Best Practices for Advancing State Energy Efficiency Programs: Policy Options & Suggestions

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ENE
Environment Northeast

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About Us

ENE (Environment Northeast) is a non-profit organization that researches and advocates innovative policies that tackle our environmental challenges while promoting sustainable economies. ENE is at the forefront of efforts to combat global warming with solutions that promote clean energy, clean air, and healthy forests.

Mission

ENE's mission is to address large-scale environmental challenges that threaten regional ecosystems, human health, or the management of significant natural resources. We use policy analysis, collaborative problem solving, and advocacy to advance environmental and economic sustainability.

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Executive Summary

In the context of a struggling U.S. economy, the imperative of reducing carbon emission, and the need to create jobs to put millions of Americans back to work, large-scale investment in making our homes and businesses more energy efficient holds the potential to help address all three problems. Over the past few years, several states have taken advantage of this opportunity by substantially increasing their investments in energy efficiency (EE) programs. These states have accomplished such investments by: (1) passing new laws requiring the procurement of all cost-effective efficiency resources that are cheaper than supply; (2) reforming utility incentives so they are aligned with expanded efficiency programs that save consumers money; and (3) adopting aggressive energy efficiency implementing regulations and processes.

As a result of these initiatives such states are in the process of tripling or quadrupling investments in consumer efficiency programs – and their associated savings, job creation, and wider macroeconomic benefits – in just a few short years. Their energy efficiency programs are currently being offered to every sector, including residential, low income, commercial, industrial, and institutional energy consumers, and on average return $3 in savings for every $1 invested. These investments in end-use efficiency are creating tens of thousands of jobs, making local business more competitive, and achieving large reductions in greenhouse gas and other air pollutants.

This paper examines the efficiency-related laws and their implementing regulations, including efficiency procurement plans and reformed utility financial incentives, which have enabled some states and utilities to achieve nation-leading levels of efficiency investments and consumer savings. It provides: (1) a description of the current status of efficiency policies and investments in different states across the country; and (2) recommended policies and best practices that can enable all states to achieve levels of efficiency investments and associated savings, job creation, and increased competitiveness thus far only experienced by a handful of states.

Over the past few decades, various state policies and programs have been adopted to try to increase investments in cost-saving consumer energy efficiency programs. During this time many states across the country have undertaken significant policy reforms to transition away from the historic utility regulatory structure, which was designed to provide utilities with a strong incentive to build out the infrastructure needed to electrify the country and rewarding them financially for electric load growth. Recognizing the ability of efficiency investments to reduce consumers' electric and thermal energy bills dramatically, leading efficiency states have adopted a new regulatory model that realigns their utilities' financial incentives with the economic best interests of their customers.

Most recently, in the past few years, several states have dramatically accelerated their commitment to investing in cost-effective energy efficiency by replacing longstanding laws and regulations that arbitrarily capped budgets for efficiency investments with laws that establish efficiency as a strategic and prioritized, low-cost resource – one that must be invested in first whenever it is cost-effective and cheaper than supply. Such states have recognized efficiency programs' ability to minimize consumers' energy costs and have enacted energy policies that treat efficiency as resource on a level playing field with supply. These states are successfully lowering consumers' energy bills, achieving emissions reductions, increasing the competitiveness of their businesses, and creating local jobs. They are reaping the many direct and indirect economic and environmental benefits that flow from investing in available low-cost efficiency resources at much higher levels than the historically modest amounts.

To maximize efficiency investments that save consumers' billions of dollars over the life of the investments, leading efficiency states have adopted some or all of the following suite of essential best practice policies:

(1) Energy efficiency procurement requirements mandating that utilities or designated 3rd party administrators invest in efficiency whenever it is cost-effective and cheaper than supply and providing stable funding for such investments;

(2) Energy efficiency resources standards requiring utilities or program administrators to achieve minimum energy savings levels each year;

(3) Elimination of utilities' disincentive towards investments in efficiency programs by ensuring through revenue decoupling that utilities are financially neutral to sales volume and load growth;

(4) Performance incentives to reward utilities or 3rd party program administrators who save consumers money through cost-effective delivery of efficiency programs;

(5) Energy efficiency stakeholder councils with a statutory mandate and the financial resources necessary to oversee programs, assess the size and character of the cost-effective efficiency potential, guide planning and budgeting, and conduct evaluation, measurement, and verification (EM&V);

(6) Efficiency financing options such as low interest loans and on-bill financing to assist customers in paying their portion of improvements and enhance traditional efficiency programs by enabling them to reach more consumers and achieve greater savings;

(7) Appliance and equipment energy efficiency standards to improve the energy efficiency of a suite of commercial products sold within the state;

(8) Consumer information programs such as building energy rating systems and direct access to energy use information and HVAC controls;

(9) Building energy codes and compliance initiatives to improve minimum building energy performance, ensure rapid code adoption, and enable true code enforcement; and

(10) All fuels comprehensive efficiency programs that address thermal and electric efficiency opportunities simultaneously and are structured to help consumers implement as many cost-effective measures as possible at the same time.

States that are achieving nation-leading level of efficiency investments and their associated economic benefits have adopted all or nearly all of these critical best practice efficiency policy, oversight, and program implementation tools. This whitepaper describes these best practices that are being deployed by leading energy efficiency states and why these policy, oversight, and implementation innovations are necessary and effective. It also examines the ability of the much greater efficiency investments brought about by these best practices to generate very substantial, positive economic results.

The paper identifies and explains that these model policies and best practices can be adopted by all states seeking to maximize the benefits of greater efficiency investments for all classes of energy consumers. It highlights policy and program approaches that deploy regulatory goals and requirements, realign utility incentives, create stakeholder oversight councils, and develop other key tools to obtain the necessary political, business, consumer, and other stakeholder support to achieve and to sustain greater investments in cost-effective energy efficiency. The paper explores how several states now treat efficiency as a primary, local energy resource that is invested in by utilities or 3rd party administrators and energy planners consistently year after year to save consumers billions.

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I. Where Are We Today: Current Investments in Energy Efficiency

Cost-effective efficiency investments are most frequently delivered through comprehensive state-based efficiency programs implemented by utilities or third party entities and overseen by public utility commissions or, in the case of municipal or co-operative utilities, their boards. Since efficiency technologies and opportunities constantly change, such programs are designed to evolve and need to be continuously updated in order to maximize savings for consumers. Well-designed efficiency programs typically include a comprehensive energy audit, the installation of, and incentives for, efficient insulation, lighting, building materials, appliances, heating-and-cooling systems, and countless other energy-saving technologies and processes. Increasingly, best practice efficiency programs offer some sort of financing option to help consumers pay for the portion of the efficiency projects that are not funded by program incentives and rebates.

Comprehensive efficiency programs are designed to provide consumers with three different types of assistance they need to overcome the numerous, diverse market barriers and failures that impede the implementation of cost saving efficiency investments. First, they provide <u>technical assistance and information,</u> including energy audits and accompanying efficiency recommendations, so customers can fully understand the efficiency opportunities that exist and their associated costs and benefits. Second, efficiency programs provide <u>financial incentives and rebates</u> to reduce the upfront cost of efficiency investments and entice consumer to adopt the efficiency recommendation identified by the program. Third, comprehensive programs provide <u>project financing</u> to help consumer pay over time for the portion of the efficiency investments that are not covered by program incentives and rebates.

There are many well-documented market barriers, market failures, and other reasons why consumers consistently fail to adopt cost-saving efficiency measures that are in their own economic best interest and thus need the support of comprehensive efficiency programs. Some of these market barriers, market failures, and other reasons that impede consumers' adoption of cost-saving efficiency measures in the absence of technical assistance and information, financial incentives and rebates, and project financing include:

(1) Split Incentives – landlords often do not want to invest in efficiency upgrades because tenants are responsible for paying energy bills. Building owners are often uncertain whether they will capture the full value of the efficiency measures they install if they were to sell the building;

(2) Lack of Individual Cost Information – by looking at a typical energy bill it's impossible to identify inefficiency. Customers cannot easily pinpoint what appliance to replace with a more efficient model or what building efficiency improvement to make to lower their energy costs;

(3) Uncertainty of Savings – it's hard for customers to calculate and be relatively certain that making an efficiency investment will save money by reducing their energy bills over time;

(4) Inadequate Information Regarding Efficient Options – there are so many choices for refrigerators, washers, dryers, lighting, heating systems, air conditioning, insulation, air sealing, and other energy improvements it's hard for consumers to know which is the most efficient, cost-effective, dependable, and worthwhile investment;

(5) Bounded Rationality – the complexity of many efficiency decisions are beyond the ability of a consumer to make an economically optimal choice. The difficulty and complexity of so many technical decisions often gets in the way of consumer action;

(6) Elevated Hurdle Rates – energy consumers, especially businesses, typically want a two- to three-year payback for an efficiency project, but are happy with an eight-year or even longer payback for other investment choices. Consumers tend to repeat ingrained spending and investment habits, neglecting cost-saving efficiency upgrades;

(7) Liquidity Constraints – consumers and business often lack access to the capital they need to purchase efficient equipment or improve building energy performance even if they are certain it will save them money over time;

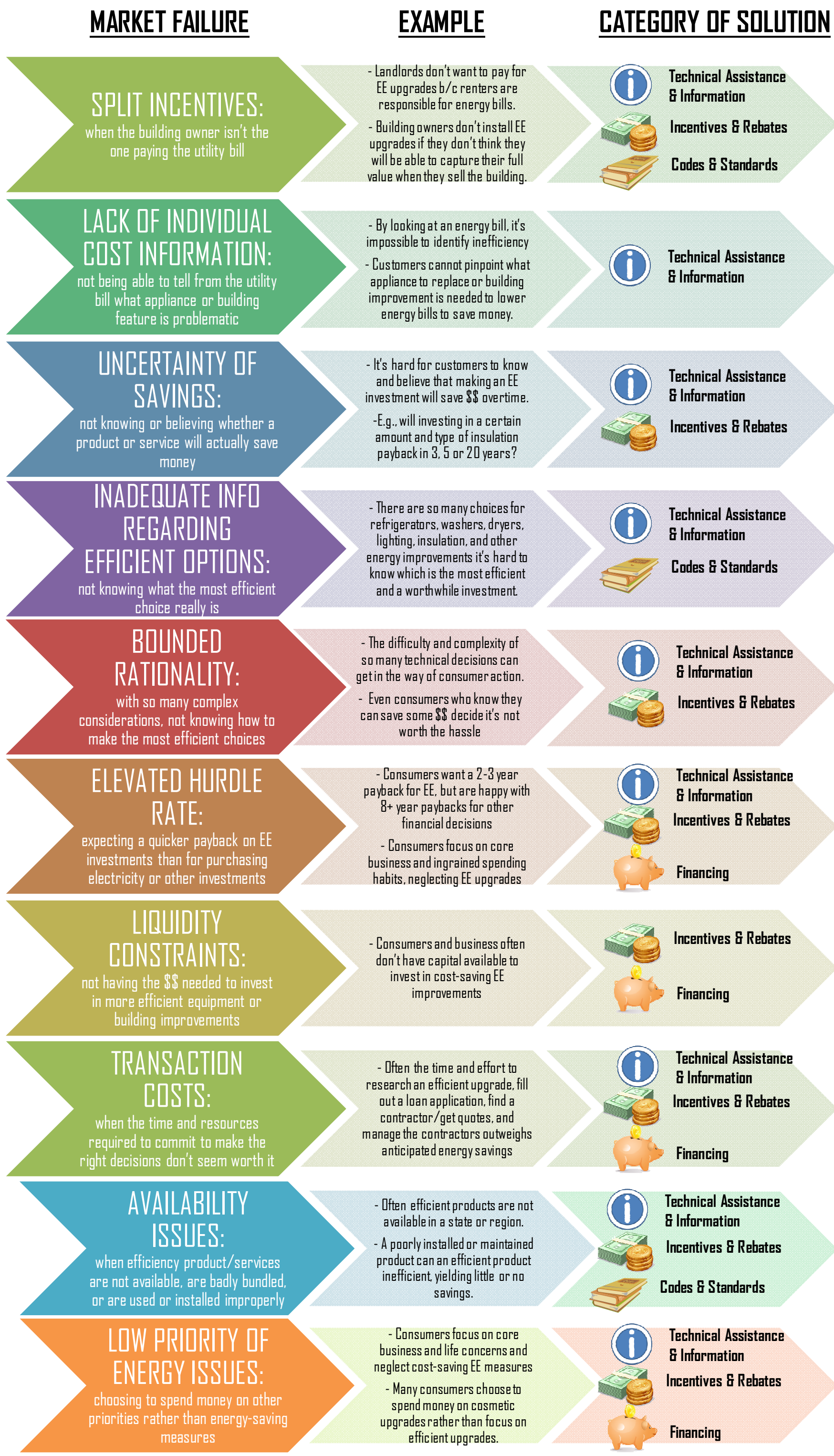
(8) Transaction Costs – the time and effort required to research an efficient upgrade, fill out a loan application, find a contractor and get quotes, and supervise workers in their home or business can in consumers' minds outweigh the expected returns in energy savings;

(9) Availability Issues – problems with efficiency product and service availability, adverse bundling and gold-plating, and fear of improper installation and maintenance impede efficiency adoption. Often efficiency products are not readily available in a state or region without the intervention of a comprehensive efficiency program;

(10) Low Priority of Energy Issues – business and residential energy consumers tend to focus on their core business and life concerns respectively and neglect to pursue cost-saving efficiency measures and upgrades;

The best efficiency programs are carefully designed to surmount these many market barriers, market failures, and other reasons consumers fail to adopt efficiency measures on their own. Comprehensive programs are adjusted over time so they can continue to overcome barriers as those barriers change. They also vary geographically in order to address state and regional market conditions and societal norms. To overcome most of these ten impediments to efficiency investments it is necessary to deploy more than one of the three different types of customer assistance. Since all market barriers must be overcome to achieve investment in all cost-effective efficiency, leading efficiency states and programs continuously and simultaneously deploy the three primary tools – (1) technical assistance and information, (2) financial incentives and rebates, and (3) efficiency financing – to overcome market failures and impediments to efficiency investments. Figure 1 lists ten market failures associated with energy efficiency, provides examples of each, and illustrates the categories of solutions or customer assistance that is needed to overcome that failure.

Figure 1: Market Failures Associated with Efficiency and Categories of Solutions to Address Them



Best practice efficiency programs deploy all three primary tools to overcome all market barriers and enable investment in all cost-effective efficiency resources. Such programs are constantly striving for and achieving comprehensiveness so that they can help consumers implement as many cost-effective measures as possible whenever they interact with the programs. Energy audits and technical recommendations strategically identify and pair extremely cost-effective measures with short payback periods with measures that have longer paybacks to ensure the programs get the most out of every site visit and to ensure consumers achieve deeper savings and avoid the creation of lost opportunities.[1] Incentives, rebates, and project financing are offered that encourage consumers to conduct the fullest complement of efficiency measures possible in order to maximize savings, minimize administrative costs, and ensure programs dollars are used wisely so the next set of consumers can be reached.

On average, comprehensive efficiency programs have been documented to save consumers roughly $3 for every $1 invested[2] and save electricity at a cost of 2 to 4 cents per kilowatt hour (kWh).[3] Importantly, this price for electric efficiency of 2 to 4 cents per lifetime kWh saved is much cheaper than the price of procuring additional electric supply from new generation, regardless of source of new electric power (see Figure 2). Energy efficiency programs thus represent a low-cost, local energy resource that can save consumers billions compared with more expensive traditional supply options.

