



Synapse
Energy Economics, Inc.

In Pursuit of All Cost-Effective Energy Efficiency

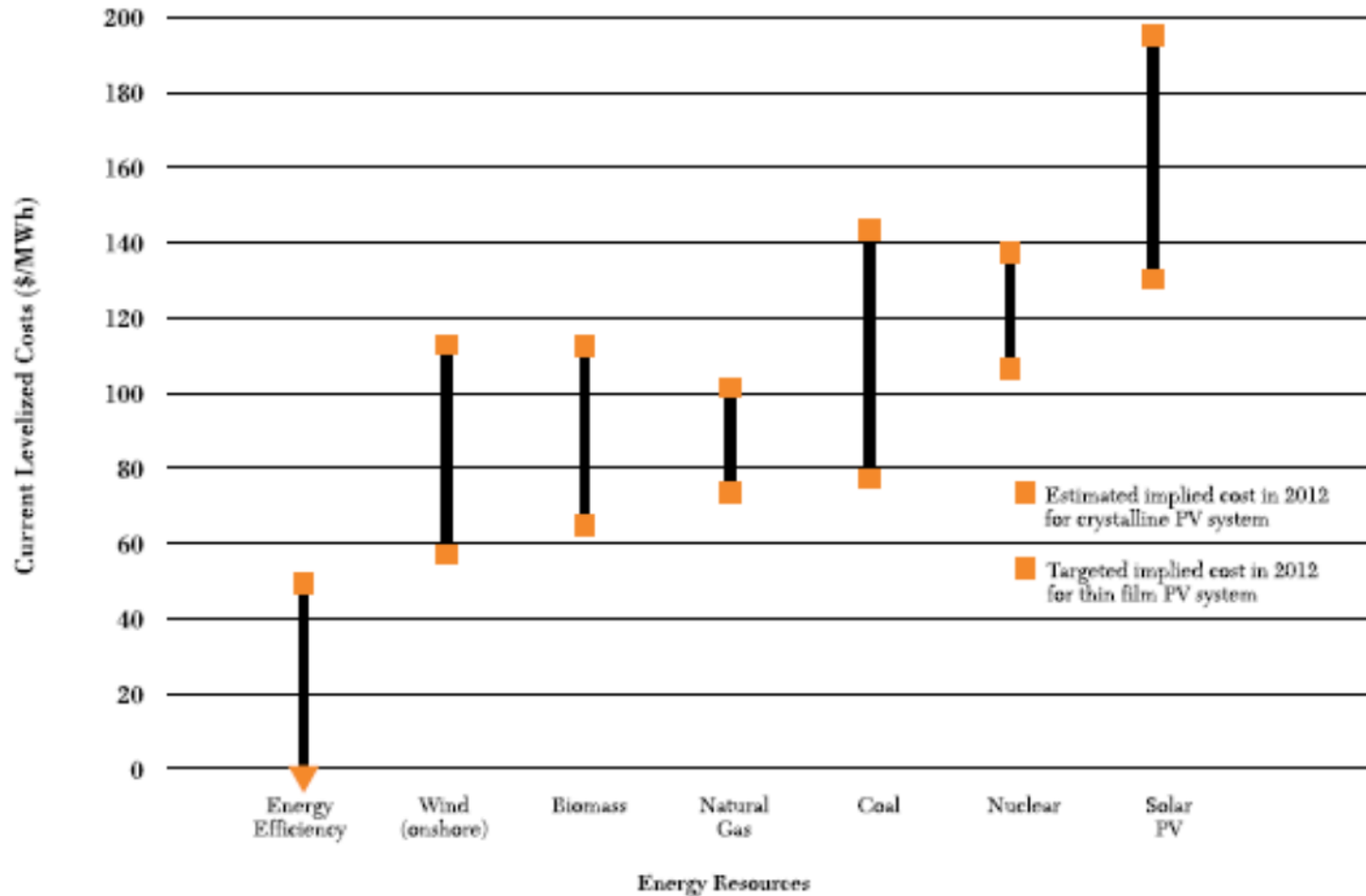
October 23, 2012

Tim Woolf

Big Picture: Observations

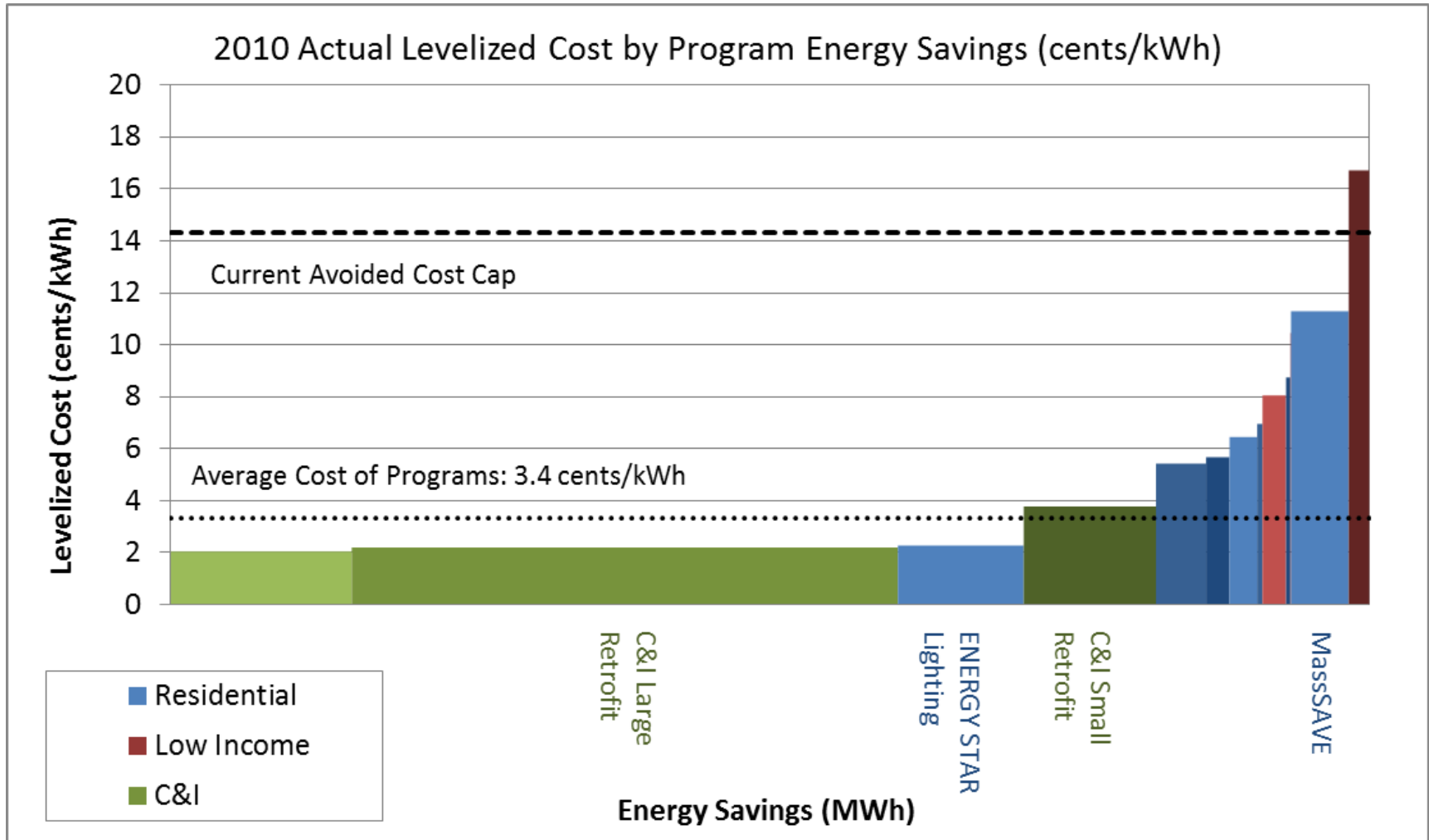
1. There is a huge potential of very low-cost energy efficiency savings opportunities throughout the US.
2. Efficiency savings cannot be achieved overnight. It takes years to build up the regulatory, institutional and market infrastructure.
3. The ability to use efficiency to stop or retire coal or gas plants, is significantly enhanced with sustained, long-term regulatory support for EE in the state.
4. Therefore, it is important to advocate for all cost-effective energy efficiency, every year, in every state; especially states where you want to stop coal.

