

# Appendix **B**: Business Case B: Details



To help natural gas and electric utilities, utility regulators, and partner organizations communicate the business case for energy efficiency, the National Action Plan for Energy Efficiency provides an Energy Efficiency Benefits Calculator (Calculator available at [www.epa.gov/cleanenergy/eeactionplan.htm](http://www.epa.gov/cleanenergy/eeactionplan.htm)). This Calculator examines the financial impact of energy efficiency on major stakeholders, and was used to develop the eight cases discussed in Chapter 4: Business Case for Energy Efficiency. Additional details on these eight cases are described in this appendix.

## Overview

A business case is an analysis that shows the benefits of energy efficiency to the utility, customers, and society within an approach that can lead to actions by utilities, regulators, and other stakeholders. Making the business case for energy efficiency programs requires a different type of analysis than that required for traditional supply-side resources. Because adoption of energy efficiency reduces utility sales and utility size, traditional metrics such as impact on rates and total earnings do not measure the benefits of energy efficiency. However, by examining other metrics, such as customer bills and utility

earnings per share, the benefits to all stakeholders of adopting energy efficiency can be demonstrated. These benefits include reduced customer bills, decreased cost per unit of energy provided, increased net resource savings, decreased emissions, and decreased reliance on energy supplies.

This appendix provides more detailed summary and interpretation of results for the eight cases discussed in Chapter 4: Business Case for Energy Efficiency. All results are from the Energy Efficiency Benefits Calculator's interpretation tab.

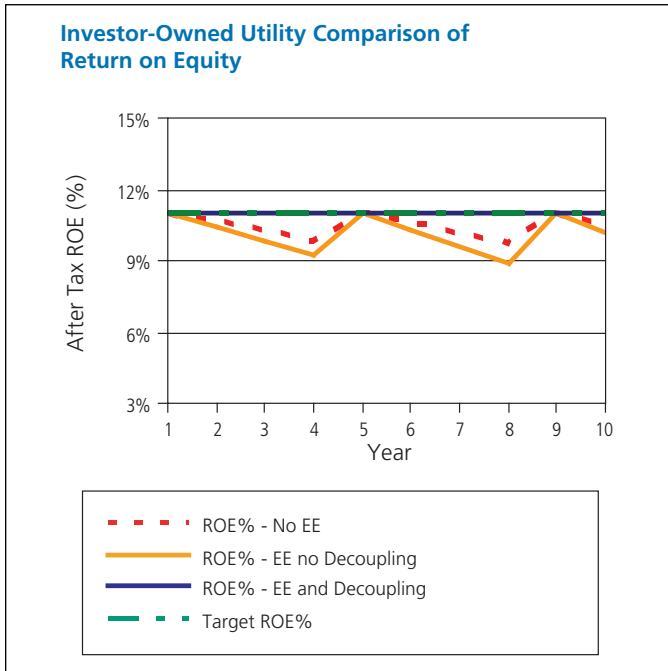
# Case 1: Low-Growth Electric and Gas Utility

## Utility Perspective

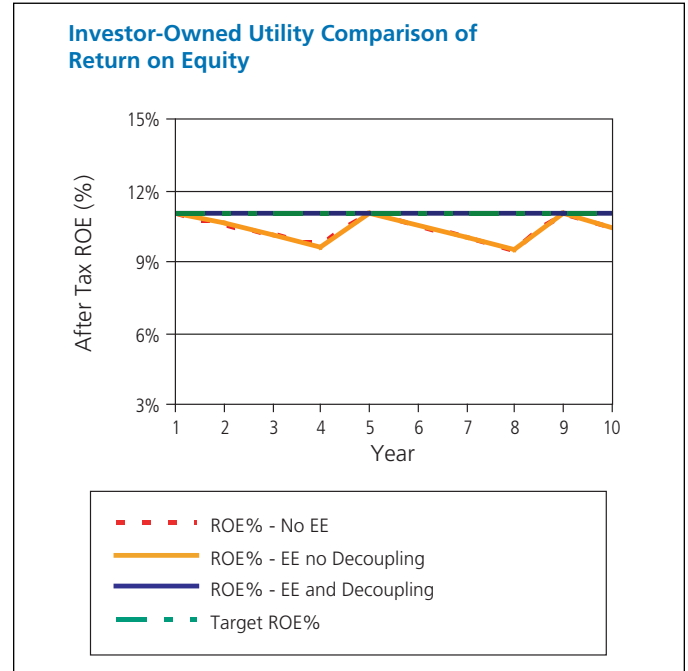
### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by return on equity (ROE), while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.

#### Electric



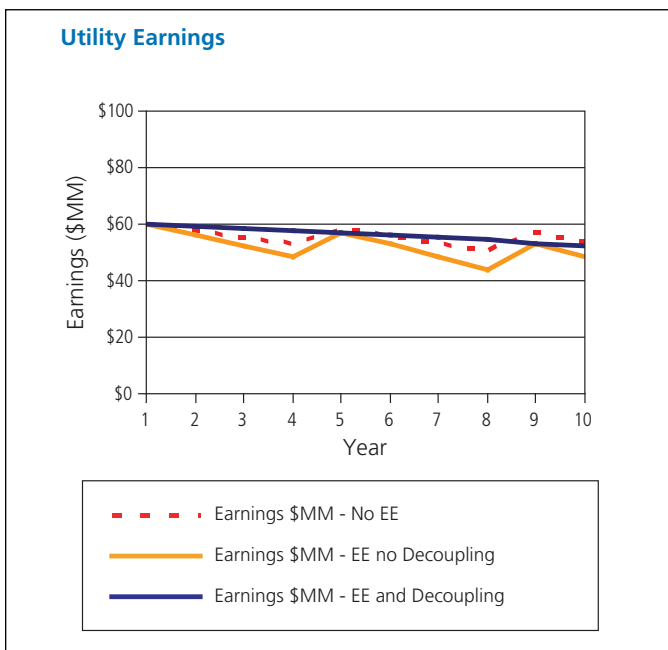
#### Gas



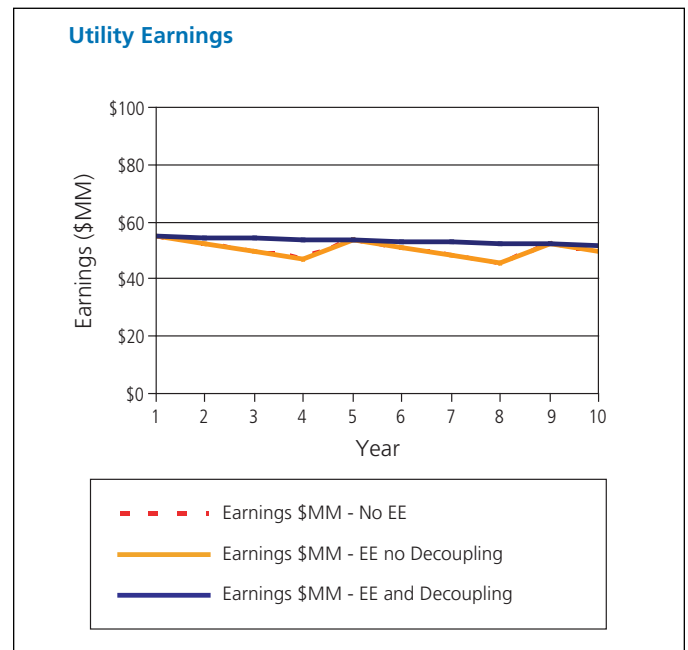
### Utility Earnings – Results Vary

Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If energy efficient (EE) reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.

#### Utility Earnings



#### Utility Earnings

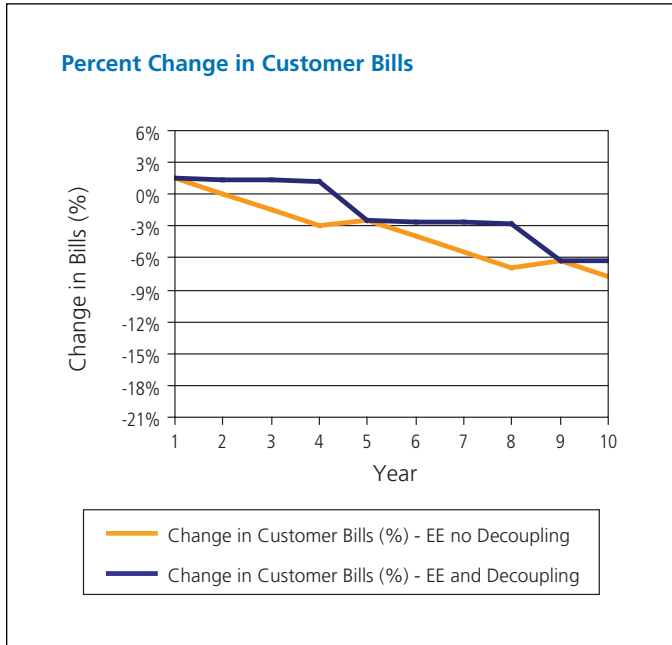


## Customer Perspective

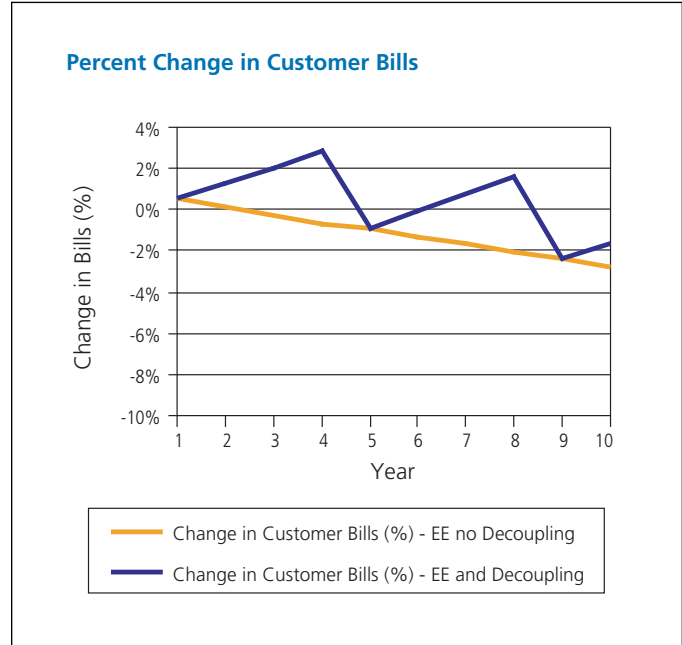
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.

#### Electric

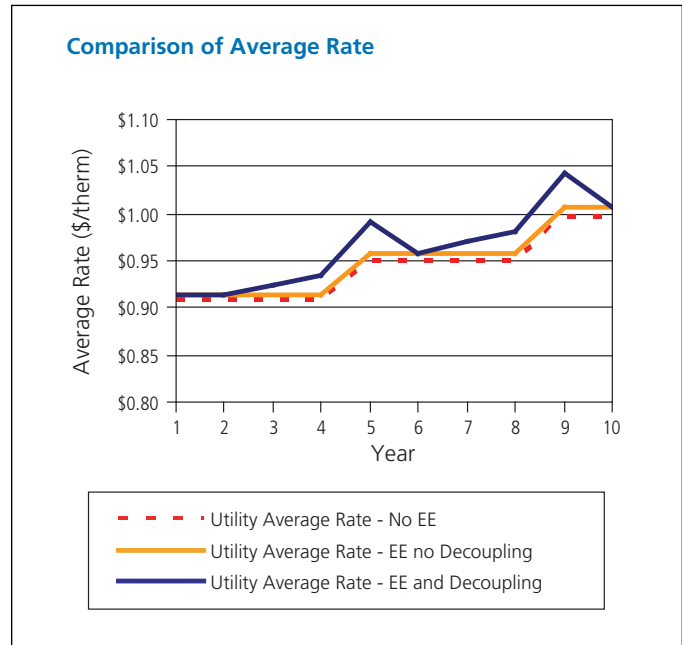
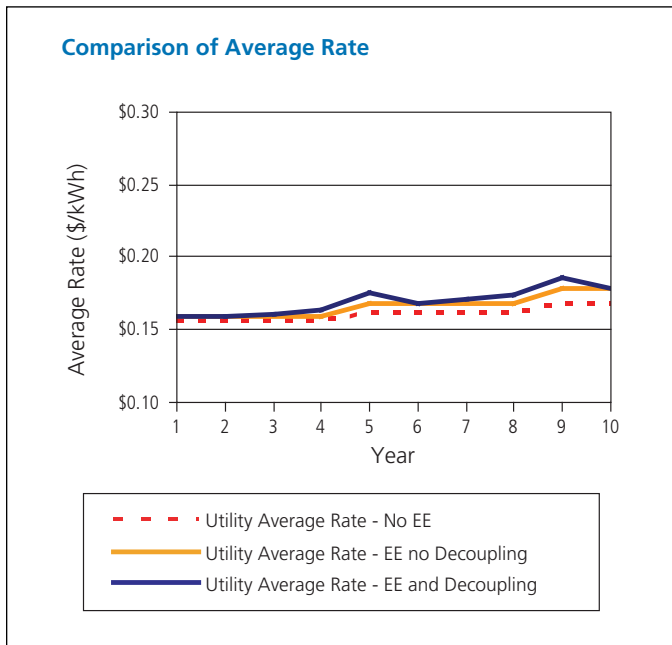


#### Gas



### Utility Rates – Mild Increase

The rates customers pay (\$/kWh, \$/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.

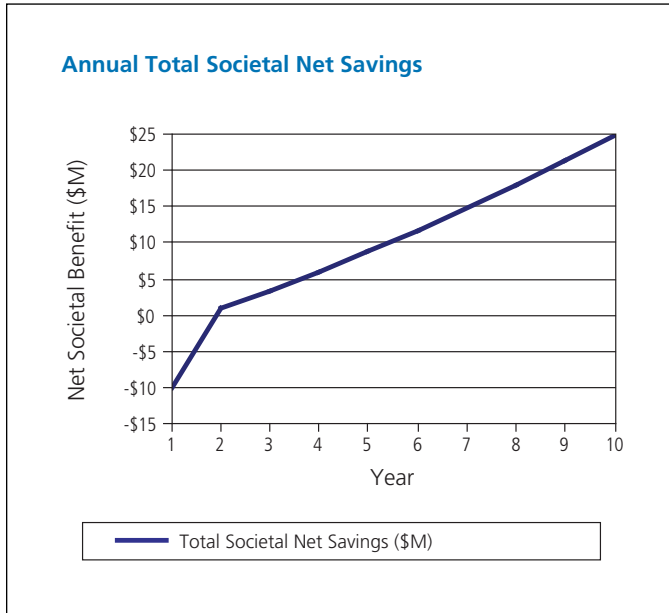


## Societal Perspective

### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.