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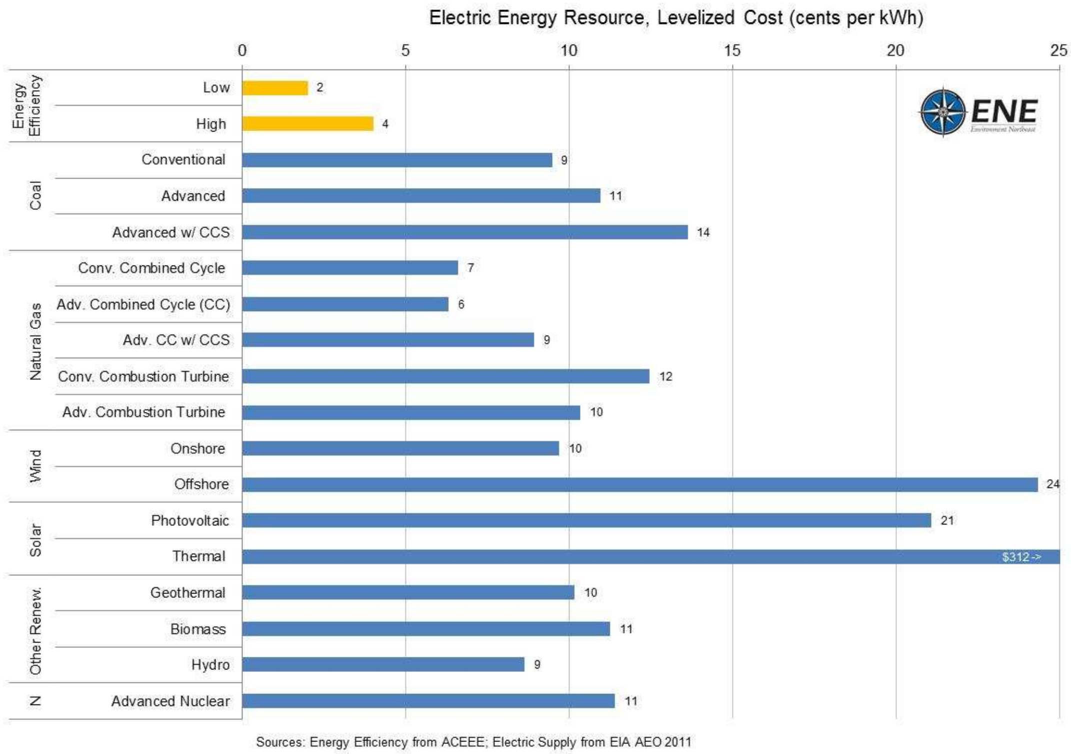
[1] According to industry practice, a lost opportunity "occurs when a customer does not install an energy efficiency measure that is cost-effective at the time and whose installation is unlikely to be cost-effective if the customer attempts to install the same measure later." See the California Public Utilities Commission's EE Policy Manual, Version 4.0, pg. 6, available at http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/45792.pdf.

[2] See e.g., Connecticut Energy Efficiency Fund, Report on the Energy Conservation Management Board Year 2010 Programs and Operations, "A Message from the Chair and Vice Chair" (March 2011), available at http://www.cl-p.com/clpMedia/ceep/index.html; Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs, A Summary of Electric Efficiency Programs Funded by Ratepayers between 2003 and 2005, Massachusetts Division of Energy Resources, April 2, 2007, pg. 1, available at http://www.mass.gov/Eoca/docs/doer/pub_info/ee03-05.pdf ; and Bruce Biewald, Max Chang, Lucy Johnston and David White, Electricity Energy Efficiency Benefits of RGGI Proceeds: An Initial Analysis, Synapse Economics, October 5, 2010, pg. 4, available at http://www.synapse-energy.com/Downloads/SynapseReport.2010-10.RAP.EE-Benefits-of-RGGI-Proceeds.10-027.pdf.

[3] A 2009 report from ACEEE examined efficiency programs in 14 states and found that the utility cost of saved energy averaged 2.5 cents per kWh saved. See Friedrich et al, Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility Sector Energy Efficiency Programs, ACEEE (September 2009), pg. ii, available at http://www.dnrec.delaware.gov/energy/information/Documents/Review%20of%20Cost%20Effective%20Energy%20Savings.pdf. The utility cost per unit of electricity saved includes an efficiency program's costs such as administrative and marketing costs incurred by the utility, technical assistance provided, incentives and rebates paid to customers, and performance incentives for the utility (it excludes net costs incurred by the participant). On average, it costs efficiency programs between 2 to 4 cents to save a kWh of electricity over the life of the measures.

Figure 2: Average Electric EE Program Cost per kWh saved vs. Supply Cost for New Generation

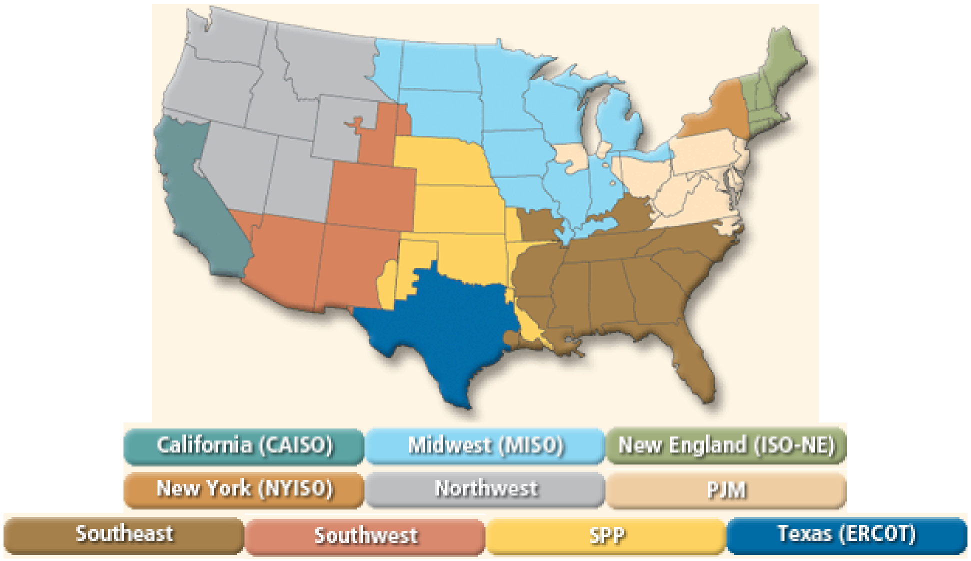


Given that average wholesale electricity prices vary across the United States' ten different regional power markets, it is also important to compare the price of efficiency with each region's average wholesale price for electricity. The Southeast, Midwest, and South Central regional power markets tend to have the lowest prices, whereas the New England, New York, PJM,[4] and California power markets tend to have higher wholesale electricity prices. Electricity prices in the Texas, Southwest, and Northwest power markets tend to be in the middle. Importantly, a comparison of the cost of efficiency versus the cost of electric supply on a regional level leads to the same result – energy efficiency is a dramatically less expensive resource than electric supply in all regions of the country.

Figure 3 is a map illustrating the 10 different electricity power markets in the continental U.S., as established by the Federal Energy Regulatory Commission. Figure 4 shows that the price of the electric efficiency resources is lower than the price of electric supply in each of these 10 different power markets even without accounting for other benefits of efficiency such as avoided transmission and distribution costs, demand induced price effects, and reductions in environmental harms.

[4] PJM stands for the Pennsylvania, Jersey, Maryland power market and includes all or most of Delaware, the District of Columbia, Maryland, New Jersey, Ohio, Pennsylvania, Virginia, and West Virginia. In addition, it contains smaller geographic regions of Indiana, Illinois, Kentucky, Michigan, North Carolina and Tennessee. For more information, see the Federal Energy Regulatory Commission's (FERC) "Electric Power Markets: National Overview," available at http://www.ferc.gov/market-oversight/mkt-electric/overview.asp.

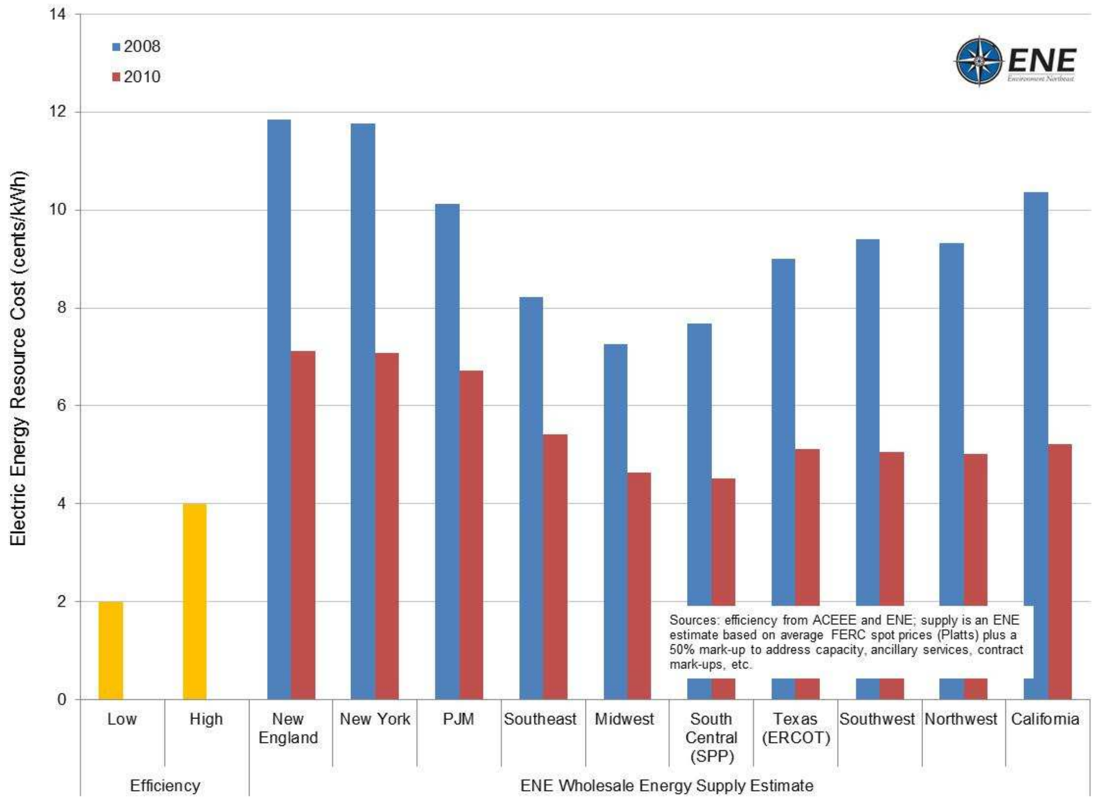
Figure 3: FERC Electricity Power Markets



Source: FERC

Figure 4: The Cost of Electric Efficiency vs. Supply in Different Power Markets

The decline in energy costs due to lower natural gas prices reduces the difference in efficiency vs. supply costs, but efficiency is still a lower cost resource in each regional power market across the country, even before factoring in other benefits such as avoided T&D costs, demand induced price effects, and environmental benefits.



In addition to delivering large savings for participating consumers, state energy efficiency programs also generate savings for non-participants by reducing the need for expensive transmission and distribution expenditures. In restructured states, efficiency programs also reduce the market clearing price of power for all consumers and in vertically integrated states they reduce the need to build expensive new power plants. Efficiency programs also provide needed economic stimulus during a challenging time for the U.S. and regional economies. New investments in energy efficiency create jobs quickly, produce significant long-term savings, and help to address long-term problems such as: (1) the United States' energy dependence on other nations; and (2) climate change, by delivering near-term reductions in greenhouse-gas emissions.[5]

The fundamental ability of energy efficiency programs to save electricity at a cost of 2 to 4 cents per kWh means that such program investments can perhaps be most aptly and succinctly viewed as a strategic economic resource – one that is dramatically less expensive than traditional supply options. Despite the fact that efficiency programs save consumers money and generate all of the additional benefits mentioned above, states across the country continue to massively underinvest in this low-cost energy efficiency resource as compared with more expensive supply (see Figure 5 below).

Figure 5: U.S. Expenditures on Electric Efficiency Programs vs. Electric Supply

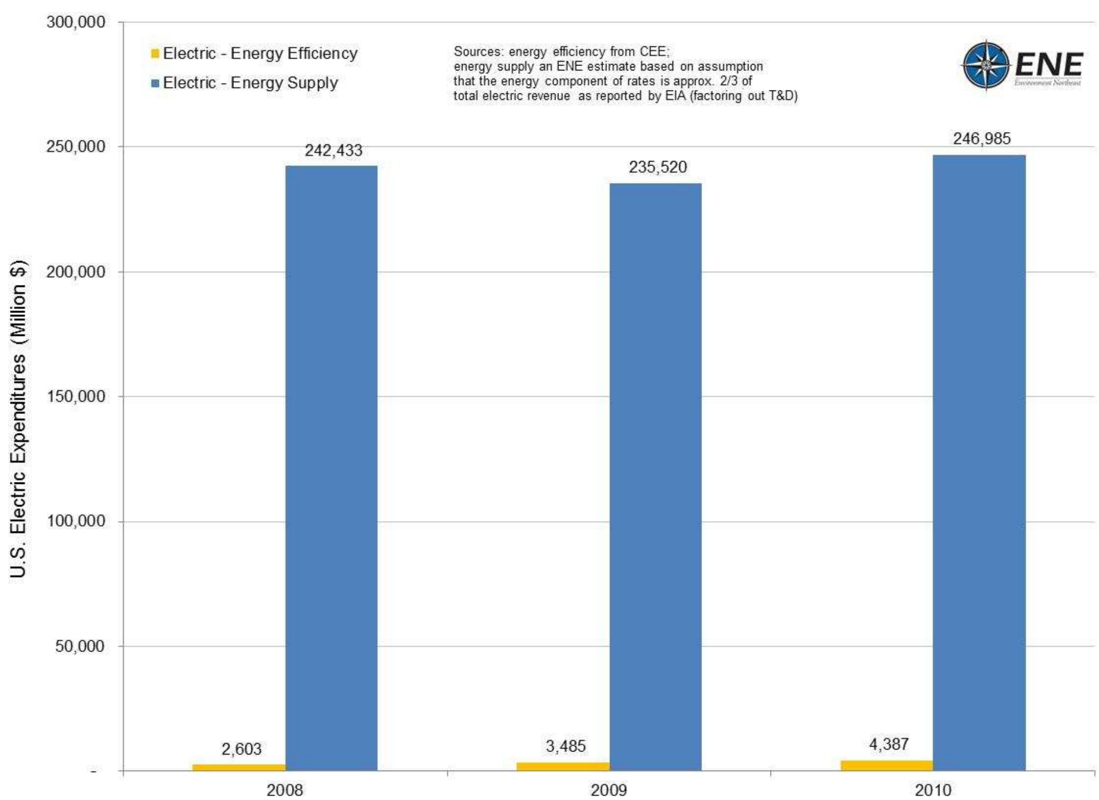


Figure 5 demonstrates that across the United States in 2010 we invested only $4.4 billion in electric energy efficiency programs and yet spent more than $240 billion on more expensive electric

[5] McKinsey & Company, "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" (December, 2007) sponsored by DTE Energy, Environmental Defense, Honeywell, National Grid, NRDC, PG&E, and Shell. Available at http://www.mckinsey.com/en/Client_Service/Sustainability/Latest_thinking/Reducing_US_greenhouse_gas_emissions.aspx.

supply. State policy facilitated spending 50 times more on a resource – electricity supply – that is much more expensive per kWh than a readily available alternative, energy efficiency. This pattern of spending more of our energy dollars on the more expensive resource represents an unnecessary and harmful drain on our economy.

As illustrated clearly in Figure 5, each year the U.S. massively underinvests in the lowest cost energy resource, energy efficiency programs. By shifting spending from higher-cost electric supply to lower cost investments in energy efficiency we can simultaneously make our domestic businesses more competitive, reduce greenhouse gases and other air pollution, and save consumers billions so they have more money to spend or invest in other parts of the economy.

The same pattern of dramatically overspending on higher cost electricity supply resources versus lower cost electric efficiency resources holds true for residential and commercial use of natural gas resources as well. Figure 6 illustrates that natural gas consumer efficiency programs deliver savings at a utility cost of between $2 to $7 per MMBtu saved compared with natural gas supply costs of $11 to $12.50 per MMBtu in 2010. Figure 7 illustrates that in 2010, U.S. consumers spent more than 40 times more on the more expensive resource – natural gas supply – than was invested in lower cost efficiency programs. Each year across the country, residential and commercial consumers spend more than $50 billion on natural gas supply while only $1.1 billion is invested in lower cost natural gas efficiency programs.

