Conservation Resources in the Draft 5th Northwest Power Plan

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Manager, Conservation Resources
Northwest Power and Conservation Council

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What You're About To Hear

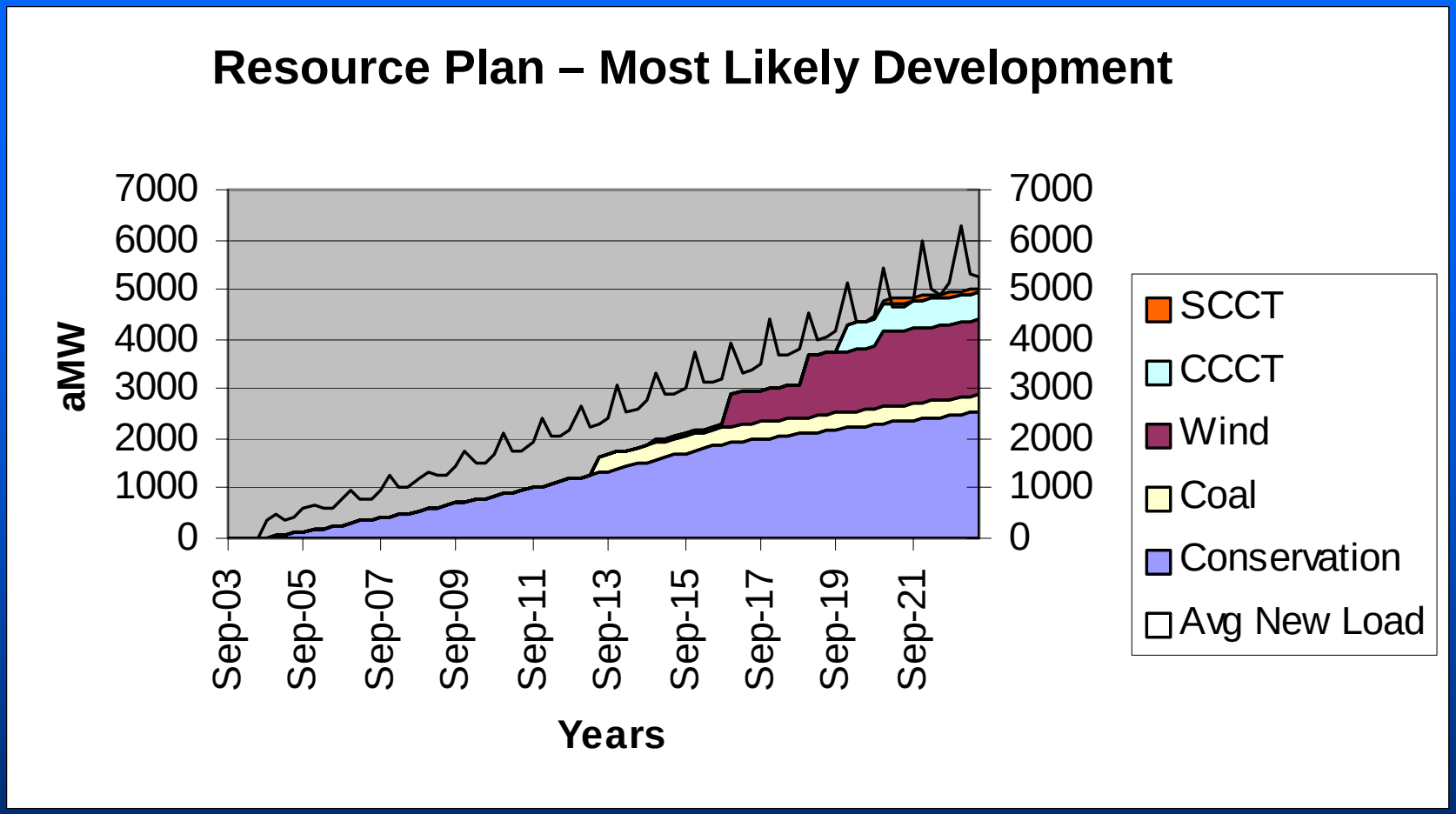
- Brief summary of Draft Regional Power Plan
- Conservation Resources in the Draft Plan
  - What we've done over the last two decades
  - How much is left to do
  - What it's worth
  - What it means for actions

Brief Summary of Draft Power Plan
Actions for next 5 years 2005-2009

- Develop 700 aMW of conservation
- Develop 500 aMW of demand response
- Develop cost-effective cogen & renewables
- Maintain an inventory of ready-to-construct coal & wind generation for post 2009
- Plan for needed transmission & improve use of existing transmission

Brief Summary of Draft Power Plan
Actions for next 5 years 2005-2009

- Confirm cost & availability of promising resources
  - Oil sands cogen, coal gasification, carbon sequestration, energy storage, high-efficiency cogen & renewables
- Set policies to ensure ability to develop resources
  - Adequacy targets, transmission issues, role of BPA
- Monitor key indicators that signal changes in plans
  - Loads & resources, conservation development, wind cost & availability, climate change science and policy



- Mean of build-out
- But future conditions can change build-out
  - Gas prices, CO2 control, conservation accomplishments

ES-10

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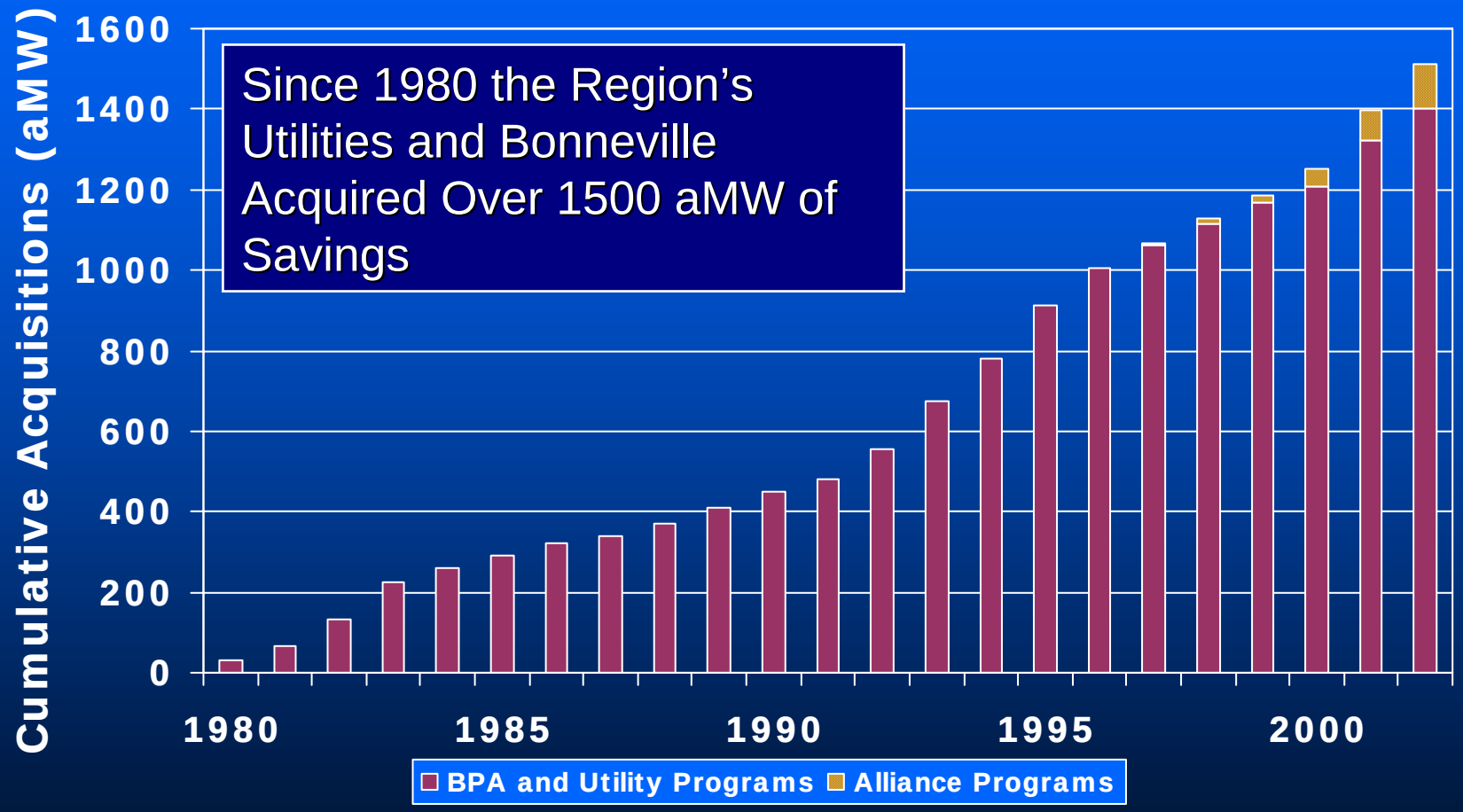
What We've Done So Far

Progress Under the Act – Bonneville and Utility Accomplishments



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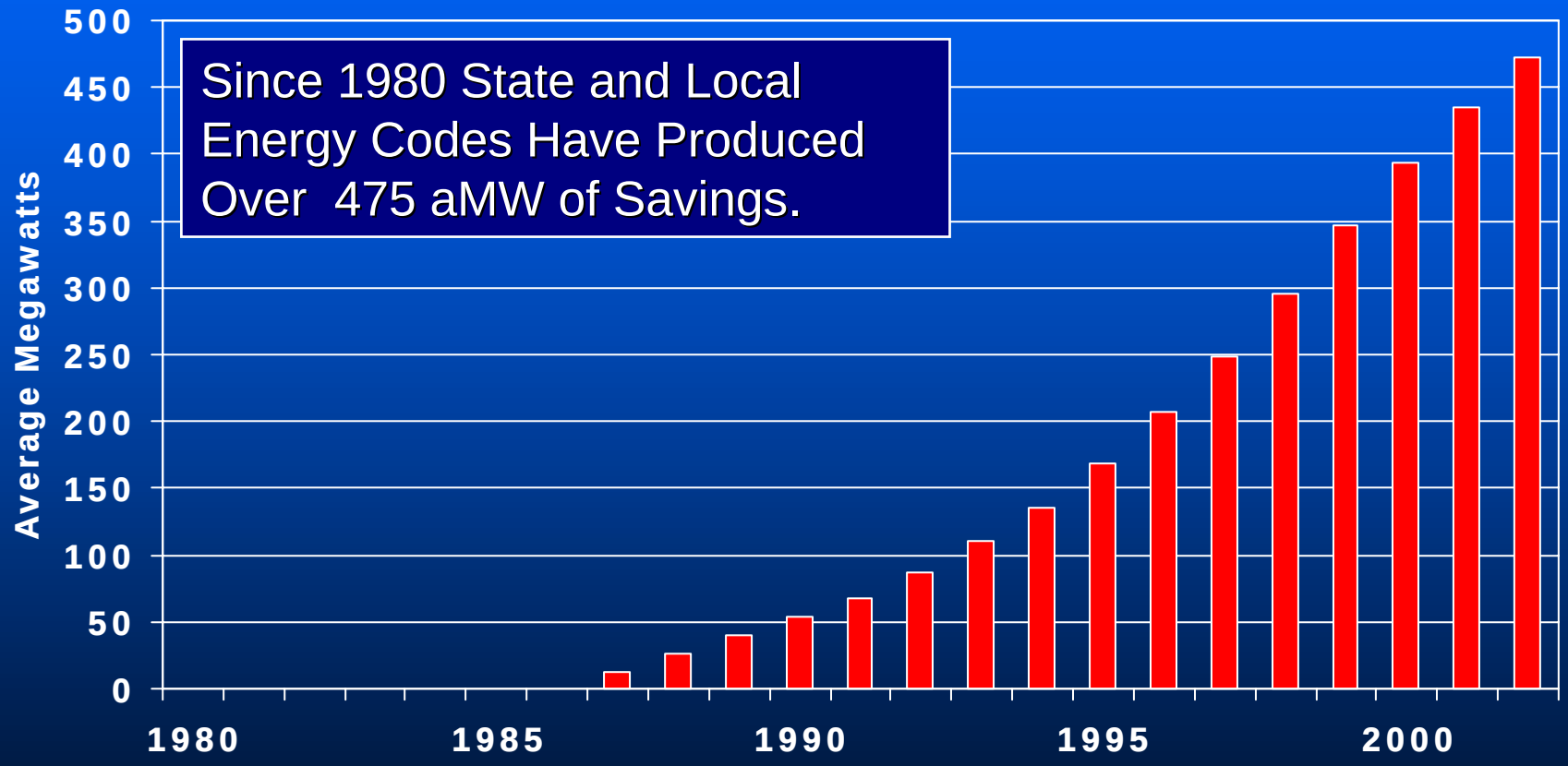
Progress Under the Act – State Energy Code Accomplishments



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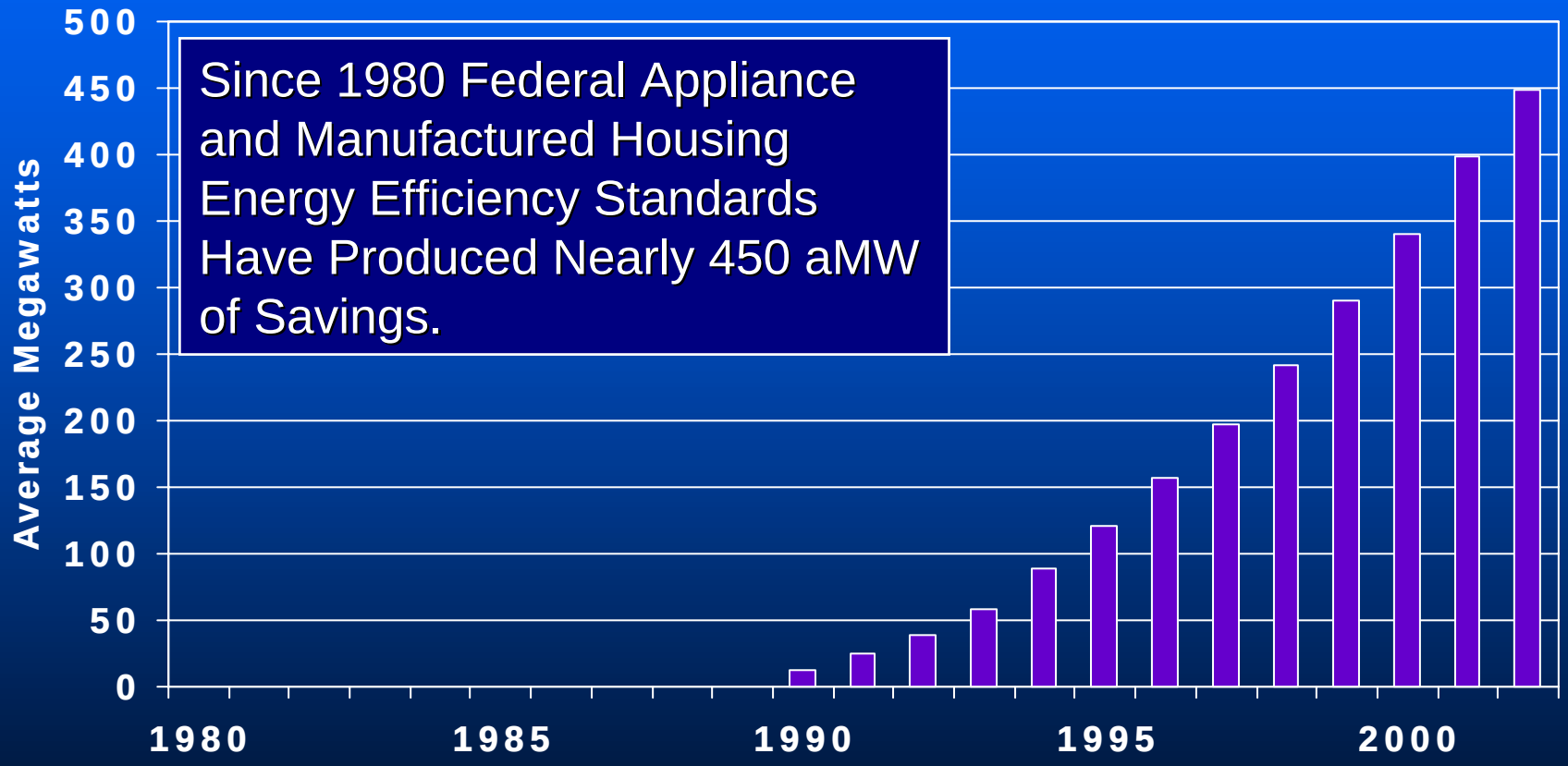
Progress Under the Act – Federal Energy Efficiency Standards Accomplishments



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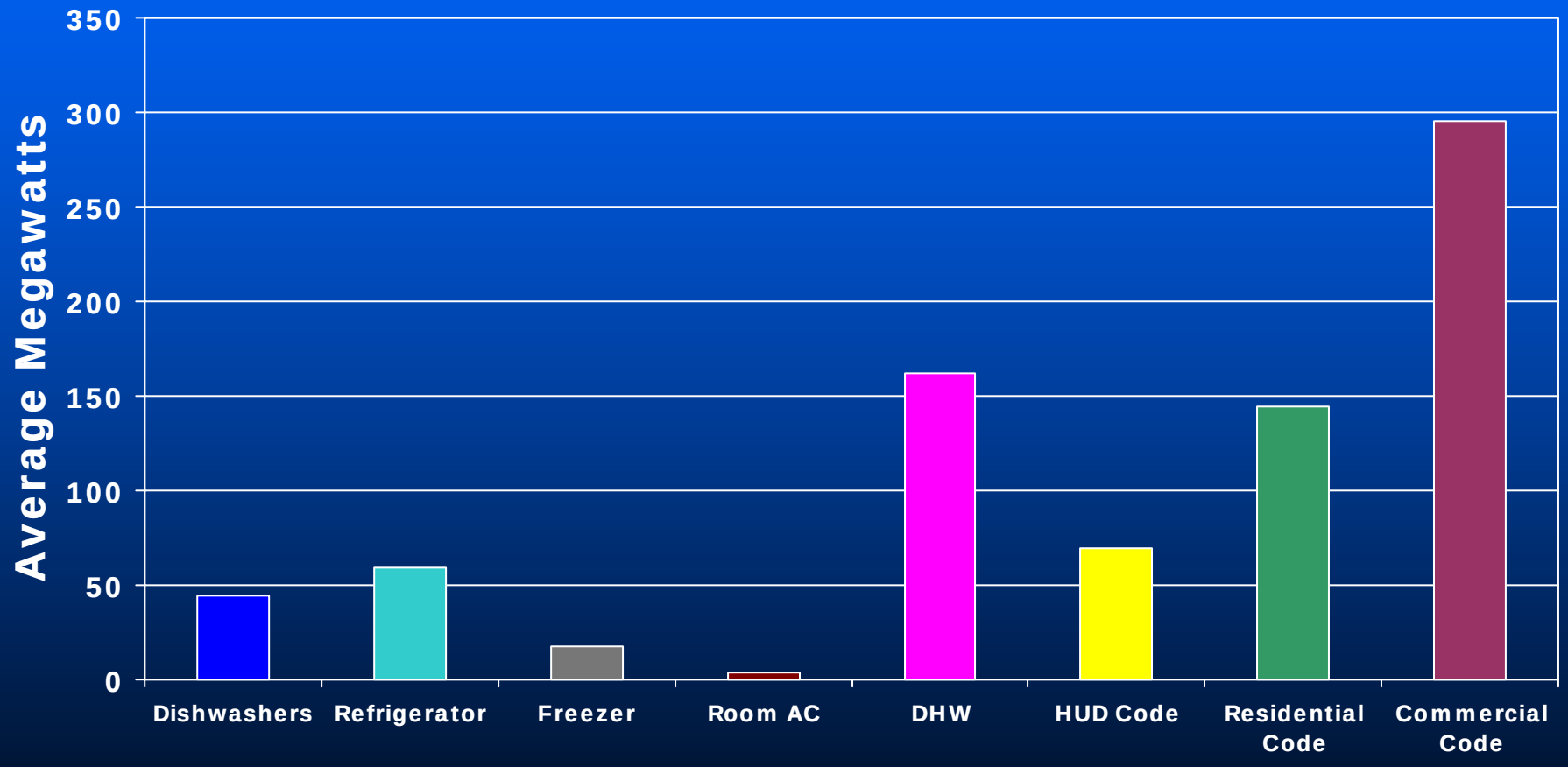
PNW Savings from Codes and Efficiency Standards 1980-2002



