

# The Role of Energy Efficiency in the Northwest

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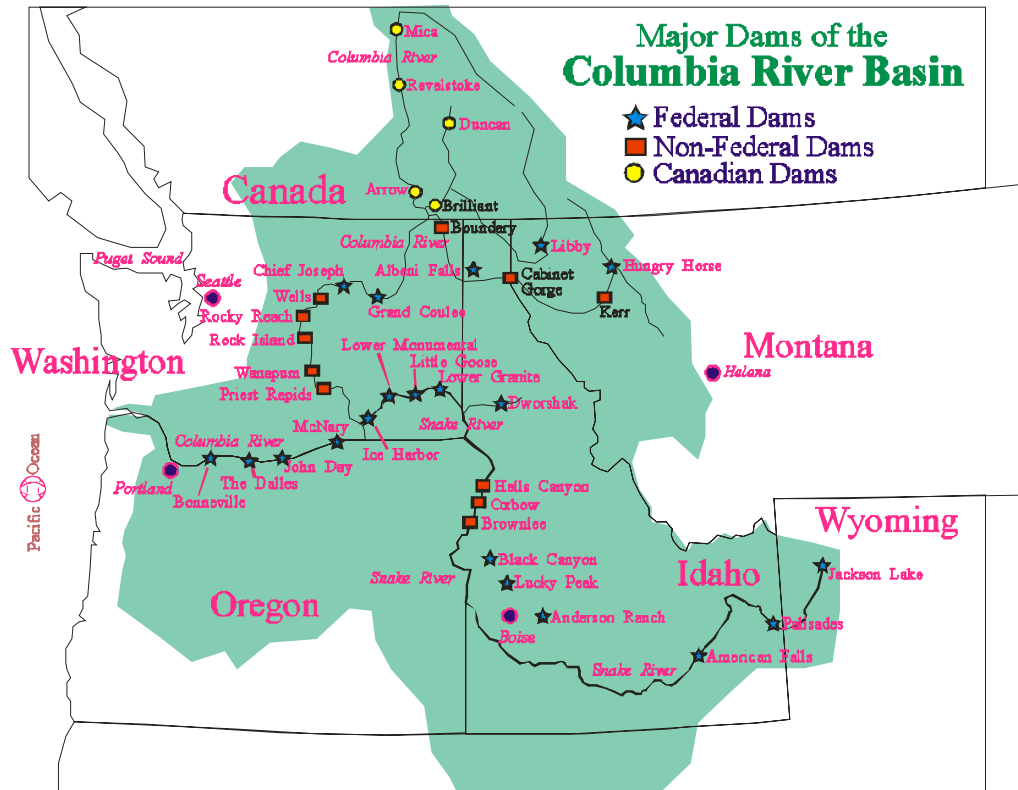
Background for State Clean Energy-Environment Technical Forum

State and Regional Energy Planning Teleconference

November 10 , 2005

# To Understand the Present, You Need to Know Our Past

# What Happened After Lewis and Clark Left?



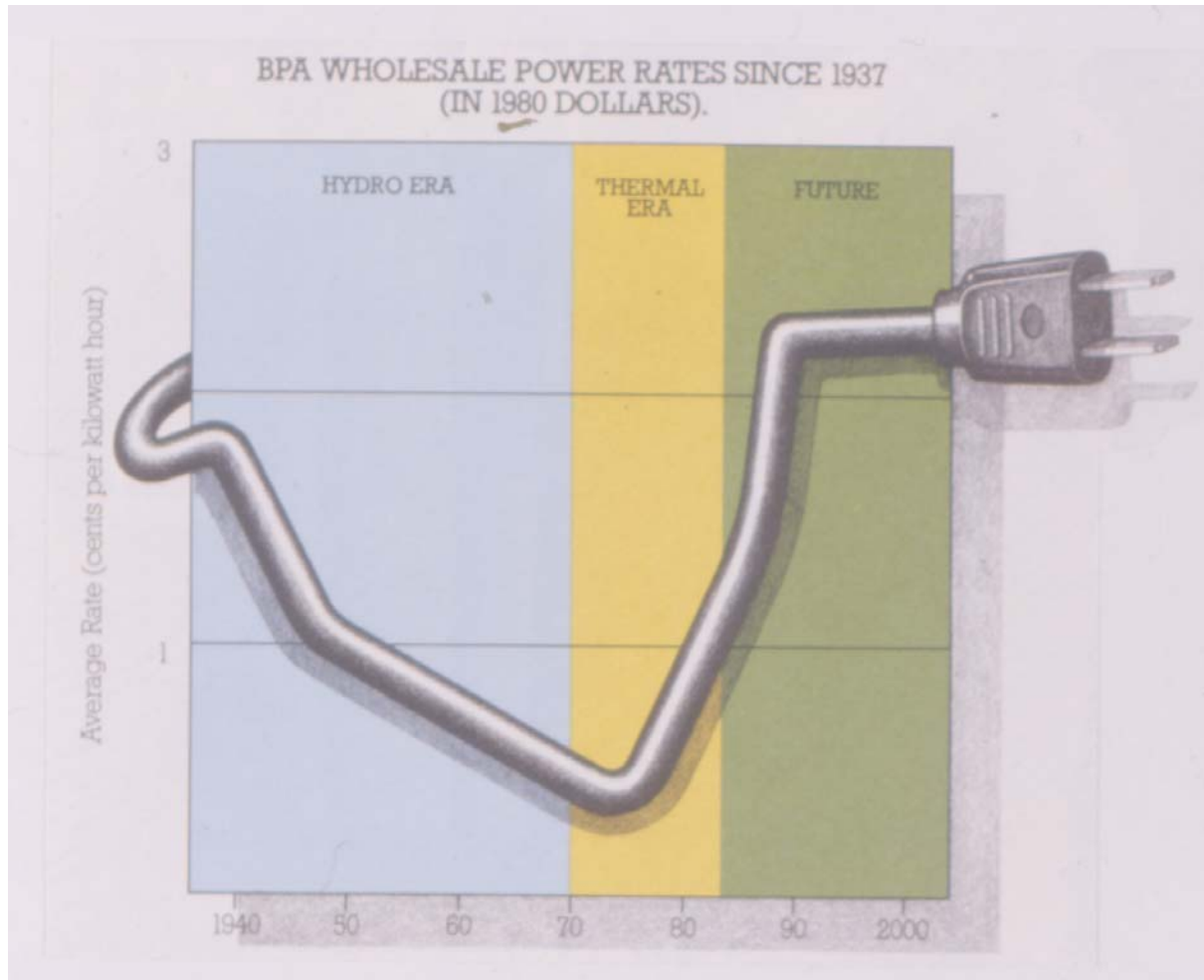
# The First Three “Eras” of Power Planning in the PNW

- “New Deal” Mysticism (1930-1950)
  - Politicians plan using “chicken entrails and crystal balls” legislate what’s needed and when
- Engineering Determinism (1950- 1970)
  - Engineers, using graph paper and rulers schedule the next power plants
- Economic Determinism (1970 to April 27, 1983)
  - Economist, using price elasticity's slow the engineer’s construction schedules

# Actions Taken in Response to “Engineering and Economic Determinist’s” Forecasts

- Utilities planned and/or started construction on 28 coal and nuclear power plants to be completed over a 20-year period.
- Native American tribes sued the state and federal government over loss of salmon
- Environmental groups sued Bonneville Power Administration over plans to turn the Columbia River into “Wave World”

# Impact of Actions Taken in Response to “Engineering and Economic Determinist’s Forecasts and Plans



# Reaction to Impact of Actions Taken in Response to “Engineering and Economic Determinist’s Forecasts and Plans



Terminate or mothball 9 nuclear and 5 coal plants at a cost to the region’s consumers of more than \$7 billion.

Motivate the region’s politicians, utilities, larger industries and public interest groups to accept the “deals” embodied in the *Northwest Power and Conservation Planning Act of 1980*



# The Fourth Era - *Northwest Power and Conservation Planning Act of 1980 (PL96-501)*

- Authorized States of ID, OR, MT and WA to form an “interstate compact” (aka, the “Council”)
- Directed the Council to develop 20-year load forecast and resource plan (“The Plan”) and update it every 5 - years
  - To assure the region of an adequate, efficient and reliable power system
  - To provide for the development of the least cost mix of resources\*
  - Conservation (energy efficiency) deemed highest priority resource equivalent to generation with a 10% cost advantage over power generating resources (2<sup>nd</sup> priority > renewable resources, 3<sup>rd</sup>>Co-gen, 4<sup>th</sup>>conventional generation)
- Mandated public involvement in Council’s planning process.

\**Federally mandated “least cost integrated resource planning” on regional basis*



# Council Planning Process and Plans

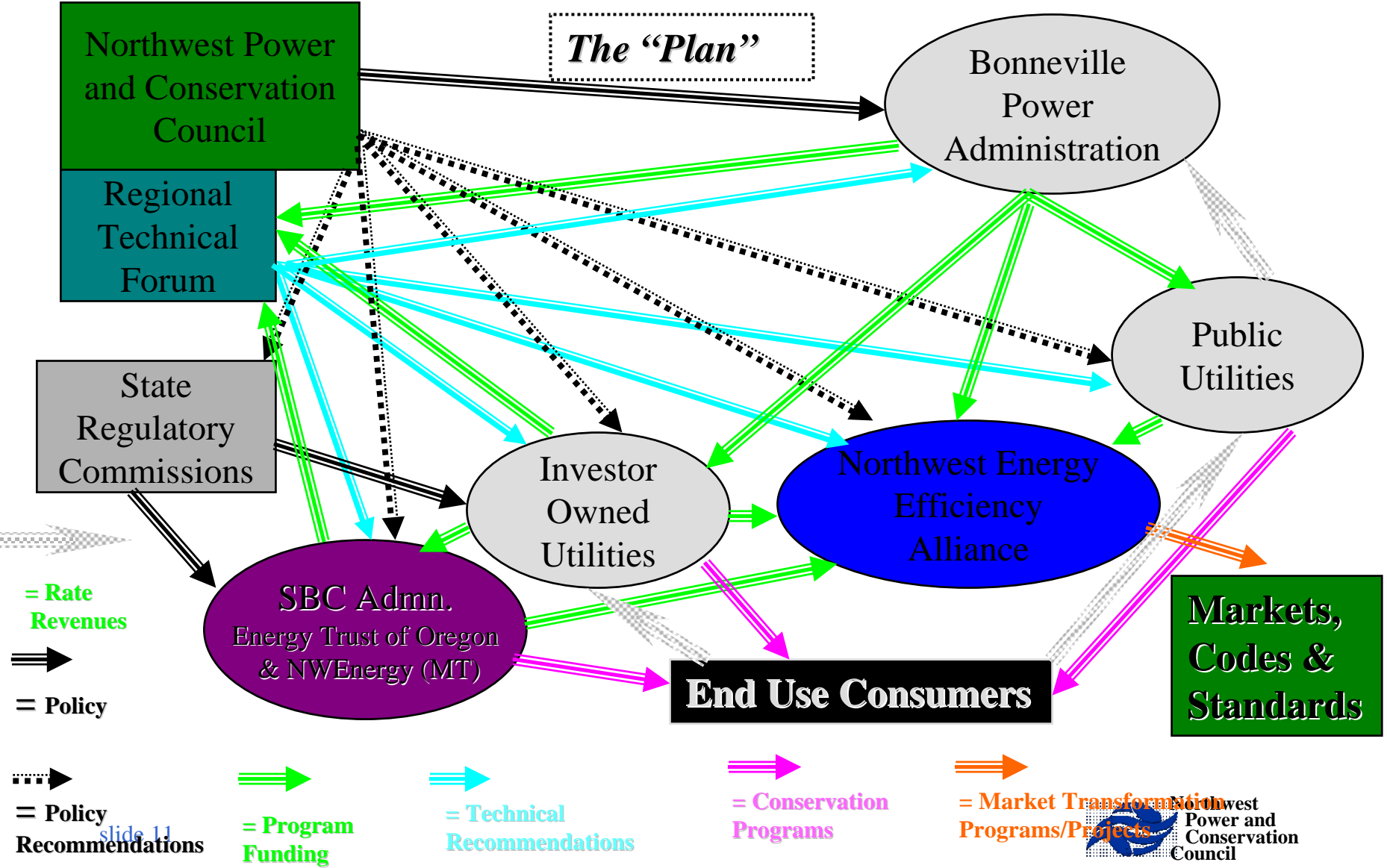
- Longest Running “Integrated Resource Planning Process” in the Country
- Serves as “Regional Lens” through which state Commissions view utility IRPs (and other resource development)
  - Regional resource adequacy
  - Resource cost-effectiveness
  - Conservation/Efficiency goals

