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

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Energy Efficiency Incentives Workshop
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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.)**

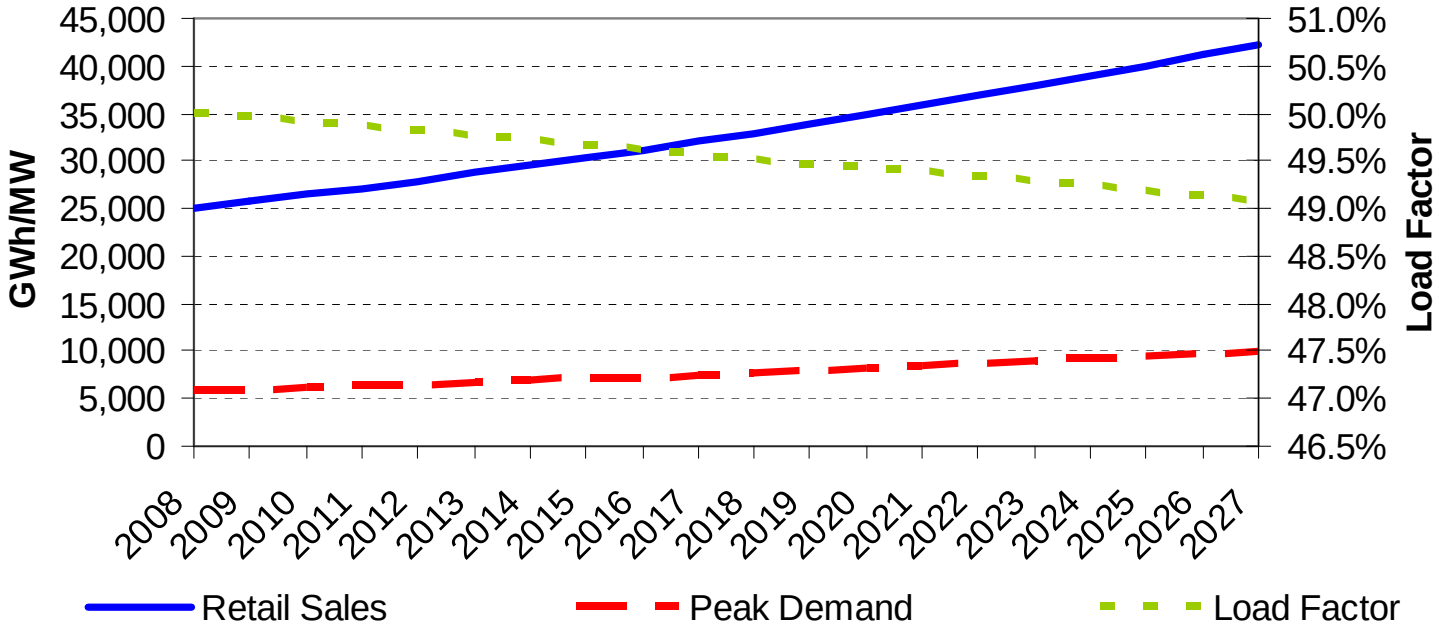
Overview of Talk

- 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

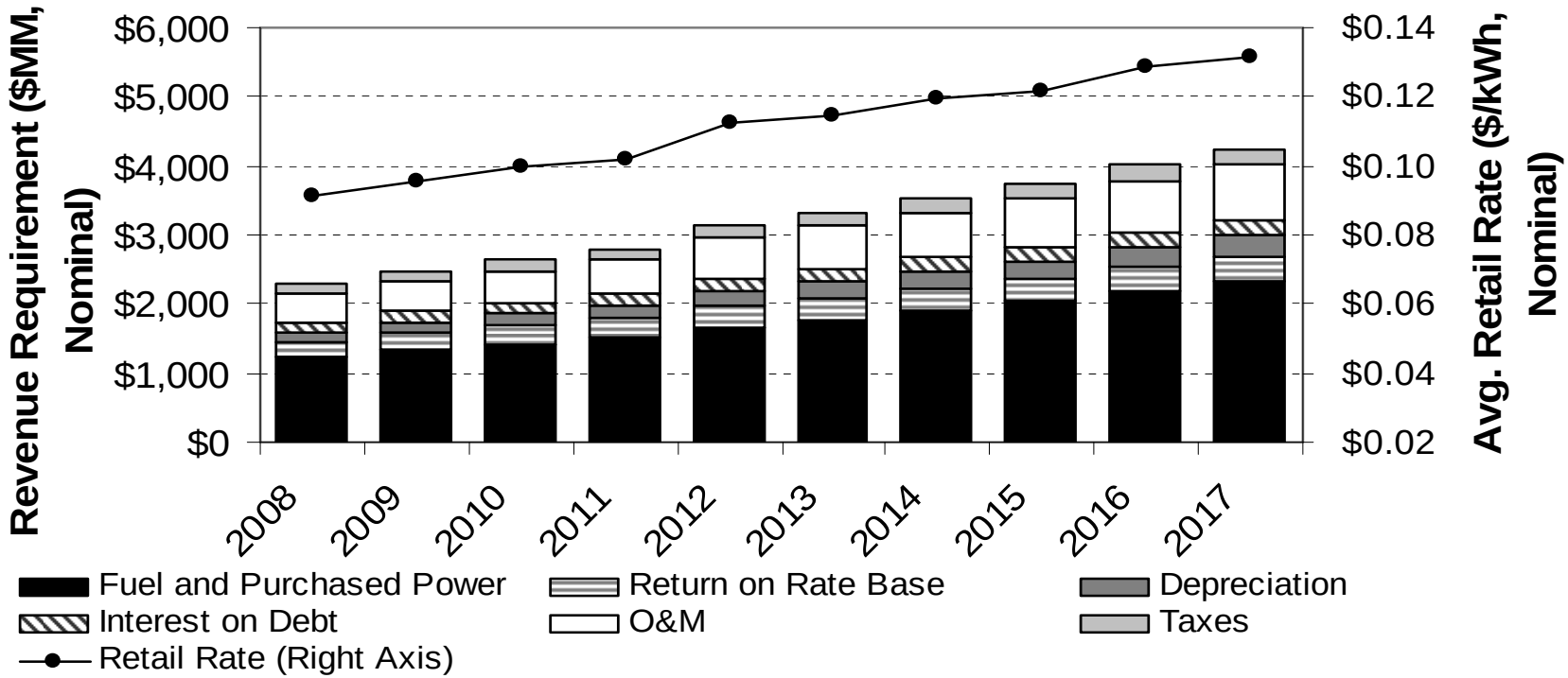
- Examined financial, cost and system characteristics of IOUs serving southwestern states
- Used characteristics of Arizona Public Service (APS) and Nevada Power (NP) to help develop our prototype SW utility
  - Collected some data on utility financial, system characteristics and DSM for Pacificorp, 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**