Energy Efficiency is Very Cheap



Source: World Resources Institute

2010 Energy Efficiency Costs in Massachusetts



If Energy Efficiency is So Cheap, Why Do We Need EE Programs?

Customers face numerous market barriers that prevent them from adopting energy efficiency:

- Lack of awareness.
- Limited product availability.
- Lack of information.
- Lack of training.
- Lack of capital.
- High transaction costs.
- Split incentives
(landlord vs. tenant)
- Short-term perspective.
- Institutional barriers.
- Uncertainty.
- Risk avoidance.
- Lack of awareness of environmental benefits.

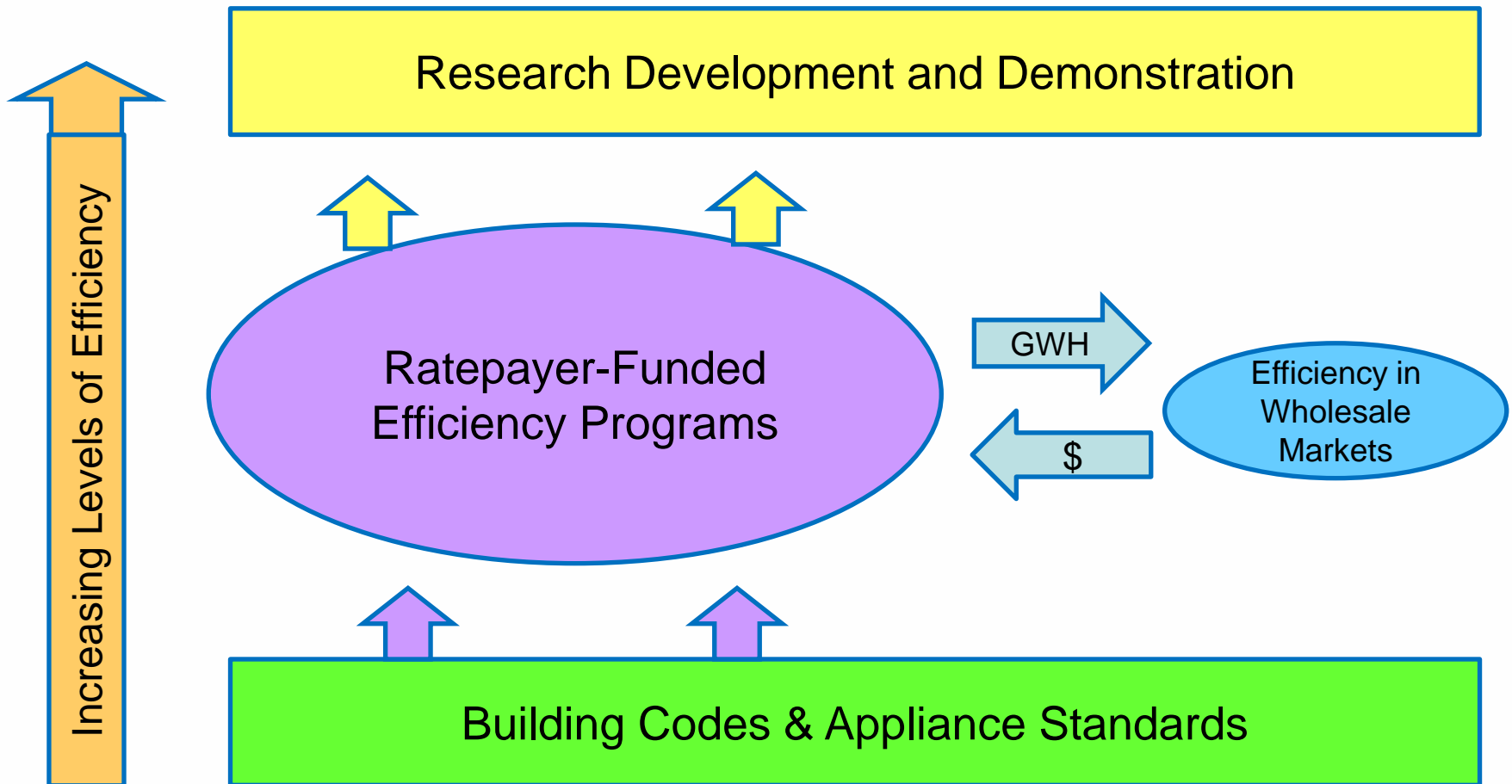
Energy efficiency programs are needed to overcome these market barriers.

Big Picture: Energy Efficiency Mechanisms

Four Mechanisms to Promote Energy Efficiency:

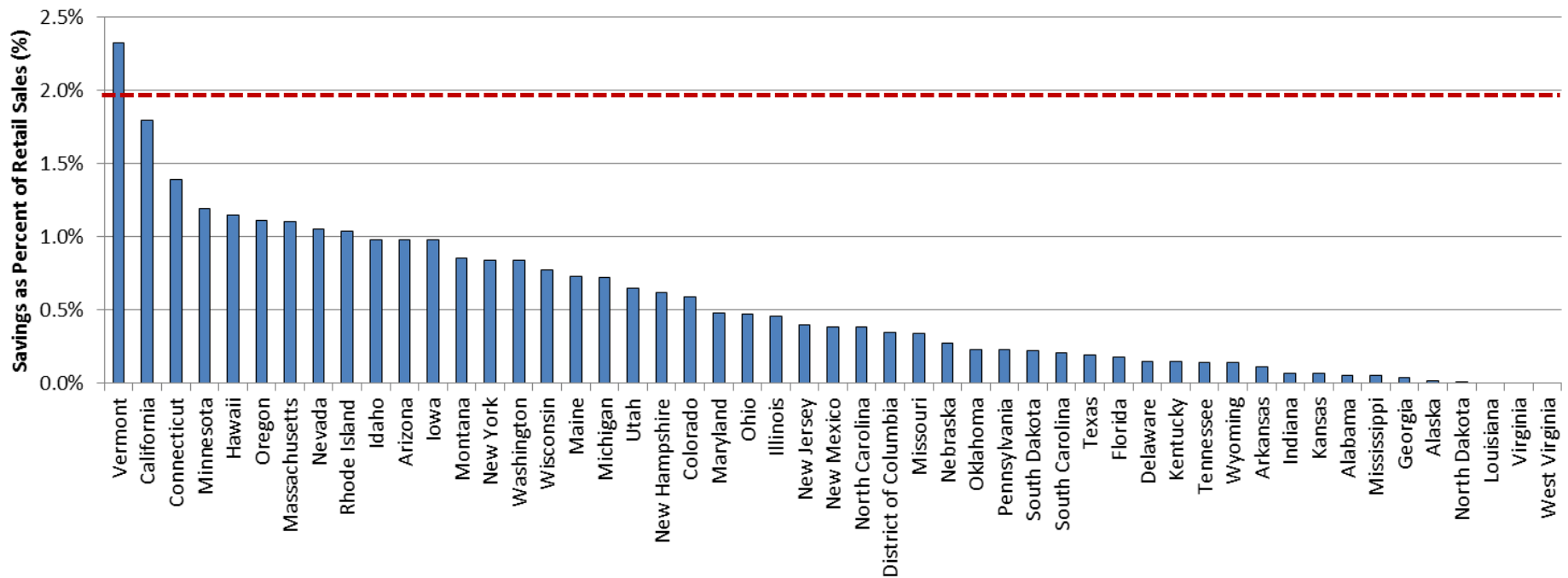
1. Building Codes and Appliance Standards.
2. Ratepayer-Funded Efficiency.
3. Organized Wholesale Markets.
4. Research, Development and Demonstration (RD&D).

