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

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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

- **Characterize prototypical southwest utility (~10 min.)**
- **Characterize alternative energy efficiency portfolios (~15 min.)**
- **Summarize shareholder incentive and decoupling mechanism analyzed (~5 min.)**
- **Results of financial modeling of prototypical southwest utility implementing alternative EE portfolios (~20 min)**
- **Discuss implications of results**

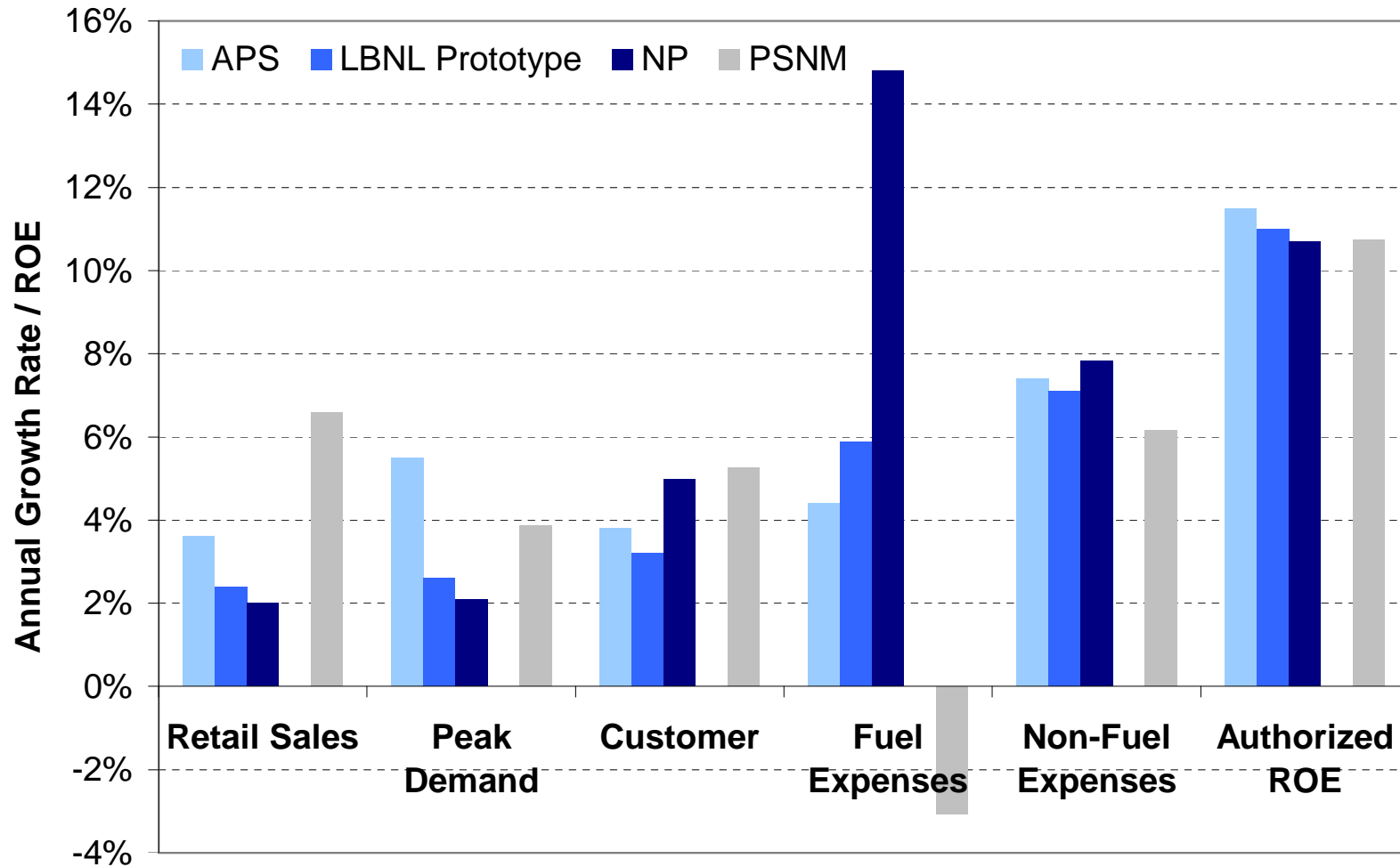
Developing Prototypical SW Utility

- 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” base case for prototypical SW utility,
 - EE cases with varying incentive mechanisms compared to Base Case

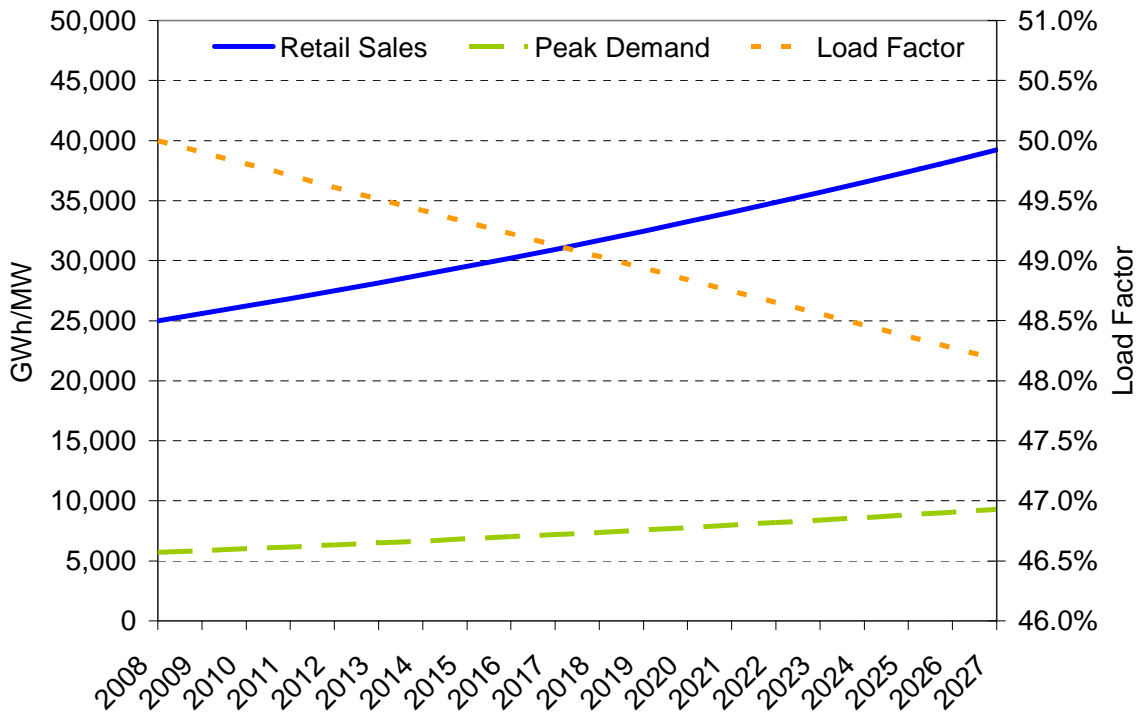
Southwest Utility Characteristics

	APS	NP	LBNL Prototype	PSNM
Sales Growth	3.6%	2.0%	2.4%	6.6%
Demand Growth	5.5%	2.1%	2.6%	3.9%
Customer Growth	3.8%	5.0%	3.2%	5.3%
Fuel Expense Growth	4.4%	14.8%	5.9%	5.2%
Non-Fuel Expense Growth	7.4%	7.8%	7.1%	15.1%
Authorized ROE	11.50%	10.70%	11.00%	10.75%

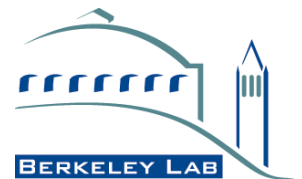
Southwest Utility Characteristics (2)