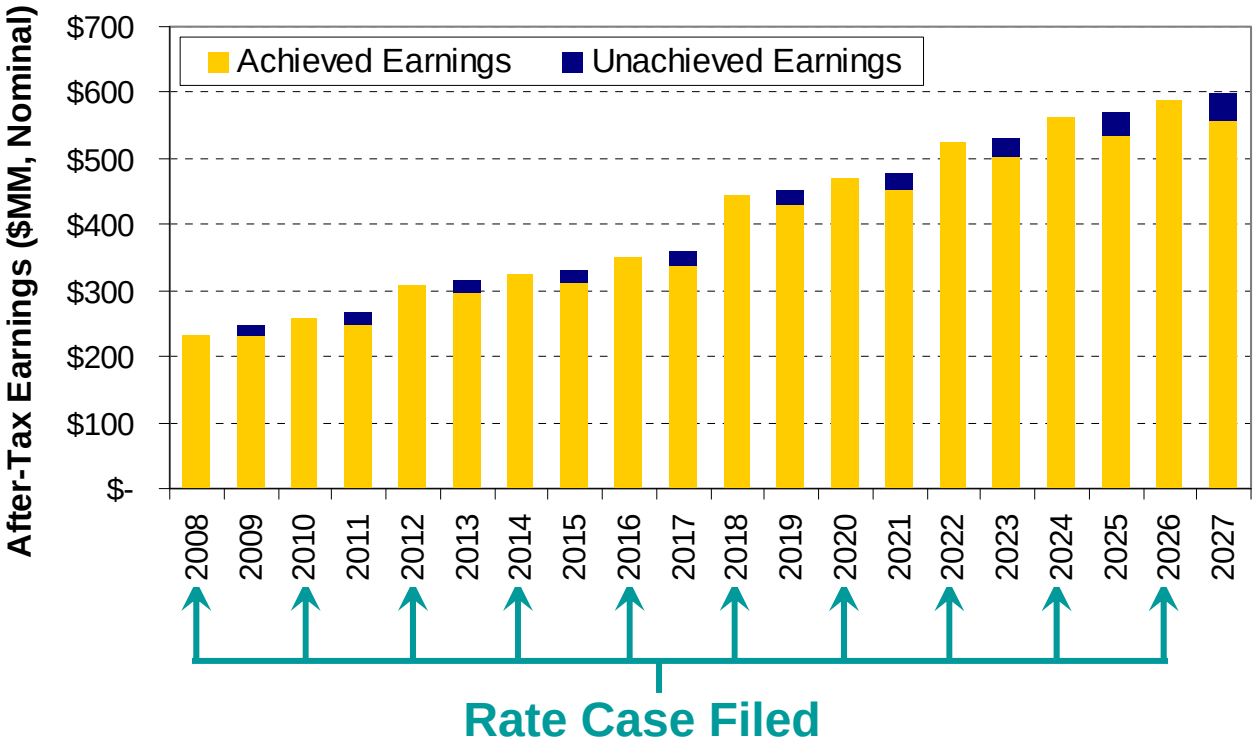
Prototypical SW Utility: Revenue Requirement and Retail Rates



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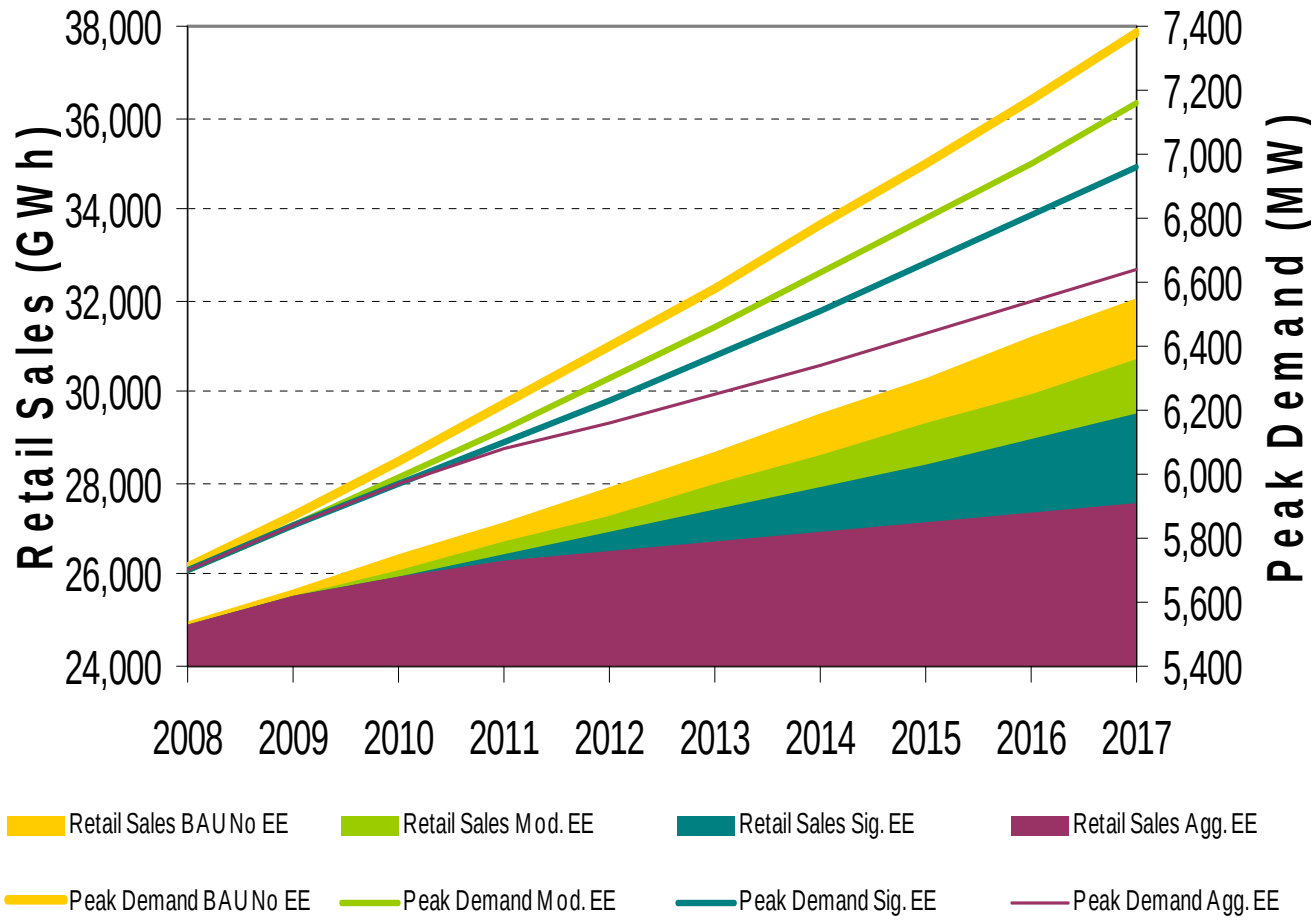
Effect of EE Portfolios on Retail Sales and Peak Demand (2008 – 2017)



