
Financial Analysis of Incentive Approaches to Promote Energy Efficiency for a Prototypical Southwest Utility

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Energy Analysis Department



Project Approach & Objectives

- Facilitate dialogue on various shareholder incentive mechanisms and/or decoupling by conducting quantitative financial analysis
- Analyze impacts of various incentives and ratemaking mechanisms on stakeholders (shareholders, ratepayers); calculate earnings, utility bill and rate impacts for prototypical utilities under different scenarios (e.g. size of EE program portfolio, initial retail rate levels, build vs. buy)
- Caveats:
 - We do NOT account for any potential link between the type and/or size of shareholder incentive mechanism and utility's motivation to increase EE goals or portfolio size
 - We do NOT analyze other potential non-financial motivators of utility behavior and support for EE (e.g., PUC orders, customer relations)
- Project Team
 - Chuck Goldman & Peter Cappers (LBNL)
 - Wayne Shirley (Regulatory Assistance Project)
 - Michele Chait (E-Three)
 - Jeff Schlegel (Consultant)
 - George Edgar (Wisconsin Energy Conservation Corp.)

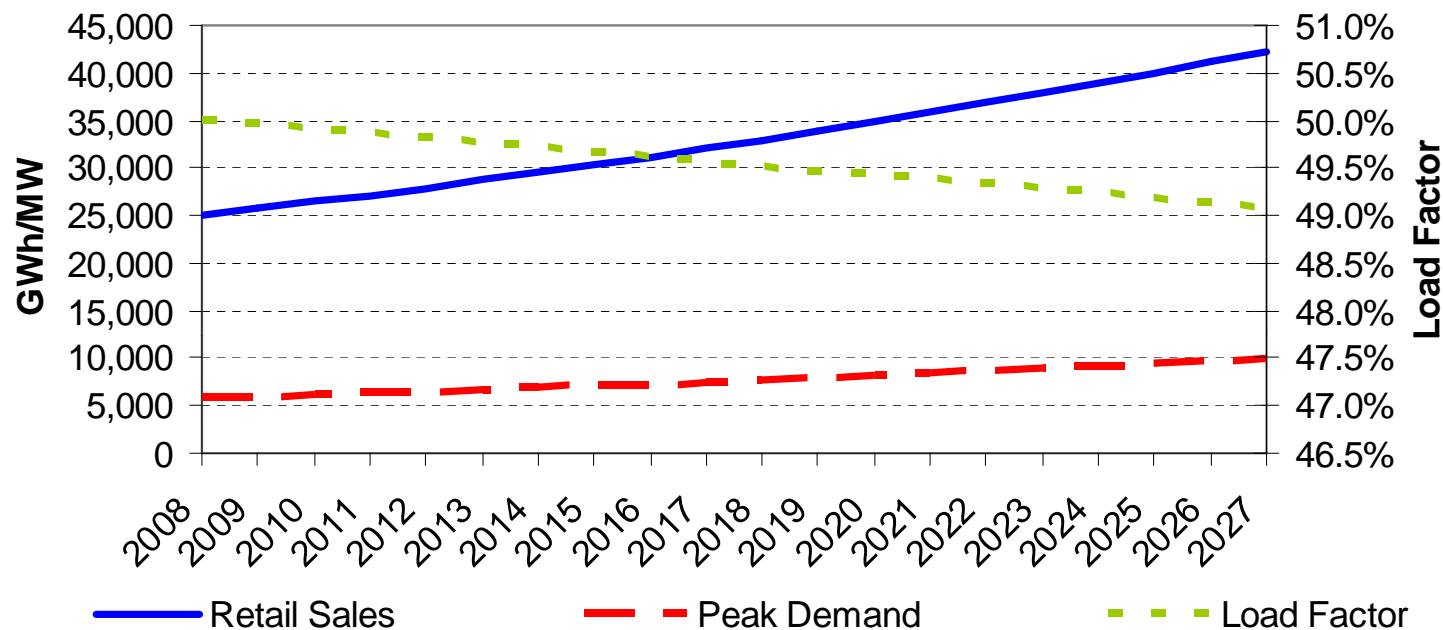
Overview of Talk

- **Characterize prototypical southwest utility**
- **Characterize alternative energy efficiency portfolios**
- **Summarize shareholder incentive and decoupling mechanism analyzed**
- **Results of financial modeling of prototypical southwest utility implementing alternative EE portfolios**
- **Discuss implications of results**

Developing Prototypical SW Utility

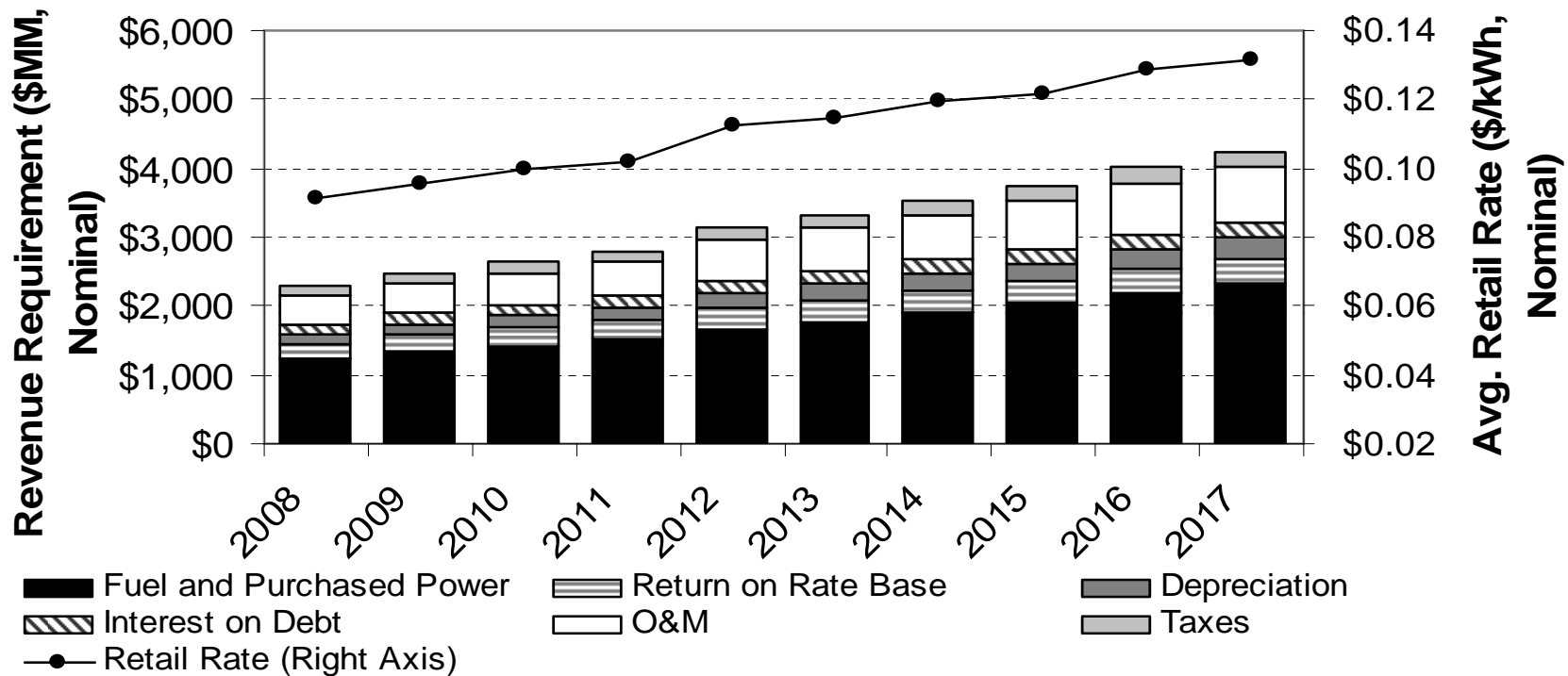
- Examined financial, cost and system characteristics of IOUs serving southwestern states
- Used characteristics of Arizona Public Service (APS) and Nevada Power (NP) to help develop our prototype SW utility
 - Collected some data on utility financial, system characteristics and DSM for Pacificorp, Public Service New Mexico (PSNM), Tucson Electric and Rocky Mountain Power
- Relied heavily upon publicly available data sources
 - Annual Financial Reports & 10-K filings
 - FERC Form 1
 - Integrated Resource Plan filings
 - Demand Side Management program filings
- Created “business as usual” No EE case for prototypical SW utility,
 - EE cases with varying incentive mechanisms compared to BAU No Case