# How Has It Worked?

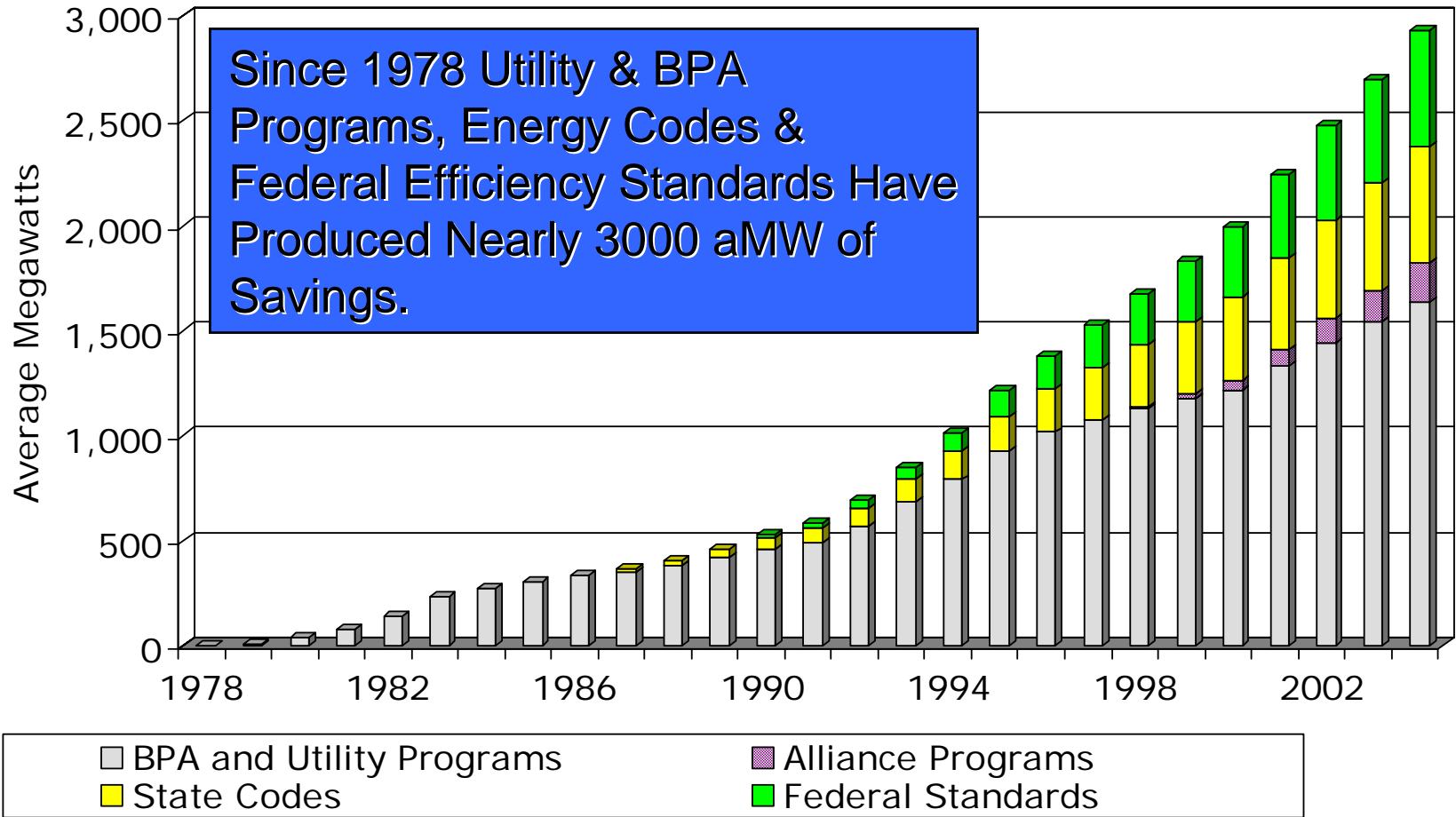
- Fundamentally changed utility resource planning
  - Council’s independent view of resource adequacy in first Plan led Bonneville and the region’s utilities terminate WNP 4&5, Skagit 1&2 and defer and ultimately cancel WNP 1&3, Creston 1&2, etc.
  - Oregon and Washington Commissions adopted “least-cost” planning requirements for investor-owned utilities, Idaho and Montana have since followed
  - First Council “Action Plan” Called on Bonneville and the Region’s Utilities to Develop Conservation to Reduce Year 2002 Loads by Between 5 – 17%

» *Let’s See How This Worked*

# How a PNW Kilowatt-Hour Gets Saved



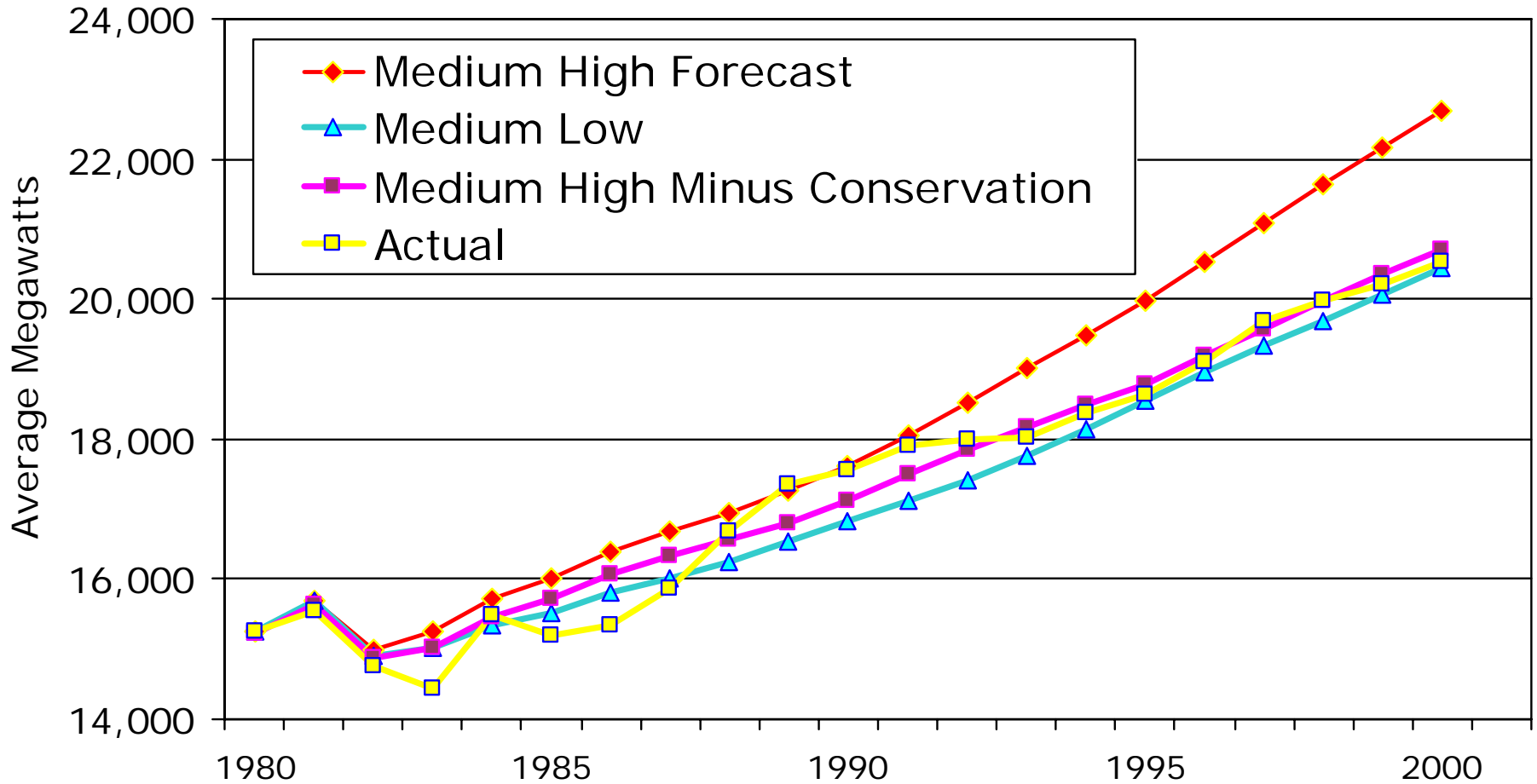
# PNW Energy Efficiency Achievements 1978 - 2004



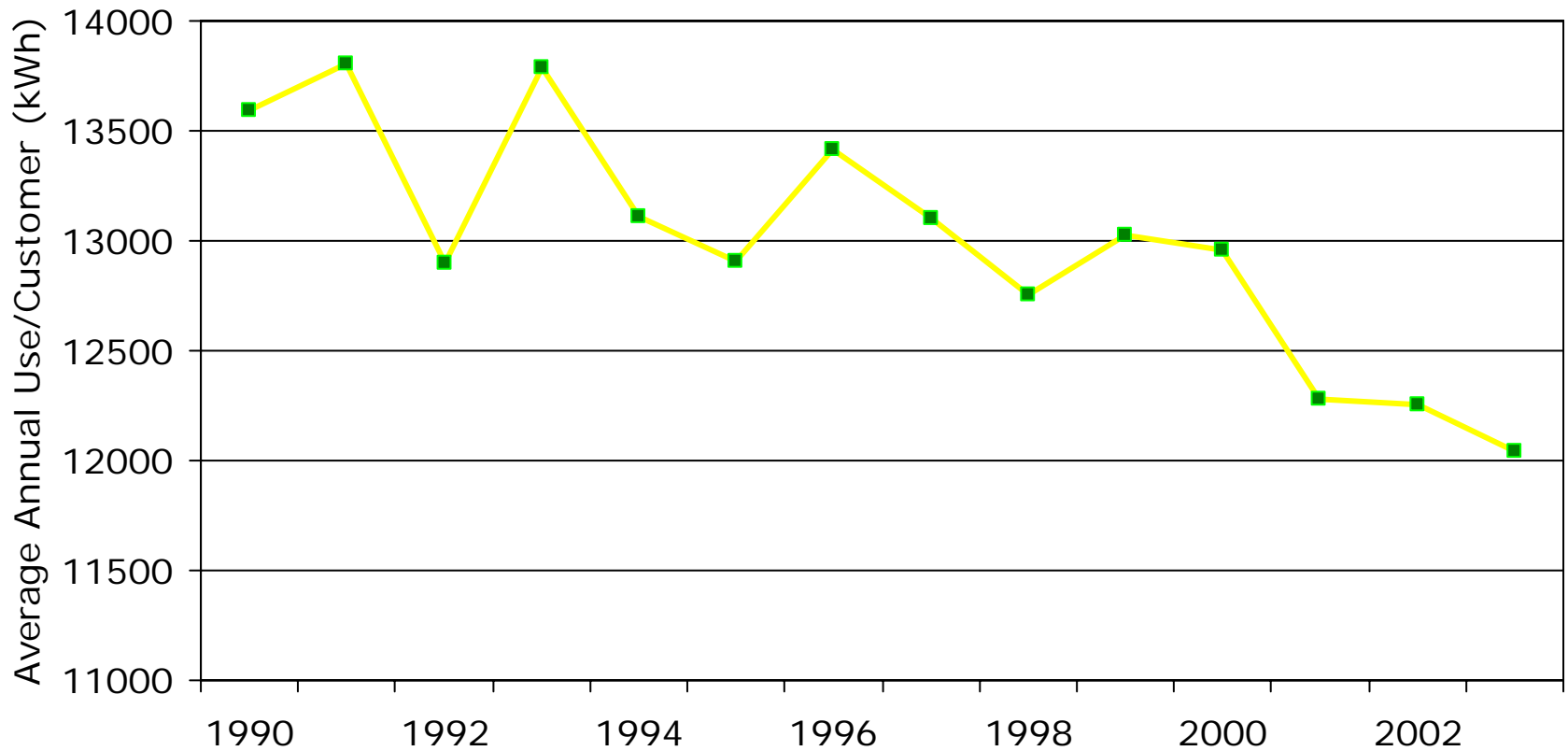
# So What's 3000 aMW?