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

Avoided Cost of Energy, Generation and T&D Capacity

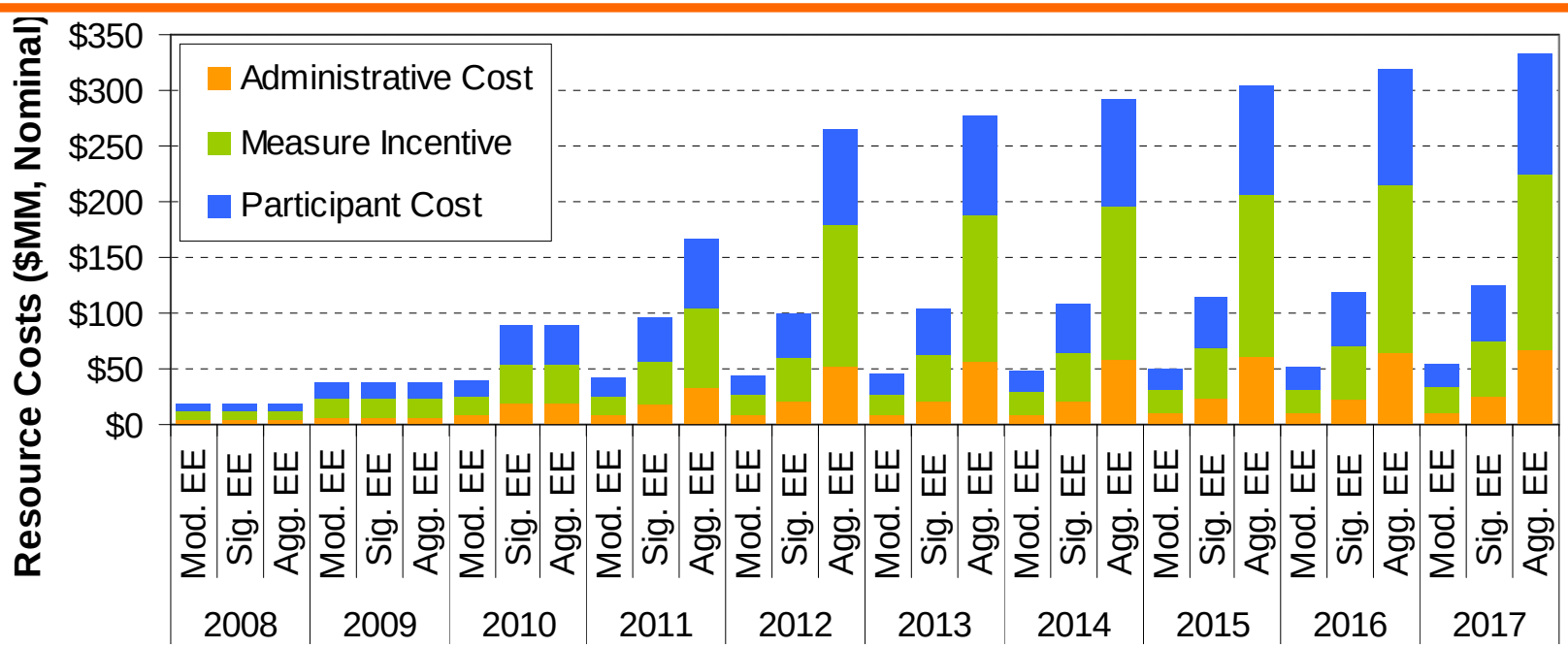
Avoided Cost Category	2008 Value	2017 Value	Annual Growth Rate
Peak Energy	$70/MWh	$103/MWh	4.4%
Off-Peak Energy	$41/MWh	$60/MWh	4.4%
Generation Capacity	$80/kW-Year	$95/kW-Year	1.9%
T&D Capacity	$30/kW-Year	$36/kW-Year	1.9%

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 1st Yr Implementation	TR Cost per Lifetime kWh Saved $2008 for 1st 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)

- **<u>Shared Net Benefits</u> (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**
- **<u>Save-a-Watt</u> (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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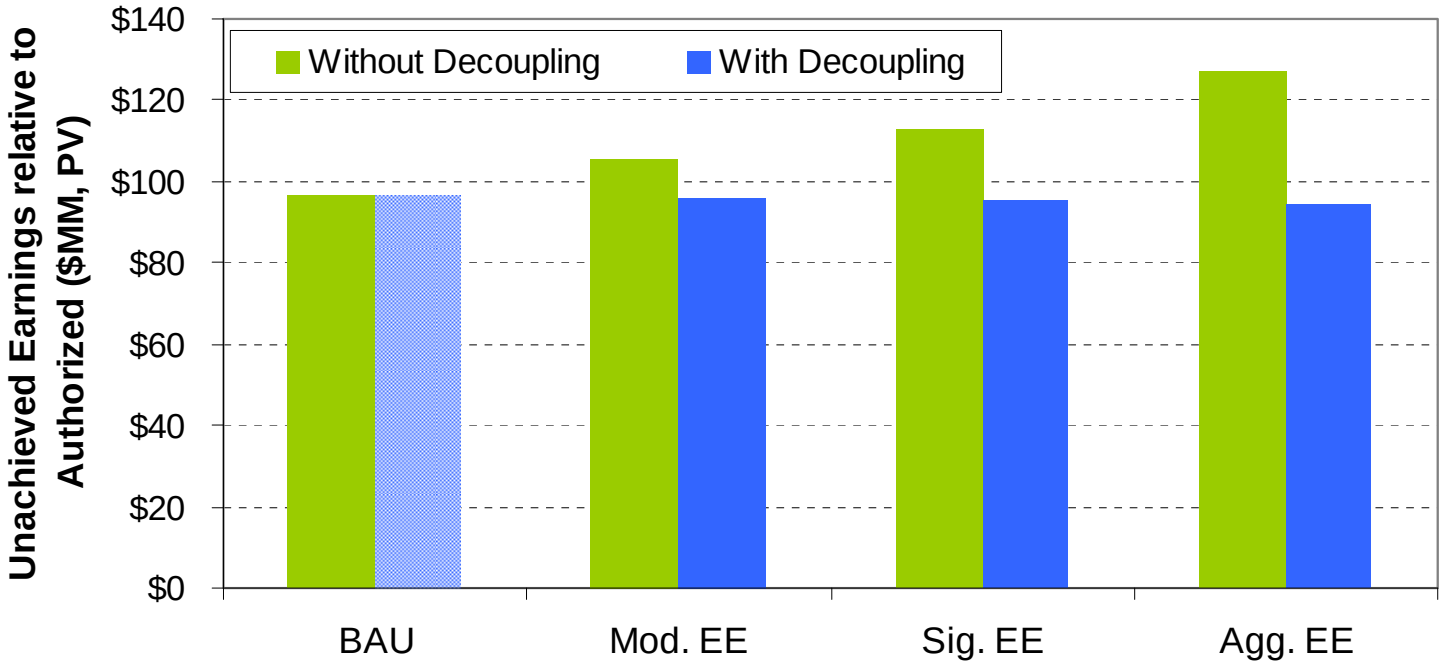
Effect of EE & Decoupling on Unachieved Earnings