Prototypical SW Utility Retail Sales and Demand Characteristics



- **2008: SW Utility has peak demand of ~5600 MW and sales of ~25,000 GWh**
- **Retail sales grow @ 2.8% annually**
- **Peak demand grows @ 2.9% annually**
- **Declining load factor at this rapidly growing utility**

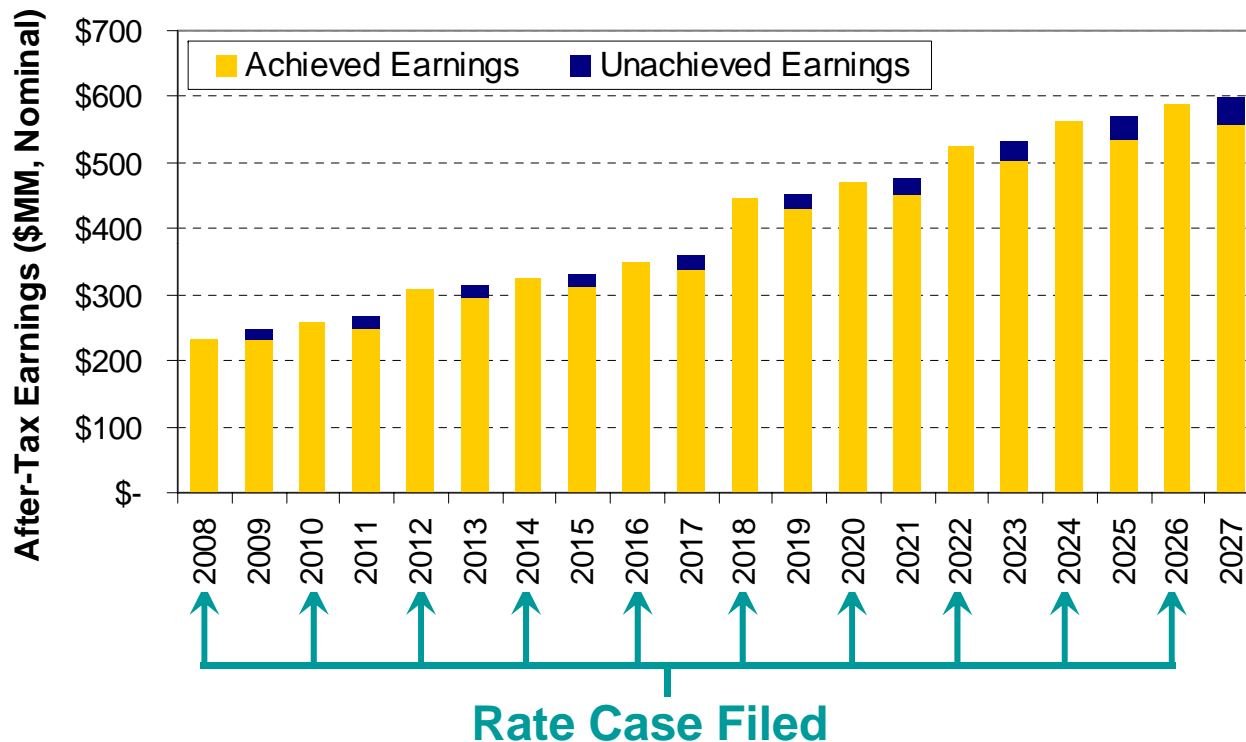
Prototypical SW Utility: Revenue Requirement and Retail Rates



- Both fuel and non-fuel costs are growing faster than sales
- Jumps in retail rates are linked to investment in new generation plant and T&D; EE can help defer

Prototypical Southwest Utility Earnings

BAU No EE Case

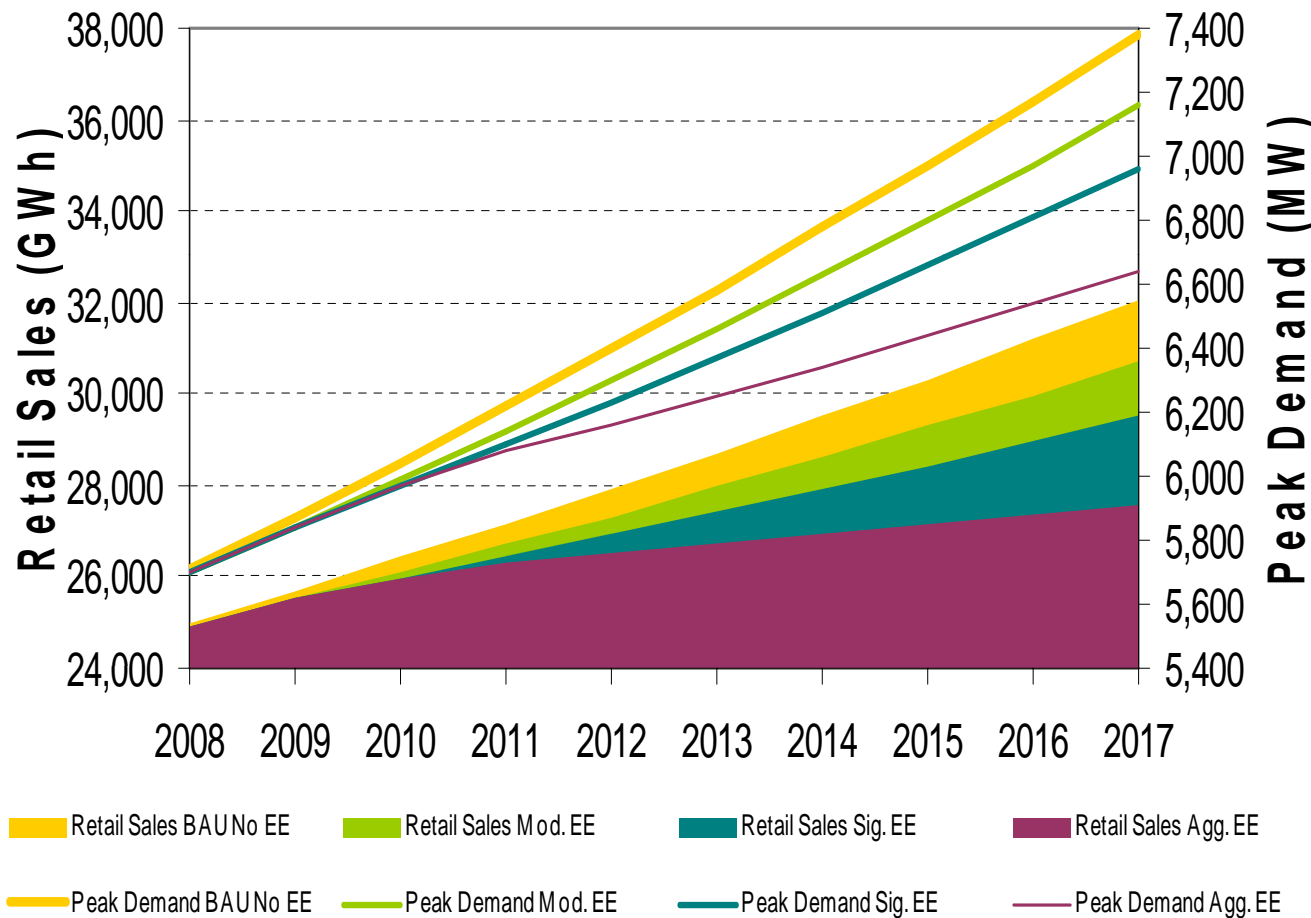


- BAU No EE case represents no decoupling mechanism and no energy efficiency
- Utility unable to achieve authorized earnings (10.75% ROE) between rate cases
- Utility's costs growing faster than revenue it receives from increases in sales
- Assume utility files biennial rate case to mitigate further earnings erosion

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Effect of EE Portfolios on Retail Sales and Peak Demand (2008 – 2017)



- Utility delivers EE programs for 10 years
- Assume 11 year avg. measure lifetime of EE portfolio
- **Moderate EE** – 0.5% sales reduction per year by 2009
- **Significant EE** – 1% sales reduction per year by 2010
- **Aggressive EE** – 2% sales reduction per year by 2012