**Electric**



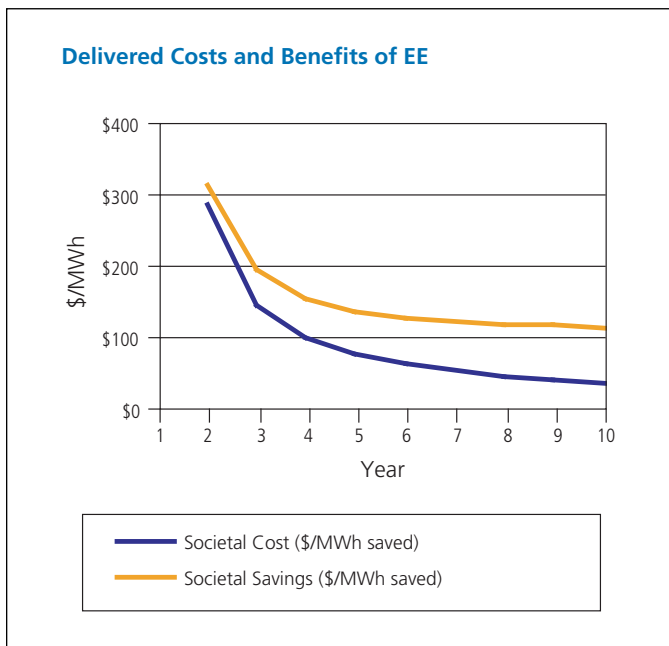
**Gas**



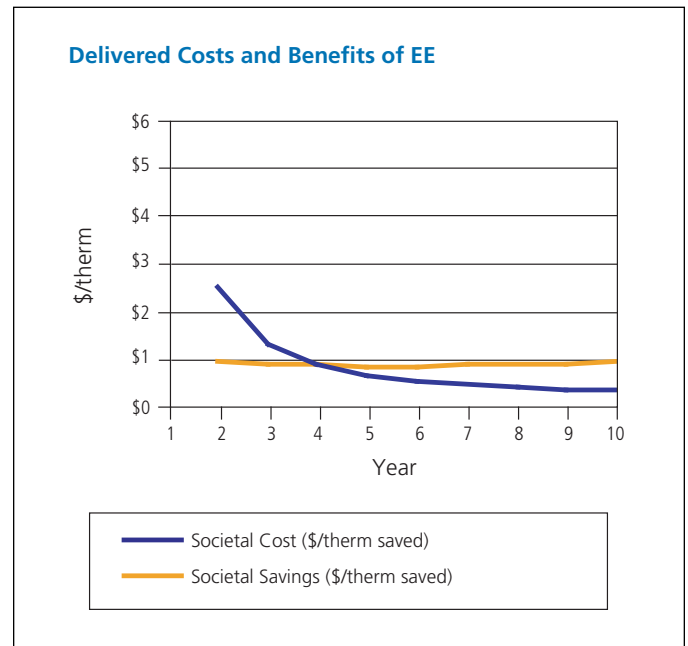
### Total Societal Cost Per Unit – Declines

Total cost of providing each unit of energy (MWh, therm) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.

**Delivered Costs and Benefits of EE**



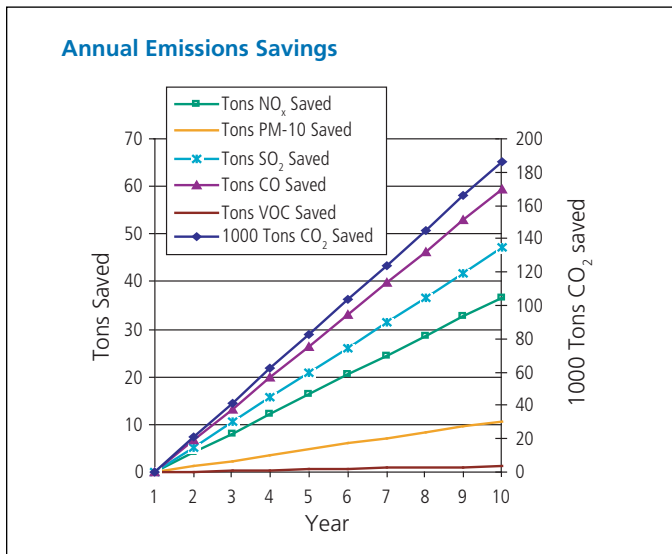
**Delivered Costs and Benefits of EE**



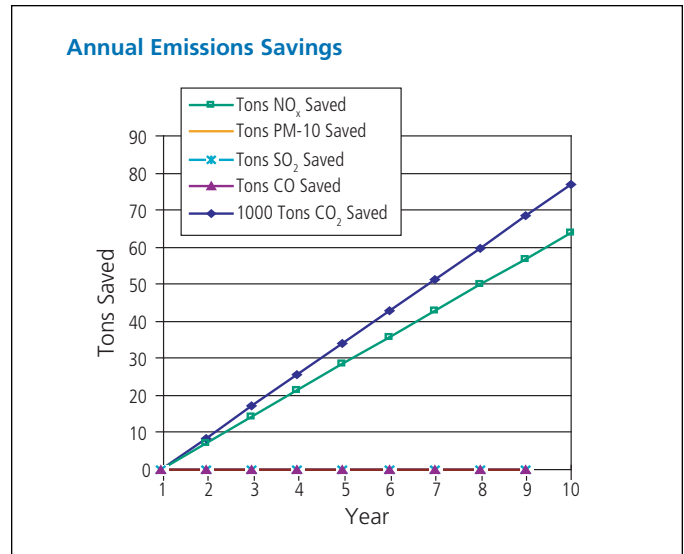
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.

**Electric**



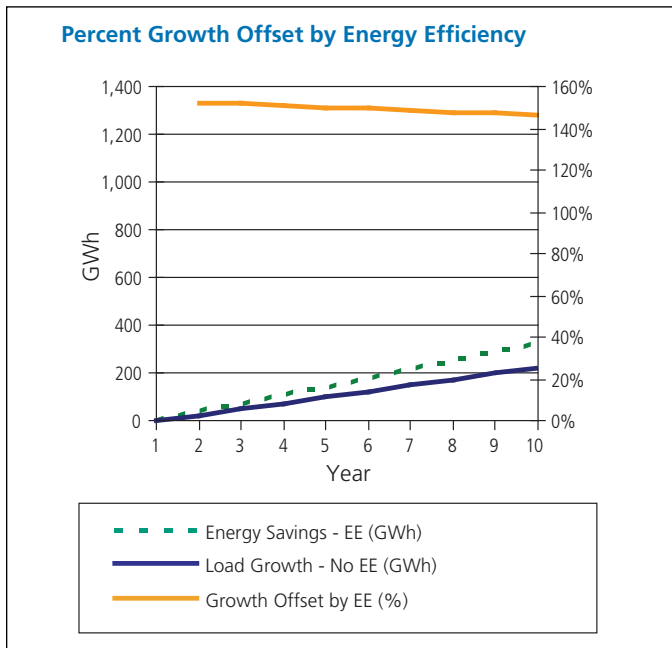
**Gas**



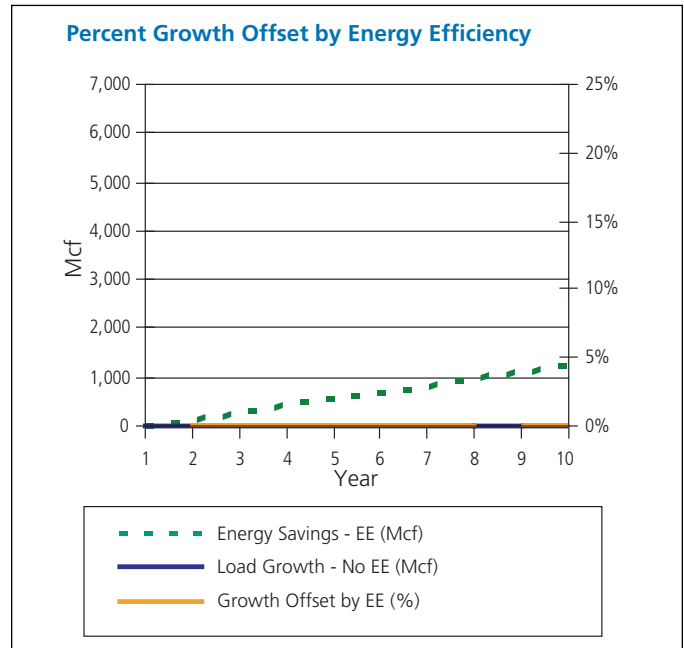
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.

**Percent Growth Offset by Energy Efficiency**



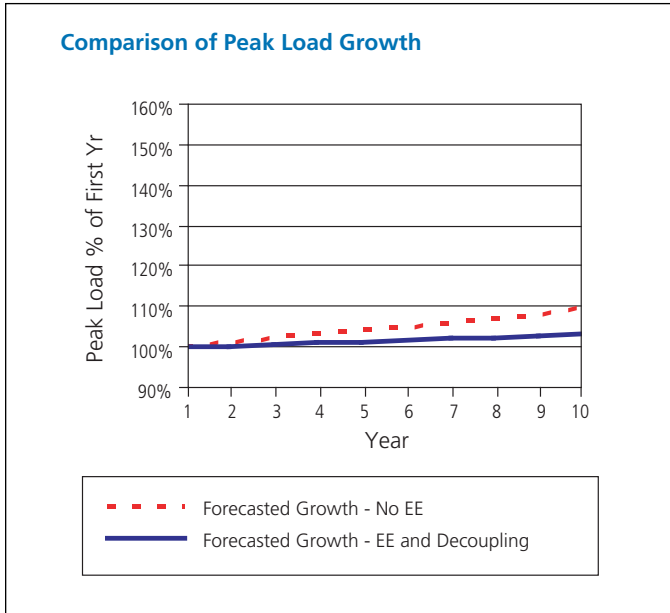
**Percent Growth Offset by Energy Efficiency**



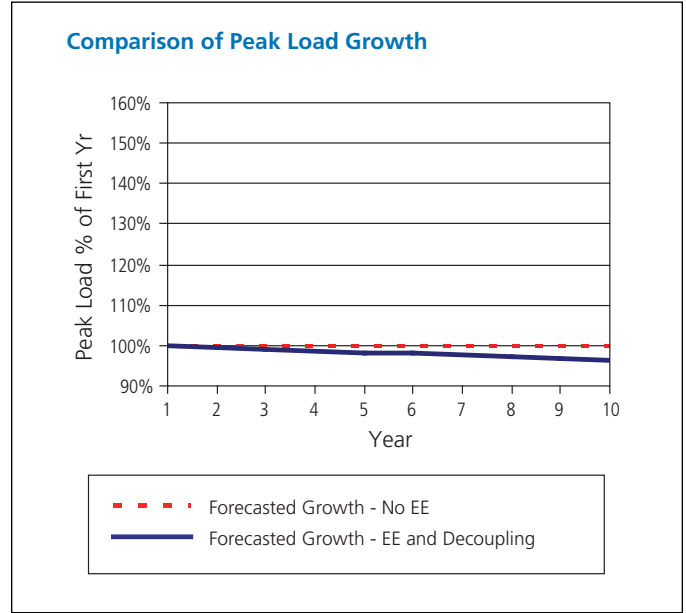
### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

#### Electric



#### Gas



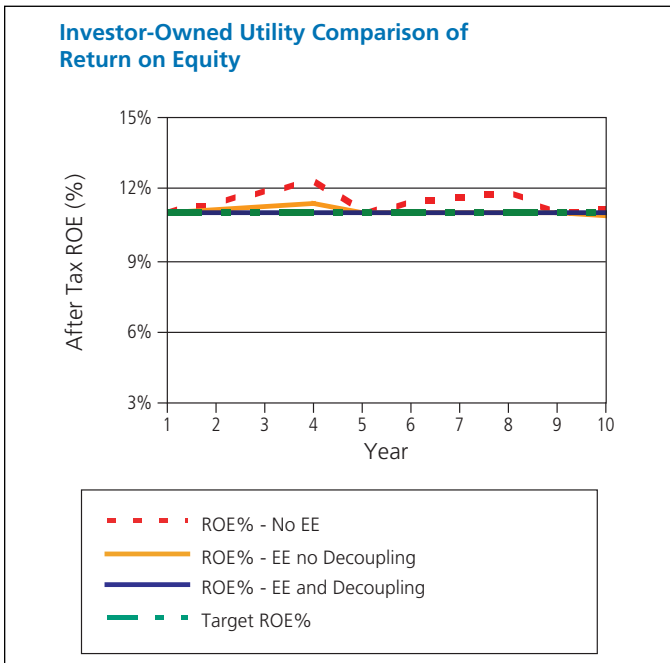
## Case 2: High-Growth Electric and Gas Utility

### Utility Perspective

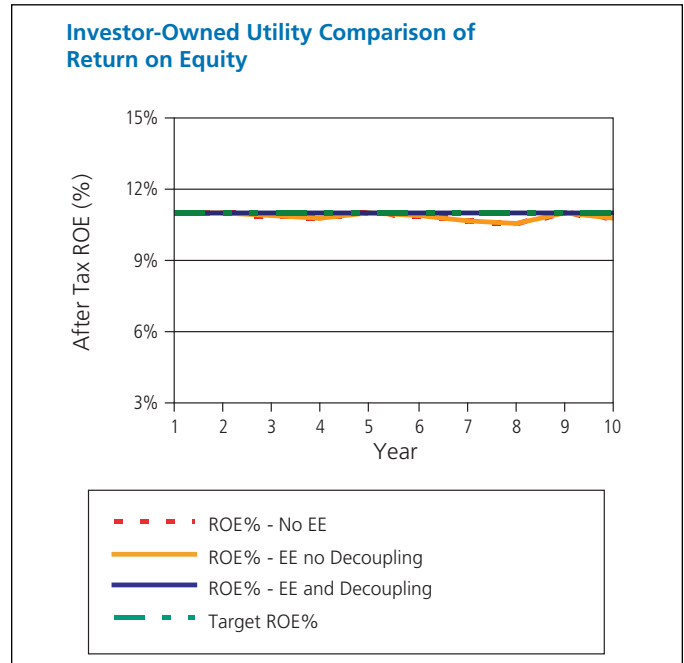
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.

#### Electric

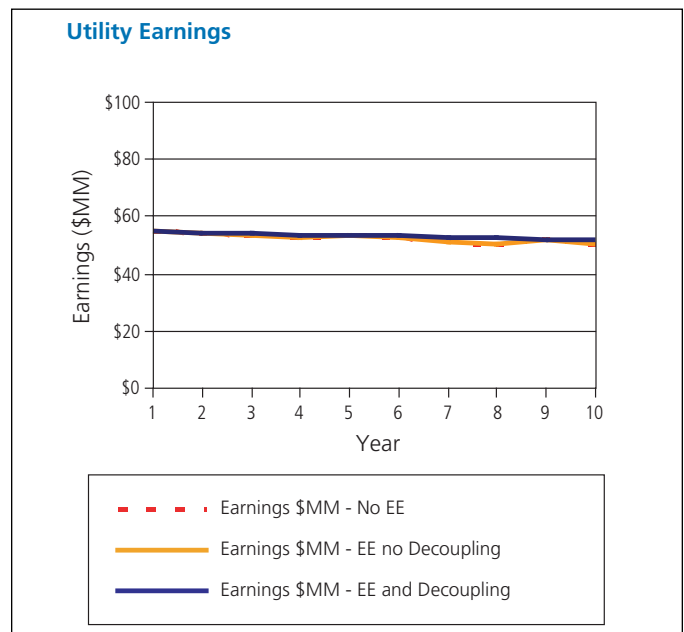
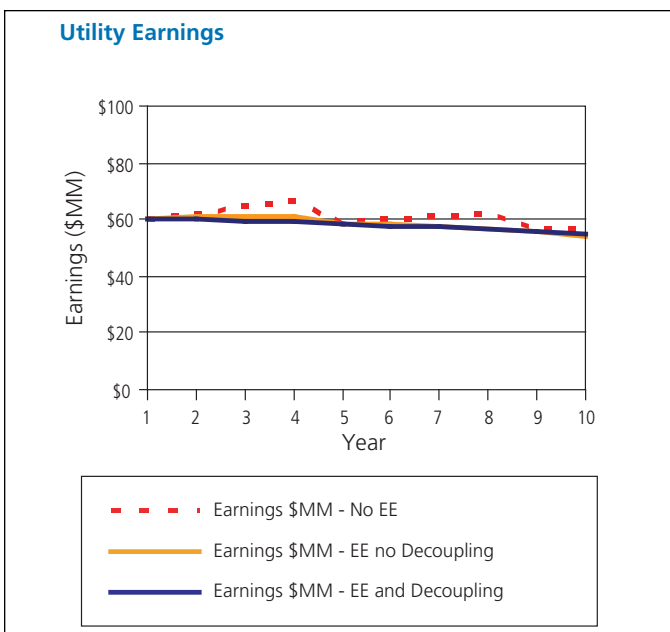


#### Gas



#### Utility Earnings – Results Vary

Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.