Physical Characteristics of Prototypical Southwest Utility



	Annual Growth Rate
Retail Sales	2.4%
Peak Demand	2.6%
Customers	3.2%



Financial & Cost Characteristics of Prototypical Southwest Utility

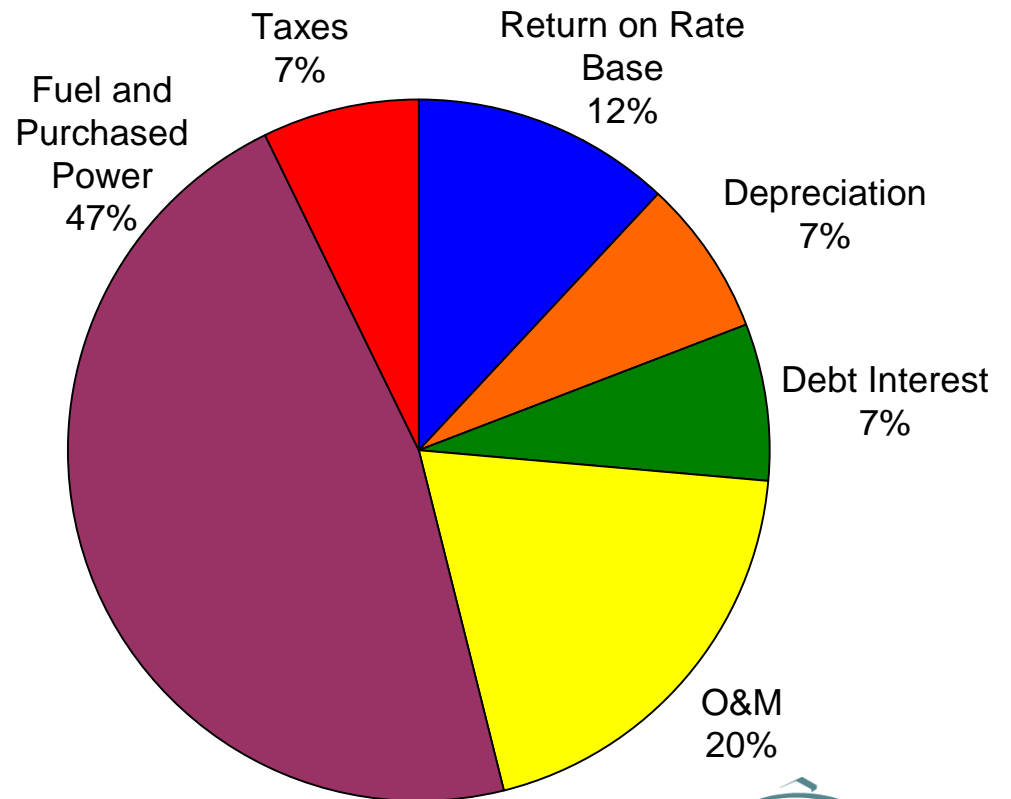
Authorized Level

ROE	11.0%
Debt Cost	6.6%
D:E Ratio	50:50

Annual Growth

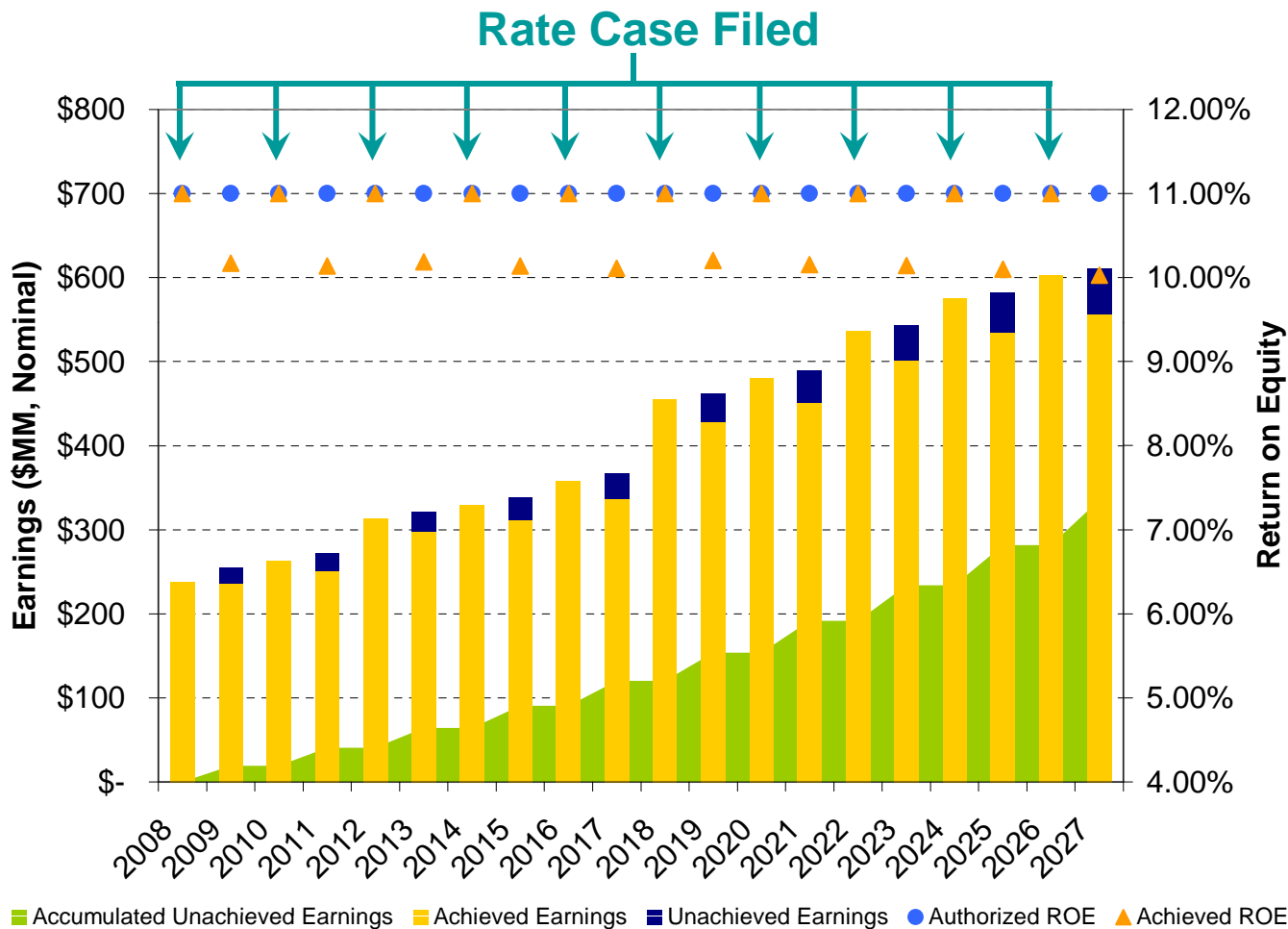
Fuel & PP	5.9%
CapEx	5.1%
O&M	8.8%

1st Year Revenue Requirement



Prototypical Southwest Utility Earnings

Base Case

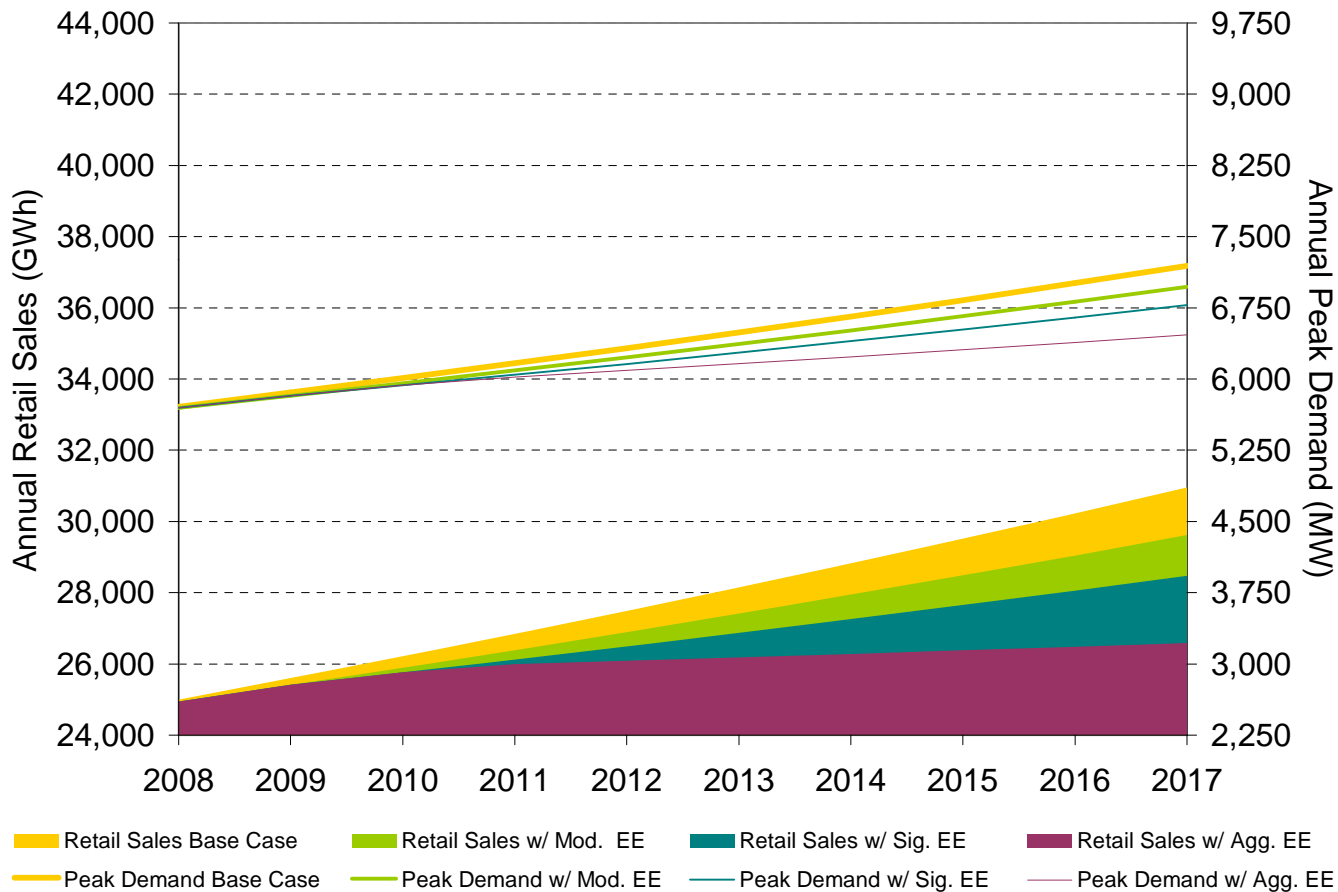


- **Base case represents no decoupling mechanism and no energy efficiency**
- **Utility unable to achieve authorized earnings (@ 11% ROE) between rate cases**
- **Utility's costs growing faster than revenue it receives from increases in sales**
- **Assume utility files biennial rate case to mitigate further earnings erosion (\$335M)**