Avoided Cost of Energy, Generation and T&D Capacity

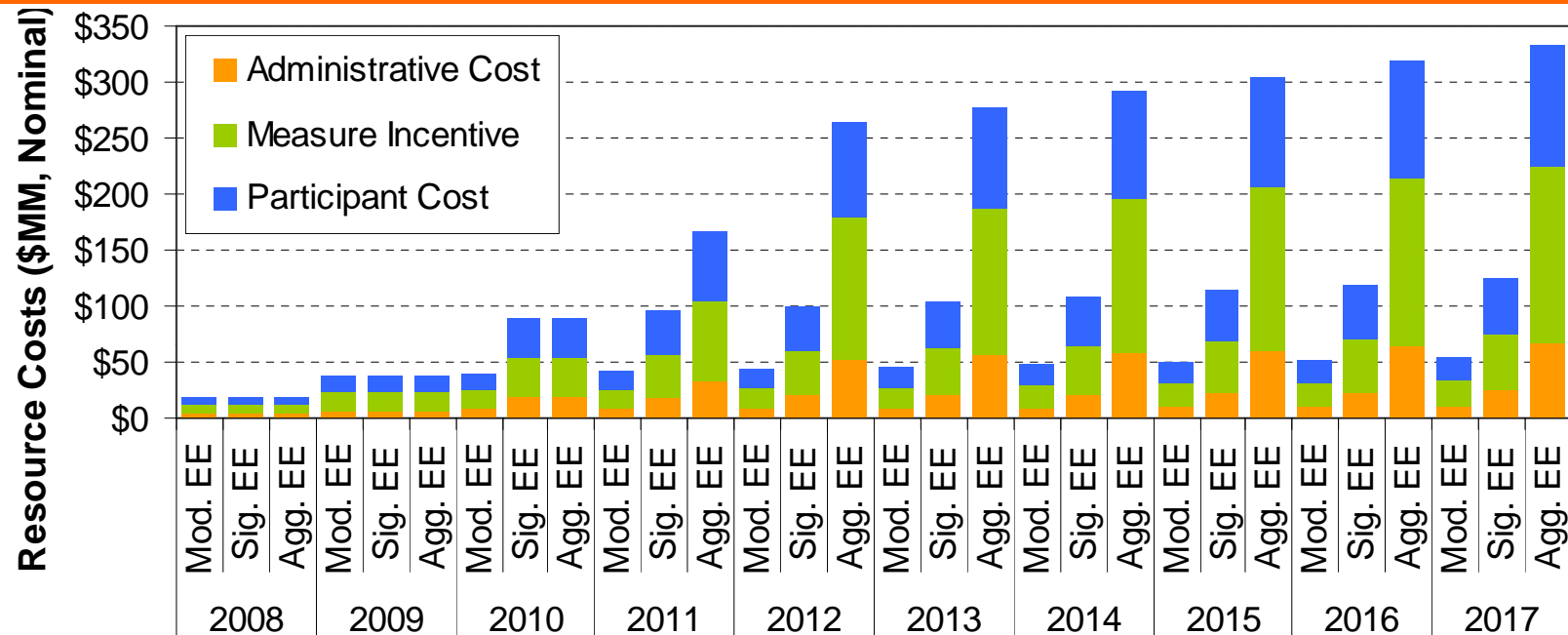
<u>Avoided Cost Category</u>	<u>2008 Value</u>	<u>2017 Value</u>	<u>Annual Growth Rate</u>
Peak Energy	\$70/MWh	\$103/MWh	4.4%
Off-Peak Energy	\$41/MWh	\$60/MWh	4.4%
Generation Capacity	\$80/kW-Year	\$95/kW-Year	1.9%
T&D Capacity	\$30/kW-Year	\$36/kW-Year	1.9%

Costs and Benefits of Alternative EE Portfolios

	Target % of Incr. Sales Reduction (Ramp up number of years)	PA Cost per Lifetime kWh Saved \$2008 for 1 st Yr Implementation	TR Cost per Lifetime kWh Saved \$2008 for 1 st Yr Implementation	TR Benefit Cost Ratio w/o Shareholder Incentives
Moderate EE	0.5% (2 Yr)	1.6 ¢/kWh	2.6 ¢/kWh	2.38
Significant EE	1.0% (3 Yr.)	1.8 ¢/kWh	3.0 ¢/kWh	2.08
Aggressive EE	2.0% (5 Yr.)	2.7 ¢/kWh	4.0 ¢/kWh	1.60

- Assume utility runs programs for 10 years
- Assume portfolio average measure lifetime is 11 years
- All EE Portfolios are very cost-effective, from Total Resource Cost perspective
- Net benefits increase but B/C ratio decreases somewhat in Significant and Aggressive EE cases

Total Resource Cost of Alternative EE Portfolios (2008 – 2017)



- **Administrative costs increase marginally as EE increases**
- **Measure incentive costs increase due to more expensive measures and for utility to achieve its savings goals**
- **Participant costs increase as more expensive measures are installed**

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Strategies to Encourage Utility to Achieve Energy Efficiency Goals

- **Issues:**
 - EE reduces future sales, which leads to some erosion of authorized earnings between rate cases
 - How does utility earn \$\$ for superior performance in delivering EE (compared to other investment opportunities)?
- **Decoupling**
 - Utility considers instituting a Revenue-Per-Customer (RPC) decoupling mechanism
- **Shareholder Performance Incentives**
 - Opportunity for additional earnings as incentive for utility to achieve EE program savings goals
 - Utility considering several different designs

Alternative Shareholder Incentives

- **Performance Target**
 - Utility receives “performance-based incentive” of an additional 10% of program costs if it achieves EE portfolio goals
 - Program costs and shareholder incentive are explicitly recovered through a rider
- **Cost Capitalization** (similar to approach used in NV)
 - Utility capitalizes the annual cost of the program over the lifetime of the installed measures
 - Authorized ROE (11%) is increased by 500 basis points for these EE investments

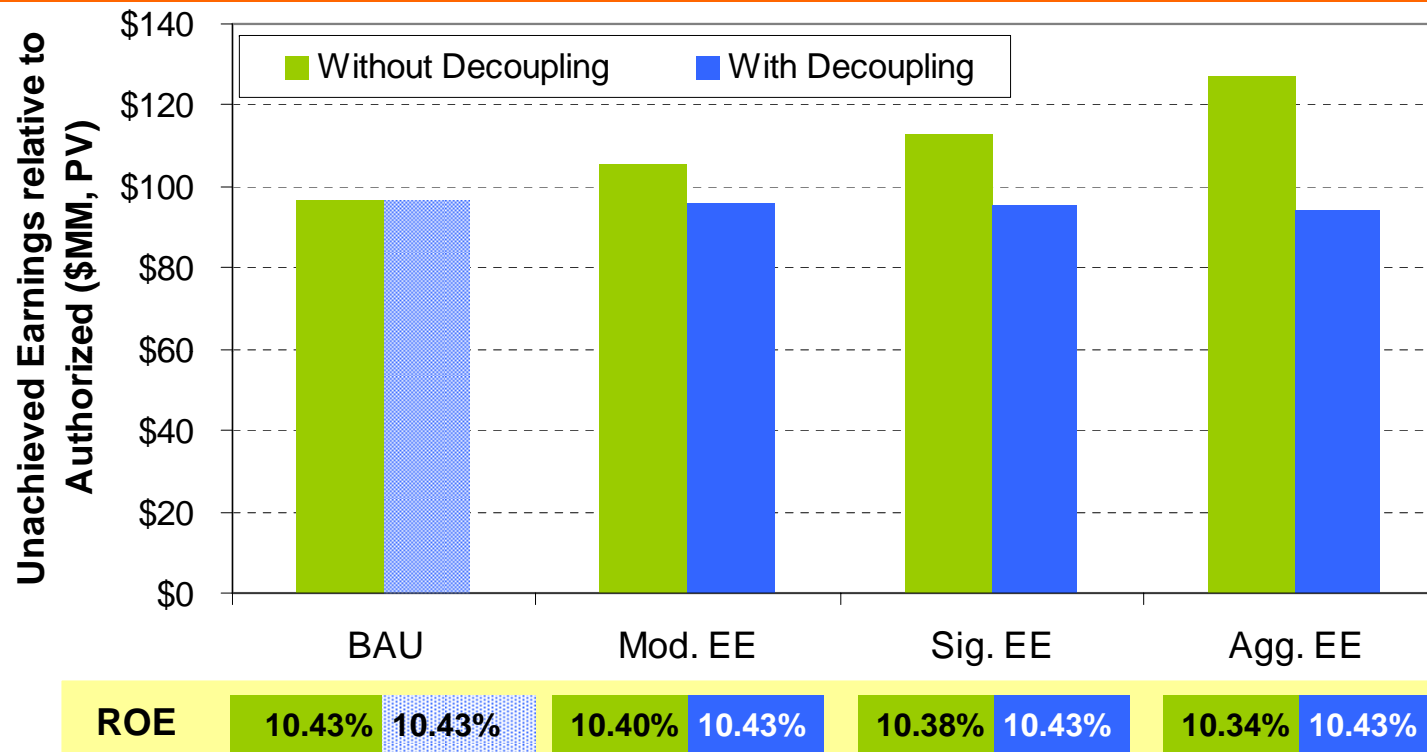
Alternative Shareholder Incentives (2)

