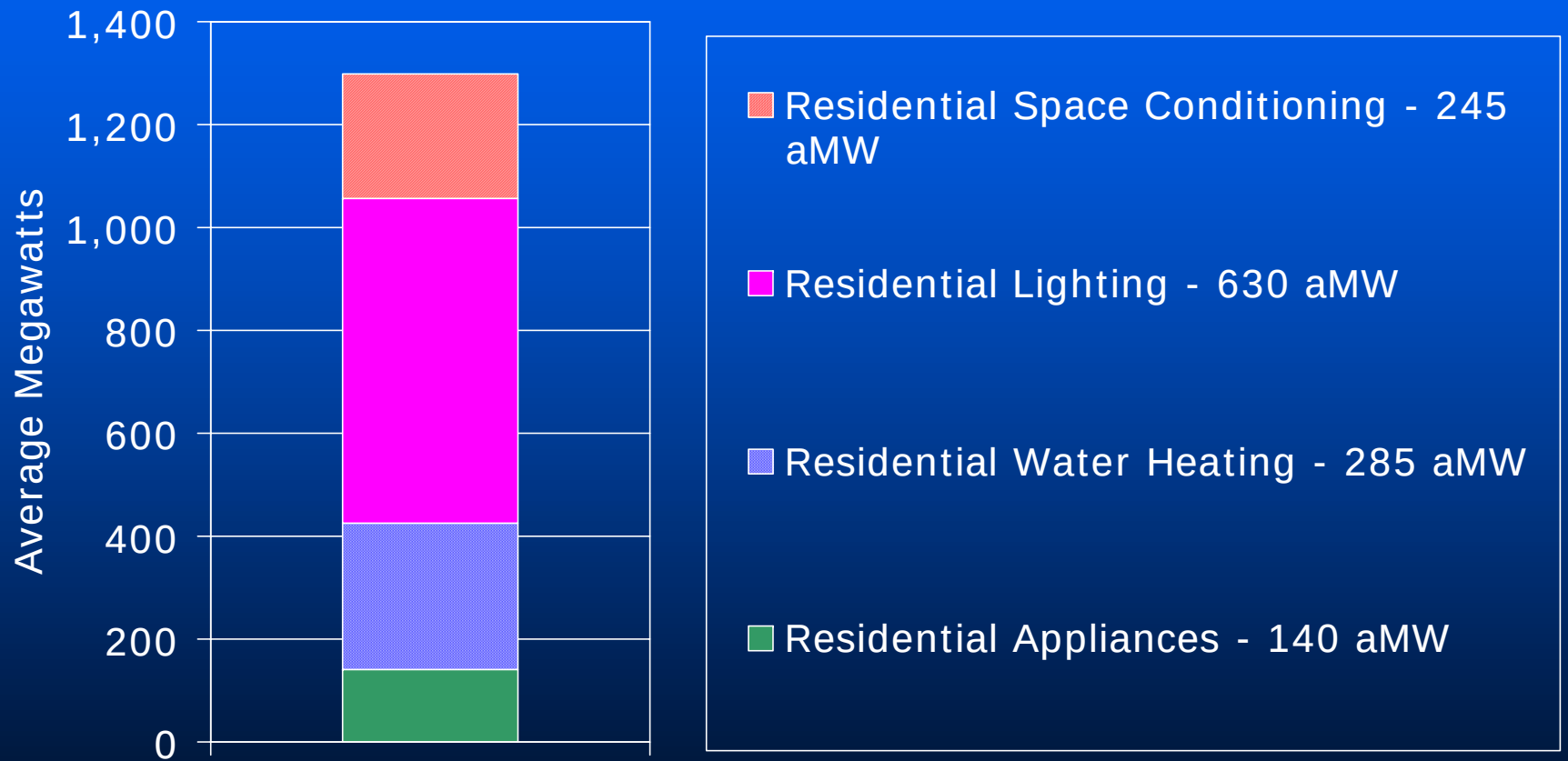
Residential Sector Target = 1340 aMW



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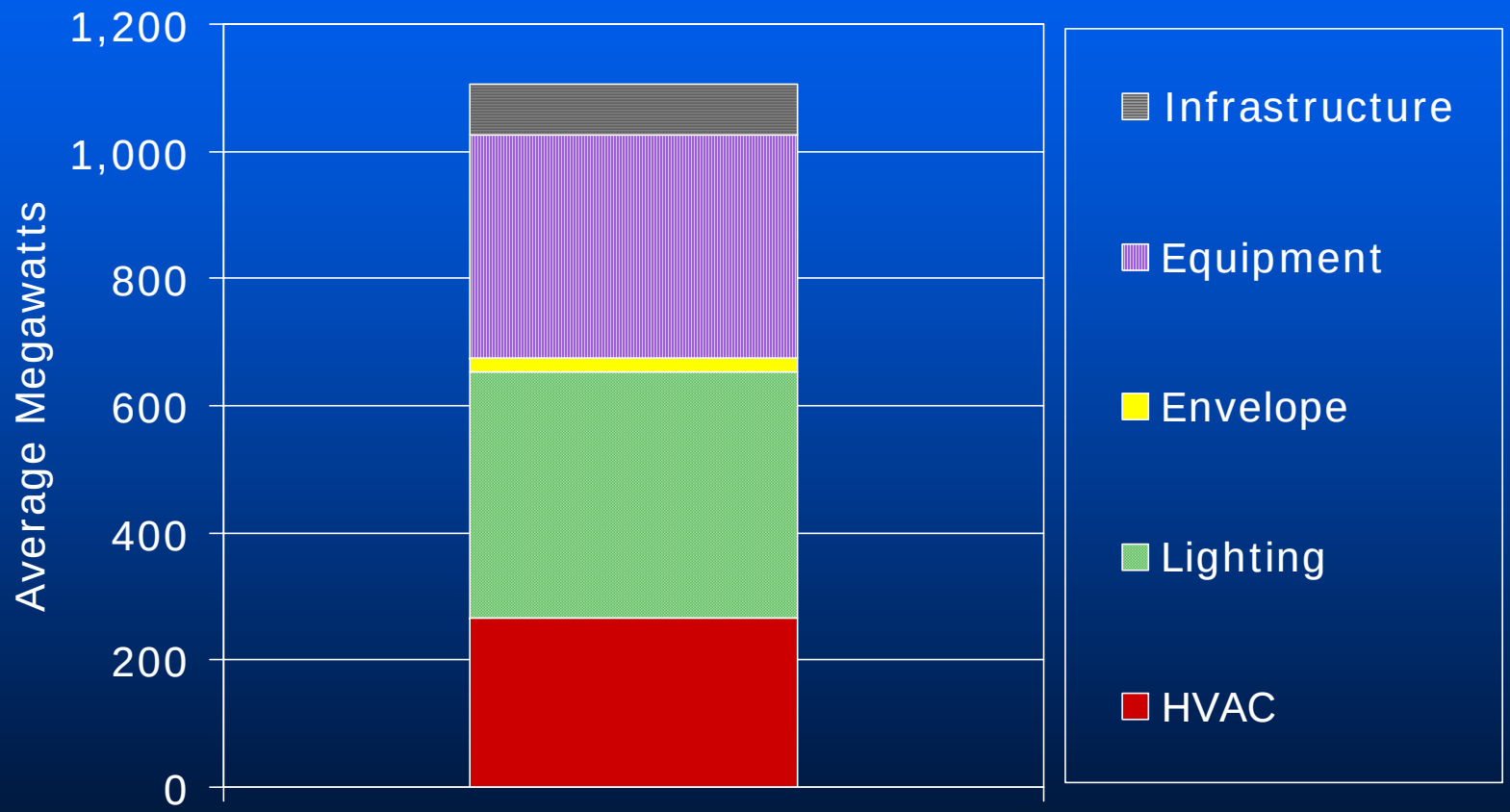
Commercial Sector Target = 1105 aMW



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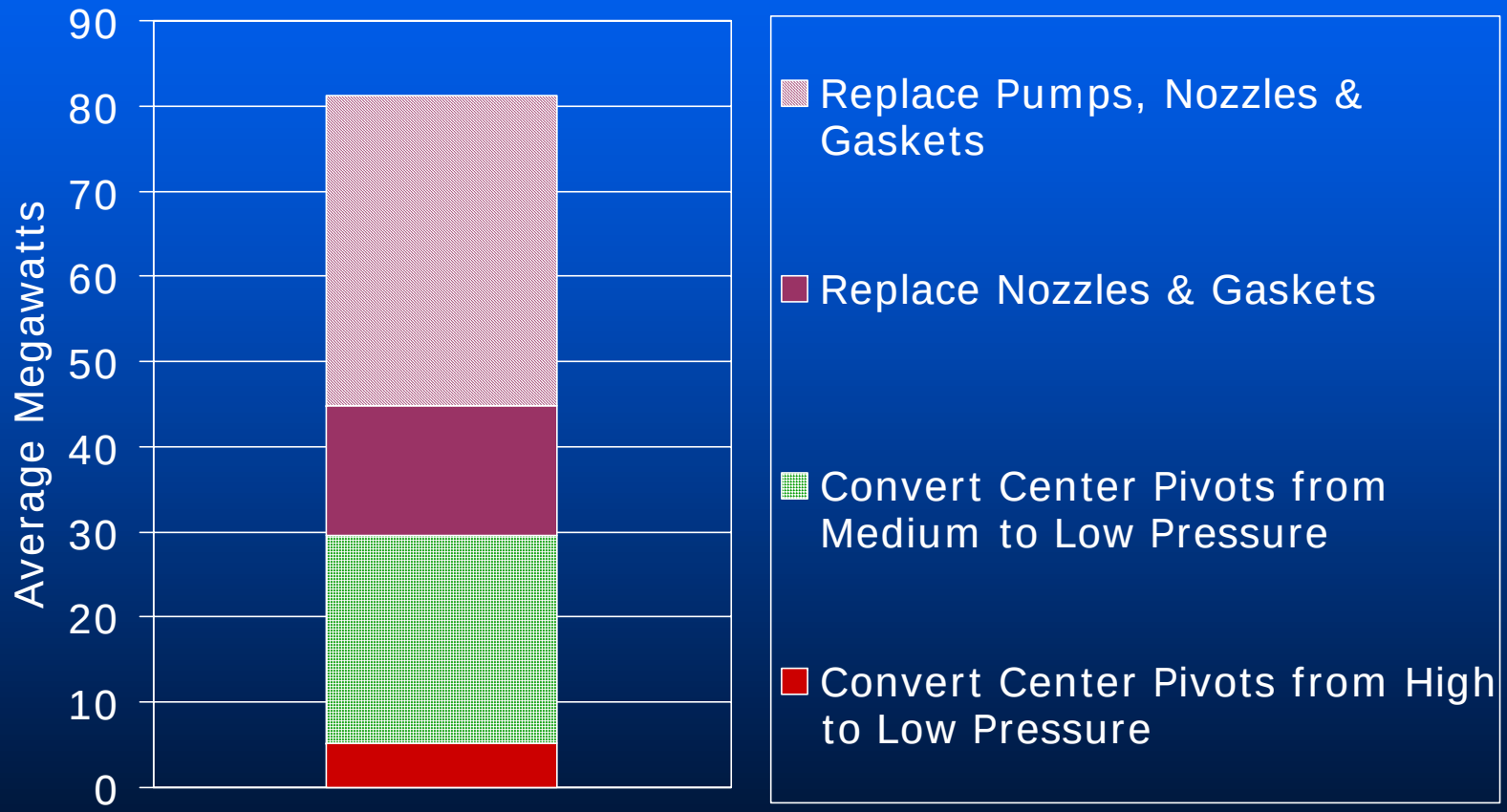
Irrigated Agriculture Sector Target = 80 aMW



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Industrial Sector Target = 350 aMW

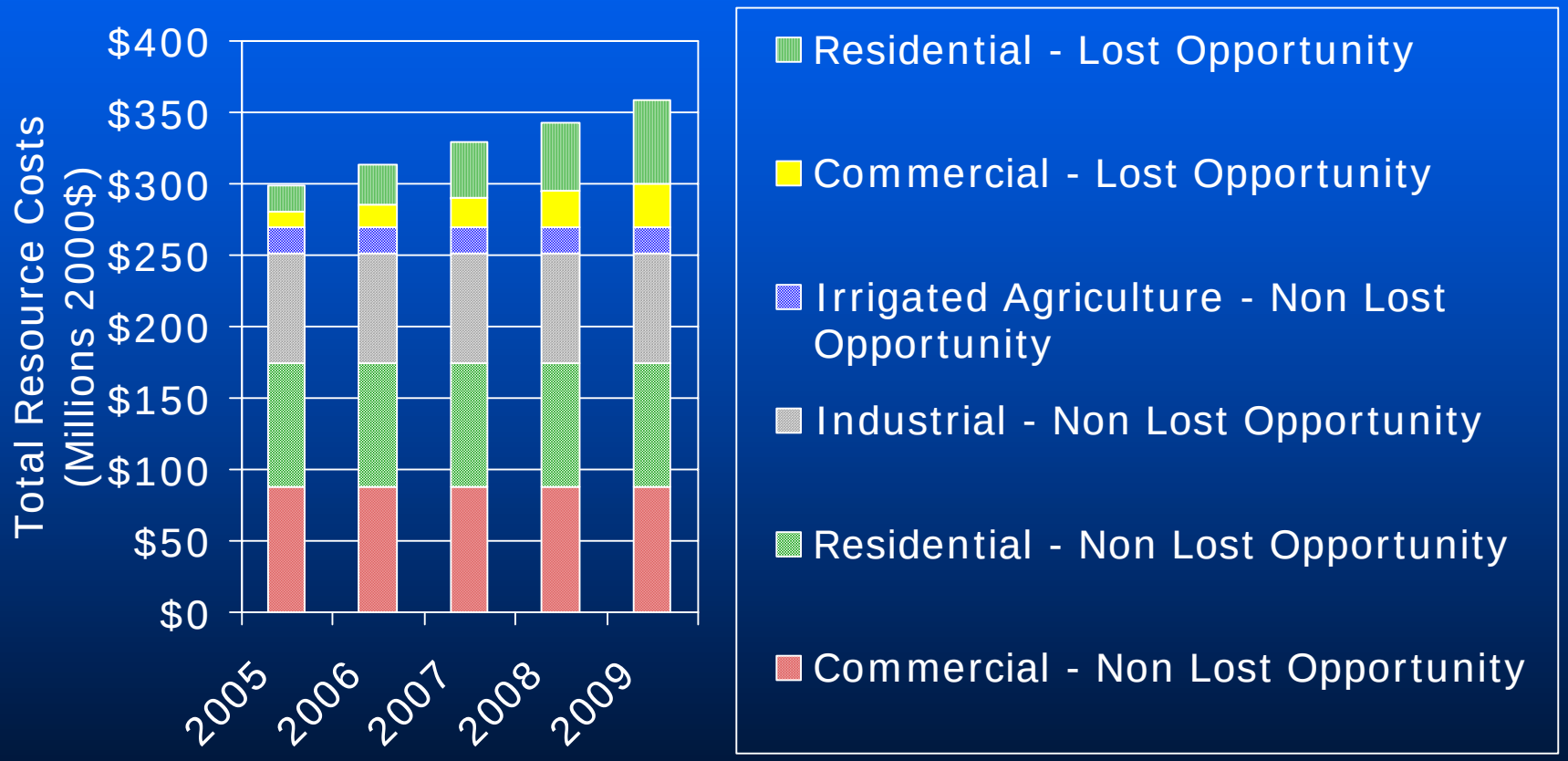
- Estimate of 5% of 2025 forecast loads
- 350 aMW at 1.7 cents per kWh
- Process controls, drive systems, lighting, refrigeration, compressed air, etc
- Potential is a function of the ongoing changes in region's industrial mix

Implementation Challenges

5th Plan
Conservation Action Items

- Ramp up "Lost Opportunity" conservation
  - » Goal => 85% penetration in 12 years
  - » 10 to 30 MWa/year 2005 through 2009
- Accelerate the acquisition of "Non-Lost Opportunity" resources
  - » Return to acquisition levels of early 1990's
  - » Target 120 MWa/year next five years
- 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.