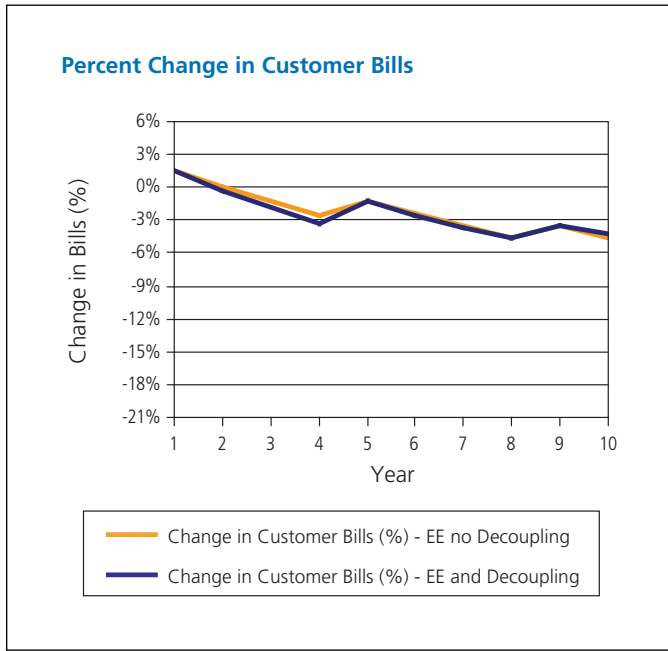


## Customer Perspective

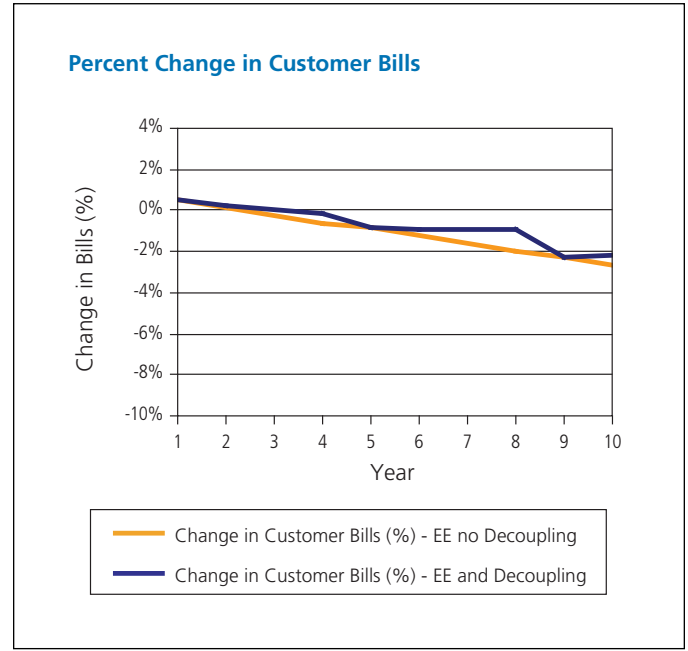
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.

#### Electric



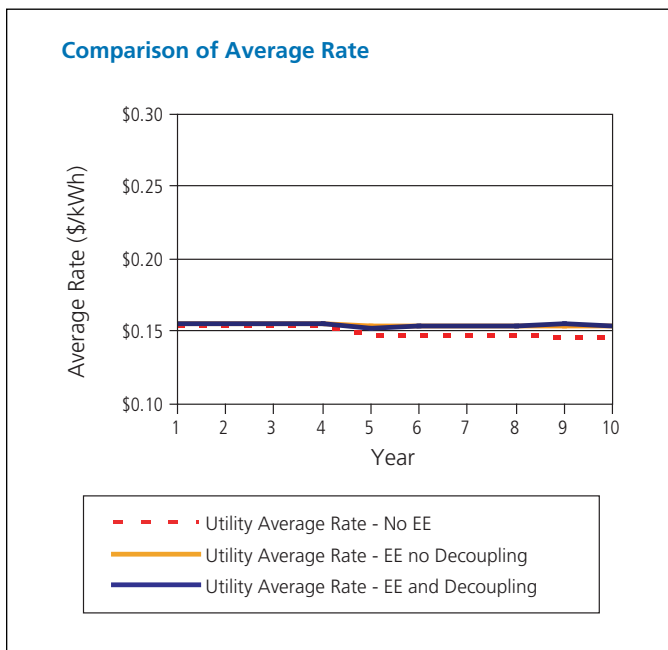
#### Gas



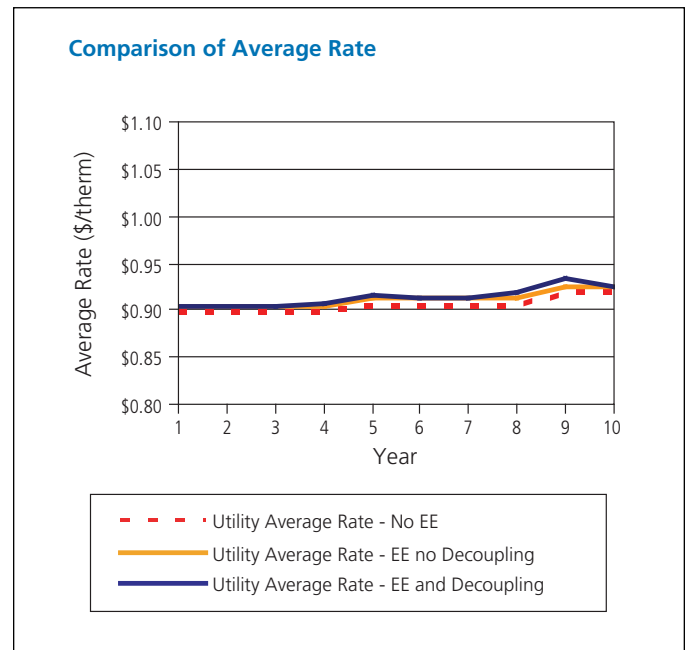
### Utility Rates – Mild Increase

The rates customers pay (\$/kWh, \$/therm) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.

#### Comparison of Average Rate



#### Comparison of Average Rate

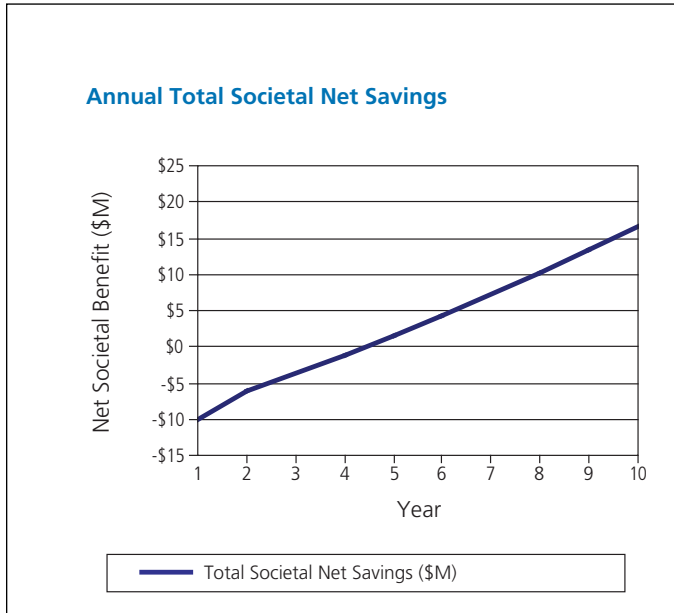


## Societal Perspective

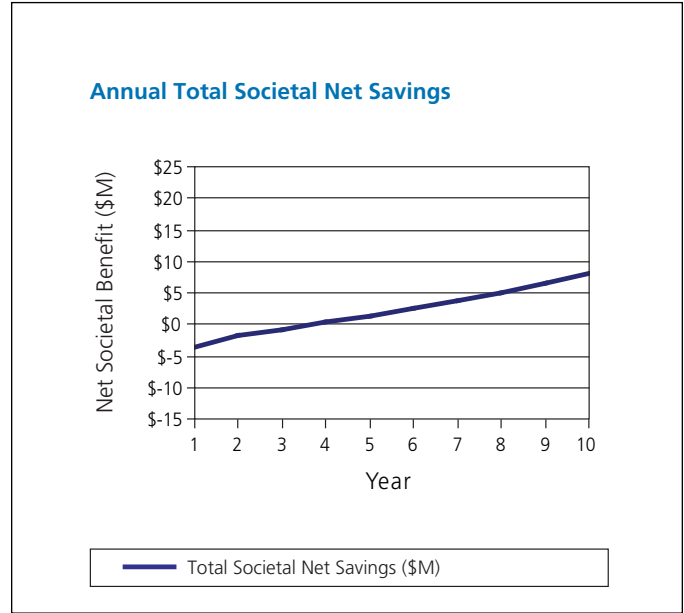
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.

**Electric**

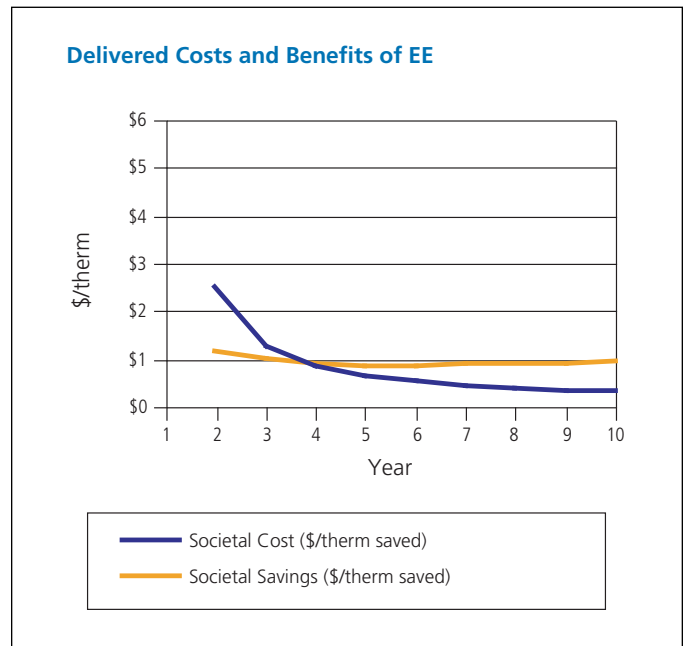
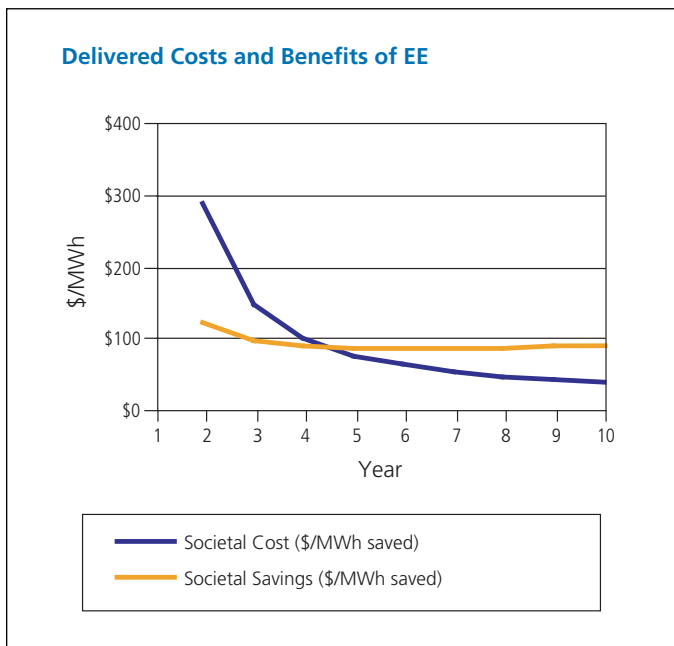


**Gas**



### Total Societal Cost Per Unit – Declines

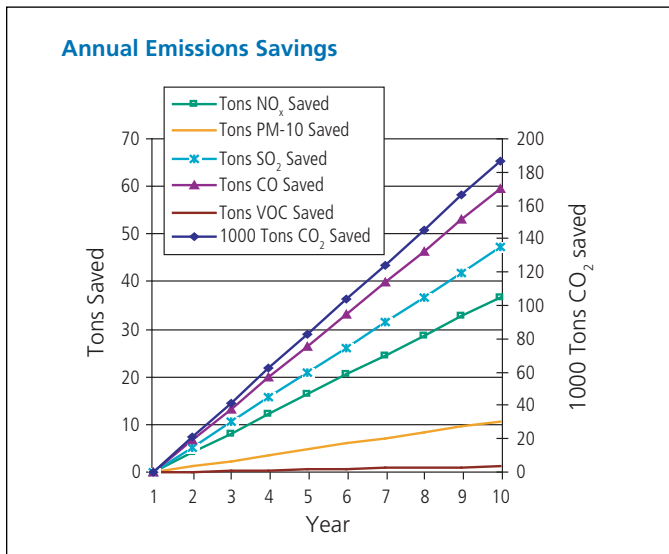
Total cost of providing each unit of energy (MWh, therm) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



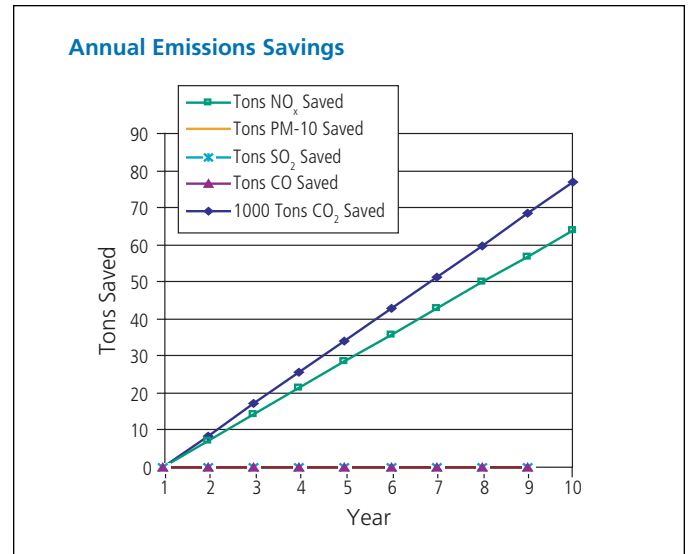
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.

**Electric**



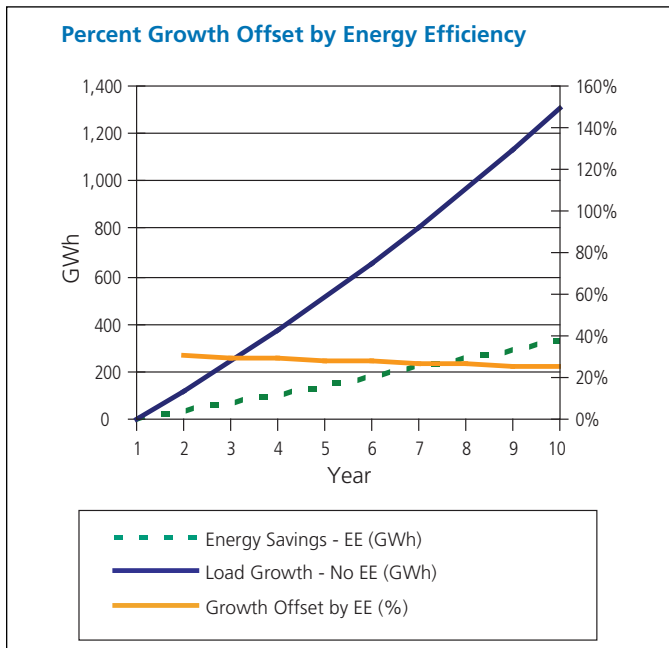
**Gas**



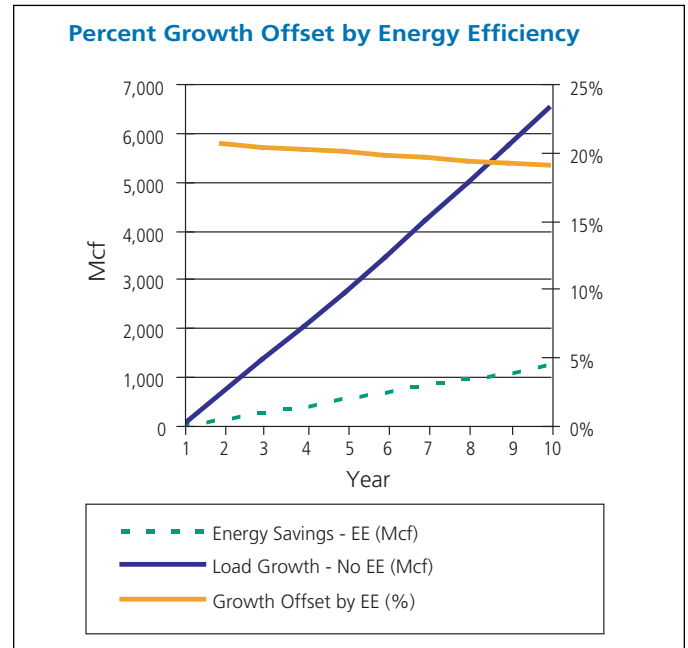
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.