- It's enough electricity to serve the entire state of Idaho and all of Western Montana
- It Saved the PNW Region's Consumers Nearly \$1.25 billion in 2004

# Energy Efficiency Resources Significantly Reduced Projected PNW Electricity Sales

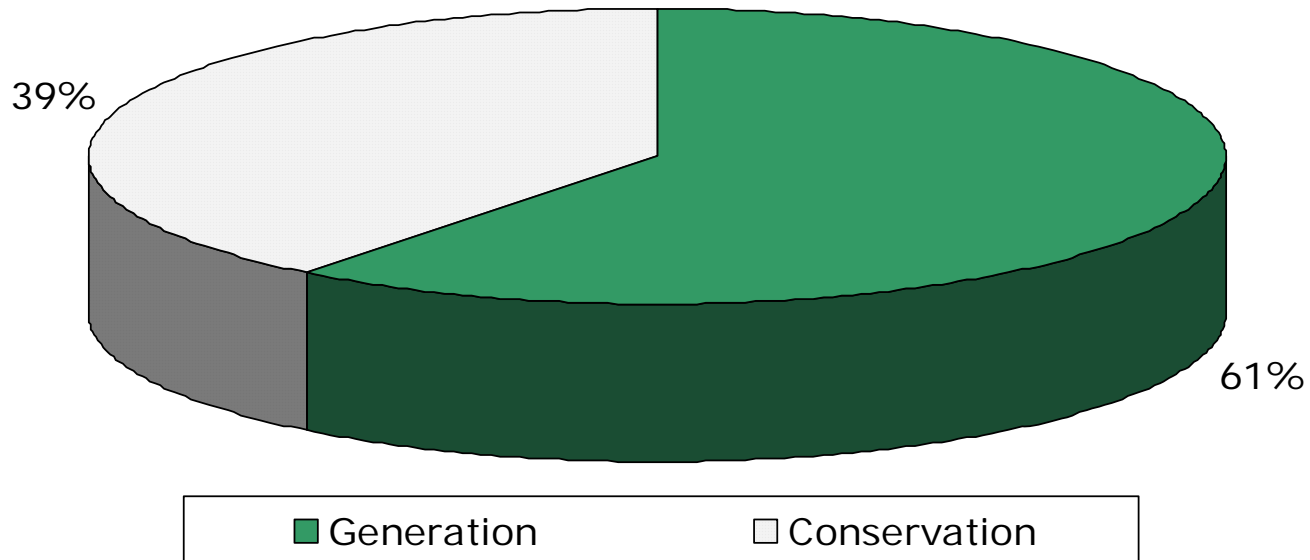


# PNW Average Residential Electricity Use/Customer



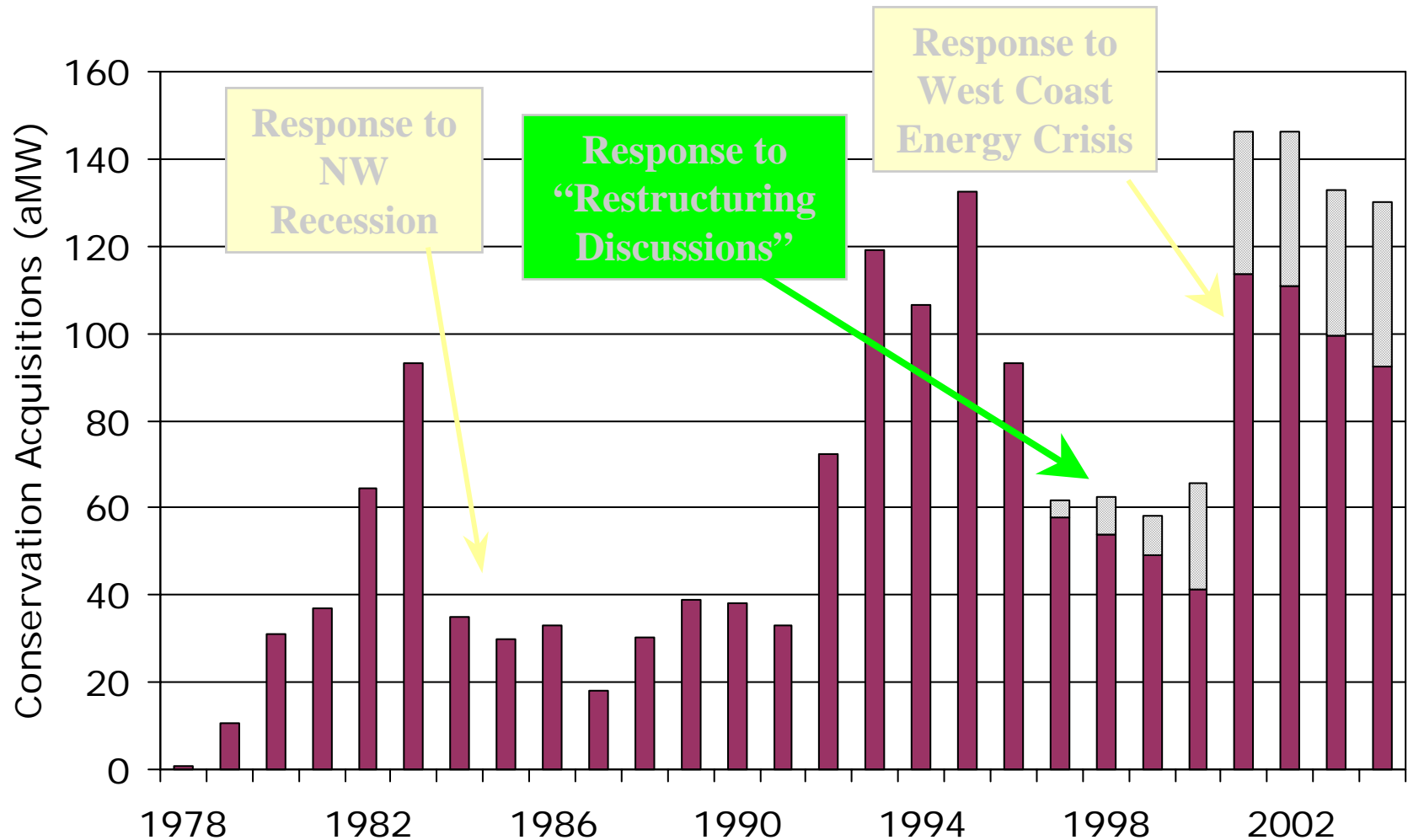


# Energy Efficiency Met Nearly 40% of PNW Regional Firm Sales Growth Between 1980 - 2003

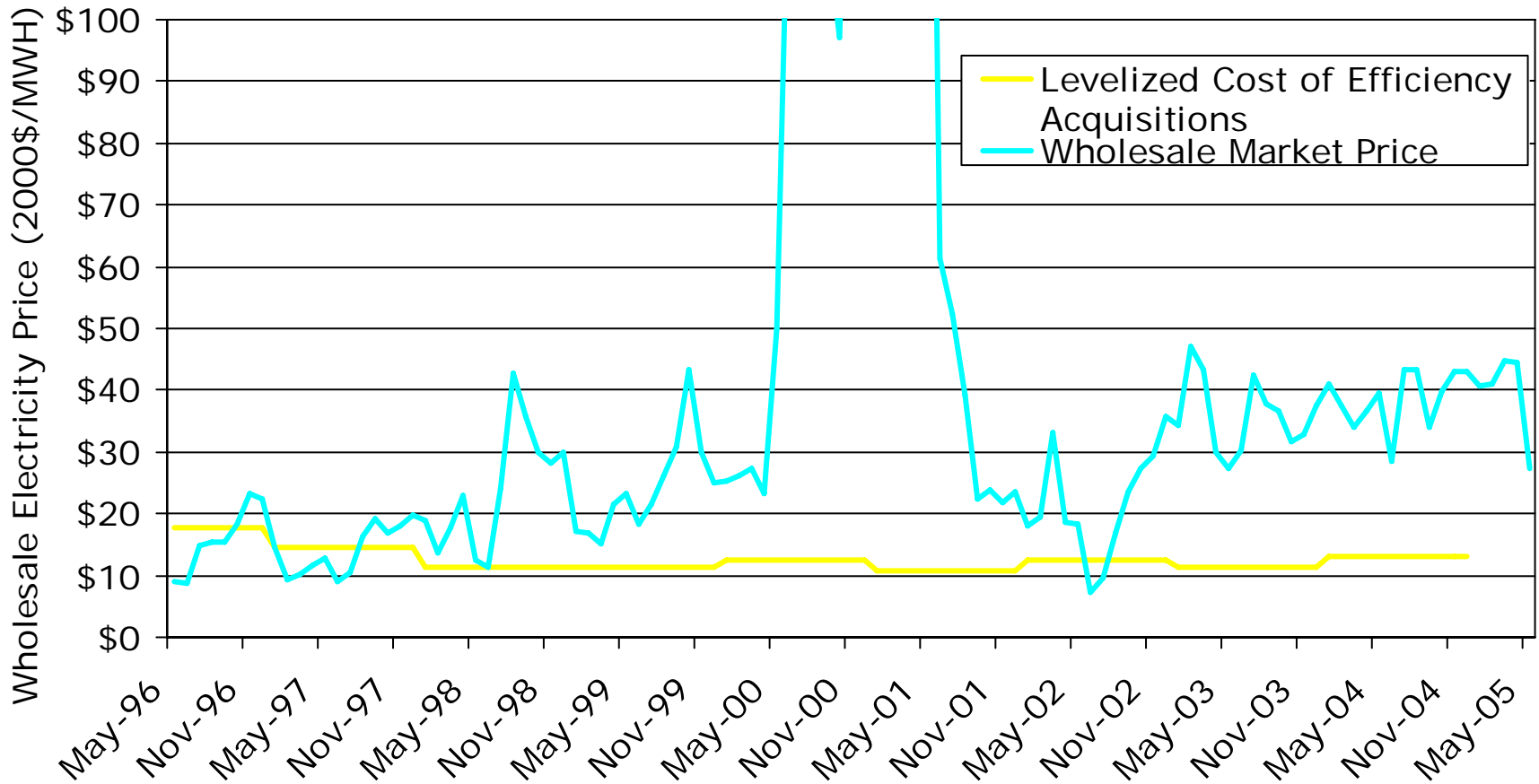


# Regional Utility Energy Efficiency Acquisitions Have Helped Balance Loads & Resources

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

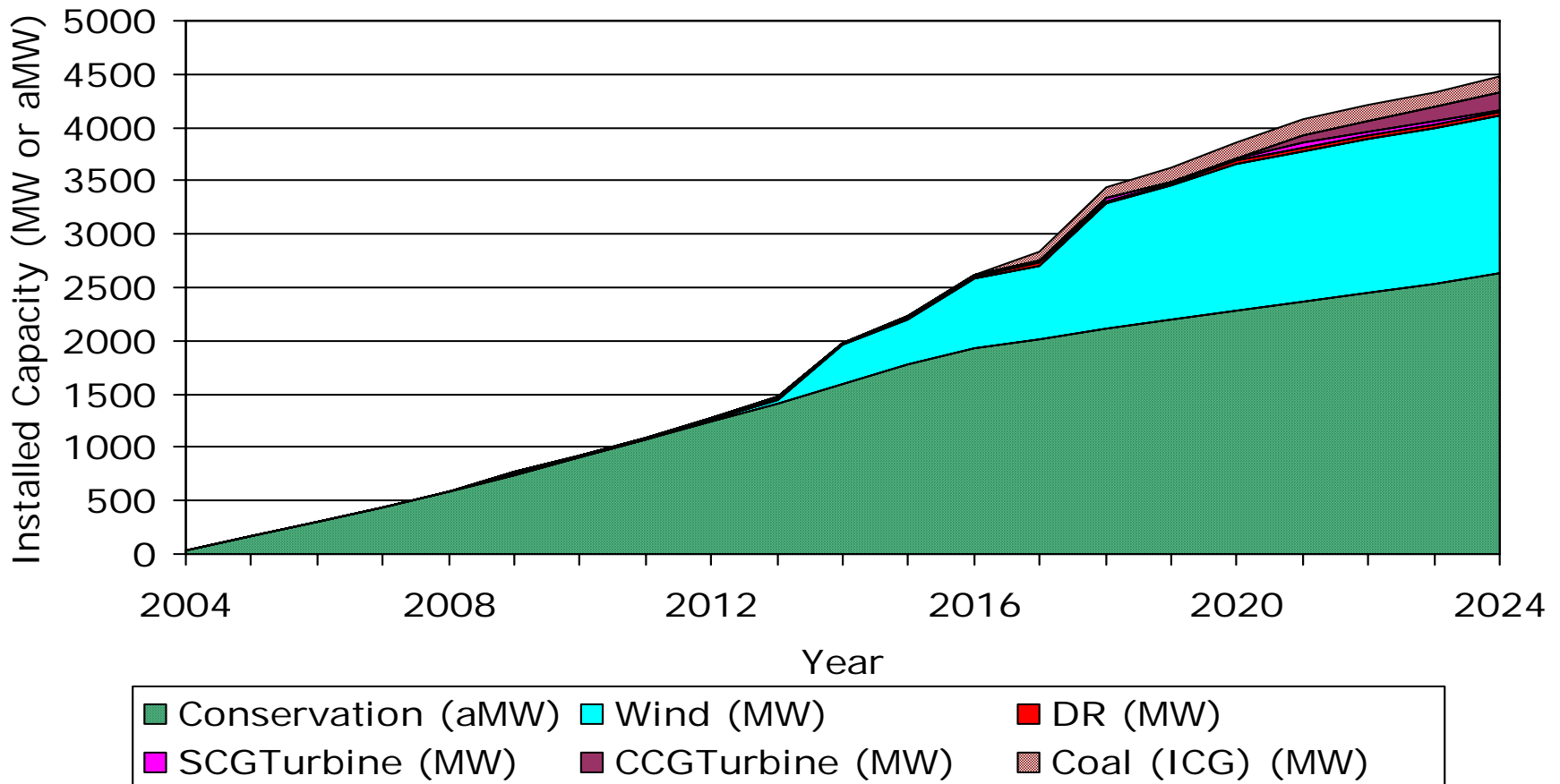