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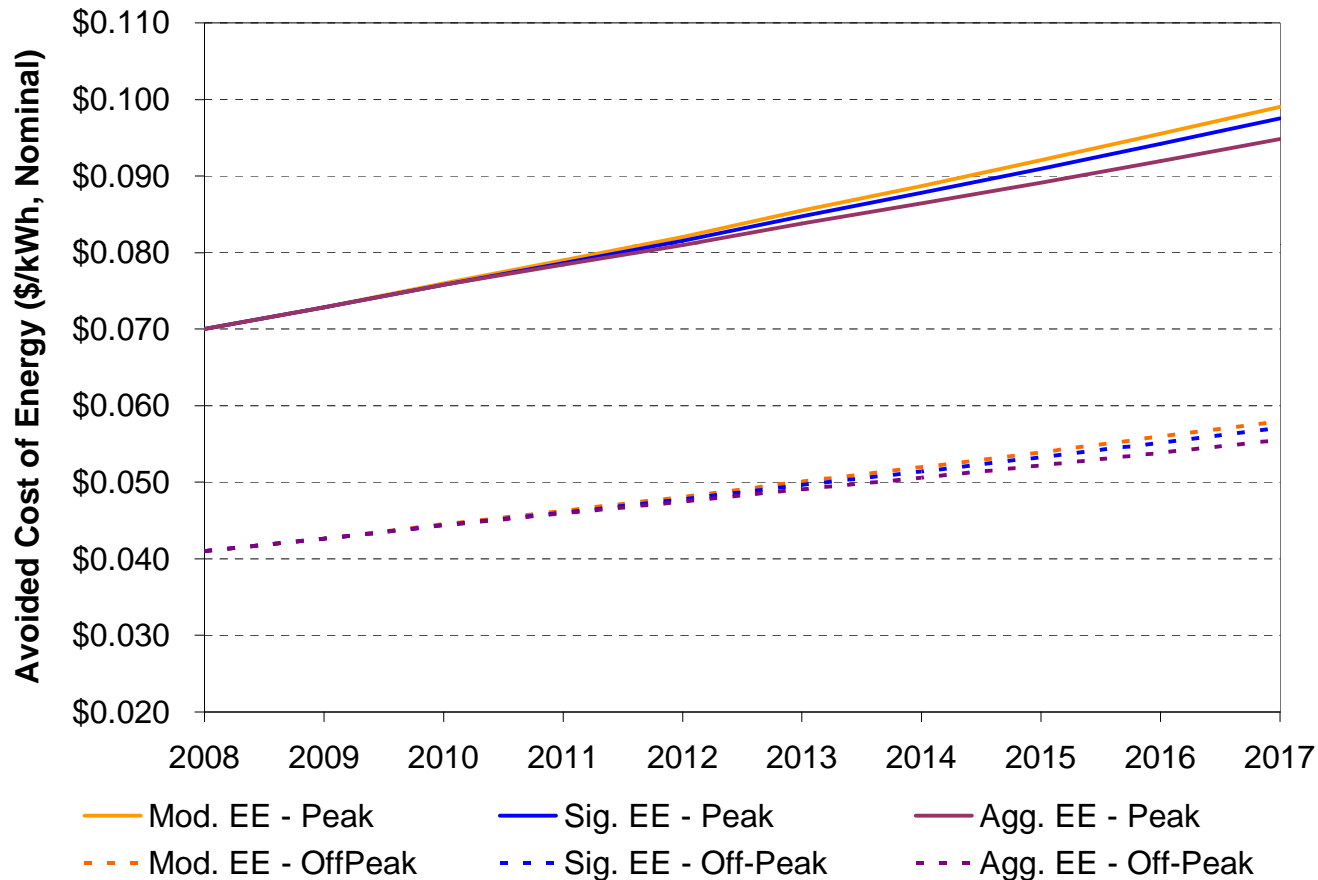
Effect of EE Portfolios on Retail Sales and Peak Demand (2008 – 2017)



- 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

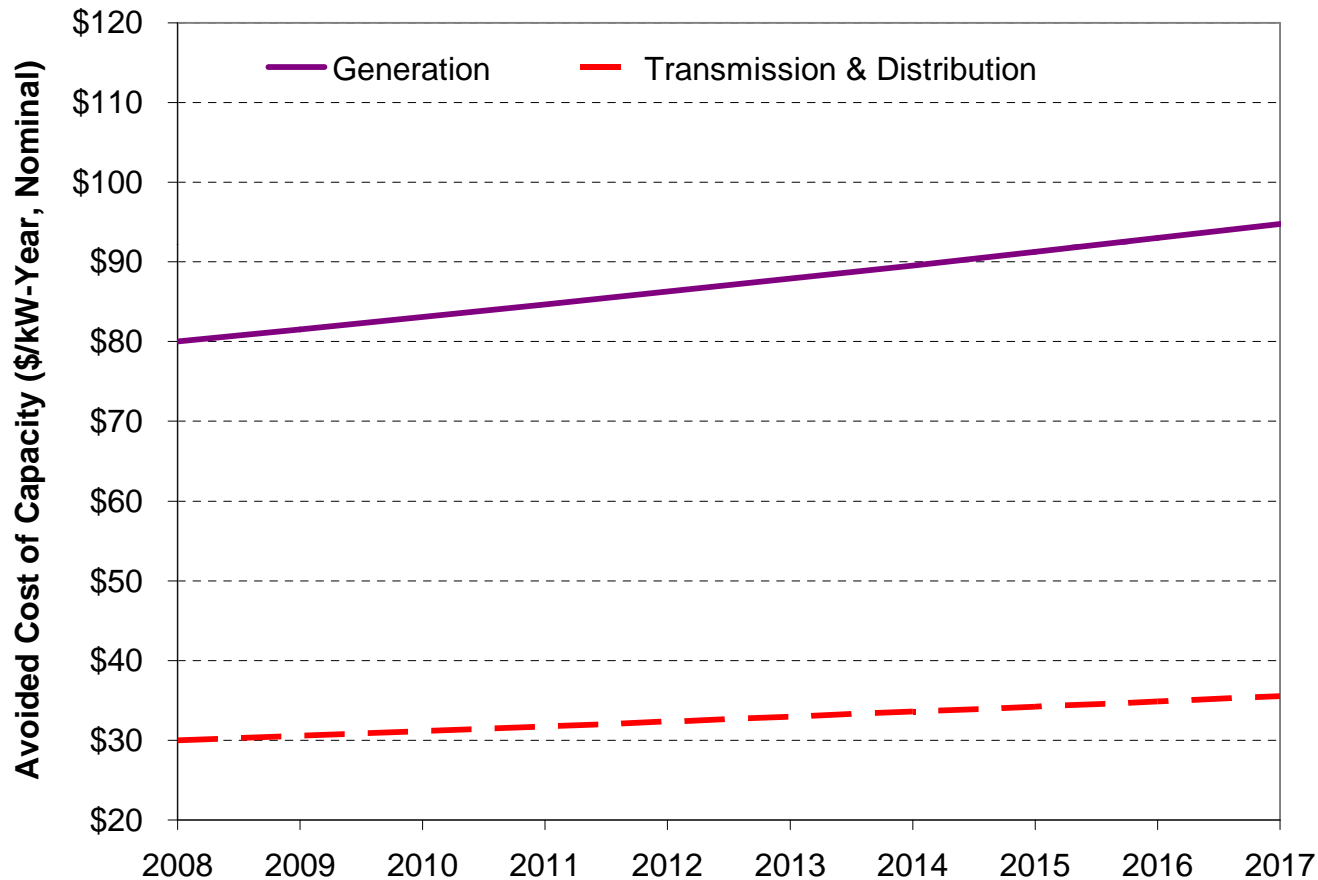


Avoided Cost of Energy



- **Avoided cost of peak and off-peak energy forecast developed for entire analysis period**
- **Supply-side additions influence growth and level of avoided costs**

Avoided Cost of Generation, Transmission and Distribution Capacity



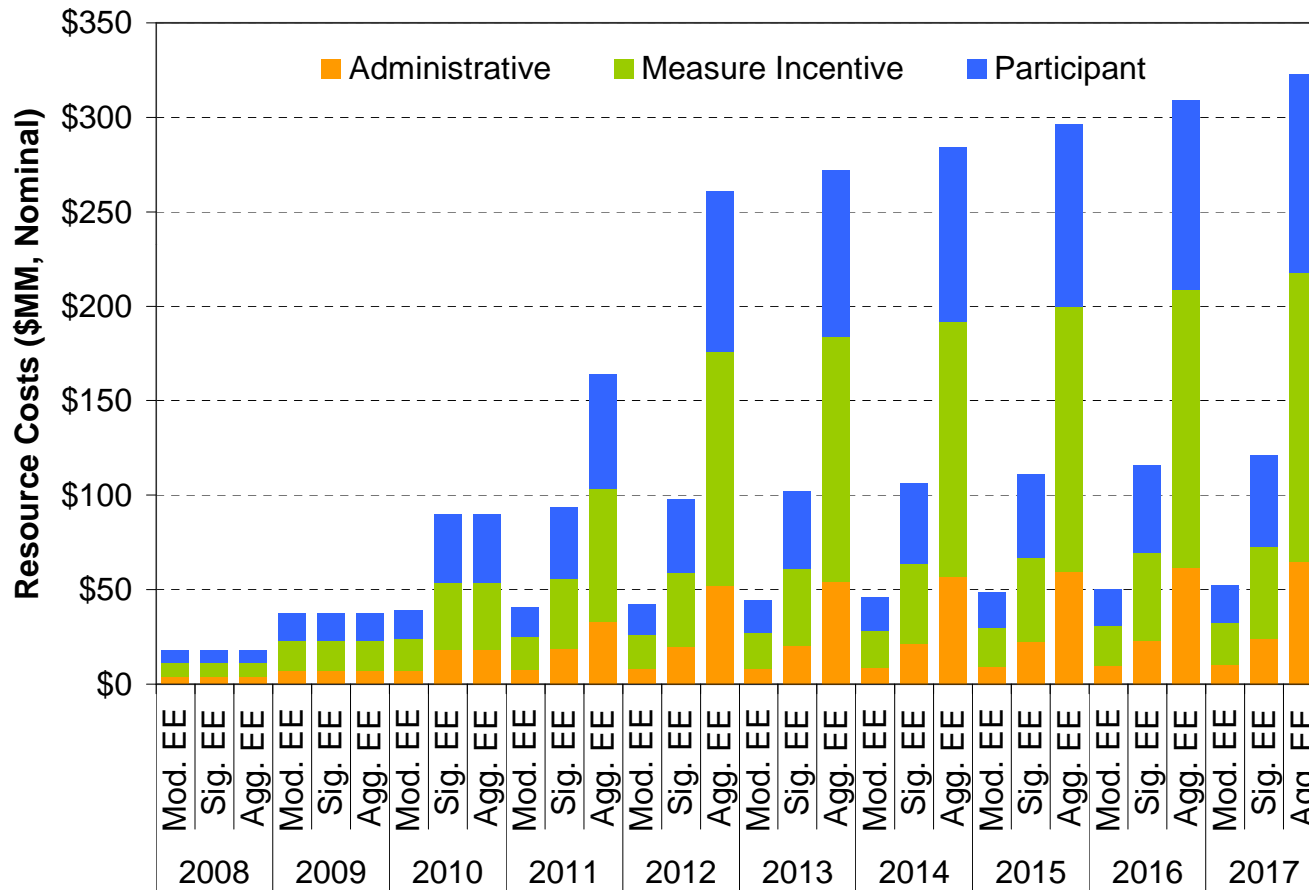
- **Avoided cost of generation, and T&D capacity forecast developed for entire analysis period**
- **Avoided T&D investment is only valued @ 50% of cost due to limited ability of EE to affect T&D capital expenditures**
- **Neither supply-side additions nor size of EE portfolio influences avoided capacity costs**
- **Avoided capacity costs grow at constant rate of 1.9% annually**