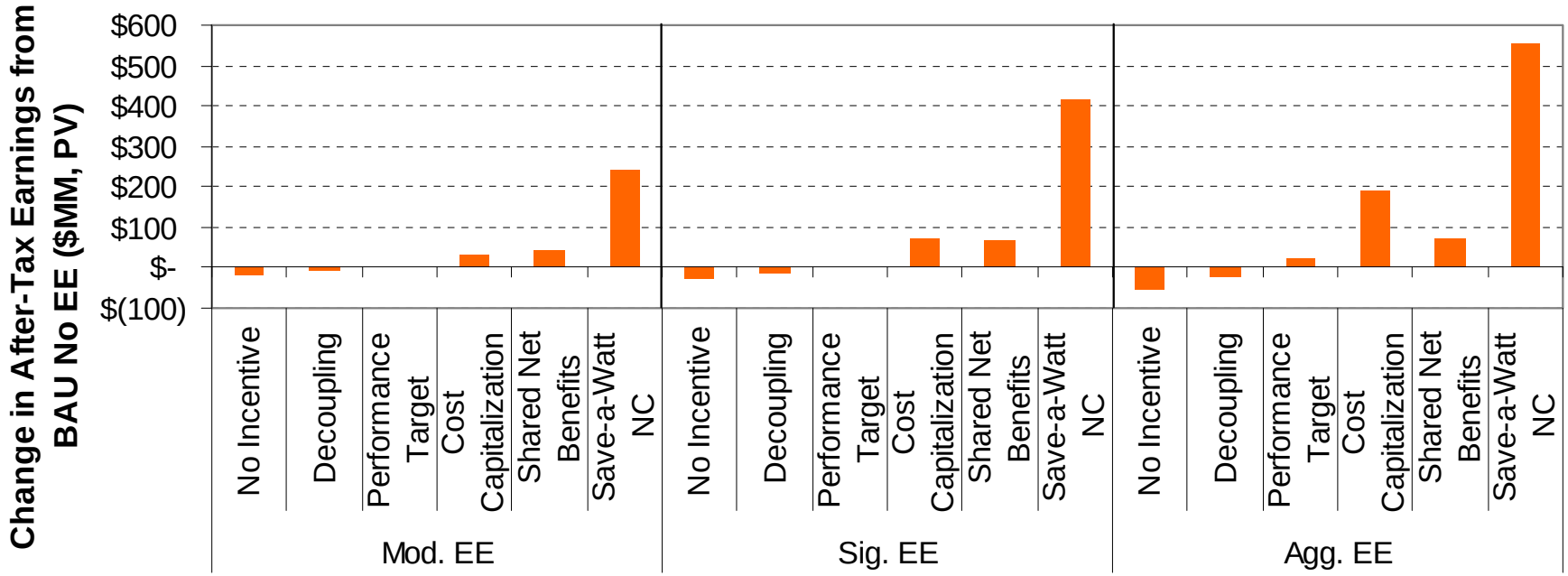


ROE				
	10.43%	10.40%	10.38%	10.34%
	10.43%	10.43%	10.43%	10.43%

- **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

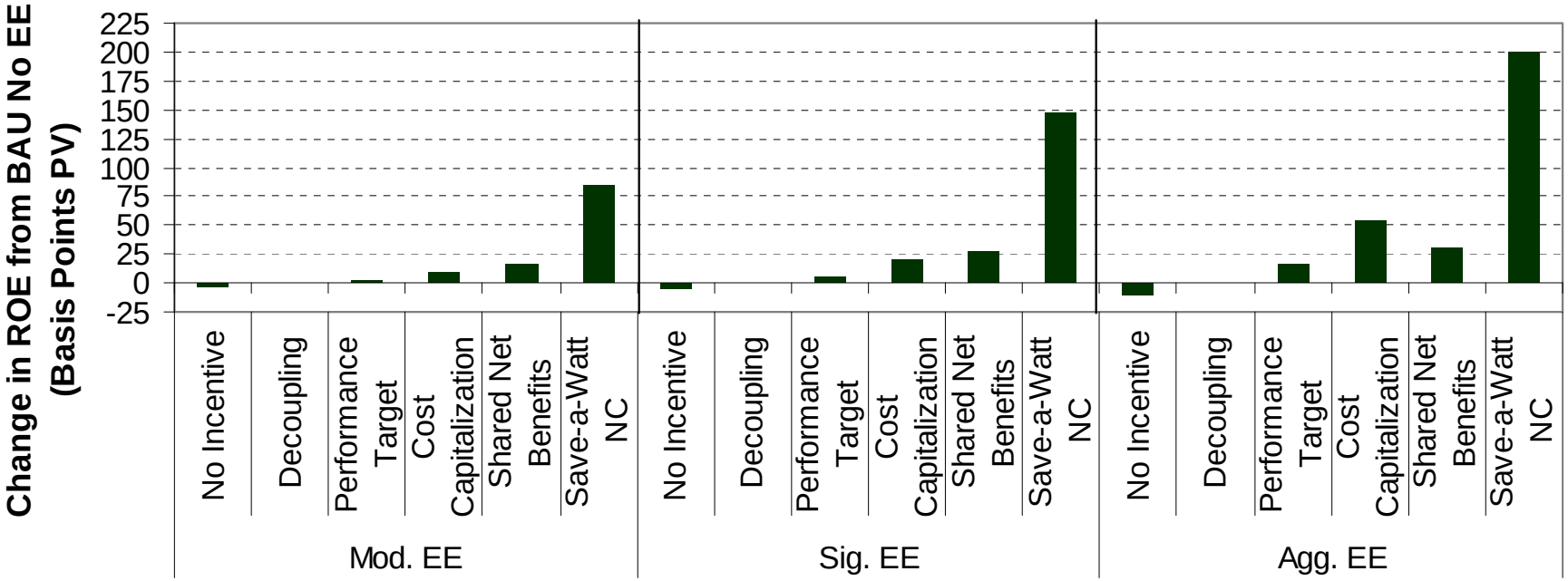
Effect of Decoupling and Shareholder Incentives



- **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)