**Percent Growth Offset by Energy Efficiency**



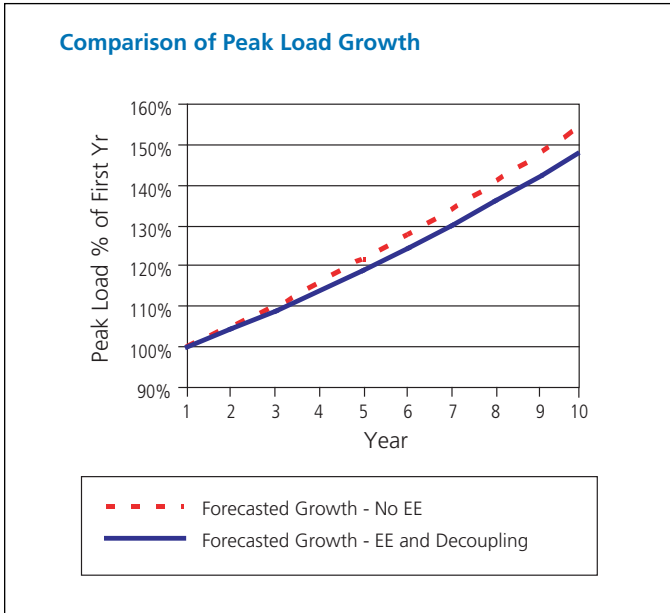
**Percent Growth Offset by Energy Efficiency**



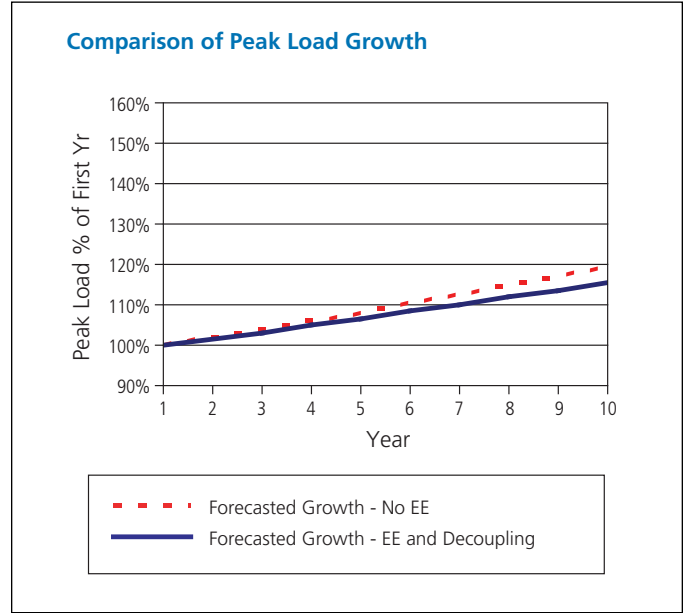
### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

#### Electric



#### Gas

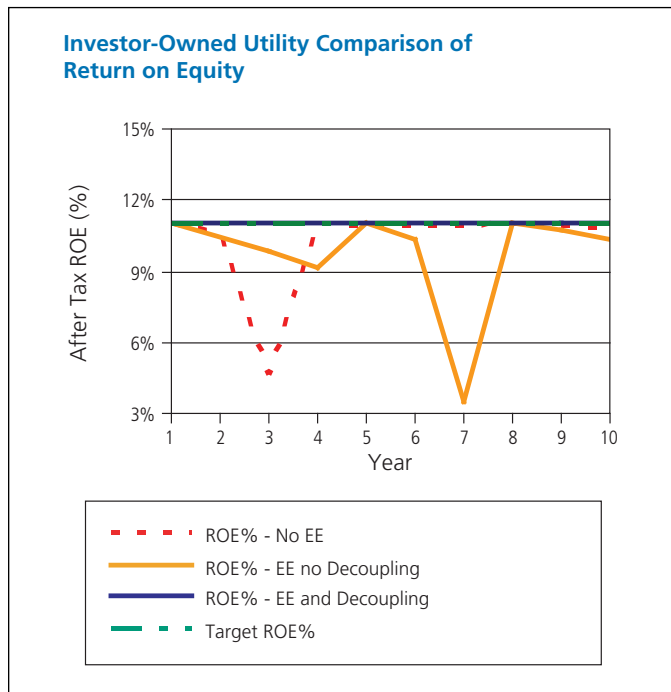


## Case 3: Low-Growth with Power Plant Deferral

### Utility Perspective

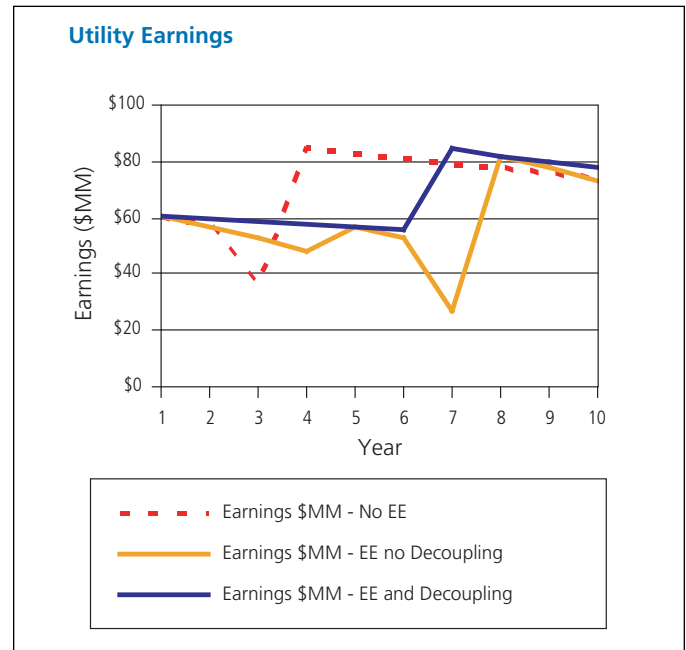
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.



#### Utility Earnings – Results Vary

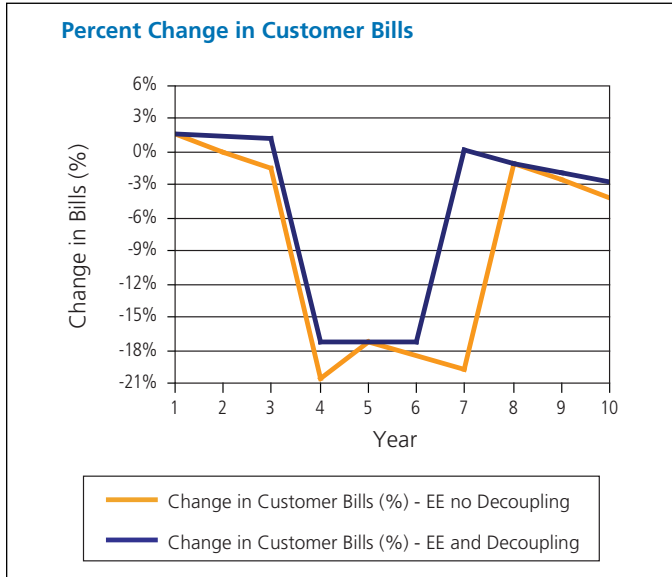
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

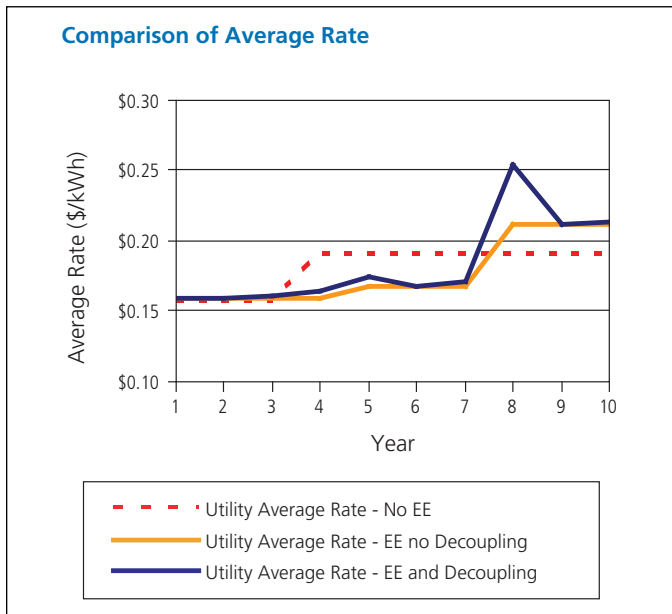
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



### Utility Rates – Mild Increase

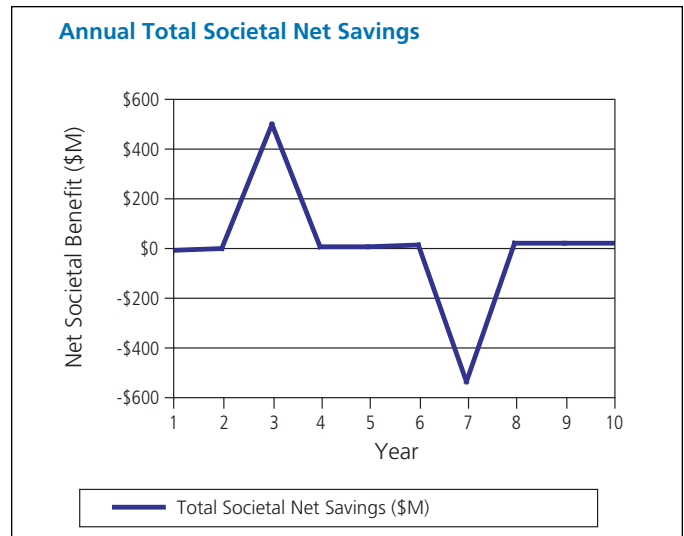
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

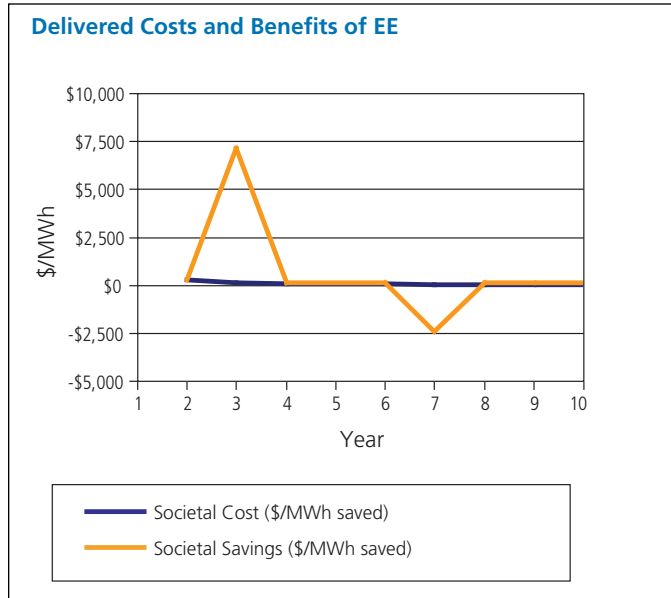
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



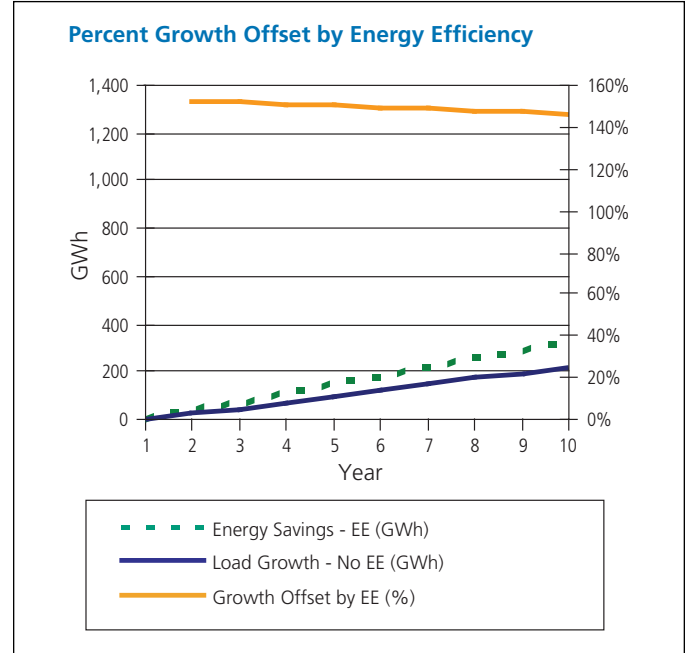
### Total Societal Cost Per Unit – Declines

Total cost of providing each unit of energy (MWh) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. Societal savings increase when an infrastructure project is delayed and then decrease when built. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE.



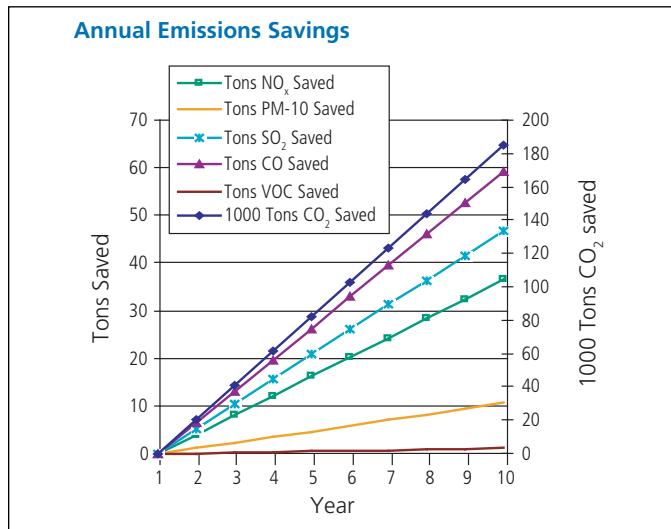
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.