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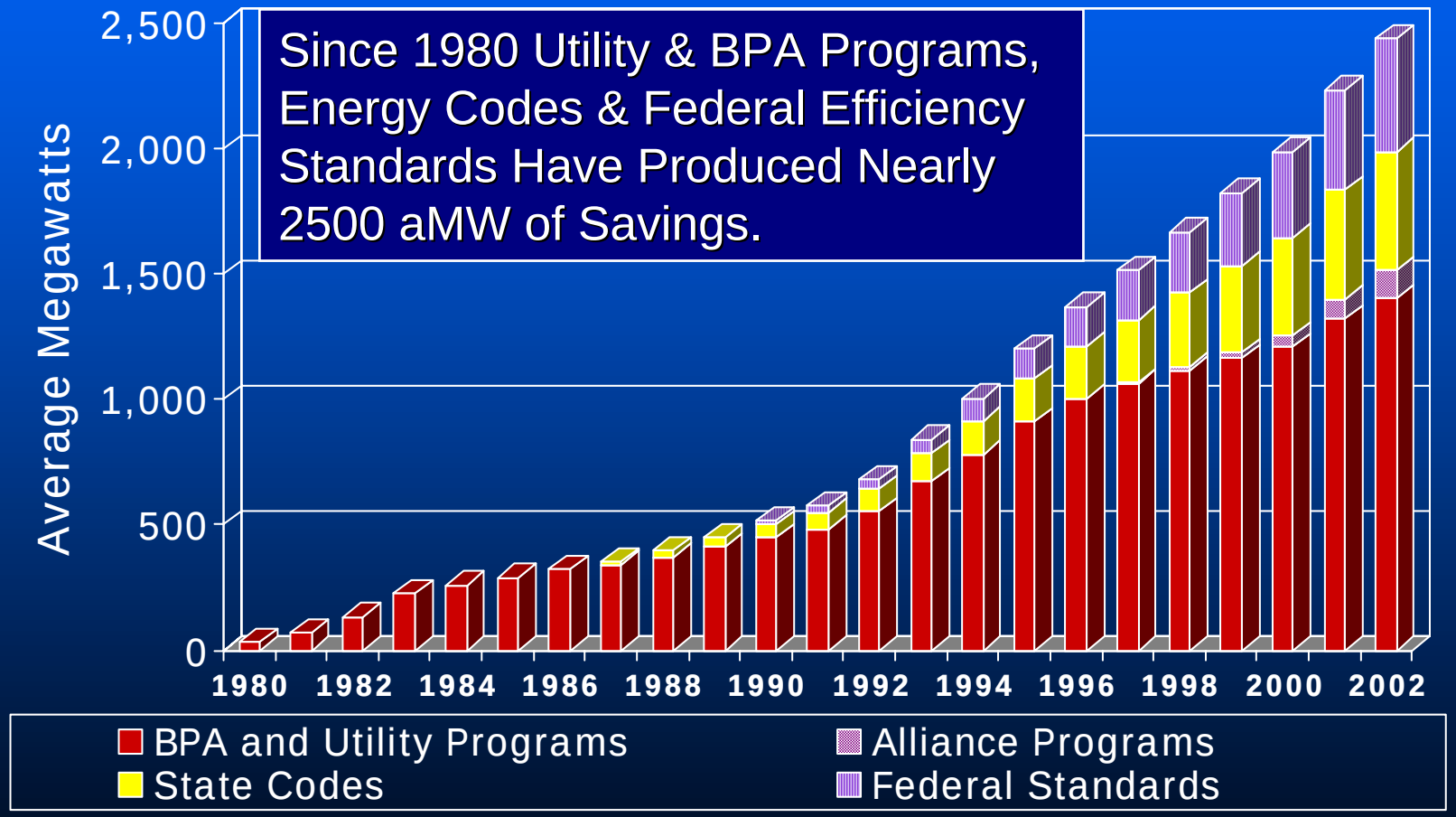
Progress Under the Act – Total PNW Conservation Savings



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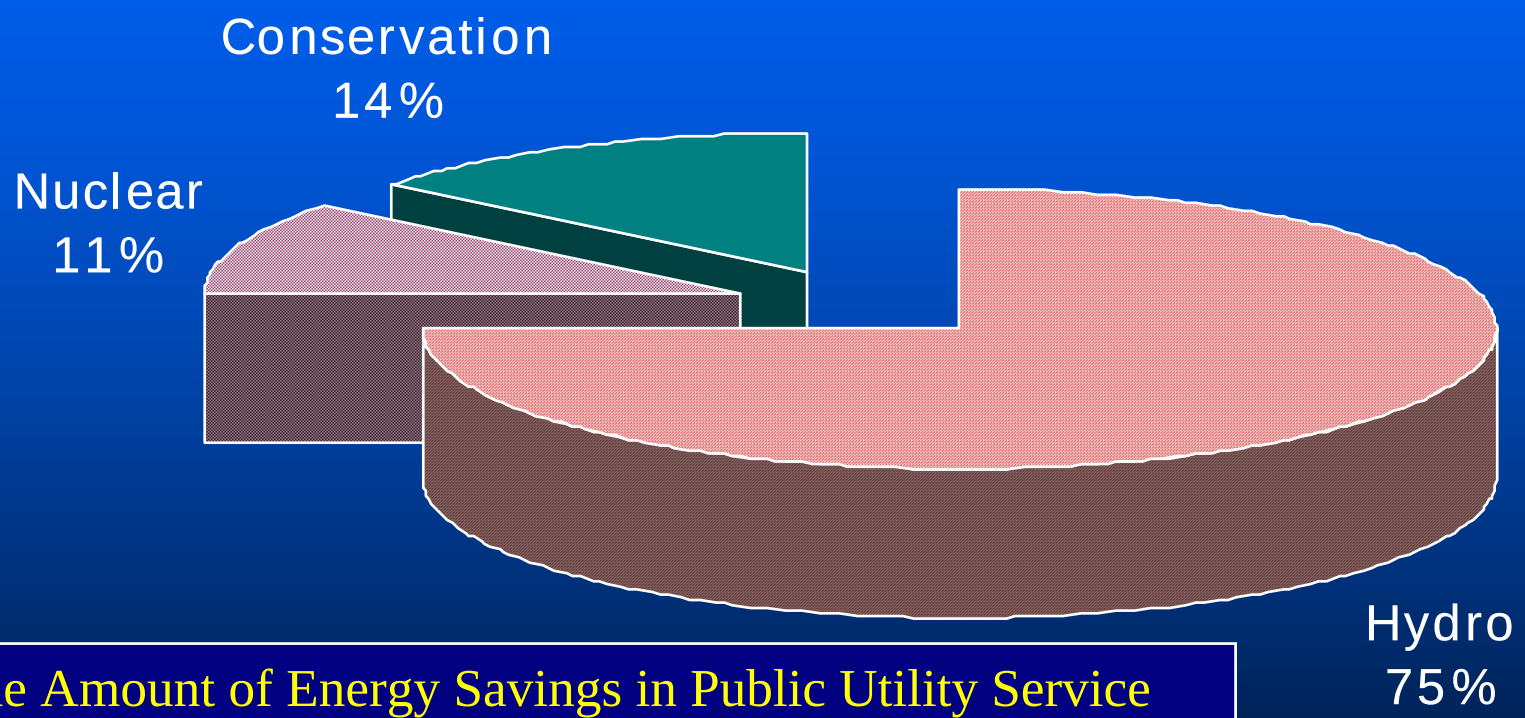
Conservation Now Supplies Over 10% of the Region's Electricity Service Needs

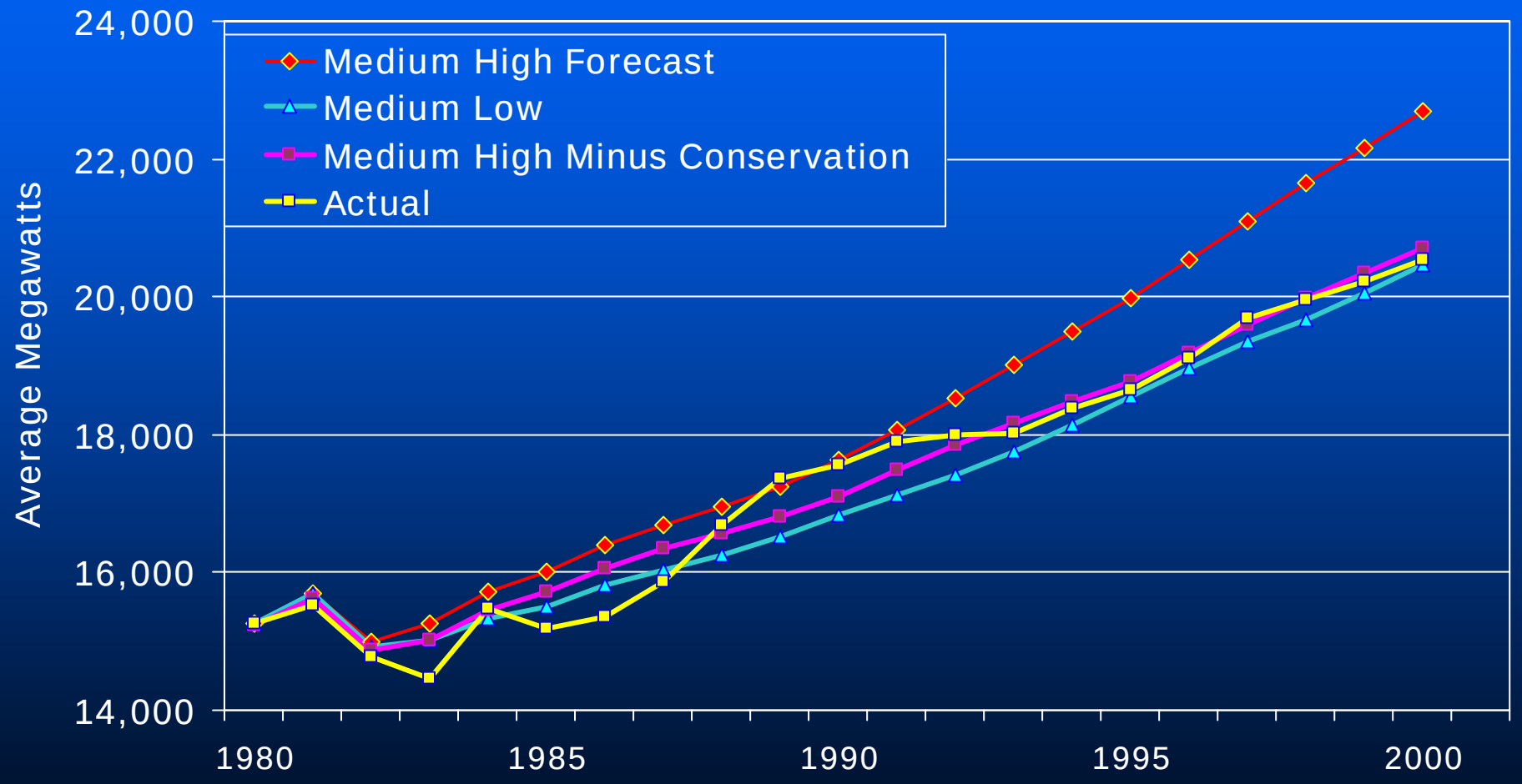
	2000	2001
PNW Electricity Sales (MWa)	21,035	18,015
PNW Conservation (MWa)	2,245	2,450
Total PNW Electricity Services (MWa)	23,280	20,465
Share of Electricity Services Met by Conservation	10%	12%

Conservation Is Now The *Second* Largest Single Federal Power Firm Energy Resource



The Amount of Energy Savings in Public Utility Service Territories from Conservation Programs, Codes and Standards Is Equivalent to ***Three Times*** the Annual Firm Energy Output of Bonneville Dam

Conservation Significantly Reduced Projected PNW Electricity Sales



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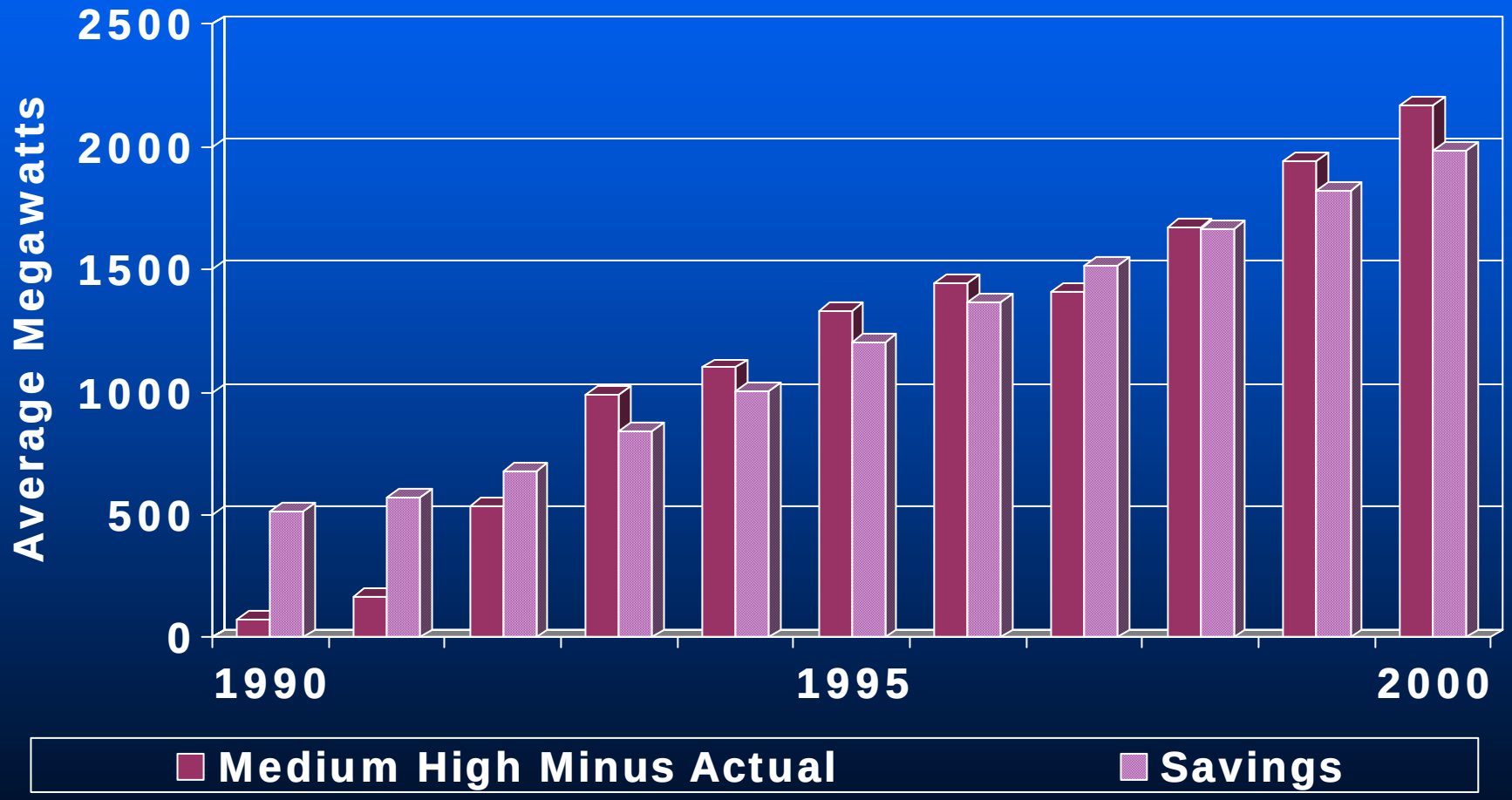
Annual Conservation Savings Compared to Difference Between 1983 Medium-High Forecast and Actual Sales



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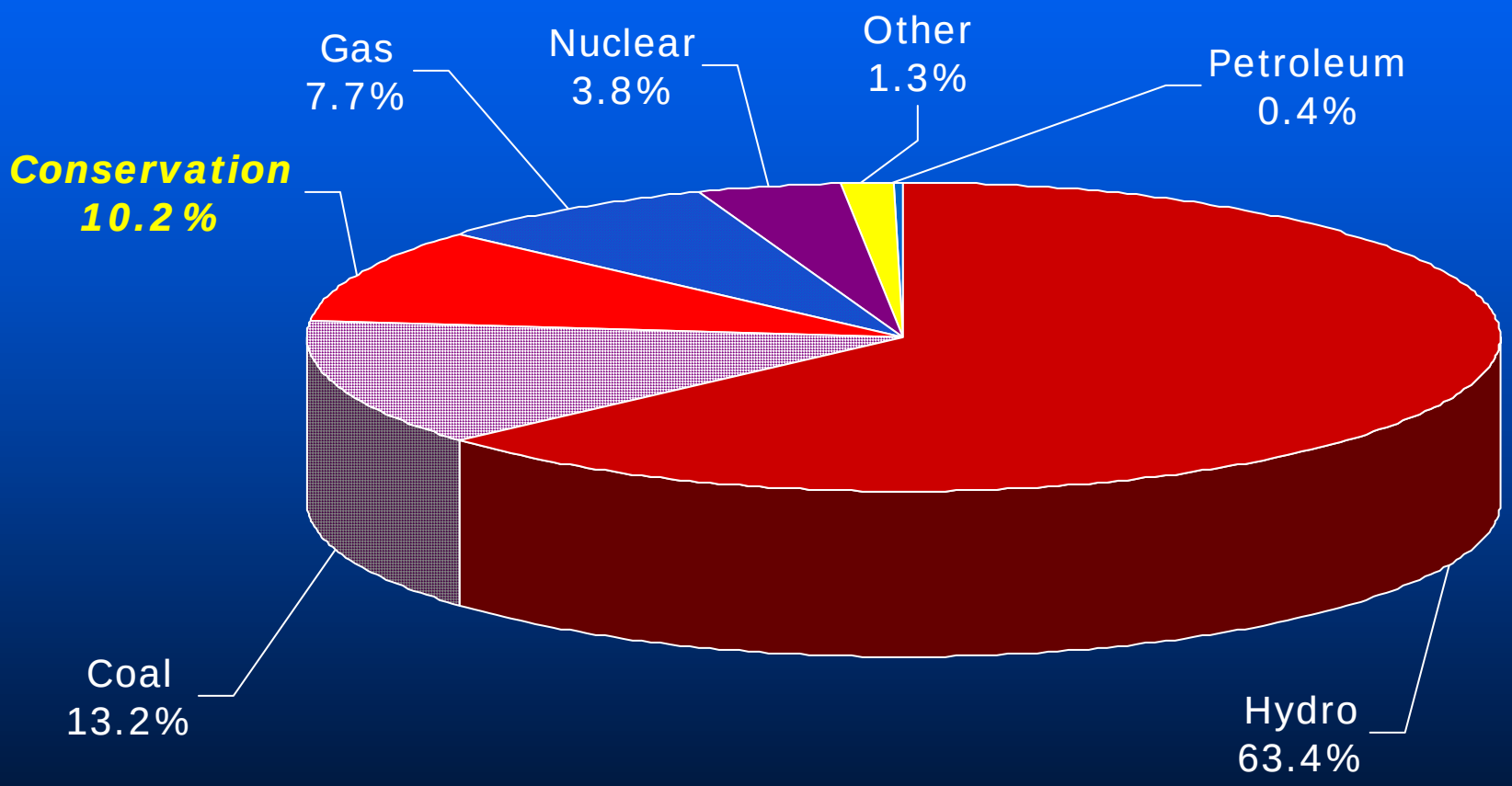
Conservation Was The Northwest's *Third* Largest Source of Electricity Supply in 2000



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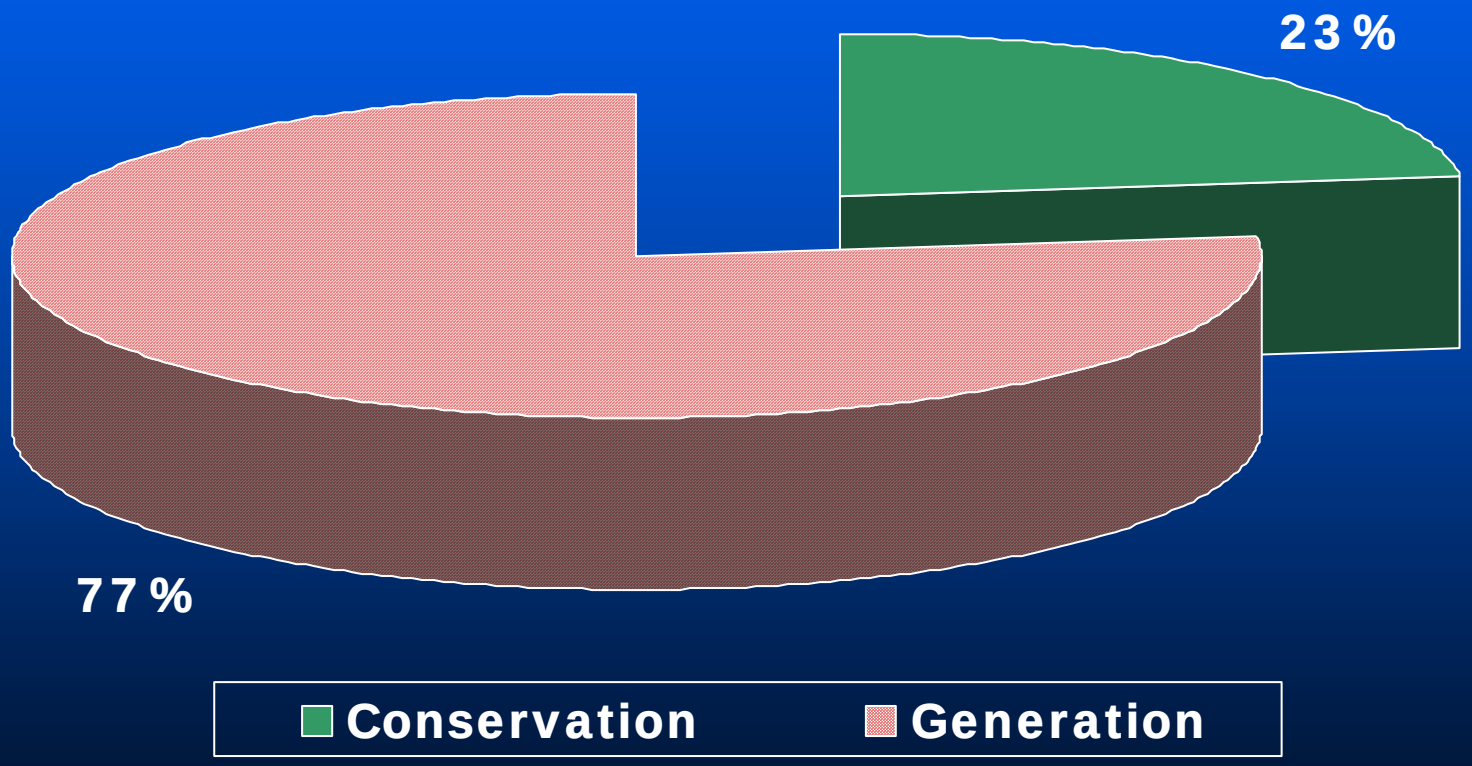
Conservation Met Approximately 1/4 of the Regional Load Growth Between 1980 - 2002