Costs and Benefits of Alternative EE Portfolios

	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
Mod. EE	1.6 ¢/kWh	2.6 ¢/kWh	2.38
Sig. EE	1.8 ¢/kWh	3.0 ¢/kWh	2.08
Agg. EE	2.7 ¢/kWh	4.0 ¢/kWh	1.60

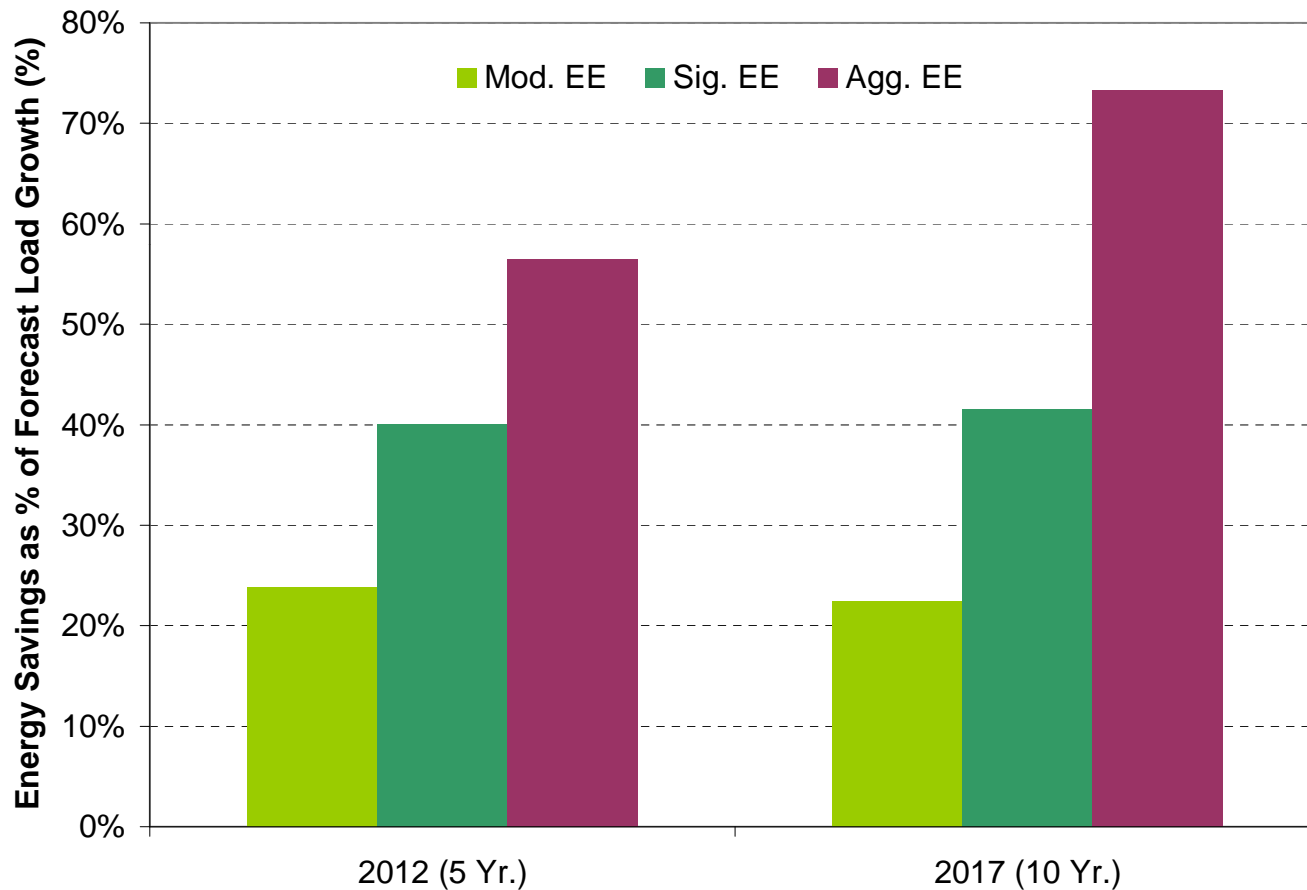
- Assume Sig. and Agg. EE portfolios have higher costs than Mod. EE portfolio due to more expensive measures and higher customer incentives
- All EE Portfolios are very cost-effective, from TR perspective
- Net benefits increase but B/C ratio decreases somewhat in Significant and Aggressive EE cases

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



- Administrative costs increase marginally as EE increases
- Measure incentive costs must increase due to more expensive measures and for utility to achieve its savings goals
- Participant costs increase as more expensive measures must be undertaken

Energy Savings as a % of Forecasted Load Growth



- After 5 years, the Moderate EE portfolio offsets ~24% of load growth, while Aggressive EE offsets 56%
- Moderate EE portfolio offsets ~40% of load growth
- In 2017, Aggressive EE portfolio offsets 73% of projected load growth

Overview

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

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**
 - Additional financial payment could induce 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

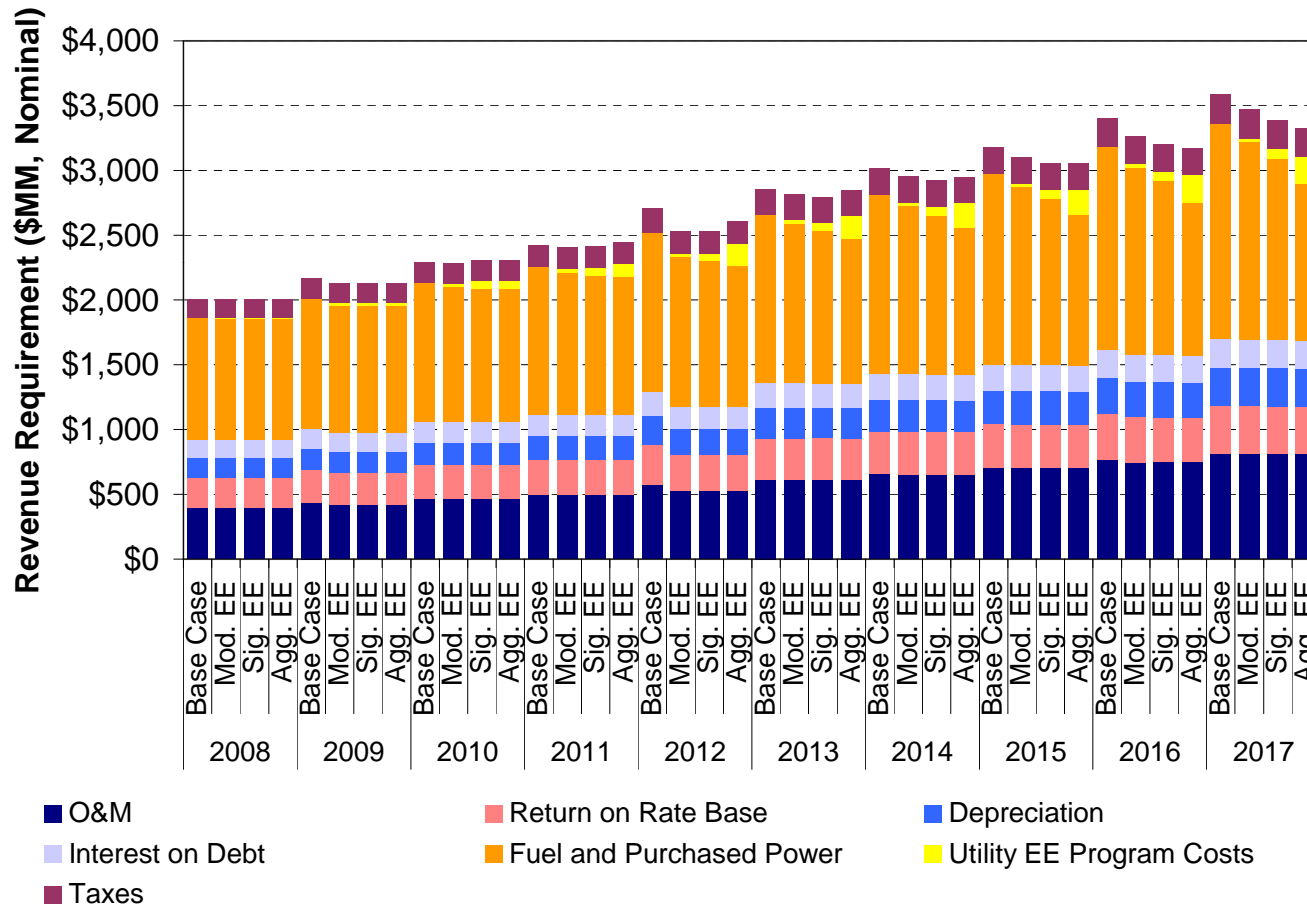
Alternative Shareholder Incentives (2)

- **Shared Net Benefits** (Similar to approach used in CA and MN)
 - Utility retains 15% of the net 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)
 - 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