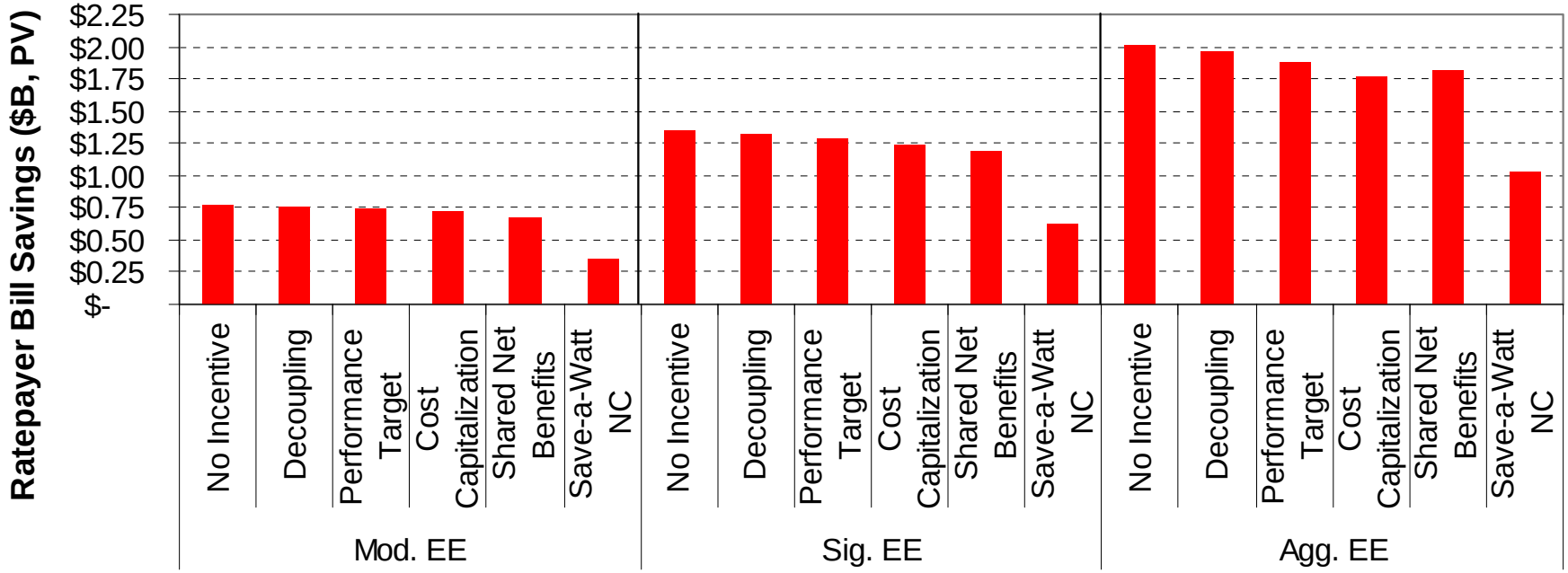
Effect of Decoupling and Shareholder Incentives



- **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

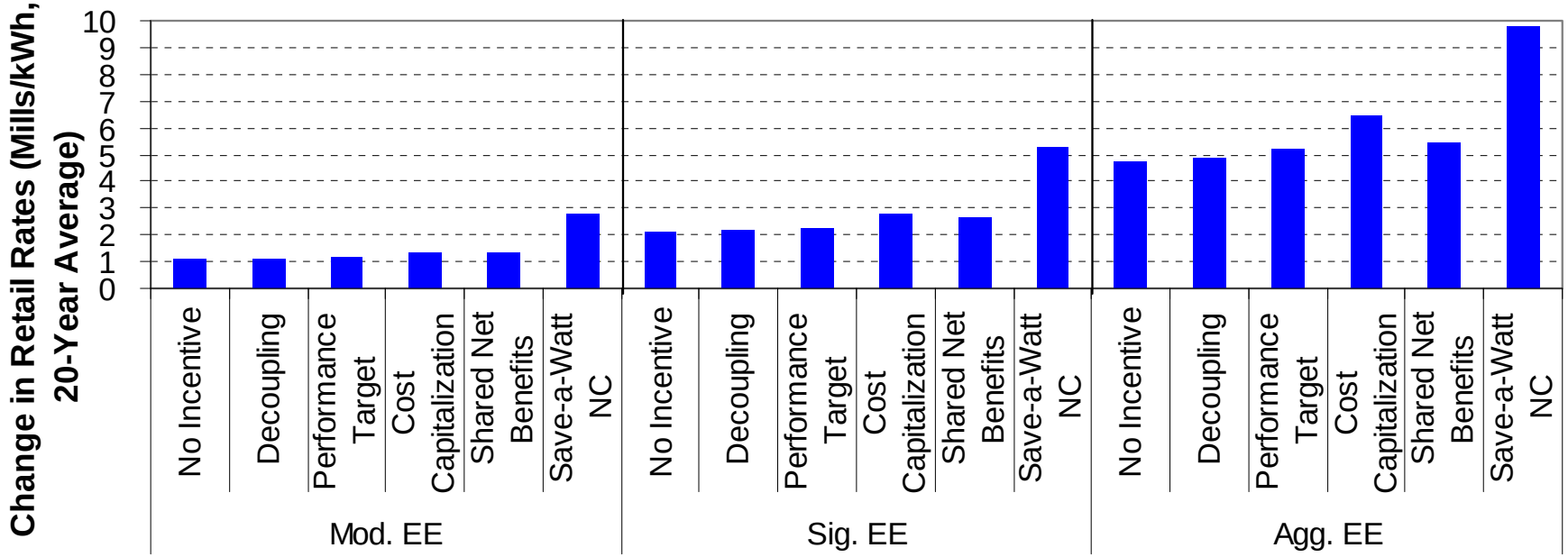
Effect of Decoupling and Shareholder Incentive



- **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)

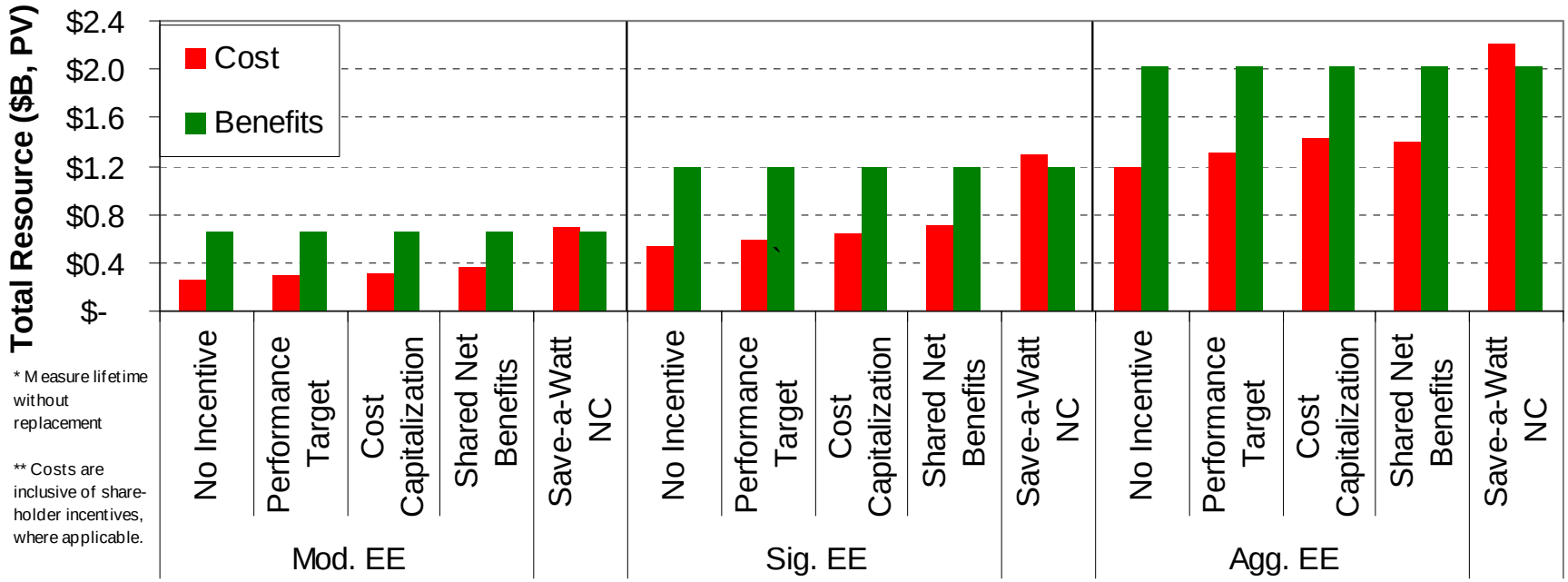
Effect of Decoupling and Shareholder Incentive