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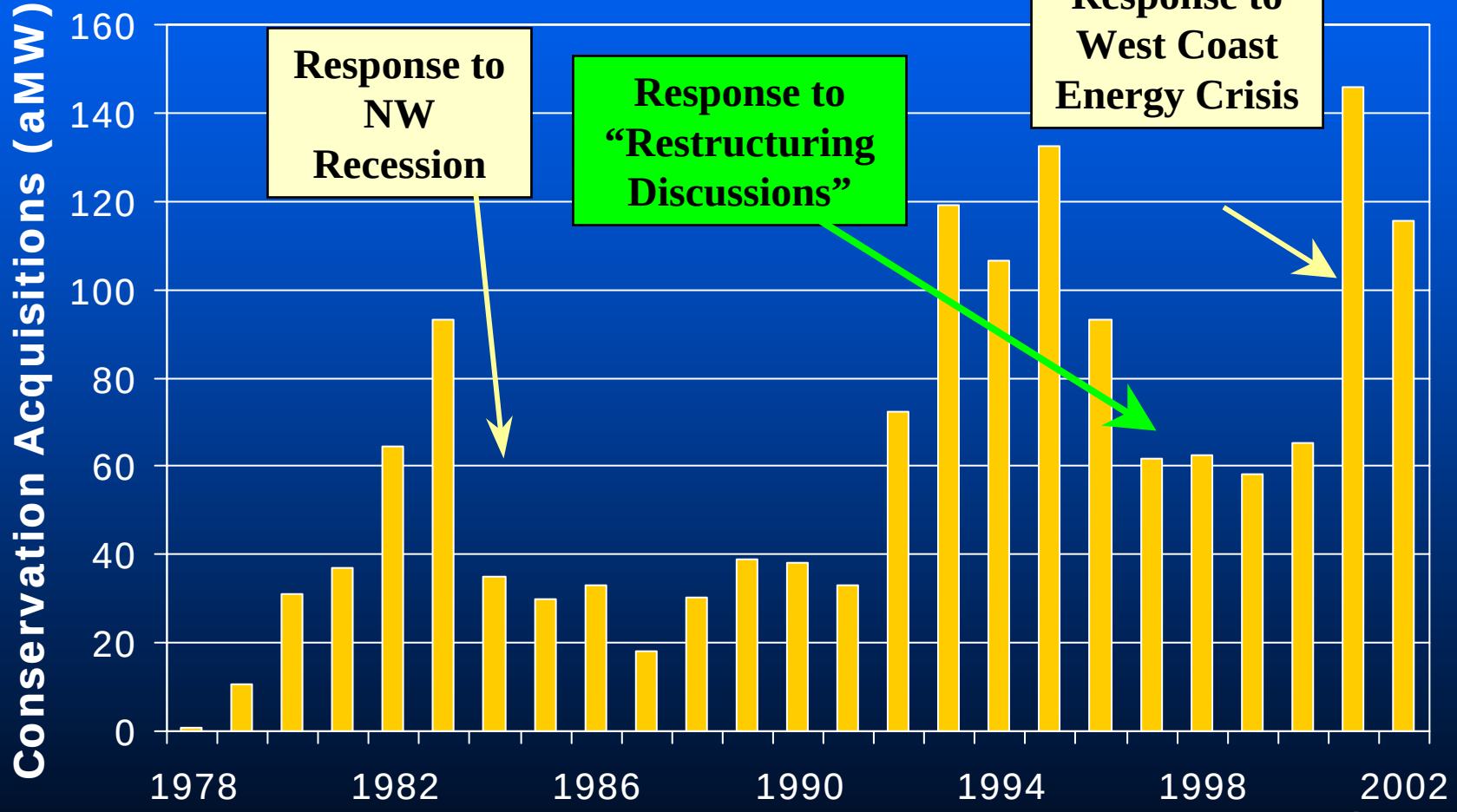
Regional Utility Conservation Acquisitions Have Also Helped Balance Loads & Resources

(Creating *Mr. Toad's Wild Ride for the Energy Efficiency Service Industry)*



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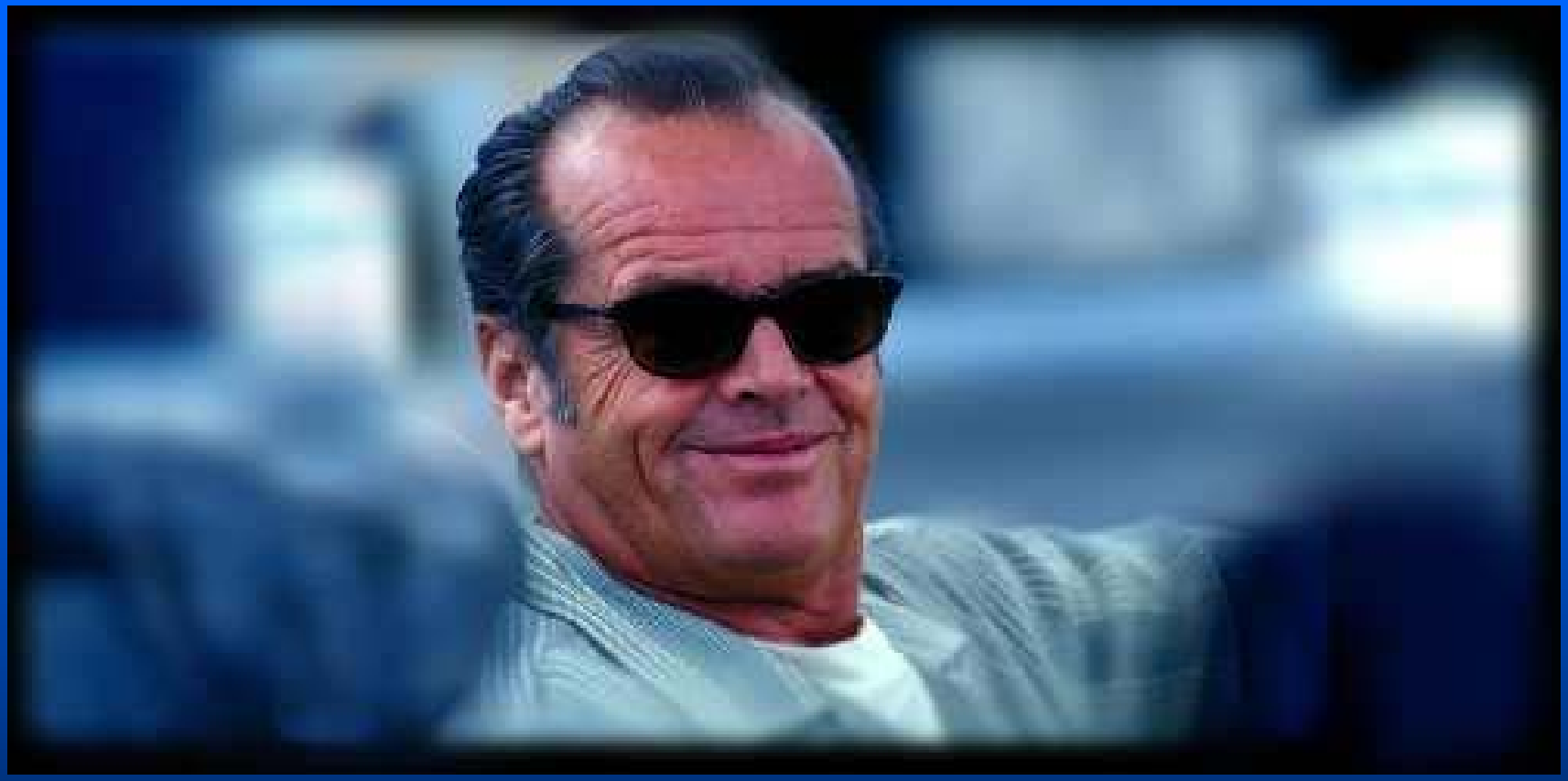
So What's 2500 aMW?

- It's enough electricity to serve the ***entire*** state of Idaho

- In the year 2002 alone, it saved the region's consumers ***$1.2 Billion*** in retail power purchases



IS THAT AS GOOD AS IT GETS?

WILLIAM FULD Talking Board Set
YES
OUIJA™
MYSTIFYING ORACLE
NO
ABCDEFGHIJKLM
NOPQRSTUVWXYZ
1234567890
GOOD BYE
© 1995 PARKER BROTHERS, A DIVISION OF TONKA CORPORATION.

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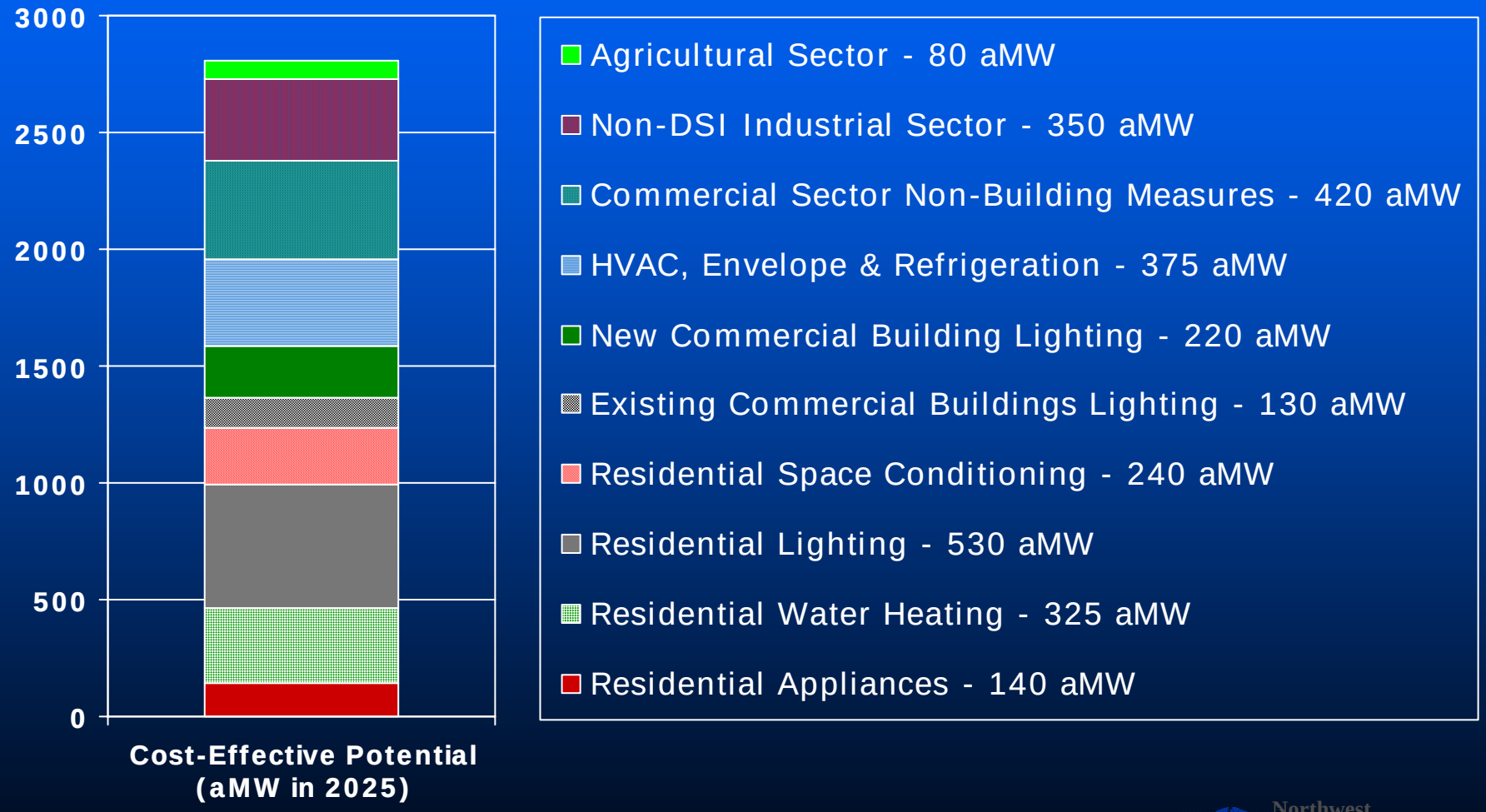
What's Left to Do

How Big is the Region's Conservation Resource?

- Remaining Potential Equivalent to Regional Accomplishments 1980 - 2001
- *Could meet half of the region's annual load growth under "medium" forecast*
- Total conservation identified 4600 aMW
- Cost effective & achievable potential 2800 aMW
  - By 2025 medium loads & avoided costs
  - Estimate 85% is achievable

Cost-Effective and Achievable Conservation Could Meet Over 10% of PNW Loads in 2025 (Medium Forecast Loads & Prices)



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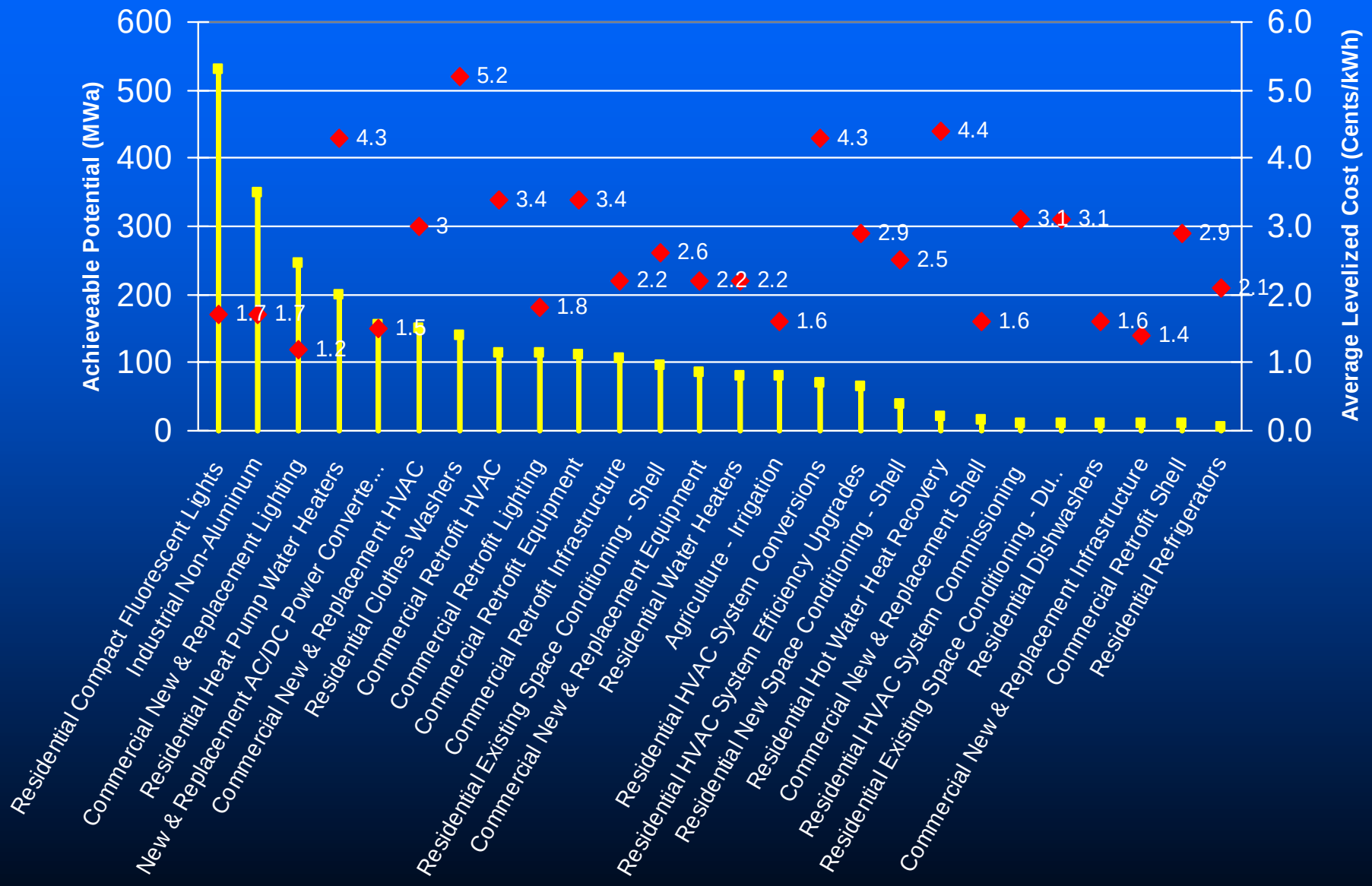
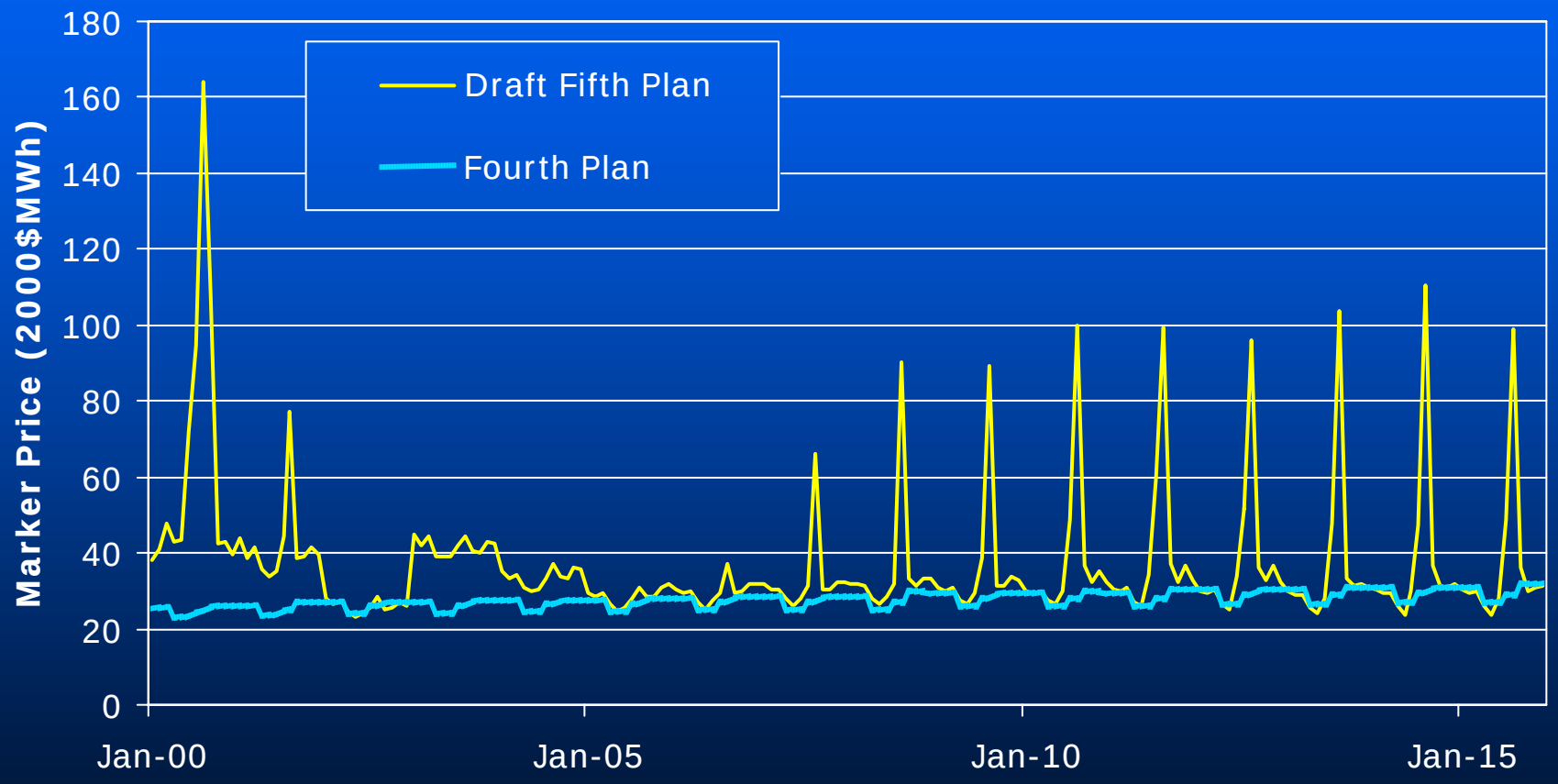
Cost & Achievable Potential by Sector & End Use
2025 Medium Forecast Loads & Prices



Where Did All This Potential Come From?