Overview

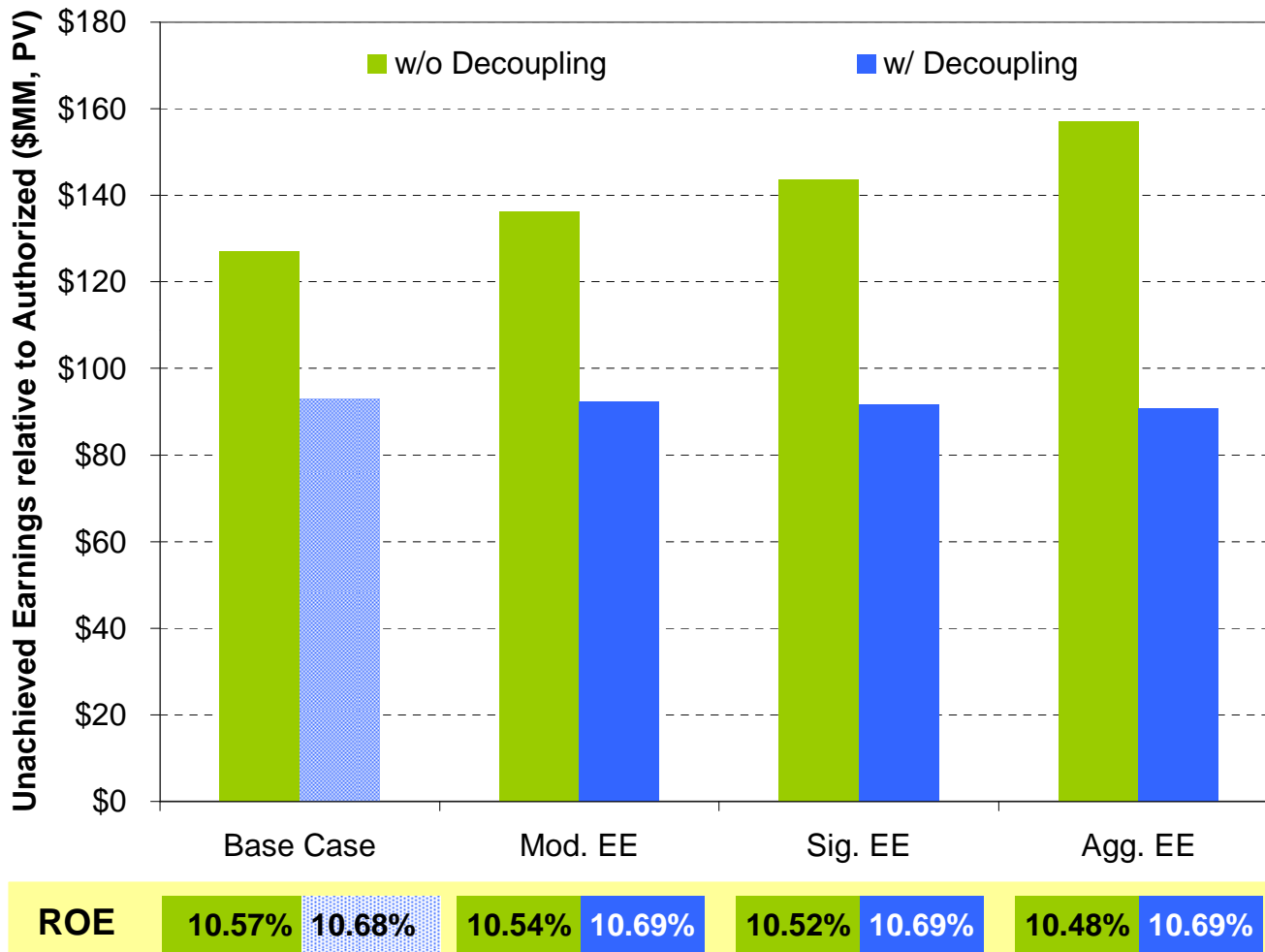
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Effect of EE on Allowed Revenue Requirement (2008 – 2017)



- In all EE cases after 2008, revenue requirement is below Base Case (No EE)
- Fuel and purchased power savings account for most of reduced revenue requirement
- EE also minimally reduces the annual growth in CapEx budgets, which impacts ratebase levels

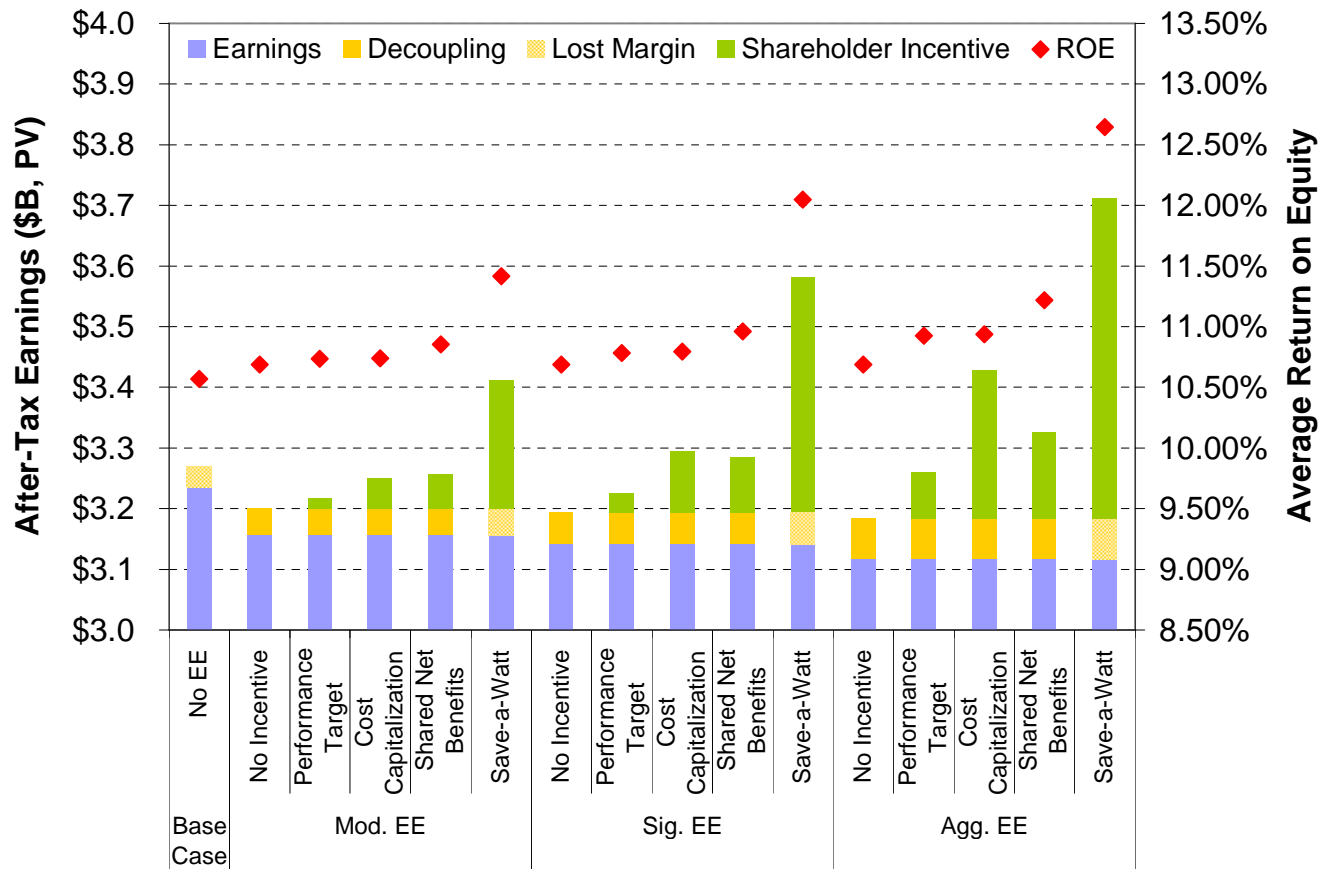
Effect of EE & Decoupling on Unachieved Earnings



- With EE and no decoupling, earnings and ROE erode more relative to authorized levels as sales are reduced
- Decoupling significantly reduces “unachieved earnings” for larger EE portfolios

Shareholder Perspective

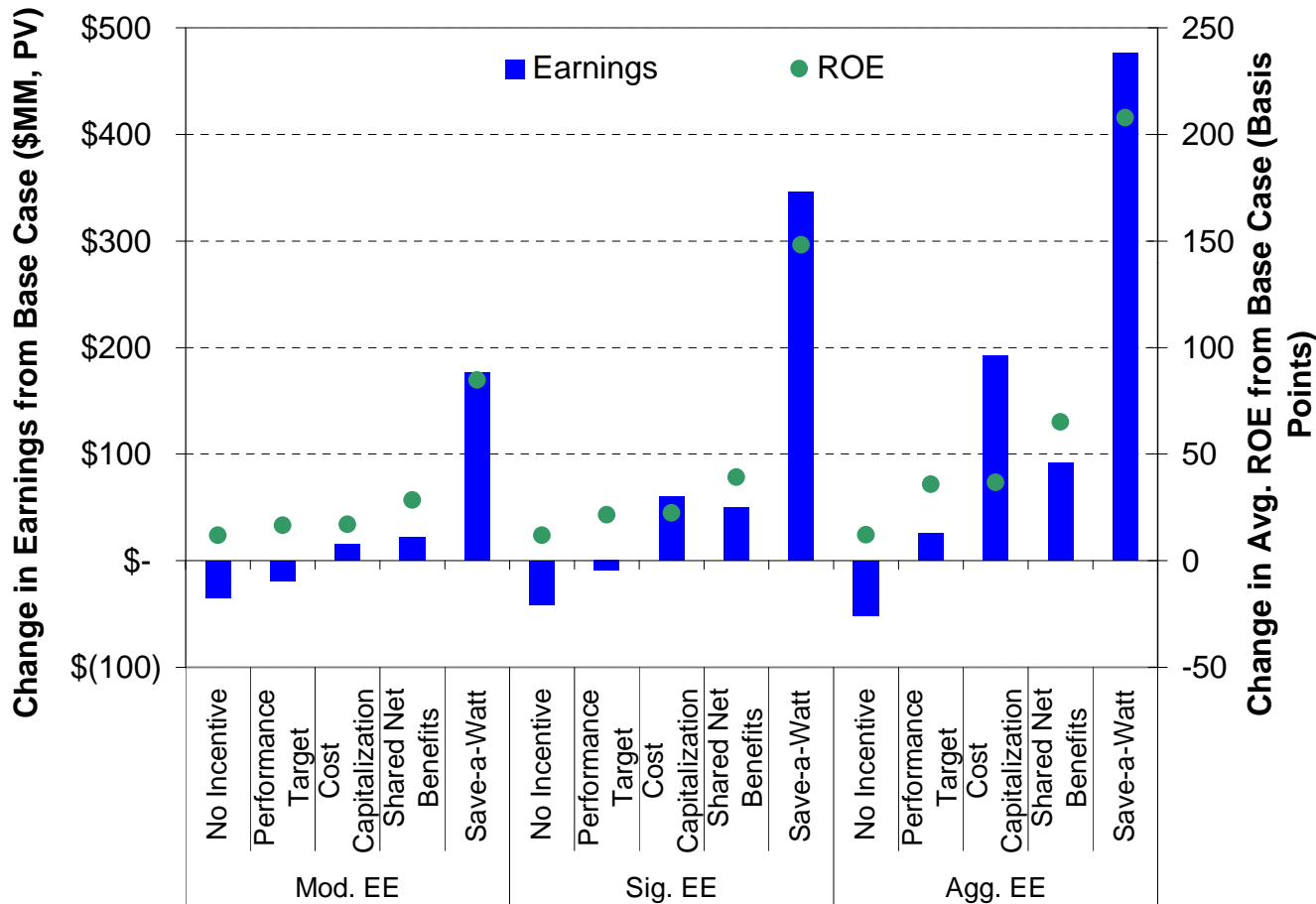
Effect of Decoupling and Shareholder Incentive