- **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

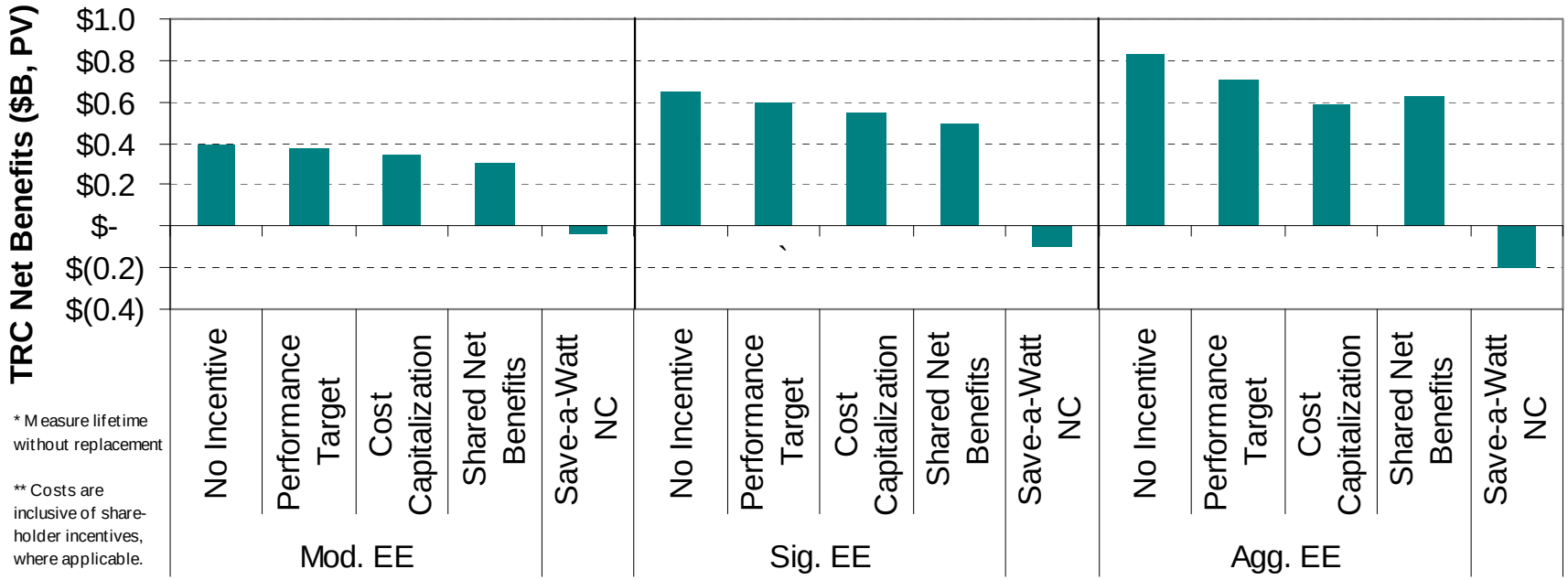
Effect of Decoupling and Shareholder Incentive



- **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
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- 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

