Synapse
Energy Economics, Inc.

# Energy Efficiency in the Forward Capacity Market

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# Energy Efficiency in the FCM

***The Settlement Agreement makes Energy Efficiency an eligible capacity resource.***

"For the Forward Capacity Market, a distinct method shall be developed to allow energy efficiency … to be fully integrated as Qualified Capacity in the Forward Capacity Market." (Section 11.II.E.2.b)

# The Roles of Energy Efficiency

***It is important to consider the role of Energy Efficiency at two points in the Forward Capacity Market.***

1. During the construction of the Installed Capacity Requirement (ICR). This happens in the Auction Year.
2. In the determination cost allocation to each LSE. This happens during the Delivery Year, 3 years after the Auction Year.

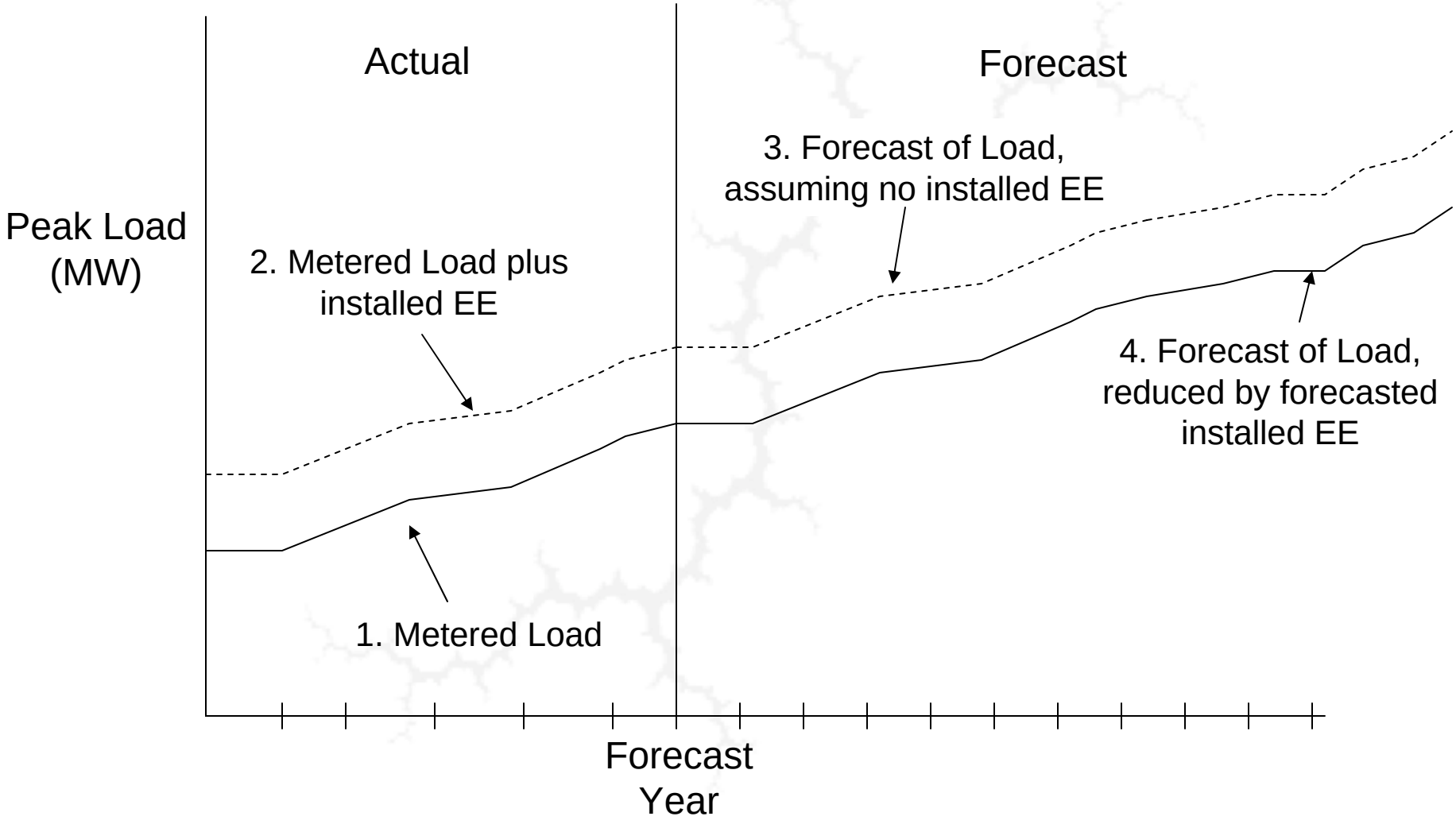
  

# ICR Determination

- Remember that ICR is the amount that is purchased in the Auction
- ICR is made up of the load forecast, impacts of tie benefits, transmission and distribution line losses, required reserves, and other factors.
- Today, the ICR is determined yearly, for the upcoming power year.
- Today, the forecast of DSM program implementation reduces the load forecast