- With decoupling and no shareholder incentive, earnings drop when EE is implemented (\$0.08B – \$0.12B)
- Earnings increase w/ contribution of decoupling and a shareholder incentive relative to Base Case for all but Performance Target in Mod. and Sig. EE cases
- Performance Target and Cost Capitalization incentives jump dramatically from Sig. EE to Agg. EE due to 118% increase in program costs

Shareholder Perspective

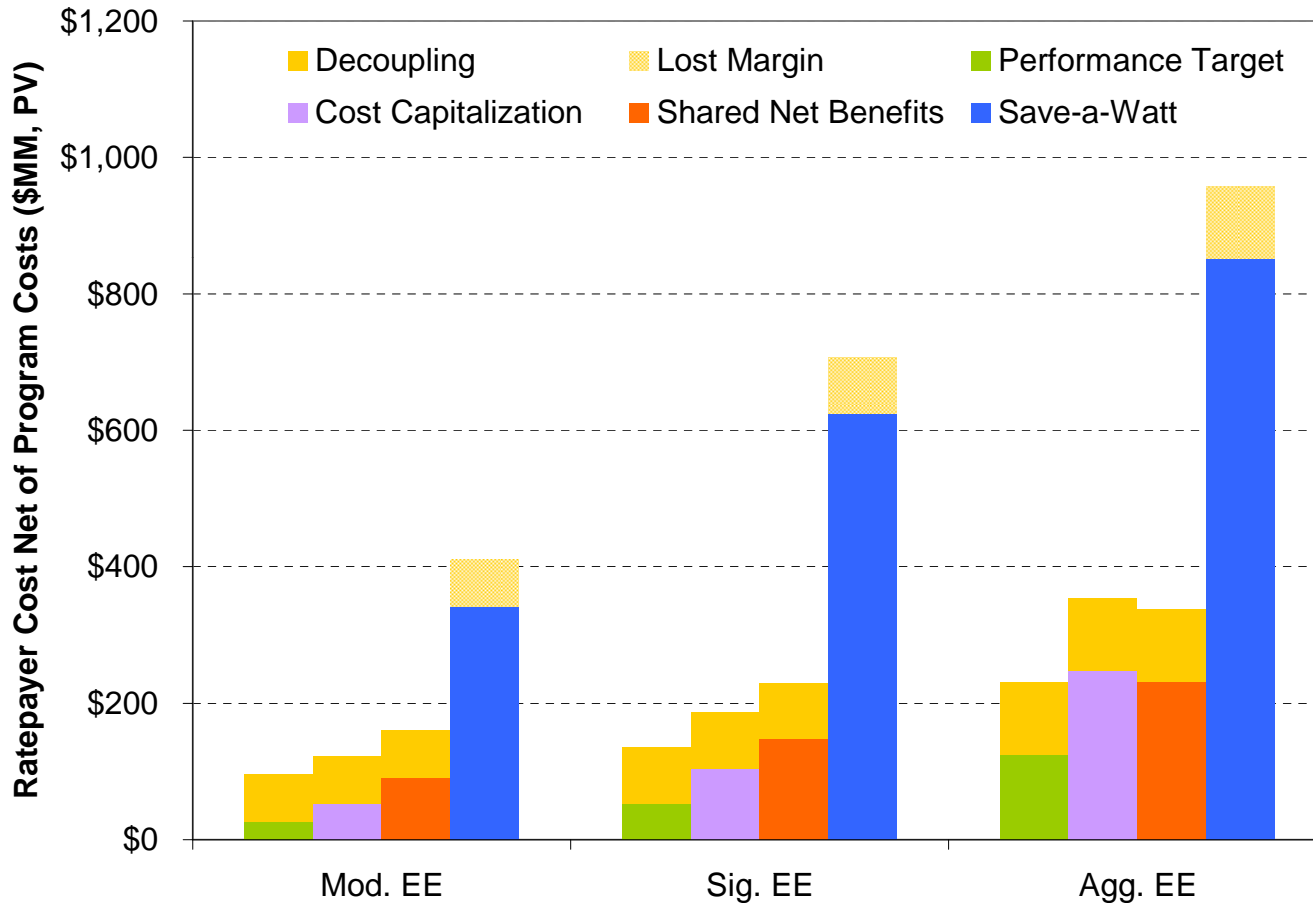
Change Effect of Decoupling and Shareholder Incentives



- Earnings only increase over Base Case when shareholder incentives are implemented
- ROE increases over Base Case regardless if shareholder incentives are provided

Ratepayer Perspective

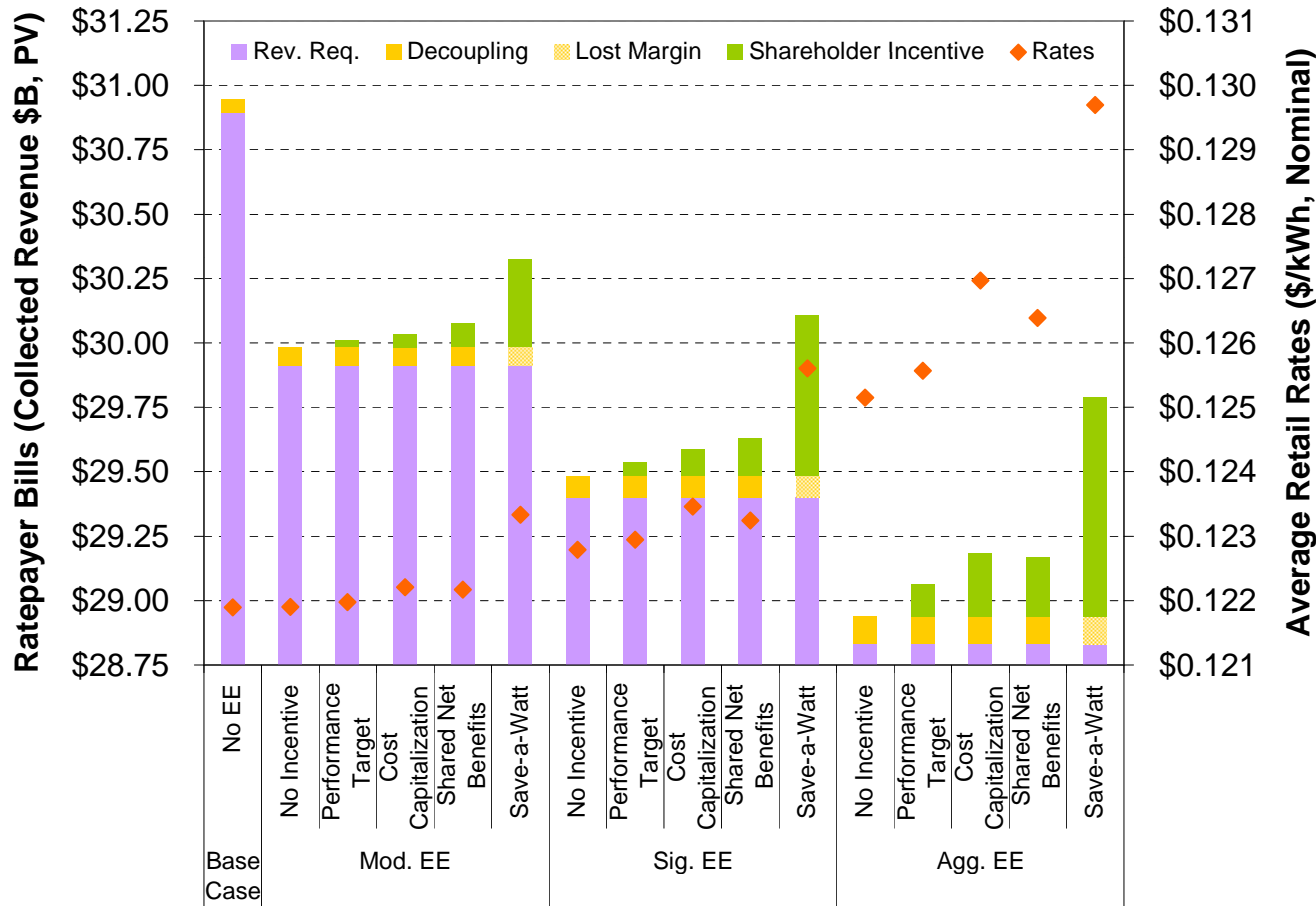
Cost of Shareholder Incentives and Decoupling



- Shareholder incentives AND decoupling for each mechanism EXCEPT Save-a-Watt
- Decoupling contributes less than shareholder incentive for all but Performance Target in Mod. and Sig. EE cases
- Combined cost to ratepayers of incentives (all but SaW) and decoupling is \$96MM - \$354MM
- SaW, net of EE program budgets, "costs" ratepayers between \$412MM and \$958MM