- New technology and/or lower cost of existing technologies
  - High performance T8 lighting, control optimization, residential compact fluorescent lighting
- New applications
  - Sewage treatment, LED traffic signals
- New end uses evaluated
  - Network PC control
  - AC/DC power converters
  - Commercial refrigerators, freezers, ice-makers

Combined With Higher Forecast of Future Market Prices!!!



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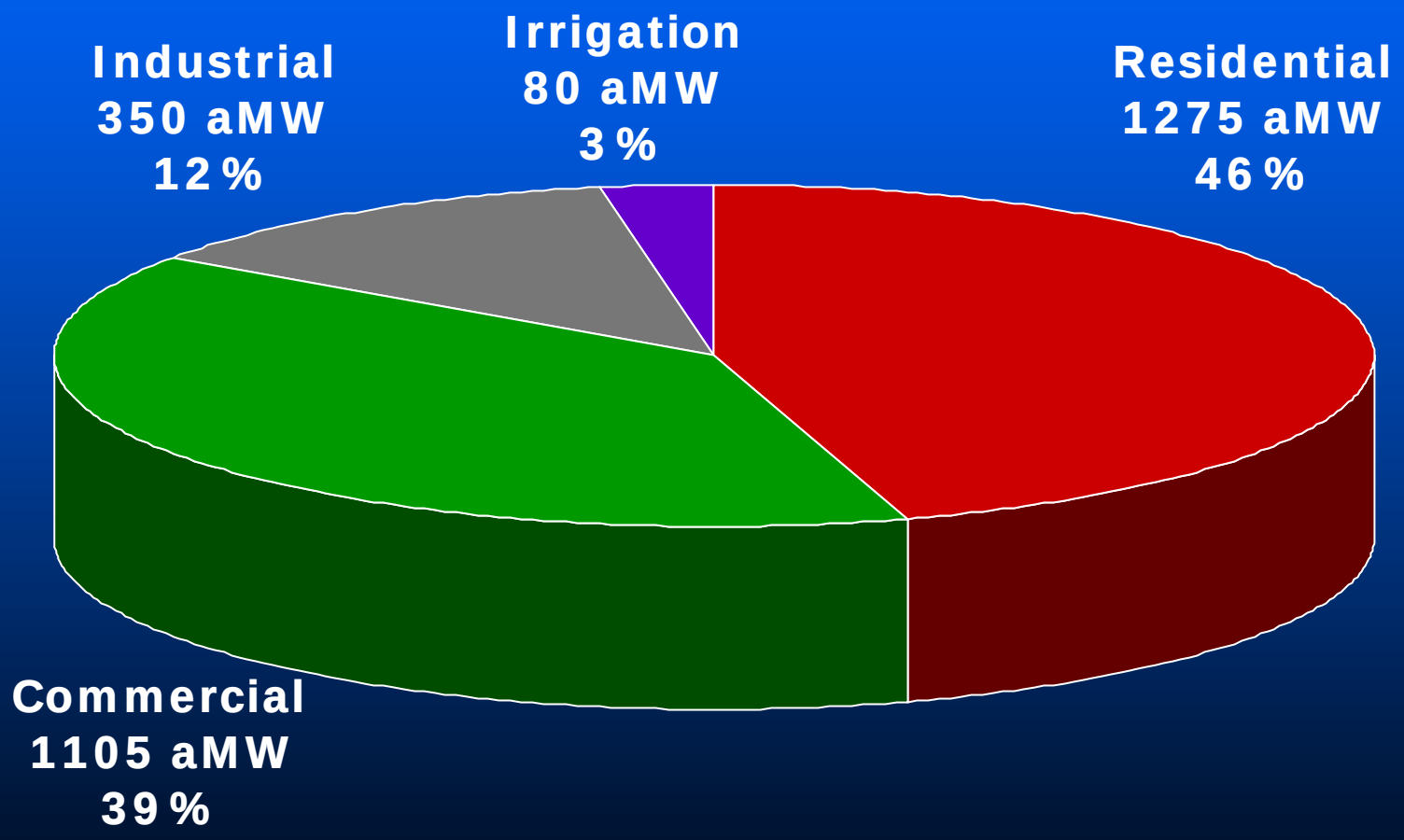
Sources of Savings by Sector



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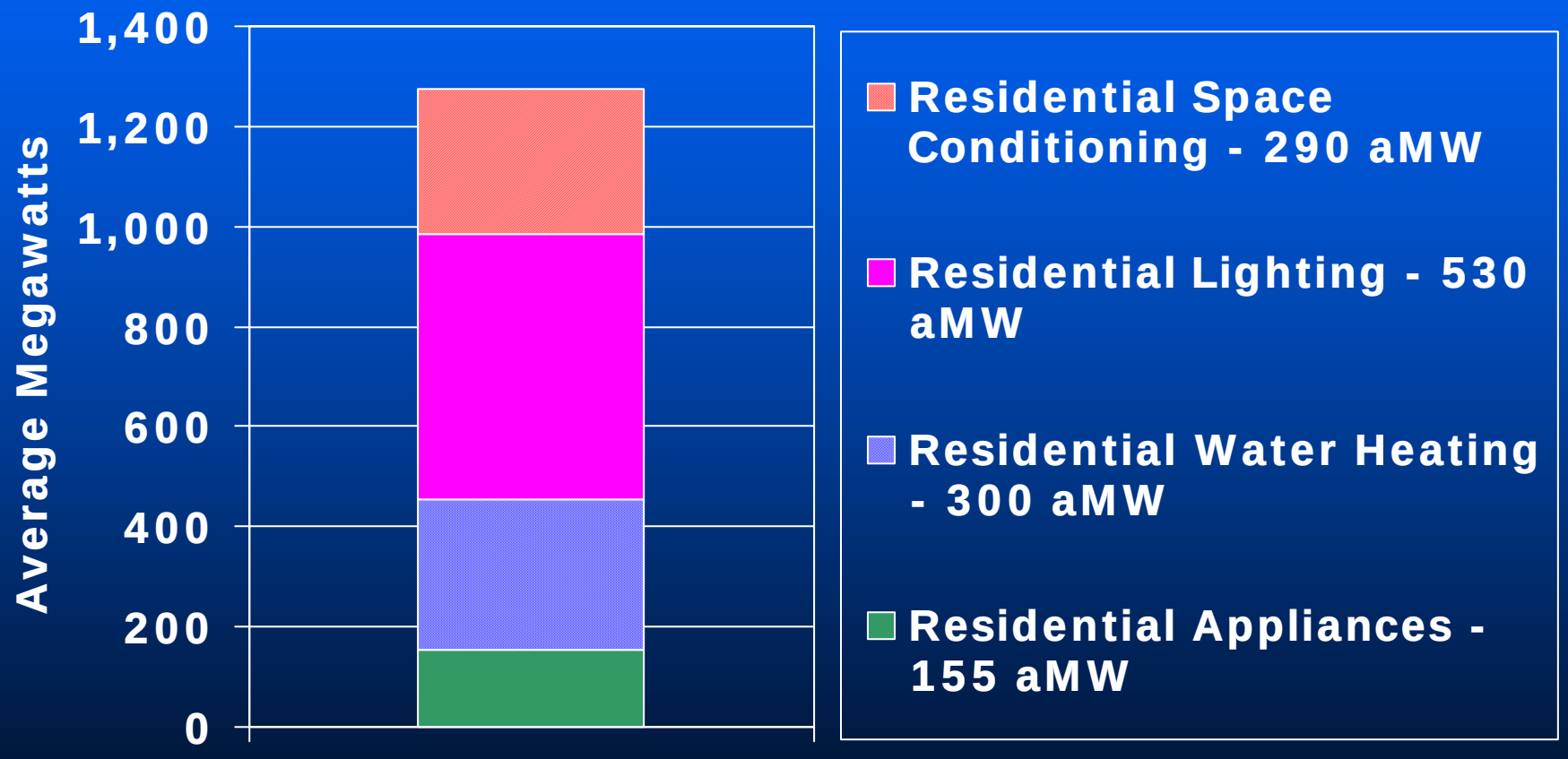
Total Residential Sector Cost-Effective & Realistically Achievable



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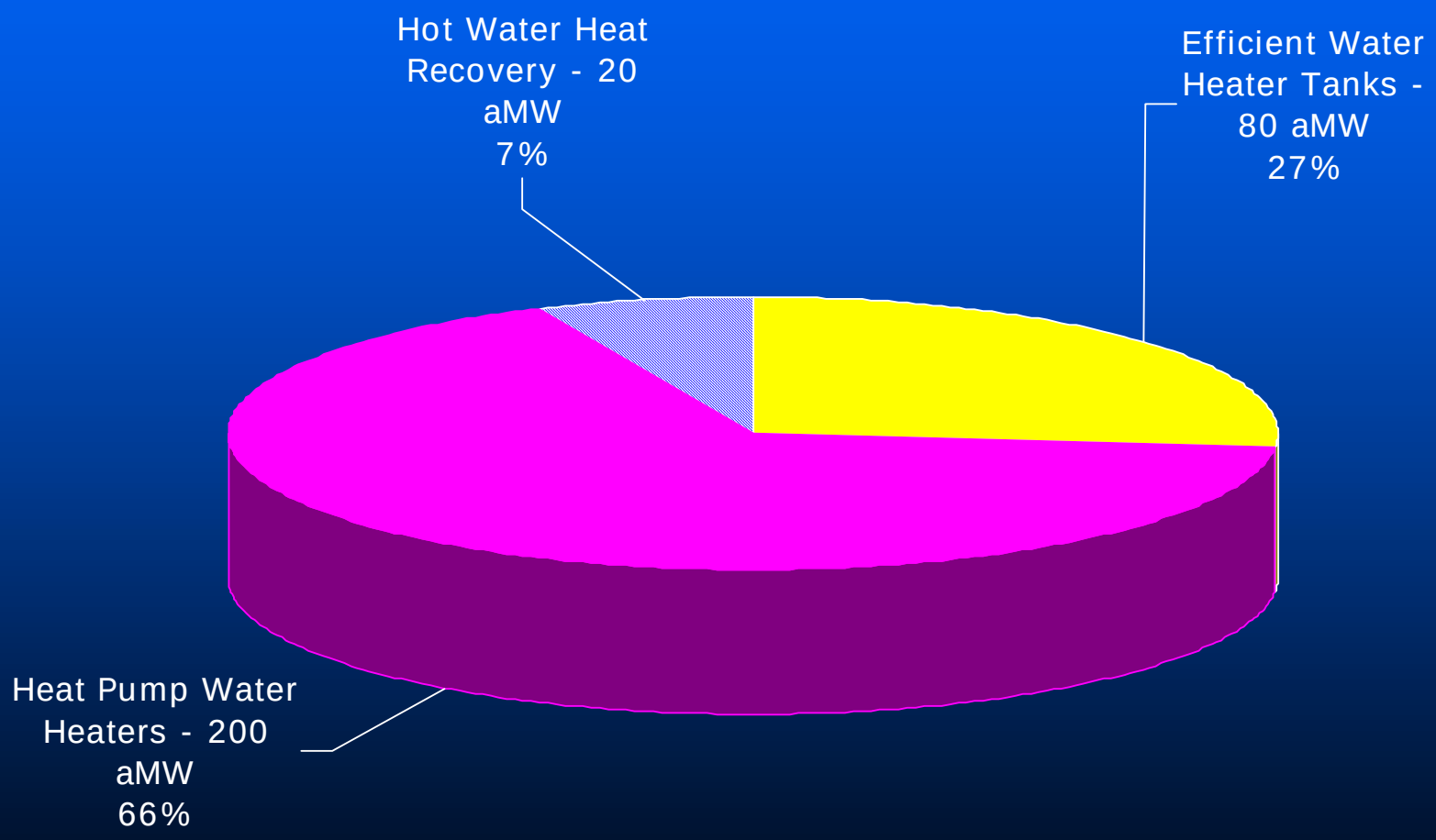
Residential Sector Realistically Achievable Potential for Water Heating (300 aMW)



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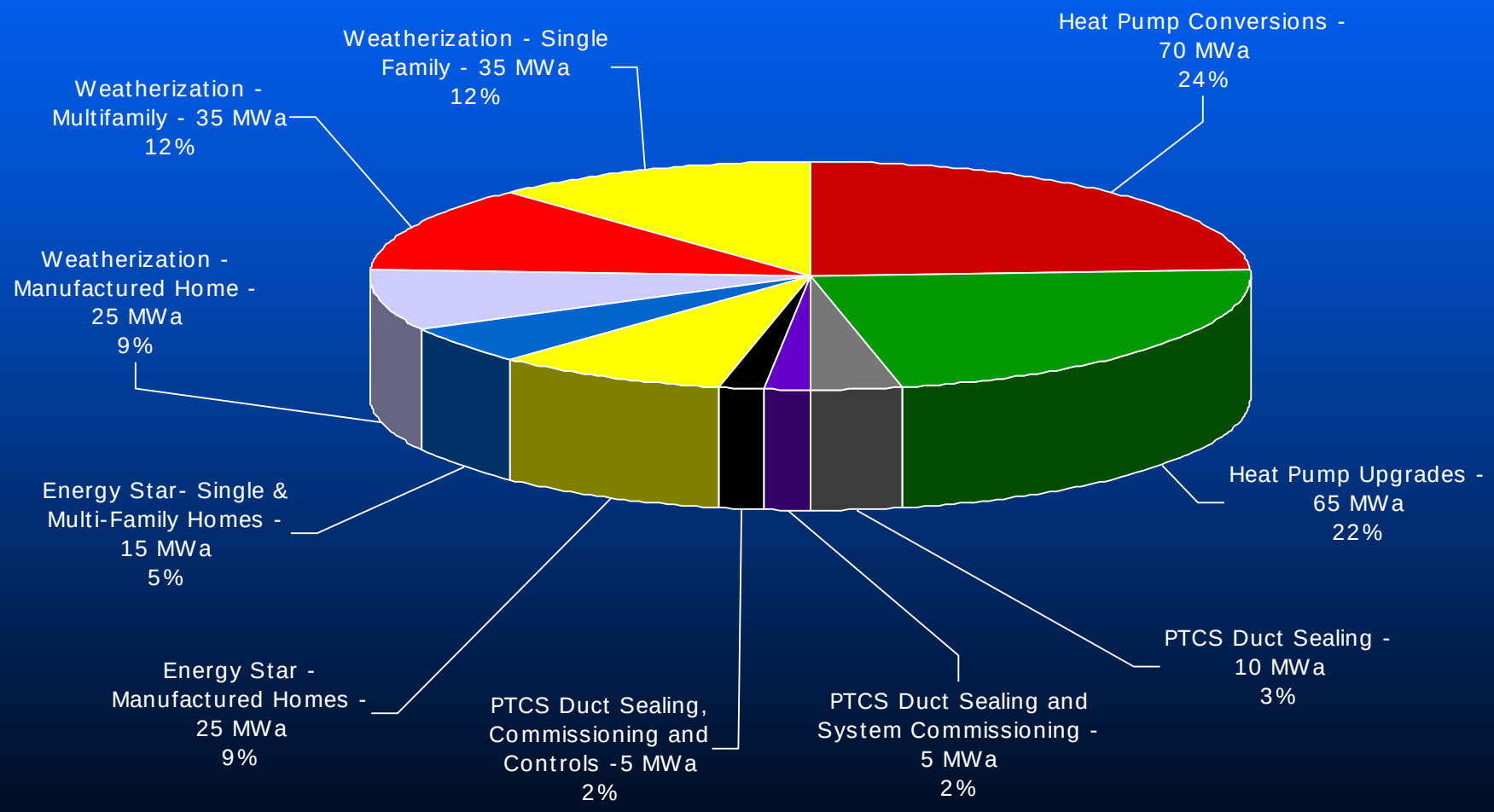
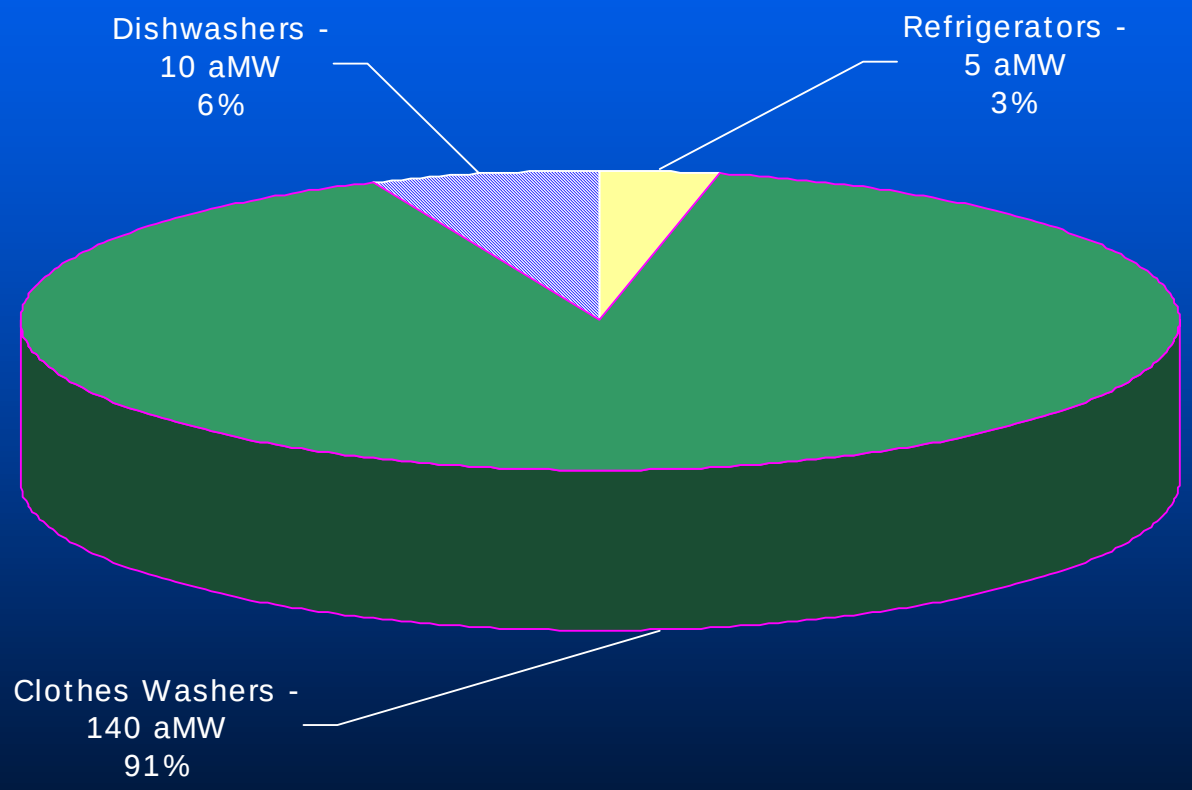
Residential Sector Realistically Achievable Potential for Space Conditioning (290 aMW)



Residential Sector Realistically Achievable Potential for Appliances (155 aMW)



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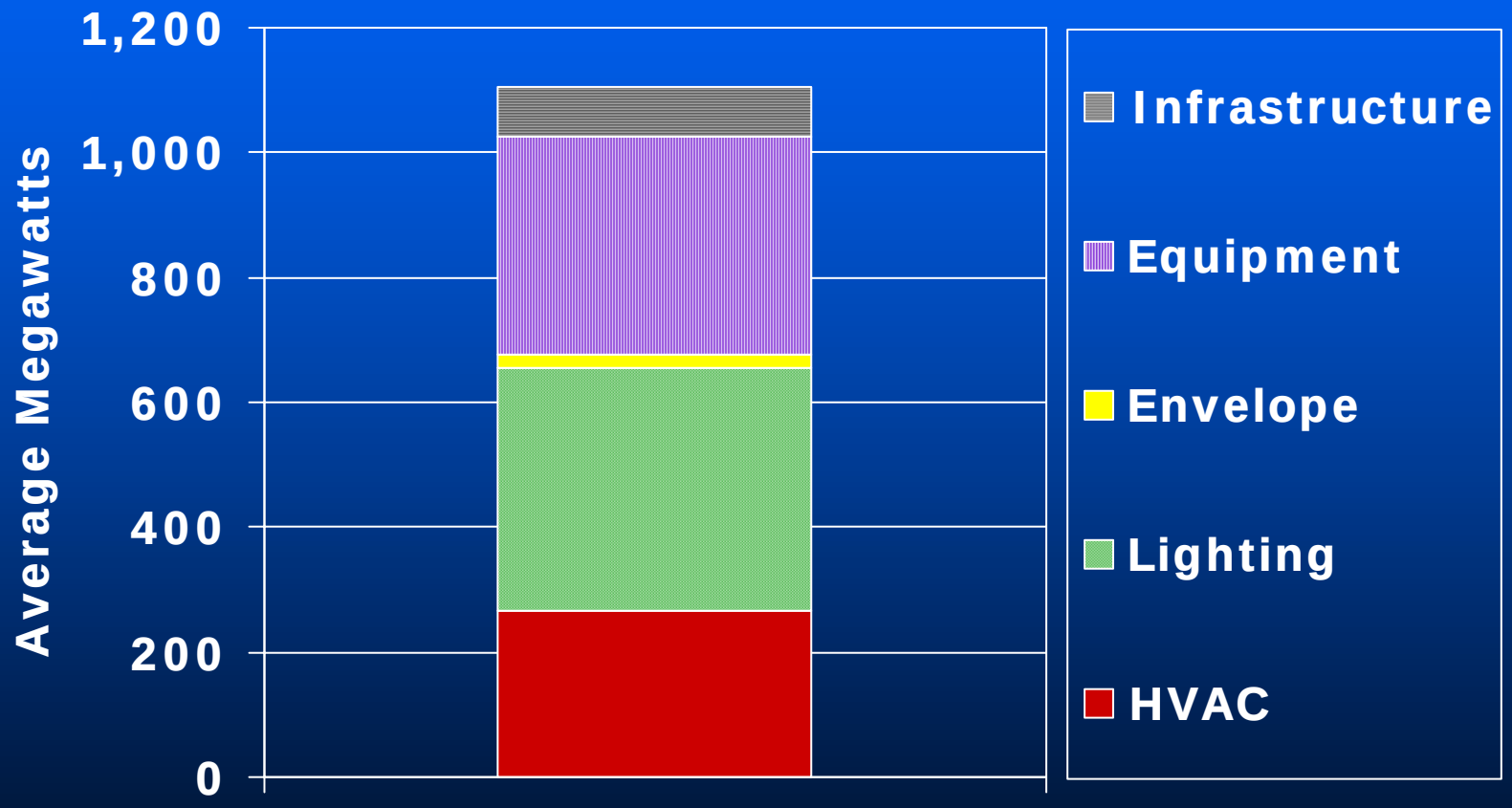
Total Commercial Sector Realistically Achievable Potential = 1105 aMW (Medium Forecast – 2025)