# Current Treatment of Energy Efficiency in ISO Peak Load Forecast



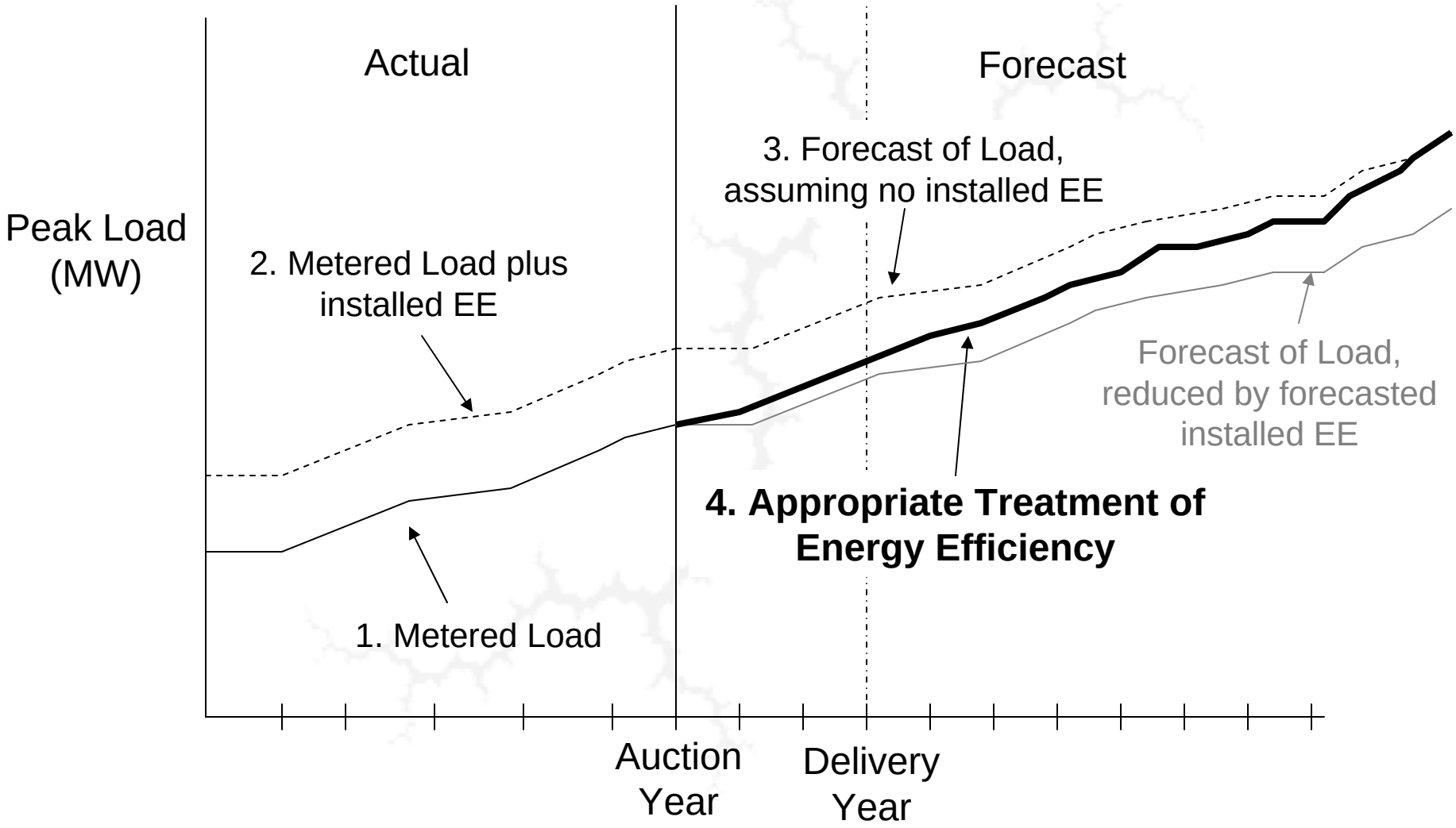
# Appropriate Treatment in the ICR

- For the FCM auction, the ICR is determined for the auction, 3 years in advance of the Delivery Year.
- It is not appropriate to reduce the load forecast by the new energy efficiency that is eligible to bid into the auction.
- Only the continuing effect of existing measures should be a load reduction

*All Energy Efficiency measures have a property called "measure life" which proscribes the number of years for which that measure has an impact on load. Existing Energy Efficiency measures should continue to reduce the ISO's load forecast only until their measure life expires.*

# Appropriate Treatment of Energy Efficiency in Setting the ICR for the FCM



# Delivery Year

- During the Delivery Year, the ISO must determine how much each Load Serving Entity (LSE) pays for the total cost of capacity that was purchased in the auction 3 years ago.
- This determination is done using the Peak Load Ratio Share of each LSE.