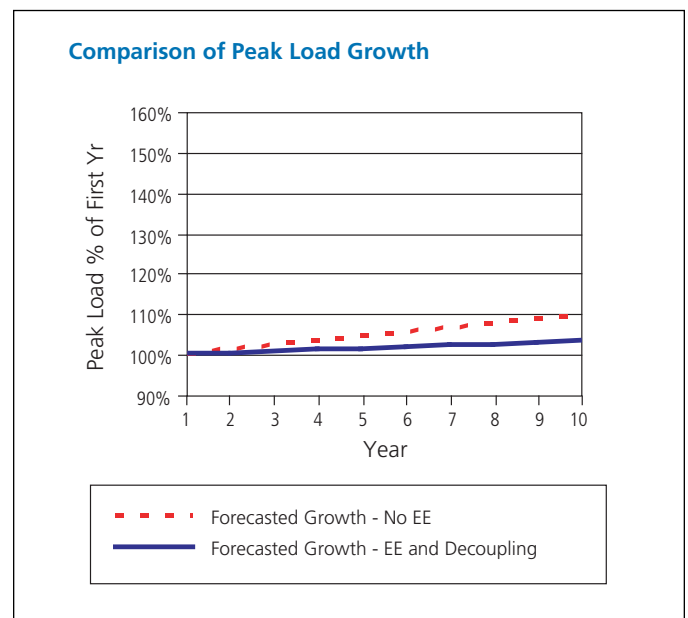
### Emissions and Cost Savings - Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

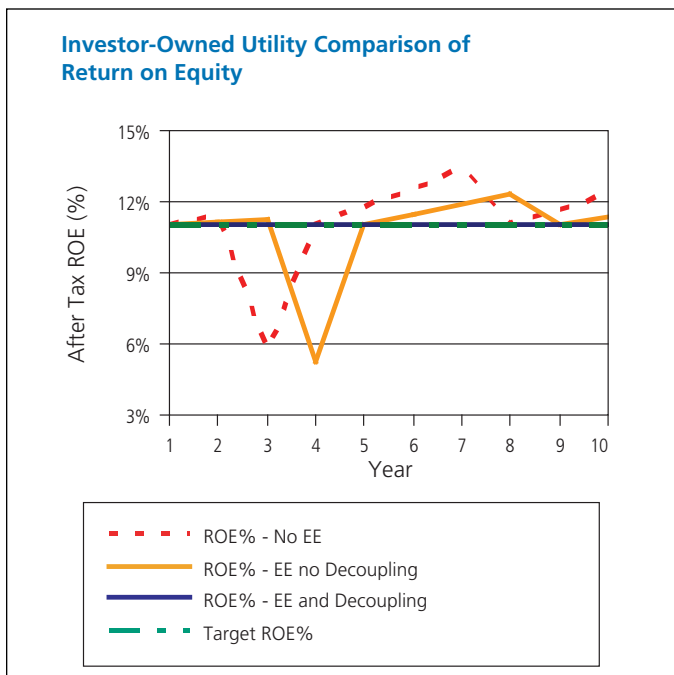


## Case 4: High-Growth With Power Plant Deferral

### Utility Perspective

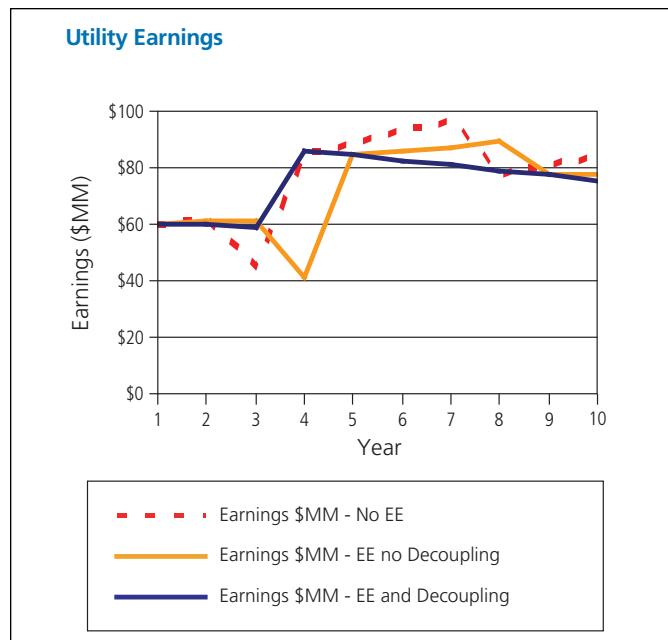
#### Utility Financial Health – Small Changes

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#### Utility Earnings – Results Vary

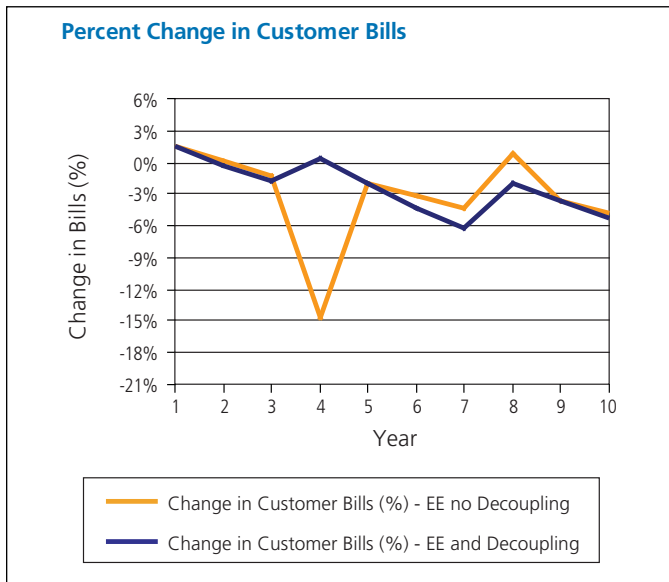
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

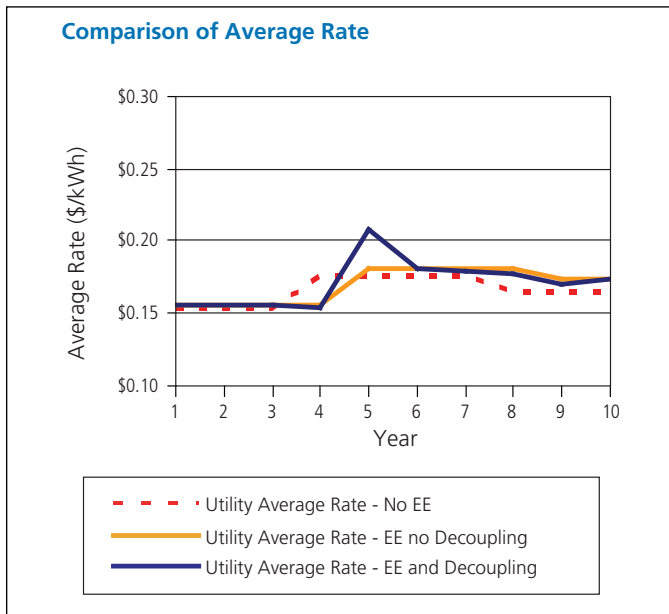
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### Utility Rates – Mild Increase

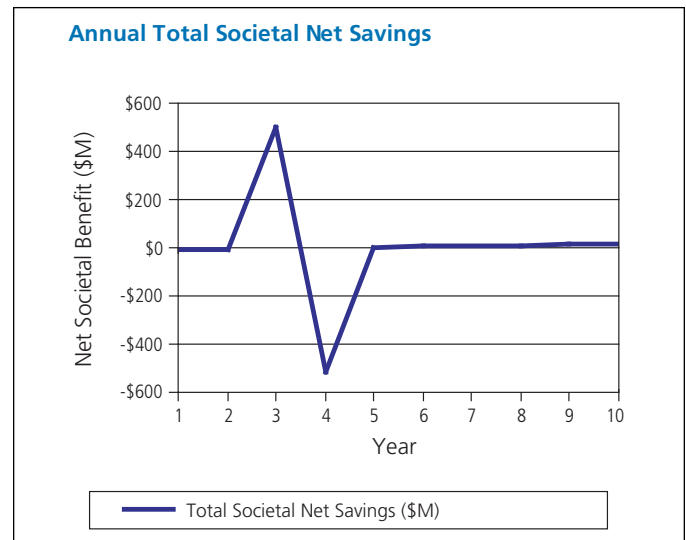
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

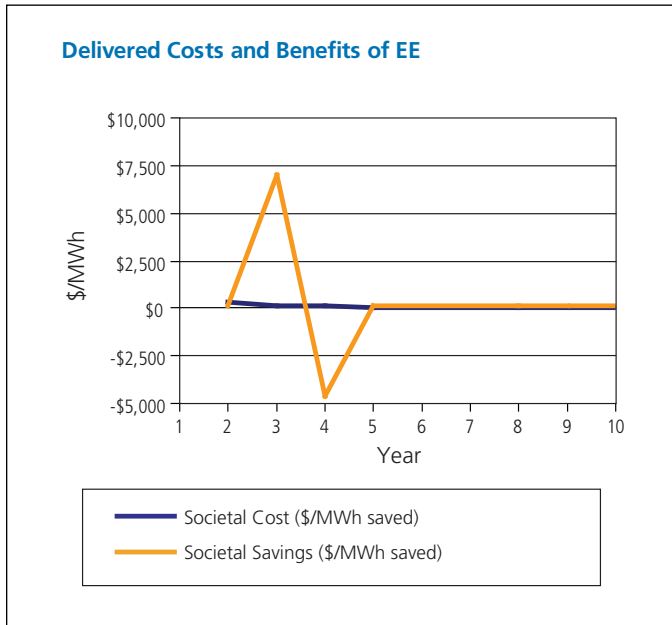
### Societal Net Savings – Increase

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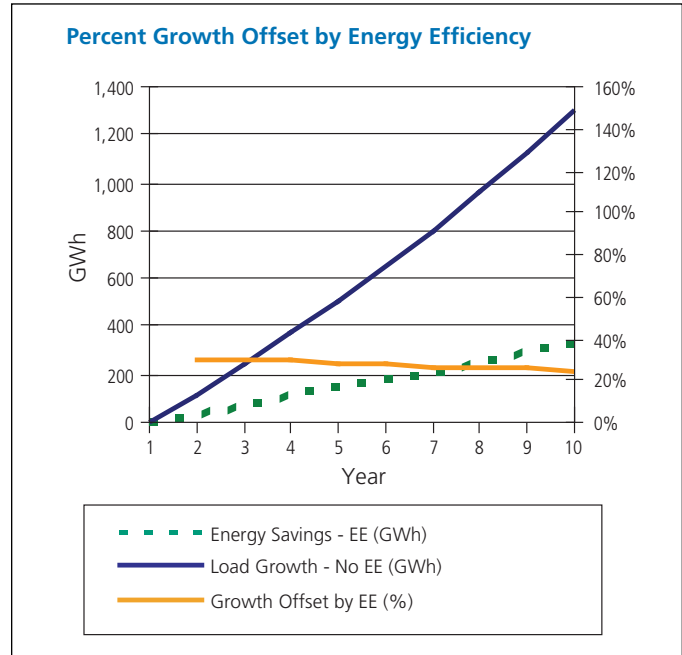
### Total Societal Cost Per Unit – Declines

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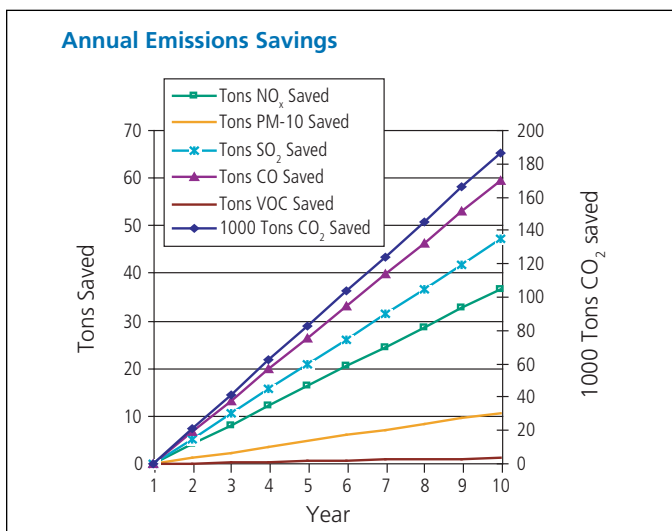
### Growth Offset by EE – Increase

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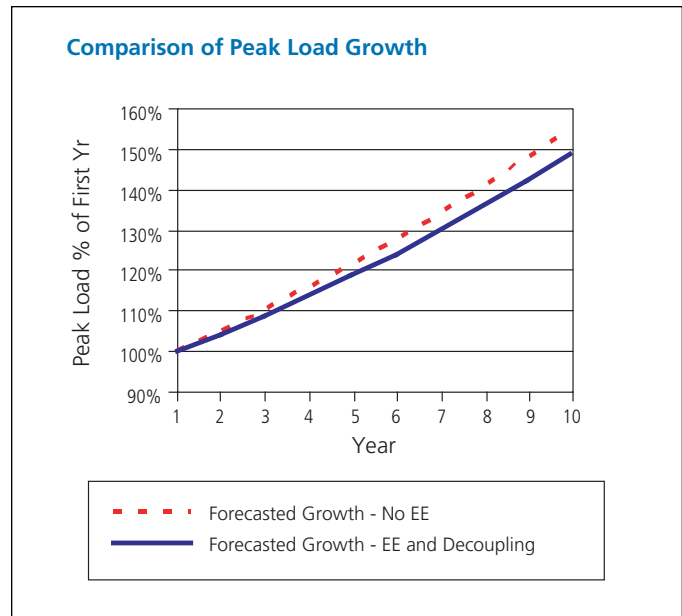
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

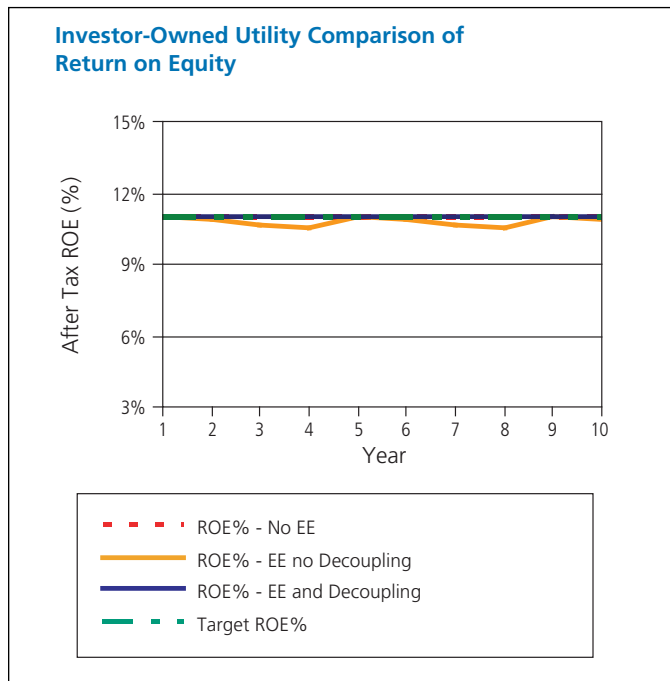


## Case 5: Vertically Integrated Utility

### Utility Perspective

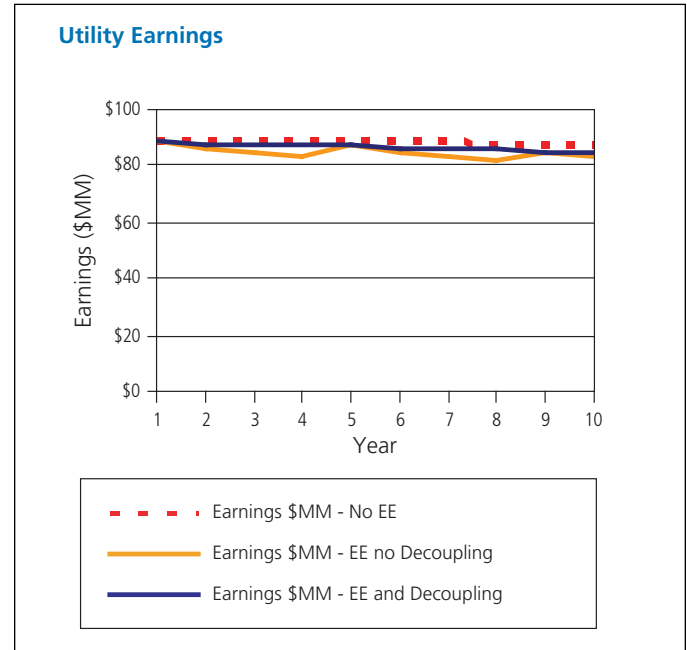
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.