# Utility Acquired Energy Efficiency Has Been **A BARGAIN!**



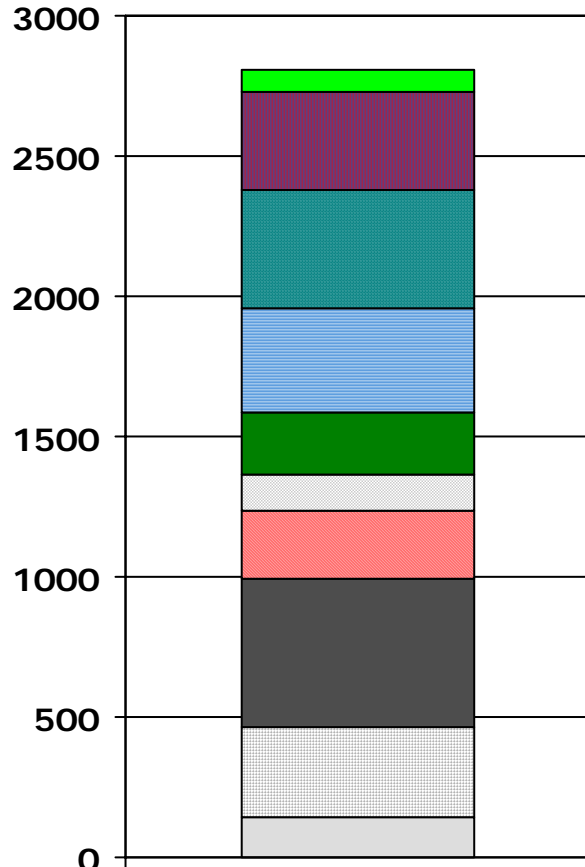
# So Much for the Past, What's Ahead

# 5<sup>th</sup> 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\*



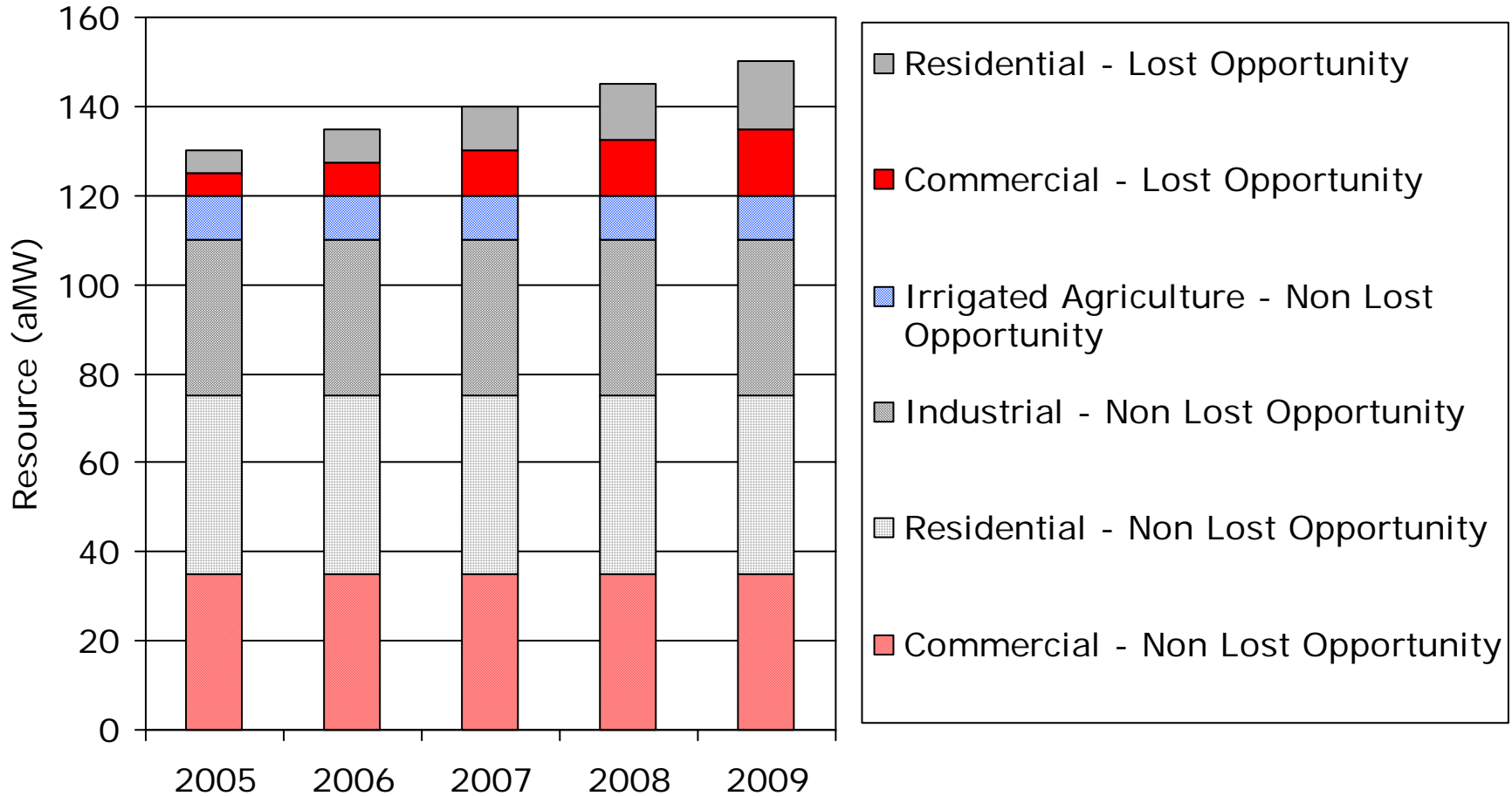
Cost-Effective Potential  
(aMW in 2025)

- 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

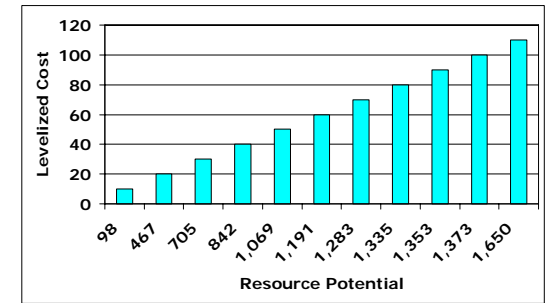
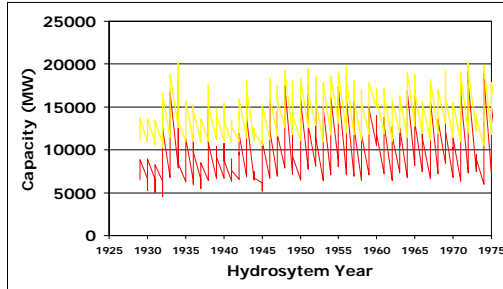
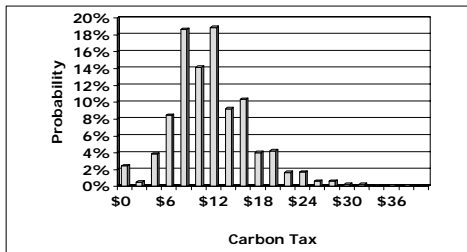
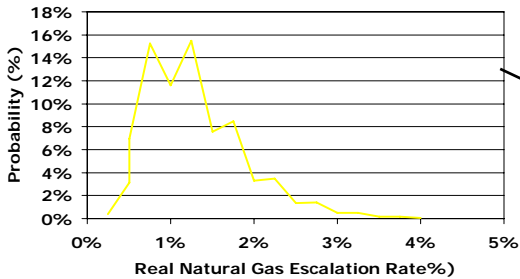
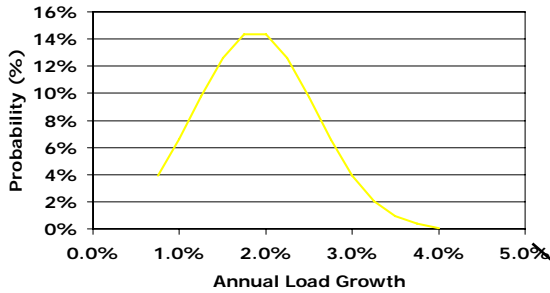




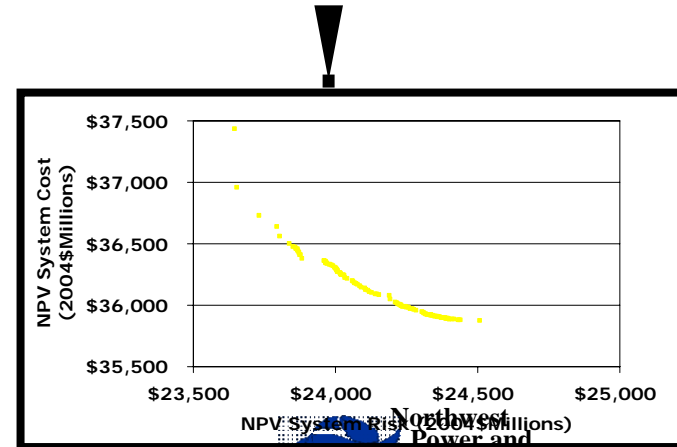
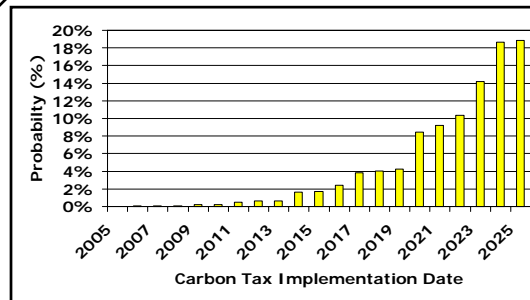
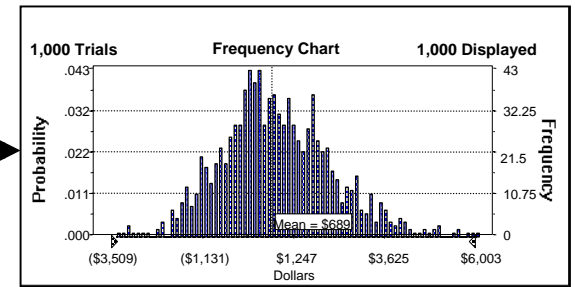
# Why Should We?