Relationships Between the Four Mechanisms



Ratepayer-Funded Efficiency: Savings By State

Annual Incremental Savings, as a Percent of Annual Sales; 2010

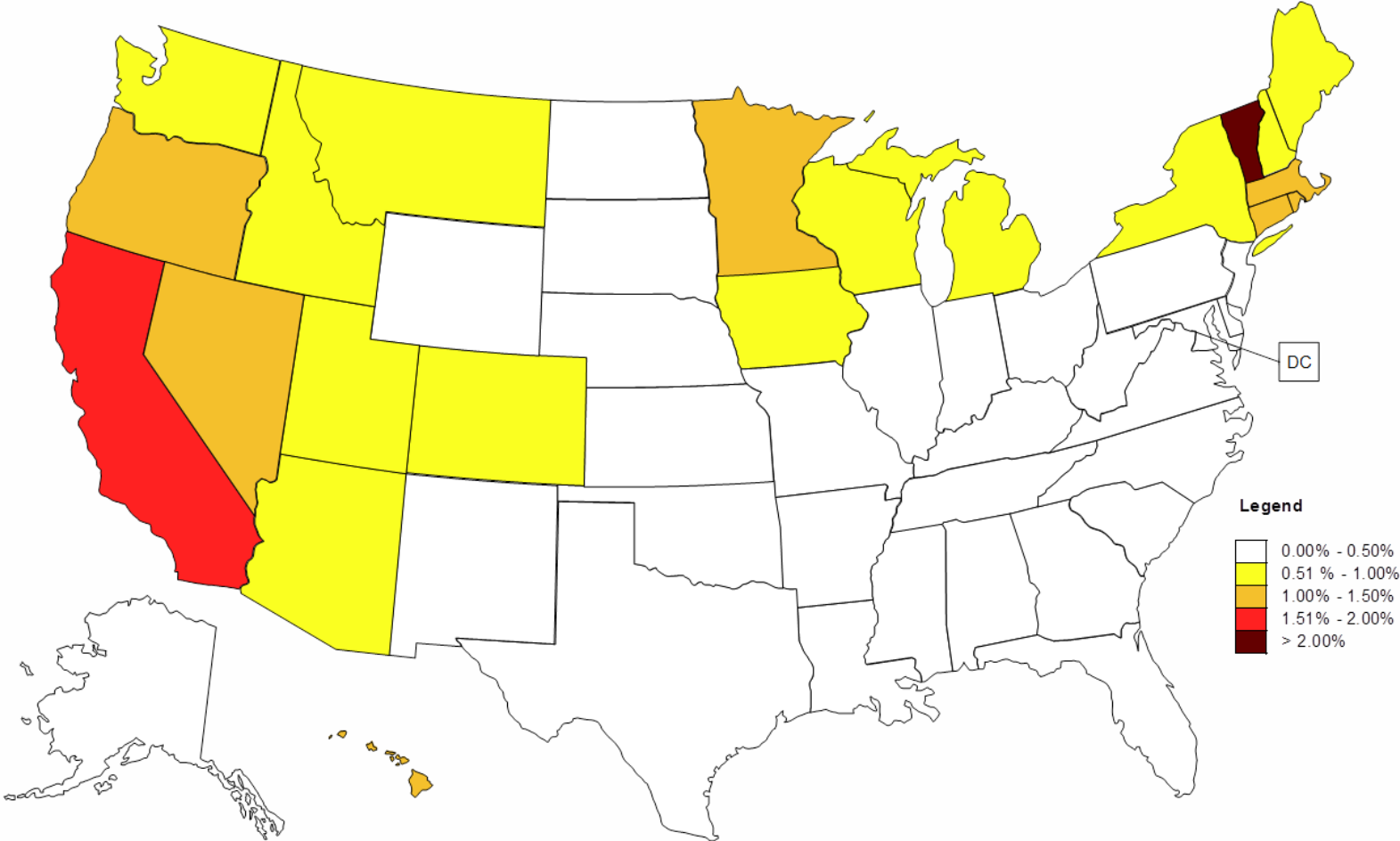


General Conclusions:

- States have really just begun to tap into the efficiency potential.
- Half of the states are achieving very little savings.
- Even the leading states could achieve greater savings.
- All states should be working towards achieving two percent reductions per year.

Efficiency Savings Across the States

2010 Net Incremental Electricity Savings by State (as a % of retail sales),
2012 ACEEE Scorecard Data



Ratepayer-Funded Efficiency: Top Ten Policies

1. Clear, stable, long-term regulatory support.
2. A mandate to implement all cost-effective energy efficiency.
3. Proper treatment of customer concerns.
4. Timely and predictable recovery of efficiency program costs.
5. A mechanism to allow regulated utilities to recover lost revenues.
6. Well-designed shareholder incentives or performance incentives.
7. Proper cost-effectiveness test(s) for screening programs.
8. Proper estimation of avoided costs.
9. Sound integrated resource planning practices, where appropriate.
10. Meaningful stakeholder engagement.

- Customer concerns are the single biggest reason that states are not achieving higher efficiency savings.
- Rate impacts are the biggest customer concern.
- This has been an issue since the beginning of time.
- This is an issue in every state, even the leading states.
- Unless rate impact concerns are addressed directly, we will never achieve all cost-effective efficiency.

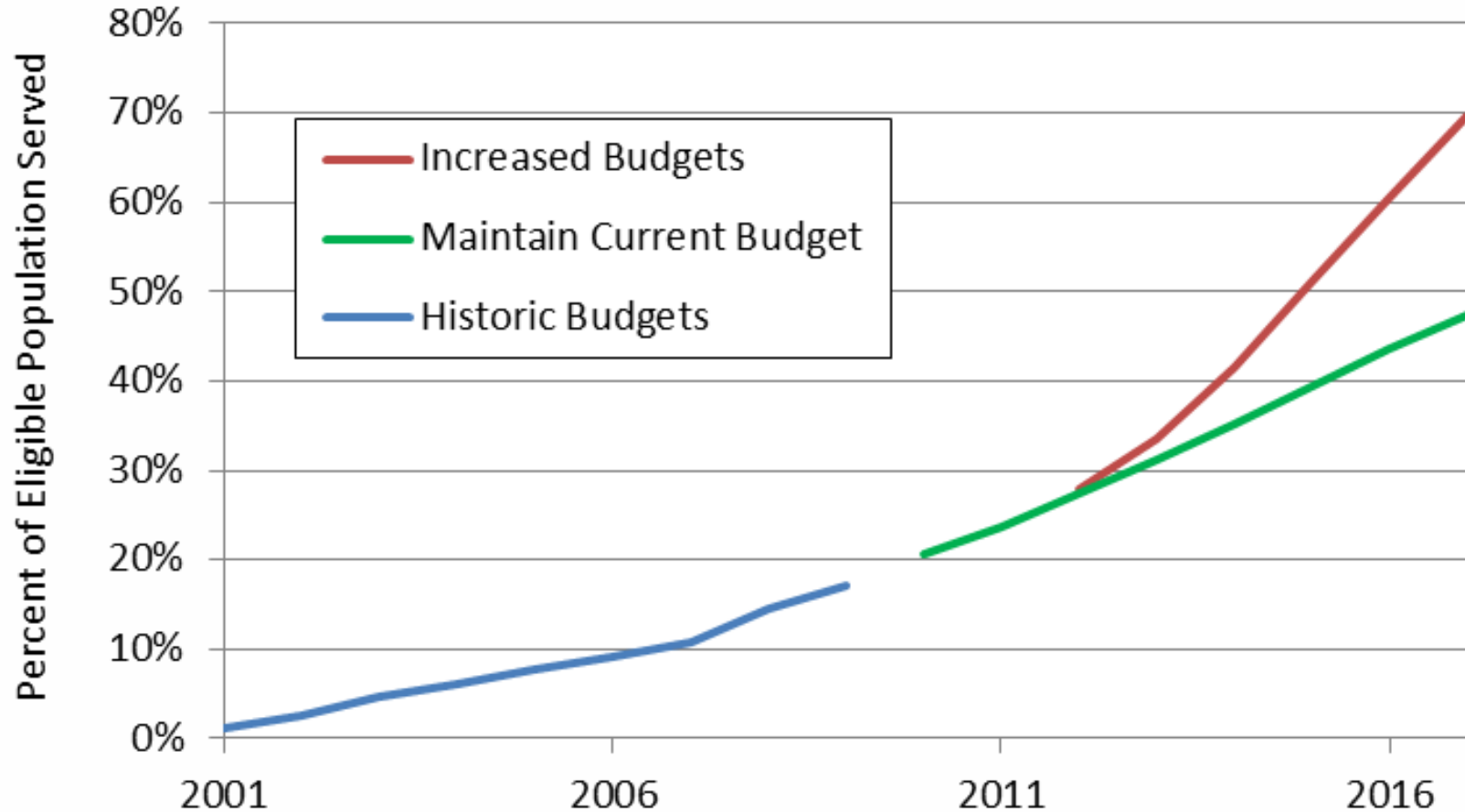
- Energy efficiency rate impacts are often misunderstood, misrepresented and overblown.
- In the majority of states, rate impacts are very small, e.g., less than 1 or 2 percent.
- In the leading states, rate impacts may start to get big, e.g., on the order of 3, 4, maybe 5 percent.
- The standard response to rate impact concerns:
 - Yes rates go up, but average bills go down.
- This response has not been effective enough.