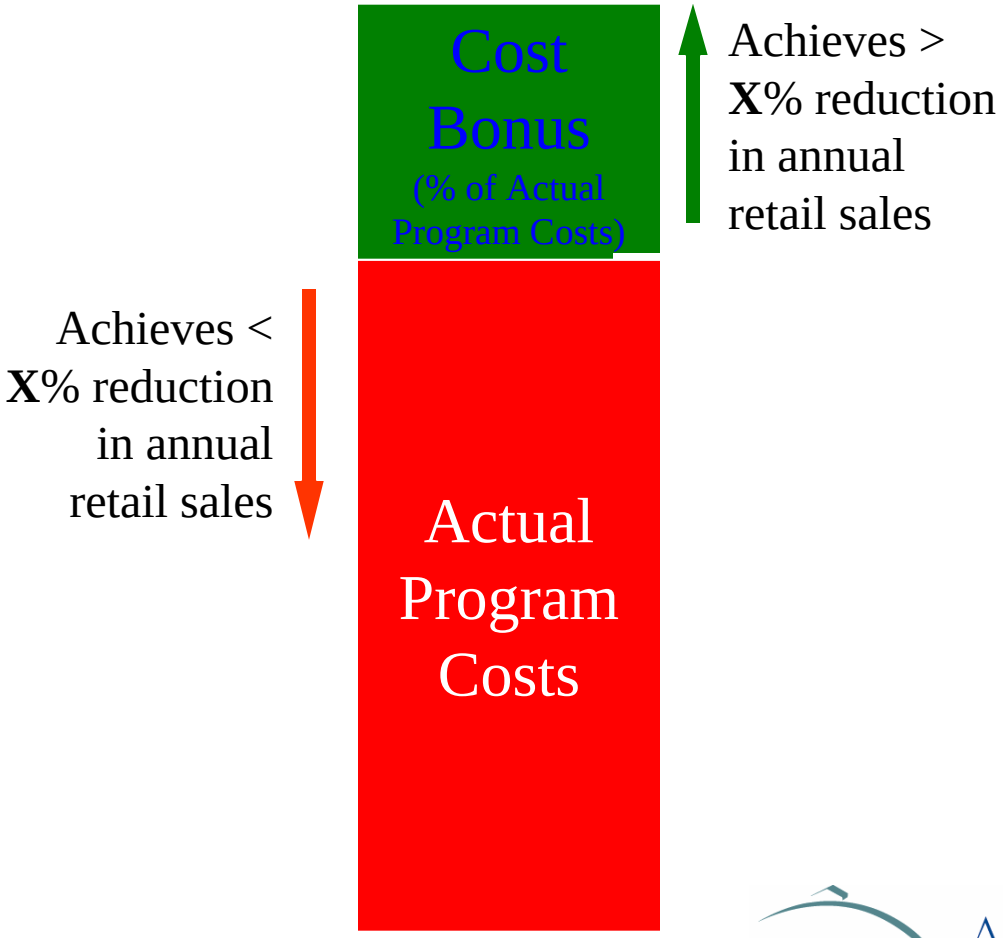
POLICY ISSUES

- **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

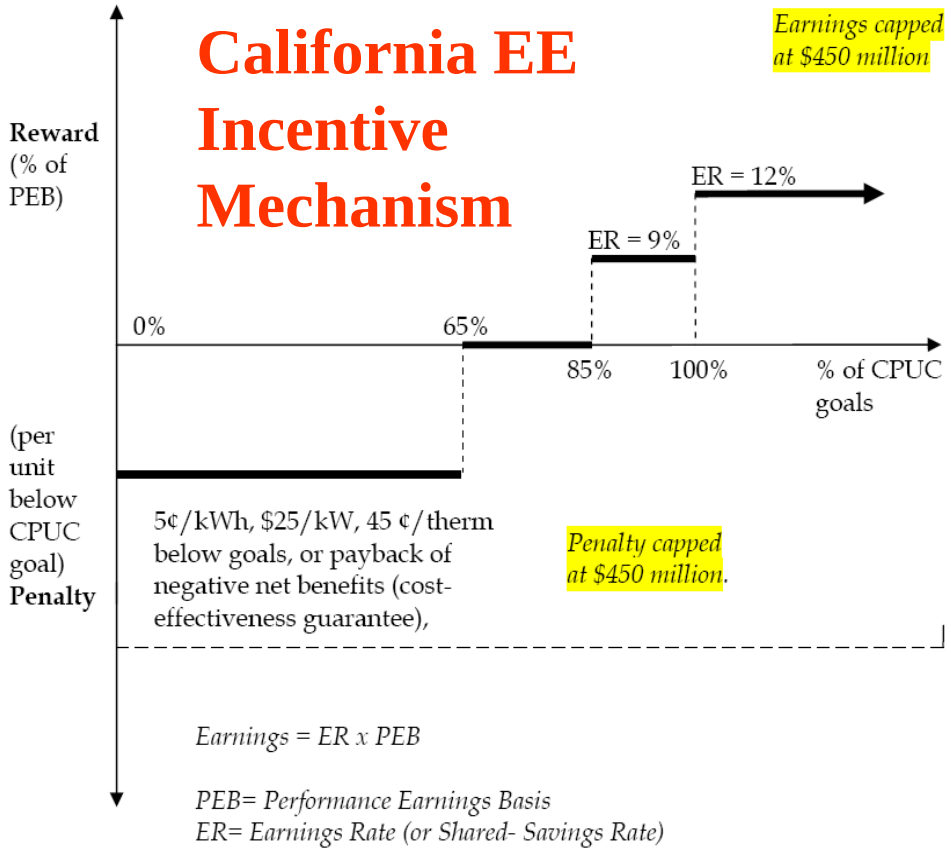
Performance Target Incentive Mechanism

- **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**



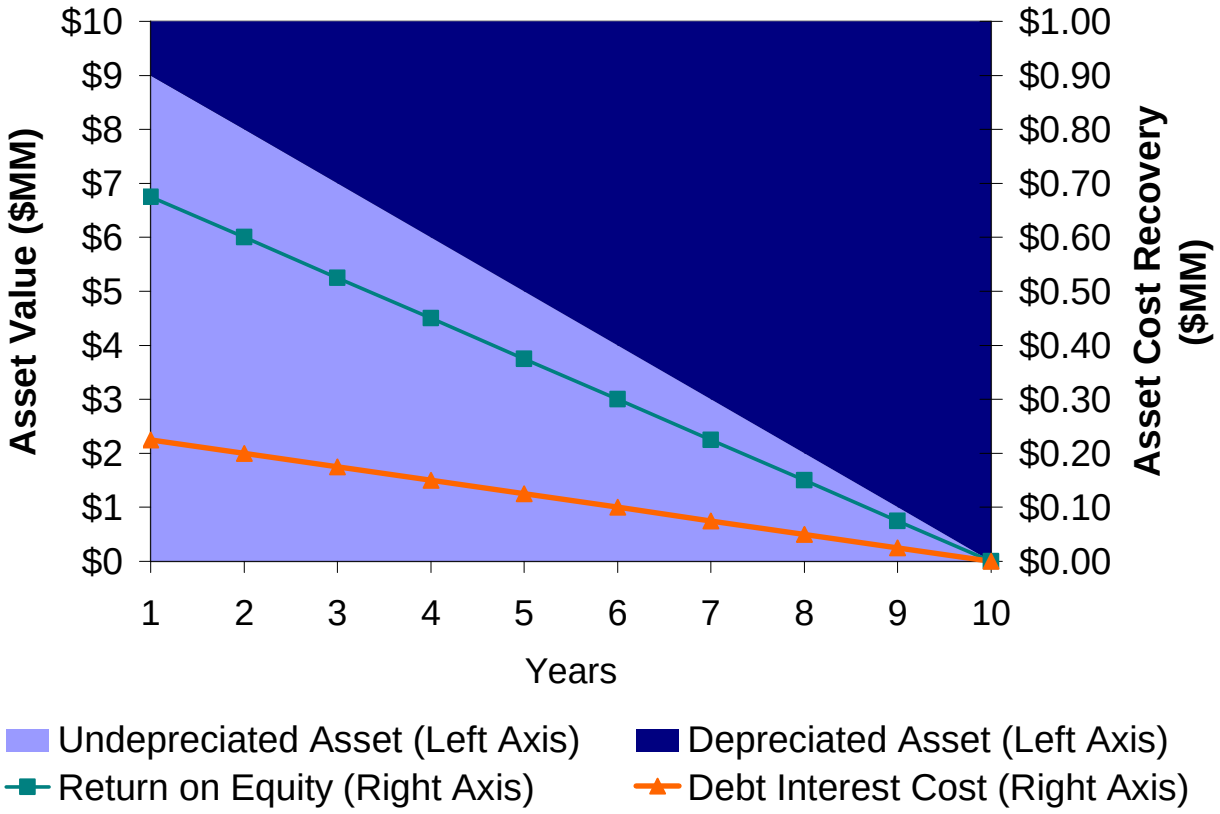
Shared Net Benefits Incentive Mechanism

- 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)