## What's Behind the 5<sup>th</sup> Plan's Conservation Targets?

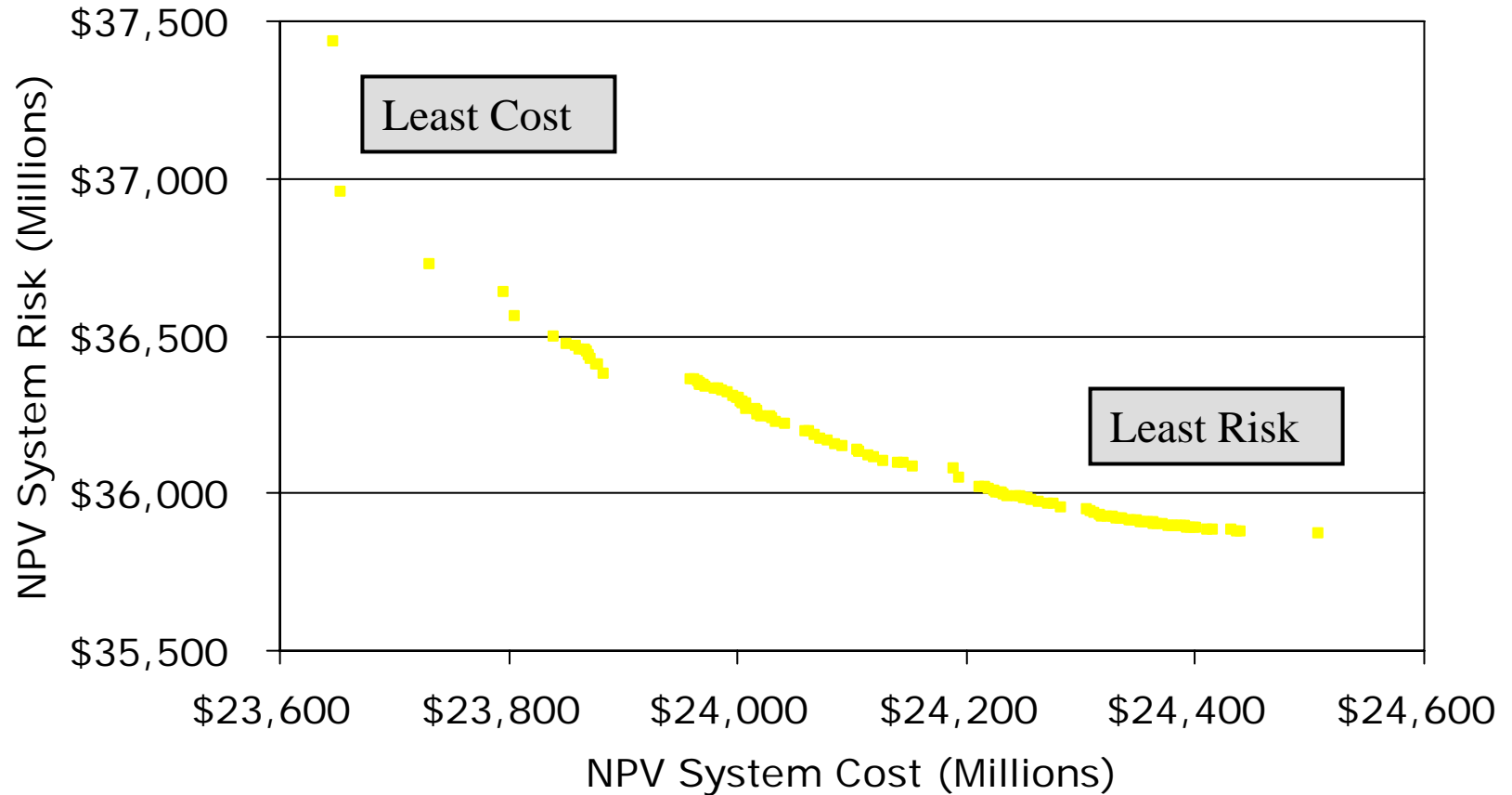
# PNW Portfolio Planning – Scenario Analysis on Steroids



**Portfolio Analysis Model**



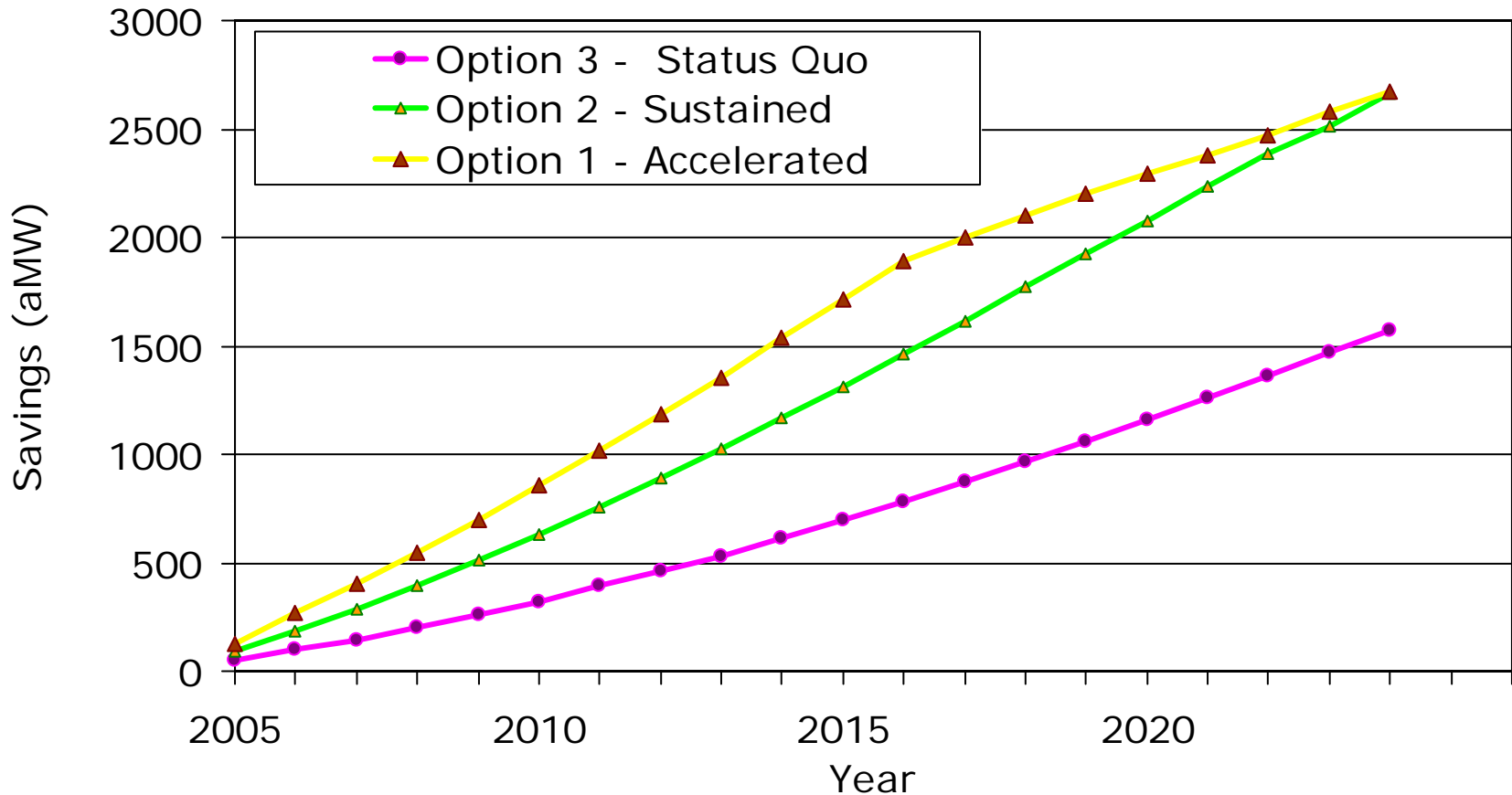
# Plans Along the Efficient Frontier Permit Trade-Offs of Costs Against Risk