Figure 6: Natural Gas Energy Resource Costs – Efficiency Programs vs. Supply

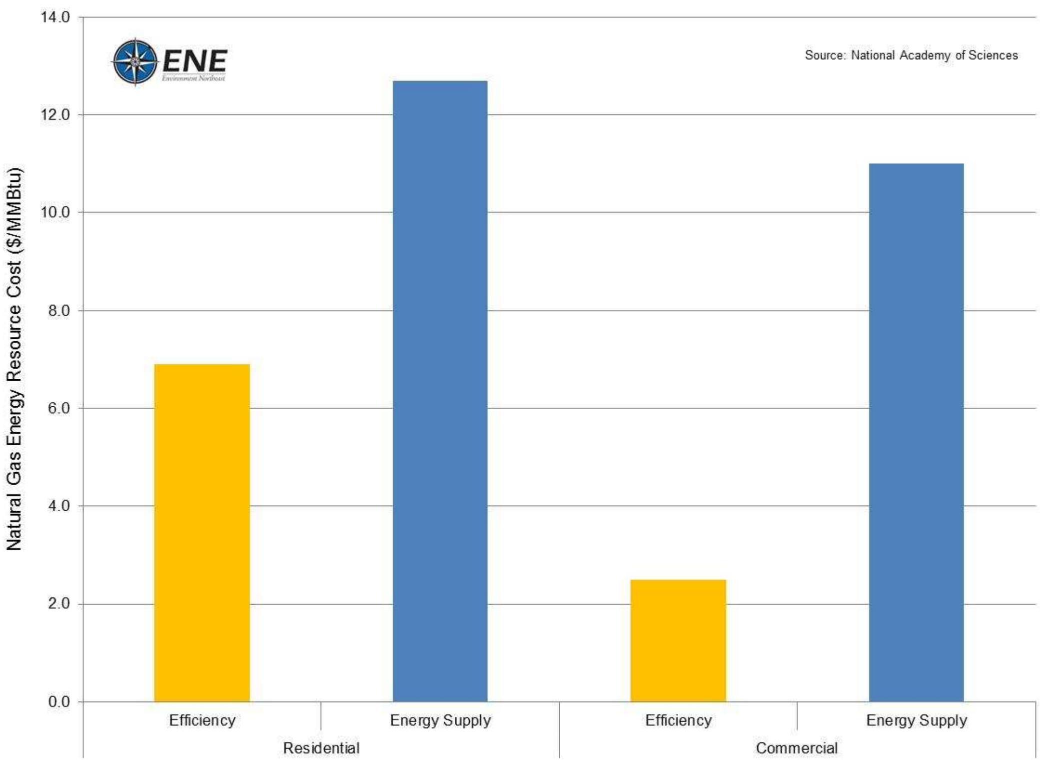
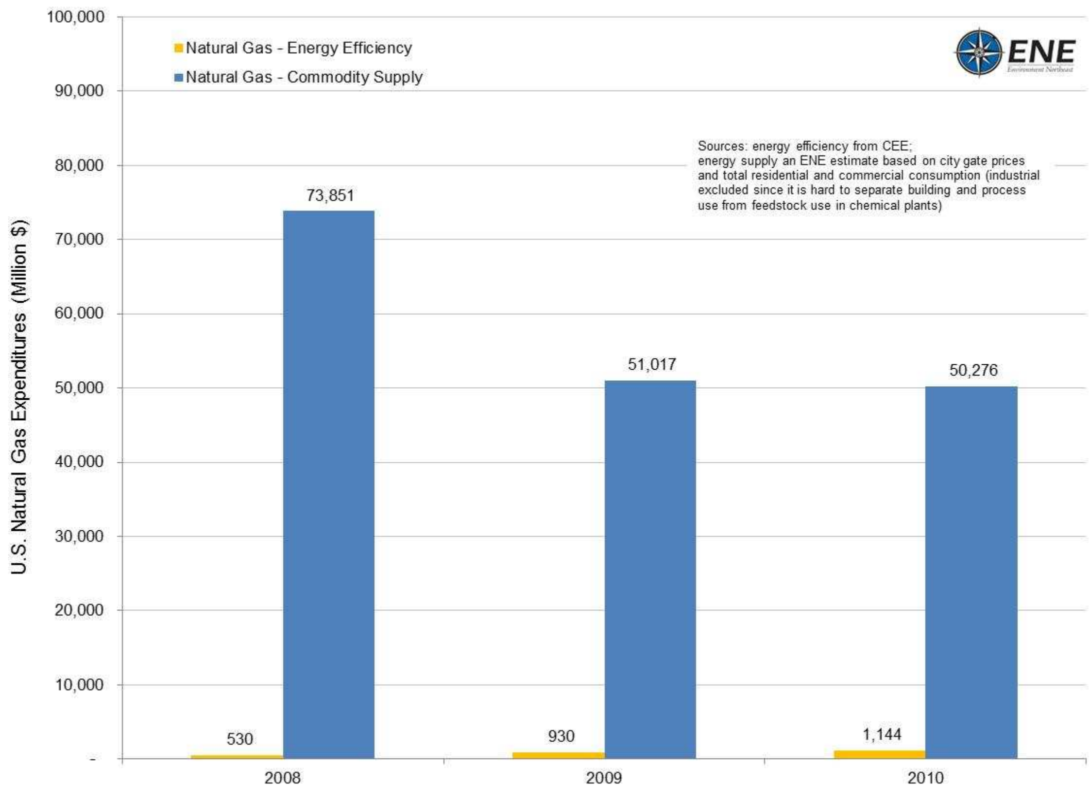


Figure 7: U.S. Expenditures on Natural Gas Efficiency vs. Energy Supply



II. Tapping an Economic Opportunity: Investment in All Cost-effective Energy Efficiency – New State Energy & Utility Requirements

Existing efficiency programs, which began in earnest in the late 1970s and early 1980s have delivered sizable savings to consumers across the country over the past three decades and represent a strong foundation upon which to build the next generation of efficiency policies and implementation.[6] Efficiency programs play a crucial role in spurring technological innovation and the commercialization of more efficient products and building materials and in so doing enable the passage of increasing stringent appliance standards and building codes. The combination of efficiency programs, technological innovation and deployment, and appliances standards and building codes have delivered an astonishing magnitude of energy savings. Figure 8 illustrates a rough approximation of the savings from all such activities from 1970 through 2007.[7]

[6] For a brief history of energy efficiency programs in the U.S. see Freeman et al., Implementing Energy Efficiency: Program Delivery Comparison Study, IEE Whitepaper (March 2010), pp. 6-9, available at http://www.edisonfoundation.net/iee/reports/IEE_EEProgDeliveryComparison.pdf.

[7] Laitner, John A. "Skip," "Testimony Before the Subcommittee on Research and Science Education, House Committee on Science and Technology" (September 25, 2007). Available at http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/092507_laitner.pdf.

Figure 8: U.S. Energy Service Demands, Energy Efficiency Gains, and Energy Supplies (1970-2007)[8]

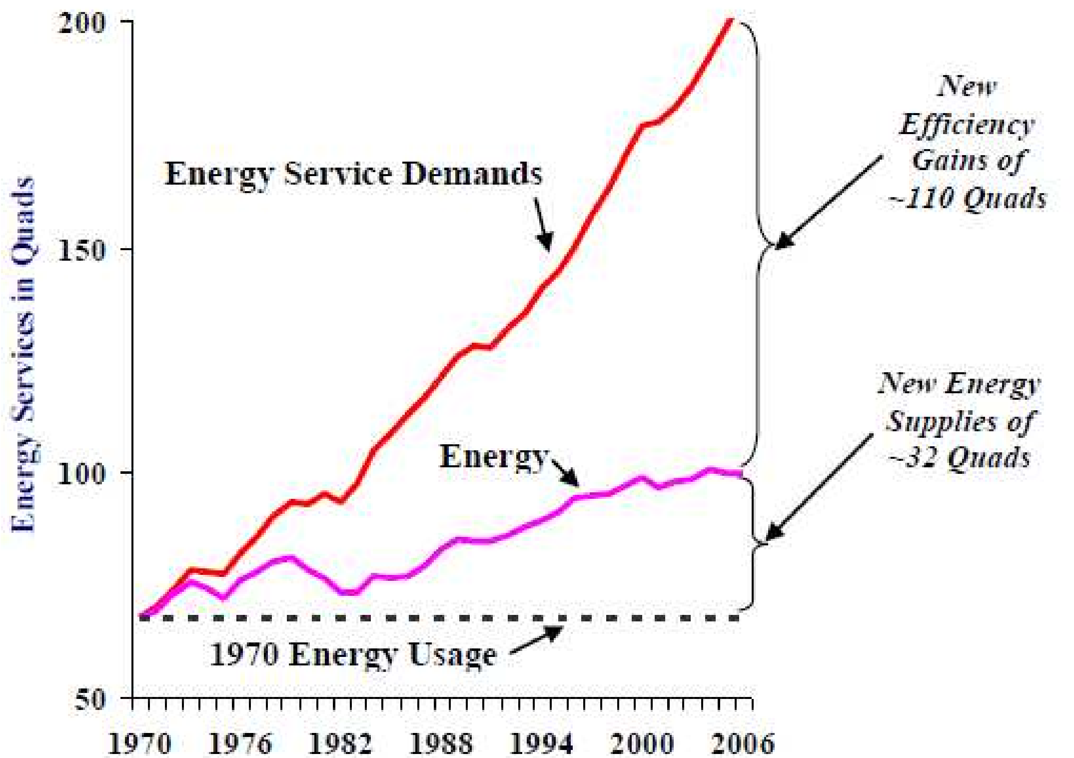


Figure 8 compares the projected level of energy usage in 2007 if the economy continued to rely upon 1970 technologies and market structures (roughly 210 quads[9]) with actual energy usage in 2007 (roughly 100 quads). Actual energy use in 2007 was much smaller than it would have been in the absence of substantial gains in energy efficiency throughout the economy. By 1990 for example, more than a thousand utilities offered some sort of demand-side management program[10] and those collective efforts coupled with appliance standards, building codes, and technology deployment have yielded sizable savings.

While existing efforts have been and will continue to deliver significant consumer savings, they have not been aggressive enough to capture the very large cost-effective efficiency opportunities that exist. In addition, efficiency opportunities constantly emerge and grow as technology advances. Figure 9 depicts the large quantity of cost-effective efficiency available in the U.S., which if invested in, would save consumers hundreds of billions of dollars. Tapping into this potential is an economic opportunity for every state in the country. It is an investment that will save consumers billions of dollars by lowering

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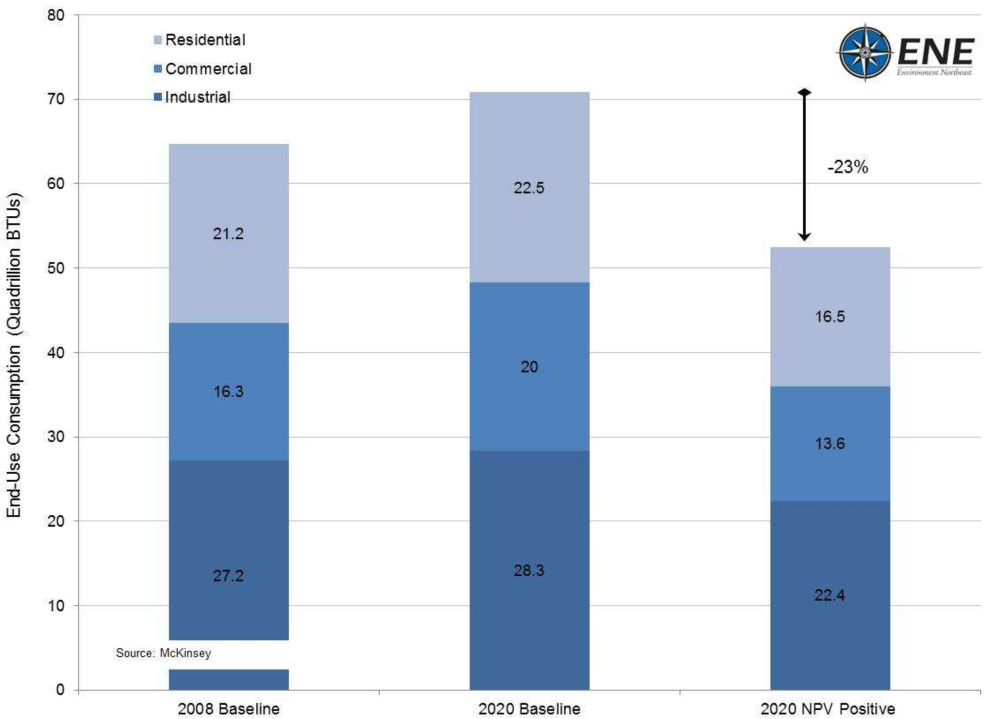
[8] Id. at pg. 4.

[9] A quad of energy is one quadrillion BTUs or 1,000,000,000,000,000 BTUs. See the U.S. DOE's glossary, available at http://www1.eere.energy.gov/site_administration/glossary.html#Q.

[10] Gillingham, Kenneth et al., "The Effectiveness and Cost of Energy Efficiency Programs" (Fall 2004), available at http://www.nicholas.duke.edu/people/faculty/newell/GillinghametalResources.pdf.

their energy bills, boost gross state product as consumers with lower energy bills have more money to spend in the local economy, increase local employment, and make U.S. businesses more competitive. Figure 9 is taken from the results of the 2009 McKinsey study, "Unlocking Energy Efficiency in the US Economy,"[11] which found that energy consumption in the non-transportation sectors (buildings and industry) could be cost-effectively reduced by 23% – or roughly 9.1 quadrillion BTUs – by 2020.

Figure 9: U.S. Energy Efficiency Potential (non-transportation sectors)



The next two figures are from the National Academy of Sciences 2010 report, "Real Prospects for Energy Efficiency in the United States," and depict residential and commercial electric and natural gas efficiency potential by end use respectively. This study found that 25-30% could be cost-effectively saved in the building sector over the next 20-25 years, and that 14-22% could be saved cost-effectively in the industrial sector.

[11] McKinsey & Co., "Unlocking EE in the U.S. Economy" (2009), pg. iii, available at http://www.mckinsey.com/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy.aspx. The report was co-sponsored by Austin Energy, US DOE, DTE Energy, Energy Foundation, EPA, Exelon Corporation, NRDC, PG&E Corporation, Sempra Energy, Sea Change Foundation, Southern Company, and the U.S. Green Building Council.

Figure 10: Residential & Commercial Electric Efficiency Cost-Curve[12]

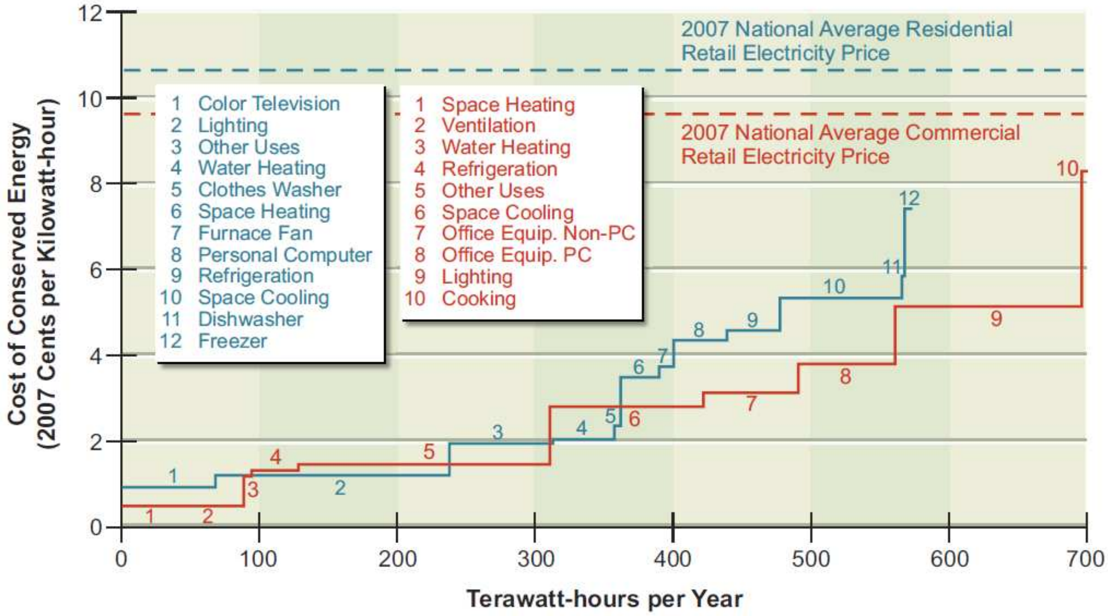
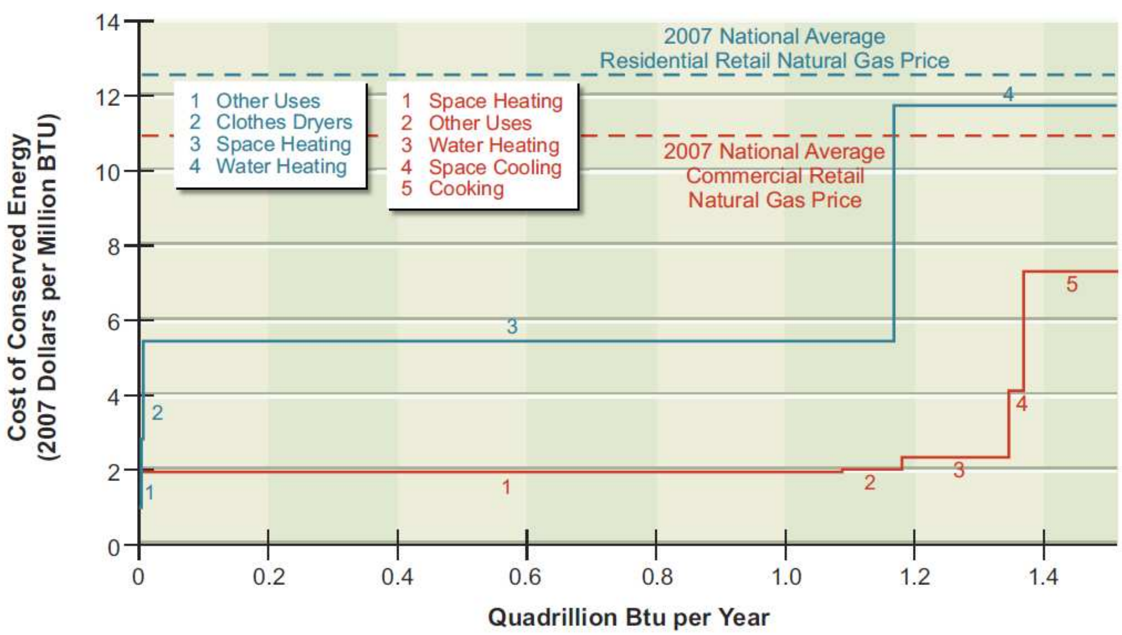


Figure 11: Residential & Commercial Natural Gas Efficiency Cost-Curve[13]



Over the past few years, several states have embarked on a new energy policy path that more fully invests in this great economic opportunity and widely available, low-cost energy resource – expanded efficiency programs. These states have done so by implementing policies which require energy efficiency to be procured as a strategic economic and energy resource. In recent years for example,

[12] National Academy of Sciences et al., Real Prospects for Energy Efficiency in the United States (National Academies Press, 2010), pg. 76. Available at http://www.nap.edu/catalog.php?record_id=12621.
[13] Id. at pg. 77.