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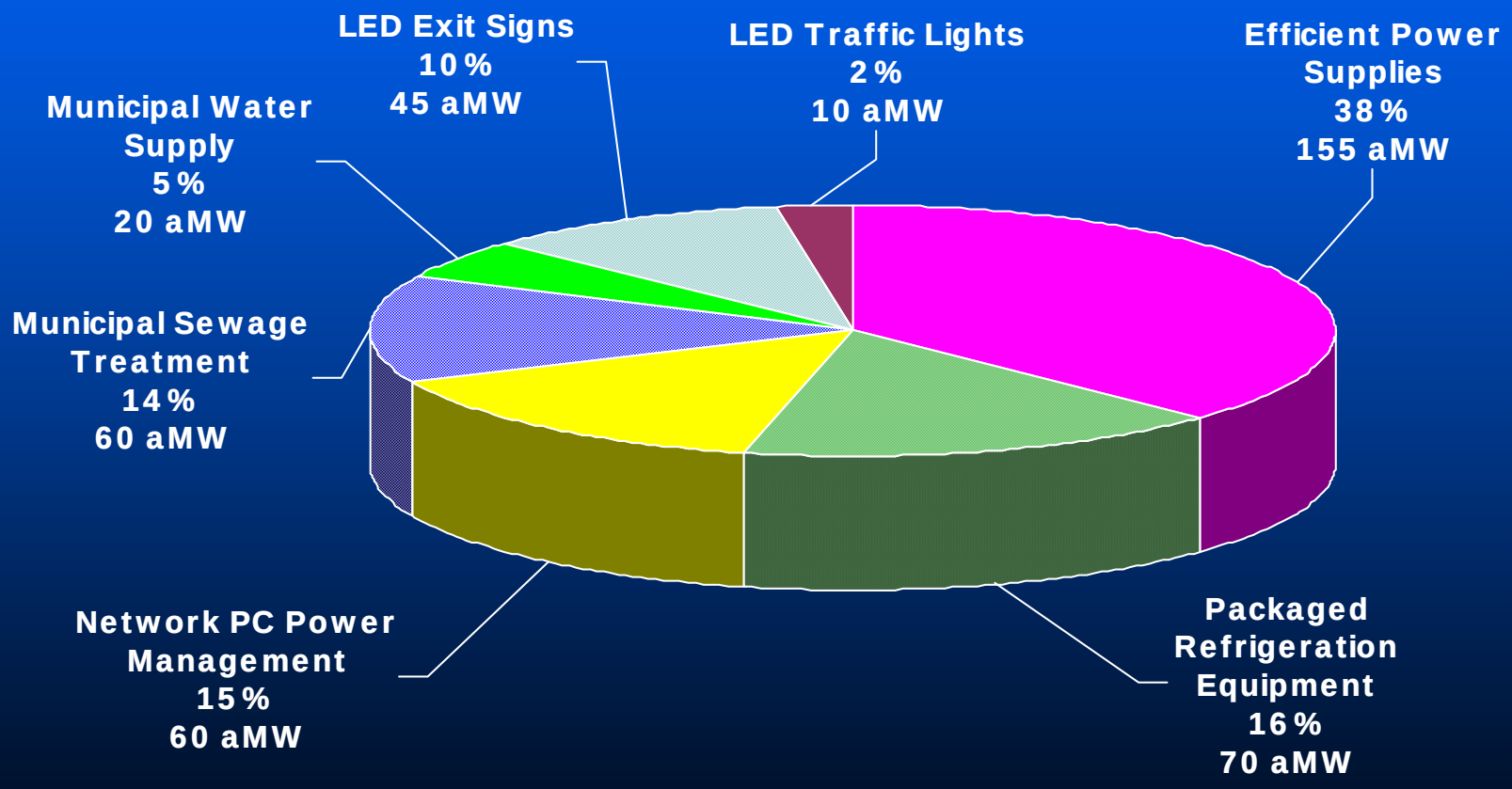
Commercial Sector Realistically Achievable Potential for Equipment & Infrastructure (Medium Forecast - 2025) = 420 aMW



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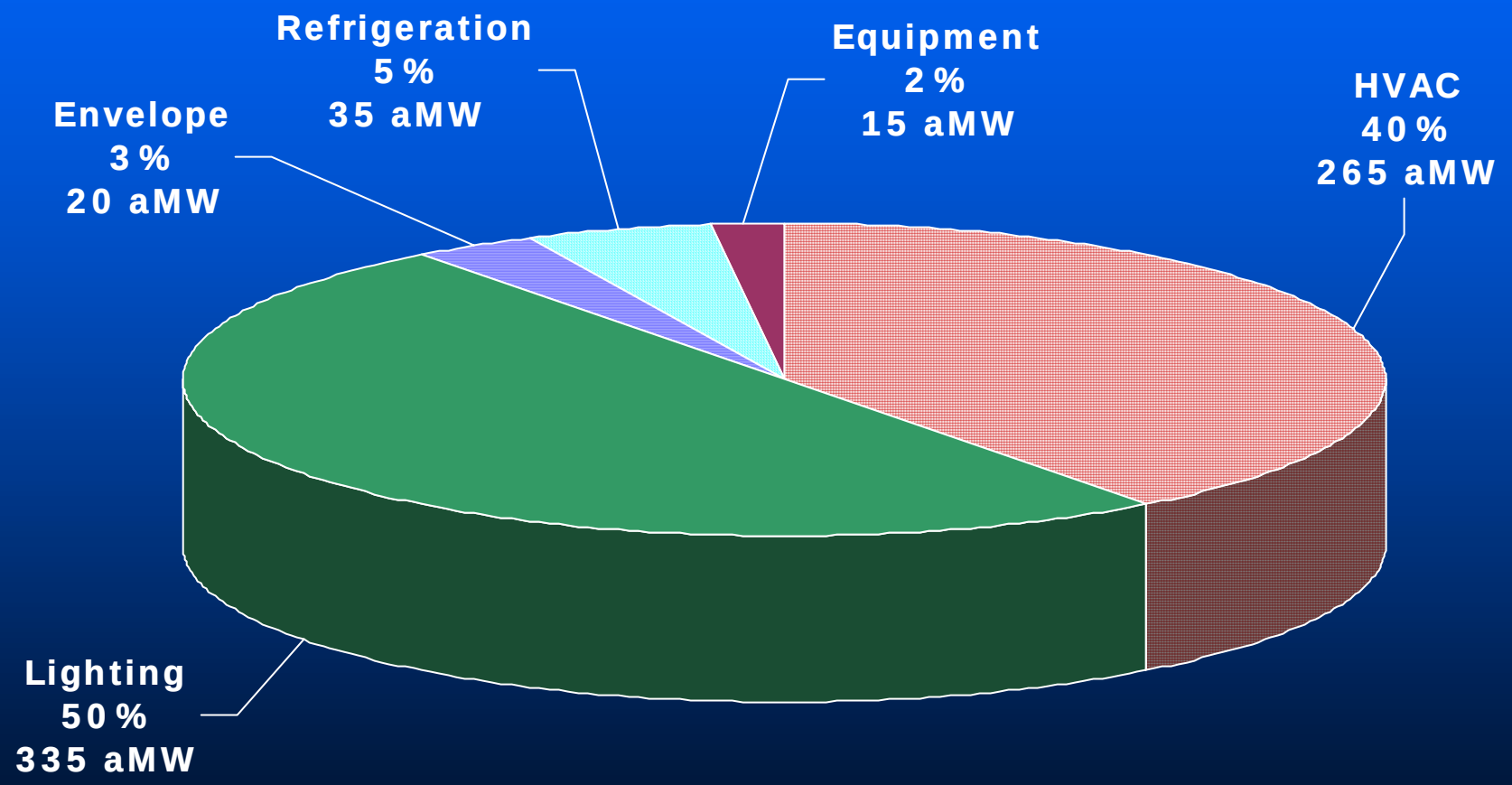
Commercial Sector Realistically Achievable Potential for Buildings = 685 aMW (Medium Forecast - 2025)



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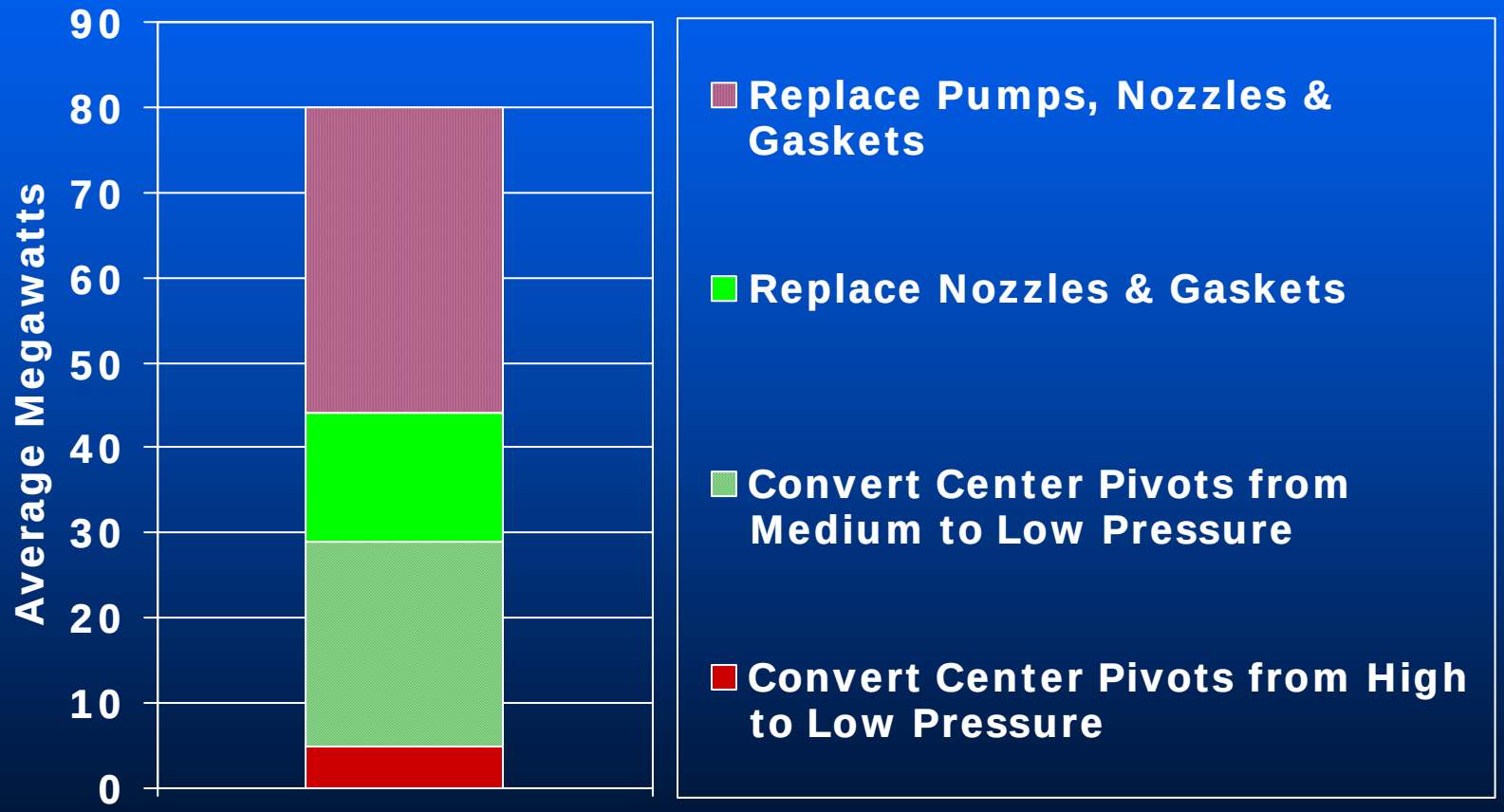
Industrial Sector Conservation Potential

- Estimate of 5% of 2025 forecast loads
- 350 aMW at 1.8 cents per kWh
  - Process controls
  - Drive systems
  - Lighting
  - Refrigeration
- Significant uncertainty around estimate
  - Changes in region's industrial mix

Irrigated Agriculture Sector Realistically Achievable Potential = 80 aMW



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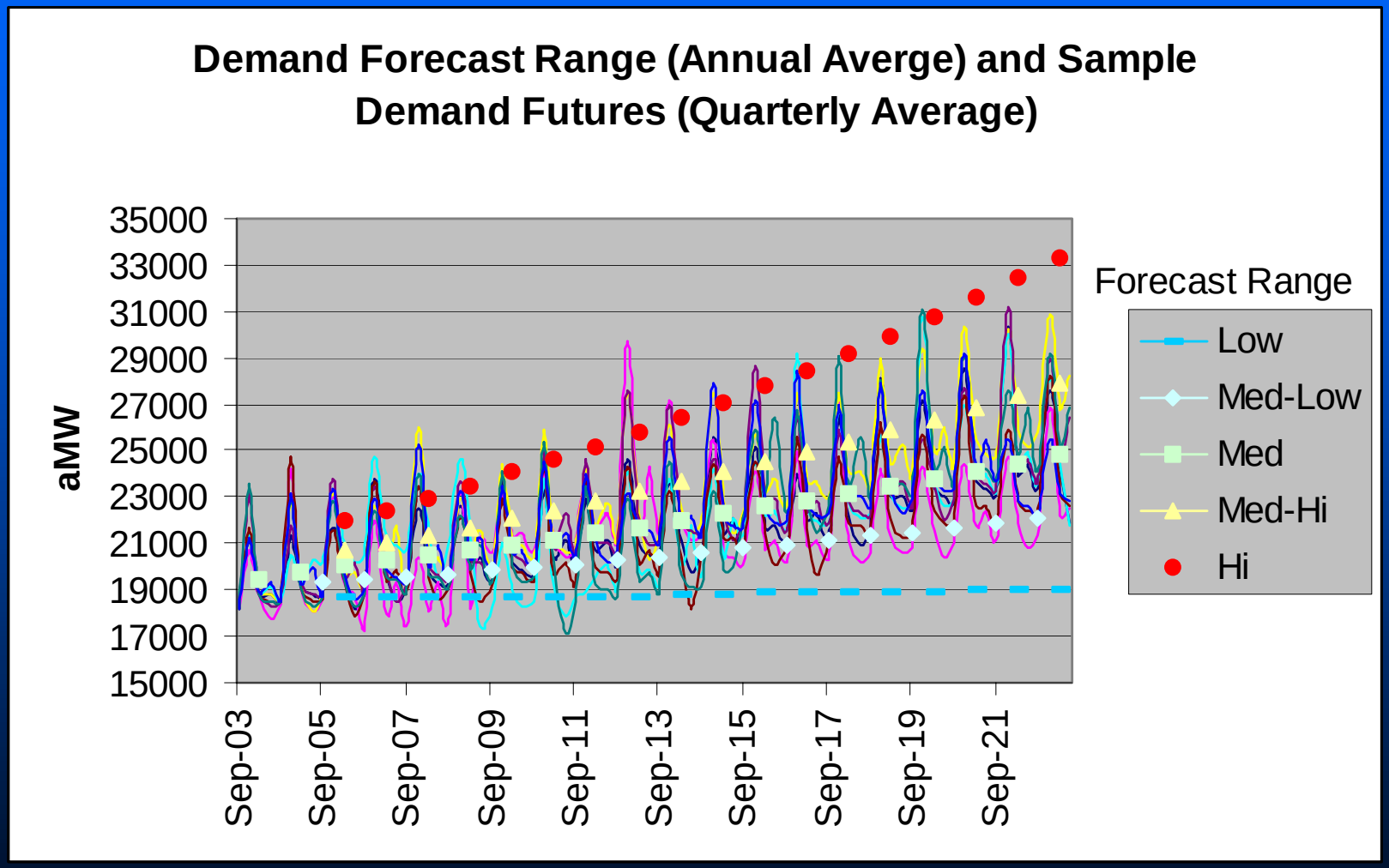
How Much Conservation to Develop?

- 2800 aMW appears cost-effective today
  - Today's forecast of avoided costs
  - Medium growth
- But we don't know future avoided costs
- Nor future growth patterns
- Or if there is a risk avoidance value or cost
- SO……

Use Portfolio Model to Determine How Much Conservation to Develop

- Consider cost & risk
- Consider wide range of uncertainties
  - Loads, power prices, fuel prices, resource cost & availability, hydro, climate change, PTC, green tags, wind shaping costs, aluminum prices …..
- Consider range of resources available
  - Conservation, Demand Response, Gas-fired, Coal-fired, Wind, Market Purchases
- Consider resource flexibility & optionality