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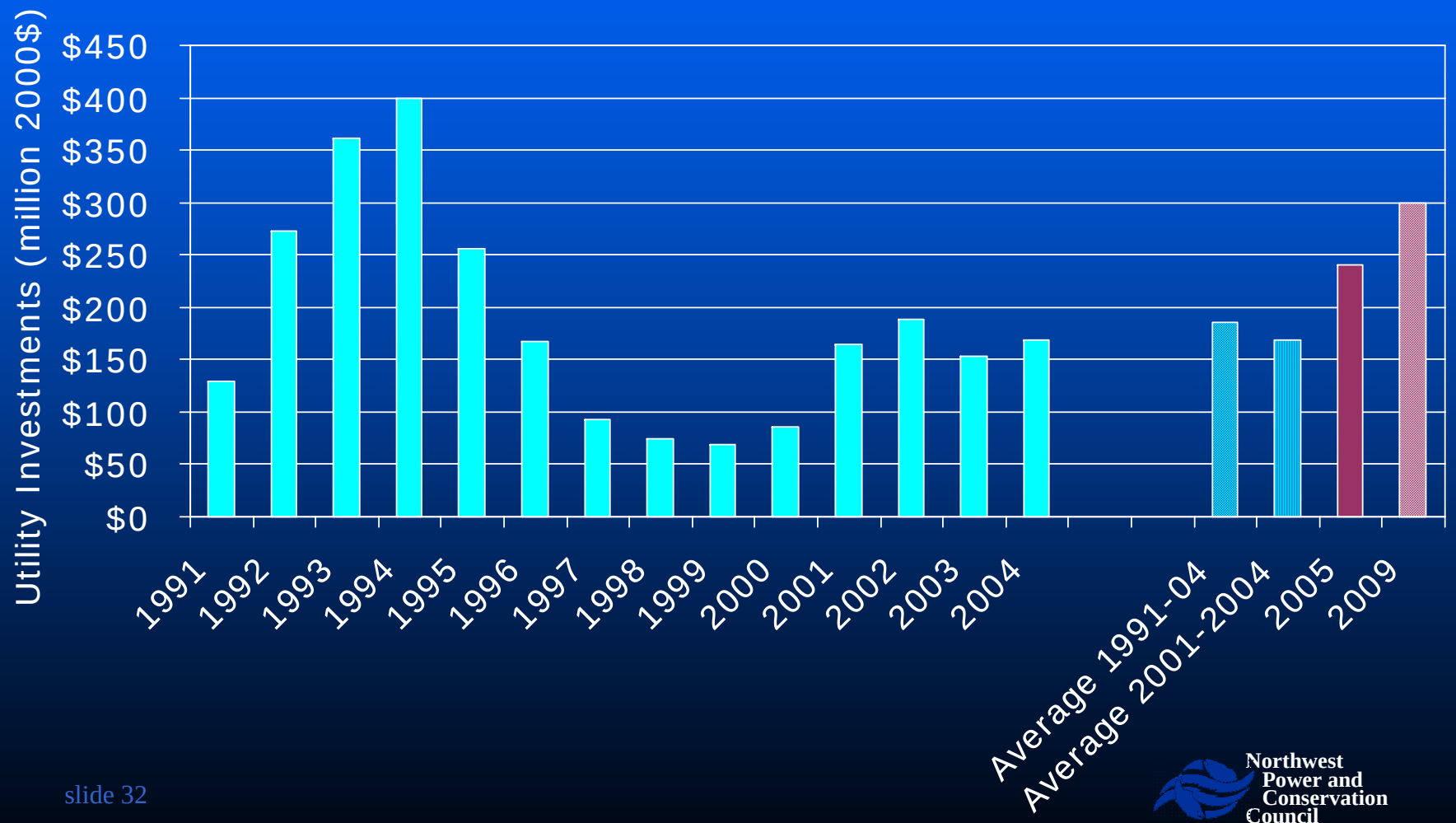
Meeting the Plan's Efficiency Targets Will Likely Require Increased Regional Investments



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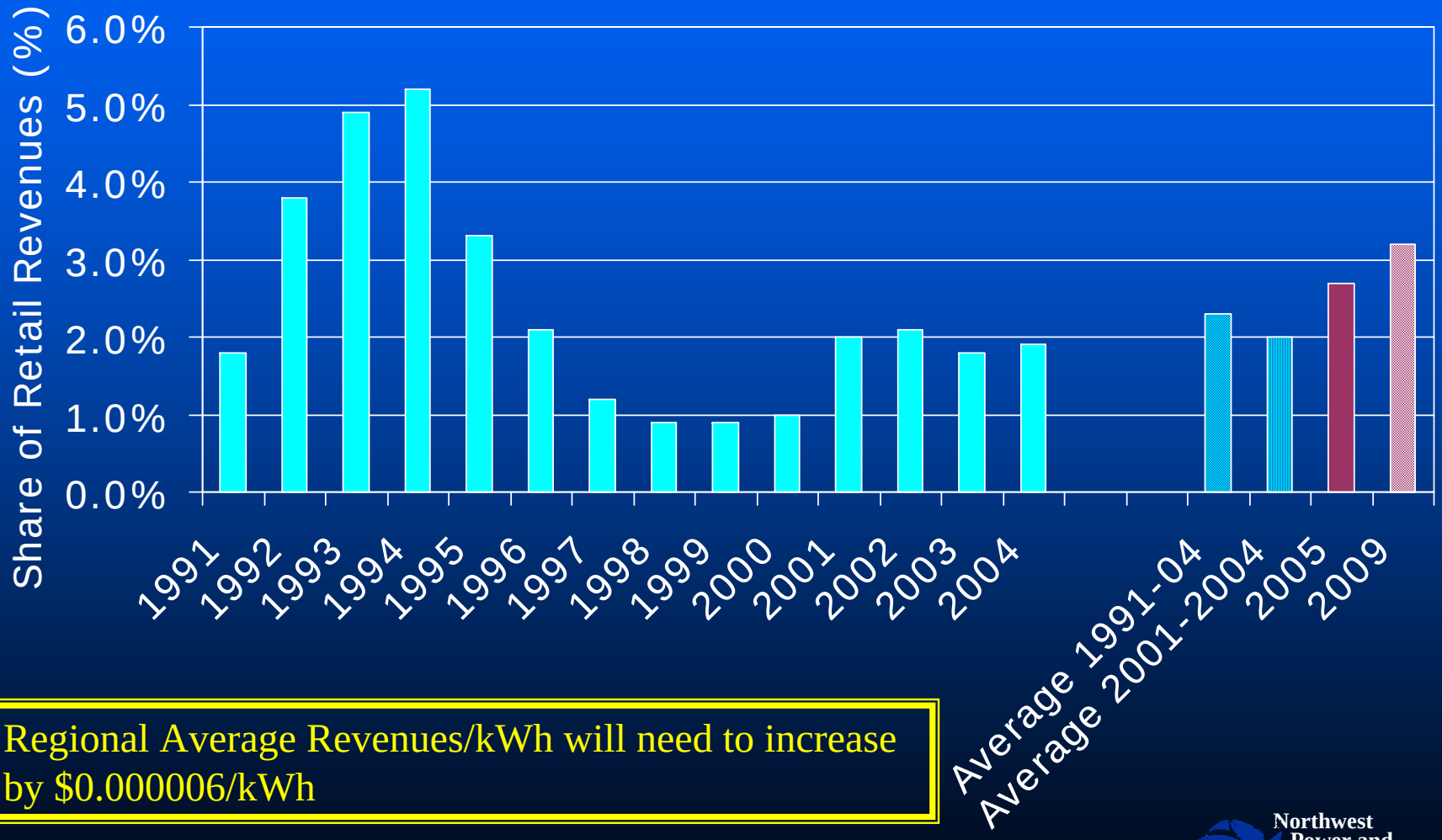
Although, The Share of Utility Revenues Required is Modest



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

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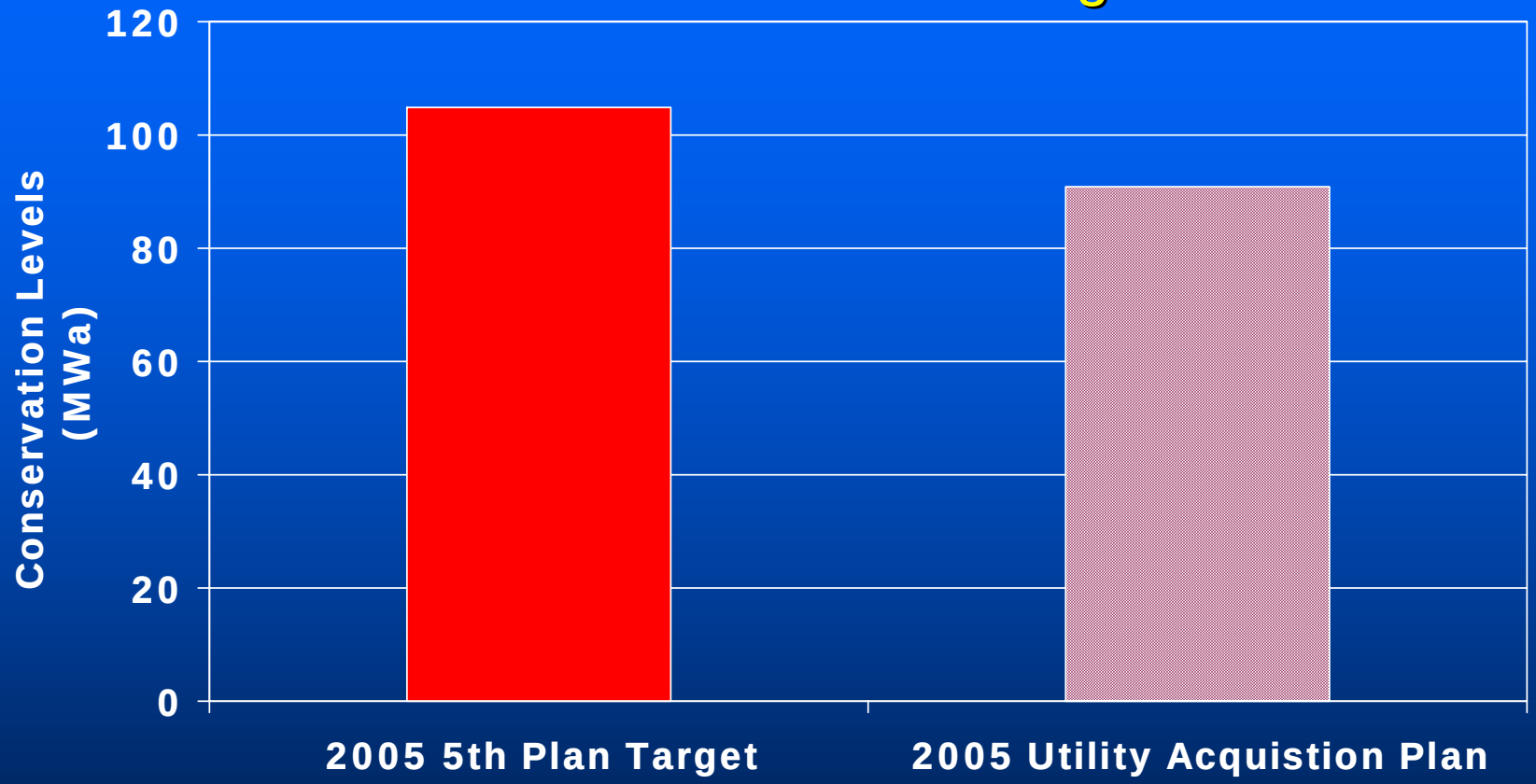
Utility* Efficiency Acquisition Plans for 2005 Are Close to 5th Plan Targets



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

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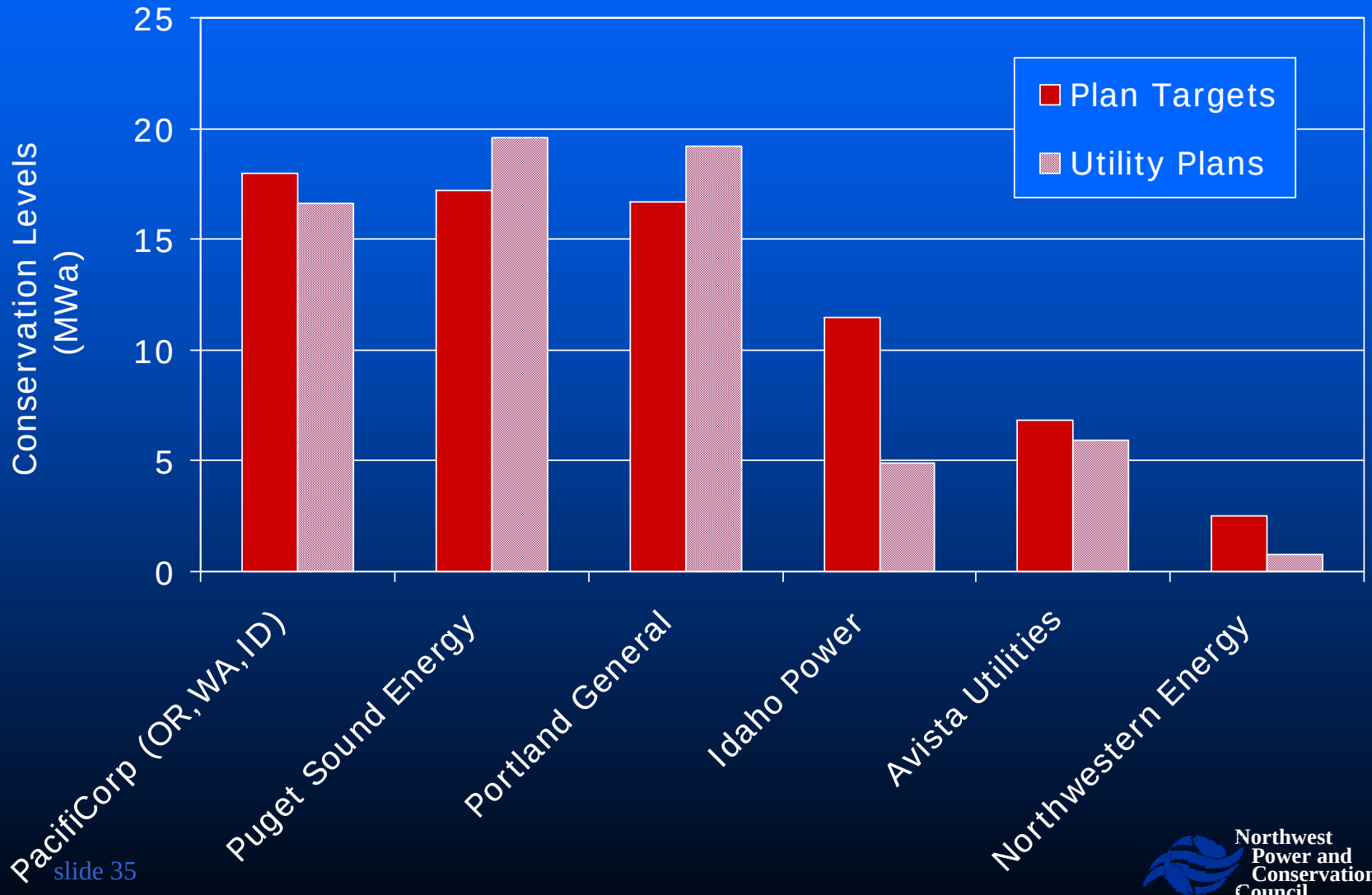
Most IOU Efficiency Plans are Close to 5th Plan's Targets