- An LSE's Peak Load Ratio Share for this delivery year is the percentage of regional load served by that LSE during last summer's peak hour.

$$\text{Peak Load Ratio Share} = \frac{\text{Peak Load of LSE}}{\text{Total System Load}}$$

# Correct Treatment in Delivery Year

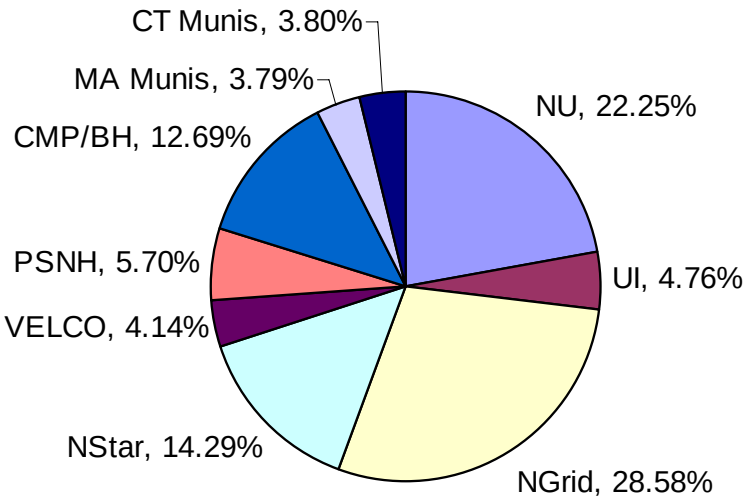
- The correct way to determine how much each LSE pays for capacity is by using Peak Load Ratio Shares using actual meter data
- LSEs will have a small financial incentive to maximize the amount of economic energy efficiency installed in their customer base
- These energy efficiency measures may be implemented by end-use customers, energy service companies, or by the LSEs themselves
- Reconstituting load will have a negative impact on those LSEs who have customers installing efficiency measures. The load ratio share of that LSE will increase, but the customer will receive the capacity market revenues.
- Furthermore, reconstituting load is administratively difficult, and the impact is minimal