Massachusetts, Rhode Island, and Vermont have all been implementing aggressive efficiency procurement policies designed around a simple economic goal – to invest in all energy efficiency resources that are cost-effective and less expensive than supply. Such states have chosen to make efficiency investment decisions on an economic basis, rather than place an arbitrary cap on investments due to political or other factors. These states are focused on achieving the net economic benefits generated by large reductions in consumers' supply costs and energy bills brought about by greater investments in comprehensive efficiency programs. As a result of innovative policies, successful implementation, and large consumer savings, Massachusetts, Rhode Island, Vermont were recently ranked the top three states in the country for "Utility and Public Benefits Programs and Policies" in ACEEE's[14] 2011 State Energy Efficiency Scorecard (Figure 12).[15]

Figure 12: ACEEE 2011 Ranking on Utility and Public Benefits Efficiency Programs and Policies

2011 ACEEE Scorecard Rank
1. Vermont
2. Massachusetts
2. Rhode Island
4. Minnesota
5. California
6. New York
7. Iowa
8. Oregon
8. Washington
10. Hawaii
10. Utah
10. Connecticut
13. Wisconsin
13. Nevada
13. Arizona
16. Colorado
17. Maine
17. New Hampshire
19. Michigan
20. Maryland

Massachusetts, Rhode Island, and Vermont decided to pursue a new economically-based efficiency policy aggressively after a realization that despite a couple decades of modest efficiency program efforts there still remained a large imbalance between the amount of energy dollars devoted to low-cost efficiency resources and the much greater amount of energy dollars spent on higher cost energy supply. Further, this imbalance persisted despite the fact that year in, year out a large quantity of inexpensive, cost-effective efficiency potential was continuously documented as untapped and available. Stakeholders in Massachusetts, Rhode Island, and Vermont found that even with a backdrop of modest

[14] ACEEE stands for the American Council for an Energy-Efficient Economy a nonprofit, 501(c)(3) organization that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, and behaviors.

[15] See Sciortino et al., State Energy Efficiency Scorecard (ACEEE, October 2011), pg. 6, available at http://www.aceee.org/research-report/e115.

but steady efficiency program delivery, new efficiency opportunities were constantly emerging as efficient technologies and processes continuously advanced and replenished the available cost-effective efficiency resource. In addition, stakeholders in these states determined that their existing policies had not been, and were not going to be, effective in fully investing in this low-cost, constantly replenishing resource.

These three states decided to act quickly and aggressively to establish new policies that could successfully harness the low-cost efficiency resource, in part in response to rising energy prices and uncertainty about future energy prices. Recognizing the following three important facts, each of these states decided to adopt new efficiency procurement policies and programs over the past several years designed to capture all cost-effective energy efficiency that is cheaper than supply:

(1) electric and natural gas supply is a much more expensive resource than energy efficiency and yet their state continued to spend too much on higher cost energy supply resources and massively underinvest in the low-cost efficiency resource;

(2) a large, constantly replenishing, low-cost efficiency potential existed despite years of modest, but steady existing efficiency programs; and

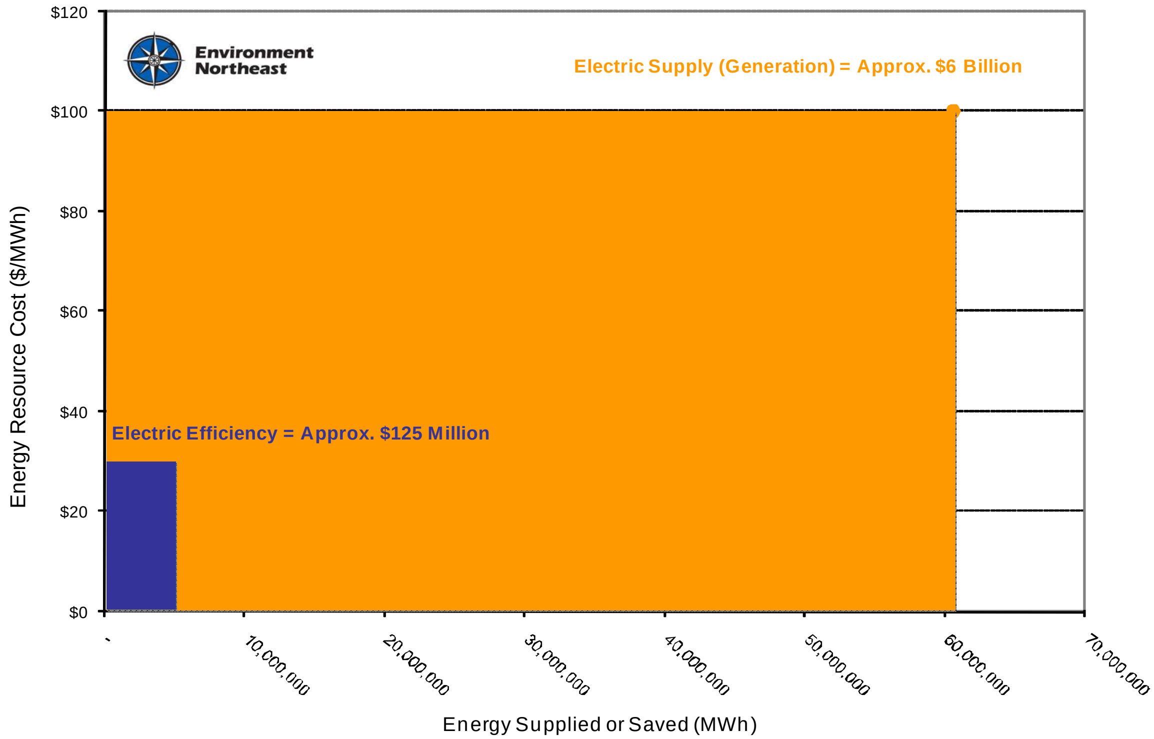
(3) existing energy laws, policies, and regulations would not succeed in enabling their state to invest in all cost-effective efficiency to lower consumers' energy bills by billions of dollars.

One example of an aggressive response to these three facts, is Massachusetts' passage of the Green Communities Act of 2008, which contained a new, widely-supported requirement that the electric and natural gas utilities invest in all cost-effective electric and natural gas efficiency that is lower cost than supply through a series of three-year efficiency investment plans.[16] With a common recognition that ending an era of massive underinvestment in low cost efficiency programs would simultaneously generate large economic and environment benefits for state, the new least cost efficiency procurement law passed in a bi-partisan manner and was universally supported by a diverse group of business, consumer, environmental, and low income stakeholders.

Figure 13 illustrates that at the time of the passage of Massachusetts' Green Communities Act, energy consumers in the state spent roughly $6 billion electric supply at a price of 10 cents per kWh and yet only invested $125 million in efficiency programs that delivered electric savings at a price of 3 cents per lifetime kWh. As stakeholders came to understand this problem and what it was costing them, consumer and low income advocates, business associations, utilities, environmental groups, and state policymakers all agreed a new efficiency policy was needed to stop the state from wastefully spending 50 times more on electric supply each year that was three times more expensive than the available electric efficiency resource. United in the belief this represented an unacceptable and inefficient economic practice that needlessly burdened every class of energy consumer and the environment, a large group of unlikely allies came together to form the Massachusetts SAVE Energy Coalition to support the adoption of the new least cost procurement or Energy Efficiency Procurement (EEP) policy for the state, a core part of the Green Communities Act of 2008.

[16] A summary of the *Green Communities Act of 2008*'s efficiency provisions is available at http://www.env-ne.org/resources/detail/ma-green-communities-act-summary/24. The actual legislative text is available at http://www.malegislature.gov/Laws/SessionLaws/Acts/2008/Chapter169.

Figure 13: Massachusetts' Annual Expenditures on Electric Efficiency Programs vs. Electric Supply (2008)



In a similar fashion to Massachusetts, widely supported, bi-partisan legislative efforts led to the passage of energy efficiency procurement laws in Rhode Island in 2006 and 2010,[17] and in Vermont in 2005 and 2006,[18] and in Connecticut in 2007.[19] Illustrating the bi-partisan and diverse stakeholder appeal of legislation requiring investment in all cost-effective efficiency that is cheaper than supply is the fact that Rhode Island's 2006 efficiency procurement law passed a Democratic-majority state Senate and House *unanimously* and was signed at a joint press event with the sitting Republican Governor a few days later. Similarly, Connecticut's 2007 Efficiency Procurement legislation was passed overwhelming by a Democratic-majority state legislature and signed by a Republican Governor.

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[17] *The Comprehensive Energy Conservation, Efficiency, & Affordability Act of 2006* and *An Act Relating to Public Utilities and Carriers – Revenue Decoupling* (2010). For a summary of Rhode Island's 2010 efficiency legislation and how it builds on the original 2006 Efficiency Procurement law see http://www.env-ne.org/resources/detail/ri-decoupling-and-efficiency-bill-2010-summary/12.

[18] Act 61 of 2005 removed an arbitrary funding cap for efficiency and requires the Vermont Public Service Board (PSB) to identify unrealized efficiency potential and adjust the Energy Efficiency Utility's (Efficiency Vermont) budget to invest in all cost-effective efficiency savings. Additional legislation in 2006 requires the Vermont PSB to give particular emphasis to four objectives as it ensures investment in all cost effective efficiency: "reducing the size of future power purchases; reducing greenhouse gases; limiting the need for transmission and distribution upgrades; and minimizing the cost of electricity." Subsequently, the statute was updated to also include particular emphasis on "providing efficiency and conservation as a part of a comprehensive resource supply strategy; providing the opportunity for all Vermonters to participate in efficiency and conservation programs; and the value of targeting efficiency and conservation efforts to locations, markets or customers where they may provide the greatest value." See 30 V.S.A. § 209(d)(4).

[19] For a summary of PA 07-242, (formerly HB 7432), *An Act Concerning Electricity and Energy Efficiency* see http://www.env-ne.org/resources/detail/ct-aac-energy-and-energy-efficiency-2007/28. In Connecticut, the utilities commission had until recently delayed implementation of the legislative mandate and not approved proposed expanded program plans.

By rebalancing investment choices, leveling the playing field for efficiency, and investing in efficiency whenever it is cost-effective and saves consumer money, Massachusetts and other Energy Efficiency Procurement states such as Vermont, Rhode Island, Connecticut, and Washington have begun to rebalance their investment choices in order to stimulate their economies, create jobs, increase energy independence, and reduce greenhouse-gas emissions. Investing in cost-effective efficiency is delivering important health, environmental, and energy security benefits for these states. Massachusetts for example, as is required by the Green Communities Act, is in the process of implementing a $1.5 billion, 3-year cost-effective efficiency investment plan that will generate electric and natural gas total consumer benefits of $6 billion, save 30 million MWh of electricity, save over 900 million therms of natural gas,[20] and in the process yield 69,000 job-years of employment and increase gross state product by roughly $9 billion.[21]

The Green Communities Act of 2008 represents a dramatic new policy framework for Massachusetts. It replaced an old policy of a statutorily-mandated, arbitrarily-capped amount of efficiency investment with a new efficiency policy based on economics, flexible to changing market conditions, and designed to maximize consumer savings. The new policy clearly requires utilities to procure all cost-effective electric and natural efficiency resources before more expensive supply with specific statutory steps to ensure this occurs. How this economic model for efficiency procurement was established and how it works in practice – including legislative requirements, public utility commission approval, program delivery, and carefully structured stakeholder oversight is described below.

[20] A detailed summary of Massachusetts' ambitious 3-year efficiency procurement plan is available at http://www.env-ne.org/resources/detail/ma-3-year-efficiency-procurement-plan-summary/24. See also, January 29, 2010 New York Times article by Leslie Kaufman titled "Massachusetts Sets Ambitious Energy Standards," available at http://www.nytimes.com/2010/01/30/science/earth/30energy.html.

[21] ENE's, "Energy Efficiency: An Engine of Economic Growth" report found efficiency program investments reduce consumers' energy bills and enable consumers to spend more money in the local economy and therefore yield direct, indirect, and induced employment growth of more than 46 jobs-years per million dollars of program spending and increase gross state product by more than $5.90 for every $1 of program investment. The report is available at http://www.env-ne.org/resources/open/p/id/964.

Case Study: All Cost-Effective Efficiency Procurement in Massachusetts and Rhode Island

The model for Energy Efficiency Procurement is very similar in Massachusetts and Rhode Island and is generating substantial positive economic results in all three states:

- **First, state law established a new economic model for efficiency investment** – an Energy Efficiency Procurement requirement for electric and natural gas utilities in these states requires them to invest in all cost-effective energy efficiency resources that are cheaper than supply;

- **Second, the states established new appointed stakeholder Efficiency Councils** – the Efficiency Councils have a designated statutory role to oversee utility efficiency programs, guide program planning and budgeting for all cost-effective efficiency investments, and conduct EM&V. The memberships of the Efficiency Councils are comprised of representatives of large businesses, small businesses, consumer and low income advocates, the environmental community, state agencies, and energy efficiency experts and are appointed by the Governor.

- **Third, utilities are required to submit successive 3-Year Efficiency Procurement Plans** – the Efficiency Procurement Plans provide the detail regarding how the utilities will invest in all cost-effective energy efficiency that is cheaper than supply, including how to fully fund the planned efficiency program investments. The 3-year Efficiency Procurement Plans go first for review, input, and approval by the Efficiency Councils and then for final approval by the PUC.

- **Forth, utilities' financial incentives are aligned with consumers' interests** – these states have removed utilities' disincentive to invest in all cost-effective efficiency by implementing revenue decoupling to make utilities neutral to sales volume and established performance incentives that rewards the utilities for delivering successful efficiency programs that lower consumers' energy bills.

A large part of the success of Energy Efficiency Procurement in Massachusetts and Rhode Island is due to the statutorily defined role and active involvement of diverse stakeholder Efficiency Councils. These Councils provide a forum for input and oversight by the very constituencies and consumer sectors that both pay for efficiency investments and reap the tremendous benefits of larger investments in cost-saving energy efficiency programs.

In Massachusetts, the Green Communities Act created an appointed stakeholder body called the Energy Efficiency Advisory Council (EEAC), which is comprised of 11 voting representatives of: (1) residential consumers, (2) low-income consumers, (3) the environmental community, (4) businesses, including large C&I end-users, (5) the manufacturing industry, (6) energy efficiency experts, (7) organized labor, (8) the department of environmental protection, (9) the attorney general, (10) the executive office of housing and economic development, and (11) the department of energy resources. Importantly, the Green Communities Act provided the Council with a budget with which to hire expert consultants to help the Council review proposed efficiency investment plans, provide advice and suggestions on new utility program designs, and be involved in evaluation, measurement, and verification of the efficiency programs. The Council's consultants may not have any contractual relationship with an electric or natural gas utility. By statute, review and approval of the utilities' proposed efficiency procurement plans requires a two-thirds vote of the Council before it is submitted to the utilities commission.[22] More information about Massachusetts' Energy Efficiency Advisory Council is available at www.ma-eeac.org/.