- **Shared Net Benefits** (Similar to approach used in CA and MN)
 - Utility retains 15% of the net **total resource** benefits from the portfolio of EE programs
 - Program costs and shareholder incentives are explicitly recovered through a rider
- **Save-a-Watt** (Proposed by Duke Energy NC, SC)
 - Utility capitalizes 90% of the costs avoided over the lifetime of the installed measures
 - Collected through a rider which serves to cover program costs and any lost earnings from reduced sales and provides financial incentive to shareholders

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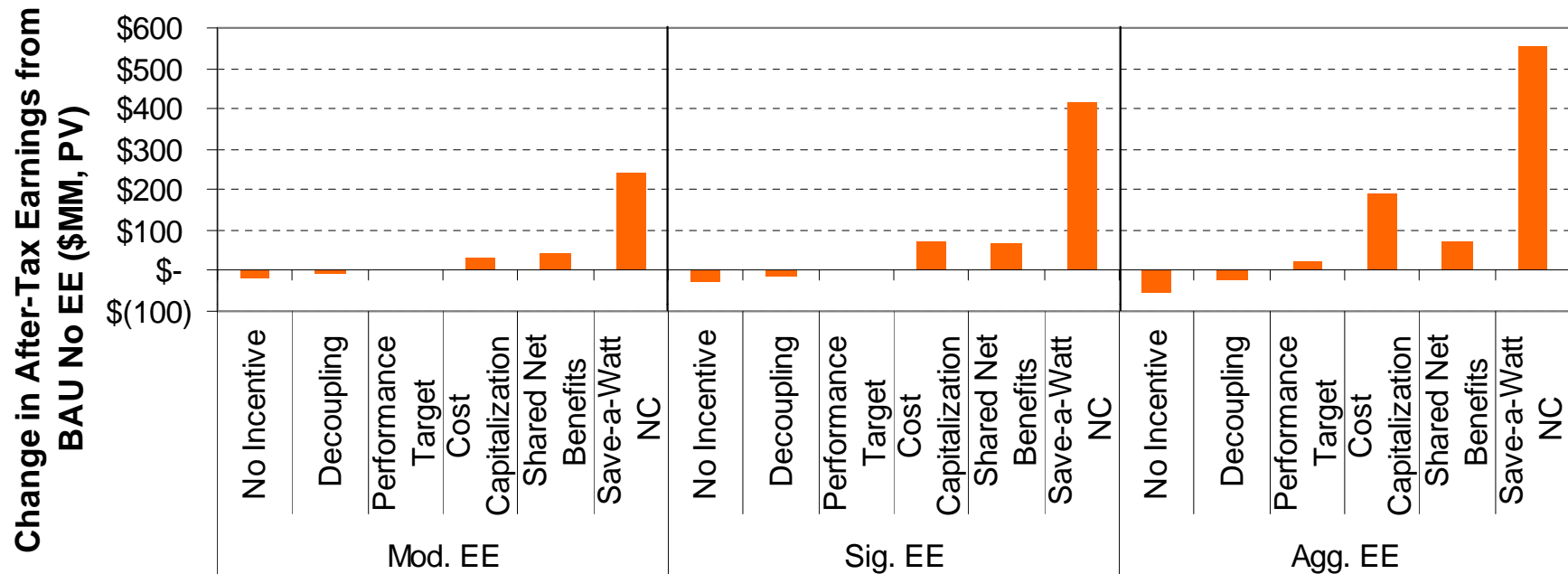
Effect of EE & Decoupling on Unachieved Earnings



- With EE and no decoupling, earnings and ROE erode more relative to authorized levels as sales are reduced
- Decoupling reduces “unachieved earnings” for larger EE portfolios (\$20-35M over 20 years)

Shareholder Perspective

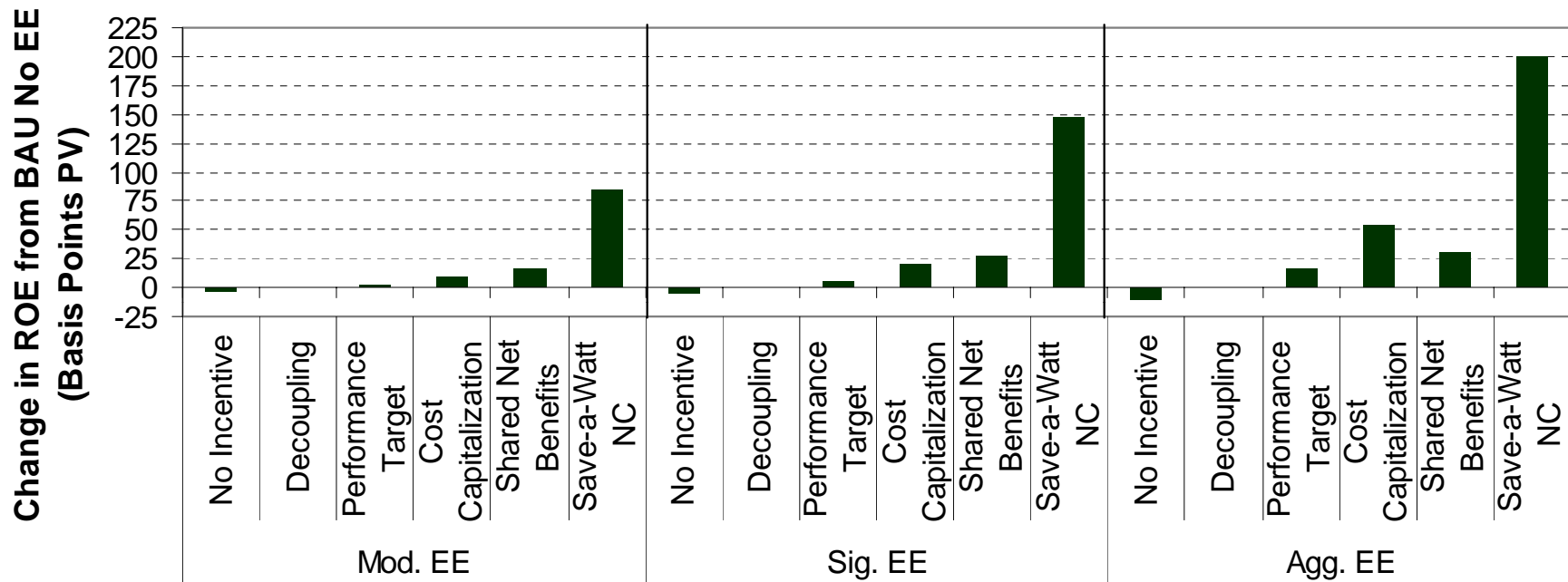
Effect of Decoupling and Shareholder Incentives



- **Implementation of any shareholder incentive raises earnings above BAU No EE level**
 - Perf. target produces modest increase in earnings
 - Shared net benefits and Cost Capitalization have similar earnings impacts for Moderate and Significant EE cases (~\$40-70M)
 - Save-A-Watt provides much higher earnings for utility (\$250-550M)

Shareholder Perspective (2)