#### Utility Earnings – Results Vary

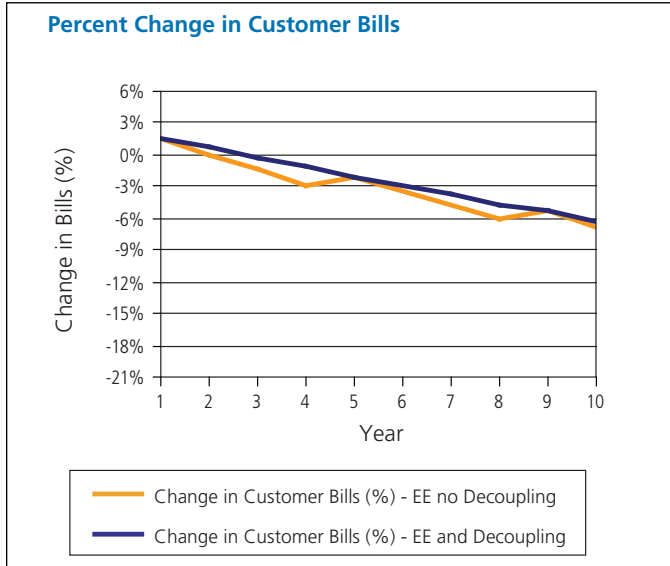
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

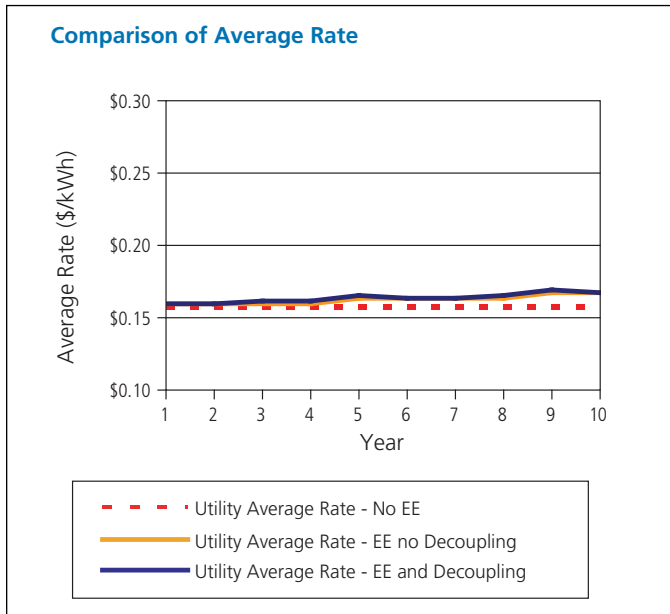
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



### Utility Rates – Mild Increase

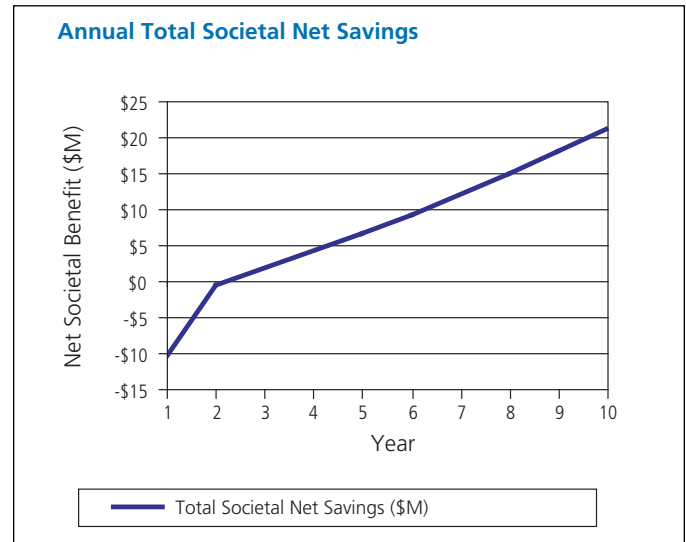
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

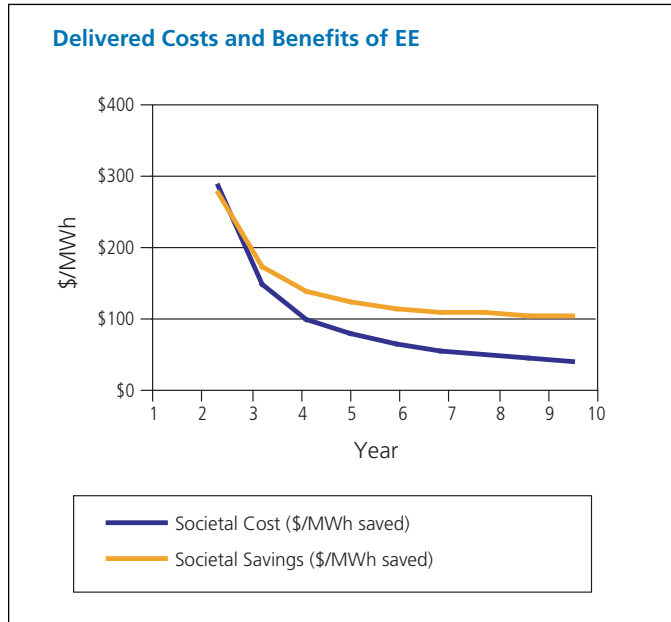
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



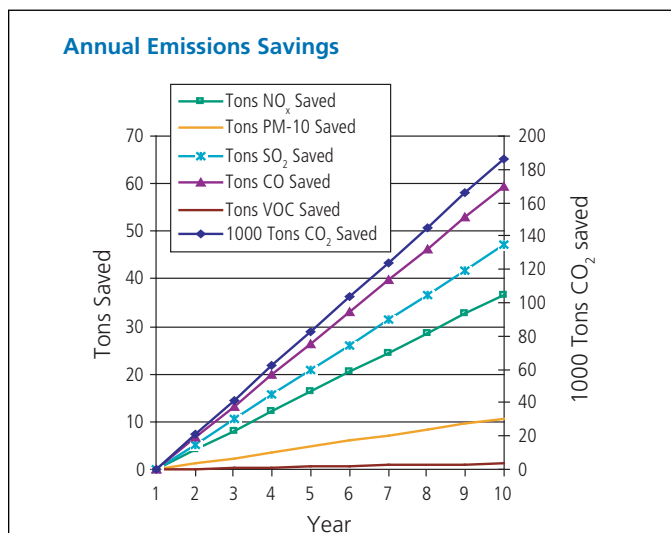
### Total Societal Cost Per Unit – Declines

Total cost of providing each unit of energy (MWh) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



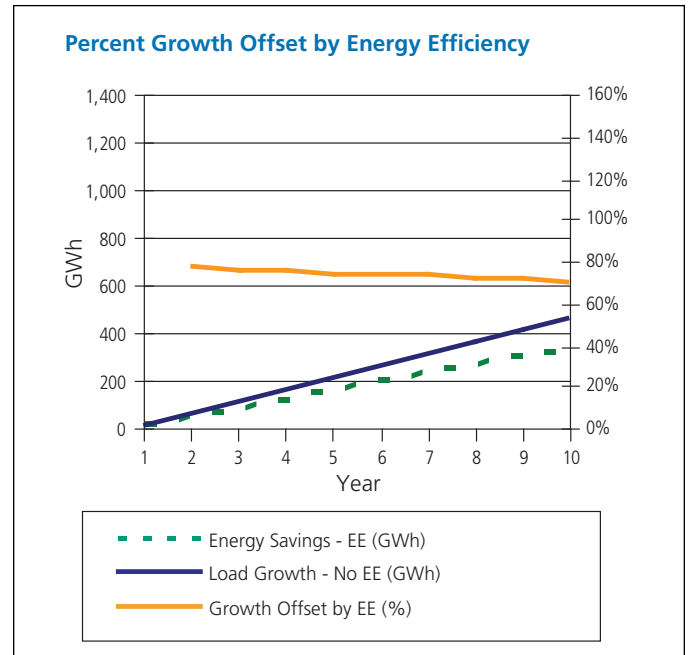
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



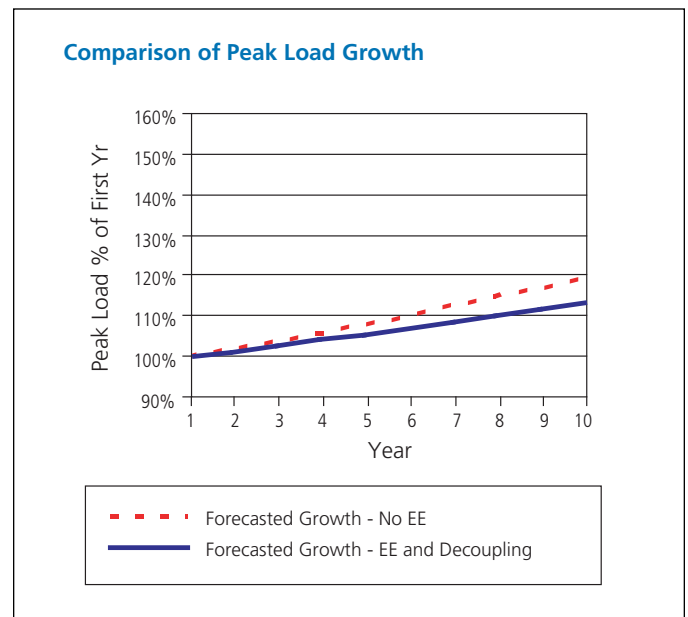
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.



### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

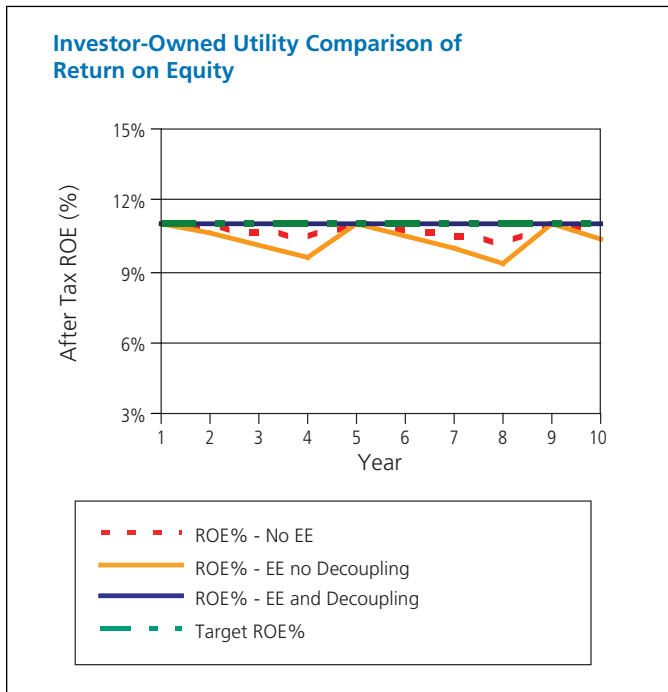


## Case 6: Restructured Delivery-Only Utility

### Utility Perspective

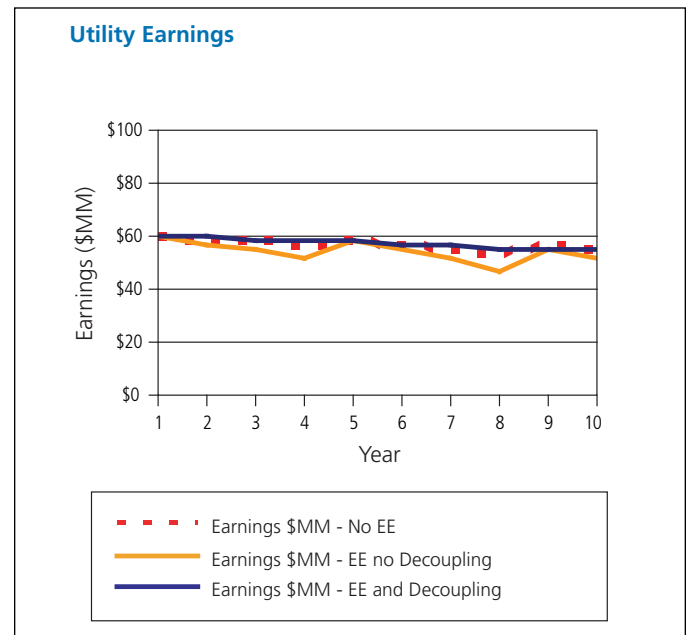
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.



#### Utility Earnings – Results Vary

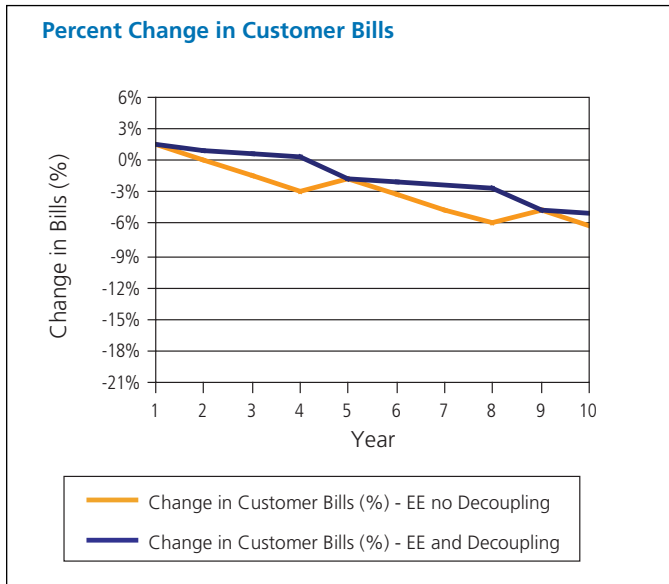
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

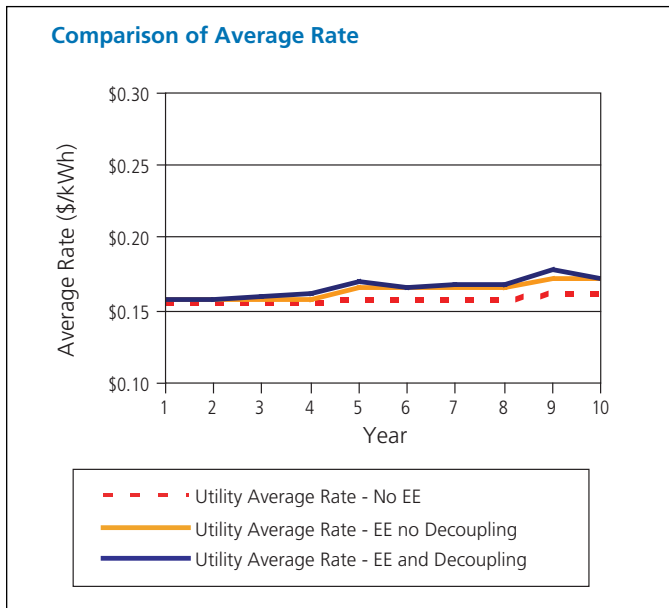
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



### Utility Rates – Mild Increase

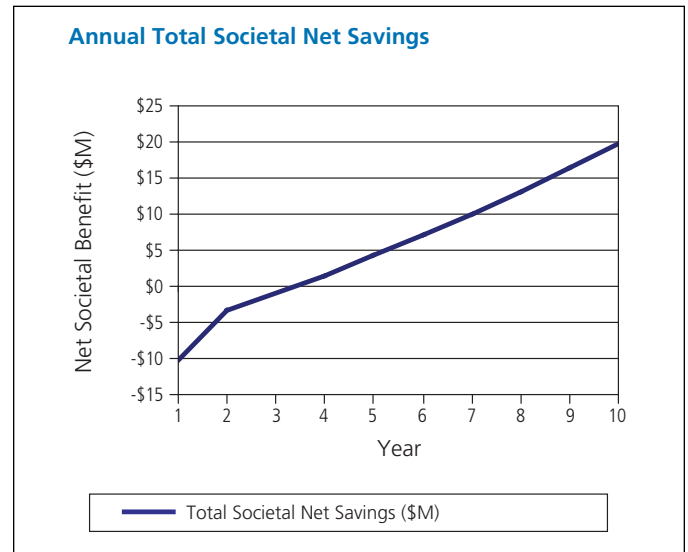
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