The Importance of Assessing Participation Rates

- It is important to identify participants:
 - Program participants' bills decrease.
 - Program non-participants' bills increase.
- As the rate impacts start to get big, so will the number of participants – an offsetting effect.
- Rate impacts, bill impacts and participation should be considered over the long-term.
- Rate impacts, bill impacts and participation should be assessed to address the decision at hand:
 - Not to compare proposed EE budget with zero EE.
 - To compare one EE budget with another.

Example of How to View Customer Participation

Small C&I Customer Participation Rates (VT)



Policy Options to Promote Participation

- Gather better data on participation.
- Include participation rate requirements in EE plans.
- Include participation rate requirements in EE targets.
- Incorporate participation rates in utility shareholder incentives.
- Increase participation rates through program designs.
- Increase program budgets, rather than decreasing them, in response to rate impact concerns.
- “All cost-effective energy efficiency for all customers.”

The Importance Cost-Effectiveness Screening

- All states use some form of cost-effectiveness tests to screen programs – i.e., identify the ones to implement.
- Cost-effectiveness was originally a selling point for energy efficiency.
 - However, in many states it has become a constraint.
- Five standard tests are used:
 - Participant test.
 - Ratepayer Impact Measure (RIM) test.
 - Program Administrator Cost (PAC) test.
 - Total Resource Cost (TRC) test.
 - Societal Cost test.

Defining Cost-Effectiveness: Five Standard Tests

	Participant Test	RIM Test	PAC Test	TRC Test	Societal Cost Test
Energy Efficiency Program Benefits:					
Customer Bill Savings	X	---	---	---	---
Avoided Energy Costs	---	X	X	X	X
Avoided Capacity Costs	---	X	X	X	X
Avoided Transmission and Distribution Costs	---	X	X	X	X
Wholesale Market Price Suppression Effects	---	X	X	X	---
Avoided Cost of Environmental Compliance	---	X	X	X	X
Other Program Impacts (utility perspective)	---	---	X	X	X
Other Program Impacts (participant perspective)	X	---	---	X	X
Other Program Impacts (societal perspective)	---	---	---	---	X
Energy Efficiency Program Costs:					
Program Administrator Costs	---	X	X	X	X
EE Measure Cost: Program Financial Incentive	---	X	X	X	X
EE Measure Cost: Participant Contribution	X	---	---	X	X
Non-Energy Costs	X	---	X	X	X
Lost Revenues to the Utility	---	X	---	---	---

Other Program Impacts

- We use the term “other program impacts” (OPIs) to include non-energy impacts or non-energy benefits.
- OPIs are those costs and benefits that are not part of the costs, or the avoided cost, of the energy provided by the utility.
- Examples: increased safety, improved health, reduced O&M costs, increased worker and student productivity, water savings, increased comfort, improved aesthetics, etc.
- OPIs also include “other fuel savings,” which are other fuels that are not provided by the utility (e.g., oil savings).

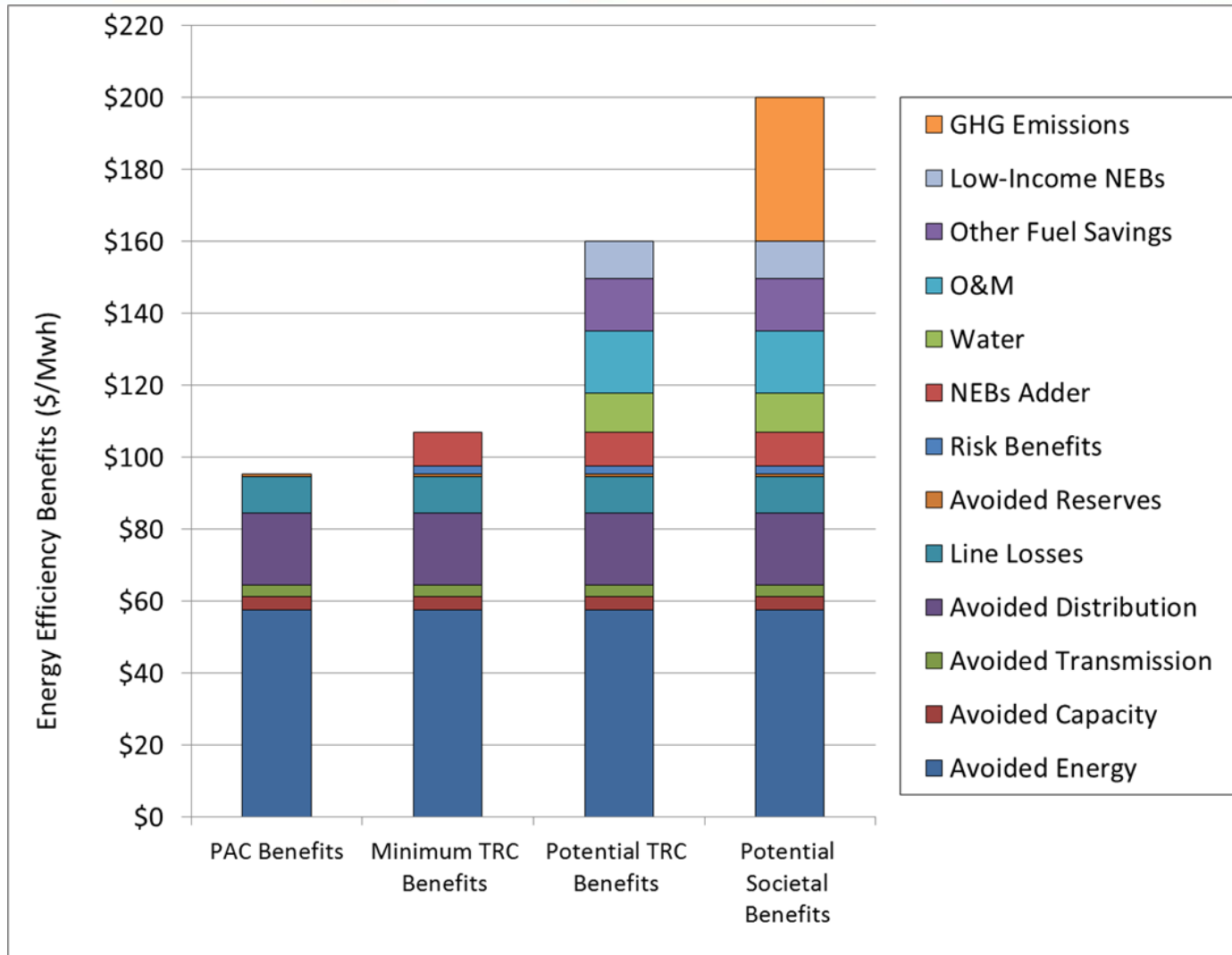
Current Treatment of Other Program Impacts

- Most states use the TRC test, however...
- Most states completely ignore or significantly undervalue OPIs.
- The outcome:
 - The results of the TRC tests are skewed against EE.
 - Significantly less efficiency is identified as cost-effective.
 - Some key programs become uneconomic.
 - Less efficiency is implemented.
 - Customers pay higher costs than necessary.
 - Fewer opportunities to avoid power plants.