Demand Uncertainty



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Resource Uncertainty

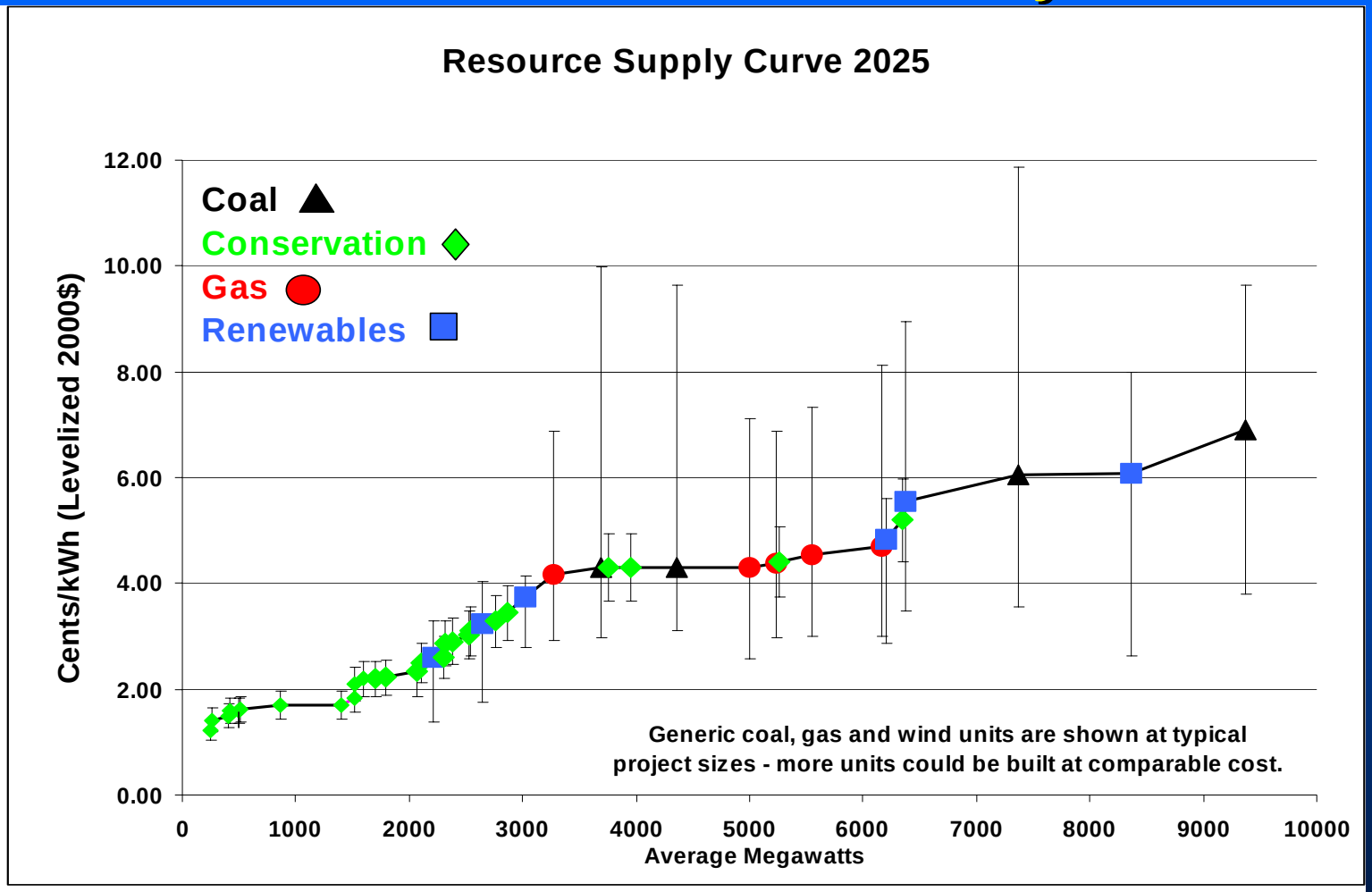

Figure ES-8

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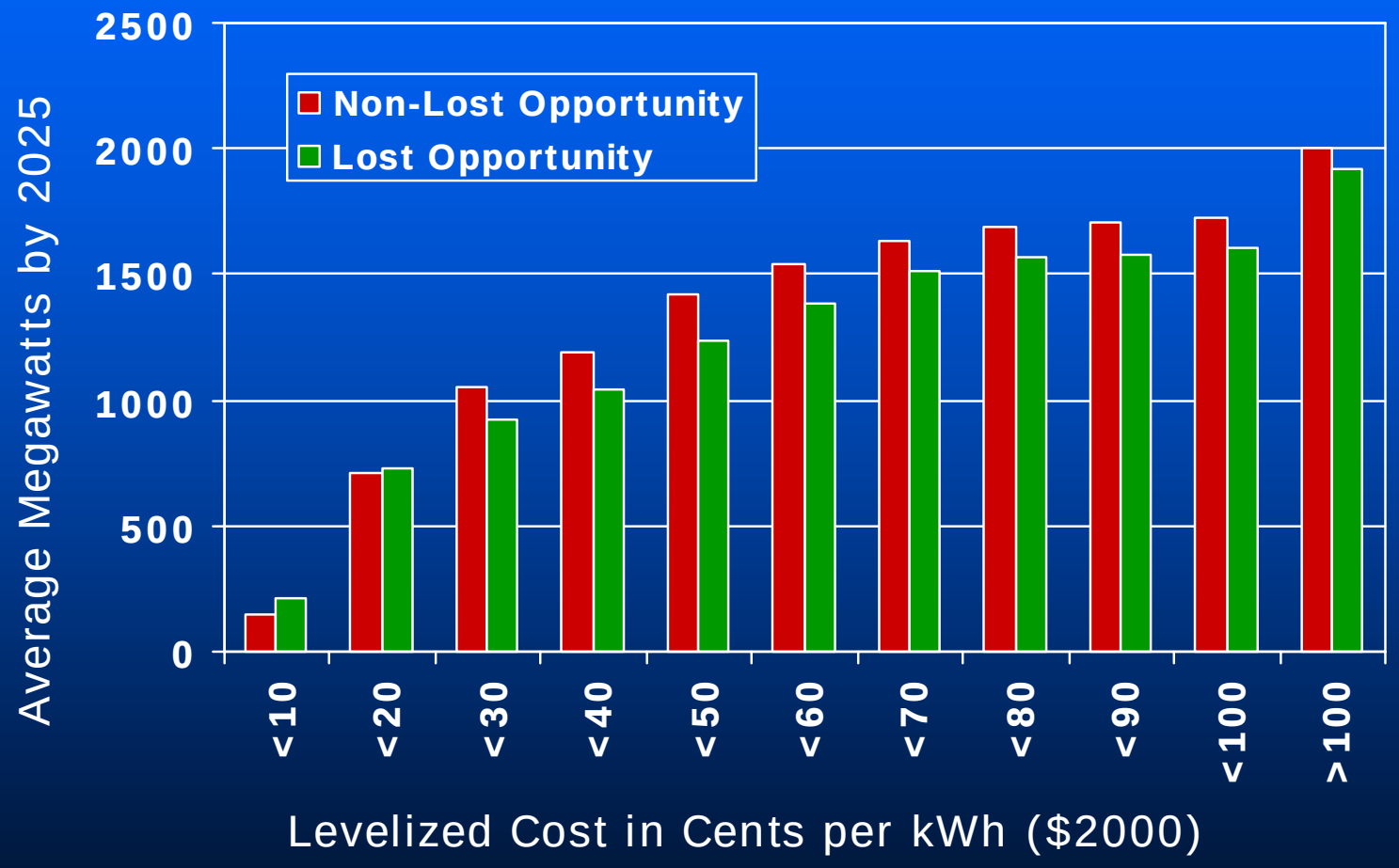
Conservation Resource Availability

- Supply curves: Amount achievable by price
  - More conservation available at increased costs
  - Separate supply curves:
    - » "Lost opportunity" conservation (new buildings & appliances)
    - » "Non-lost opportunity" conservation (retrofit)
  - Limited annual lost opportunity conservation near-term
    - » Ramp up to maximum of 85% of potential
  - Limited annual non-lost opportunity conservation
- Model tests alternative levels of annual conservation
- Finds least-cost and least risk "plans"

Achievable Conservation Supply Curves



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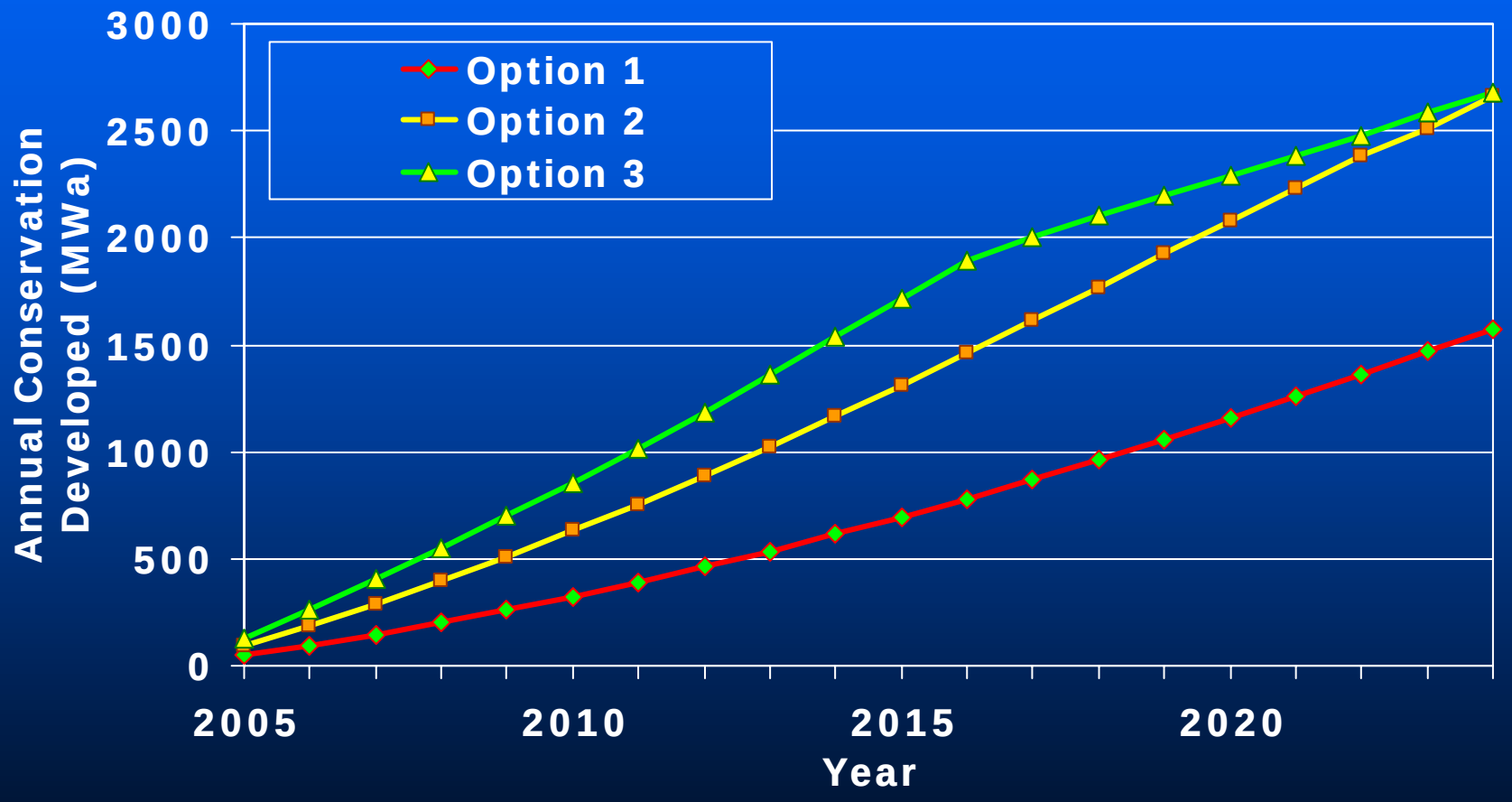
Three Conservation Options Tested

- **Option 1**: 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
- **Option 2**: 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**: Accelerated non-lost opportunity
  - Non-lost opportunity limited to 120 aMW/year
  - Ramp-up lost-opportunity to 85% by 2017

Average Annual Conservation Development for Alternative Levels of Deployment Tested



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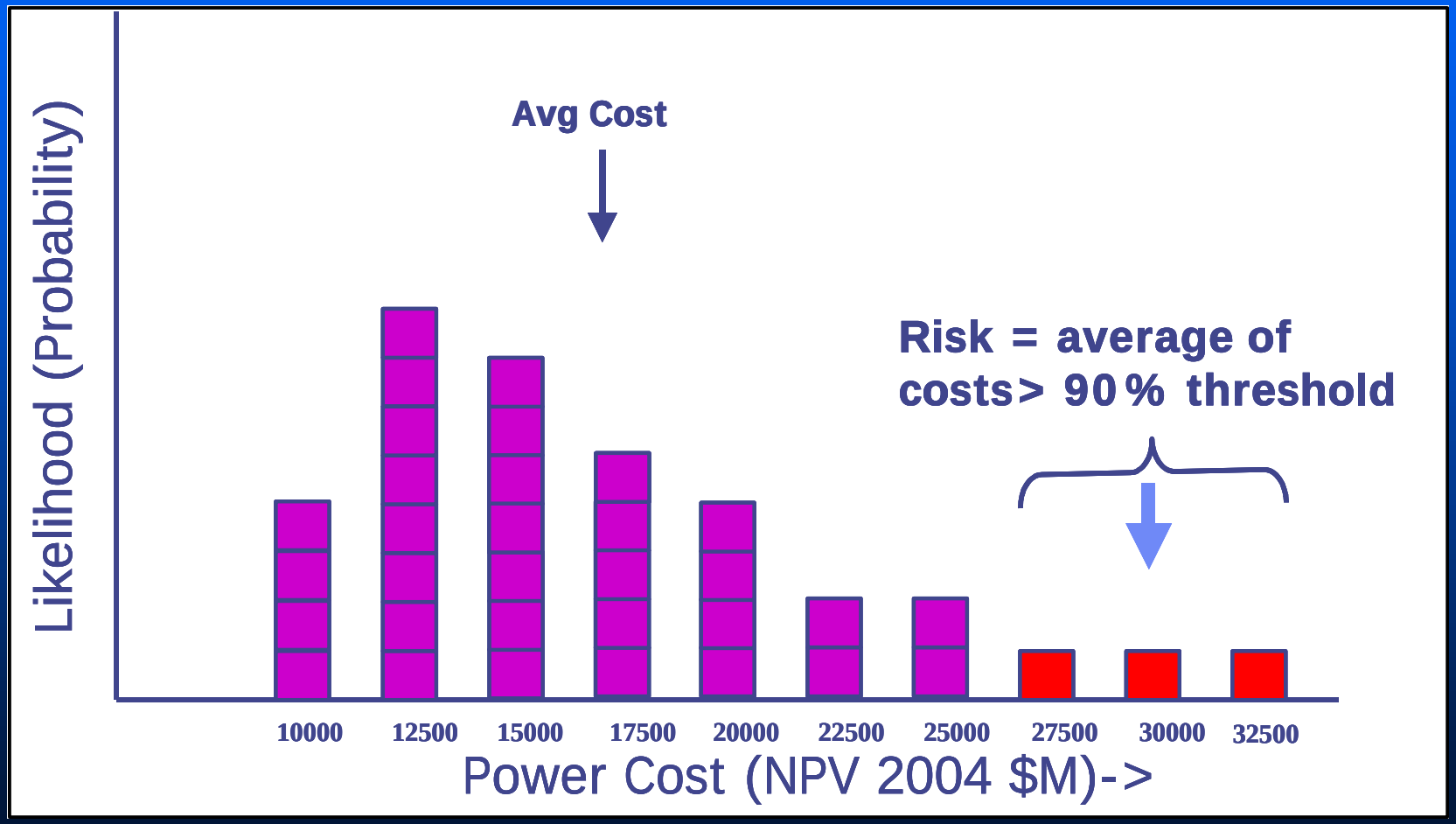
Measures of Cost & Risk

Net Present Value of System Costs Going Forward



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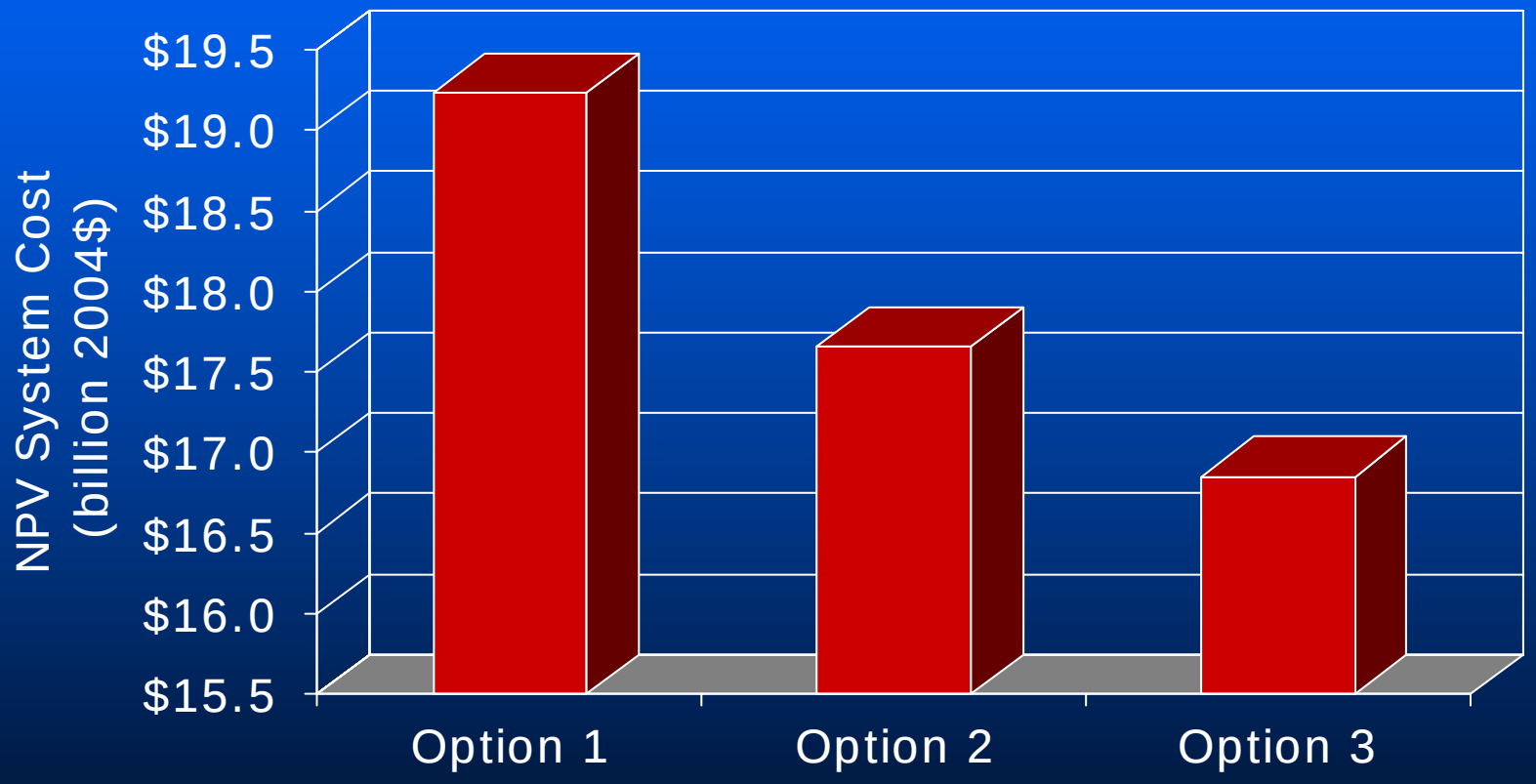
Mean Net Present Value System Cost of Alternative Levels of Conservation Deployment



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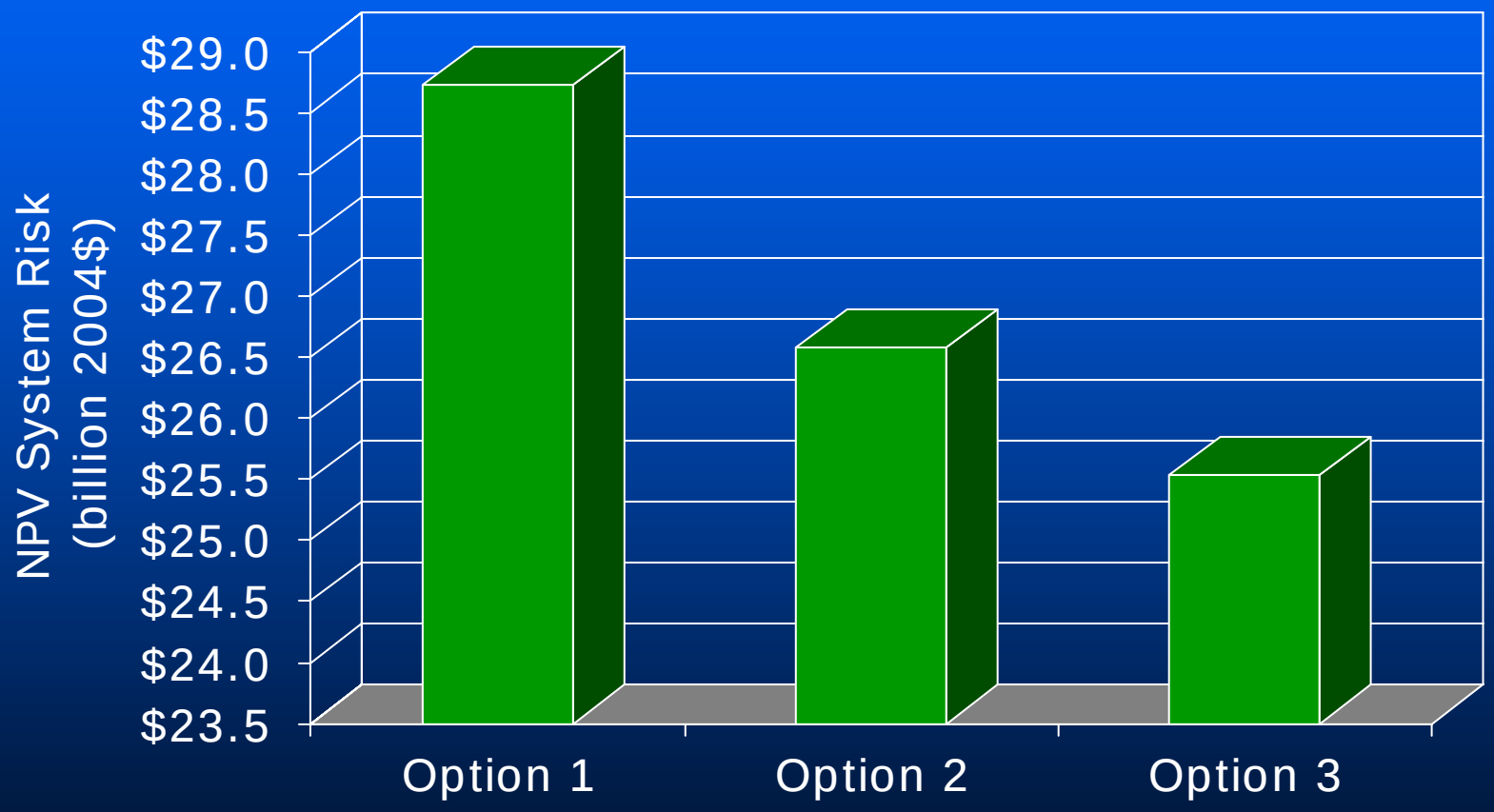
Net Present Value System Risk of Alternative Levels of Conservation Deployment