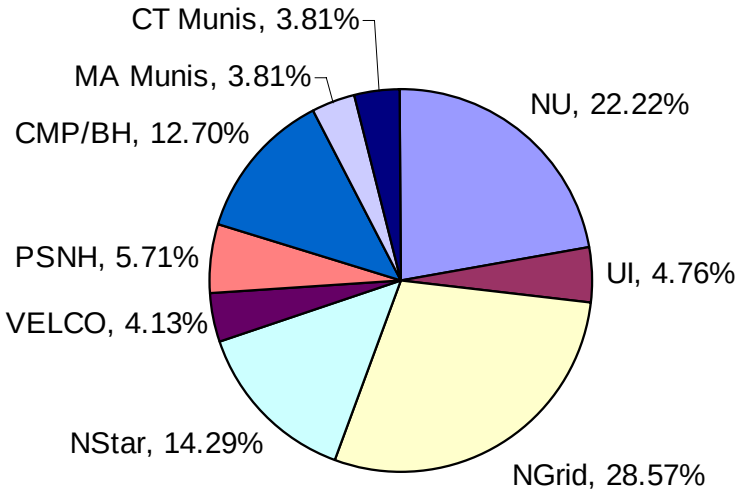
# Effect of Energy Efficiency on Peak Load Ratio Share

*If we use illustrative but realistic data, the effect on Peak Load Ratio Share is minimal, down to a few hundredths of a percent.*

**Peak Load Ratio Shares**
**Reconstitued Load**




**Peak Load Ratio Shares**
**Using Actual and Estimated Meter Reads**




***Based on a system load of 31,5000MW and total one-year EE of 151MW***

# Effect of Energy Efficiency on Annual Cost of Capacity

*The same small impact is seen in the percentage change in annual Cost of Capacity (see column on furthest right)*

***Illustrative Values for Power Year 2011-2012***

**Installed Capacity Requirement (MW)**

36,750 (summer 2010 peak load x 1.5% growth x 15% reserve margin)

**Capacity Clearing Price ($/kWh)**

$ 6.05

**Total Cost of Capacity ($m)**

$ 2,668

| | | | | Reconsituted Load | | Metered Load | | Delta | | |
|---|---|---|---|---|---|---|---|---|---|---|
| LSE | Summer 2010 Peak Load (MW) | %EE | EE (MW) | Peak Load Ratio Share | Capacity Cost ($m) | Peak Load Ratio Share | Capacity Cost ($m) | Peak Load Ratio Share | Capacity Cost ($m) | Capacity Cost (%) |
| NU | 7,000 | 0.6% | 42 | 22.25% | 593.61 | 22.22% | 592.90 | -0.03% | (0.71) | -0.12% |
| UI | 1,500 | 0.5% | 8 | 4.76% | 127.12 | 4.76% | 127.05 | 0.00% | (0.07) | -0.05% |
| NGrid | 9,000 | 0.5% | 45 | 28.58% | 762.46 | 28.57% | 762.30 | -0.01% | (0.16) | -0.02% |
| NStar | 4,500 | 0.5% | 22 | 14.29% | 381.19 | 14.29% | 381.15 | 0.00% | (0.04) | -0.01% |
| VELCO | 1,300 | 0.8% | 10 | 4.14% | 110.43 | 4.13% | 110.11 | -0.01% | (0.32) | -0.29% |
| PSNH | 1,800 | 0.3% | 5 | 5.70% | 152.15 | 5.71% | 152.46 | 0.01% | 0.31 | 0.20% |
| CMP/BH | 4,000 | 0.4% | 16 | 12.69% | 338.53 | 12.70% | 338.80 | 0.01% | 0.27 | 0.08% |
| MA Munis | 1,200 | 0.1% | 1 | 3.79% | 101.24 | 3.81% | 101.64 | 0.02% | 0.40 | 0.40% |
| CT Munis | 1,200 | 0.2% | 2 | 3.80% | 101.32 | 3.81% | 101.64 | 0.01% | 0.32 | 0.31% |
| Totals | 31,500 | | 151 | 100% | 2,668 | 100% | 2,668 | 0% | 0.00 | |

# Effect of Energy Efficiency on Capacity Clearing Price

*Furthermore, if we assume that the inclusion of EE in the auction can reduce the capacity clearing price by only $0.05/kW-month, the benefit to all LSEs outweighs any impact on Cost of Capacity.*