In Rhode Island, the efficiency stakeholder body is called the Energy Efficiency and Resource Management Council (EERMC) and is comprised of seven voting members appointed by the Governor with the advice and consent of the State Senate. The voting members include the following representatives: (1) expertise in energy regulation and law; (2) large commercial/industrial users; (3) small commercial/industrial users; (4) residential users; (5) low income users; (6) environmental issues pertaining to energy; and (7) expertise in energy design and codes. In addition, there are four ex-officio, non-voting members, representing the electric utility, the natural gas utility, the fuel oil or heating fuel industry, and the Commissioner of the Office of Energy Resources. The EERMC's website is www.rieermc.ri.gov/ and contains further information about this important body.

In Connecticut, the efficiency council is the Energy Conservation Management Board (ECMB) and advises, assists, and oversees the utilities in their development and implementation of comprehensive and cost-effective energy conservation and market transformation plans. The Council was created in 1998, which predates Connecticut's Efficiency Procurement law, in order to oversee the utilities' efficiency programs and now plays an expanded role in the Energy Efficiency Procurement process. More information about the ECMB is available at www.ctsavesenergy.org/ecmb/. In addition to the important policy, program input, and oversight roles performed by these three stakeholder councils, each body produces an annual report summarizing for policymaker, energy consumers, and the general public about the performance, results, and large economic and environmental benefits of the efficiency programs each year. Recent examples of the Councils' Annual Efficiency Reports can be found as referenced below.[23]

The implementation of an all cost-effective Energy Efficiency Procurement requirement is a process that entails: (1) continuously assessing the amount of cost-effective efficiency potential available in the state; (2) developing multi-year plans for how to deliver and pay for comprehensive efficiency programs available to all consumer sectors; (3) evaluating, measuring, and verifying program implementation; and (4) continuously making changes necessary changes to improve program delivery as technologies and opportunities evolve. This process of efficiency procurement cycles over several years in order to maximize savings for consumers and benefits to states' economies as a whole. An illustrative example (Figure 14) of how this process works in Massachusetts is provided below.

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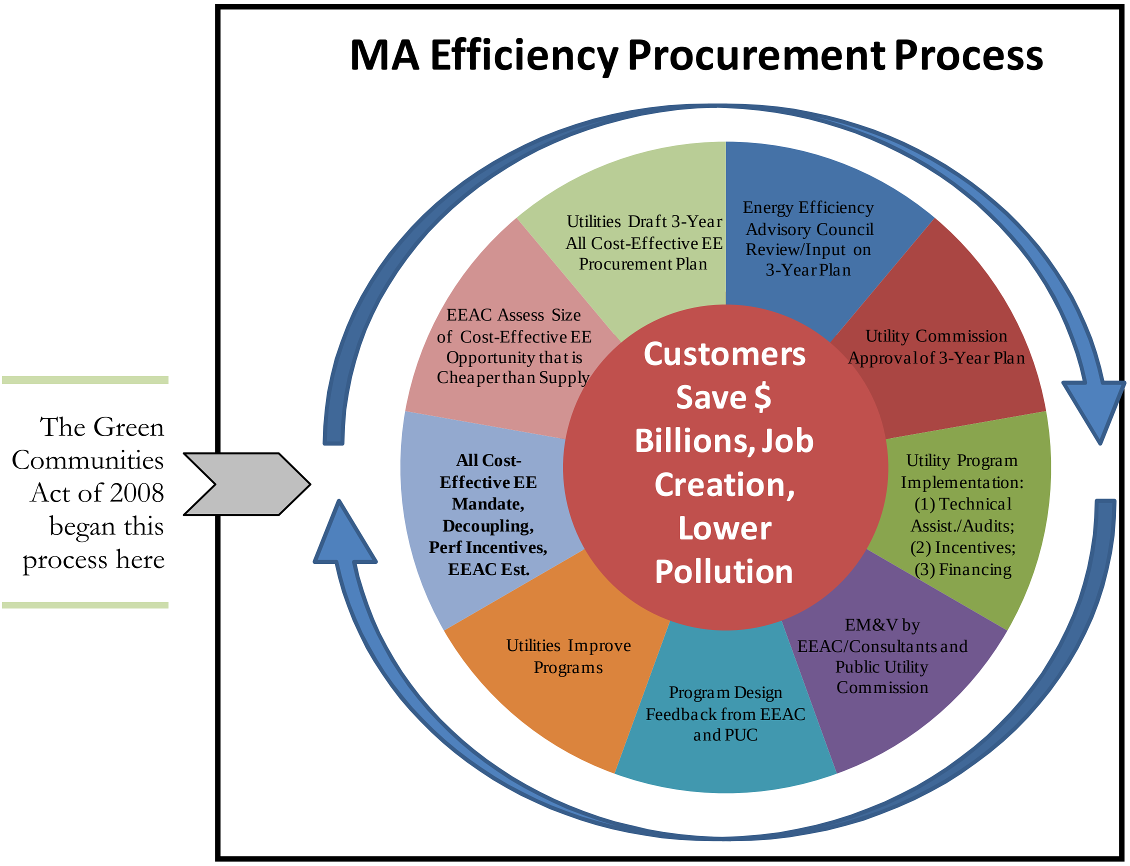
[22] Massachusetts' utilities are required to submit an electric and natural gas efficiency procurement plan that invests in all cost-effective efficiency every three years to the Council for approval and comment. The Council is required to review the plan and submit approval or comments to the utilities within three months. The utilities then have three months to revise the plan and incorporate recommendations from the Council before submission of the plan to the utilities commission together with the Council's approval or comments and a statement of any unresolved issues. See M.G.L. c. 25, §21(b)(1), 21(c) and (d)(1).

[23] The Massachusetts EEAC's Annual Report is available at www.mass.gov/Eoeea/docs/doer/Energy_Efficiency/eeac-2010-report-ee-advisory-council.pdf. The Rhode Island EERMC's Annual Report is available at www.rieermc.ri.gov/documents/annual/1_EERMC_April 2011.pdf. The Connecticut ECMB's 2010 Annual Report is available at www.ctsavesenergy.org/files/2010 Annual Legislative Report Final.pdf/.

Figure 14: MA Efficiency Procurement Process – Flow Chart



Through their Energy Efficiency Procurement processes Massachusetts, Vermont, Connecticut, and Rhode Island are fixing their historic imbalance in spending on low-cost efficiency resources versus more expensive supply. Figure 15 illustrates the increase in investments in low cost efficiency resources in Massachusetts. Since the passage of the *Green Communities Act* annual investments in electric programs in the state have more than quadrupled from $125 million in 2008 to $550 million in 2012.[24] Similar increases have occurred in Vermont, where approved electric efficiency program investments have increased from $17 million in 2005 to $46 million in 2014.[25] In Rhode Island, utility investments in consumer electric and natural gas efficiency has more than tripled from $16 million in 2007 to $49 million in 2011, resulting in $465 million in total benefits to ratepayers.

Figure 16 depicts historical efficiency program investments levels per capita in the top 20 states around the country and highlights the new investments levels in Vermont, Rhode Island, Connecticut,

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[24] Taken together, electric and gas efficiency program investments have increased from $155 million in 2008 to nearly $700 million in 2012.

[25] See Vermont PSB's "Order re: Energy Efficiency Utility Electric Budgets for Demand Resources Plan" (August 1, 2011), pg. 4. Note also pg. 5, concluding "additional cost-effective electric energy efficiency is reasonably available, and therefore we are increasing the electric EEU budget. This additional investment in cost-effective energy efficiency will result in *total electric costs to Vermont that are lower than they would otherwise be* by providing savings to consumers who install electric efficiency measures as well as savings to all ratepayers through reduced need for power purchases by utilities, deferred need for system upgrades such as new transmission facilities, and other statewide savings." [italics added]. Available at http://aceee.org/files/EEU-2010-06%20DRP.pdf.

and Massachusetts ushered in by all cost-effective efficiency procurement policies. Figure 17 shows the annual savings levels measured as a percentage of total electric load that will be achieved by leading states, including in Efficiency Procurement states. As whole, the following three figures demonstrate the nation-leading efficiency investments that are being made in the Northeast as a result of Energy Efficiency Procurement legislation, regulation, and efficiency Councils, and greatly expanded and enhanced efficiency program implementation.

Figure 15: MA Electric Efficiency Program Investment Levels (2008-2012)

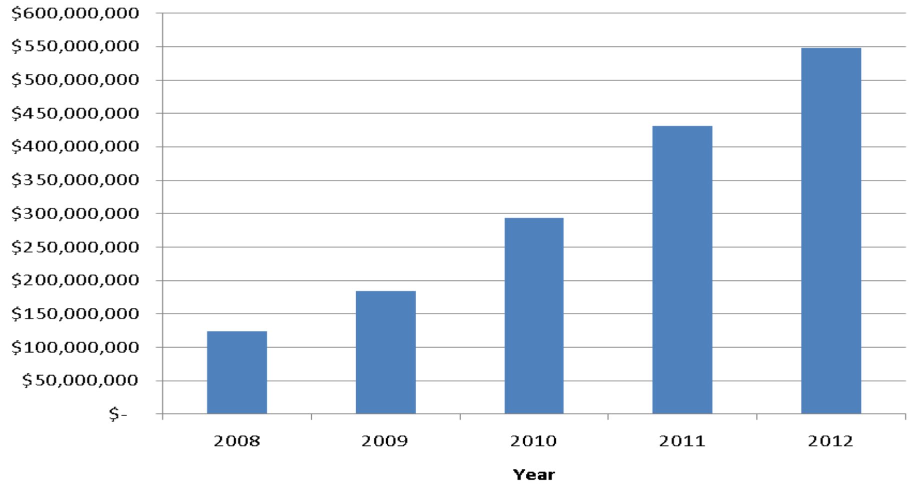


Figure 16: Historic & New Per-Capita Electric EE Investment Levels for Top 20 States

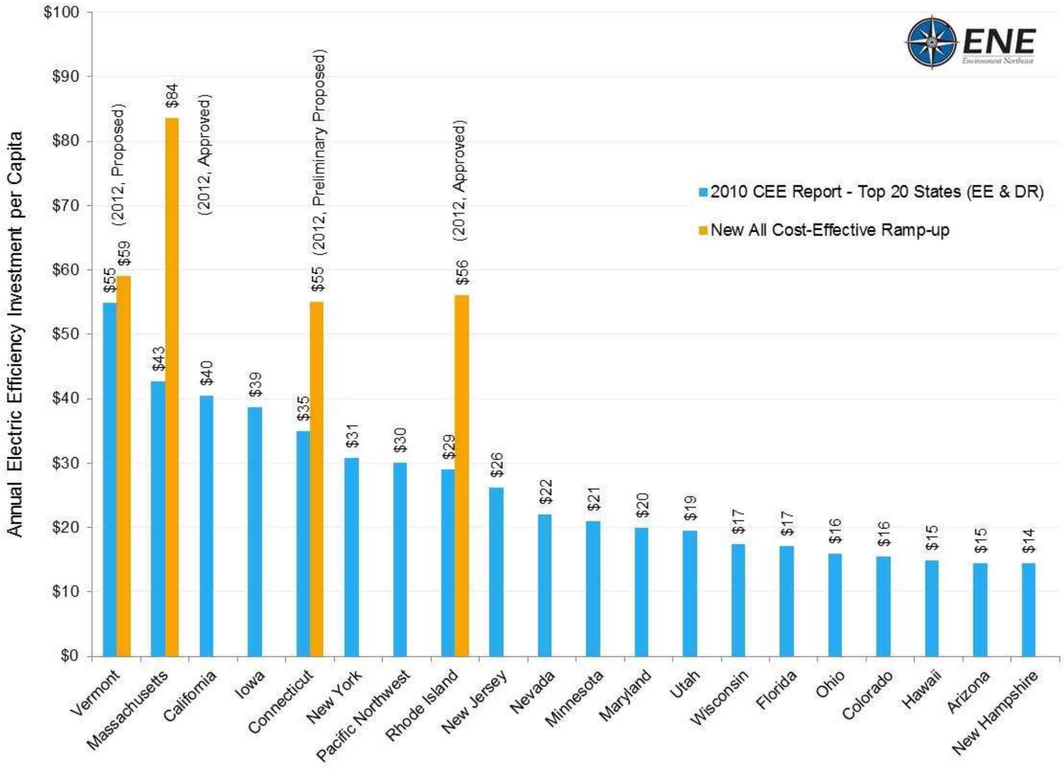
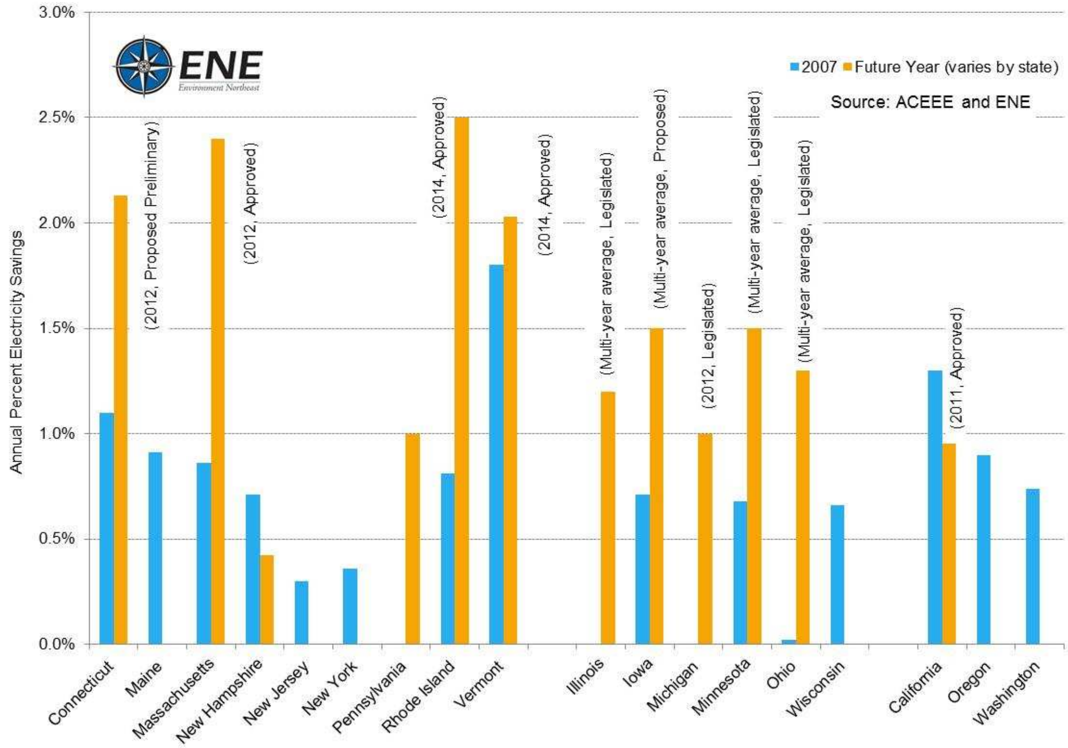


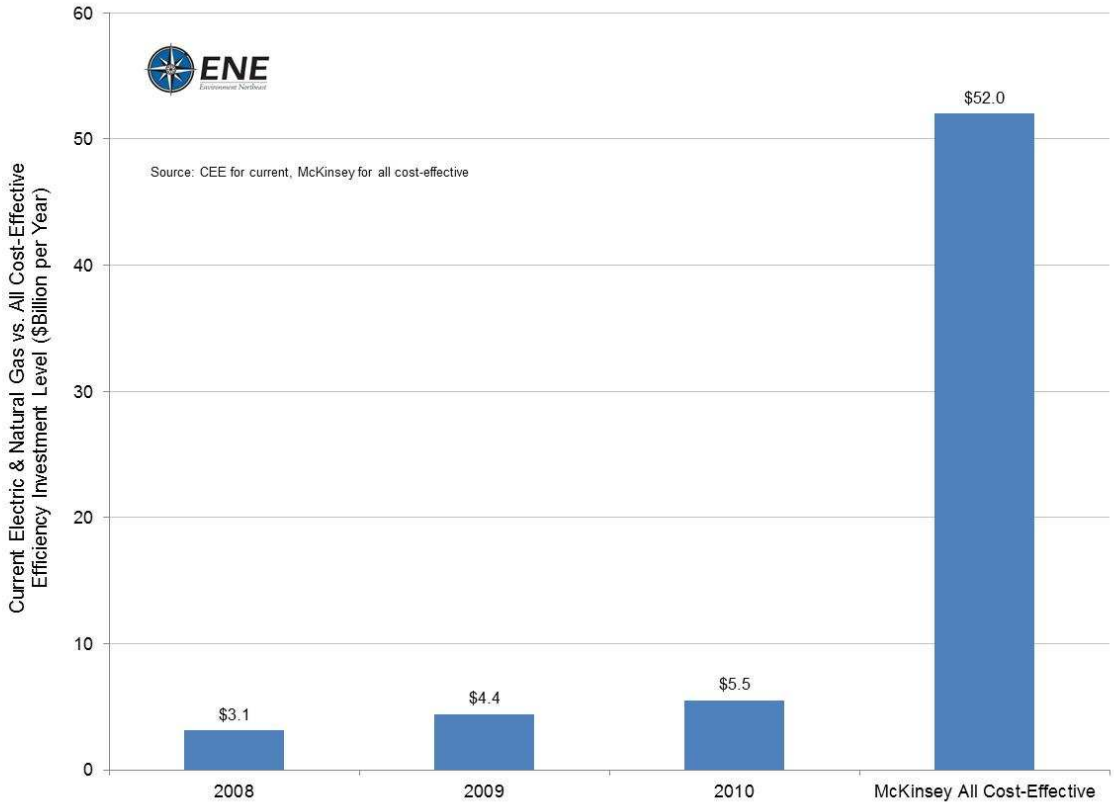
Figure 17: Historic & New Annual Efficiency Program Saving Levels for Top 20 States



The same wasteful imbalance that existed in Massachusetts and led to dramatic policy reform – a massive underinvestment in the lower cost resource, efficiency, as compared with high cost supply (Figure 13) – exists across the U.S. today. As Figure 5 demonstrates above, across the United States in 2010 consumers spent more than $240 billion on electric supply resources and only invested $4.4 billion in less expensive electric energy efficiency programs. As a country the fact that we are nowhere close to investing an adequate amount in the lower cost energy resources represents an incredible economic opportunity. Figure 18 illustrates that we only invest $5.5 billion annually in electric and natural gas efficiency programs when there is a much larger pool of cost-effective efficiency resources available – McKinsey estimates about $52 billion annually[26] – that we could invest in to save consumers money and improve our economy. With the right efficiency policies and structures in states across the country we could harness many times more of this low cost energy resource in order to lower consumers' energy bills.