Rationale for Including Other Program Impacts

- OPIs should be included in cost-effectiveness tests to ensure that the tests are internally consistent.
 - If the participating customer's costs are included, then that customer's benefits should be included.
- In the TRC test the participant's costs and the participant's non-energy benefits can be quite large.
- Experience indicates that these benefits are very important to many customers, sometimes more important than the energy benefits.

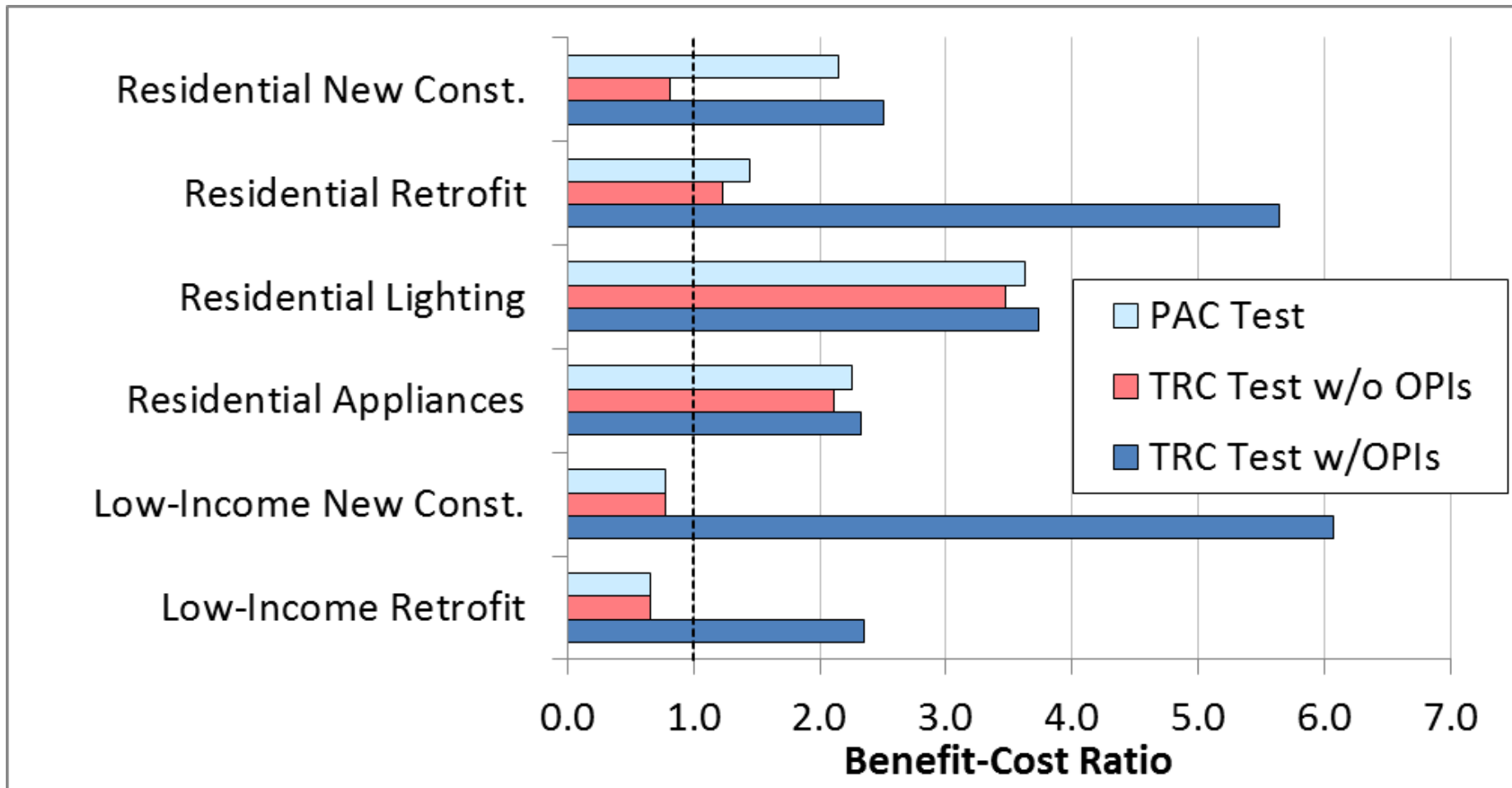
One Example of Other Program Impacts (VT)