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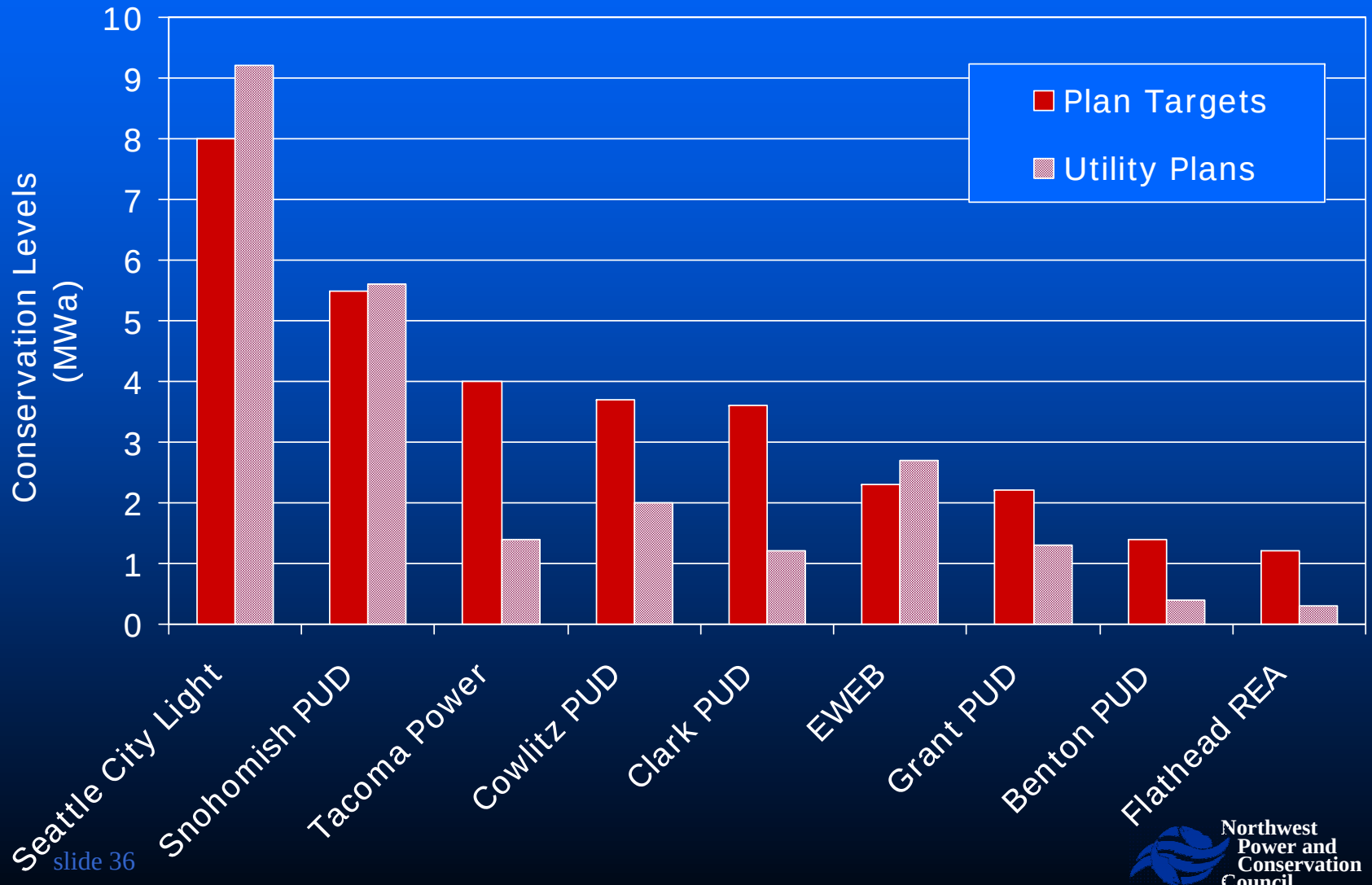
However, Several Large Public Utility Efficiency Plans Are Well Below 5th Plan Targets



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Summary

- 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

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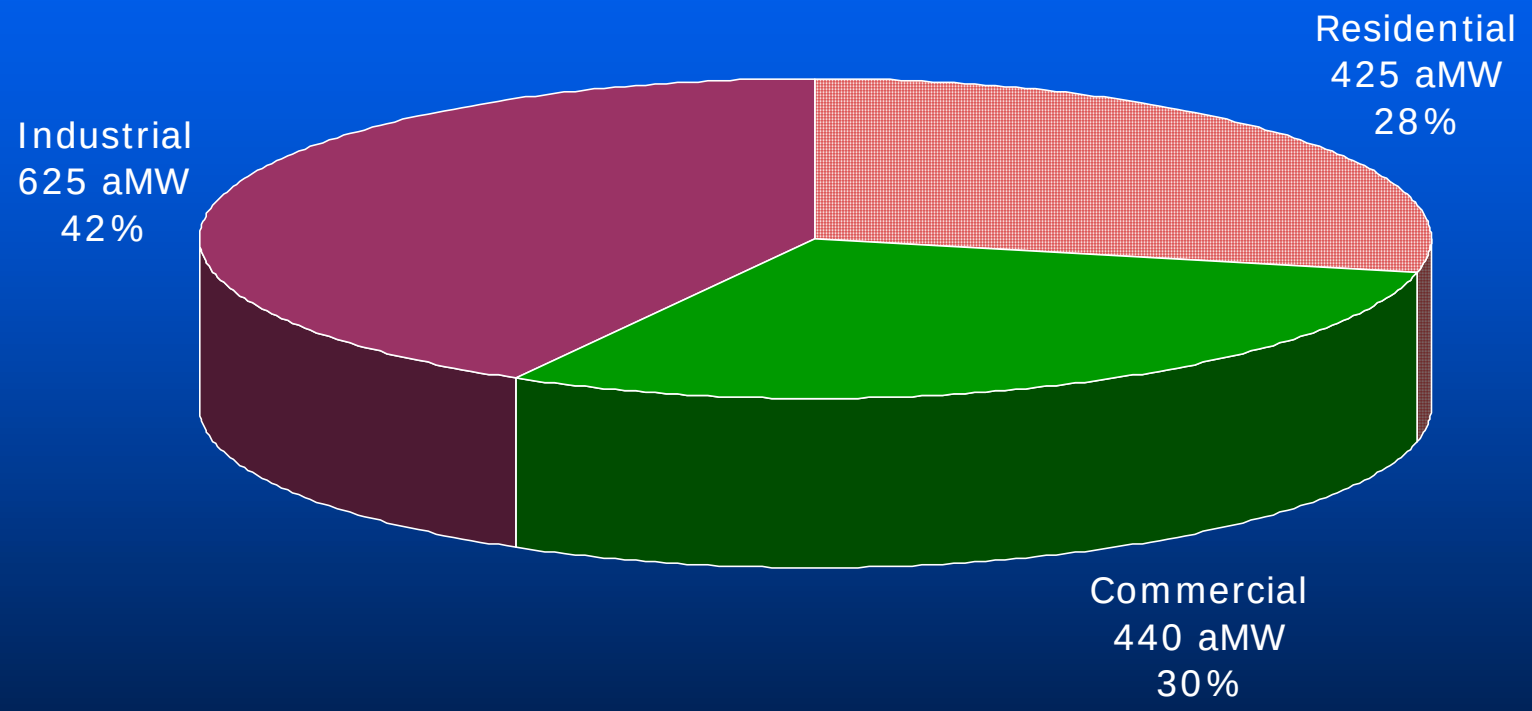
Montana Electric Sales
1,490 aMW in 2004



Source: US DOE/EIA

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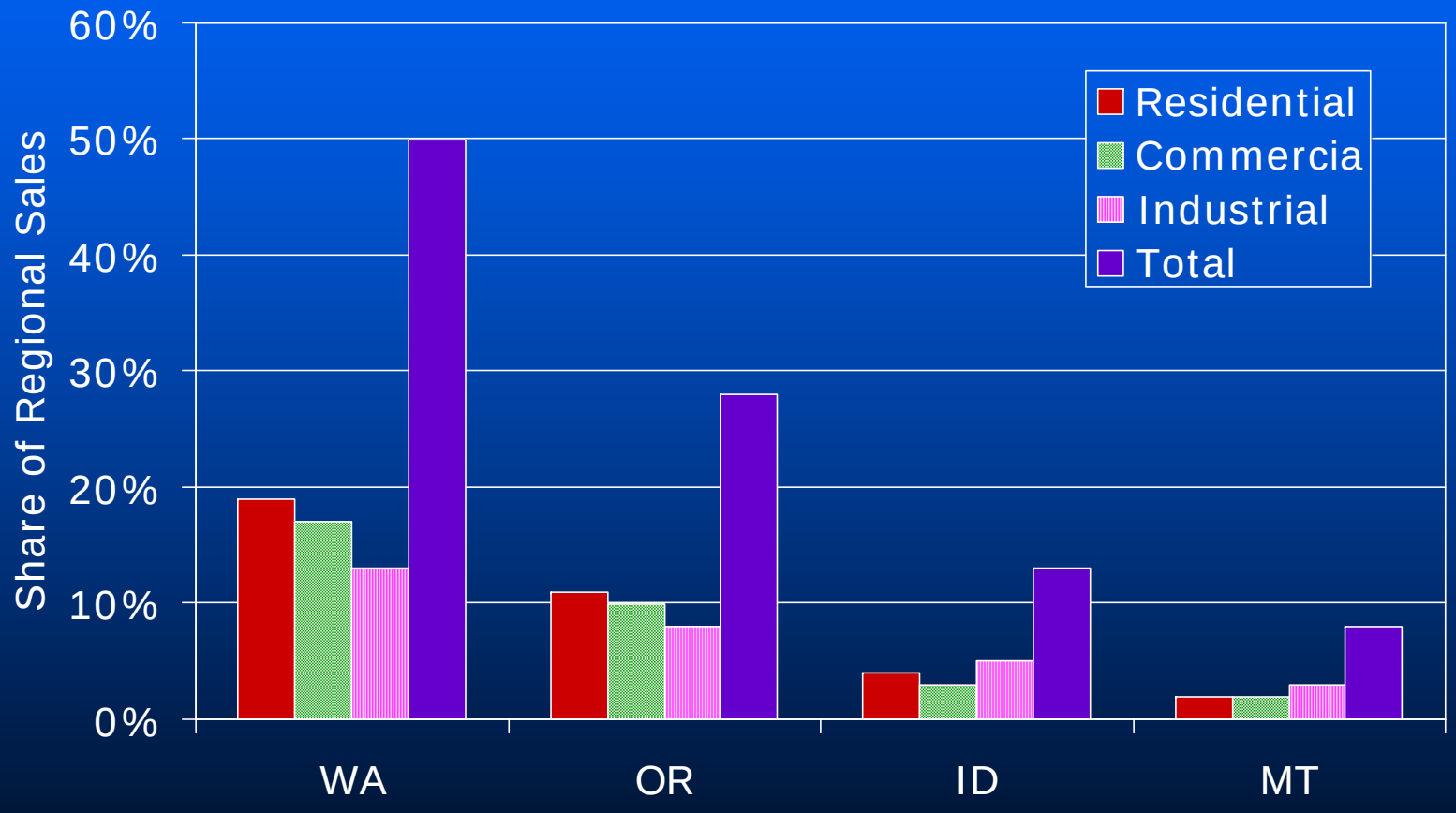
Montana Electricity Sales Represent 8% of Regional Sales Across All Sectors



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Residential Sector Results

What's Left To Do At Home?

65 Average MW

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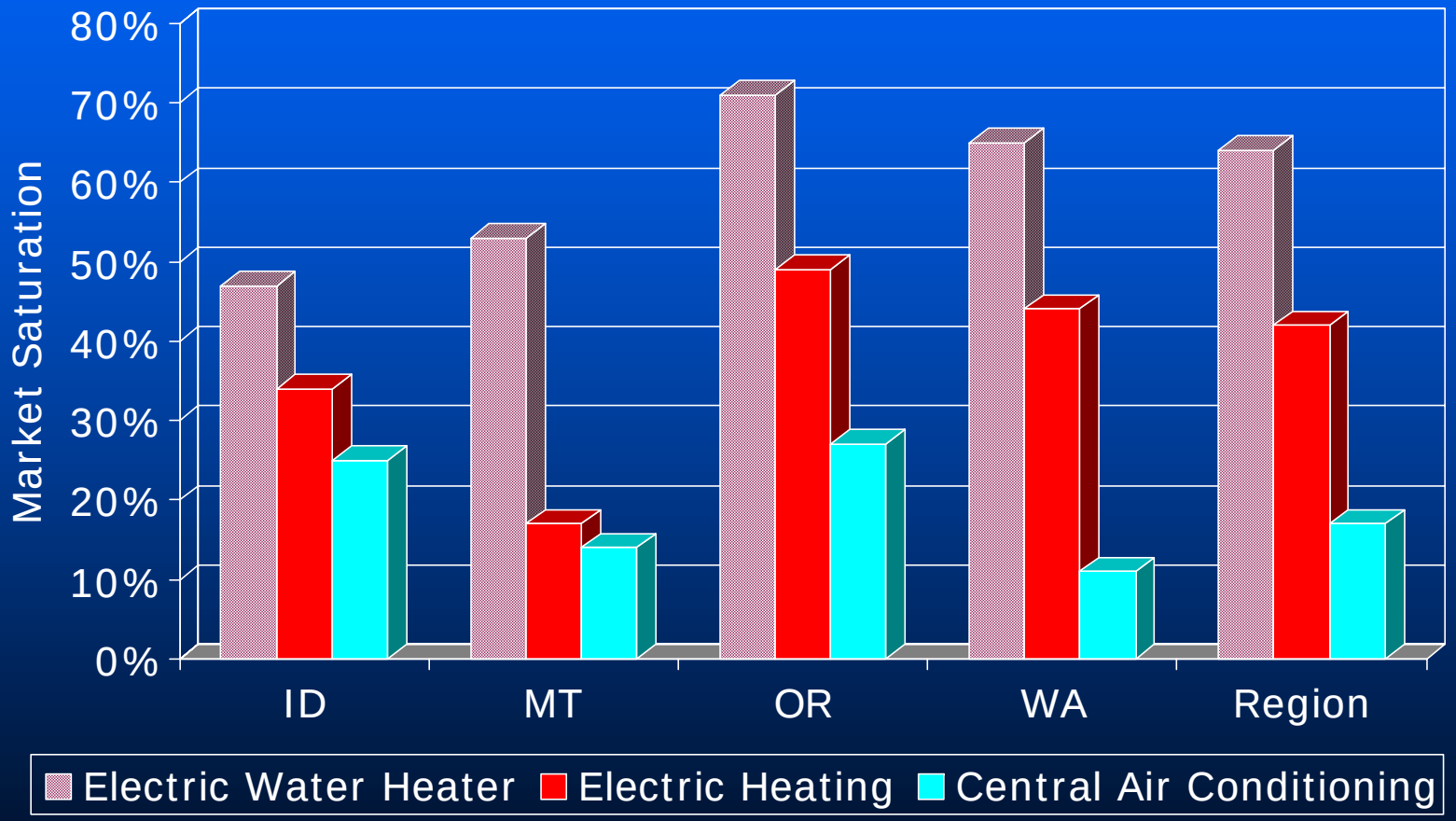
Montana Has The Region's Lowest Market Shares of Electric Water and Space Heating