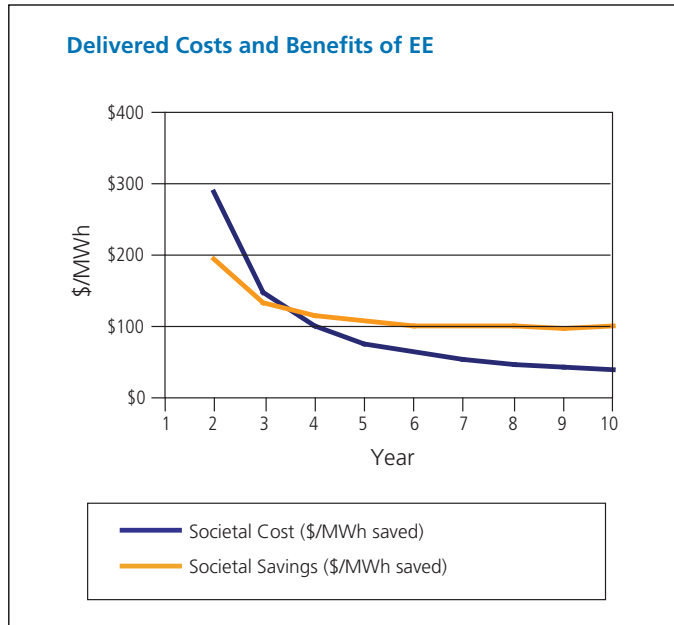
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



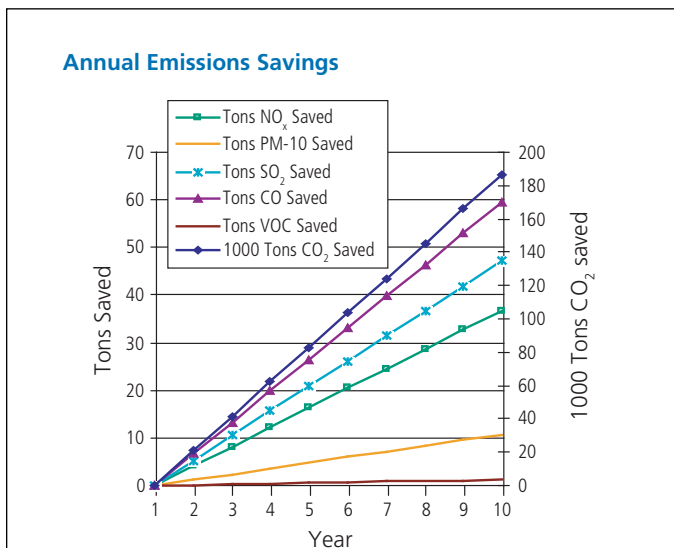
### Total Societal Cost Per Unit – Declines

Total cost of providing each unit of energy (MWh) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



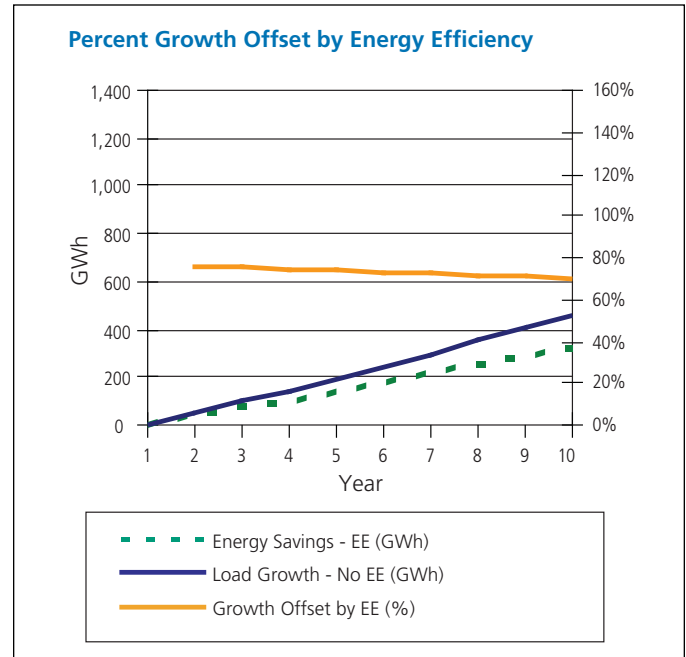
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



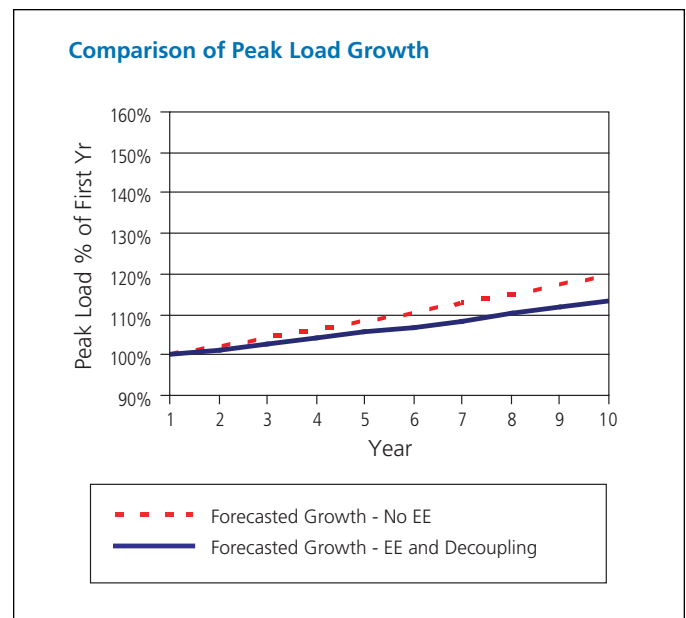
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.



### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

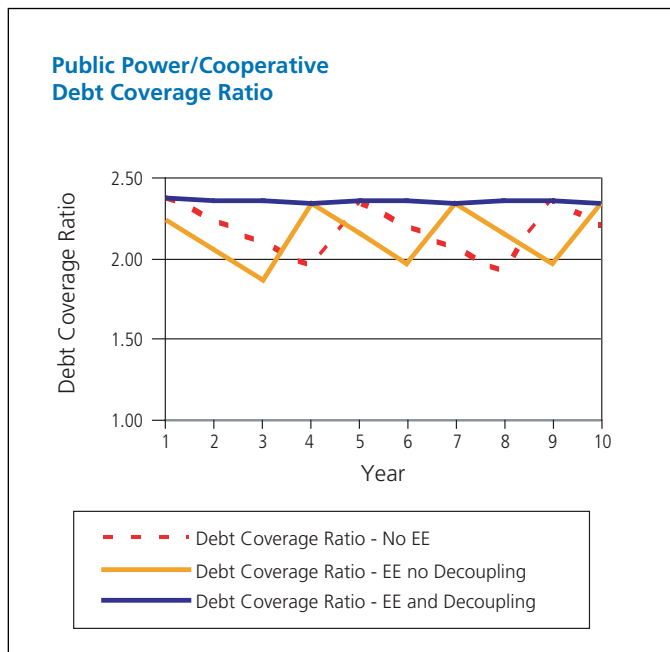


## Case 7: Electric Publicly and Cooperatively Owned Debt Coverage Ratio

### Utility Perspective

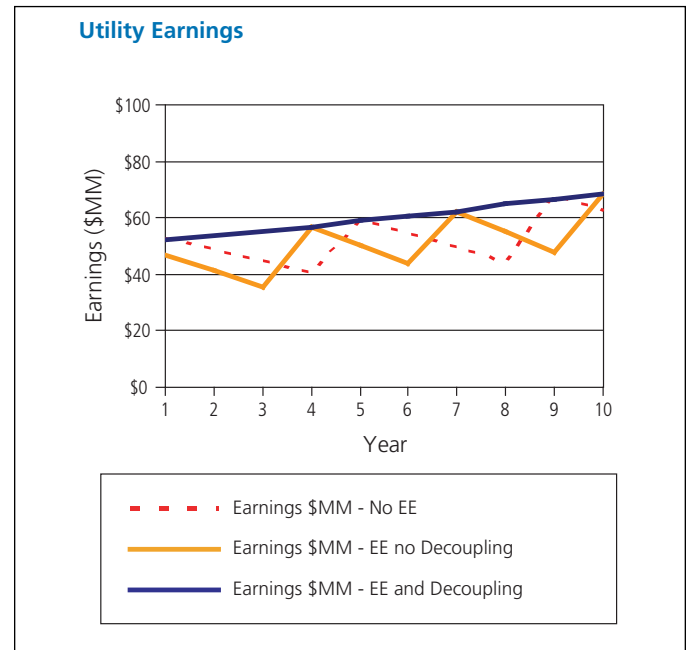
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.



#### Utility Earnings – Results Vary

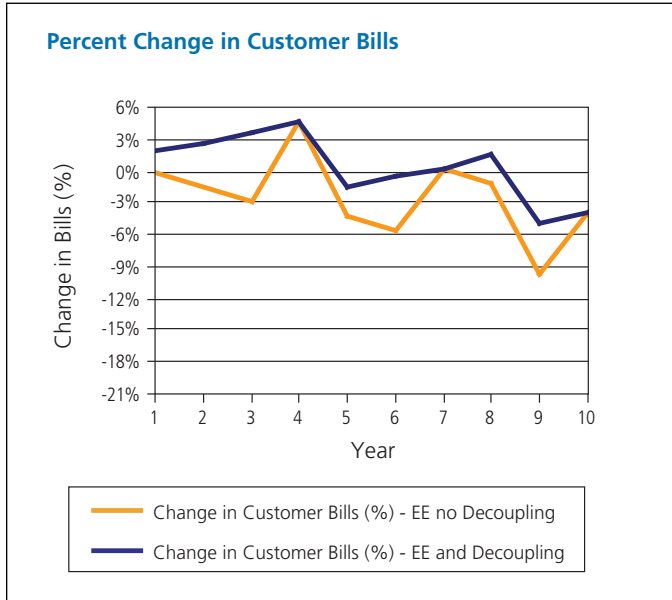
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

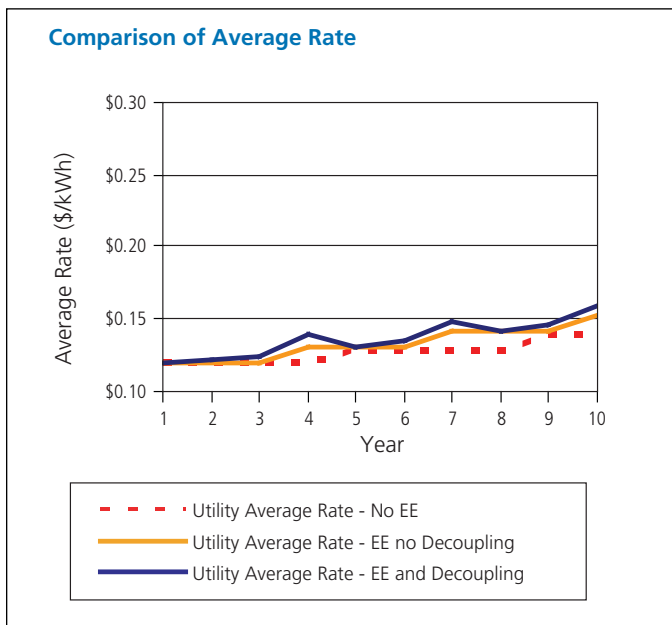
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



### Utility Rates – Mild Increase

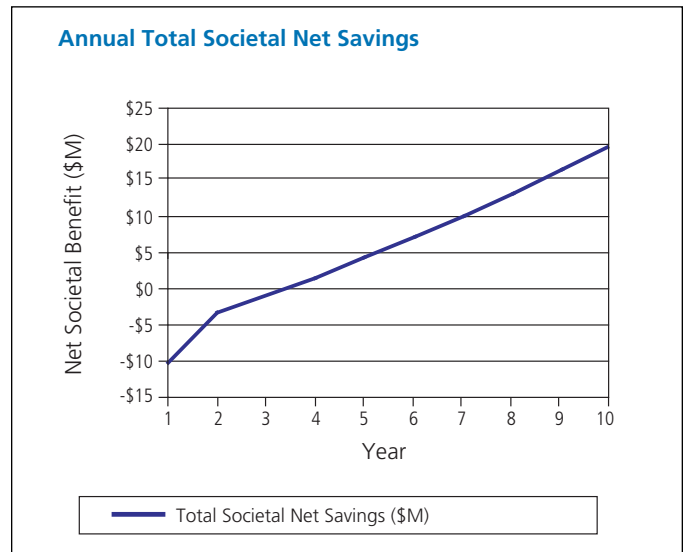
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

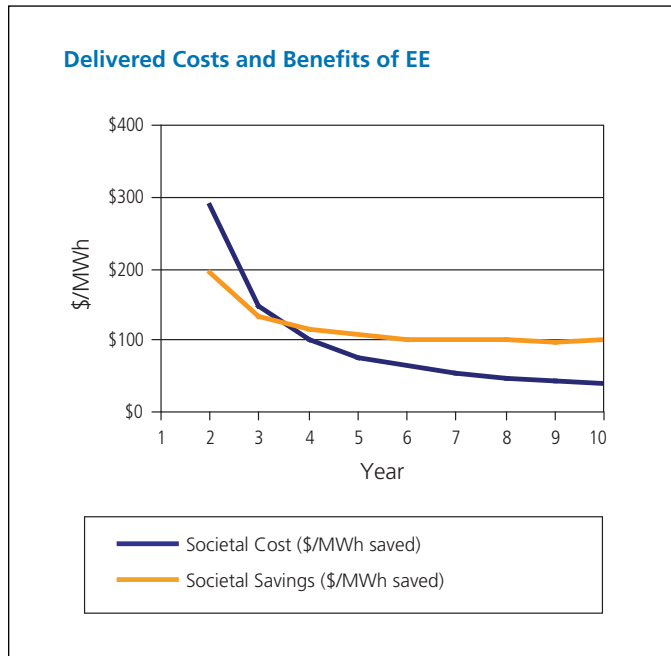
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



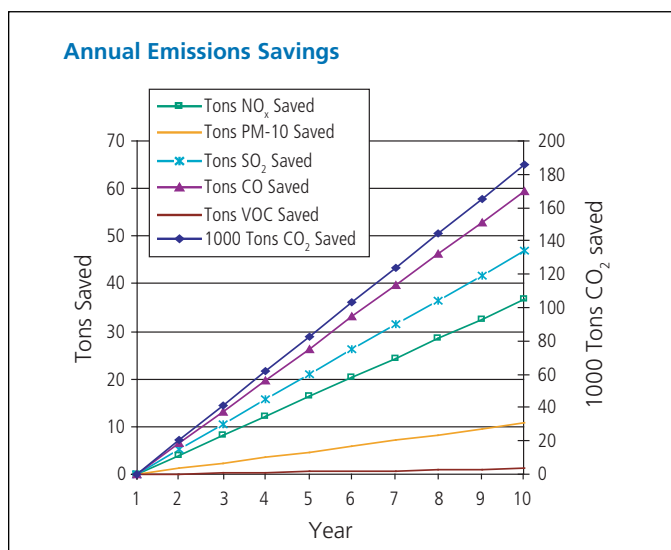
### Total Societal Cost Per Unit – Declines

Total cost of providing each unit of energy (MWh) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