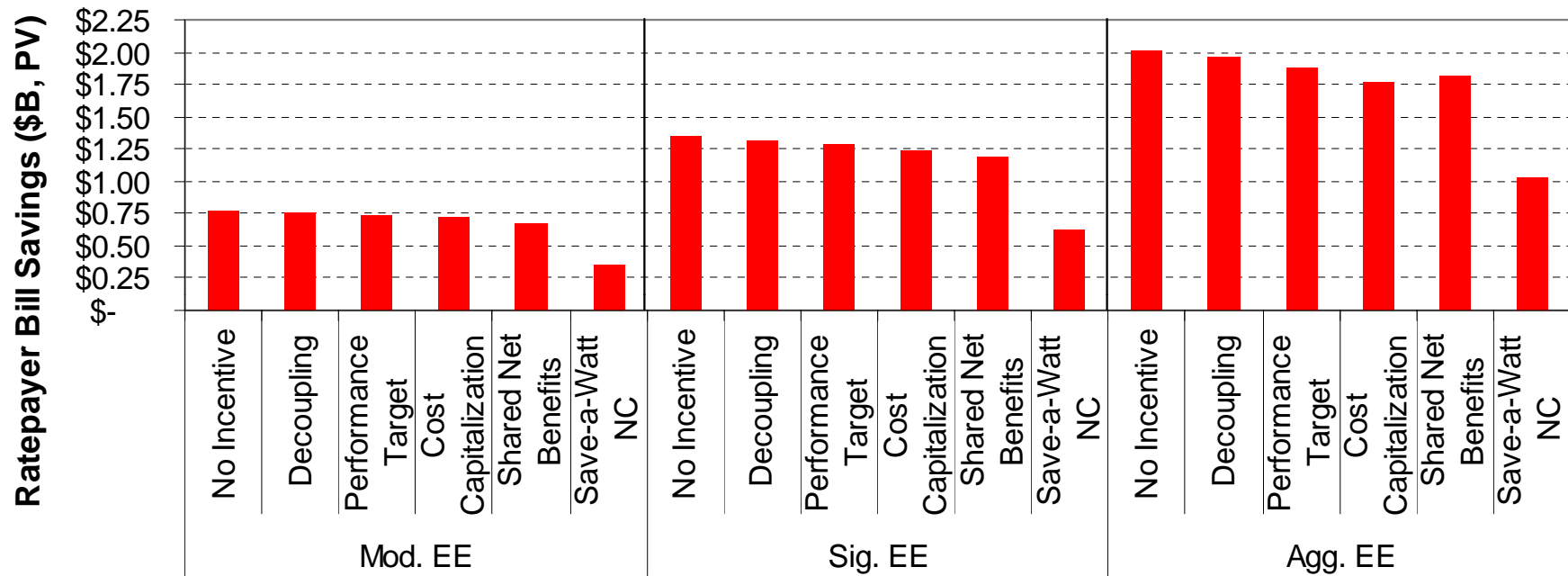
Effect of Decoupling and Shareholder Incentives



- ROE increases over BAU No EE case only if either decoupling or shareholder incentive is provided
- Excluding Save-A-Watt, utility sees between 0 – 17 basis point increase in Mod. EE case and 0 – 27 basis point increase in Significant EE case

Ratepayer Perspective

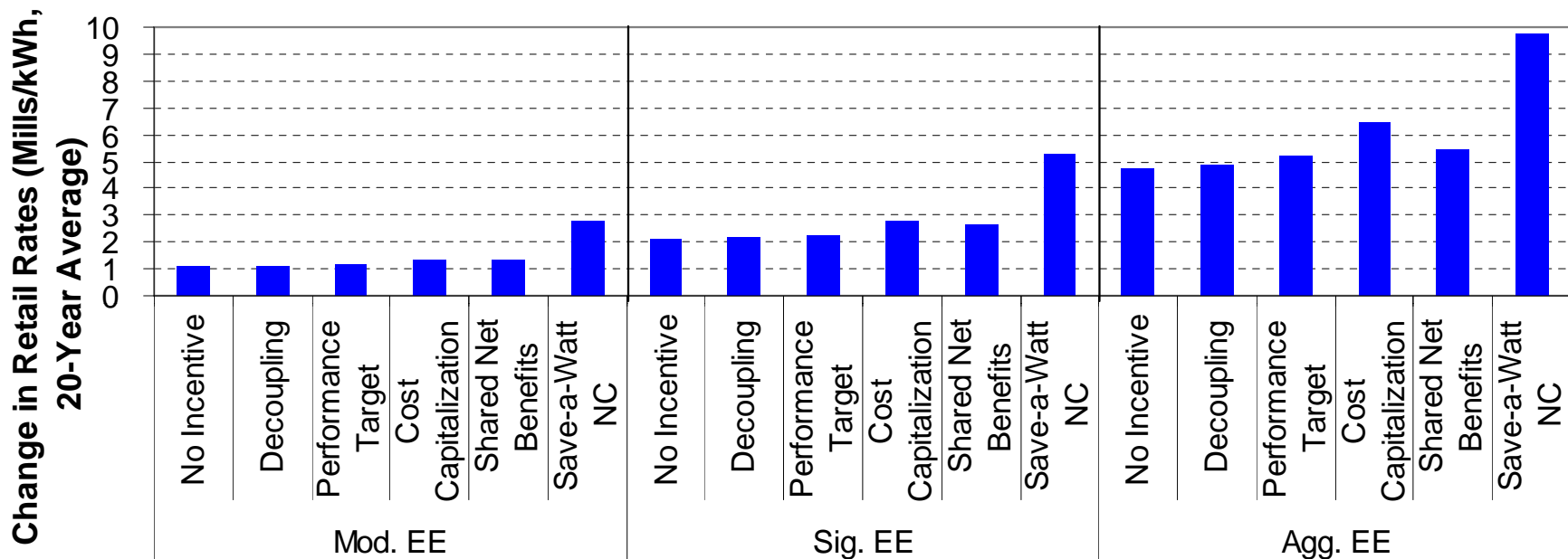
Effect of Decoupling and Shareholder Incentive



- Ratepayer bill savings increase with larger EE portfolios, except for Save-A-Watt
 - ~\$700M for Mod. EE; ~\$1.2B for Sign. EE and ~\$1.7B for Agg. EE
- Ratepayer bill savings are \$350-700M lower with Save-A-Watt

Ratepayer Perspective (2)

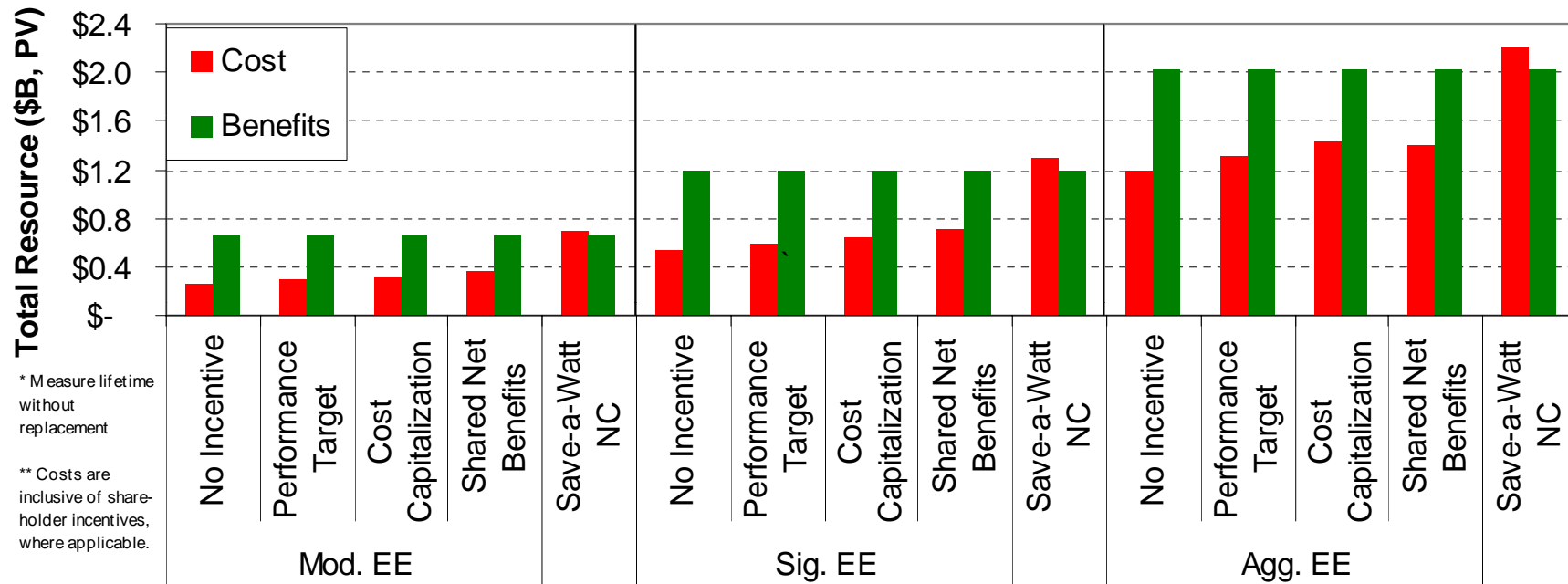
Effect of Decoupling and Shareholder Incentive