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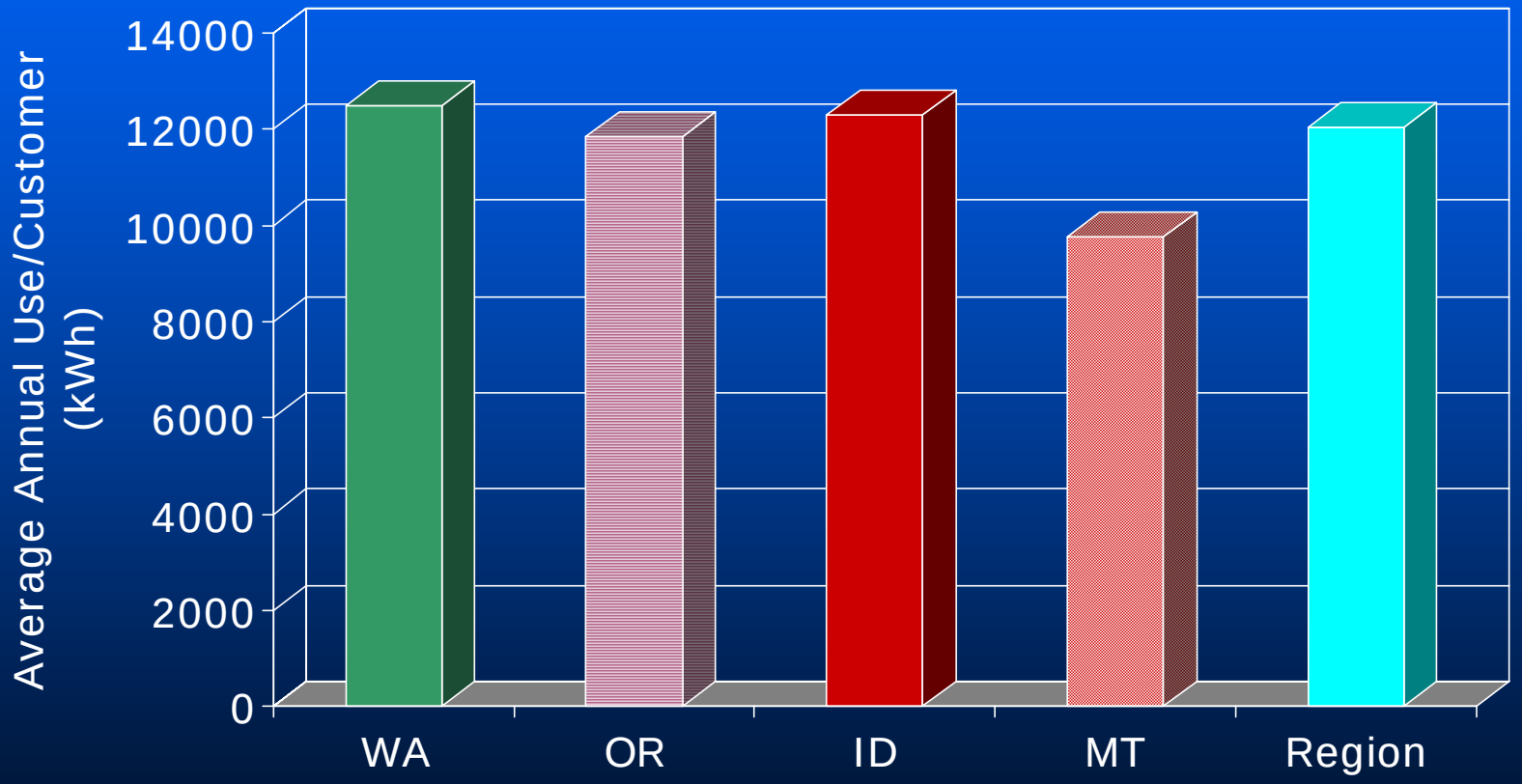
Montana's Average Electricity Use/Residential Customer Is The Lowest in the Region



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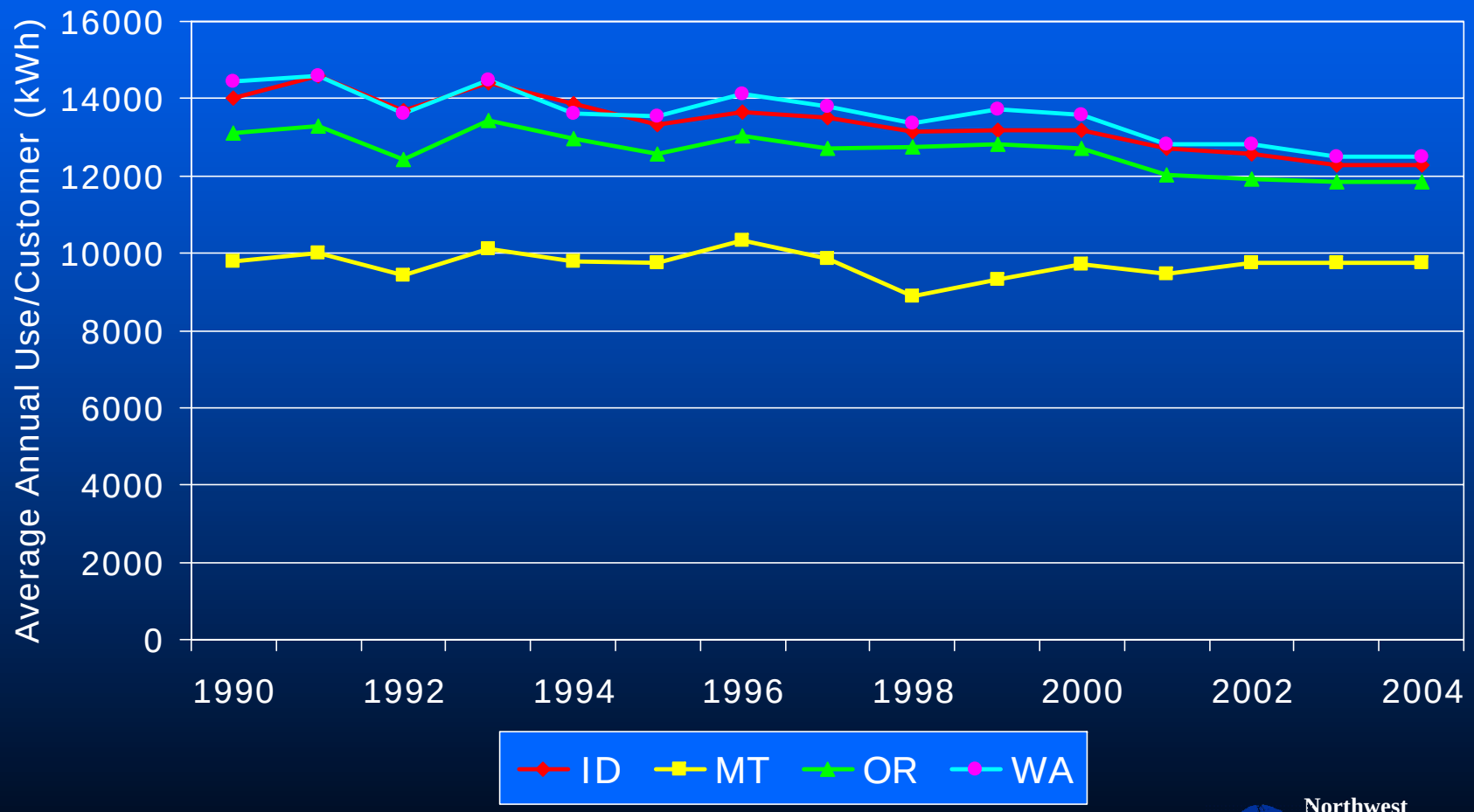
But Residential Customer Use Has Not Declined Since 1990, While Use in Other PNW States Has



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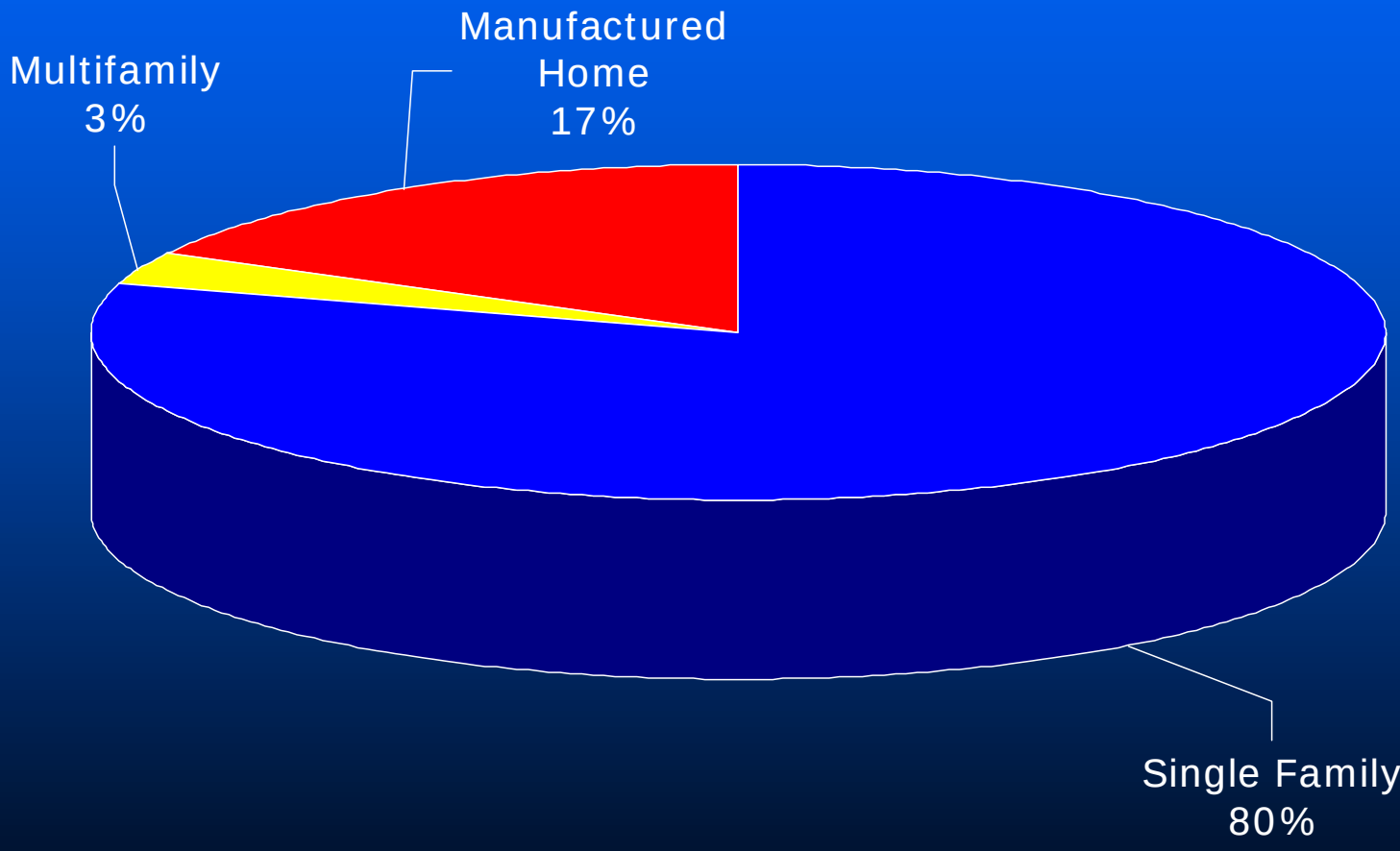
Montana's Housing Stock is Predominantly Single Family and Manufactured Homes



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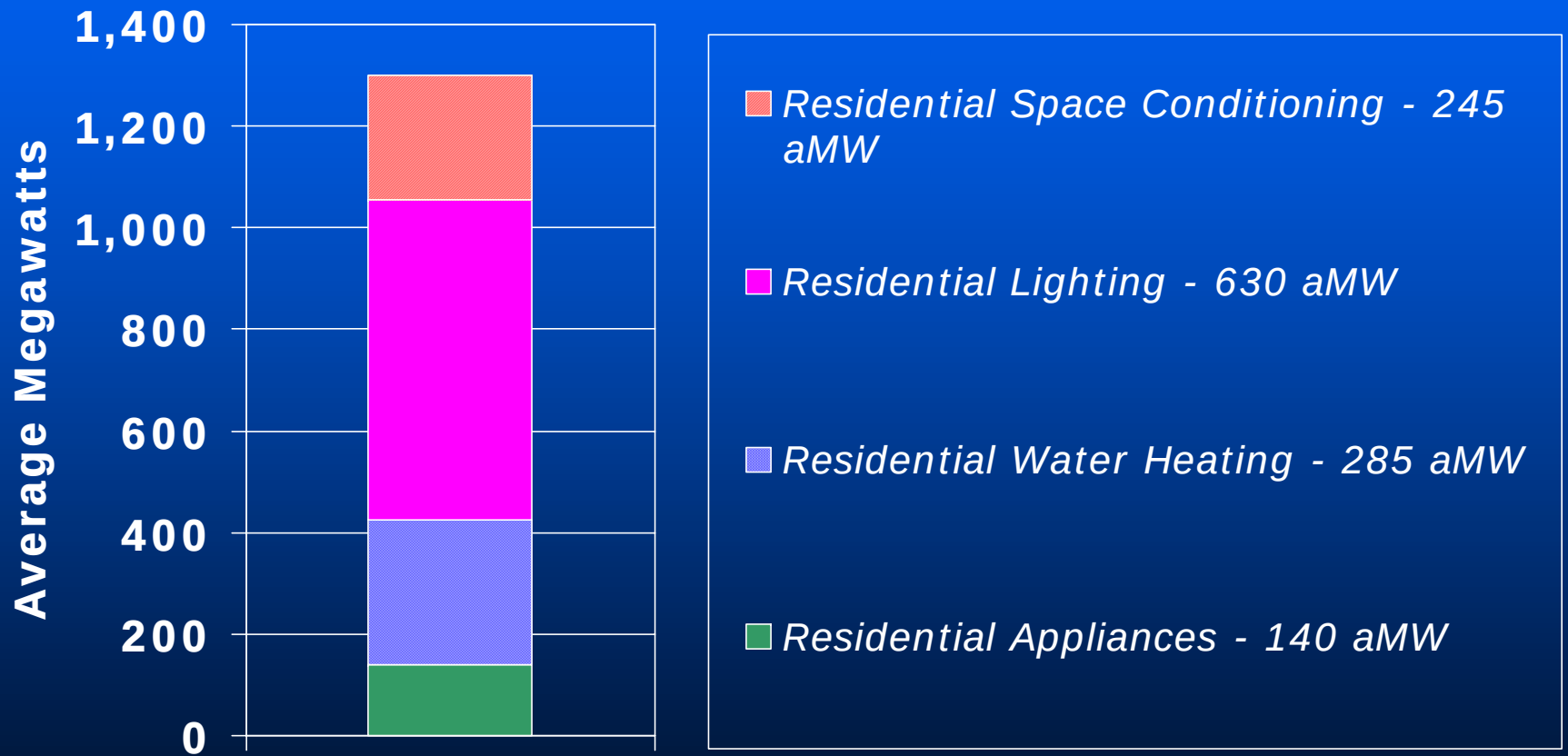
Regional Residential Sector Cost-Effective & Realistically Achievable Regional Potential = 1340 aMW



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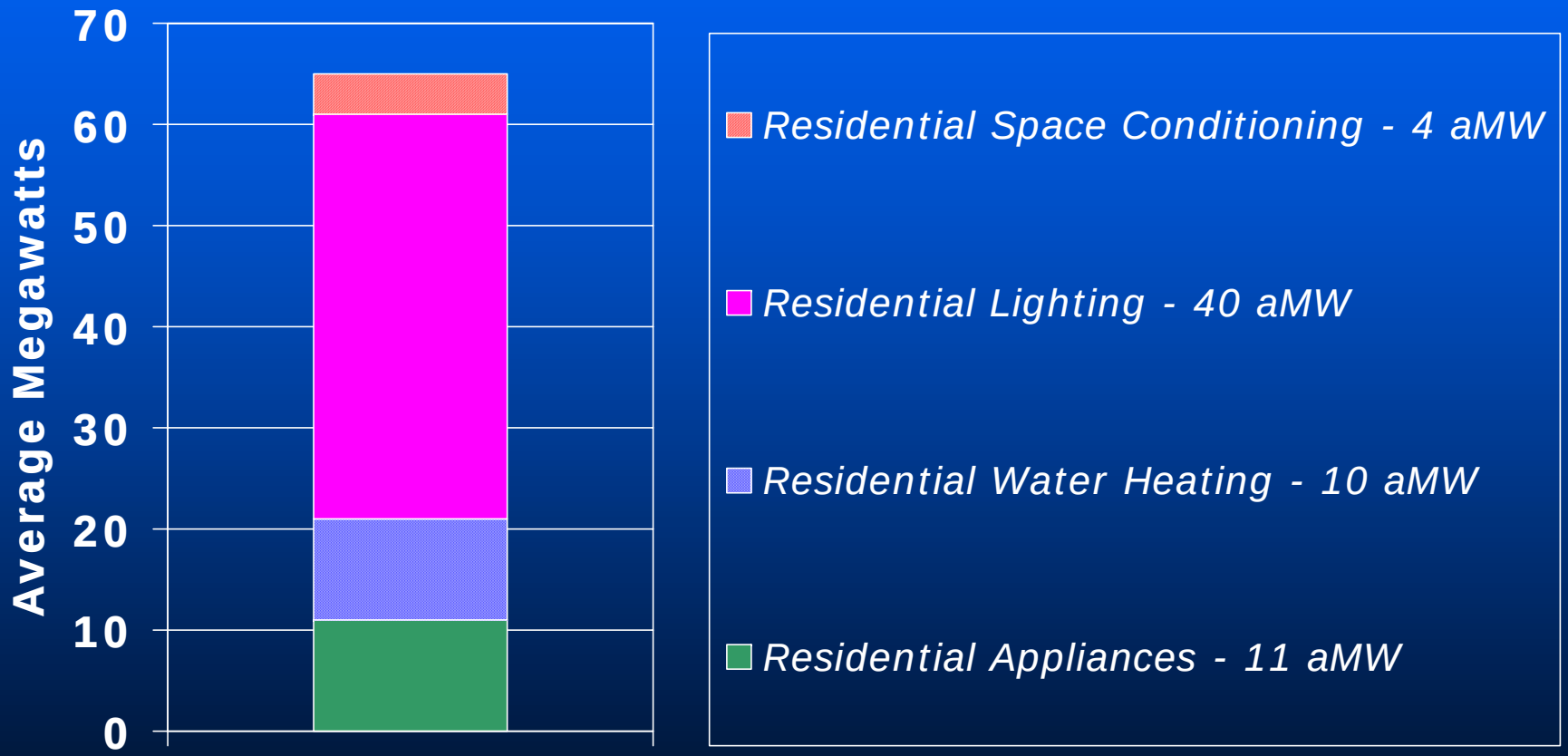
Montana Residential Sector Cost-Effective & Realistically Achievable Regional Potential = 65 aMW