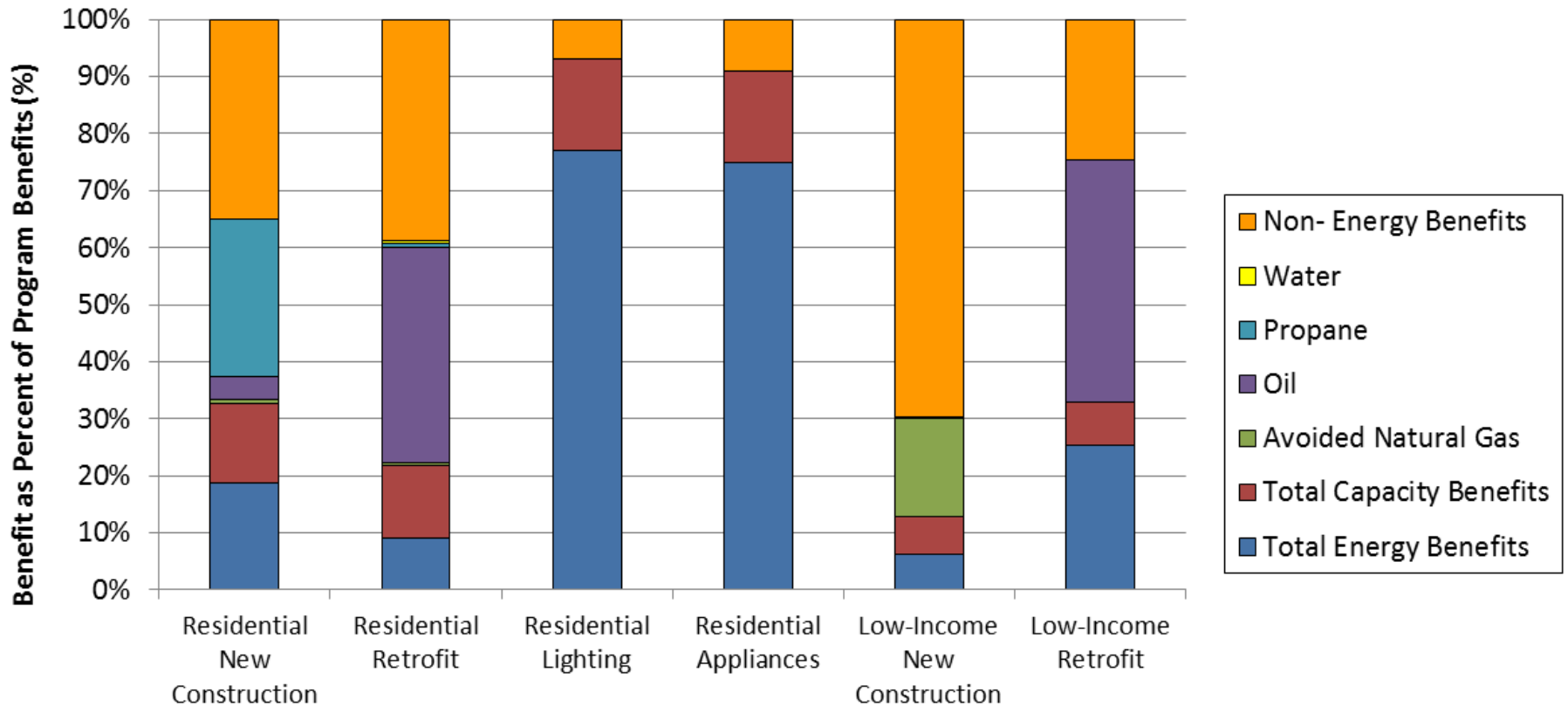
Implications of Other Program Impacts

- Other program impacts can have significant effects on low-income programs, residential retrofit programs and residential new construction programs.
 - Including OPIs has the effect of avoiding lost opportunities, allowing for comprehensive EE treatment, and promoting customer equity.
- Other program impacts can also have significant effects on C&I programs.

Cost-Effectiveness Results: For 2012 Efficiency Plan for a Massachusetts PA



Same Cost-Effectiveness Results: Breakout of Benefits by Type



OPIs Raise Important Customer Concerns

- Including OPIs in the TRC test is likely to expand the universe of cost-effective efficiency.
- This may result in increased energy efficiency budgets, or a different mix of energy efficiency programs within given budgets.
- Including OPIs in the TRC test will also require electric and gas utility customers to pay for achieving non-energy benefits.
 - These benefits could be seen as outside the sphere of electric and gas utility responsibility.

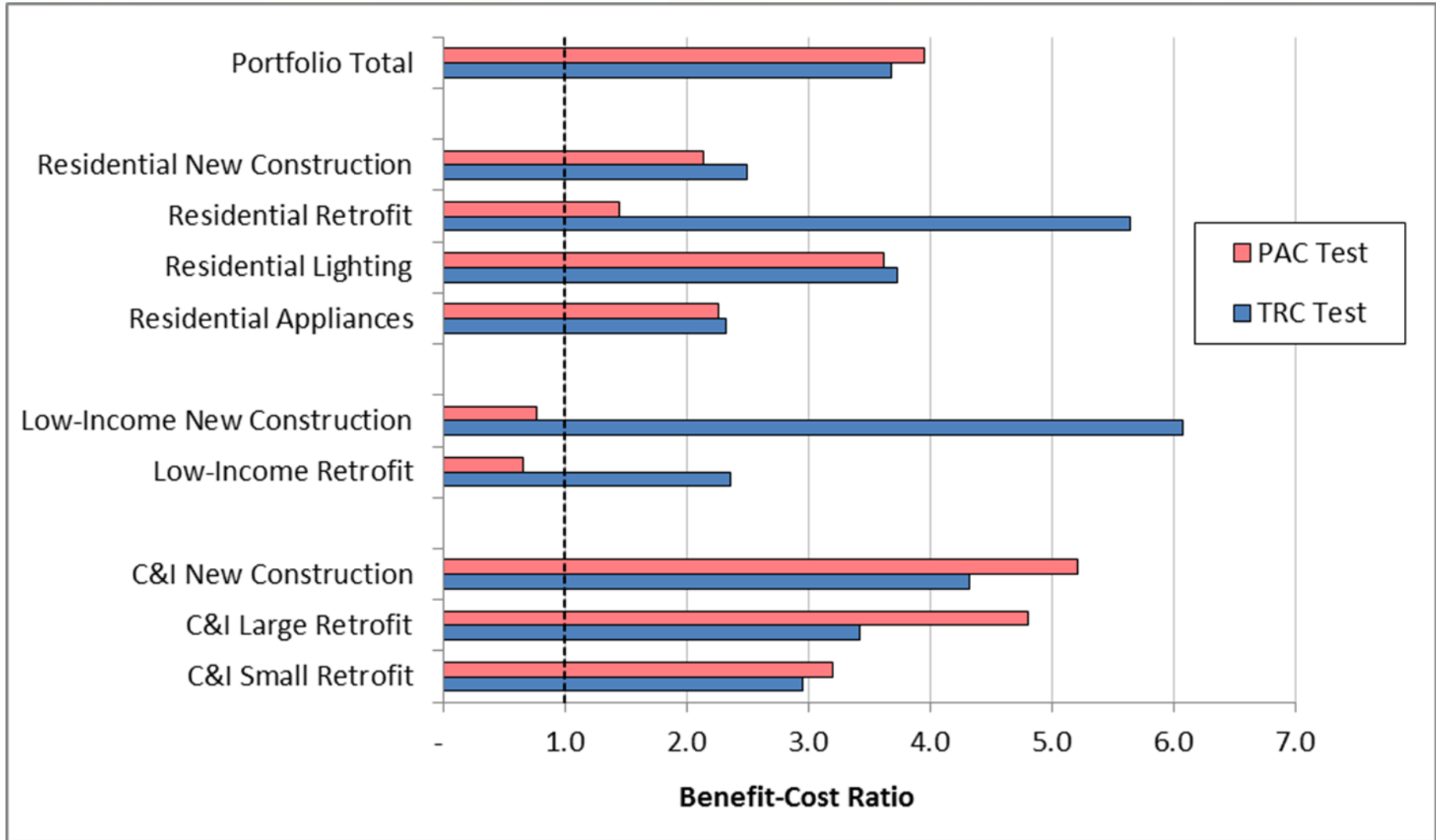
Addressing Customer Concerns

- Including OPIs is necessary to maintaining internal consistency in the TRC test.
 - If regulators decide they do not want to consider costs and benefits outside the utility's sphere, then they should not use the TRC test, use the PAC test instead.
- Including OPIs helps achieve public policy benefits, especially customer equity.
- Overall customer benefits can be ensured by applying the Program Administrator Cost test to the energy efficiency portfolio, as described below.

Recommendations for Applying the Tests

- The Societal Cost test or the TRC test should be used to screen energy efficiency programs.
 - These tests should be used only if they include reasonable estimates of OPIs.
- However, in order to address customer concerns, the PAC test should be applied to the entire portfolio of efficiency programs.
 - This will ensure that the entire set of programs will result in a net reduction in costs to utility customers.
 - In the MA example above, under the PAC test:
 - Utility benefits exceed utility costs by a factor of four.
 - Costs = \$195 mil; Benefits = \$773 mil; Net Benefits = \$578 mil