[26] McKinsey & Co., "Unlocking EE in the U.S. Economy" (2009), pg. iii, available at http://www.mckinsey.com/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy.aspx.

Figure 18: Current EE Program Investment vs. EE All Cost-Effective Potential (non-transportation)



States across the country have taken different approaches to try to invest much greater amounts in the low cost efficiency resource. In general terms, states can be divided into two categories: (1) states that have passed statutes with enough detail so that the statute itself is the primary driver of efficiency program investment levels in the state; and (2) states that rely primarily on their utility commission (and/or municipal and co-operative utility boards) to drive efficiency program investments in the state through their resource planning processes.

A. Statute Drives Efficiency Investments

As described above, several states recognized the problem of massive underinvestment in low cost energy efficiency and passed the legislative solution of an economically-based Energy Efficiency Procurement (or "All Cost-Effective Efficiency") statutory policy model with substantial legislative detail. These states – including Connecticut, Maine[27], Massachusetts, Rhode Island, Vermont, and Washington – have made substantial and growing investments in cost-effective efficiency. In fact, five of these six these statutory Efficiency Procurement (All Cost-Effective) states are ranked in the top 10 nationally for Utility and Public Benefits Programs and Policies for efficiency.[28]

Other states have recognized the same underinvestment problem and adopted a different statutory tool to try to address it – a legislative Energy Efficiency Resource Standard, or legislative

[27] Note that Maine's statute requires legislative review of PUC approved energy efficiency budget increases and the Legislature has not allowed any of the proposed program expansion to move forward, so in many ways the legislated requirement to procure cost-effective efficiency is undercut by the legislative review.
[28] See Sciortino et al., State Energy Efficiency Scorecard (ACEEE, October 2011), pg. 6, available at http://www.aceee.org/research-report/e115.

EERS. Legislative EERSs are designed to achieve increased investments in cost-effective efficiency. They are a statutory requirement for utilities, or other state efficiency program administrator, to achieve a specified level of cost-effective efficiency savings by a date certain. Illinois, New Mexico, Ohio, Pennsylvania, and Texas have all adopted legislative EERSs.[29] In 2011, none of these five states were ranked in the top 20 in the country for Utility and Public Benefits Programs and Policies, but they may be in the years ahead if they meet their statutory EERSs' savings requirements.[30]

The main difference between a statutory Efficiency Procurement (All Cost-Effective Efficiency) state and a legislative EERS state is as follows: (1) in a Efficiency Procurement state the statutory requirement is economic in nature – to procure all cost-effective energy efficiency that is cheaper than supply – which is then followed by stakeholder council and/or commission proceedings to identify the savings needed to achieve that legislative low-cost resource procurement requirement; (2) alternatively, in a legislative EERS state the required savings levels are established in the legislation and the frame is more focused on those targets and not explicitly economically-based.[31]

Figure 19 shows the status of the 50 states with regard to the primary driver of efficiency investments in the state. The figure depicts whether the state is primarily an Energy Efficiency Procurement state with a *detailed statutory requirement to invest in all cost-effective efficiency that is cheaper than supply* (with a savings target subsequently set in stakeholder council and/or utility commission proceedings on an economic basis) or a legislative EERS state where *specific savings levels of efficiency to be achieved have been established by statute.*

Figure 19 also depicts states whose primary efficiency investment driver is the inclusion of efficiency as part of a statutory Renewable Portfolio Standard (Nevada and North Carolina) and a state that relies primarily on a statutorily-defined System Benefits Charge to fund efficiency programs (New Jersey). Of these three states, Nevada ranks in the top 20 for Utility and Public Benefits Programs and Policies. In addition, the figure layers in detail regarding whether a state has a *legislative goal for efficiency savings* or a *statutory cap on funding.*

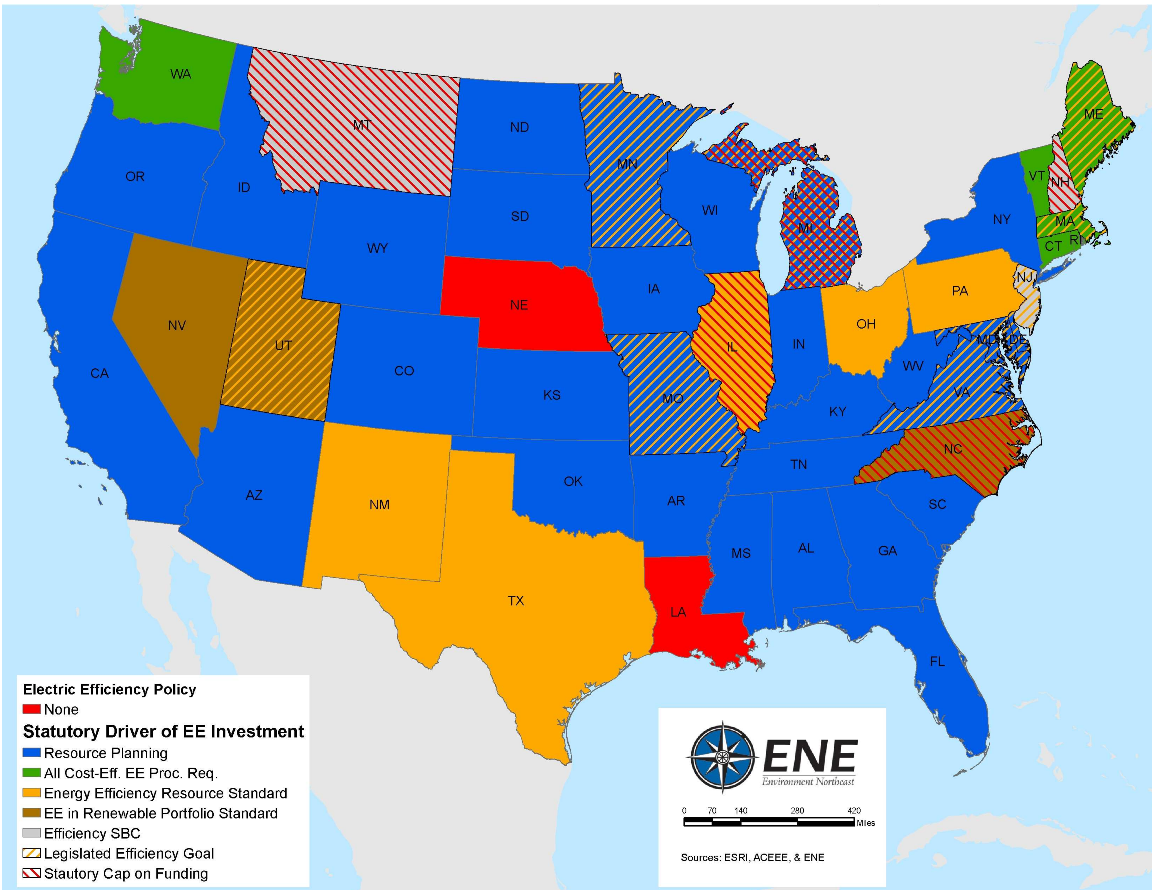
B. Utility Commission Drives Efficiency Investments

While there has been new statutory efficiency policy innovation and implementation in more than a dozen states as described above, Figure 19 illustrates that most states primarily rely on utility commissions' (or municipal and cooperative utility boards') resource planning and rate cases as the primary driver of efficiency program investment levels and required savings. Commissions in states that have continued with a vertically integrated, fully-regulated utility sector tend to make such decisions as part of the development of utilities' integrated resource plans (IRPs). Commissions in some states determine the required efficiency investment and savings levels as part of rate cases or stand-alone efficiency rate proceedings. It is important to note that commissions in some resource planning / rate case states have established aggressive efficiency investment and savings levels and several have utility commission-established multi-year savings goals that organizations such as ACEEE consider to be EERSs. We have chosen to categorize all of these states as resource planning states, since a commission can change goals at any time and the efficiency savings levels in these states are not in statutes as EERSs. Figure 19 categorizes states by their primary driver of efficiency investments and as

[29] Illinois also passed a statutory cap on efficiency funding, making it very unlikely the state's utilities will be able to fulfill their statutory efficiency savings requirements.
[30] See Sciortino et al., State Energy Efficiency Scorecard (ACEEE, October 2011), pg. 6, available at http://www.aceee.org/research-report/e115.
[31] In legislative EERS states, savings requirements may be based on an understanding of the cost-effective EE potential.

such, states that have *commission-required* EERSs and savings levels are catalogued as resource planning / rate case states because commission proceedings are the main determinant of efficiency investments. Recognizing there are many ways of categorizing a state's predominating efficiency policy, Figure 19 is just one attempt to do so. Its aim is to provide a new, directional flavor of the different approaches taken by various states across the country and is an initial assessment with information through mid-2011, which can continue to be updated by working with stakeholders active in efficiency policy and implementation in different states.

Figure 19: Primary Driver of Efficiency Program Investments



One example of the use of an integrated resource plan to help to determine the level of efficiency investments is the Tennessee Valley Authority's (TVA) 2011 IRP, which is highlighted below.[32]

[32] See TVA's Integrated Resource Plan: Environmental & Energy Future (TVA, March 2011), available at http://www.tva.com/environment/reports/irp/index.htm.

Case Study: Efficiency as a Resource in IRPs – Tennessee Valley Authority 2011 IRP

TVA's 2011 IRP took two years to develop and was designed to identify "the resources that will be needed to satisfy expected energy demand in the Tennessee Valley region over the next 20 years" and support TVA's goal of being "one of the nation's leading providers of low-cost and cleaner energy by 2020. TVA's IRP relies upon a substantial amount of low-cost energy efficiency resources, including:

- 3,600-5,100 MW achieved through efficiency by 2020 and
- 11,400-14,400 GWh saved through efficiency by 2020, which equates to
- Cumulative energy savings of 5.4% by 2020

TVA also recently released an energy efficiency potential study conducted by Global Energy Partners. The study identified available cost-effective achievable potential savings of 3,256 – 7,494 GWhs by 2015. This indicates that the 2011 IRP is a great start, but that substantially more cost-effective efficiency investments exist that could save consumers more money. Acquiring such resources would likely necessitate explicit state policies for investing in all cost-effective energy efficiency before more expensive supply and building such efficiency investments into IRPs to maximize consumer savings.

One of the best ways to judge which efficiency policies are the most effective is by comparing the magnitude of efficiency investments and savings levels that are being achieved. This information is depicted in Figures 16 and 17 above. Similarly, Figures 20 and 21 show how the states' statutory Efficiency Procurement / All Cost-Effective, legislative EERS policies, commission resource planning / rate cases, and other efficiency policies have translated into electric efficiency investment levels across all 48 states in the continental U.S. Figure 22 illustrates the same thing for natural gas efficiency investments per unit of energy.[33]

[33] Figures 20 and 22 depict the per capita amounts, as this a commonly used metric for investment levels, but investment per unit of energy consumed is probably a better metric since a per capita view does not reflect differences in commercial and industrial compositions and because for natural gas there are a number of other heating fuels used in some regions.

Figure 20: National Per Capita Electric EE Program Investments

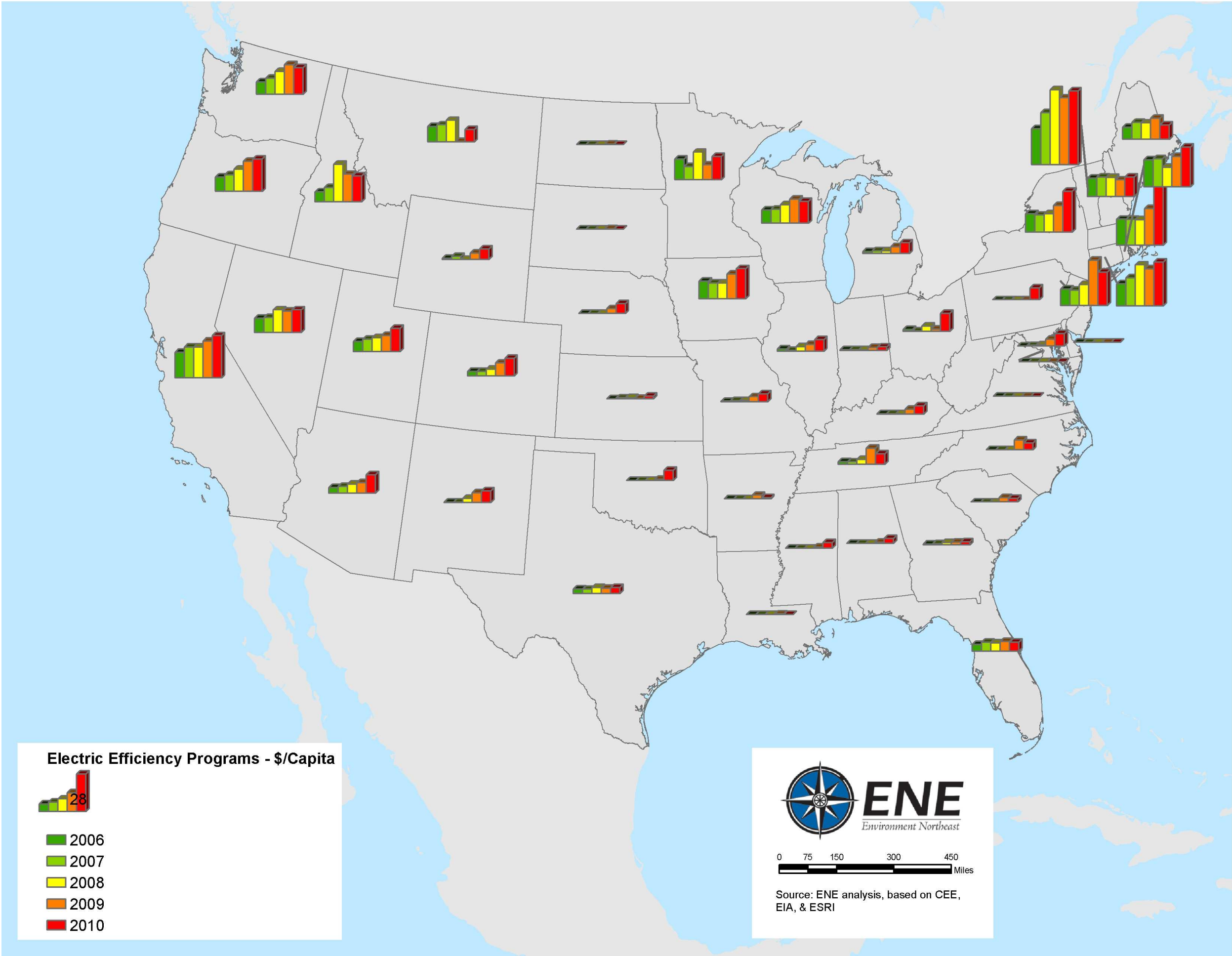


Figure 21: National Electric EE Program Investment Level per Unit of Energy Sold ($/MWh)