- Retail rates increase by no more than ~6 mills/kWh in comparison to BAU No EE case for all levels of EE savings and any mechanism except for Save-a-Watt

TRC Perspective

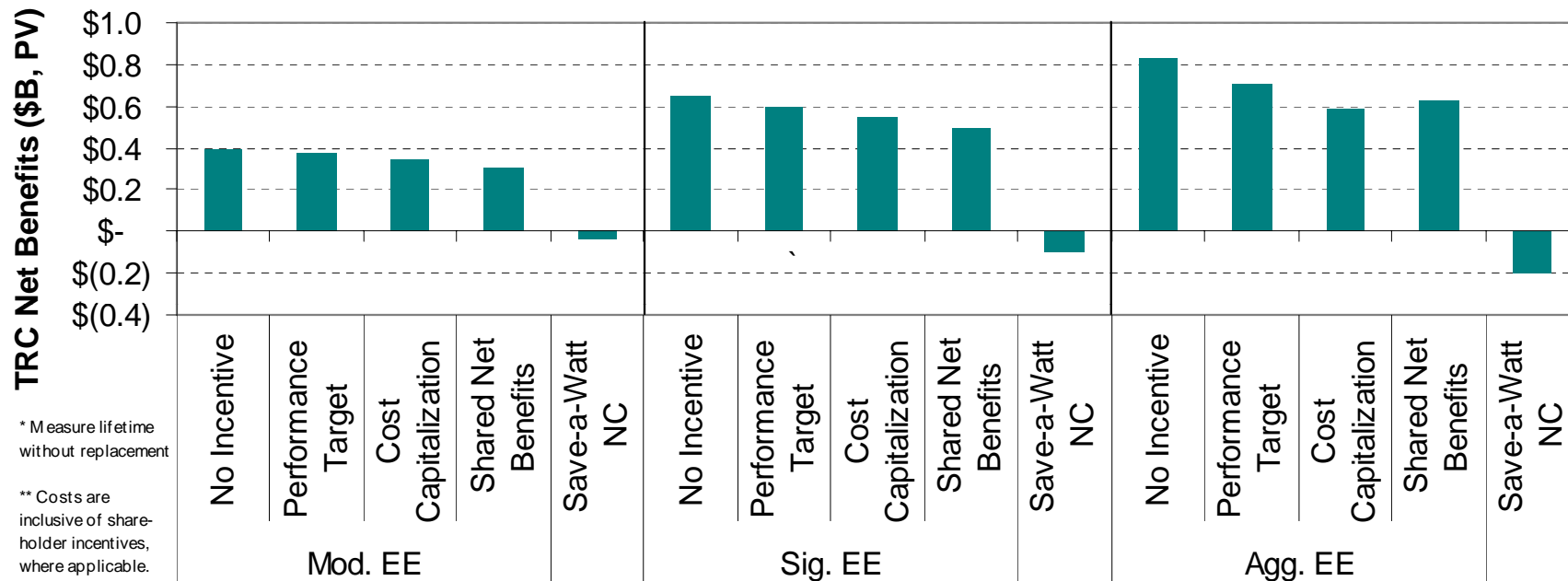
Effect of Decoupling and Shareholder Incentive



- **Resource Costs include EE program costs and cost of net shareholder incentive, when applicable**
- **Resource Benefits value EE savings at forecasted avoided costs of energy and capacity**

TRC Perspective (2)

Effect of Decoupling and Shareholder Incentive



- **TRC Net Benefits (Benefits minus Costs) range from \$400-800M with EE and no incentives**
- **Net Benefits are still significant with shareholder incentives (except for Save-a-Watt NC)**

Overview

- Characterize prototypical southwest utility
- Characterize alternative energy efficiency portfolios
- Summarize shareholder incentive and decoupling mechanism analyzed
- Present results of financially modeling prototypical southwest utility introducing alternative EE portfolios
- **Discuss implications of results**

Implications of Results

- **Our southwestern prototypical utility has:**
 - Costs growing faster than sales
 - In BAU No EE case, utility experiencing earnings growth but not achieving authorized ROE
 - Low to moderate EE costs
- **Implementing EE: Societal perspective**
 - The EE portfolios are cost effective from the TRC perspective (except for Save-a-Watt)
 - ♦ **Net resource benefits are still significant (~\$350M to ~\$600M) with Perf. Target, Cost Capitalization, and Shared Net Benefits; and increase with more aggressive EE goals**
 - ♦ **Net resource benefits are negative with Save-A-Watt (\$-30M to \$-200M), driven in part by our assumptions regarding measure costs paid by participants**
- **Ratepayer Perspective**
 - Significant bill savings accrue (2% - 6%) in all EE cases
 - Average rates increase by 1 – 6 mills/kWh for all EE cases with shareholder incentives (except Save-A-Watt which has greater rate impacts)

Implications of Results (cont)

• Shareholder perspective

- If EE is implemented without decoupling, the overall level of earnings decreases by \$16 - \$55M and ROE drops by 3 to 10 basis points compared to BAU No EE case
- Introducing decoupling increases ROE back to BAU No EE case (e.g. 10.43%)
- Additionally implementing shareholder incentives results in:
 - ◆ ROE increasing in all cases and over all shareholder incentives, relative to BAU No EE case, and this increase gets larger as size of EE portfolio grows
 - ◆ If decoupling and either Shared Net Benefits or Cost Capitalization are implemented, earnings improve for all EE portfolios
 - ◆ If Save-A-Watt alone is implemented, much higher earnings (\$243 - \$552M) and ROE (85 - 200 basis points) are achieved compared to BAU No EE case

Discussion Questions

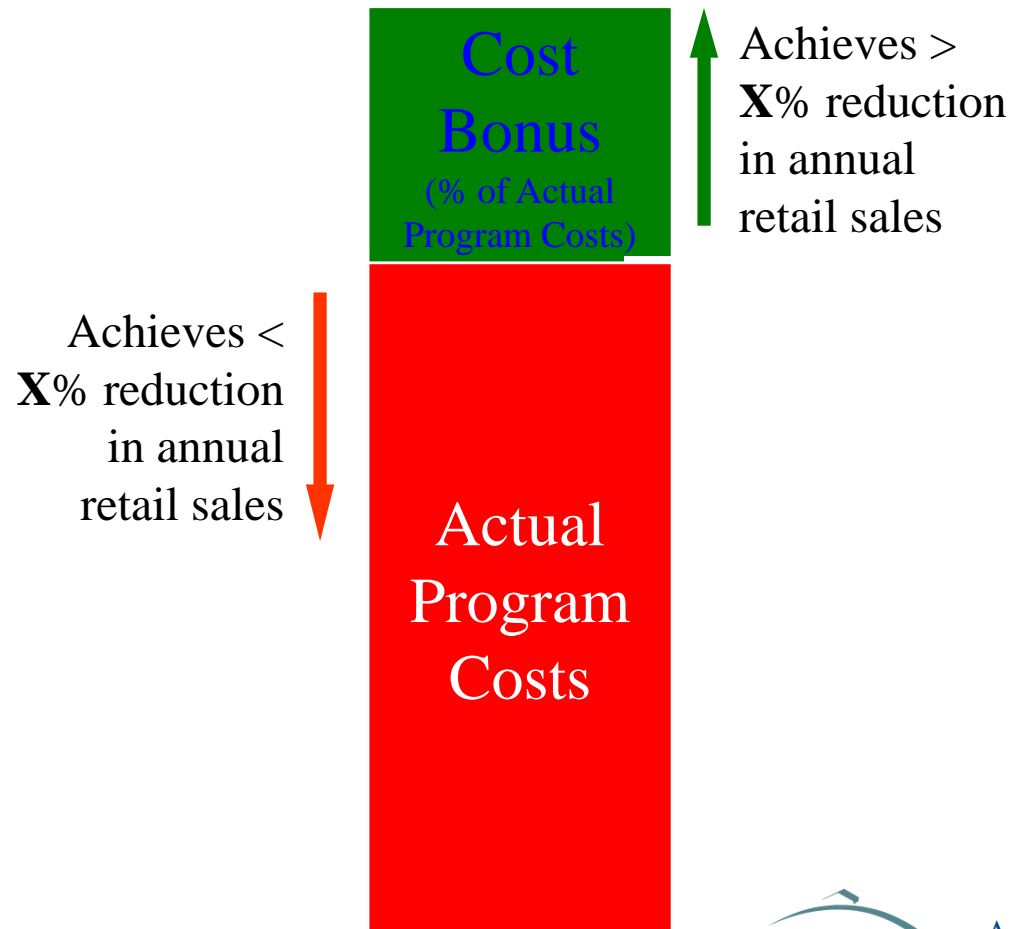
POLICY ISSUES

- **Relative importance and contribution of decoupling and alternative incentive mechanisms to shareholders and ratepayers?**
- **How much is enough? - Level & structure of incentives necessary to motivate utility mgmt**
- **Are incentives a “zero sum” game between utilities and consumers or are shareholder incentives likely to increase net benefits by driving higher levels of efficiency?**
- **Relative importance of ROE vs. absolute earnings in motivating utilities?**
- **Relationship between utility’s incentive mechanism and types of EE or DSM programs that it is likely to deploy?**