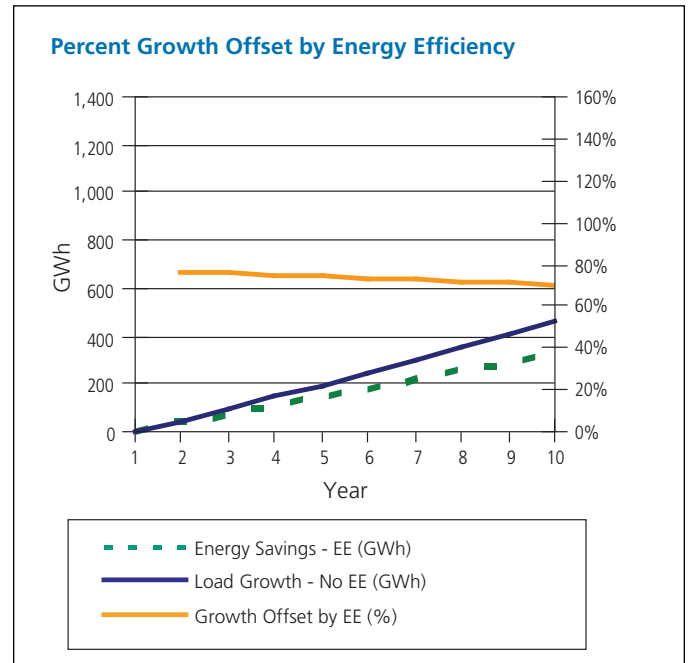
### Emissions and Cost Savings – Increase

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



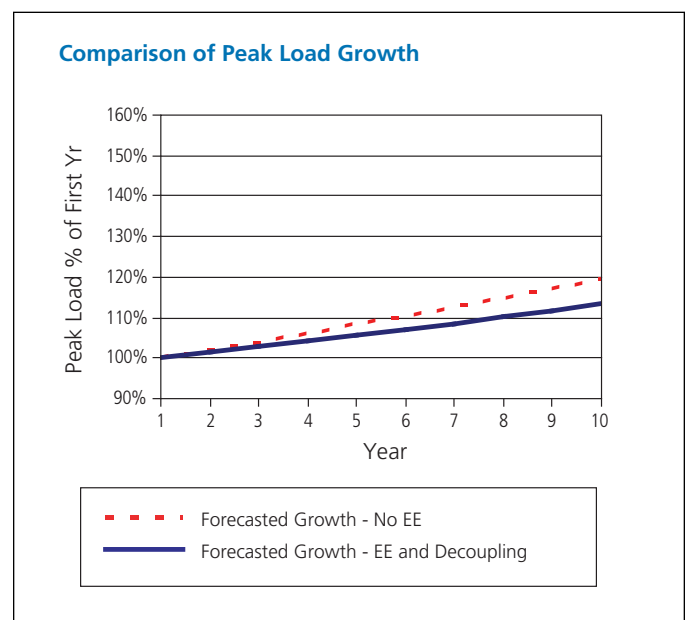
### Growth Offset by EE – Increase

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.



### Peak Load Growth – Decrease

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

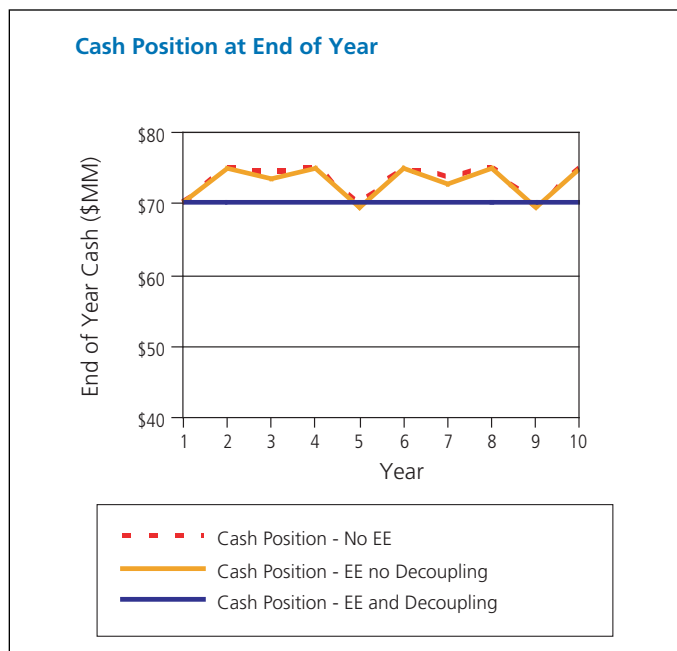


## Case 8: Electric Publicly and Cooperatively Owned Cash Position

### Utility Perspective

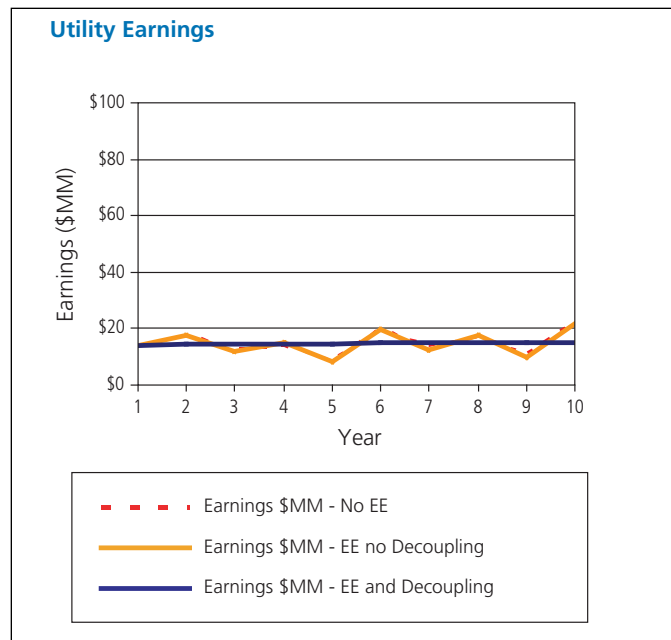
#### Utility Financial Health – Small Changes

The change in utility financial health depends on whether or not there are decoupling mechanisms in place, if there are shareholder incentives in place (for investor-owned utilities), the frequency of rate adjustments, and other factors. Depending on the type of utility, the measure of financial health changes. Investor-owned utility health is measured by ROE, while publicly or cooperatively owned utility health is measured by cash position or debt coverage ratio.



#### Utility Earnings – Results Vary

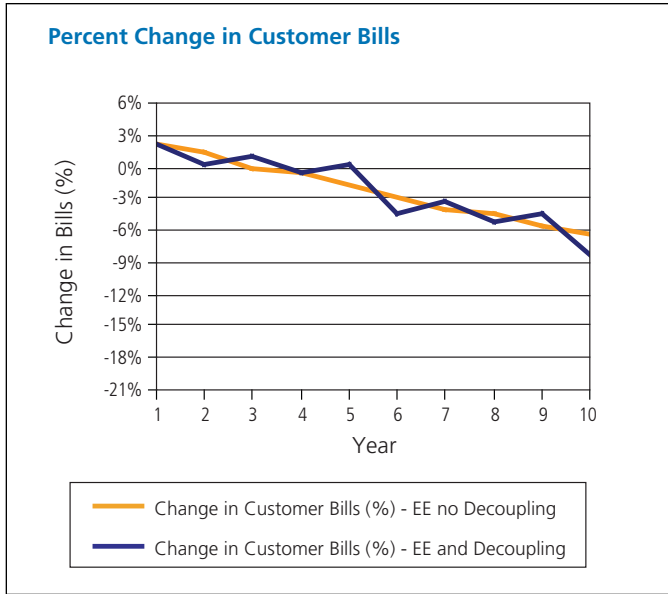
Utility earnings depend on growth rate, capital investment, frequency of rate adjustments, and other factors. If EE reduces capital investment, the earnings will be lower in the EE case, unless shareholder incentives for EE are introduced. However, utility return (ROE or earnings per share) may not be affected.



## Customer Perspective

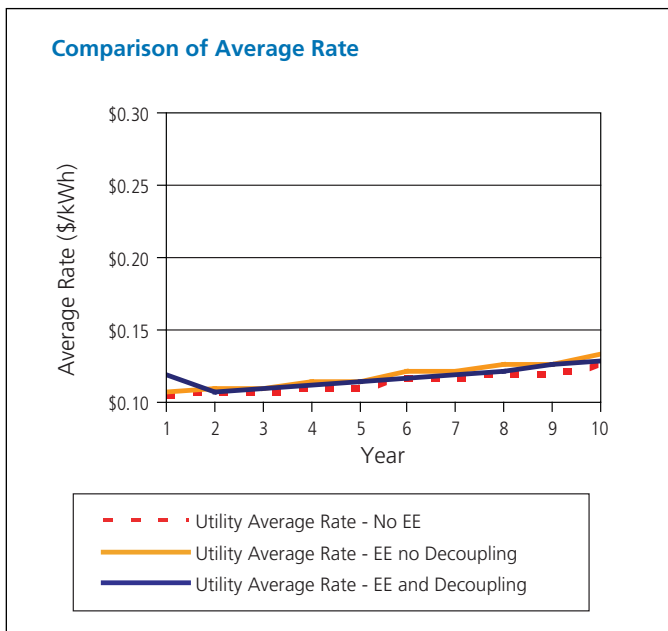
### Customer Bills – Decrease

In the first year, customer utility bills increase because the cost of the EE program has not yet produced savings. Total customer bills decline over time, usually within the first three years, indicating customer savings resulting from lower energy consumption.



### Utility Rates – Mild Increase

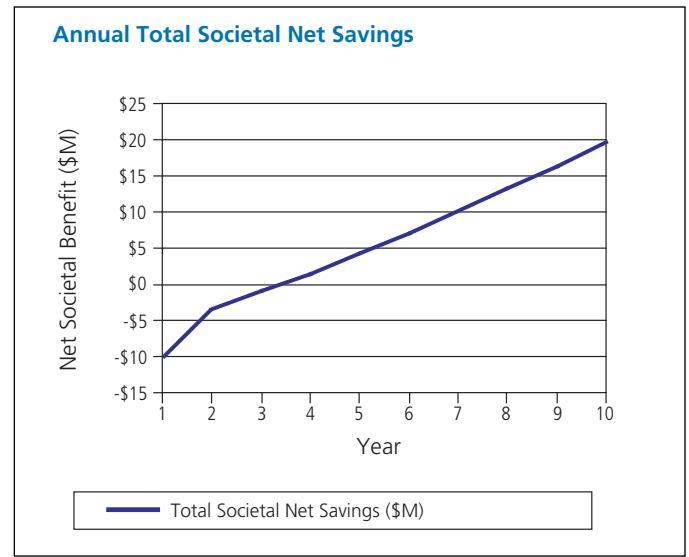
The rates customers pay (\$/kWh) increase when avoided costs are less than retail rates, which is typically the case for most EE programs. Rates increase because revenue requirements increase more quickly than sales.



## Societal Perspective

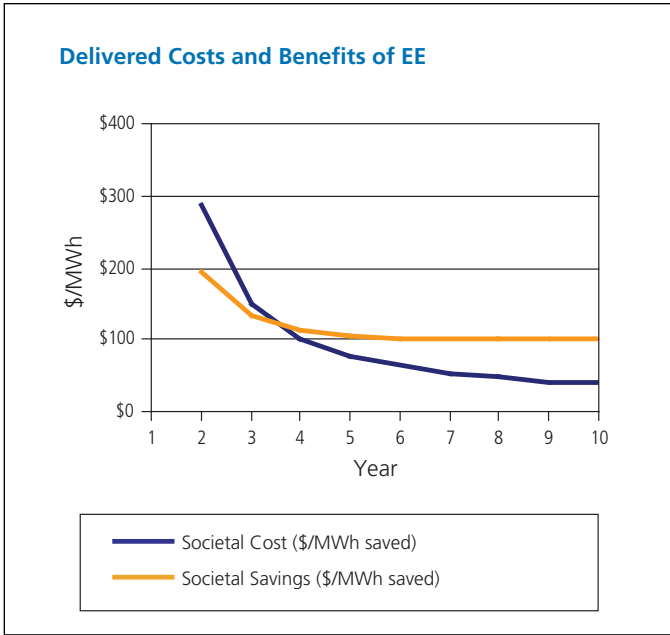
### Societal Net Savings – Increase

The net savings are the difference of total utility costs, including EE program costs, with EE and without EE. In the first year, the cost of the EE program is a cost to society. Over time, cumulative EE savings lead to a utility production cost savings that is greater than the EE program cost. The graph shape is therefore upward sloping. Total Societal Net Savings is the same with and without decoupling; therefore, only one line is shown.



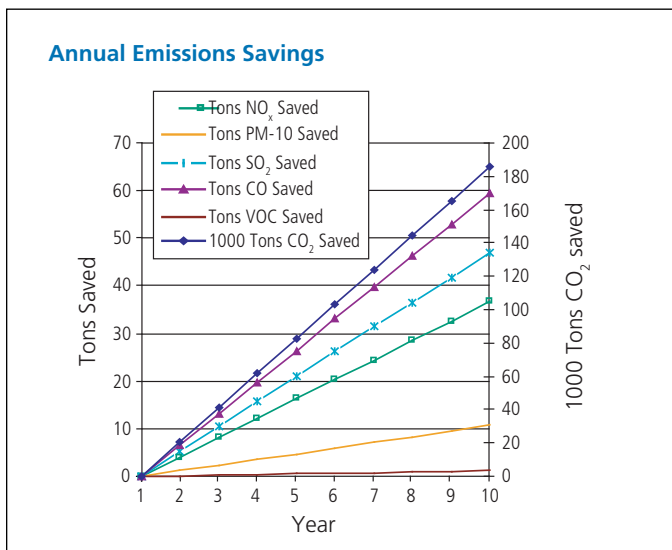
**Total Societal Cost Per Unit – Declines**

Total cost of providing each unit of energy (MWh) declines over time because of the impacts of energy savings, decreased peak load requirements, and decreased costs during peak periods. Well-designed EE programs can deliver energy at an average cost less than that of new power sources. When the two lines cross, the annual cost of EE equals the annual savings resulting from EE. The Societal Cost and Societal Savings are the same with and without decoupling.



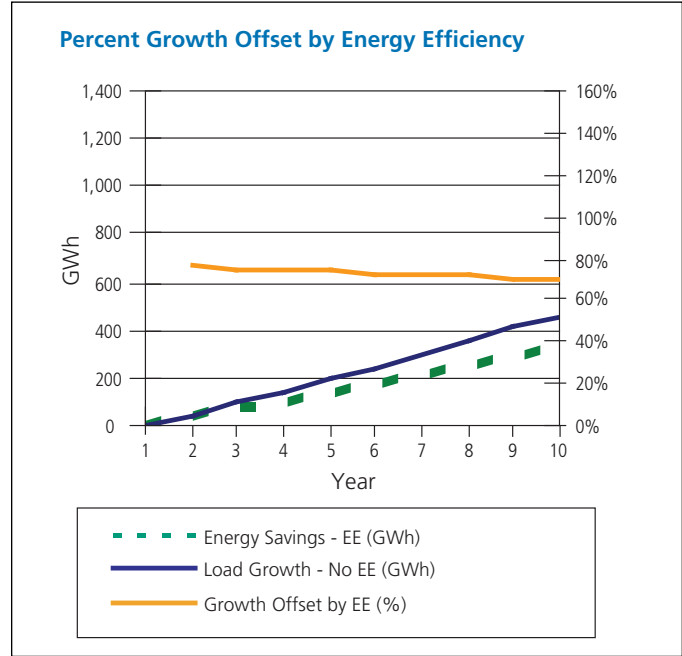
**Emissions and Cost Savings – Increase**

Annual tons of emissions saved increases. Emissions cost savings increases when emissions cost is monetized. Emissions costs and savings are the same with and without decoupling.



**Growth Offset by EE – Increase**

As EE programs ramp up, energy consumption declines. This comparison shows the growth with and without EE, and illustrates the amount of EE relative to load growth. Load growth and energy savings are not impacted by decoupling. With load growth assumed at zero, no load or percent growth offset shown.



**Peak Load Growth – Decrease**

Peak load requirements decrease because peak capacity savings are captured due to EE measures. Peak load is not impacted by decoupling.