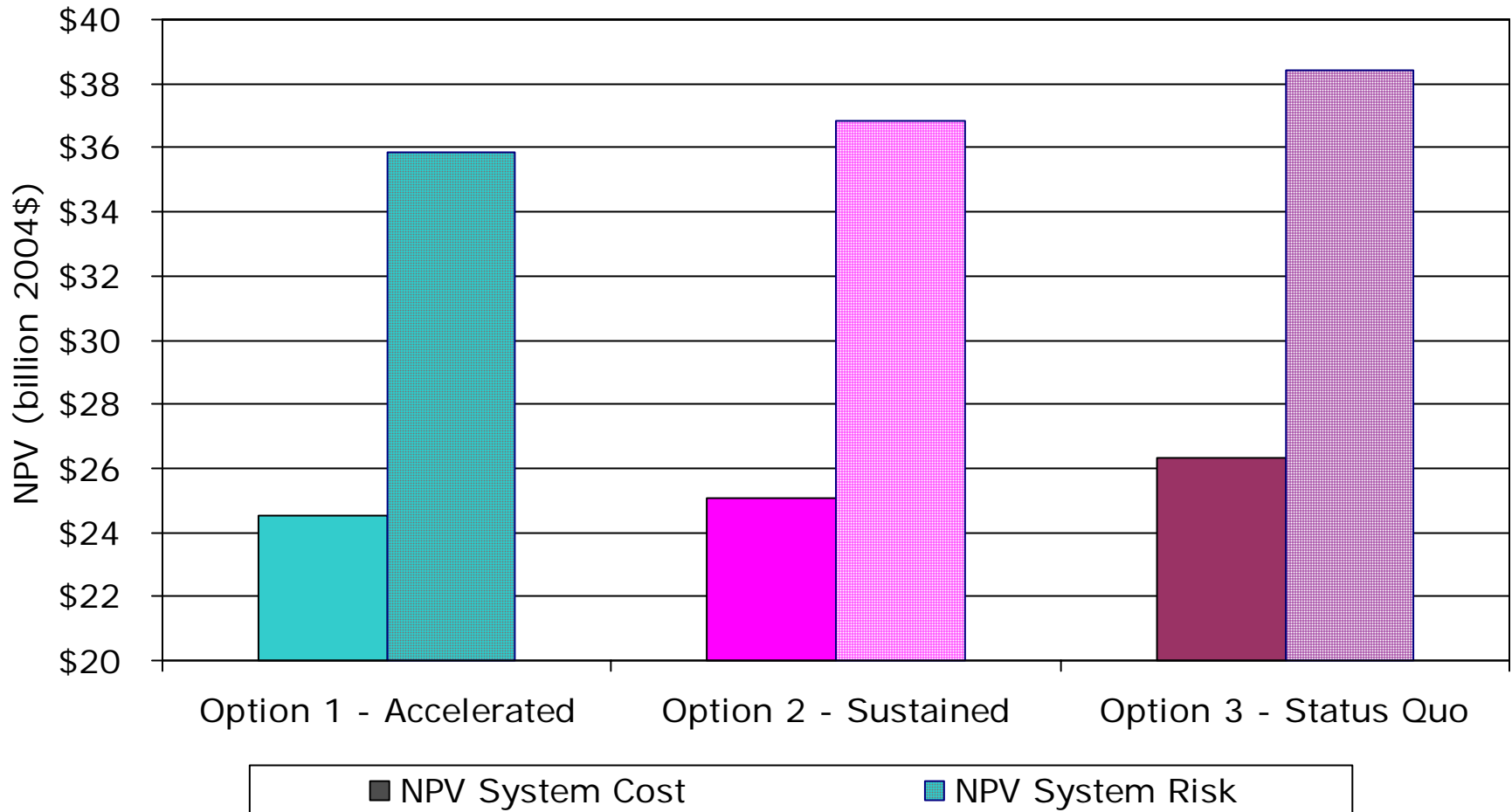
# Three Conservation Options Tested

- **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

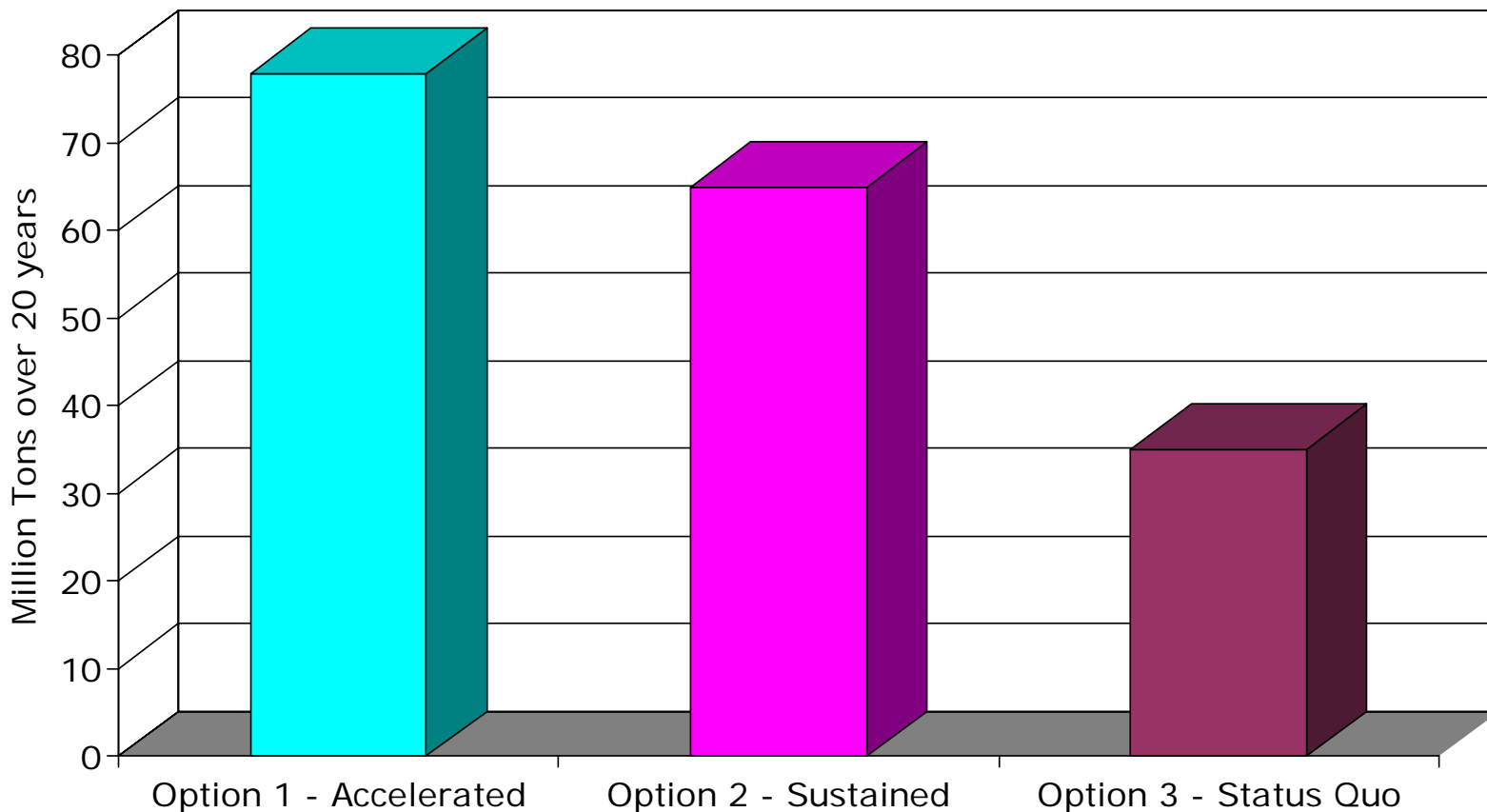
# Average Annual Conservation Development for Alternative Levels of Deployment Tested



# Accelerating Conservation Development Reduces Cost & Risk



# WECC Carbon Dioxide Emissions Reductions for Alternative Conservation Targets





# Why Energy Efficiency Reduces 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

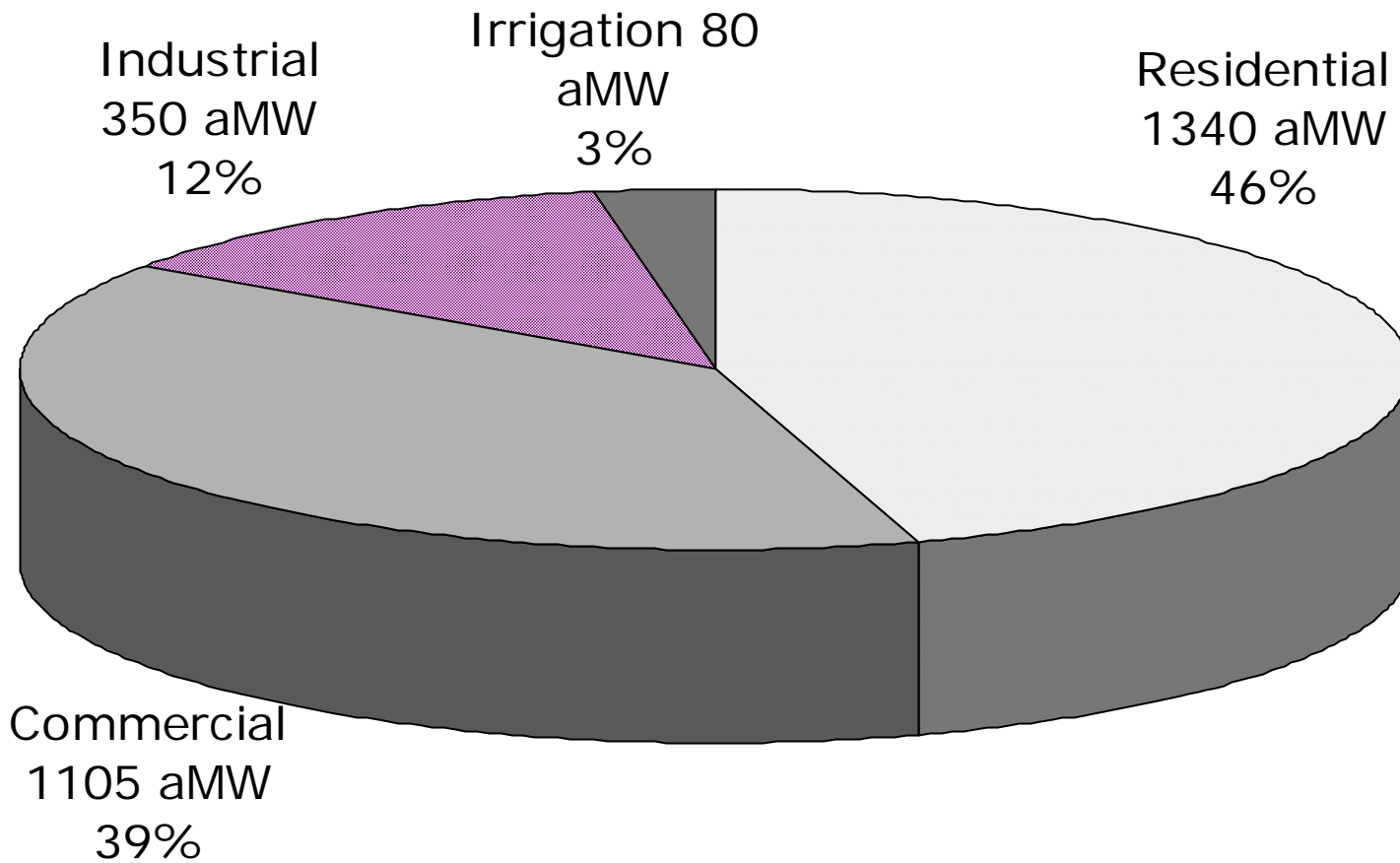
When we took the “ramp rate” constraints off the portfolio model it developed