Appendix Slides

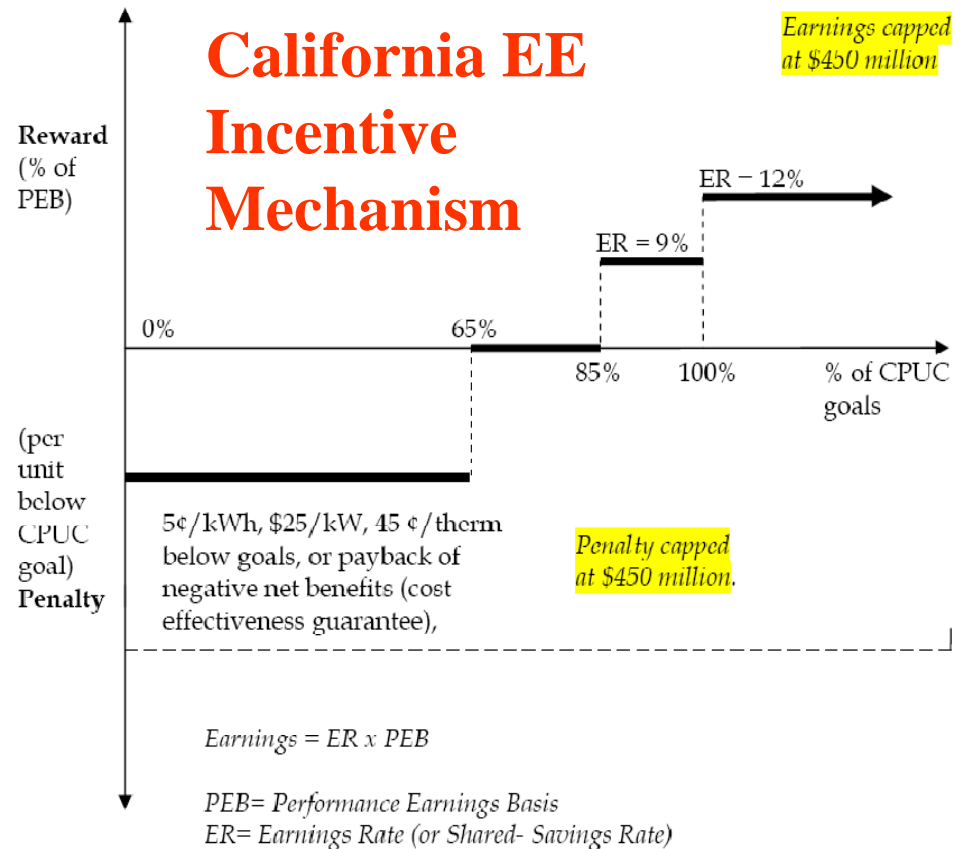
Performance Target Incentive Mechanism

- Utility able to fully recover program costs
- As an incentive, utility is rewarded an additional % of total program costs
- Incentive level typically tied to achievement of energy (and/or demand) savings goals



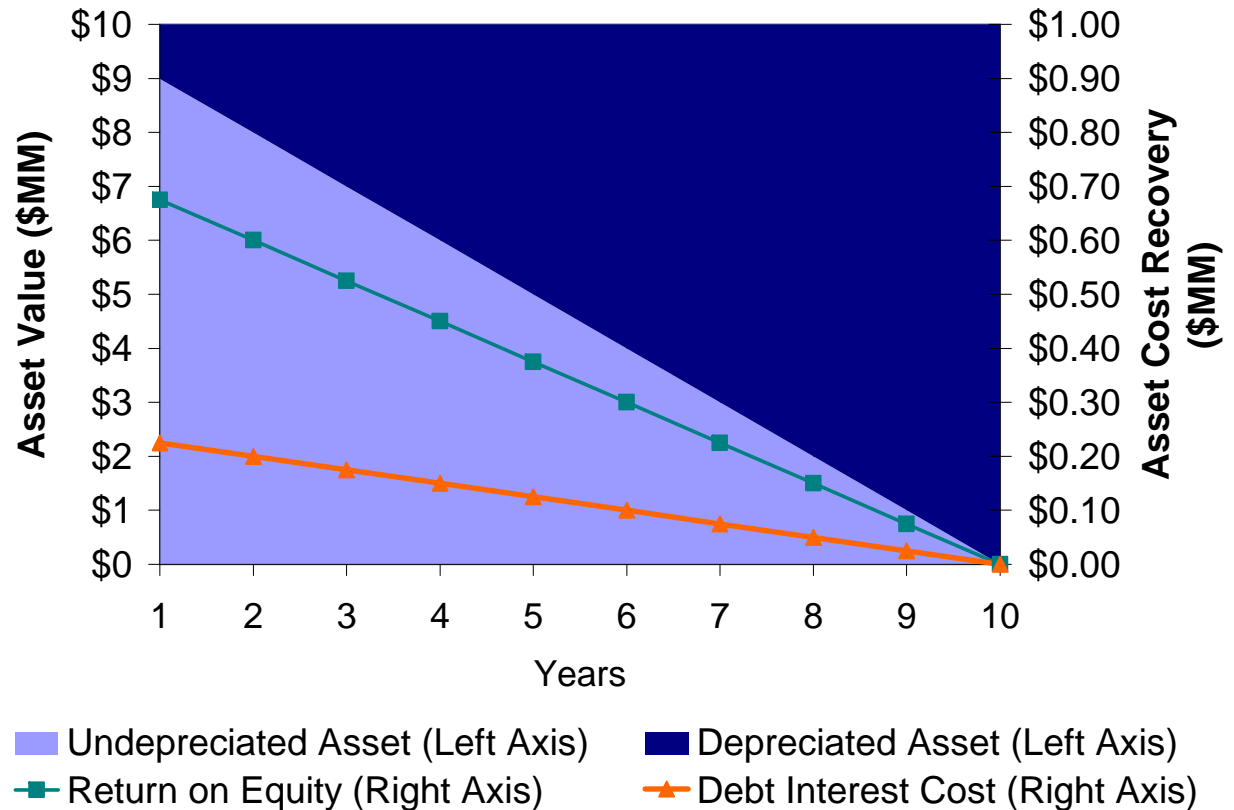
Shared Net Benefits Incentive Mechanism

- Utility retains % of the net resource benefits of the EE program portfolio
- Incentive level typically tied to achievement of energy savings goals or level of net benefits
- Benefits are typically defined as avoided costs of energy, capacity, T&D savings, and environmental benefits (in some cases)