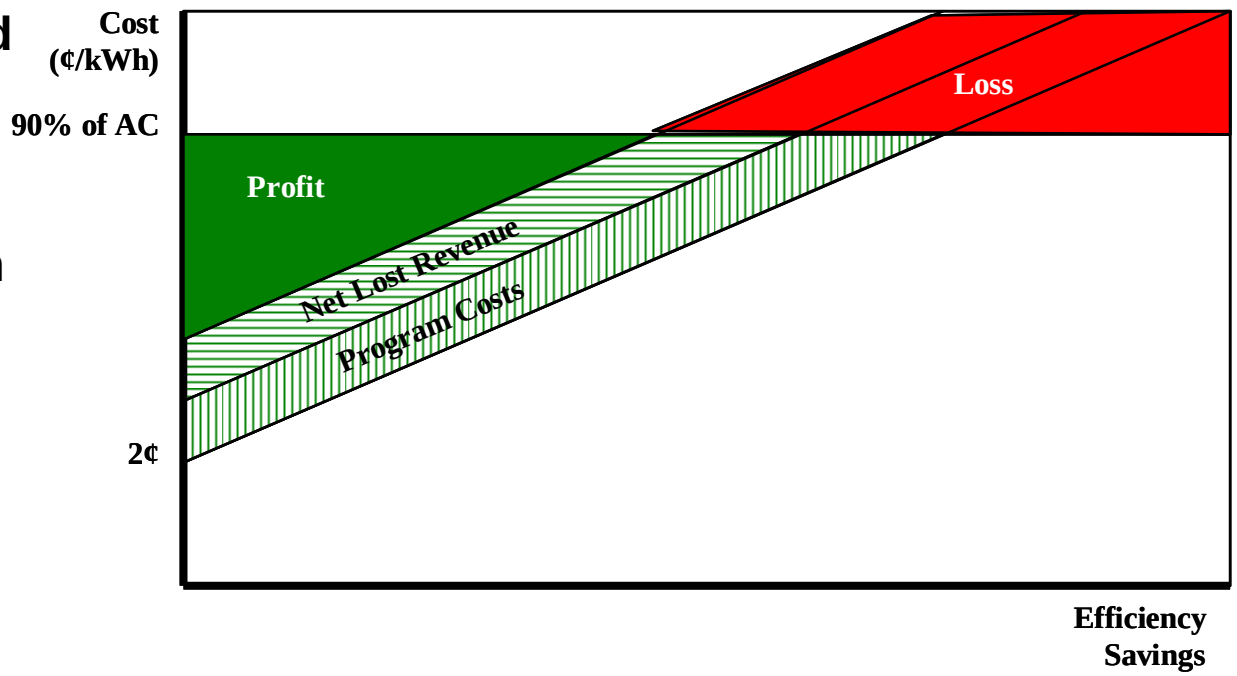
Cost Capitalization Incentive Mechanism

- **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

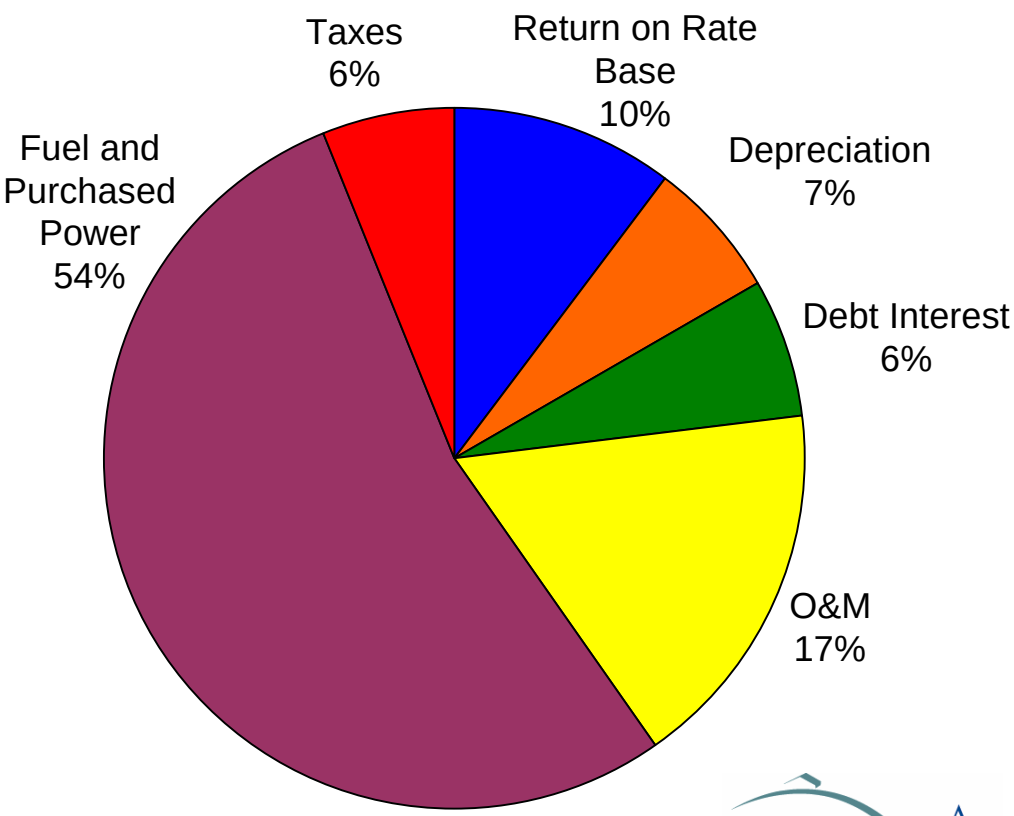


Financial & Cost Characteristics of Prototypical Southwest Utility

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

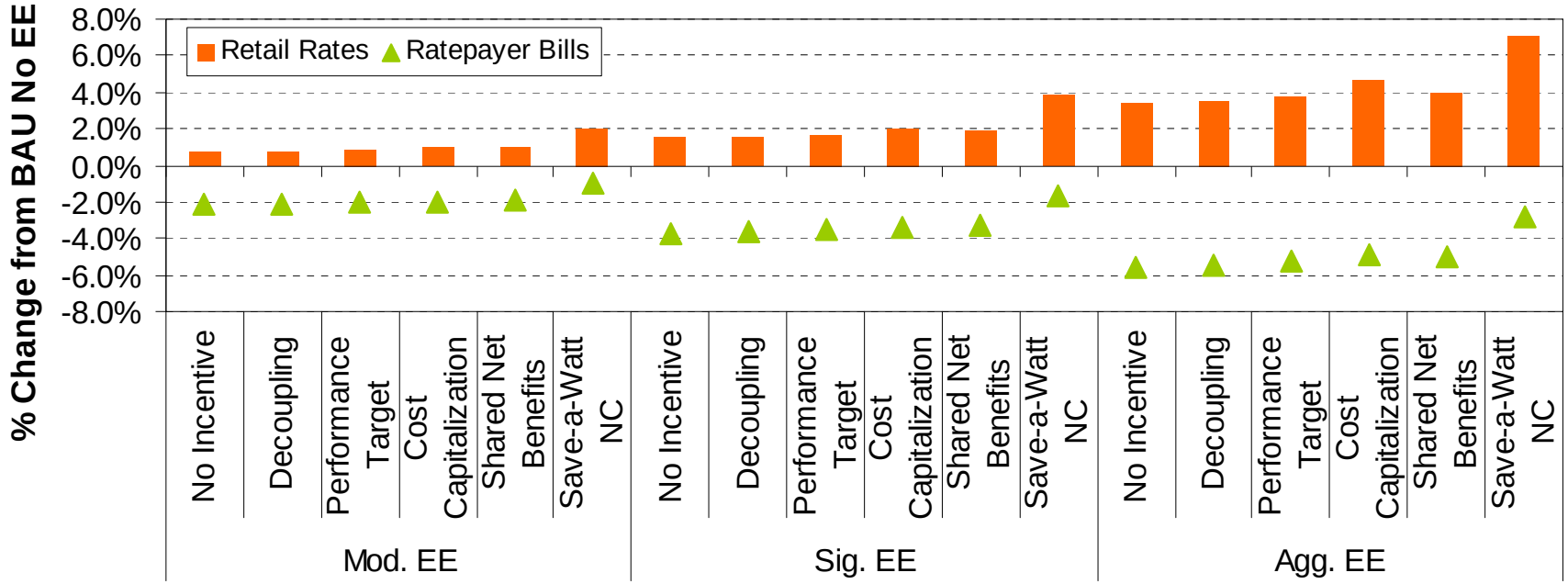
	Annual Growth
Fuel & PP	6.7%
CapEx	5.1%
O&M	8.8%

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**