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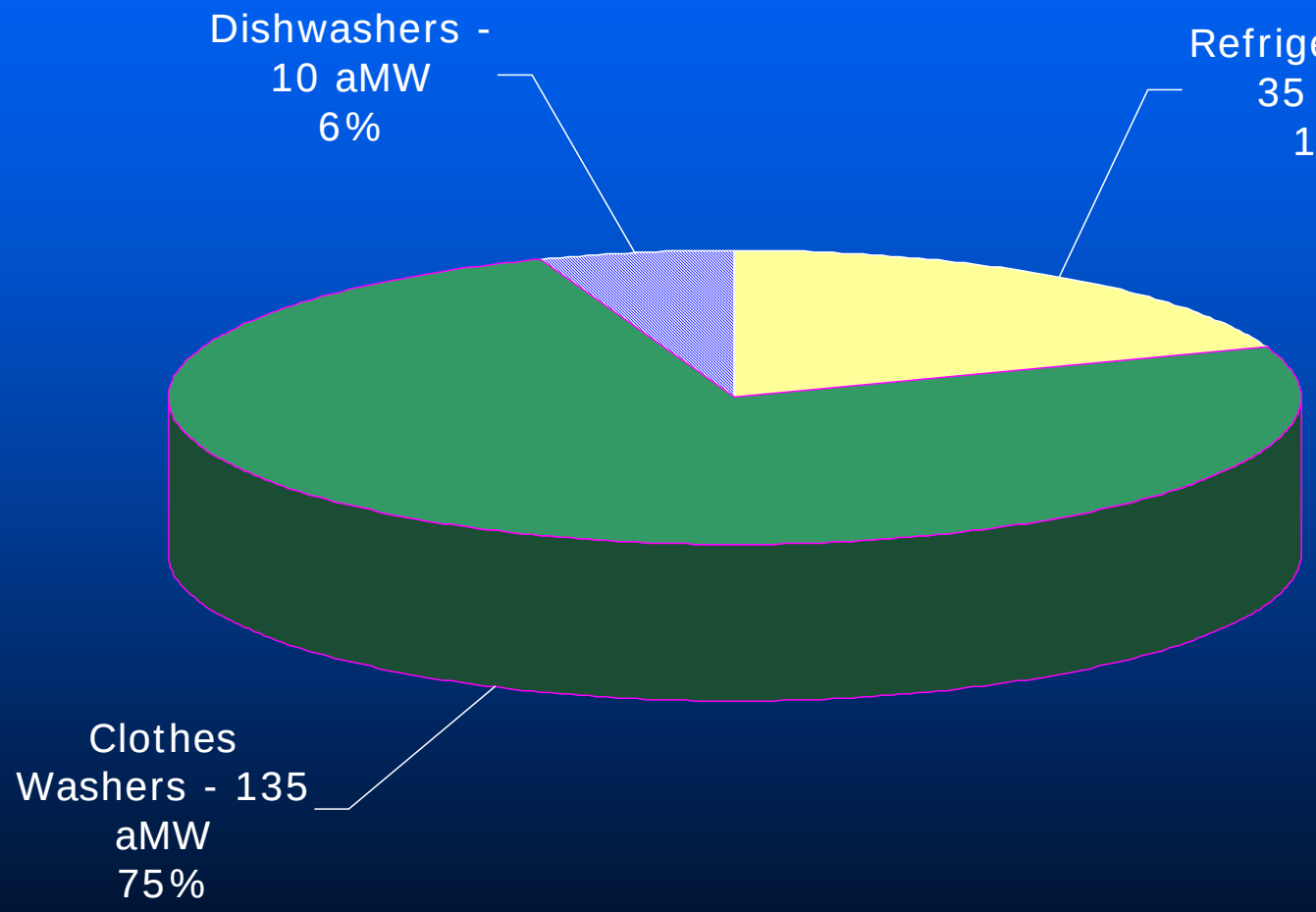
Regional Residential Sector Realistically Achievable Potential for Appliances



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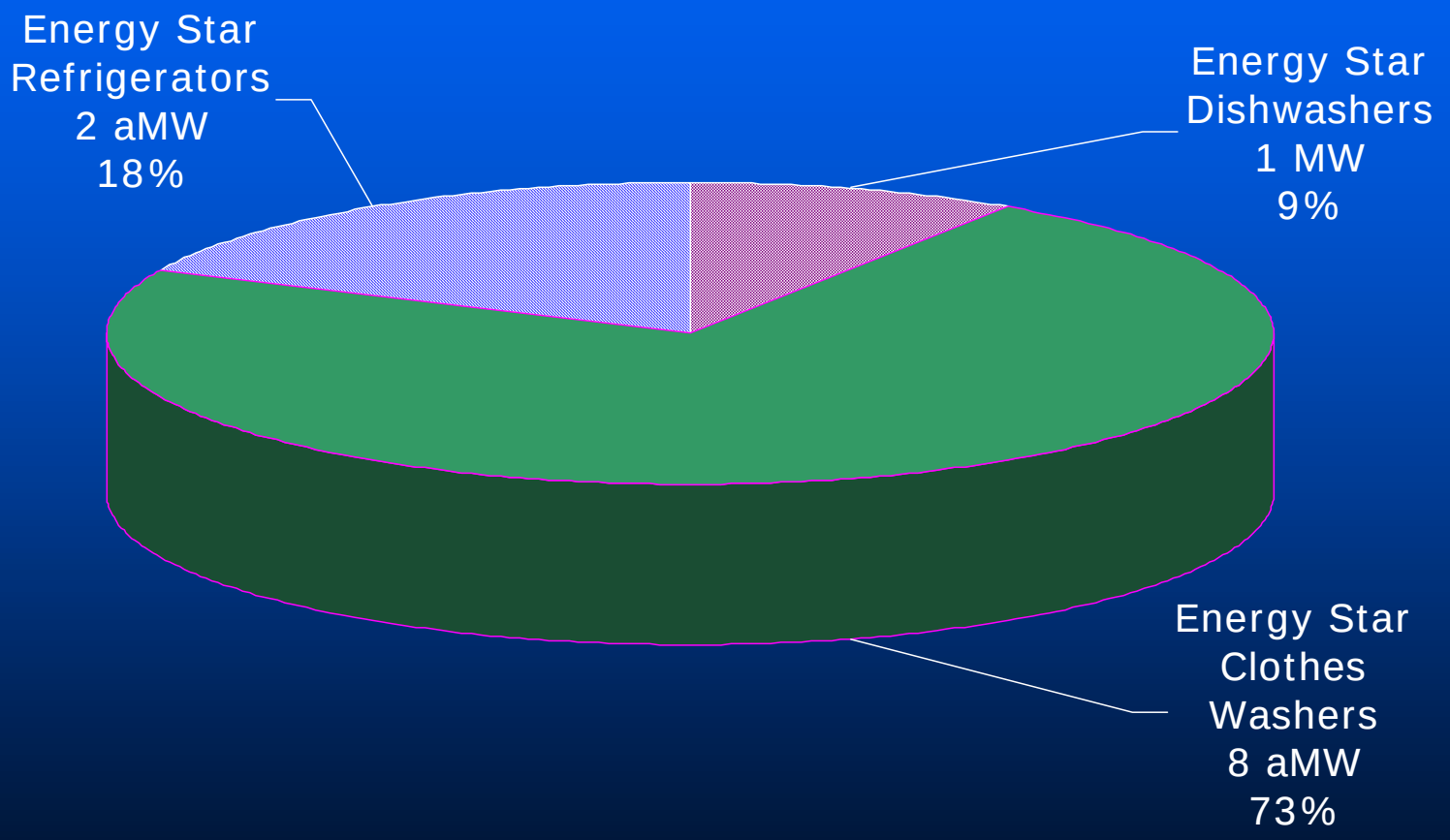
Montana Residential Sector Achievable Conservation Resource Potential for Appliances



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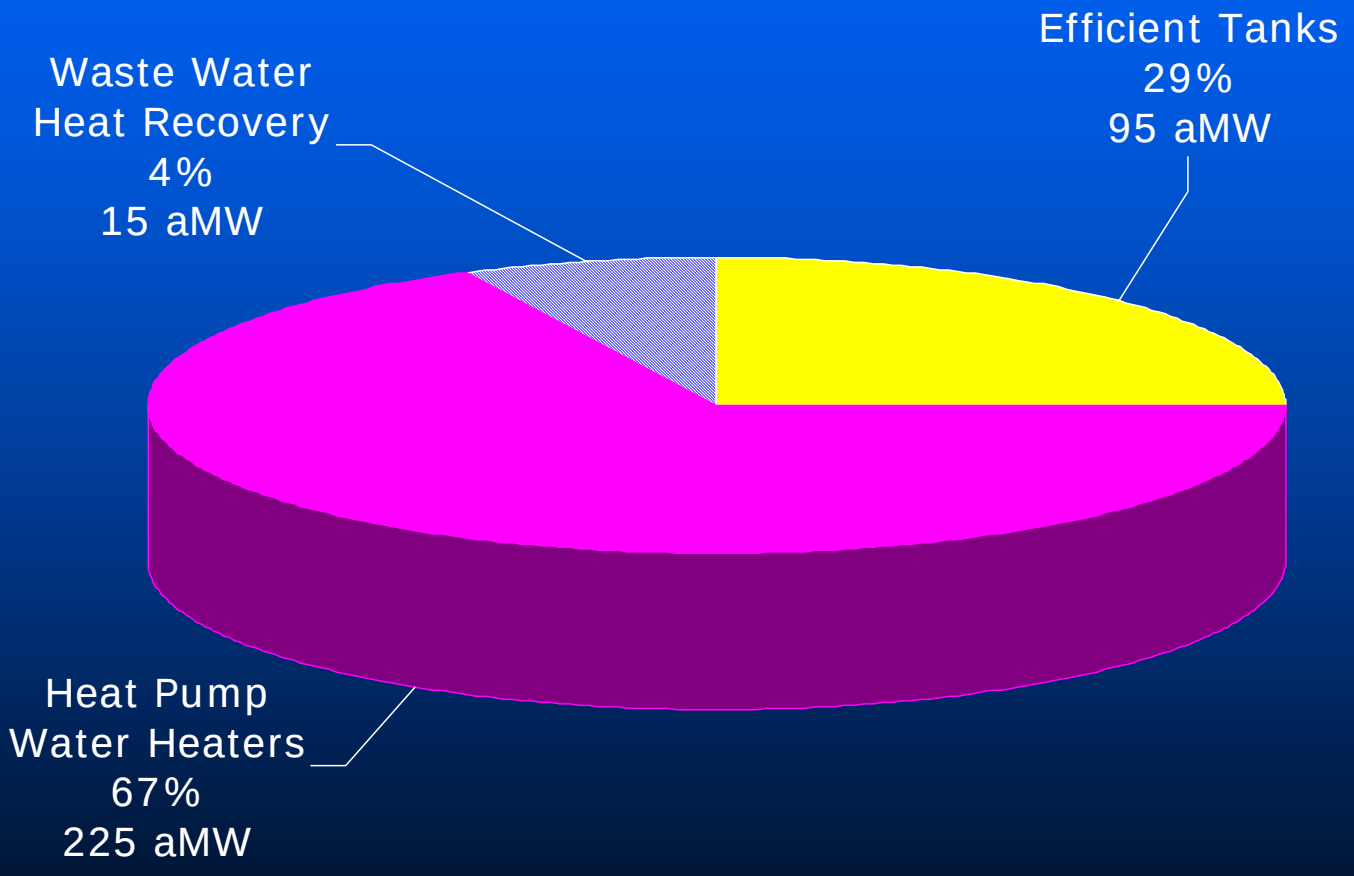
Regional Residential Sector Realistically Achievable Potential for Water Heating



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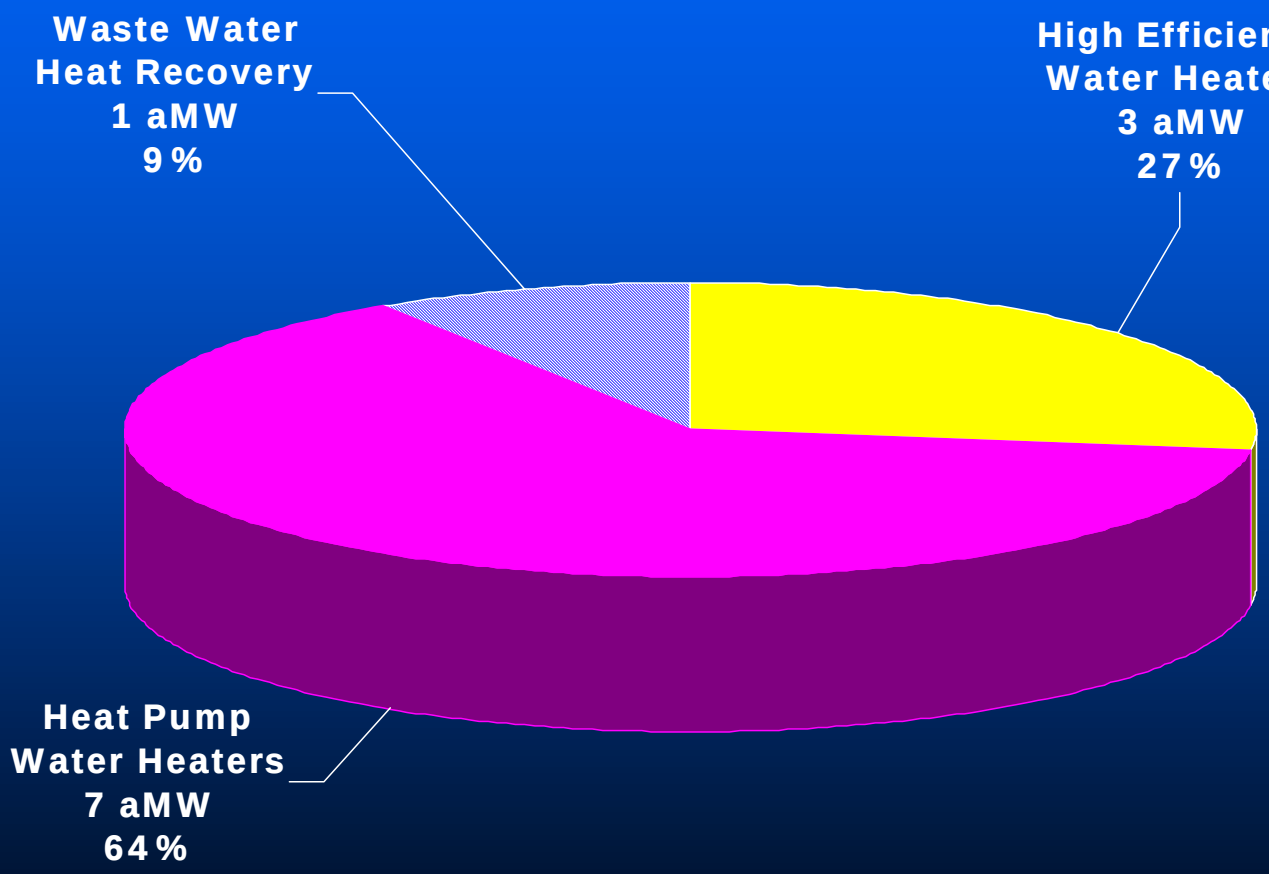
Montana Residential Sector Conservation Resource Potential for Water Heating