***Illustrative Values for Power Year 2011-2012***

**Installed Capacity Requirement (MW)**

36,750 (summer 2010 peak load x 1.5% growth x 15% reserve margin)

**Capacity Clearing Price ($/kWh)**

$ 6.05 without EE
$ 6.00 with EE

**Total Cost of Capacity ($m)**

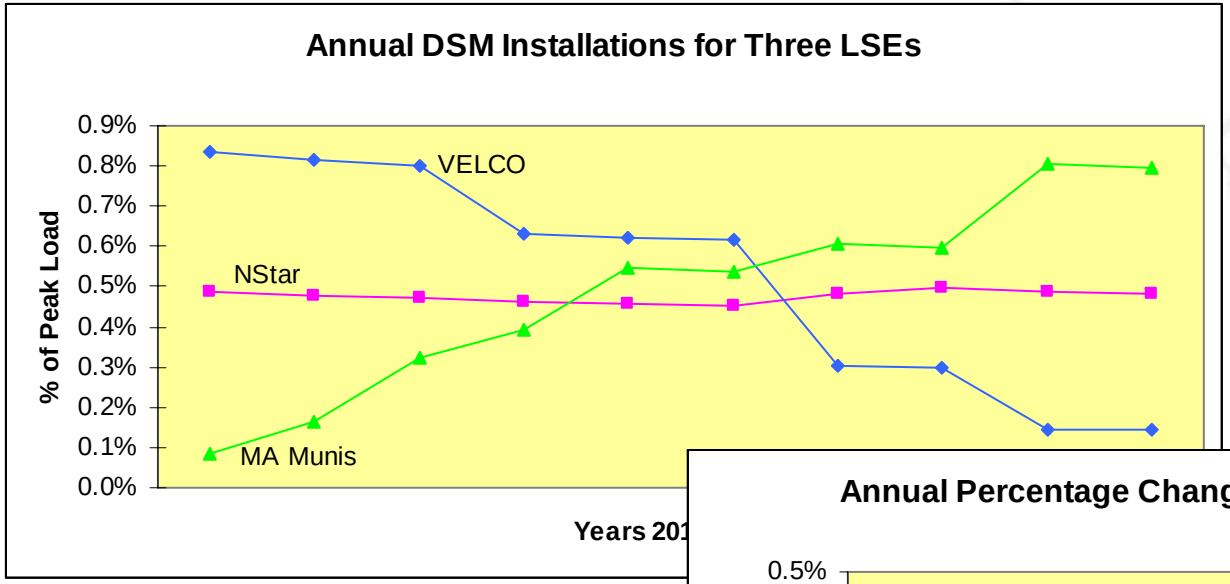
$ 2,668 without EE
$ 2,646 with EE

| | | | | Reconsituted Load | | Metered Load | | Delta | | 5 Cent Impact | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LSE | Summer 2010 Peak Load (MW) | %EE | EE (MW) | Peak Load Ratio Share | Capacity Cost ($m) | Peak Load Ratio Share | Capacity Cost ($m) | Capacity Cost ($m) | Capacity Cost (%) | Capacity Cost ($m) | Capacity Cost (%) |
| NU | 7,000 | 0.6% | 42 | 22.25% | 593.61 | 22.22% | 592.90 | (0.71) | -0.12% | (4.90) | -0.83% |
| UI | 1,500 | 0.5% | 8 | 4.76% | 127.12 | 4.76% | 127.05 | (0.07) | -0.05% | (1.05) | -0.83% |
| NGrid | 9,000 | 0.5% | 45 | 28.58% | 762.46 | 28.57% | 762.30 | (0.16) | -0.02% | (6.30) | -0.83% |
| NStar | 4,500 | 0.5% | 22 | 14.29% | 381.19 | 14.29% | 381.15 | (0.04) | -0.01% | (3.15) | -0.83% |
| VELCO | 1,300 | 0.8% | 10 | 4.14% | 110.43 | 4.13% | 110.11 | (0.32) | -0.29% | (0.91) | -0.83% |
| PSNH | 1,800 | 0.3% | 5 | 5.70% | 152.15 | 5.71% | 152.46 | 0.31 | 0.20% | (1.26) | -0.83% |
| CMP/BH | 4,000 | 0.4% | 16 | 12.69% | 338.53 | 12.70% | 338.80 | 0.27 | 0.08% | (2.80) | -0.83% |
| MA Munis | 1,200 | 0.1% | 1 | 3.79% | 101.24 | 3.81% | 101.64 | 0.40 | 0.40% | (0.84) | -0.83% |
| CT Munis | 1,200 | 0.2% | 2 | 3.80% | 101.32 | 3.81% | 101.64 | 0.32 | 0.31% | (0.84) | -0.83% |
| Totals | 31,500 | | 151 | 100% | 2,668 | 100% | 2,668 | (0.00) | | (22.05) | |