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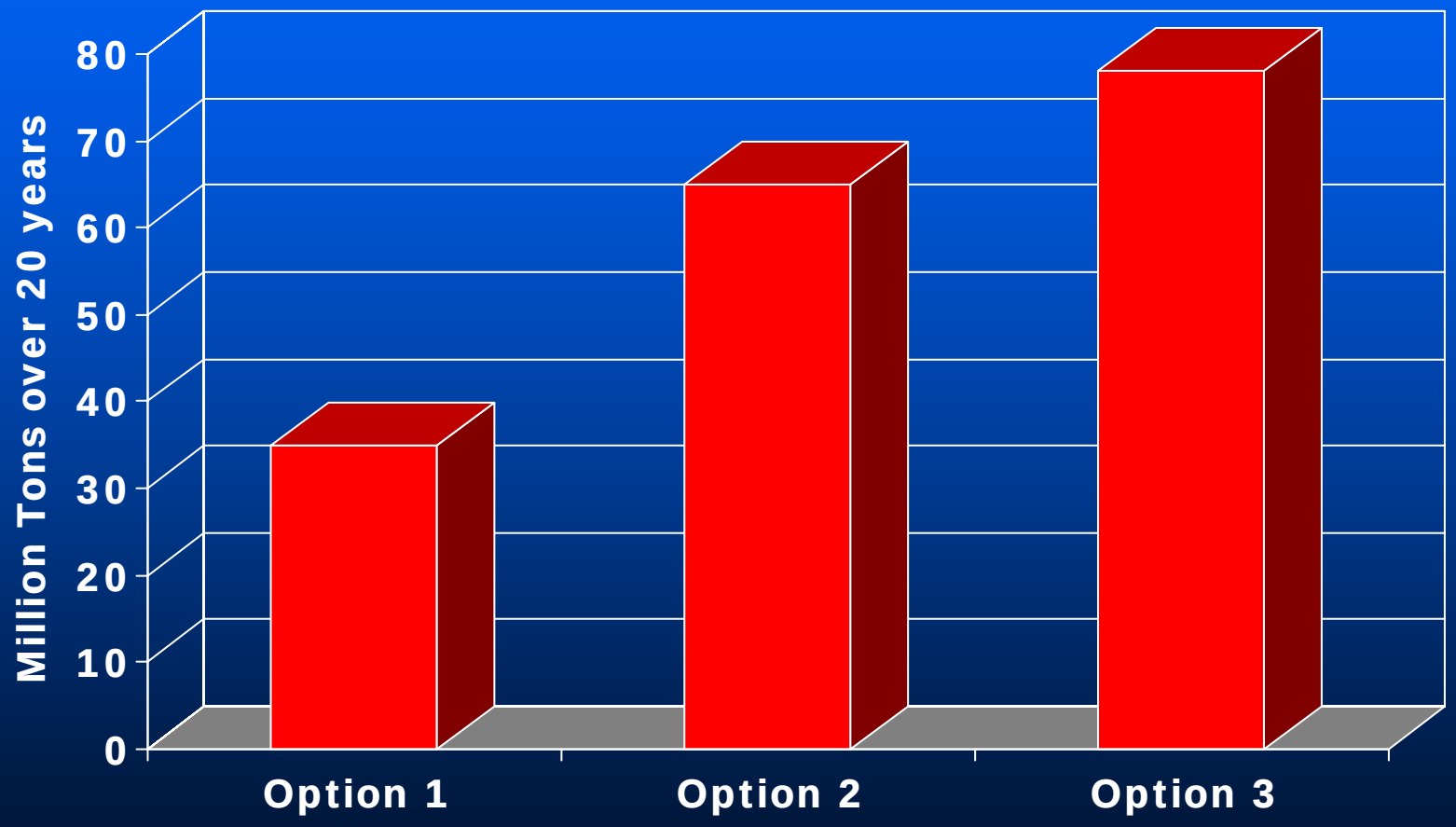
WECC Carbon Dioxide Emissions Reductions for Alternative Conservation Targets



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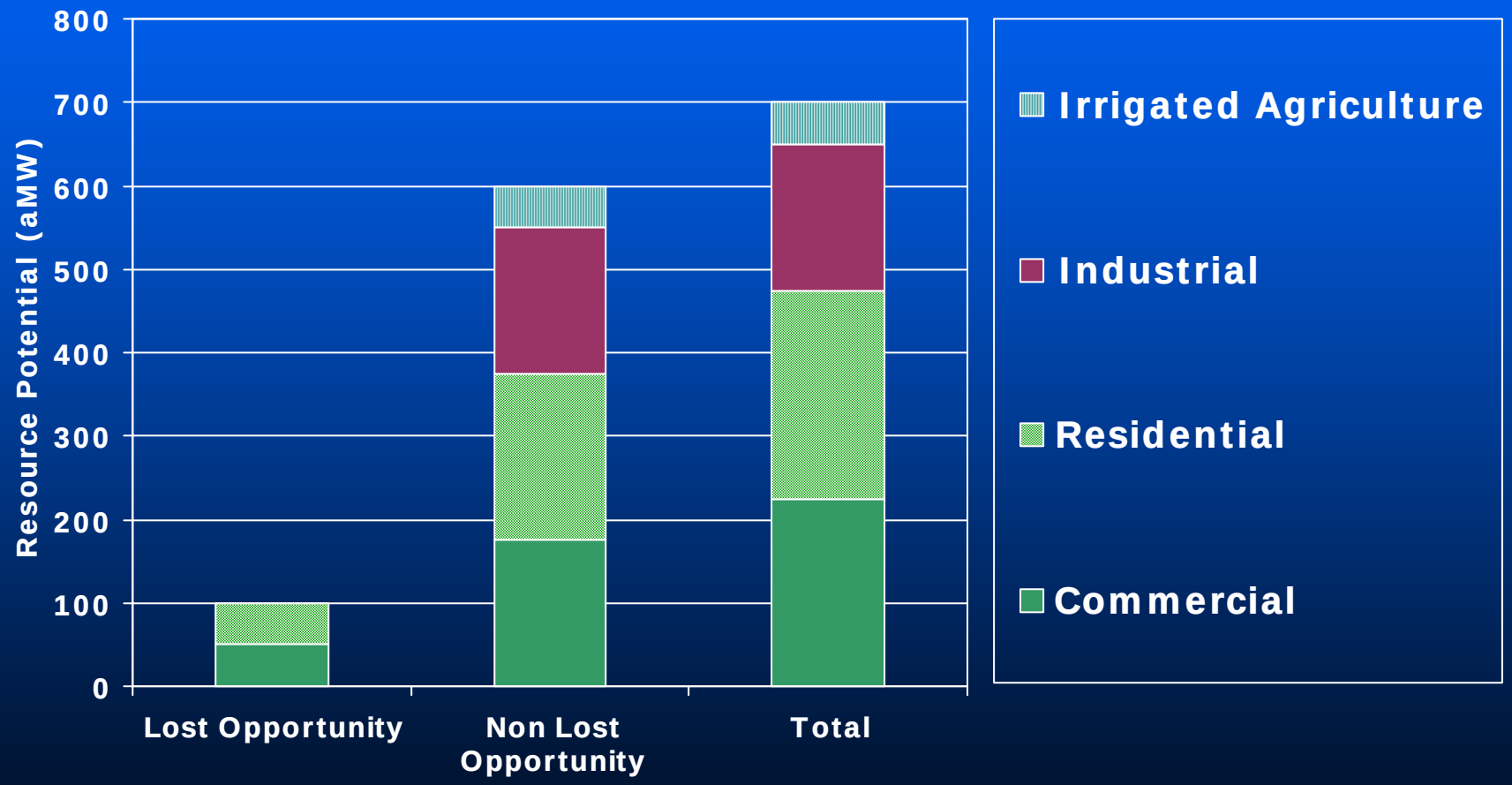
Near-Term Conservation Targets (2005-2009)

Regional Conservation Resource Targets
2005 – 2009 = 700 aMW



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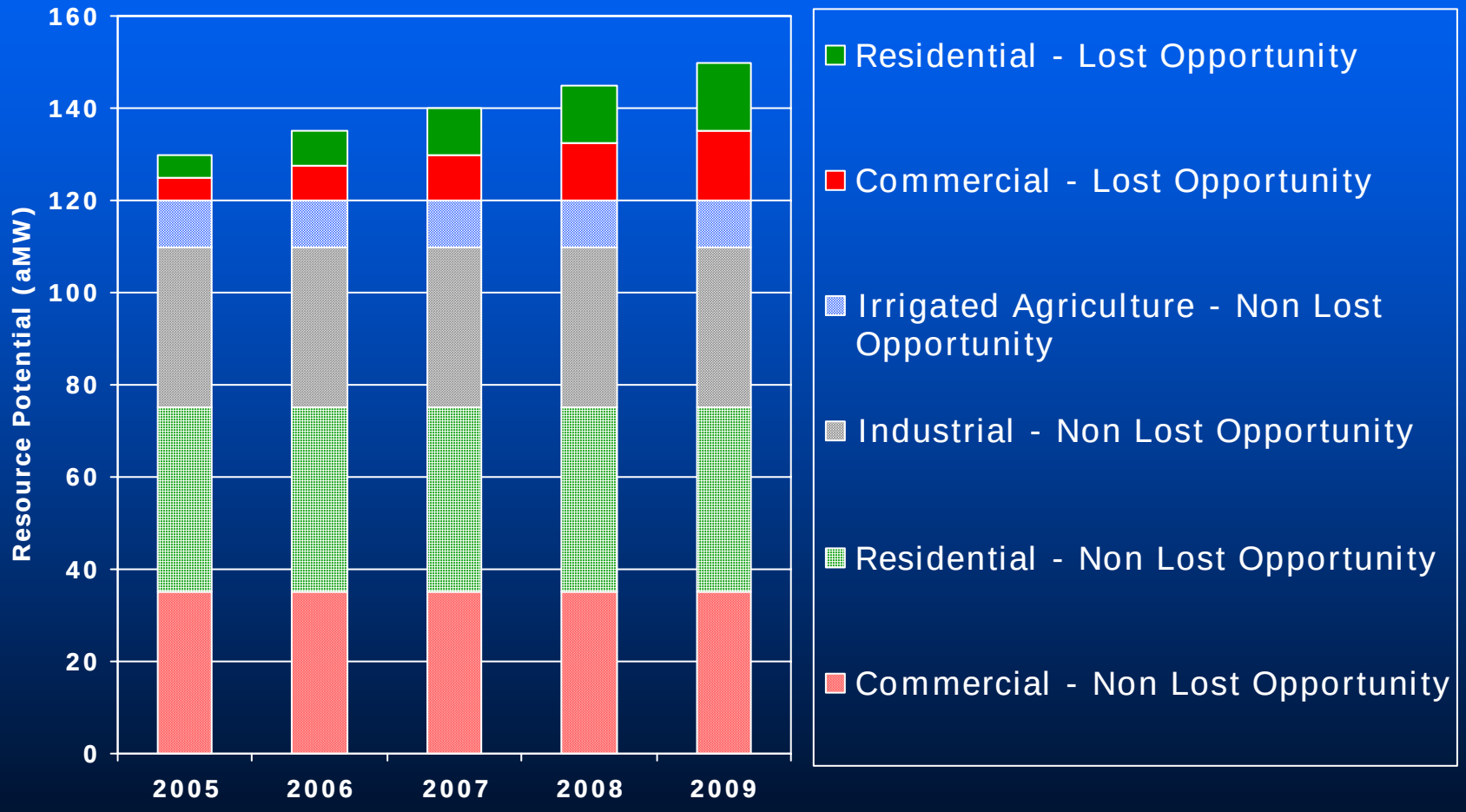
Regional Conservation Resource Acquisition Targets 2005 – 2009 = 700 aMW



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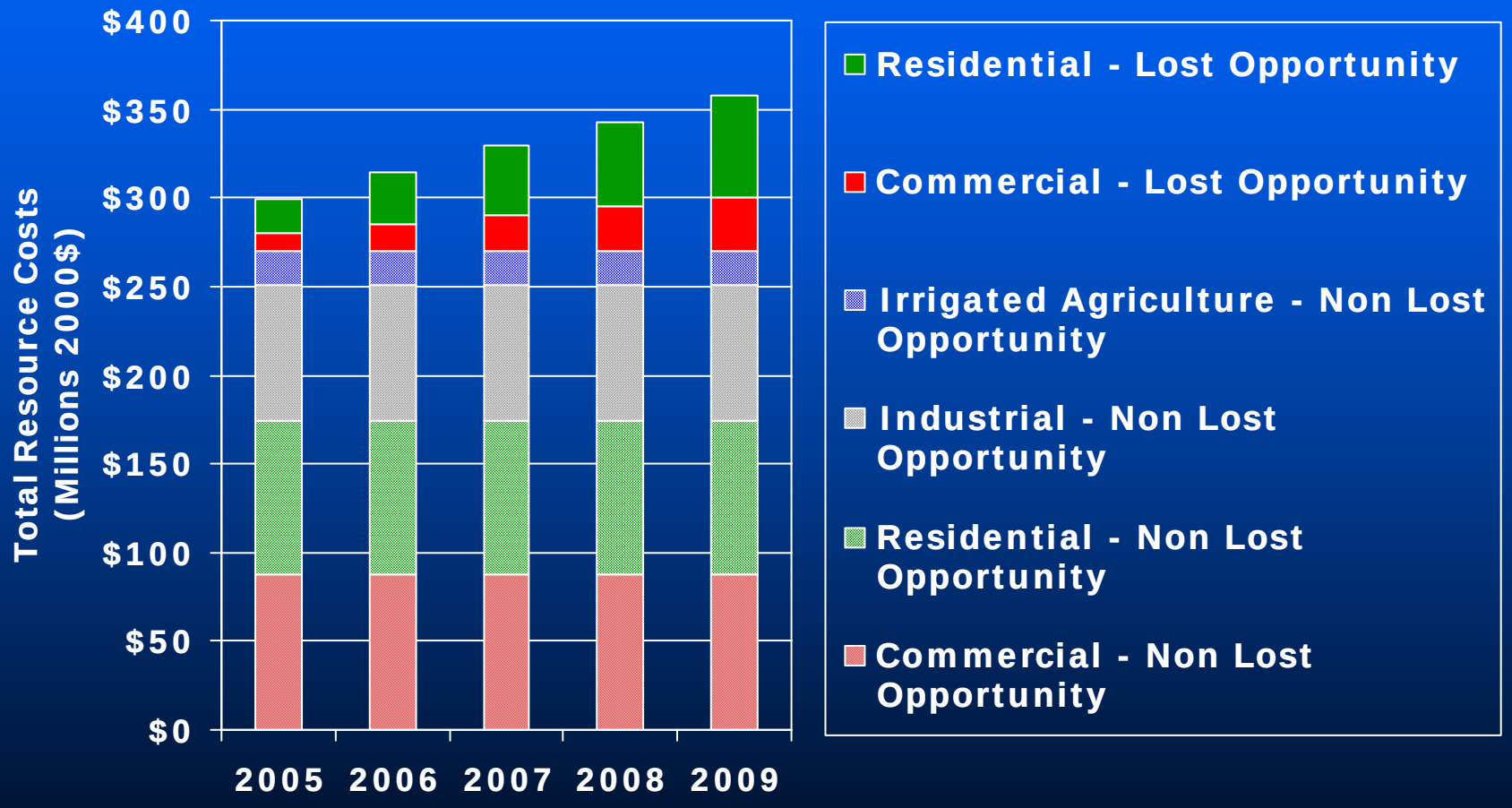
Total Resource Acquisition Cost 2005 – 2009 = $1.64 billion



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Is 700 aMW

5-years

“Doable”?

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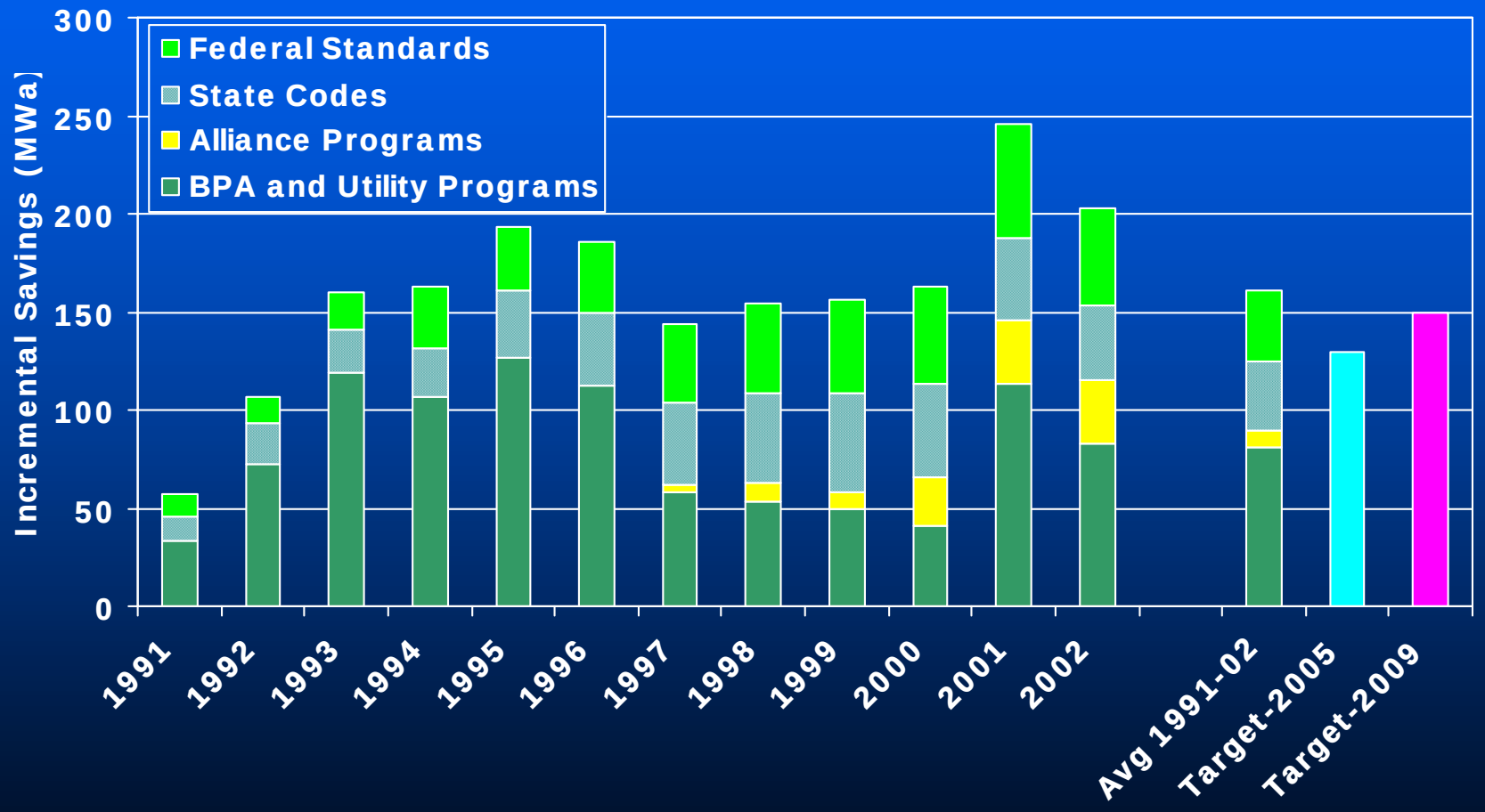
It's Less Than the Average Annual PNW Conservation Achievements 1991 - 2002



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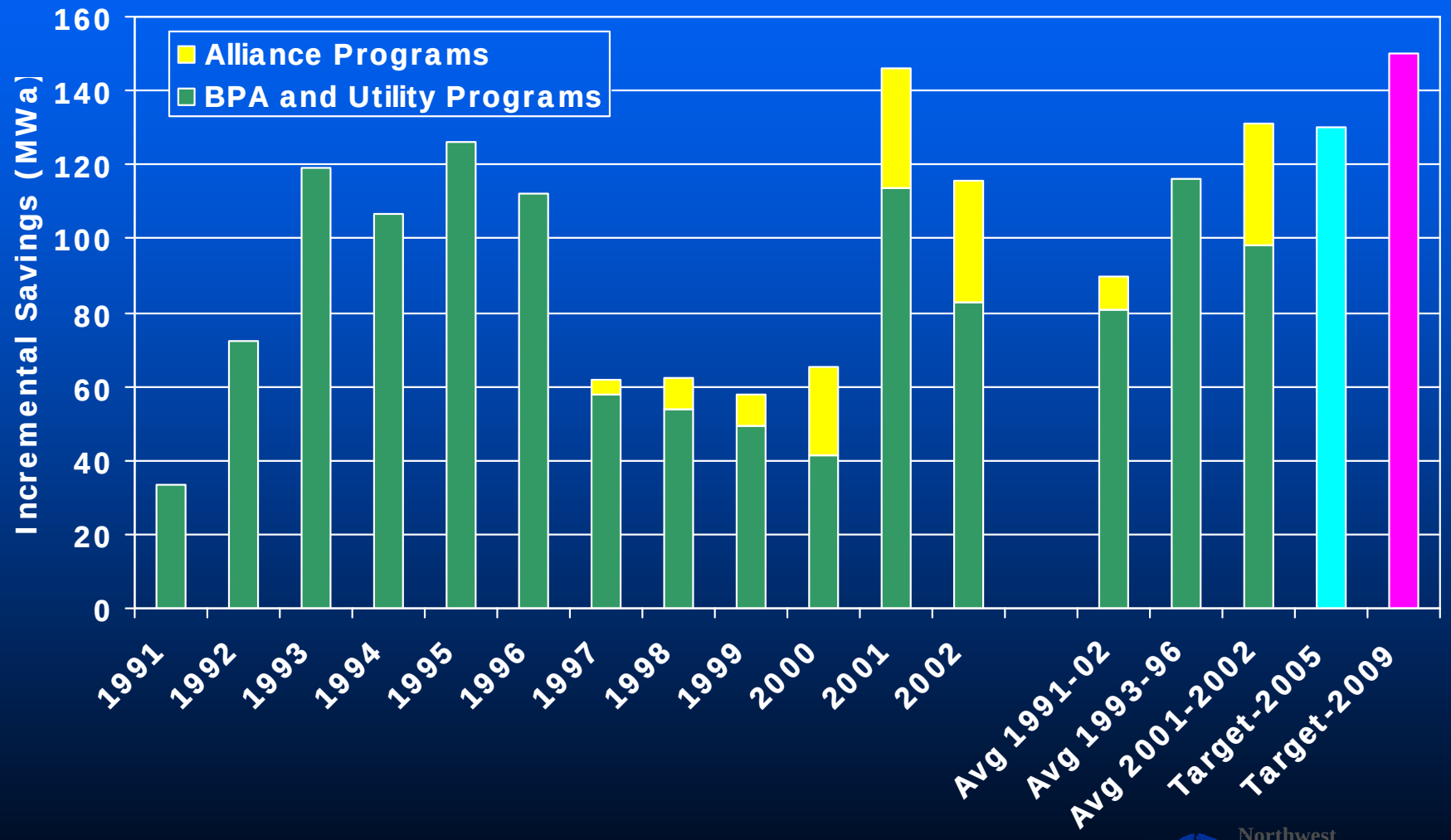
It's Close to Bonneville,Utility and Alliance Conservation Achievements 2000 - 2001