Portfolio Level Cost-Effectiveness Results



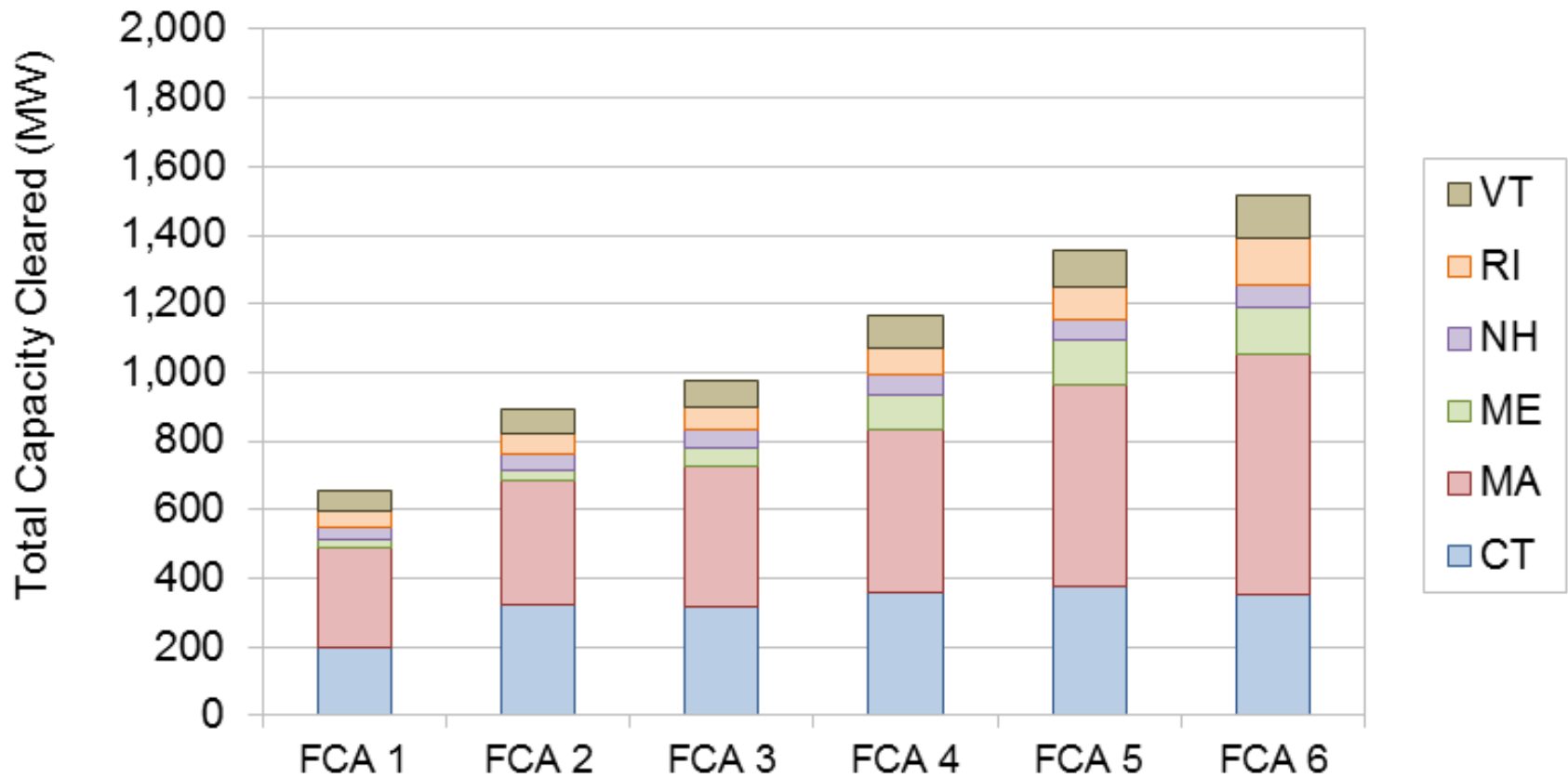
Energy Efficiency in Wholesale Markets: Potential Benefits

- Reduced market prices.
- Increased reliability.
- More efficient operation of the markets.
- Mitigation of market power concerns.
- Environmental benefits. (Will be small or very small.)
- Generate revenues that flow back to ratepayer-funded energy efficiency programs.

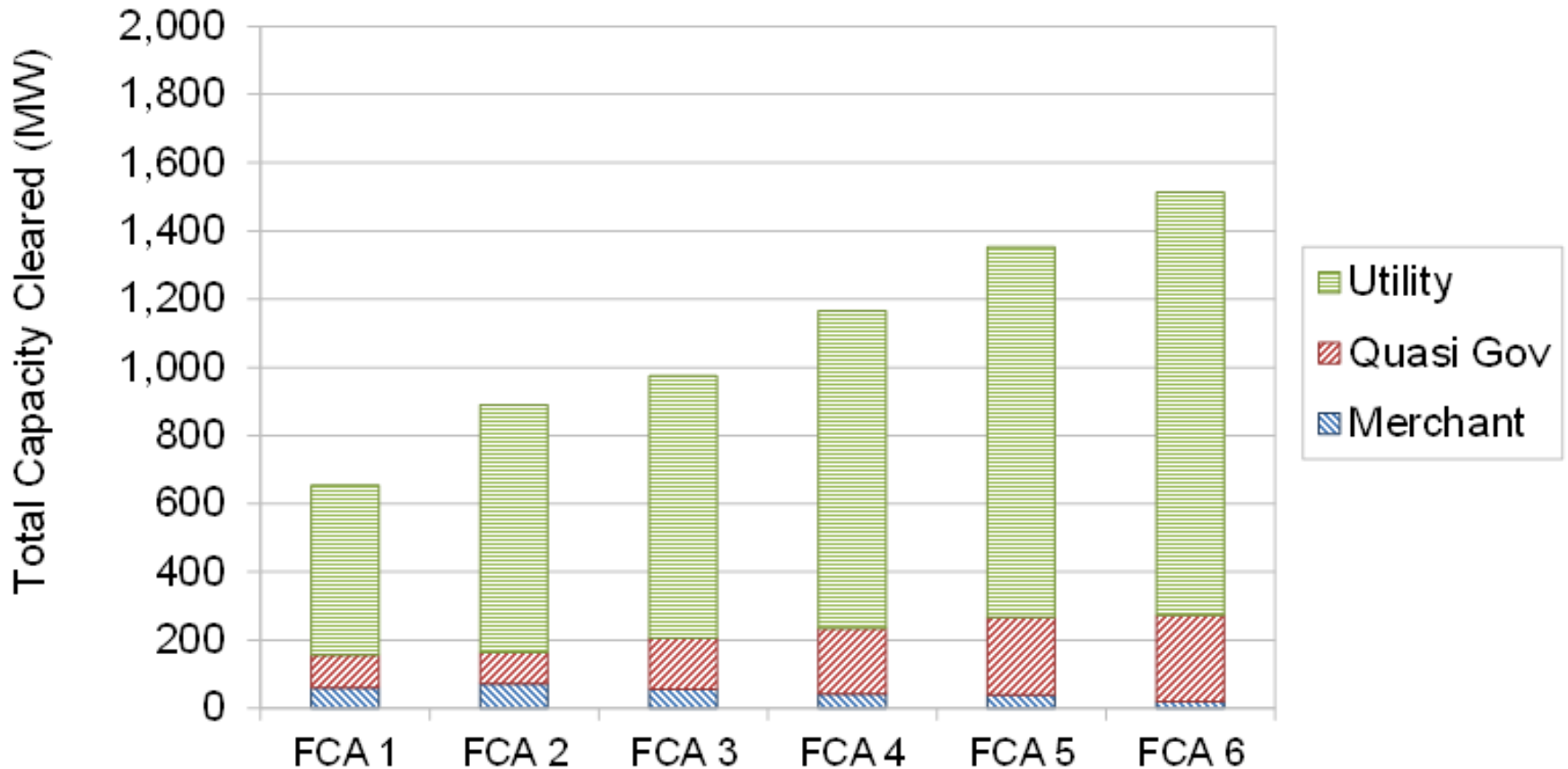
How Energy Efficiency and Demand Response Fit in Wholesale Electricity Markets

- Capacity Markets:
 - Energy efficiency & demand response potentially eligible.
 - Currently allowed in several capacity markets.
- Energy Markets:
 - Only demand response is potentially eligible.
 - FERC supported this approach in Order 745, however the Order is currently held up in appeals.
 - Several markets allow this now, but in a limited way.
- Ancillary Services Markets:
 - Only demand response is eligible.
 - Currently allowed in several regions.