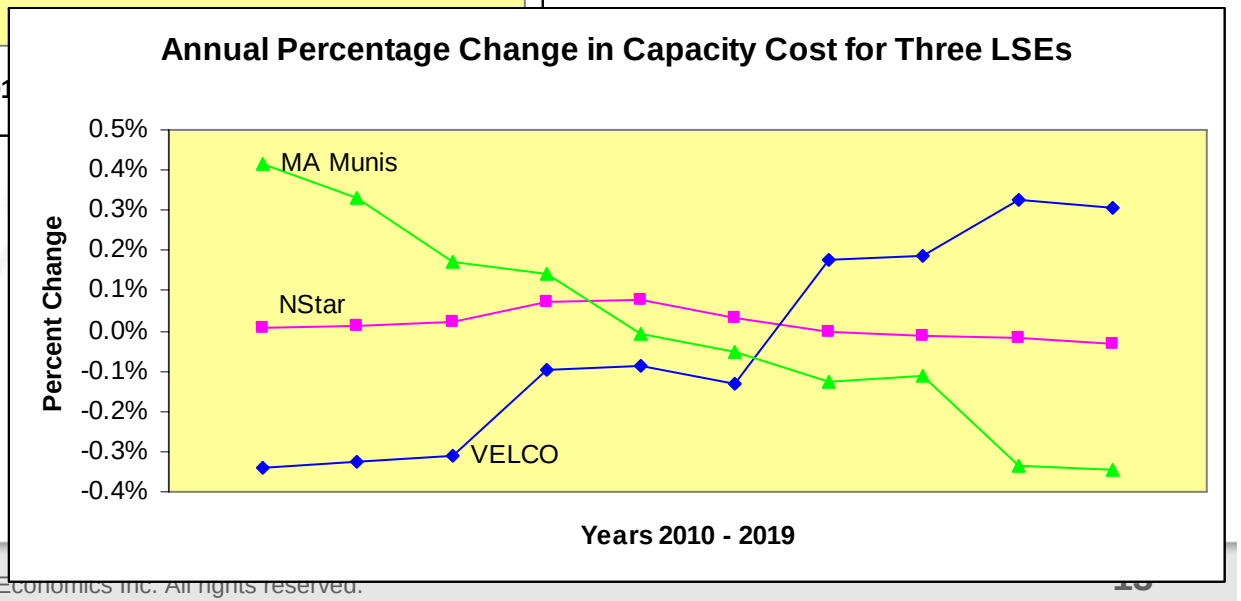
  

# Long Range Impact Balance

*Over the long run, if we assume that each LSE will eventually install all economic EE measures, any single year impact on Peak Load Ratio Share balances out.*




**This chart assumes all service territories will balance at economic EE installations of 0.5% of peak load per year over 10 years**



# Conclusions

- In the FCM auction, the ISO should not consider Energy Efficiency that is offered as a capacity resource in its determination of ICR
- In the delivery year it is appropriate to use each LSE's actual Peak Load Ratio Share to calculate capacity payments
- This small financial incentive to serve load as efficiently as possible is both correct and appropriate in a competitive capacity market.
- The alternative will harm those LSEs whose customers install energy efficiency measures, discourage customer installations, or both.
- Just as suppliers have an obligation to generate efficiently, so too do LSEs have an obligation to serve load efficiently. This method provides an incentive for that obligation.