Ratepayer Perspective

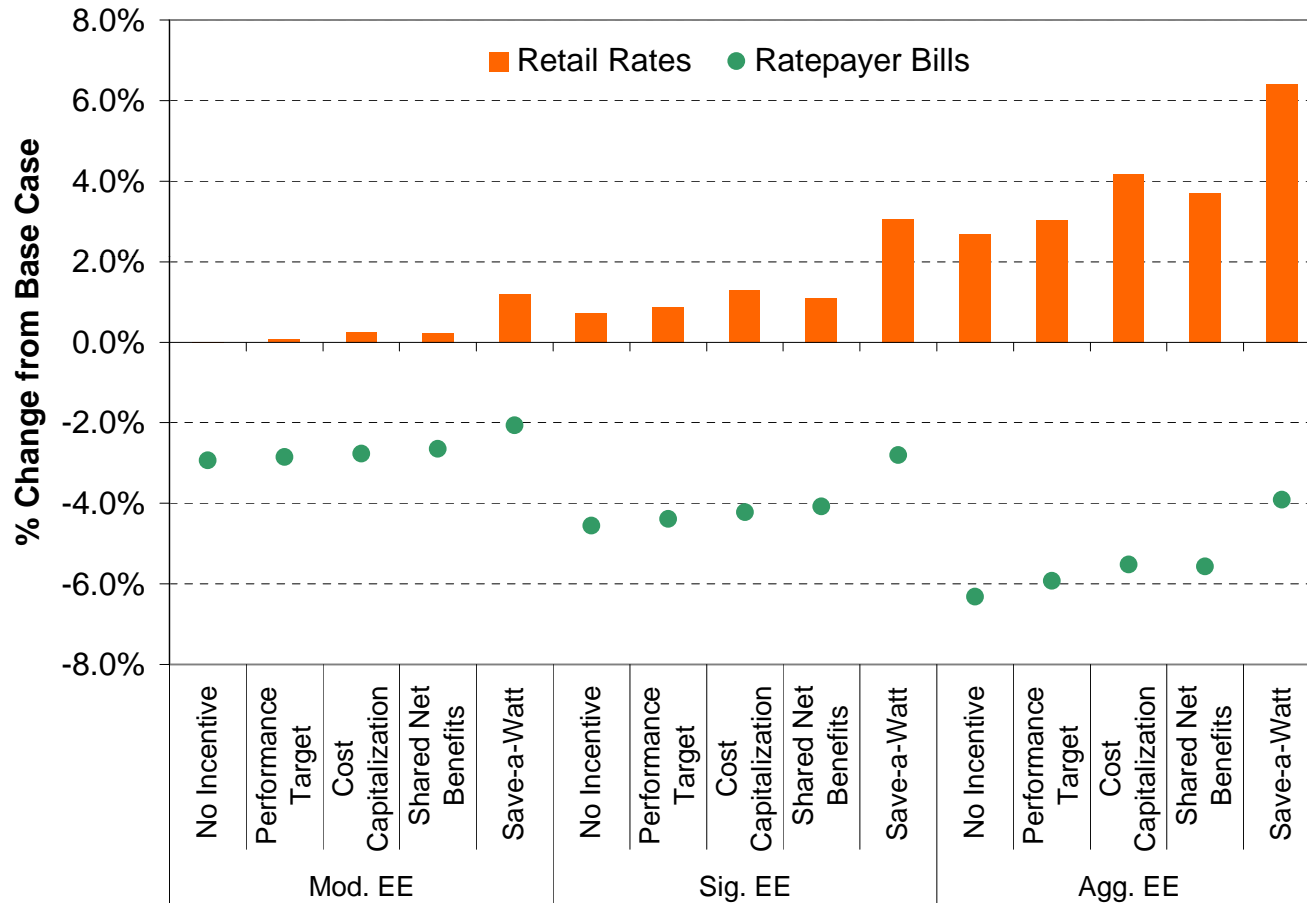
Effect of Decoupling and Shareholder Incentive



- Ratepayer bill savings increase with larger EE portfolios (i.e., ~\$0.9 to ~\$1.7B, except for Save-A-Watt)
- Small retail rate increase (0 – 5 mills/kWh) in all cases relative to Base Case w/o decoupling

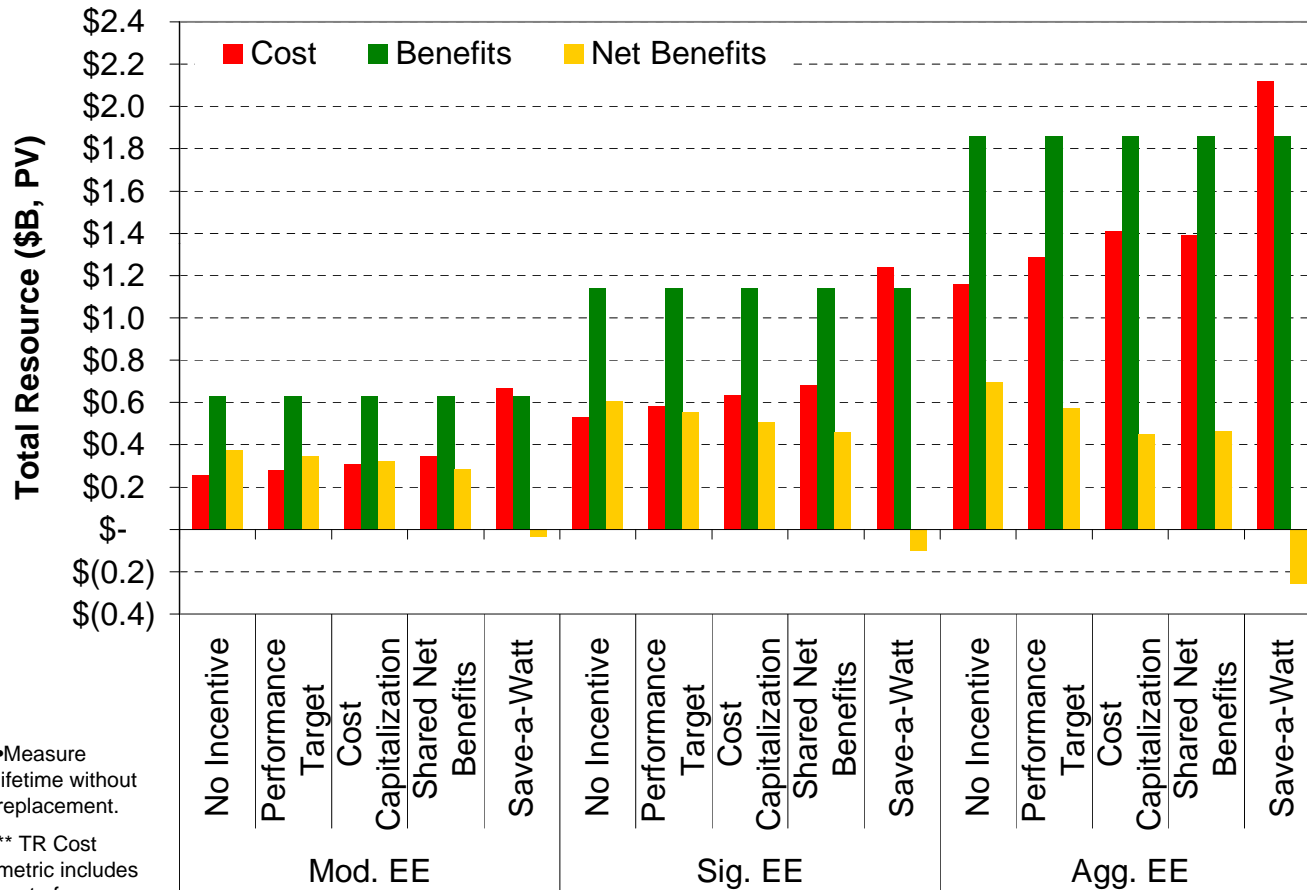
Ratepayer Perspective

% Change Effect of Decoupling and Shareholder Incentive



- % increase in retail rates grows as size of EE portfolio increases
- Avg. bill savings to ratepayers increases with larger EE portfolios (e.g. ~3.0% to ~4.5%, to ~6.0%), excluding Save-A-Watt

TRC Net Resource Benefits of EE

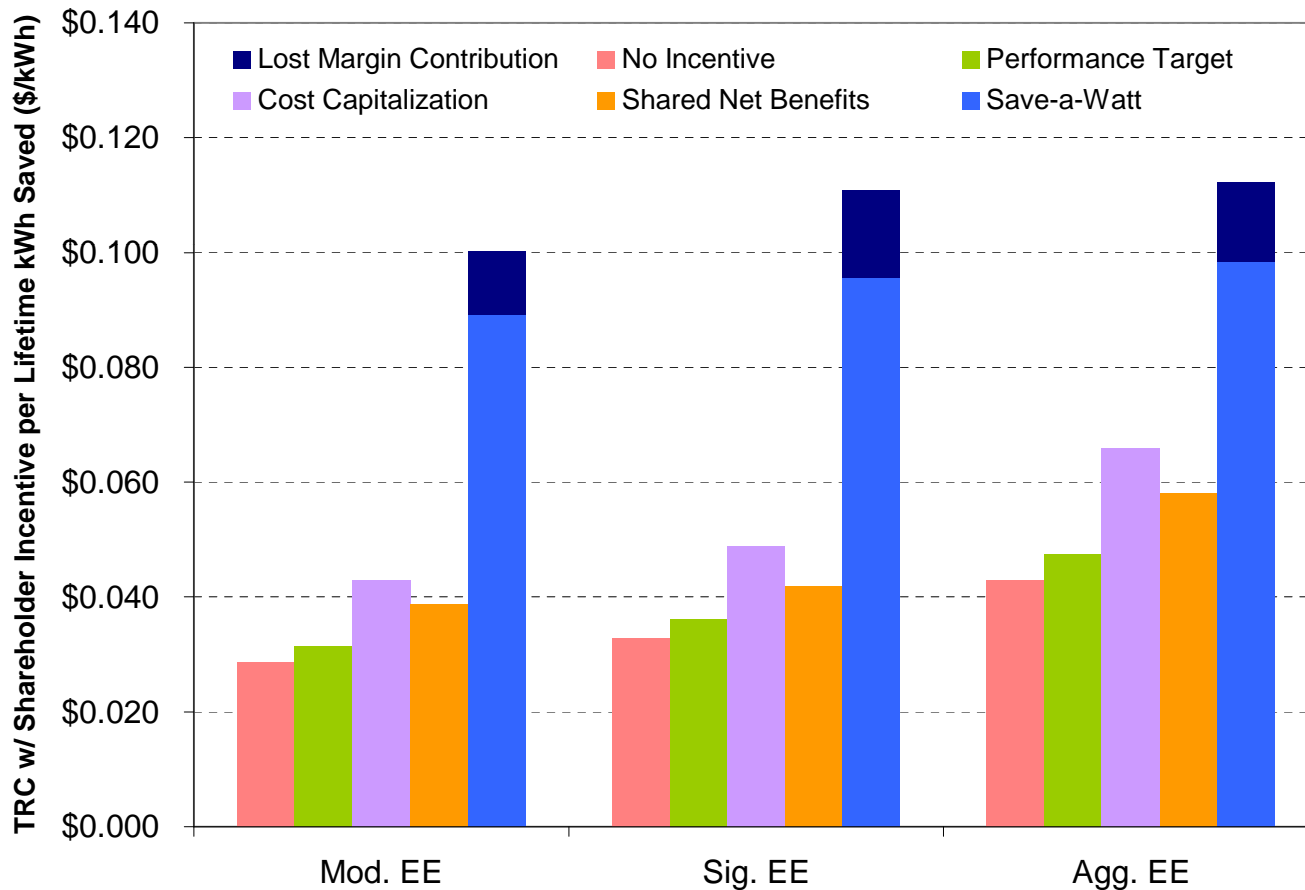


- Resource benefits valued at forecasted avoided cost of energy and capacity
- In every case (except SaW), EE with incentives produces positive net benefits (~\$0.3B – \$0.6B)
- SaW resource costs are 90% of Resource Benefits + Participant costs, the latter increases with larger EE portfolios by design

•Measure lifetime without replacement.