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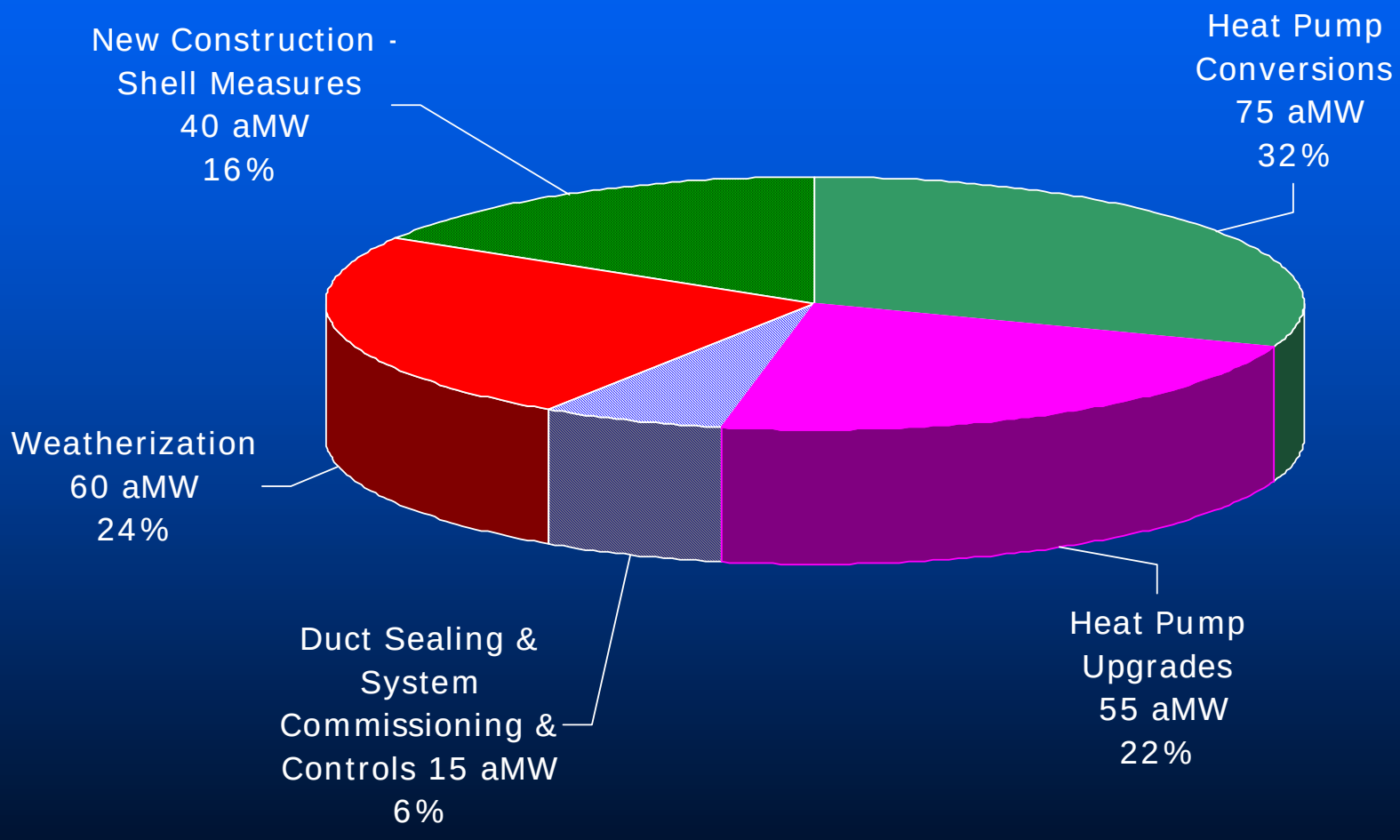
Regional Residential Sector Realistically Achievable Potential for Space Conditioning



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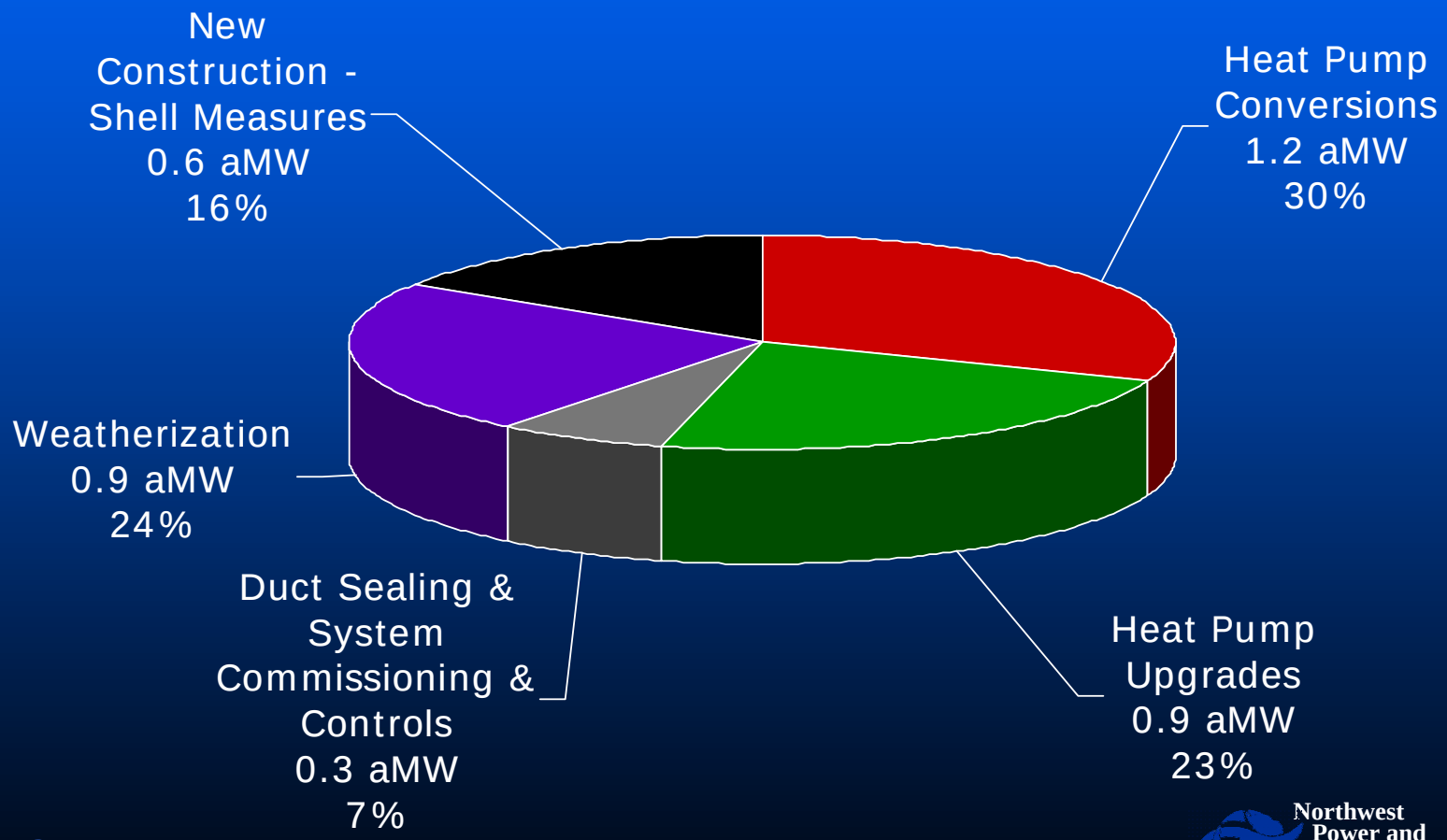
Montana Residential Sector Conservation Resource Potential for Space Conditioning



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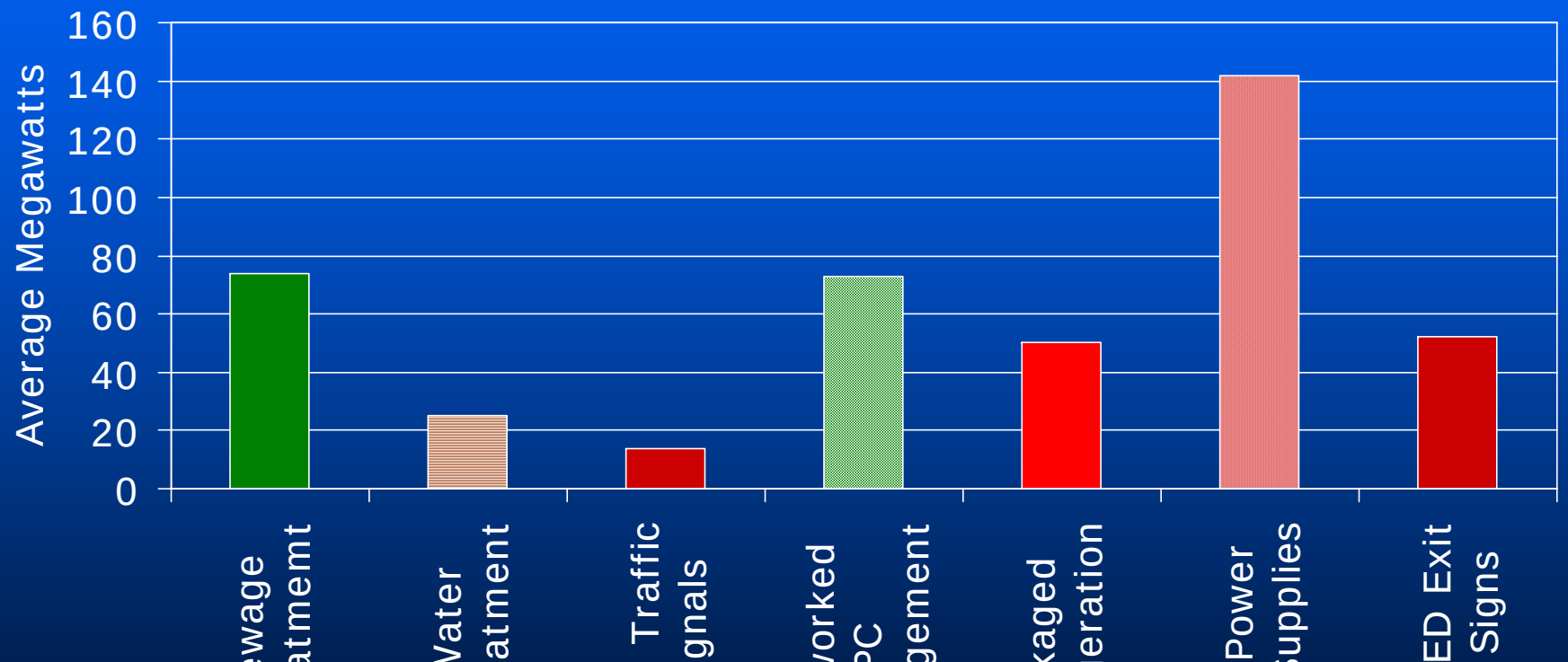
Commercial Sector Results

What's Left To Do At the Office?

95 Average MW

Regional Non-Building Resource Potential = 430 aMW



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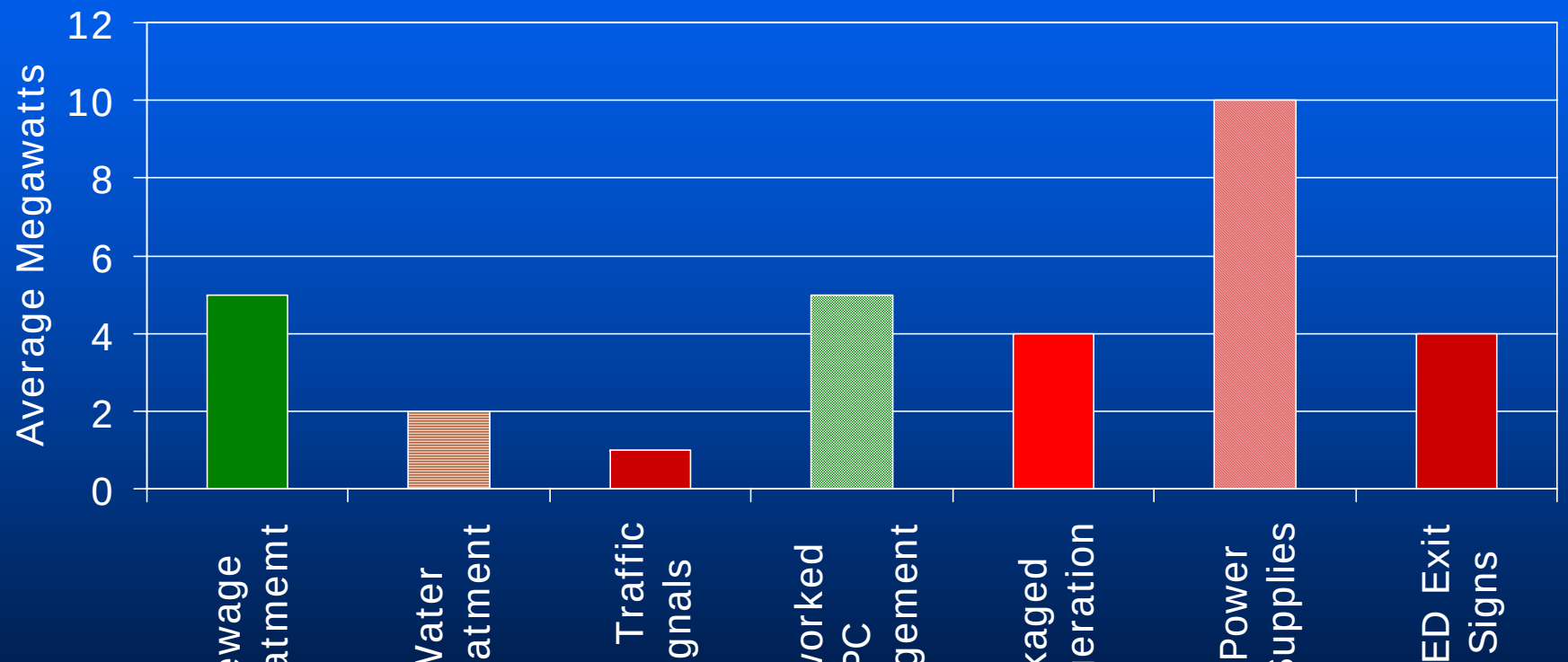
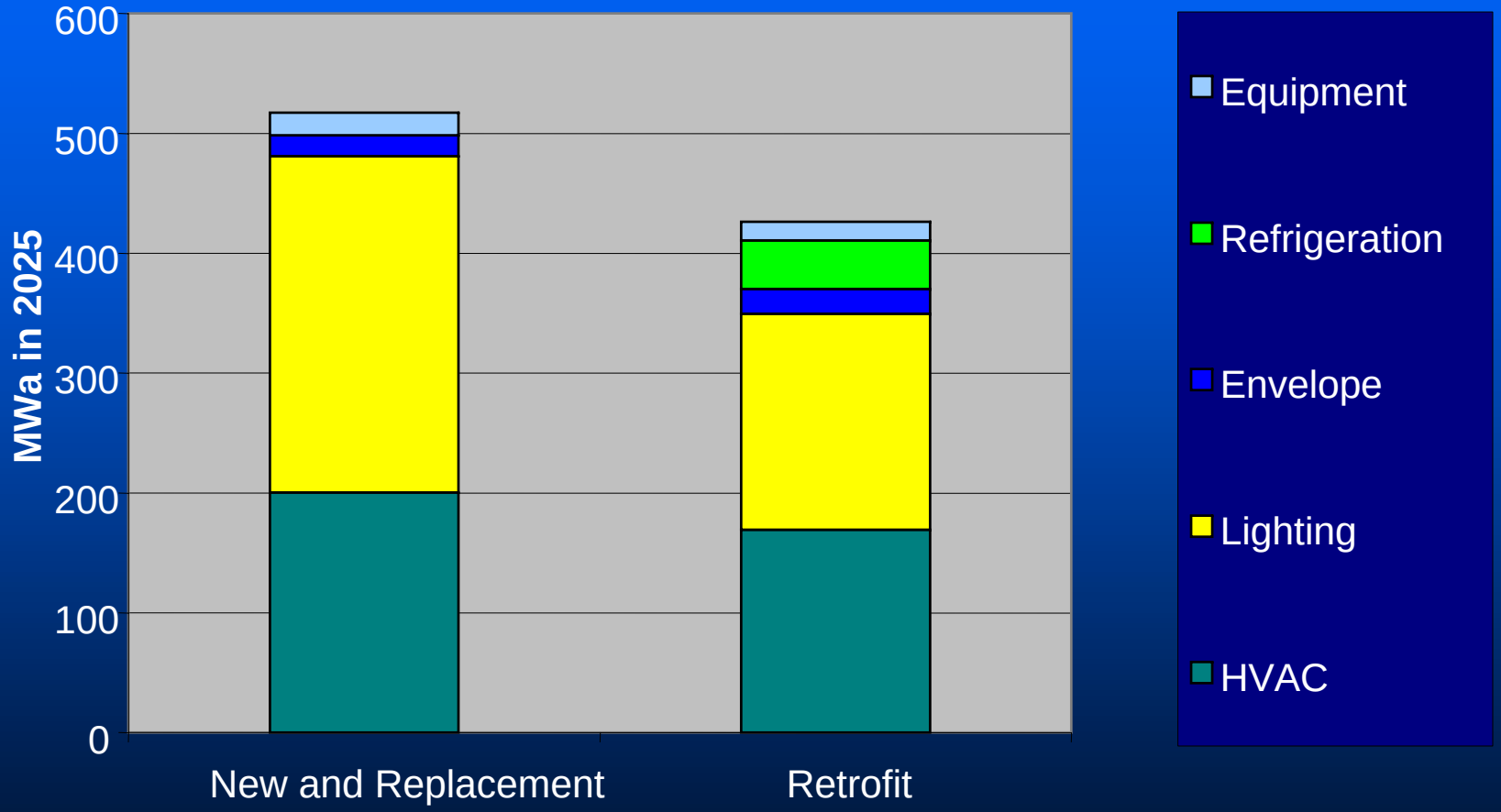
Montana Non-Building Resource Potential = 30 aMW



Northwest Power and Conservation Council

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



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Irrigated Agriculture Sector Results

What's Left To Do Out on the Farm?