Energy Efficiency in Capacity Markets: Amount Procured to Date in New England



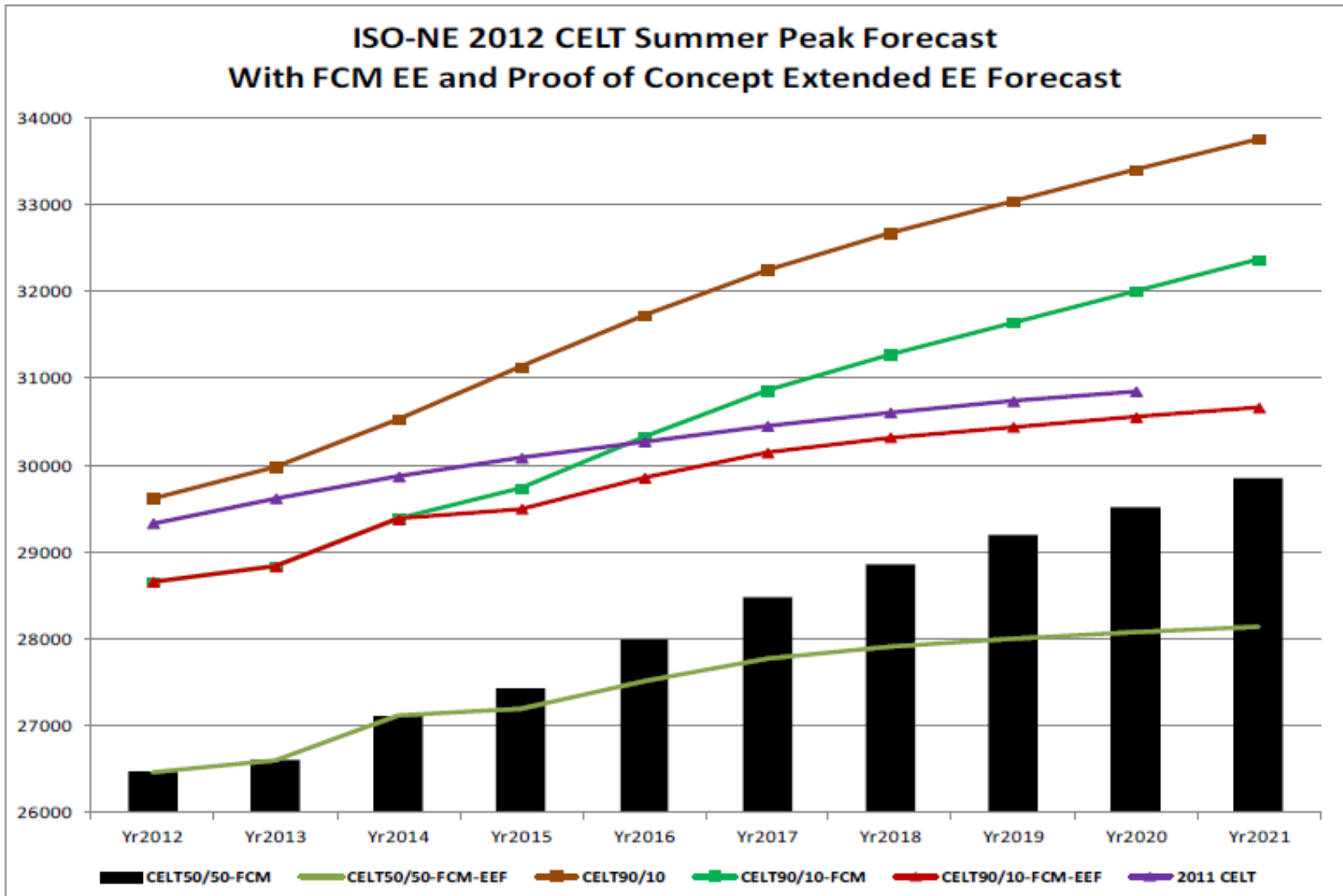
Energy Efficiency in Capacity Markets: Most of the Efficiency is Ratepayer-Funded



Energy Efficiency in Capacity Markets: Key Issues to Get Right

- Include efficiency savings in the load forecast, so that it will influence resource planning.
- Demand-side resources should be treated comparably to supply-side resources.
- Demand-side resources should be paid the same as supply-side.
 - Paid the marginal clearing price.
 - Paid for all years that they deliver.
- Evaluation, measurement and verification must meet high standards.

Energy Efficiency in Capacity Markets: The Importance of Accounting for EE in Forecasts



Summary: Energy Efficiency Priorities

- Ratepayer-funded:
 - Efficiency policies should account for customer concerns.
 - Get the cost-effectiveness tests right.
 - Pursue all cost-effective efficiency for all customers.
 - Pursue all cost-effective efficiency, all states, all years.
- Wholesale Markets:
 - Main reason to promote efficiency is to generate revenues for the ratepayer-funded programs.
- One of the key reasons to get this right is so that when the federal & state governments finally address climate change, we will be able to really push the limits of EE.

Select Energy Efficiency References

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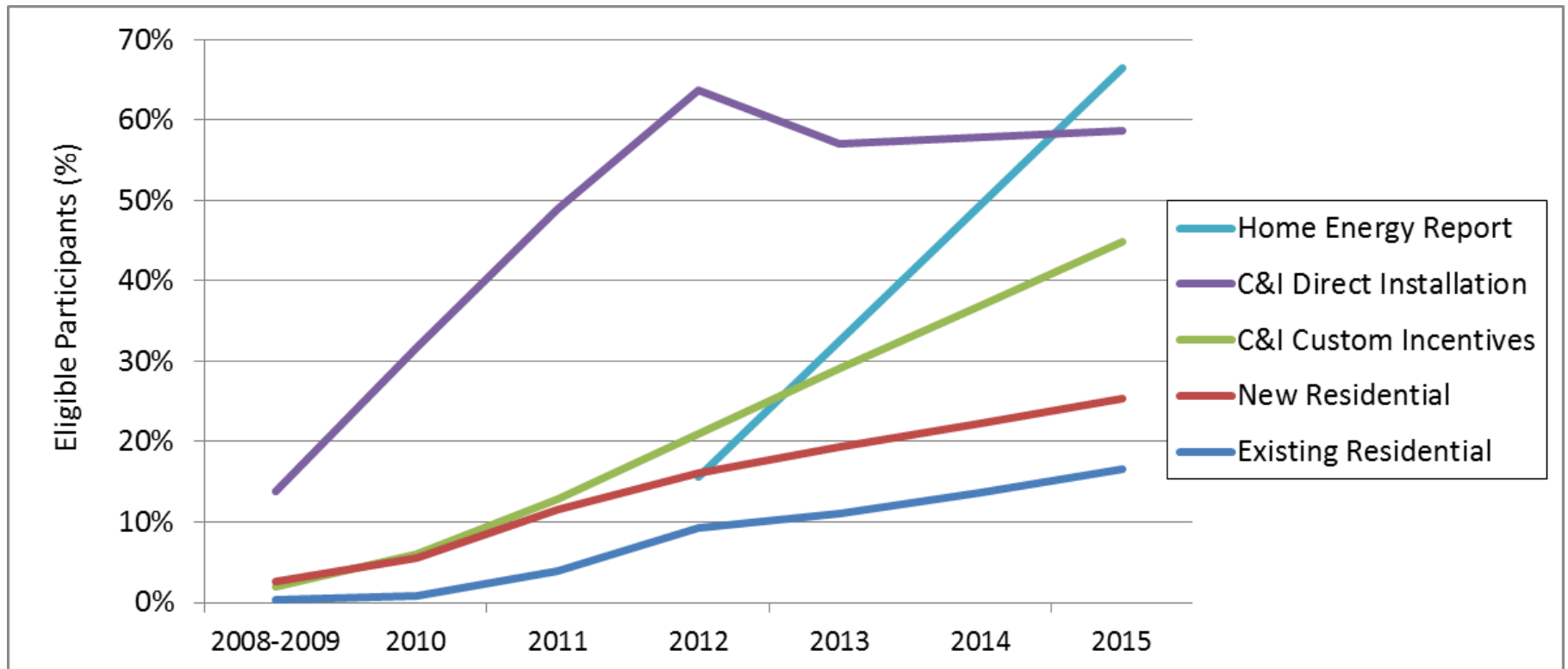
Synapse Web Site:

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Appendix

Participation Rates In Nova Scotia – By Program



It's Important to Include All Avoided Costs

Example of Avoided Costs by Component – Massachusetts