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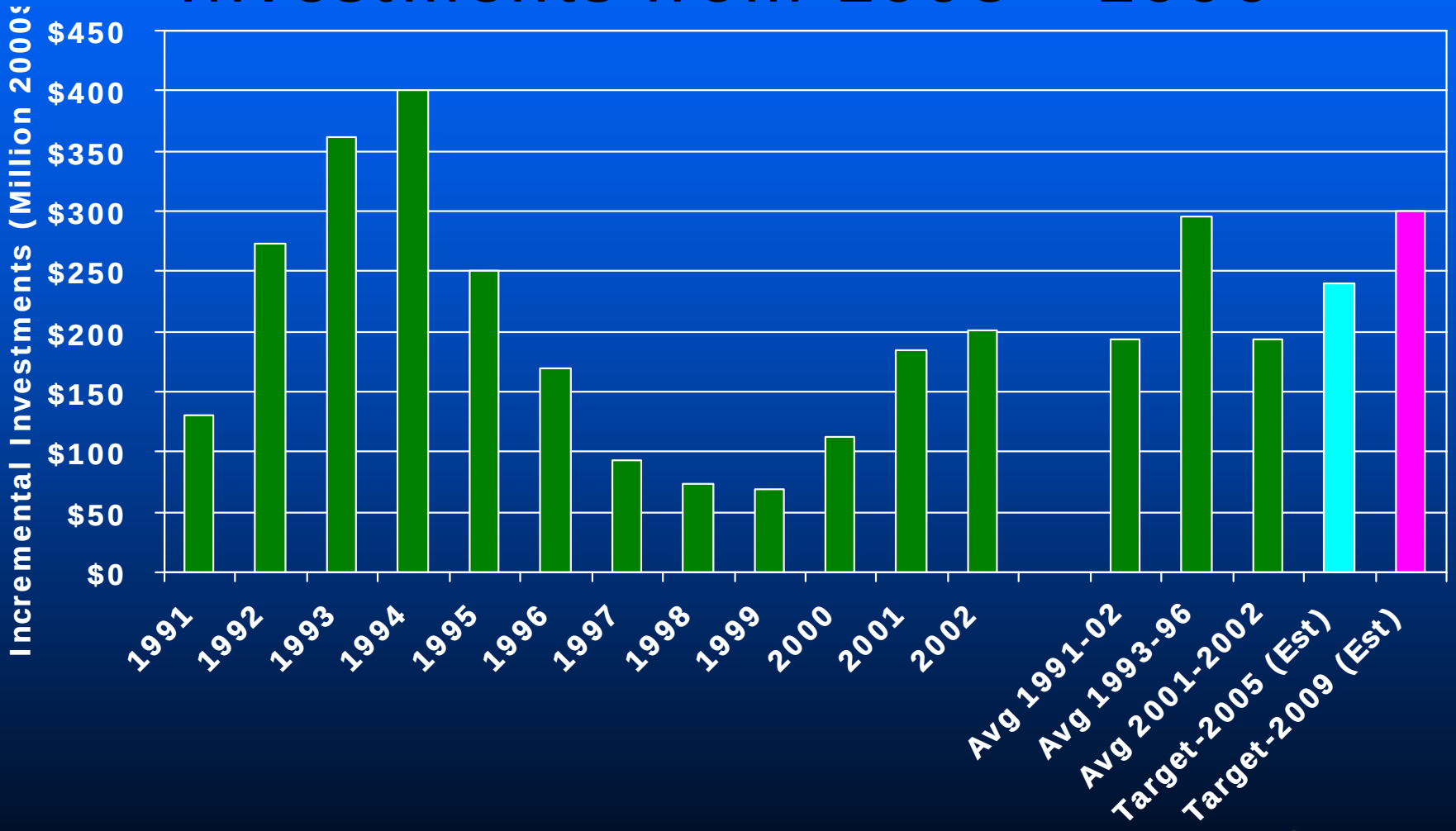
It Might Cost Less Than the Average Annual Utility System Conservation Investments from 1993 - 1996



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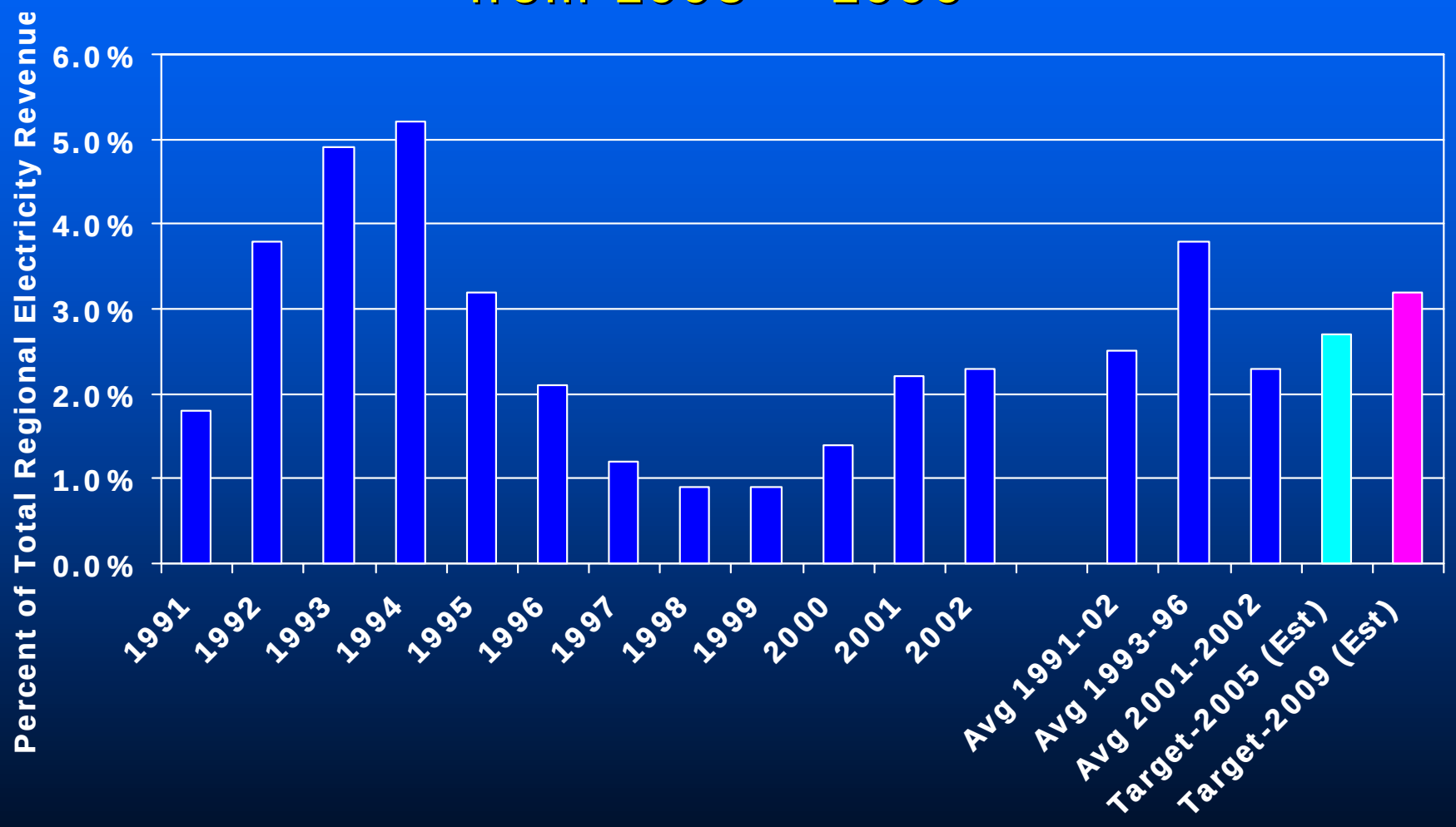
It's Lower Than the Annual Utility System Conservation Investments Were As A Share of Total Revenues from 1993 - 1996



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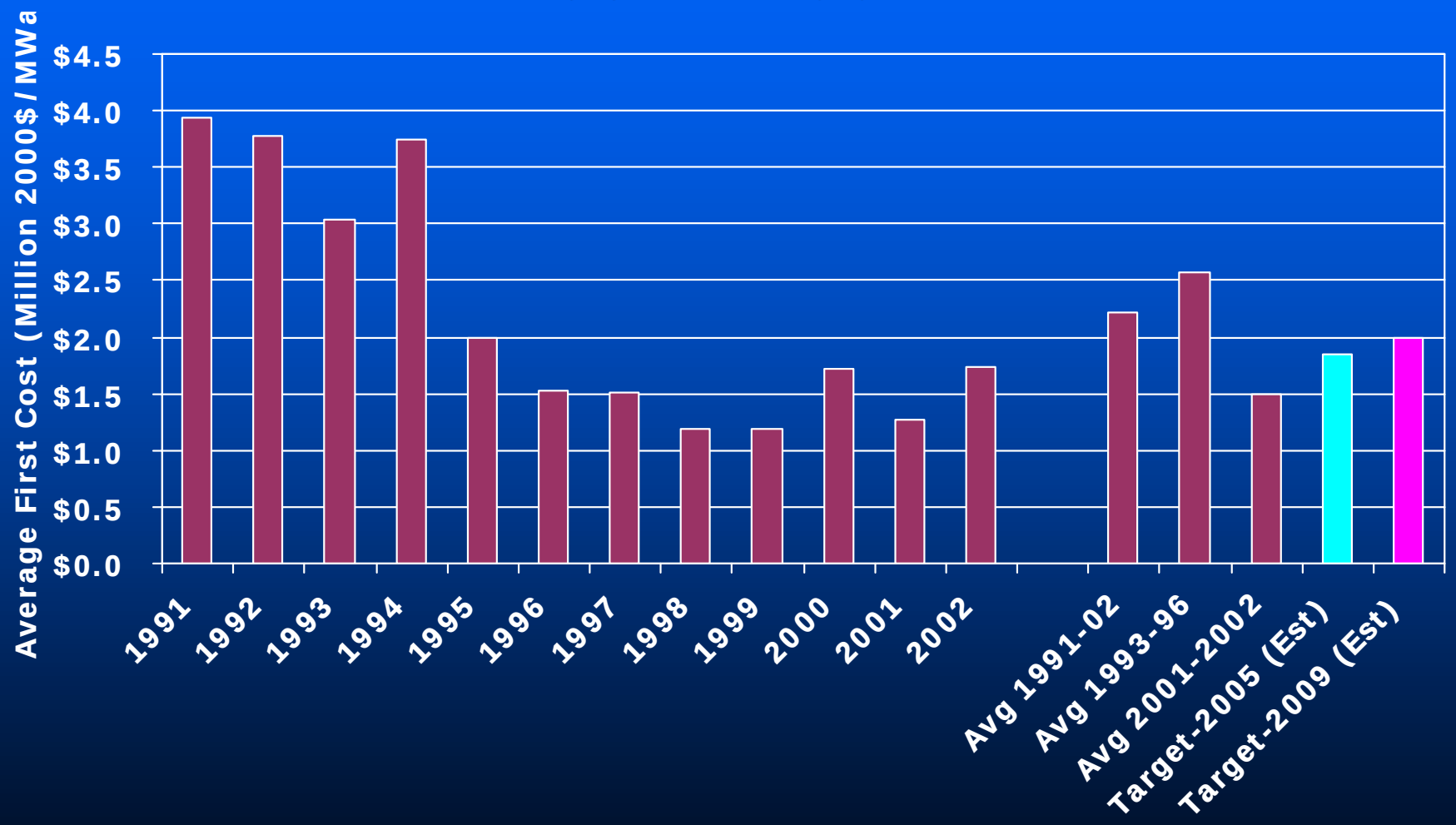
It Could Cost Less Than the Average Annual Utility System "First Year" Conservation Cost 1991 - 2002



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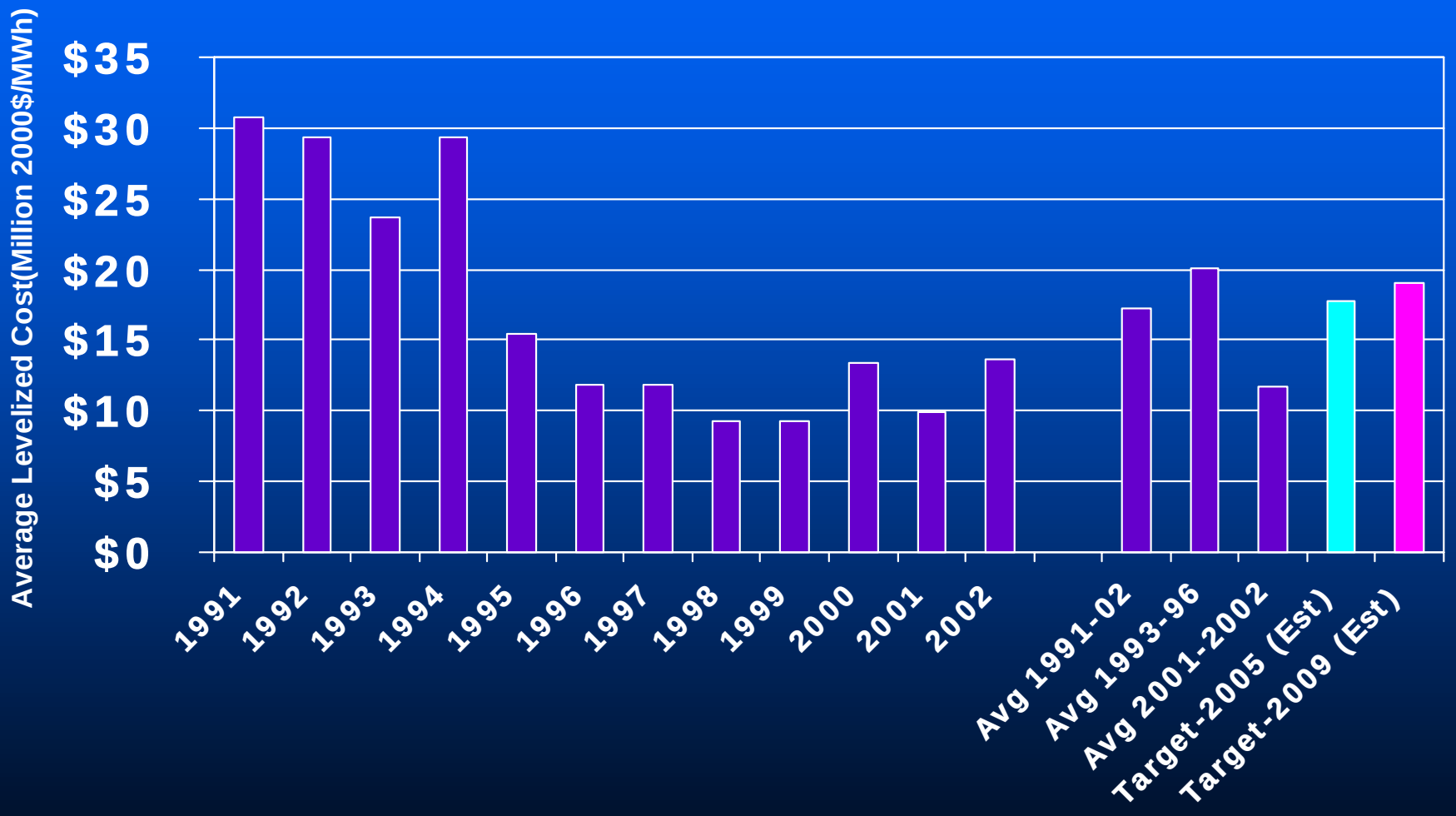
It Could Cost Less Than the Average Annual Utility System Levelized Conservation Cost 1991 - 2002



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700 aMW conservation over 5-years – a challenge but doable

- We've done that much at times in past
  - Less than average annual achievement from all sources 1991-02
  - Utility system has spent more in the past
  - Many major utilities have conservation targets at or near this level
- Mostly taps new sources of improved efficiency
  - 40% is lost-opportunities that are not available yet
  - Nearly two-thirds is new measures or new applications
  - Getting it all means making PNW 10% more efficient over 20 years
- There is a rate impact but
  - About 2/3 of cost of meeting target is already in current rates
  - Additional cost ~$50 - $75 million/yr = less than 1% of regional utility revenue requirements

We Have Improving Acquisition Tools

- Market transformation efforts; Alliance, CEE & others
- Twenty years of BPA & utility experience
- Improved regulatory mechanisms
- System Benefit Charge administrators OR & MT
- Federal appliance standards & processes
- State and local codes and programs
- An energy-efficiency industry
- "Improved" consumer economics
- We're not alone any more
  - (California, Midwest, Northeast, Energy Star, ACEEE, China, …)

Draft Plan
Conservation Action Items (1)

- Focus on “Lost Opportunity” conservation
  - New initiatives are needed at all levels
  - Programs, codes and standards
  - Ramp up to 85% penetration in 12 years
    - » 10 to 30 MWa/year 2005 through 2009, medium growth
- Acquire “Non-Lost Opportunity” conservation early
  - Return to acquisition levels of early 1993-1996
  - Utility & regional programs, market transformation
  - Target 120 MWa/year next five years

Draft Plan
Conservation Action Items(2)

- A mix of mechanisms will be needed
  - Local utility, SBC Administrator & BPA programs
  - Market transformation
  - Codes and standards
  - Regional programs and coordination
- Develop a strategic conservation plan
  - Identify who does what by when
  - Council convenes forum
  - Produce plan in one year

Draft Plan
Conservation Action Items(3)

Elements of Strategic Conservation Plan

- Aggressive utility action is needed
  - Market and consumer actions insufficient
  - Modest increase targets & budgets over recent levels
- BPA can play a key role
  - Strategic plan should define BPA role & actions
  - Structure of BPA conservation programs & funding
- Codes & Standards
  - States should adopt high priority appliance standards
  - States should update energy codes to reflect Model Conservation Standards for new buildings
  - Improve federal appliance standards

Draft Plan
Conservation Action Items(4)

Elements of Strategic Conservation Plan

- Increase budget for market transformation
  - New initiatives & technologies
  - Codes & standards support
  - Increase pace and/or scope of existing initiatives
- Regional investments in "infrastructure" needed
  - RD&D, evaluation, education & training, common specifications, some acquisition
  - Possible entities: Alliance, BPA, RTF, or create new one (resolve through strategic plan process)

Draft Plan
Conservation Action Items(5)

- Track conservation accomplishments
  - Improve mechanisms for regional reporting
  - Reports to Council annually
- Address regulatory barriers to conservation
  - Incorporate “hedge” value in IRPs
  - Strategies to mitigate lost-revenue impacts
  - Consider financing conservation investments
  - Evaluate SBC as alternative mechanism
  - Avoid conservation disincentives in the design of BPA allocation

Summary

- It's big – Over 2600 aMW
- It’s cheap ~ 2.4 cents/kWh
- It's new “stuff” and improved “old stuff”
- It's about 40% lost opportunity
- It’s nearly all capital
- It’s going to require more money at a time when utilities are faced with the bad politics of rate increases
- Both regional ***cost*** and ***risk*** increase if we fail

Opportunities for public comment

- Public Hearings:
  - Tuesday, Oct. 12, Missoula
  - Tuesday, Oct. 26, Portland.
  - Wednesday, Oct. 27, Eugene
  - Thursday, Oct. 28, Tri Cities
  - Monday, Nov. 1, Twin Falls
  - Monday, Nov. 8, Boise
  - Wednesday, Nov. 10, Seattle
  - Tuesday, Nov. 17, CdA Id

- Comments close Nov 19
- Send comments to

  Mark Walker
  Director of Public Affairs
  Northwest Power & Conservation Council
  851 SW 6th Avenue, Suite 1100
  Portland, Oregon 97204-1348
  fax 503-820-2370
  or email
  comments@nwcouncil.org

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