** TR Cost metric includes cost of shareholder incentives.

TRC w/ Shareholder Incentive per Lifetime kWh Saved



- This metric includes total resource cost with cost of EE shareholder incentives
- Contribution of Lost Margin to SaW is explicitly shown so that one can properly compare costs of alternative incentive designs
- Costs per lifetime kWh saved increase with EE portfolio in all cases, minimally for SaW

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; declining sales per customer
 - In Base 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, but the contribution of the shareholder incentive results in negative net benefits to ratepayers for Save-a-Watt only
 - ♦ Net resource benefits are significant (\$0.3B to \$0.6B) with Performance Target, Cost Capitalization, and Shared Net Benefits incentives; and increase with more aggressive EE goals
 - ♦ Net resource benefits are negative with Save-A-Watt (\$-0.05B to \$-0.26B) as assumed participant costs exceed the 10% of net resource benefits to ratepayers left over from SaW incentive mechanism (i.e., 90% of avoided costs)
- **Ratepayer Perspective**
 - Significant bill savings accrue (2% - 6%) in all EE cases
 - For all EE cases with shareholder incentives, average rates increase (0 – 5 mills/kWh)

Implications of Results (cont)

- **Shareholder perspective**

- If EE is implemented without decoupling, the overall level of earnings decreases by \$79 - \$118M and ROE drops by 2 to 9 basis points compared to Base Case
- Introducing decoupling increases ROE by 12 basis points compared to Base Case without EE (but utility still not achieving authorized ROE) but utility still has lower earnings by \$35 to \$52M relative to the Base Case
- Additionally implementing shareholder incentives results in:
 - ◆ ROE increasing in all cases and over all shareholder incentives, relative to Base 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
 - ◆ With Performance Target and a decoupling mechanism applied, earnings improve over the Base Case only with an Aggressive EE portfolio
 - ◆ If Save-A-Watt alone is implemented, much higher earnings (\$177 - \$477M) and ROE (85 - 208 basis points) are achieved compared to Base Case

Discussion Questions

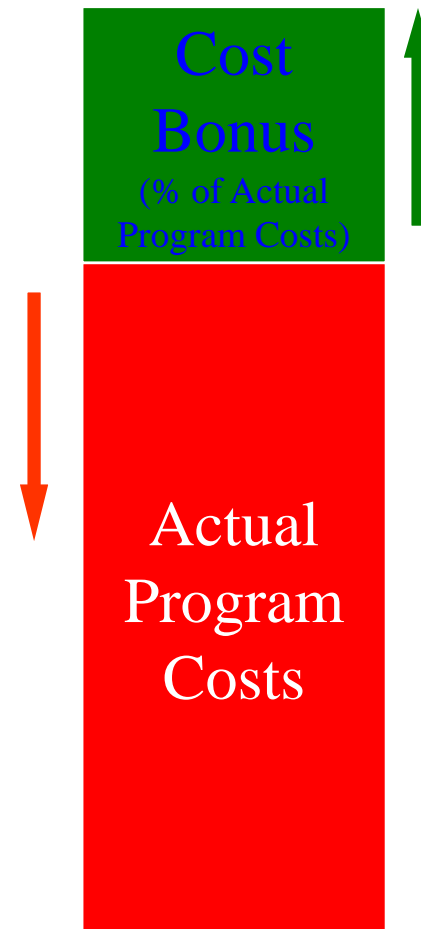
POLICY ISSUES

- **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?**
- **If states pursue Aggressive EE savings goals, how does this affect our thinking about incentive mechanisms and decoupling?**
- **Relationship between utility’s incentive mechanism and types of EE or DSM programs that it is likely to deploy?**
- **Relative importance of ROE vs. absolute earnings in motivating utilities?**

Appendix Slides

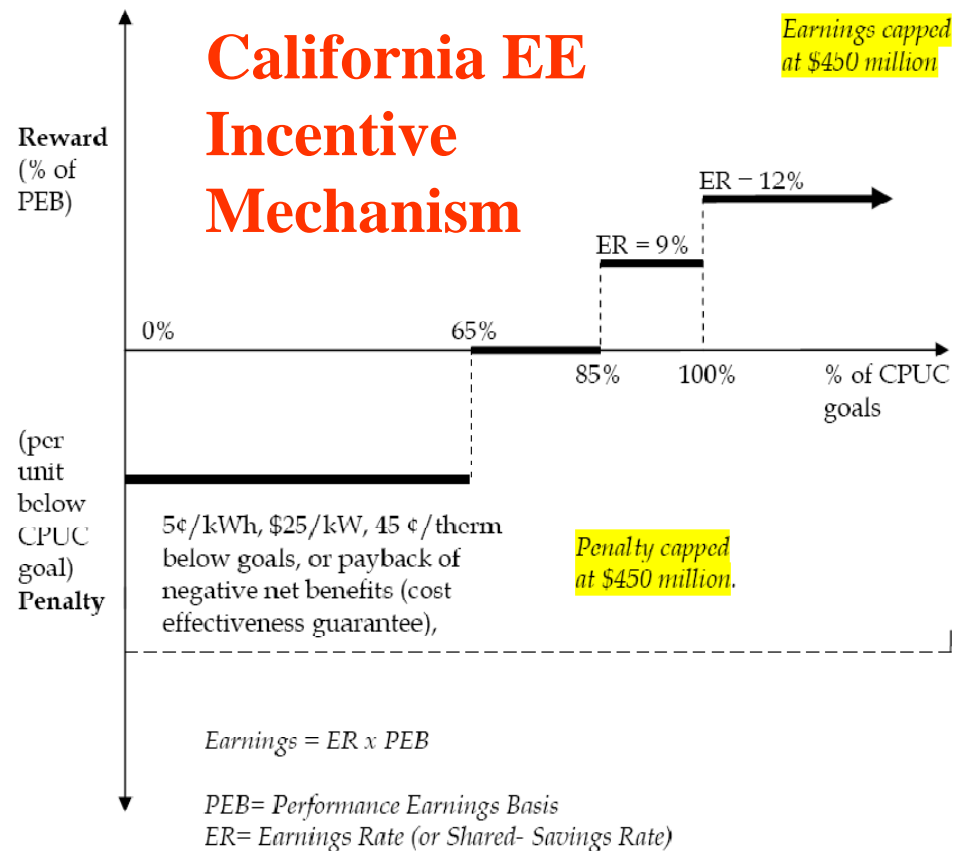
Performance Target Incentive Mechanism

- 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



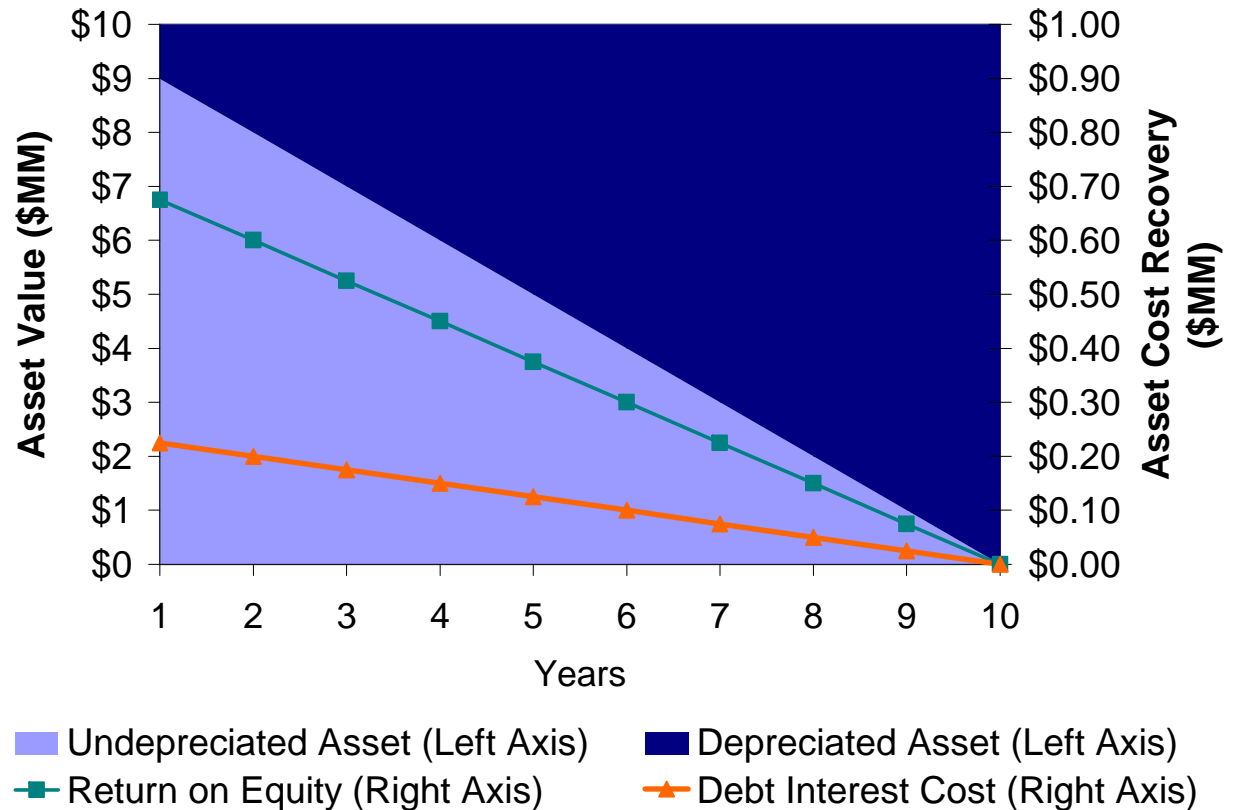
Shared Net Benefits Incentive Mechanism

- 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