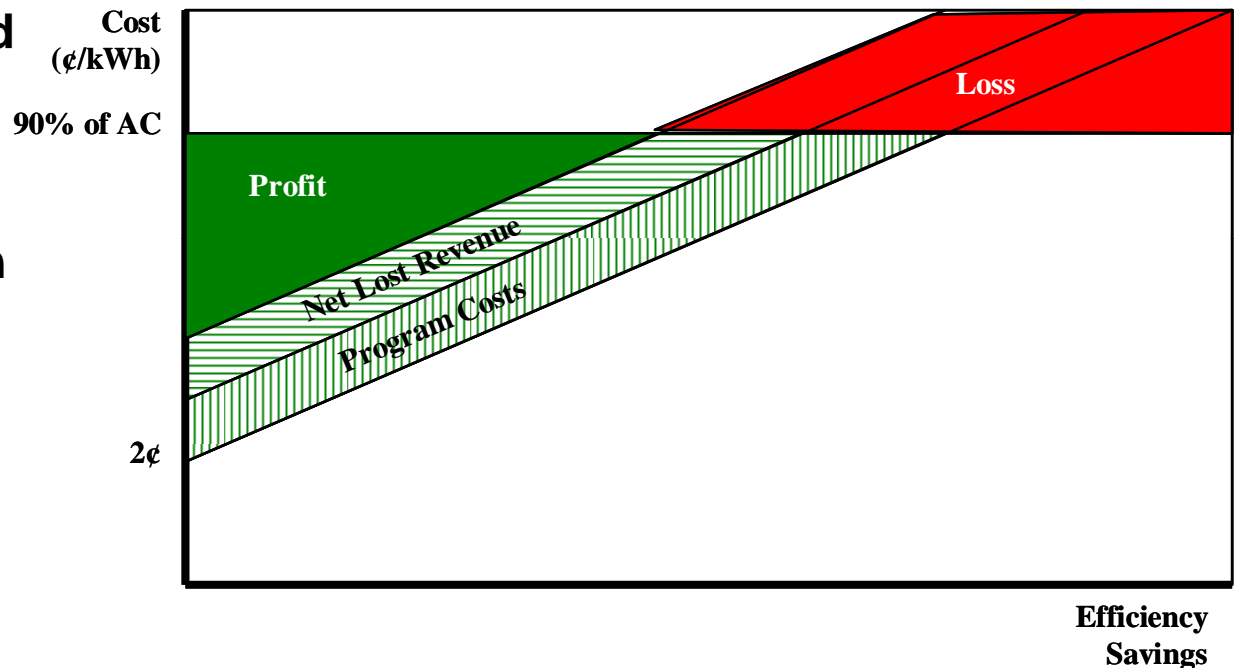
Cost Capitalization Incentive Mechanism

- Utility is able to capitalize/ratebase EE program costs (similar to supply-side assets)
- EE investment is typically amortized over avg. lifetime of EE measures
- Utility earns a return on the un-depreciated EE asset, often with a kicker to its authorized ROE



“Save-a-Watt” Incentive Mechanism

- Duke Energy proposed an incentive mechanism that values DSM demand and energy savings at 90% of their lifetime avoided costs
- Avoided “investment” in energy and capacity is amortized over lifetime of the EE measures
- Utility able to charge ratepayers a return on the un-depreciated avoided “investment”
- Mechanism covers program costs, any net lost revenue, and traditional incentive payment



Financial & Cost Characteristics of Prototypical Southwest Utility

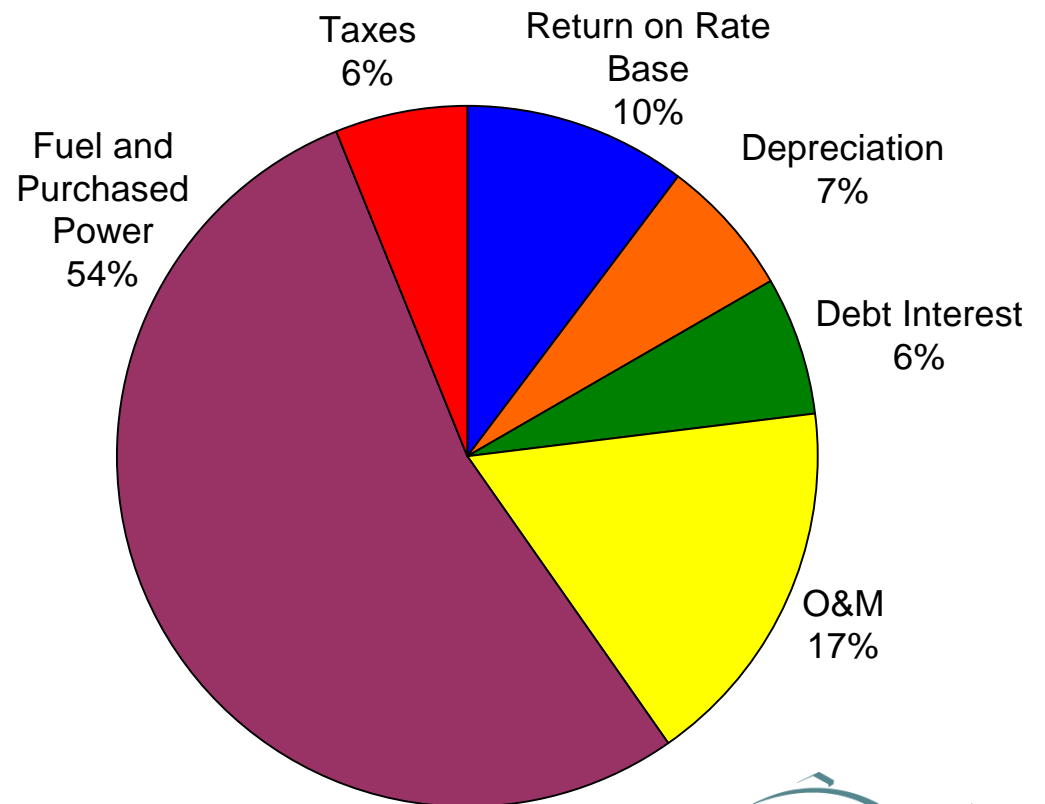
Authorized Level

ROE	10.75%
Debt Cost	6.6%
D:E Ratio	50:50

Annual Growth

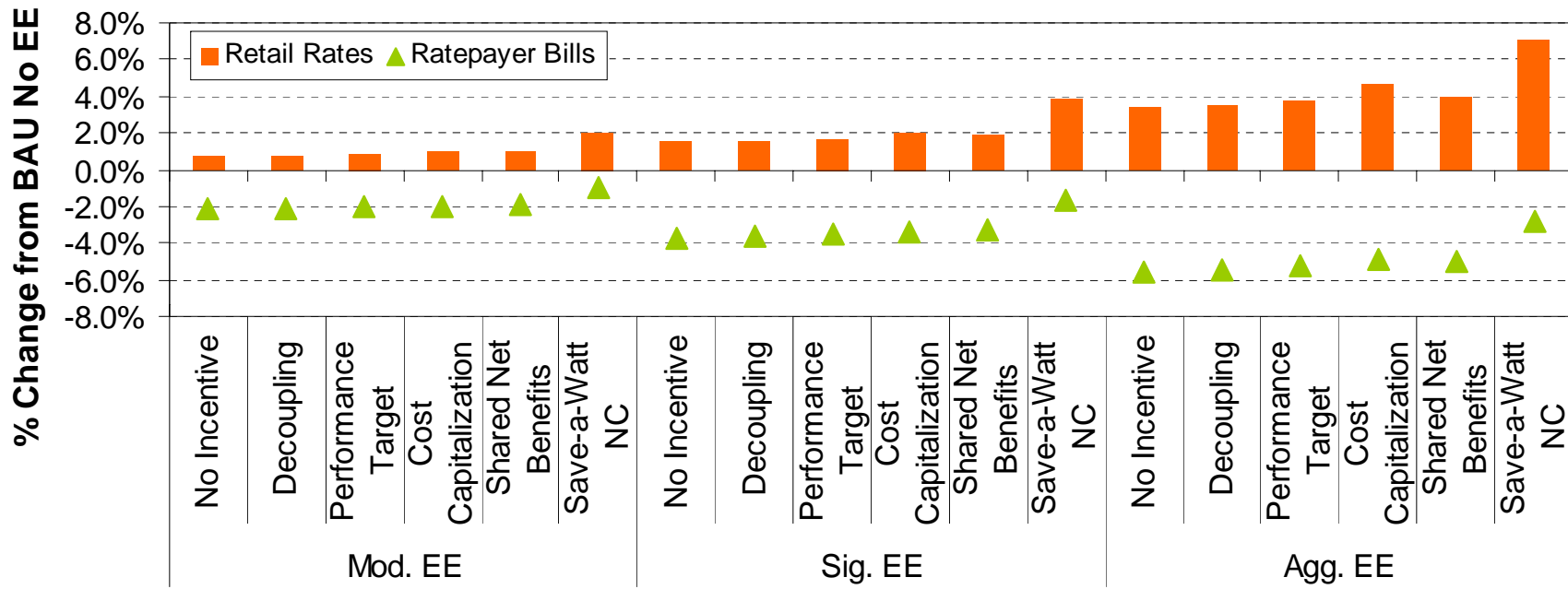
Fuel & PP	6.7%
CapEx	5.1%
O&M	8.8%

1st Year Revenue Requirement



Ratepayer Perspective

% Change Effect of Decoupling and Shareholder Incentive



- % increase in retail rates grows as size of EE portfolio increases (e.g., ~1% to ~2% to ~3%), excluding Save-a-Watt
- Avg. bill savings to ratepayers increases with larger EE portfolios (e.g. ~2% to ~4%, to ~5%), excluding Save-A-Watt