>1 Average MW

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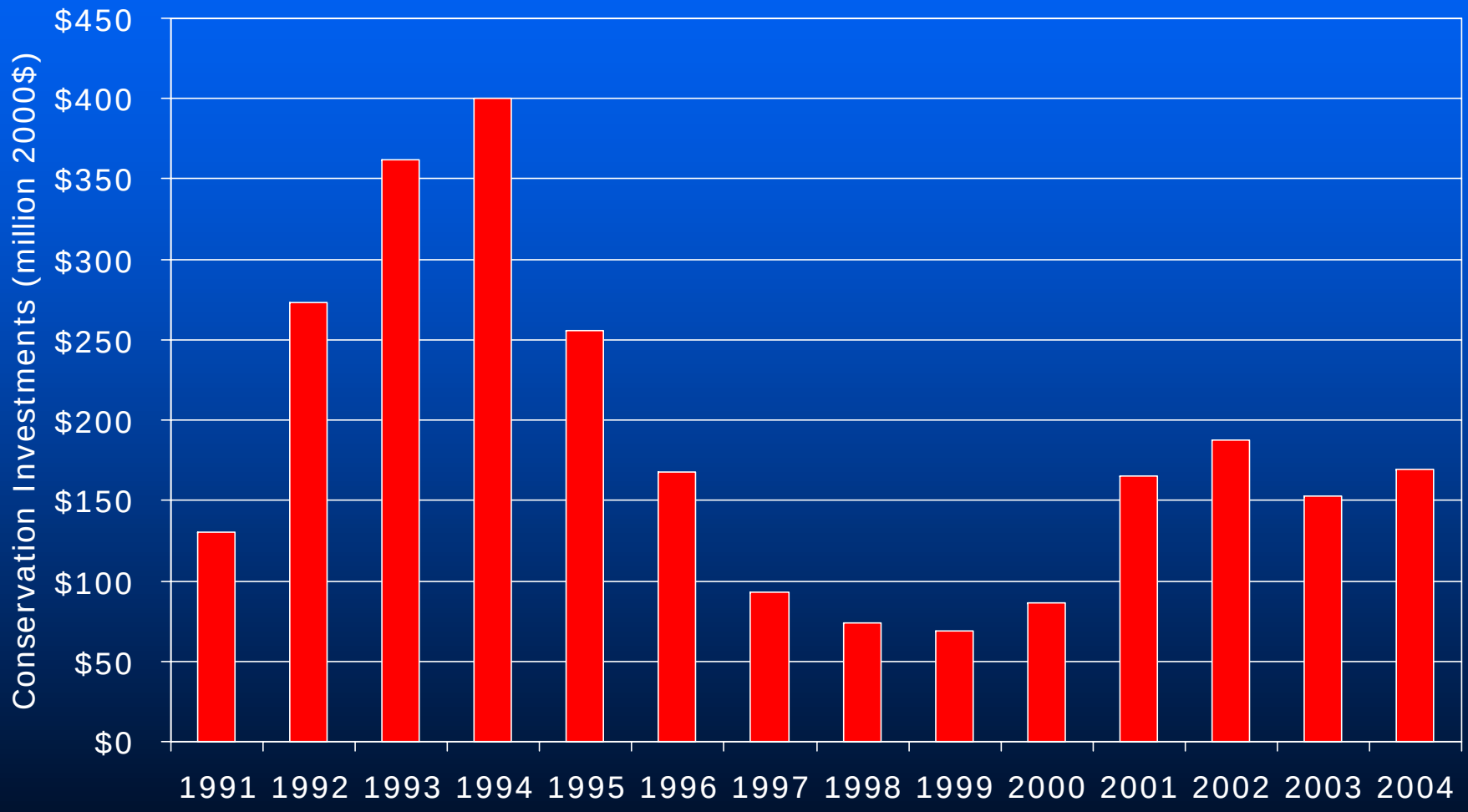
Industrial Sector Assessment

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

= 30 aMW

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



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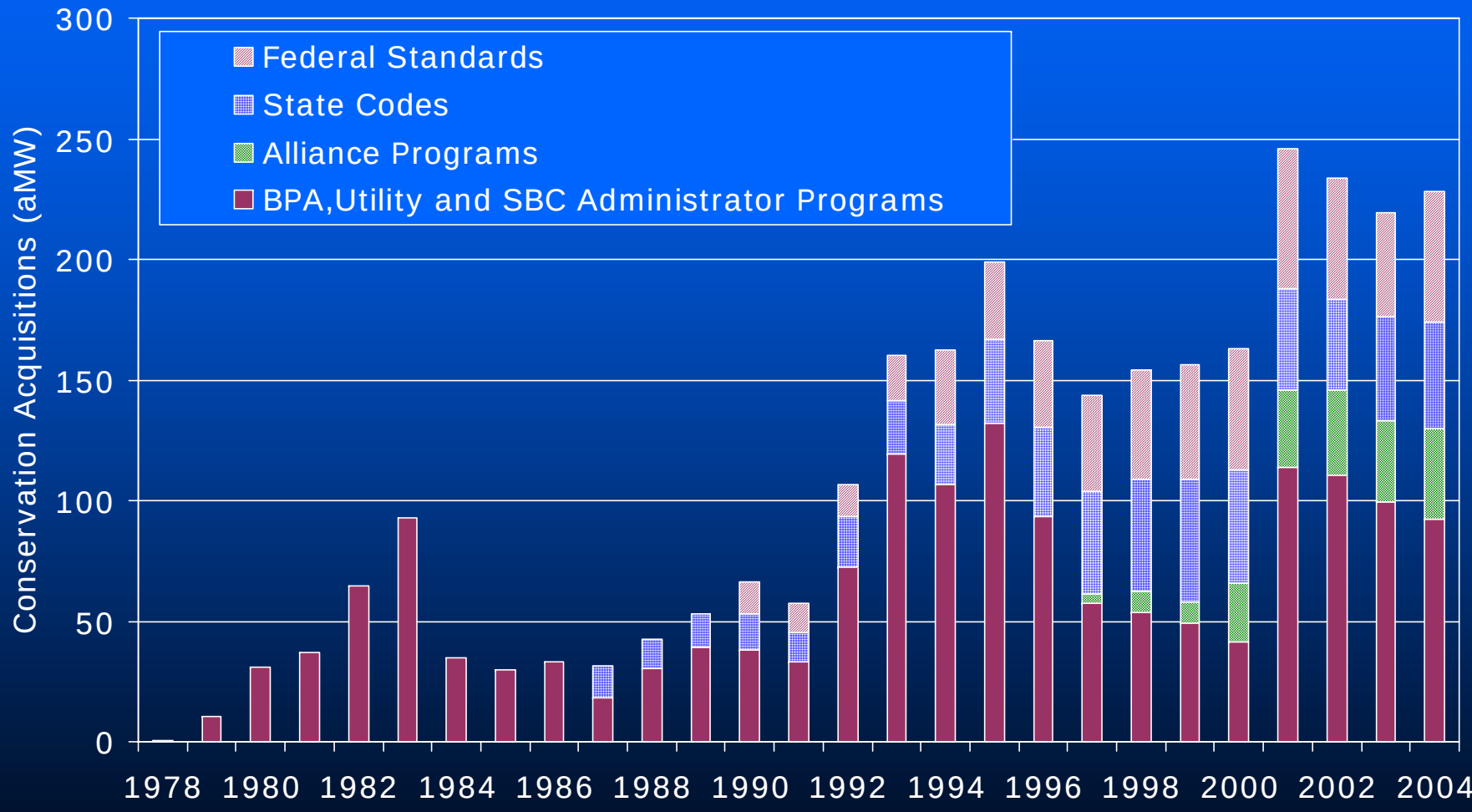
Total PNW Annual Energy Efficiency Achievements Have Been Growing, Largely Due To The Impact of Energy Codes and Standards



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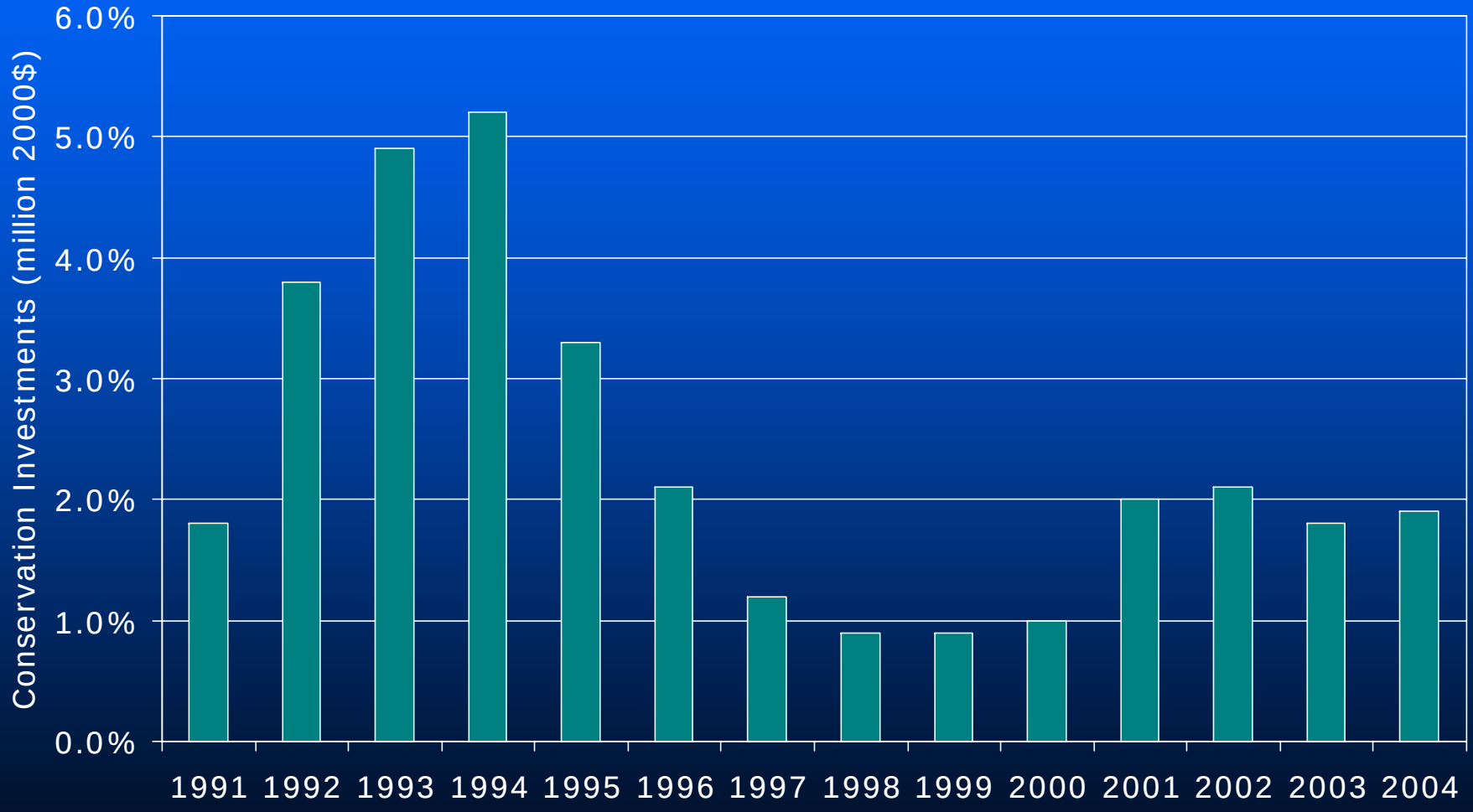
PNW Utilities Now Invests Less Than 2% of Their Retail Sales Revenues in Energy Efficiency



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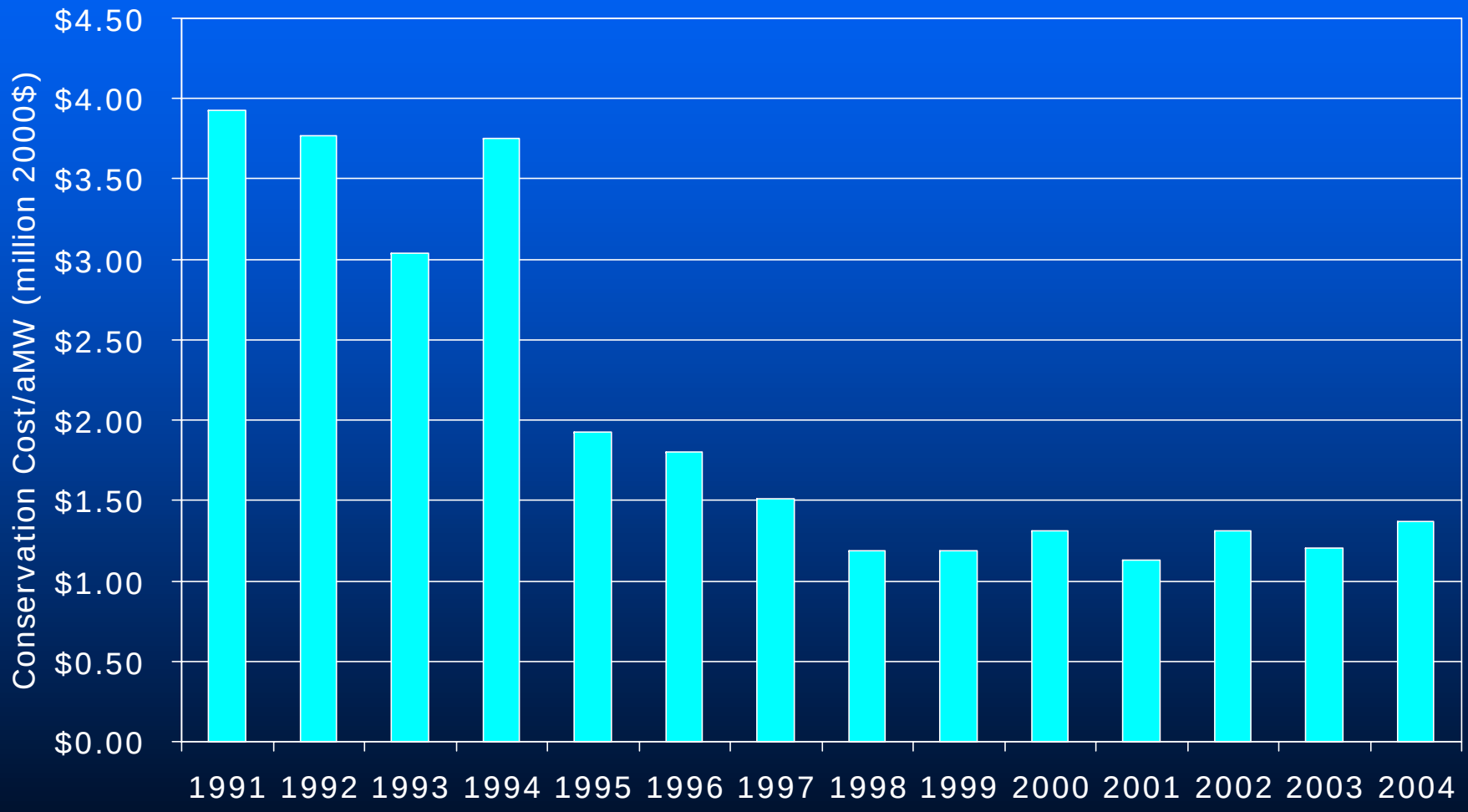
Fortunately . . . The "First Year" Cost ($/aMW) of Utility Acquired Energy Efficiency Has Declined