**1500 aMW**

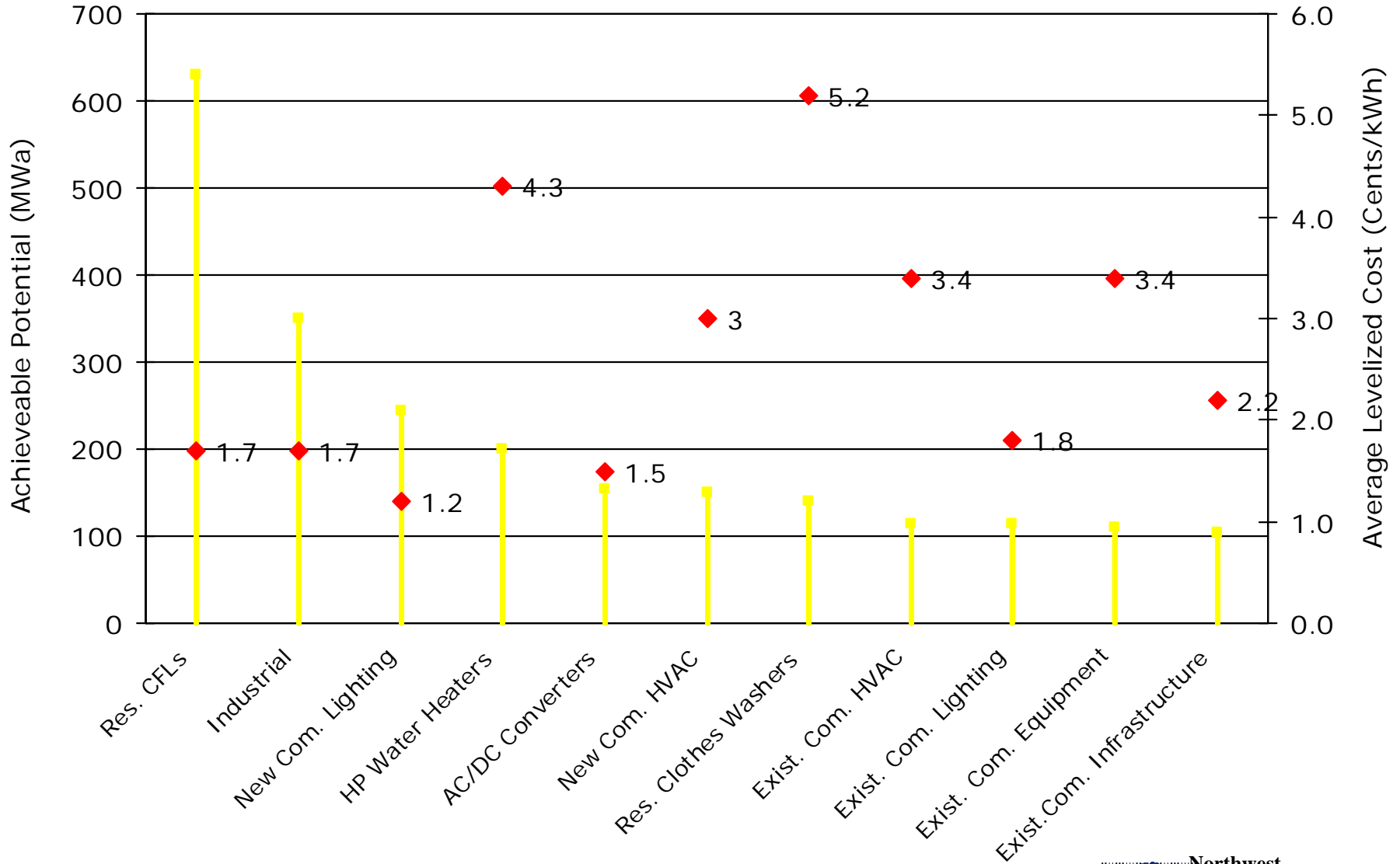
of Energy Efficiency in 2005

# Where Are We Getting The Savings?

# Sources of Savings by Sector



# Major Sources of Efficiency Resource



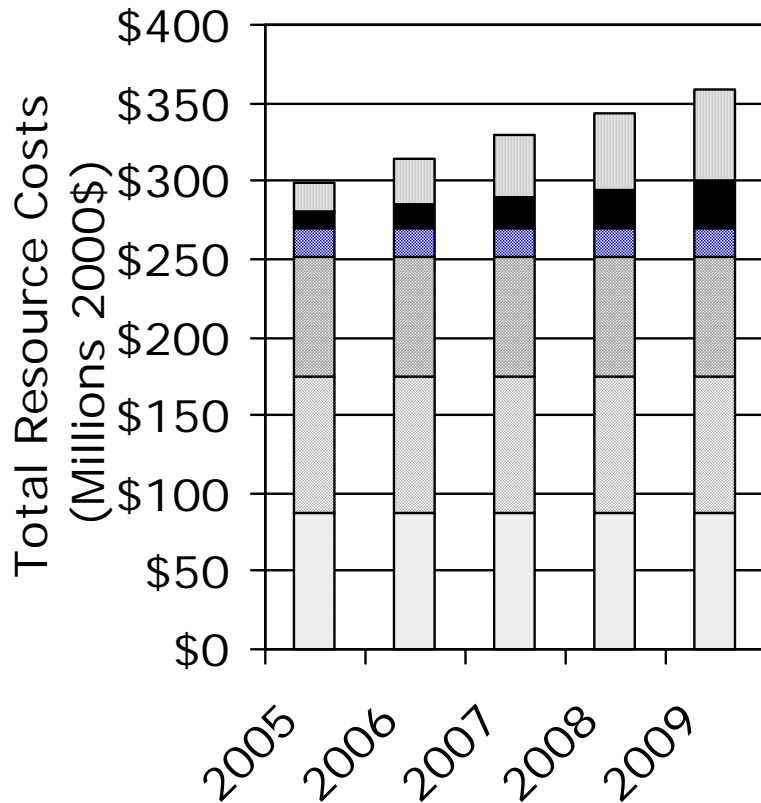
# Implementation Challenges

# 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

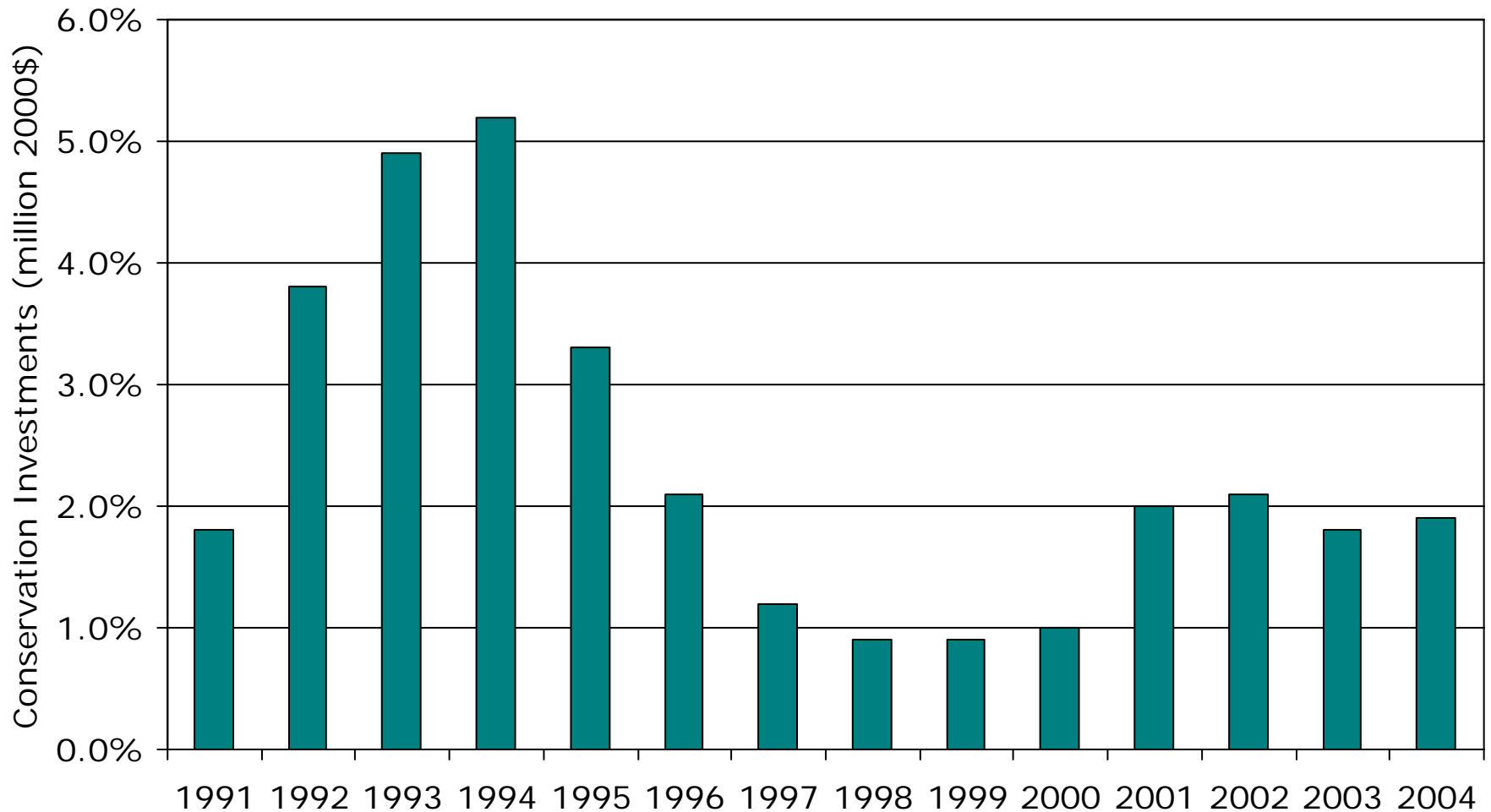
# The Total Resource Acquisition Cost\* of 5<sup>th</sup> Plan's Conservation Targets 2005 – 2009 = \$1.64 billion



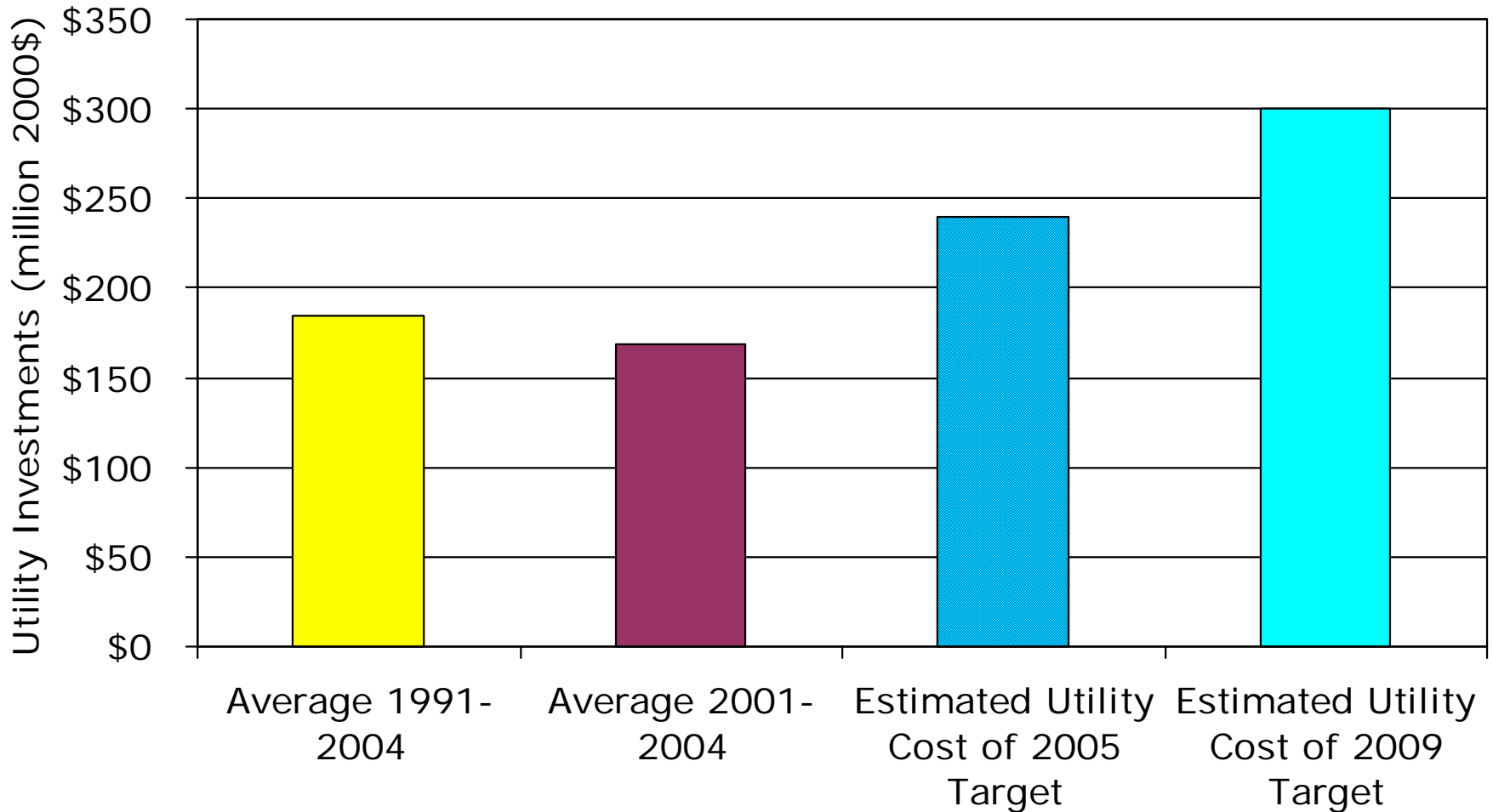
\*Incremental capital costs to install measure plus program administration costs estimated at 20% of capital.