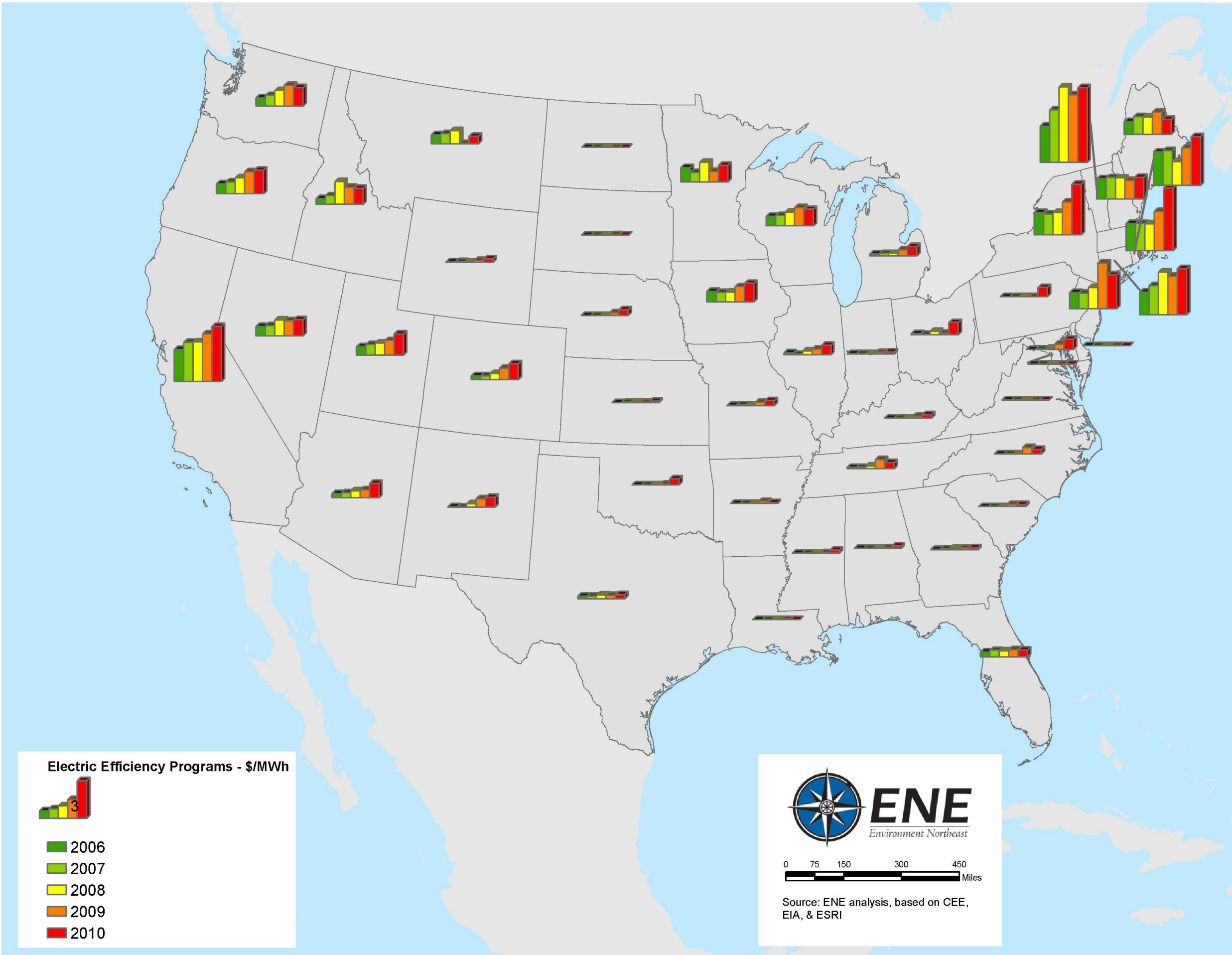
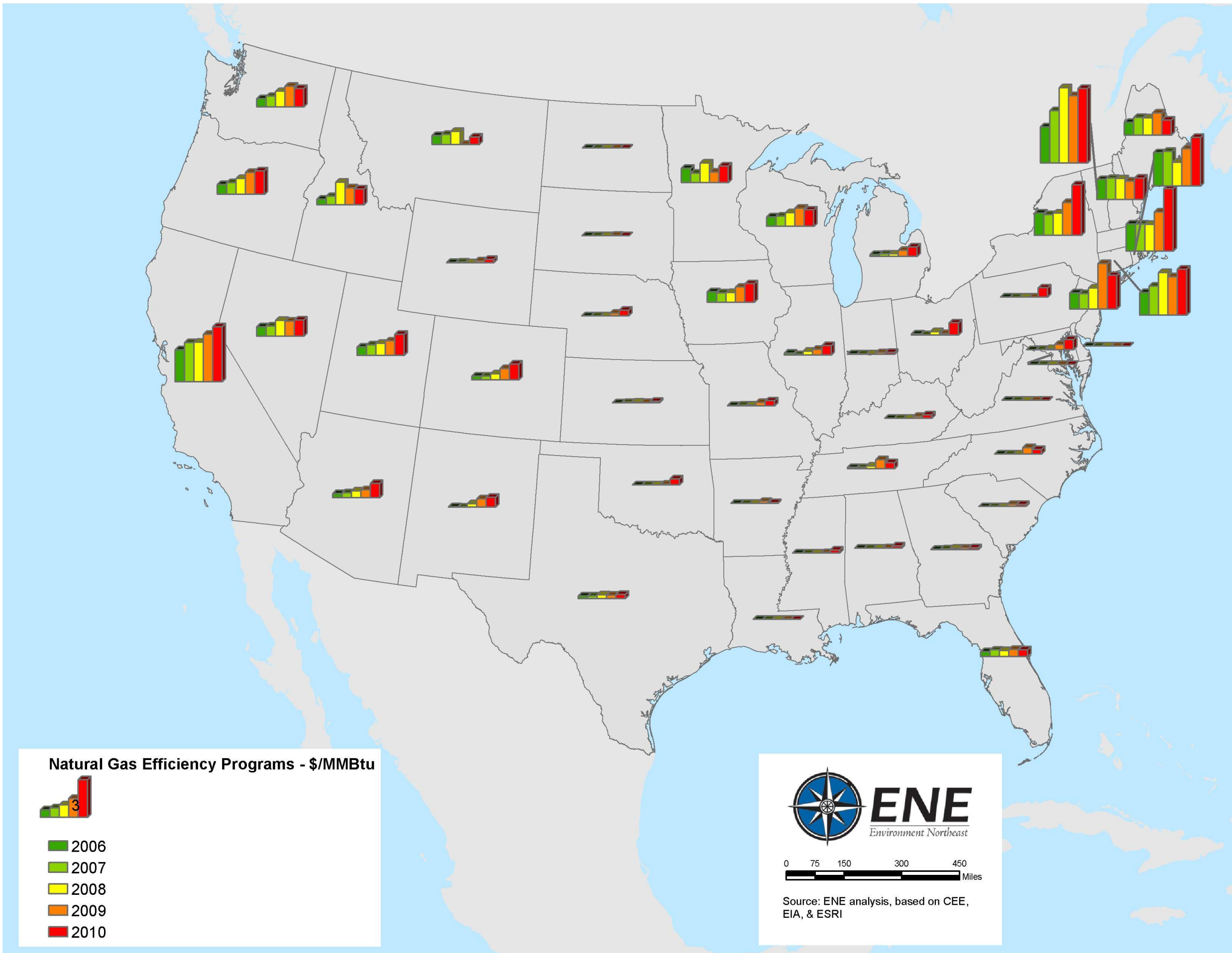


Figure 22: National Natural Gas EE Program Investment Level per Unit of Energy Sold ($/therm)

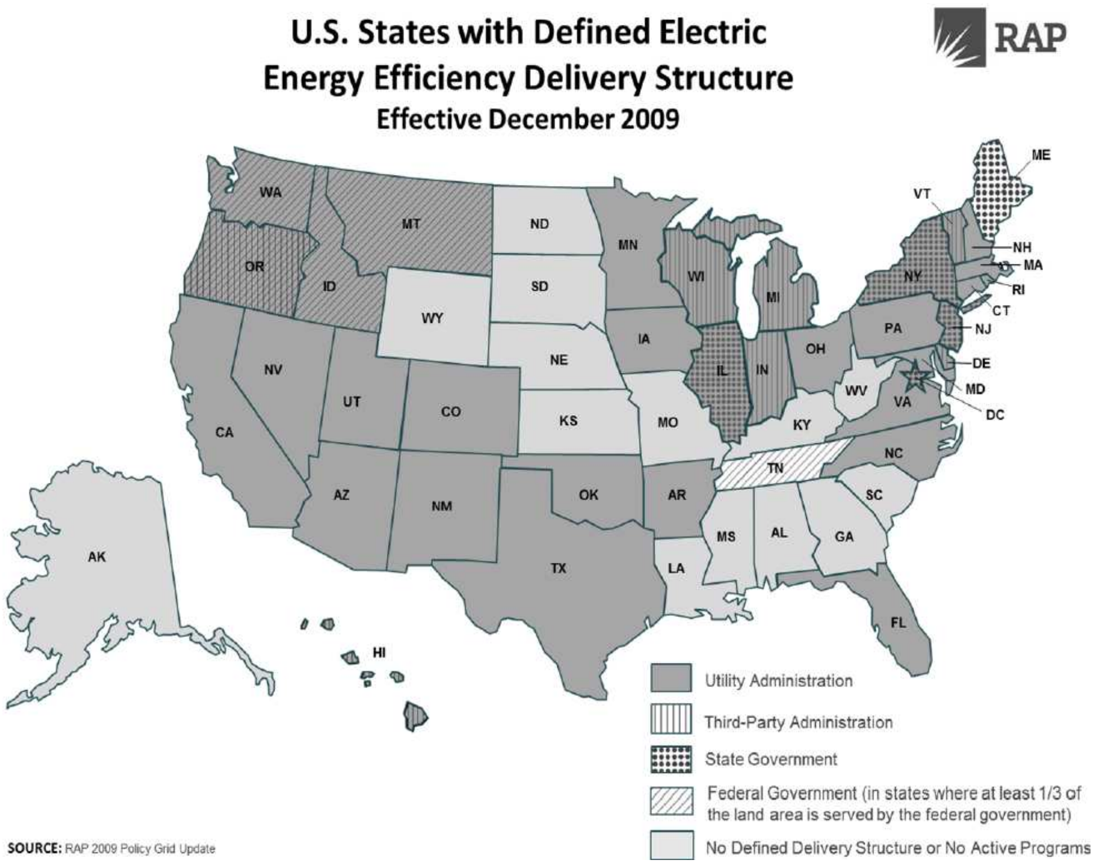


Figures 20, 21, and 22 illustrate that on average statutory Efficiency Procurement / All Cost-Effective states (Massachusetts, Rhode Island, Vermont, Washington, Maine, and Connecticut) have achieved the highest per capita efficiency investments and savings levels by a wide margin. Legislative EERS states (Illinois, New Mexico, Ohio, Pennsylvania, and Texas) have achieved moderate progress to date. Resource planning / rate case states and commission-established EERSs states have a mixed record; some such states e.g., California, Oregon, New York, New Jersey, Iowa, Minnesota, Wisconsin, and Idaho have performed very well to moderately well, but the majority of such states have fared quite poorly in terms of the level of efficiency investment.

III. Efficiency Program Management Structure

States have adopted several different program management and oversight strategies to ensure that much larger efficiency investments are actually delivering the substantial consumer savings that are expected. While in most states, the designated efficiency program administrators are utilities, in some states they are 3rd party administrators (such as Efficiency Vermont or the Energy Trust of Oregon). Additionally, in some states, program administration is conducted by a state or quasi-state entity. According to a detailed Lawrence Berkeley National Laboratory report, there is not a single administrative structure for energy-efficiency programs that is clearly superior to others.[34] That is, with the right incentives, oversight, and underlying efficiency procurement and resource acquisition policies both utility administration and 3rd party administration have the ability to deliver nation-leading efficiency investments and program results. Figure 23 below illustrates the predominating program administrators in each of the 50 states.

Figure 23: National Map of Program Administration Structure[35]



Regardless of the model of program administration, there are commonalities in how efficiency programs are effectively overseen and evaluated. The range of tools deployed by states to oversee and have input into efficiency planning, investment amounts, and program design include the following:

(1) the establishment of appointed efficiency stakeholder councils with a statutory role to oversee programs, provide input into program planning and budgeting for growing efficiency investments, and conduct evaluation, measurement, and verification;

(2) a clear requirement that program administrators must report efficiency program results regularly to such stakeholder councils and/or to the public utility commission and that the

[34] *See* Lawrence Berkeley National Laboratory, "Who Should Administer Energy-Efficiency Programs?" (2003), available at http://eetd.lbl.gov/ea/ems/reports/53597.pdf.
[35] Hausauer, B. "US States with Defined Electric Energy Efficiency Delivery Structure" (May 2011, draft) with data effective December 2009, available at www.raponline.org/document/download/id/834.

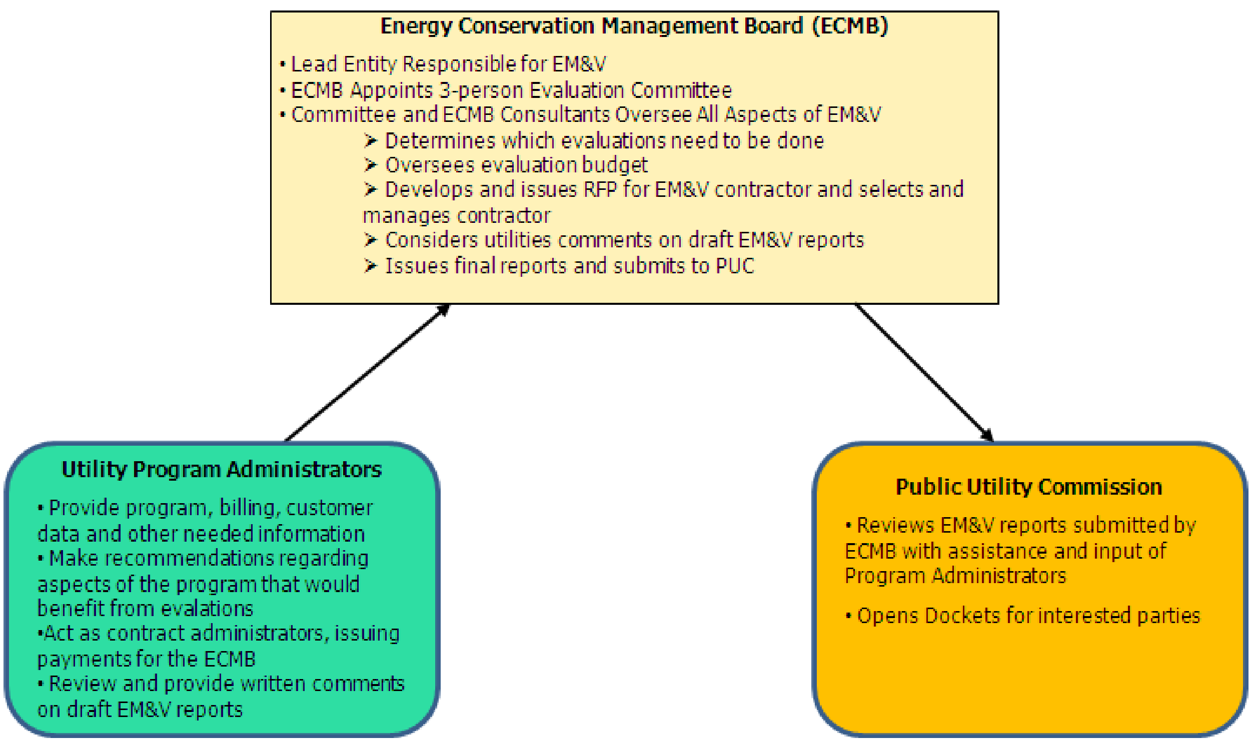
stakeholder councils and commissions have the right to request all the information necessary to evaluate the efficacy of the programs; and

(3) an oversight role for designated consumer advocates such as the state's Attorney General, Consumer Counsel's office, or similar entity.

(4) Independent evaluation, measurement, and verification of program results.