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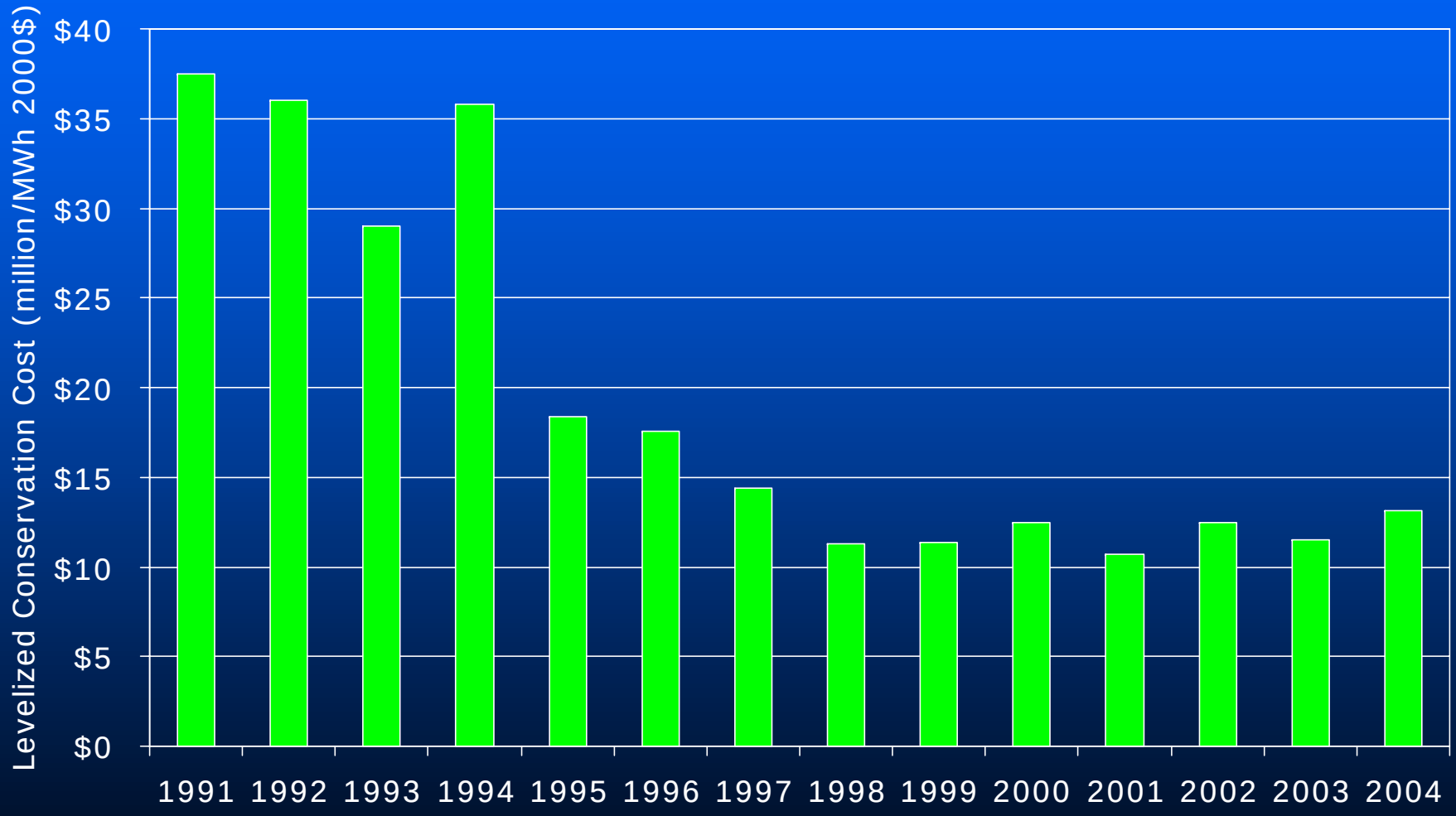
PNW Utilities Have Gotten More Efficient at Acquiring Energy Efficiency - Cost Are Now Below $15 MWH



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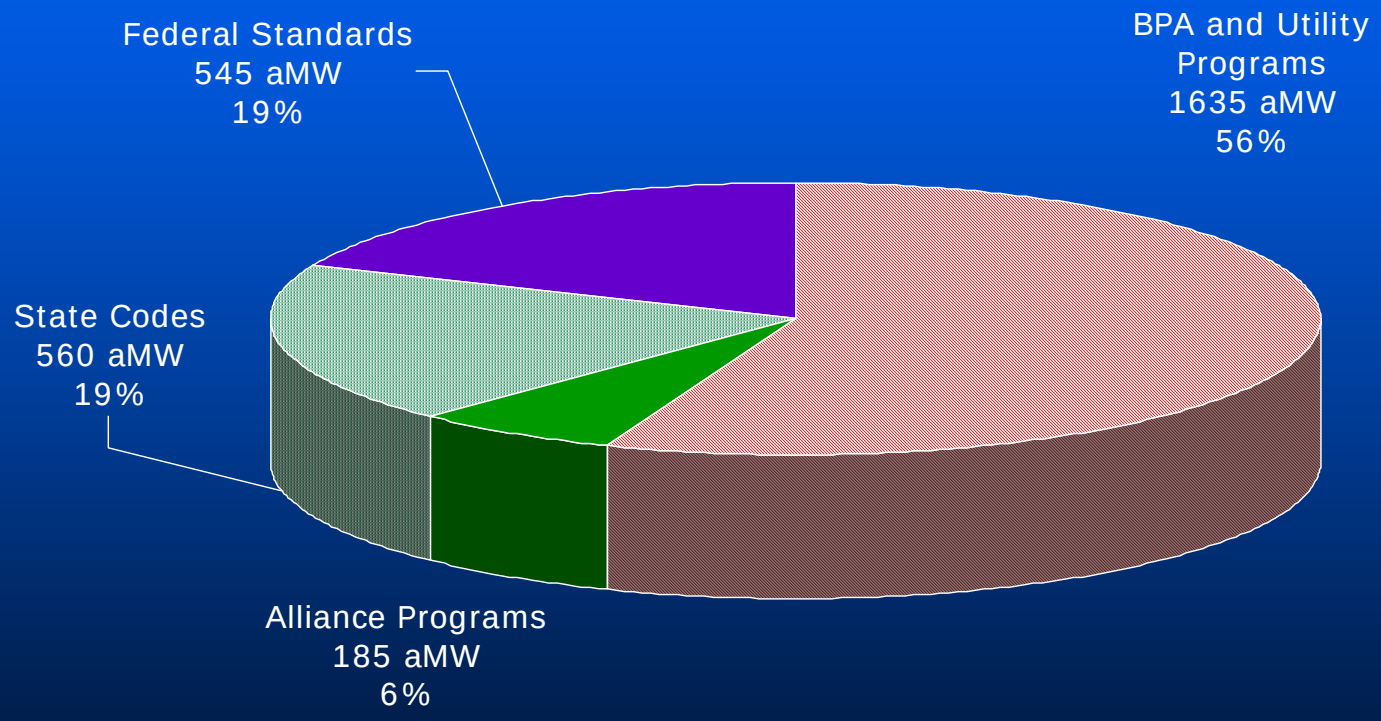
Cumulative 1978 - 2004 Efficiency Achievements by Source



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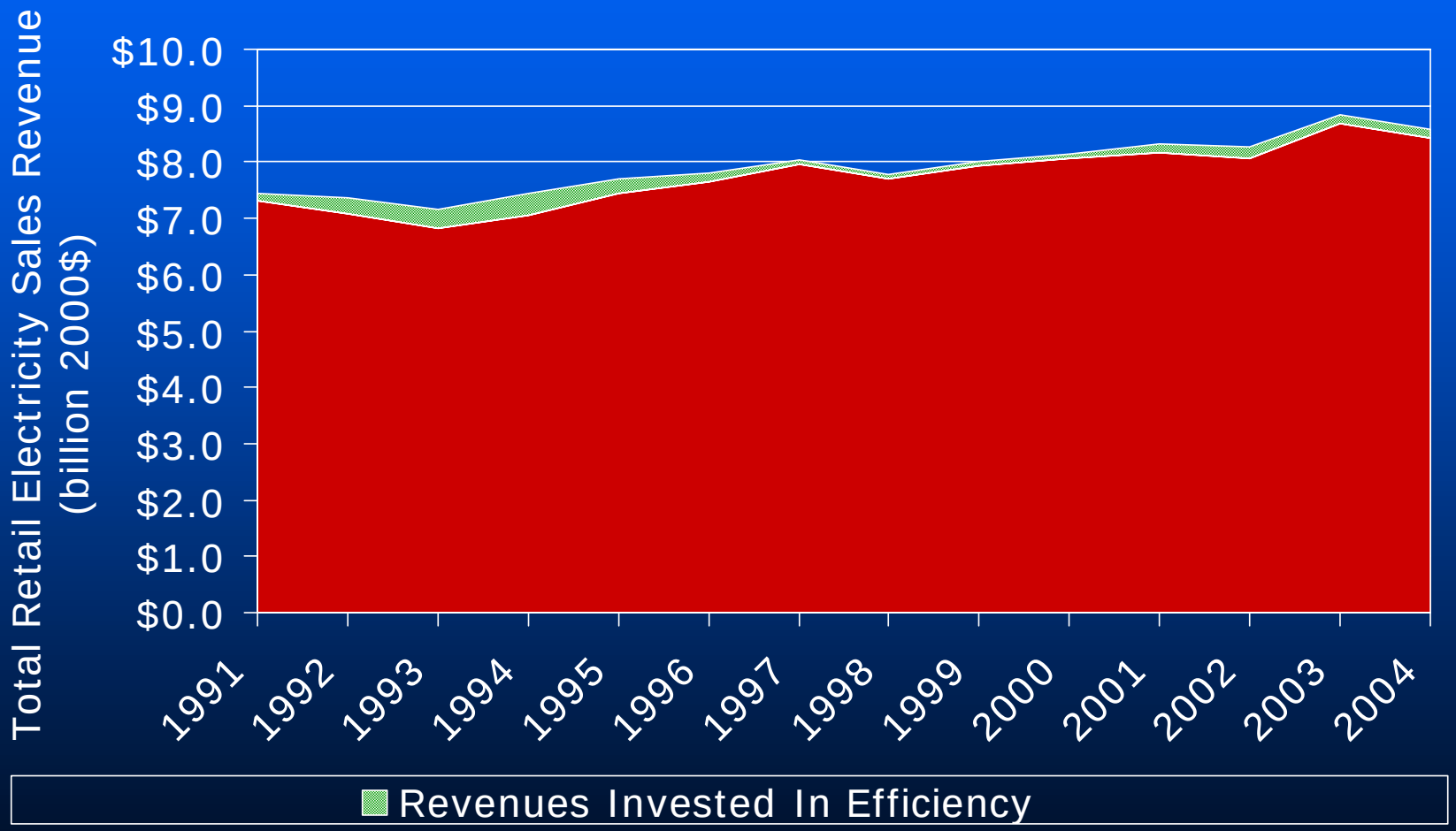
The Share of PNW Retail Electricity Sales Revenues Invested In Energy Efficiency Has Declined Since The Early 1990's



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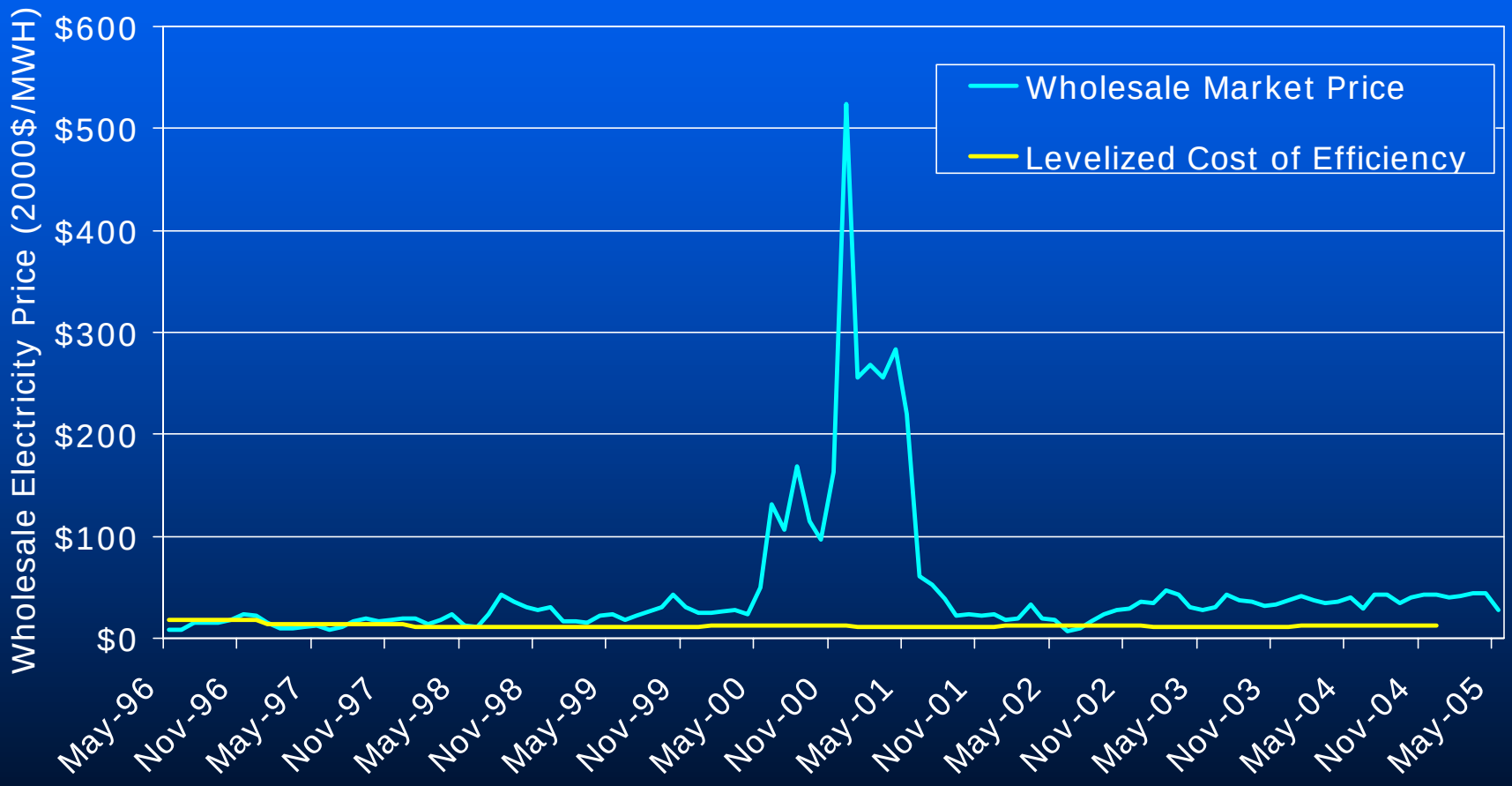
Utility Acquired Energy Efficiency Has Been Cost-Competitive with Market Purchases



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