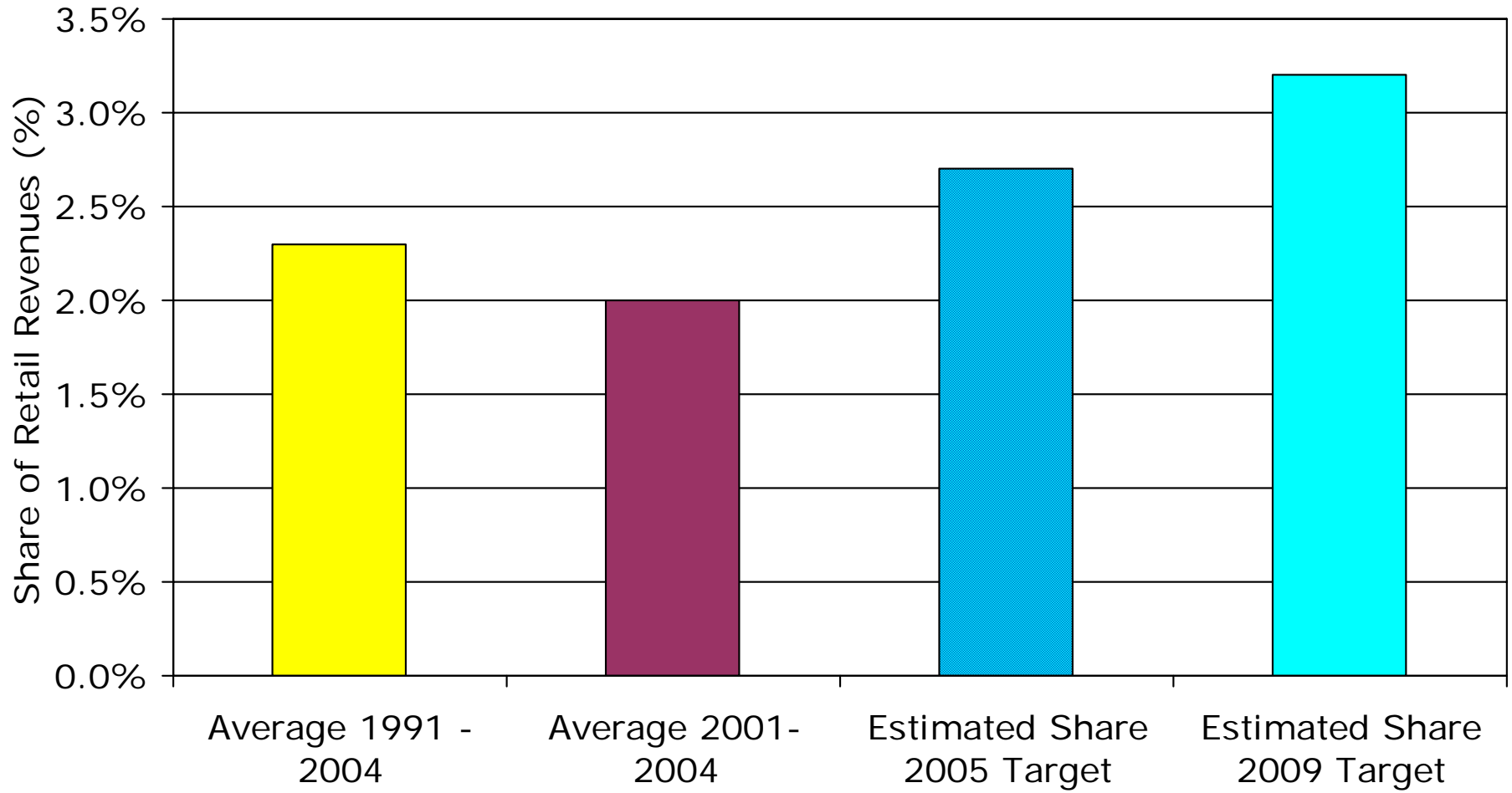
# PNW Utilities Now Invests Less Than 2% of Their Retail Sales Revenues in Energy Efficiency



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

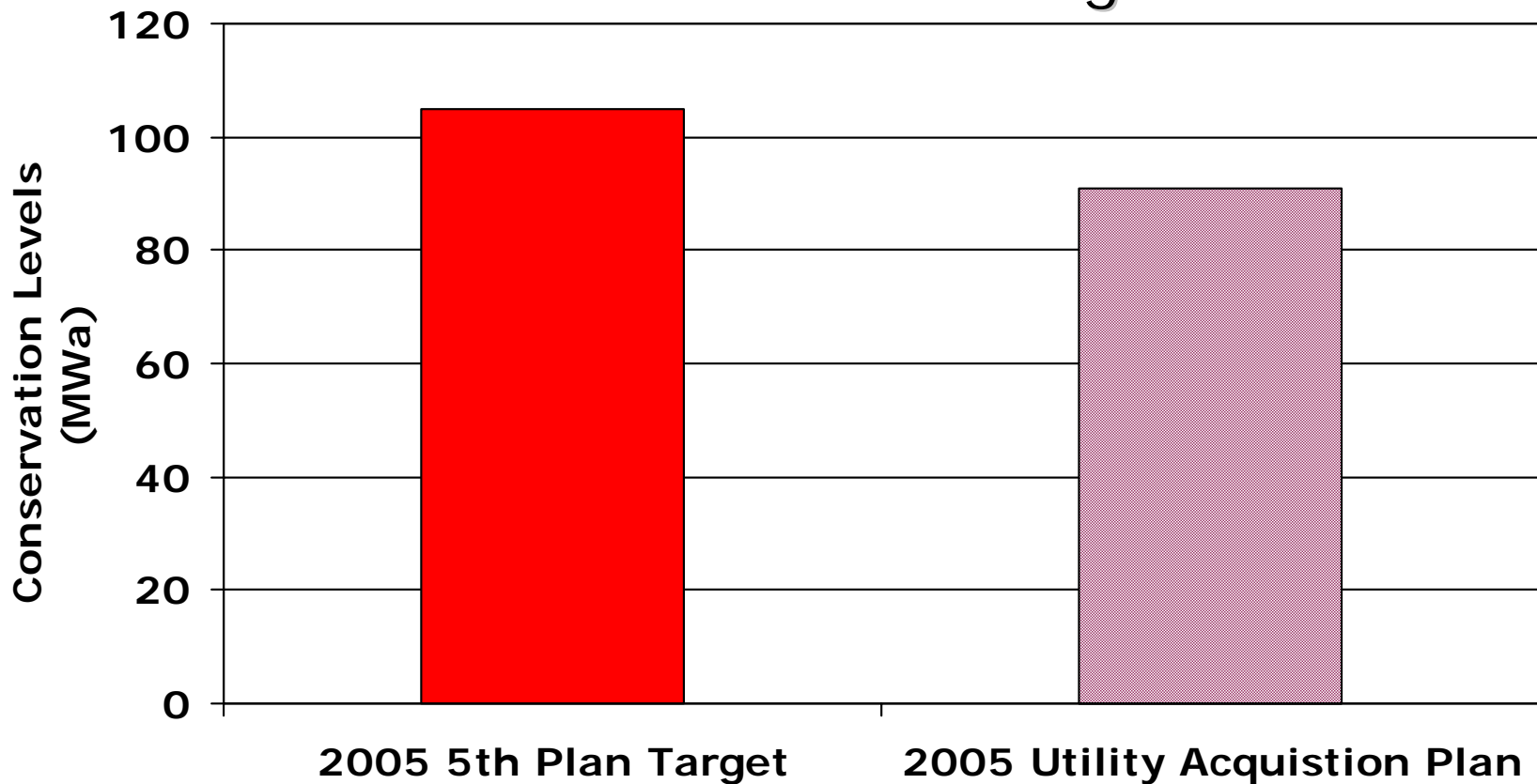


# Although, The Share of Utility Revenues Required is Modest



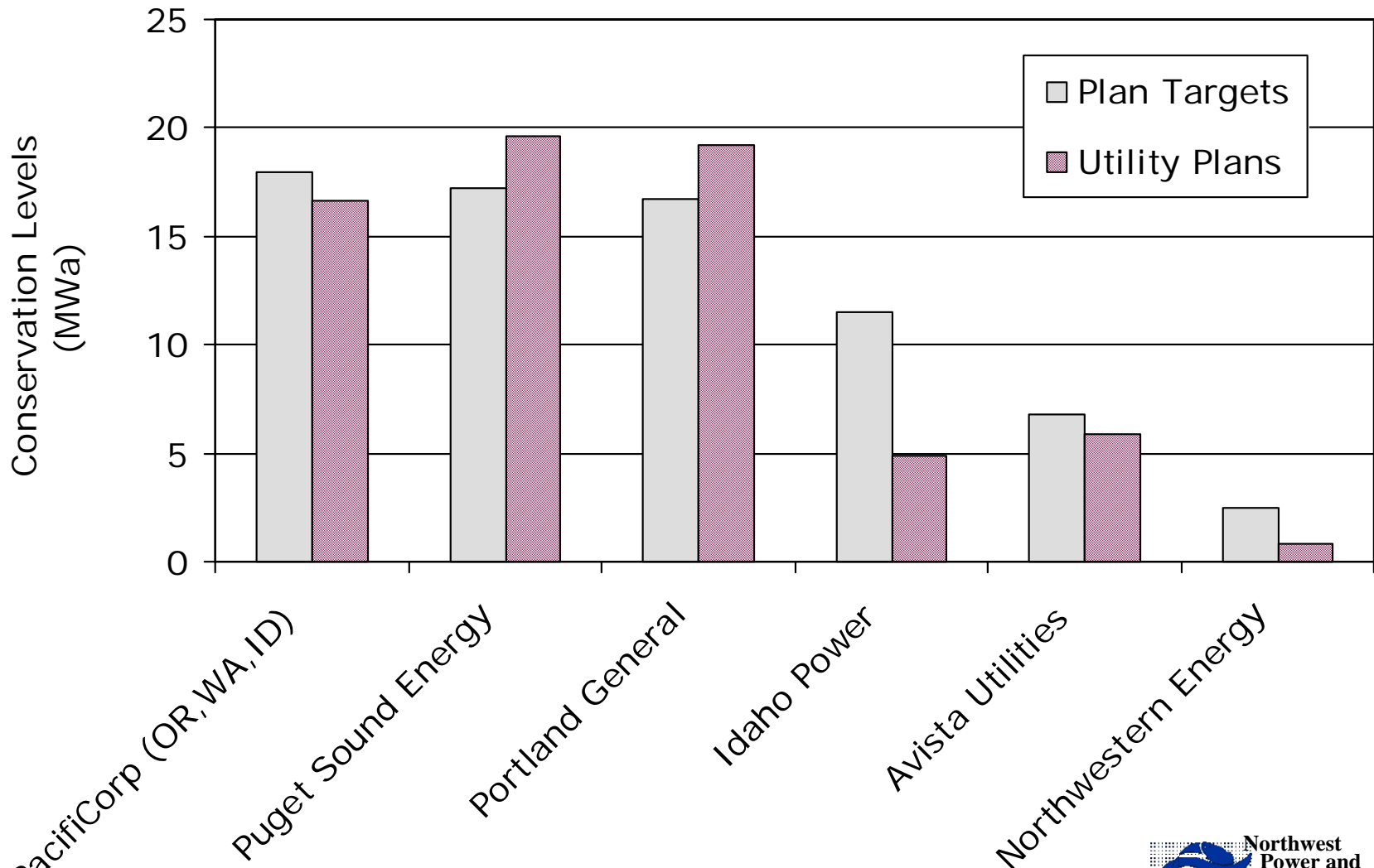
Regional Average Revenues/kWh will need to increase by \$0.000008/kWh

# Utility\* Efficiency Acquisition Plans for 2005 Are Close to 5<sup>th</sup> Plan Targets



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

# Most IOU Efficiency Plans are Close to 5<sup>th</sup> Plan's Targets



# However, Several Large Public Utility Efficiency Plans Are Well Below 5<sup>th</sup> Plan Targets