In some states, detailed program evaluation, measurement of verification (EM&V) is conducted at first by program administrators (utilities or 3rd party administrator) and then reviewed by appointed stakeholder council's, and/or other consumer advocate such as the state Attorney General or Consumer Counsel, and then by the PUC for verification and oversight. In other states, EM&V is conducted directly by the oversight bodies – the Council's, consumer advocate, PUC, or co-operative boards. As efficiency program investments have grown and are increasing relied upon as a critical energy resource, the trend has been and should be towards having oversight bodies, through their independent consultants, conduct EM&V directly in order to improve the credibility, independence, and authoritative value of such critical program reviews. Figure 24 is a flow chart illustrating how one state, Connecticut, organizes efficiency program administration, oversight, and reporting.

Figure 24: Flow Chart on EM&V Roles and Responsibility in Connecticut[36]



One common lesson for efficiency program administration and oversight is that success depends on clearly defined roles and responsibilities for the different delivery and oversight entities. In addition, it is important to ensure that oversight entities' structure and membership allow them to provide an

[36] For more information regarding the process for how EM&V is conducted in Connecticut see http://neep.org/uploads/EMV%20Forum/EMV%20Library/The%202010%20ECMB%20Program%20Evaluation%20Plan.pdf.

objective, and when warranted, critical review of program performance and to issue constructive and binding feedback for improvement to program administrators. Oversight entities must be able to perform in a competent and effective manner and provide all the consumers in the state – who after all are paying for the efficiency program investments – with credible EM&V of the programs. The oversight entities should conduct or oversee an unbiased review and verify for consumers and policymakers that program administrators' delivery of efficiency programs is cost-effective and delivering the expected savings and overall results.

To guarantee success, oversight entities must have the autonomy, integrity and, importantly, the resources to be able to conduct meaningful and effective EM&V of the efficiency programs. In several states, including Connecticut, Rhode Island, and Massachusetts, the appointed efficiency oversight councils are provided with a modest, but crucial and highly leveraged budget to retain expert consultants to help perform the required general program oversight and EM&V activities.

IV. Cost-effectiveness Tests Discussion

The touchstone for evaluating efficiency programs performance is cost-effectiveness, as the purpose of efficiency programs is to be designed and implemented in a manner that ensures the benefits of the programs are greater than the costs. Over the years, states have used a variety of different cost-effectiveness tests including: (1) the Total Resource Cost (TRC) test (sometimes modified to include additional benefits), (2) the utility cost test or the energy & water test, a.k.a. the Program Administrator Cost Test (PACT), (3) the Ratepayer Impact Measure (RIM) test, (4) the Participant Cost Test (PCT), and (5) the Societal Cost Test (SCT). In addition, the public purpose test, the total market effects test, and the program efficiency test have been used in some jurisdictions.

Three of these tests are the most frequently relied upon as the principle test by states across the U.S. – (1) the TRC test (sometimes modified), (2) the SCT, and (3) the PACT (a.k.a the utility or energy & water cost test). The TRC is an excellent test to use as it embodies a key goal of efficiency programs – to ensure that the total economic benefits of the programs exceed their total costs. The TRC test is the ratio of *total benefits* i.e., the benefits to the program participants, the utility, and all utility consumers at large (including non-participants) to *total costs* i.e., the program costs such as rebates/consumer incentives, administrative costs, and customer contributions to the efficiency measures. If the ratio of total benefits to total costs is greater than 1.0, then an efficiency program is deemed to be cost-effective according to the TRC.

Some states include some additional benefits and costs of the efficiency programs in their TRC test and may refer to it as a "modified TRC." This approach can also start to resemble the SCT, which assesses efficiency programs not just from a utility sector point of view, but from a broader societal perspective. The benefits in the SCT include positive societal externalities, such as reducing environmental harms by reducing pollution or improved comfort or aesthetics, and the costs include negative societal externalities.[37] The SCT's broad view of comparing the *societal benefits* of the efficiency programs with their *societal costs* can make it a helpful test to employ and several states have done so successfully. However, the SCT at times can prove to be a challenging test to implement because achieving agreement among policy-makers, utilities, and stakeholders on the precise values for all the societal benefits and costs is a difficult task.

[37] ACEEE, online glossary available at http://www.aceee.org/glossary/9#letters.

In addition to the TRC, the PACT or utility/energy and water cost test is also an excellent test to use because it examines cost-effectiveness from the point of view of the energy sector. The PACT or utility/energy cost test is the ratio of the *energy and water benefits* generated by the efficiency program in terms of avoided supply costs (i.e., transmission, distribution, and generation and savings from avoided gas and water usage) to the *energy efficiency program costs* such as rebates/consumer incentives and administrative costs. One key advantage of the PACT is that it represents the same methodology that utility commissions and other state regulatory entities use to evaluate supply options. There is a compelling logic to evaluating energy efficiency – an alternative energy resource to supply – in the same manner as supply options. In addition, because the PACT is contained to the smaller sphere of energy and water efficiency program costs and the resulting savings, it is easier to calculate than the TRC, modified TRC, or SCT.

Other tests are frequently problematic because they tend to fail to focus on – or ignore all together – the benefits of efficiency that generate net economic savings for consumers. One such example is the ratepayer impact measure test, or RIM test. The RIM test examines the effects of the programs from the perspective of *the utility* and the effect on the rates of *non-participating ratepayers*. The RIM test commonly measures the rate effects for non-participants resulting from changes in utility revenues and operating costs driven by efficiency program. This approach obscures the fact that as states learn more about the economics of efficiency as a low-cost resource available at every utility customers' home or business they are designing programs to encourage all utility customers to become participants in the efficiency programs over time. A recent example is Massachusetts, which is on track to have two-thirds of residential customers participate in the state's efficiency programs by the end of 2012 and will continue to grow participation levels from there.[38]

The benefits in the RIM test include: (1) the energy-related costs avoided by *the utility* and (2) capacity-related costs avoided by *the utility*, including generation, transmission, and distribution costs. On the cost side the RIM test includes: (1) program overhead costs; (2) utility/program administrator incentive costs; (3) utility/program administration installation costs; and (4) lost revenue *to the utility* from consumer bill savings resulting from the efficiency programs.

In many ways, this forth "cost" turns cost-effectiveness on its head – that is, by counting customer bill savings as a cost, the use of the RIM test is biased against efficiency programs that serve a vital function – lowering participating consumers energy bills. For any state that holds lowering consumers' energy bills and reaching as many consumers are possible as primary motivators for conducting efficiency programs, then this practice of counting *participating consumers' energy bill savings as a "cost"* is a fatal attribute of the RIM test. The RIM test also excludes important benefits such as additional resource savings (e.g., natural gas and water if the efficiency program is electric), reliability benefits, positive environmental effects, non-economic benefits, and avoided collection costs.

Figure 25 illustrates the components of the preferred Total Resource Cost Test, Societal Cost Test, and Program Administrator Cost Test (a.k.a. the utility/energy and water cost test) compared with the more narrow, problematic RIM Test.

[38] See T. Woolf, "A Regulator's Perspective on Energy Efficiency," slide 18, presented on Sept 7. 2011 at an Efficiency Maine Symposium: In Pursuit of Maine's Least-Cost Energy. Available at http://www.efficiencymaine.com/docs/education/woolf-me-efficiency-symposium-20110906.pdf.

Figure 25: Attributes of the TRC, PACT, SCT, and RIM Test[39]

Test	Benefits	Costs
Program Administrator Cost Test (PACT) a.k.a. Utility / Energy & Water Cost Test (benefits and costs for program administrator within energy sector)	• Energy savings • Capacity, transmission, and distribution savings • Additional energy resource savings (i.e., natural gas and water if EE program is electric) • Avoided credit and collection costs	• Technical assistance and energy audits for consumers • Rebates and incentives for consumers • Costs of EE financing offerings • Program administration costs
Total Resource Cost (TRC) Test (benefits and costs for all utility consumers)	• Energy savings to participating customers, non-participants, and the utility • Capacity, transmission, and distribution savings to participants, non-participants, and the utility • Additional resource savings (i.e., natural gas and water if EE program is electric) • Avoided credit and collection costs • Monetized environmental and non-energy benefits • Applicable tax credits	• Technical assistance and energy audits for consumers • Rebates and incentives for consumers • Costs of EE financing offerings • Program administration costs • Customer contributions to the efficiency measures • Incremental measure costs (customer and utility)
Societal Cost Test (SCT) (benefits and costs evaluated on a societal basis)	• Energy savings to participating customers, non-participants, and the utility • Capacity, transmission, and distribution savings to participants, non-participants, and the utility • Additional resource savings (i.e., natural gas and water if EE program is electric) • Avoided credit and collection costs • Monetized environmental and non-energy benefits • Non-monetized environmental, societal, and non-energy benefits (e.g., cleaner air, improved health, improved comfort, etc.)	• Technical assistance and energy audits for consumers • Rebates and incentives for consumers • Costs of EE financing offerings • Program administration costs • Customer contributions to the efficiency measures • Incremental measure costs (customer and utility) • Non-monetized environmental, societal, and non-energy costs
Ratepayer Impact Measure (RIM) Test (benefits and costs for the utility and non-participating customers)	• Energy-related costs avoided by the utility • Capacity-related costs avoided by the utility, including generation, transmission, and distribution costs	• Technical assistance and energy audits for consumers • Rebates and incentives for consumers • Costs of EE financing offerings • Program administration costs • Lost revenue to utility from consumer bill savings resulting from EE programs *(Note: treating participating consumers' bill savings as a "cost" makes the RIM test a poor fit for states aiming to lower consumers' energy bills)*

For the aforementioned reasons, for states that have the goal of reducing consumers' energy bills, the TRC and PACT (utility/energy and water cost test) are preferred methods for oversight entities such as appointed stakeholder councils and utility commissions to use in ensuring efficiency programs are delivering value for consumers and for measuring the direct economic benefits that are created.

[39] Sources include the *National Action Plan for Energy Efficiency* (Nov 2008), "Table 3-1: Summary of Benefits and Costs Included in Each Cost-Effectiveness Test," available at http://www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf and ENE's experience from Efficiency Council's in the Northeast.

V. The Macro Economic Benefits of Efficiency Investments

Recent studies have documented the economy-wide benefits generated by the reductions in energy consumption and consumer savings delivered by efficiency programs. ENE and EDR Group's, "Energy Efficiency: Engine of Economic Growth" report (October 2009)[40] quantified the macroeconomic benefits to New England of investing in a conservative estimate of all cost-effective energy efficiency resources through new efficiency procurement policies. The results from the Engine of Economic Growth study, which was conducted using a multi-state policy forecasting model by Regional Economic Models, Inc. (REMI), showed that dramatic increases in employment and gross state product would result from the greater efficiency investments ushered in by implementing all cost-effective efficiency procurement policies.

The Engine of Economic Growth report's use of the REMI forecasting model projected the macroeconomic impacts of expanded efficiency programs in comparison to a scenario where no programs exist. The study analyzed efficiency programs for electricity, natural gas, and "unregulated fuels," (fuel oil, propane, and kerosene), using very conservative estimates of investment levels needed to capture all cost-effective efficiency that is less expensive than energy supply. The scenarios were modeled over 15 years with reasonable ramp-up rates and used representative efficiency programs for each fuel type, with cost and savings assumptions based on data from current programs, program expansion proposals, and state-level cost-effectiveness studies. The model continues for another 20 years to capture the economic benefits achieved over the life of efficiency measures. The assumptions used were also informed by discussions with utility program administrators and other efficiency experts.

Further, in order to investigate the complementary nature of efficiency programs across jurisdictions in a region, two scenarios were modeled for each fuel. The first scenario assumed each state acted alone (the "individual" scenario). The second scenario assumed all New England states were to act at once to implement cost-effective energy efficiency (the "simultaneous" scenario). In all cases, the simultaneous scenario generated greater economic benefits to the region, as energy savings improved states' relative national competitiveness and increased trade among states and with the rest of the world.

Some of the specific results are as follows. First, the Economic Engine report found that increasing *electric efficiency* program investments in all six New England states to levels representing a conservative estimate of all cost-effective over 15 years – \$16.8 billion invested by utilities' and 3rd party administrators' programs – would increase economic activity by \$162 billion (2008 dollars), as consumers would spend energy bill savings in the wider economy. The report found that \$99 billion, or roughly 61 percent of increased economic activity, would contribute to increasing gross state products (GSPs) in the region, with \$73 billion returned to workers through increased real household income and employment equivalent to 767,000 job years (one full-time job for a period of one year). Second, the report found that over 15 years, increased *natural gas efficiency* – \$4.1 billion invested by program administrators – would increase regional economic activity by \$51 billion, boost GSPs by \$31 billion, and increase real household income by \$22 billion while creating 208,000 new job years of employment. Third, unregulated fuels efficiency programs – \$6.3 billion invested by program administrators – would increase New England's economic activity over 15 years by \$86 billion, boost GSPs by \$53 billion, and increase real household income by \$37 billion while creating 417,000 job years of new employment.

The report found that the macroeconomic benefits of efficiency were a result of changes in the economy that occur with increased spending on efficiency measures and decreased spending on energy.

[40] See Howland, Murrow et al. Energy Efficiency: Engine of Economic Growth (ENE, October 2009), available at http://www.env-ne.org/resources/open/p/id/964.

The majority of these impacts (81 to 91 percent) result from the energy savings realized by households and business. Lower energy costs cause other forms of consumer spending – such dining out and other discretionary purchasing – to increase. Lower energy bills reduce the costs of doing business in the region, bolstering the global competitiveness of local employers and promoting additional growth.

The effectiveness of efficiency investments can be evaluated by considering economic benefits relative to efficiency program dollars invested. Figure 26, from the Economic Engine report illustrates the absolute and relative economic benefits of the simultaneously-modeled energy efficiency investments for all six New England states. Figure 27, also from the same report, shows the number of dollars of increased gross state product for every $1 invested in efficiency programs. Figure 28 illustrates the projected impacts for Massachusetts of investing in a conservative estimate of all cost-effective efficiency. Figure 29 is an illustrative diagram of how cost-effective efficiency investments increase businesses sales, gross state product, and household income and create new job years of employment.

Figure 26: Economic Benefits from Investment in All Cost-Effective Energy Efficiency (New England)

	Electric	Natural Gas	Unregulated Fuels
Total Efficiency Program Costs ($Billions)	16.8	4.1	6.3
Increase in GSP ($Billions)	99.4	30.6	53.1
Maximum annual GSP Increase ($Billions)	5.6	1.8	2.9
Percent of GSP Increase Resulting from Efficiency Spending	12%	11%	9%
Percent of GSP Increase Resulting from Energy Savings	88%	89%	91%
Dollars of GSP Increase per $1 of Program Spending	5.9	7.4	8.5
Increase in Employment (Job Years)	767,011	207,924	417,061
Maximum annual Employment Increase (Jobs)	43,193	12,907	24,036
Percent of Employment Increase from Efficiency Spending	16%	15%	12%
Percent of Employment Increase from Energy Savings	84%	85%	88%
Job-Years per $Million of Program Spending	46	50	66

Figure 27: Dollars of GSP Increase per $1 of Program Funding (New England)

	Electric		Natural Gas		Unregulated Fuels	
	Individual	Simultaneous	Individual	Simultaneous	Individual	Simultaneous
Connecticut	5.6	5.7	6.3	7.0	6.3	7.1
Massachusetts	5.5	6.4	6.7	7.5	8.0	10.9
Maine	4.3	4.9	8.4	12.4	6.6	7.0
New Hampshire	3.9	5.9	6.7	10.8	6.2	8.5
Rhode Island	4.0	5.4	4.4	5.7	6.2	7.6
Vermont	3.7	4.3	4.5	6.5	6.6	7.4
Six State Region	5.1*	5.9	6.4*	7.4	6.9*	8.5

Figure 28: Summary of Economic Impacts of Cost-Effective Efficiency Investments (New England)

	Electric	Natural Gas	Unregulated Fuels
Total Efficiency Program Costs ($Billions)	7.6	2.4	2.0
Increase in GSP ($Billions)	49	18	22
Maximum annual GSP Increase ($Billions)	2.8	1.0	1.2
Percent of GSP Increase Resulting from Efficiency Spending	13%	11%	10%
Percent of GSP Increase Resulting from Energy Savings	87%	89%	90%
Dollars of GSP Increase per $1 of Program Spending	6.4	7.5	10.9
Increase in Employment (Job Years)	331,000	112,000	139,000
Maximum annual Employment Increase (Jobs)	18,800	6,800	7,800
Percent of Employment Increase from Efficiency Spending	17%	15%	13%
Percent of Employment Increase from Energy Savings	83%	85%	87%
Job-Years per $Million of Program Spending	43	47	70

[1] 2008 is the dollar year basis for all figures unless otherwise indicated

Figure 29: Illustration of How Cost-Effective Efficiency Investments Generate Economic Benefits

VI. U.S. Efficiency Potential – the Magnitude of Cost-Effective Efficiency Resources

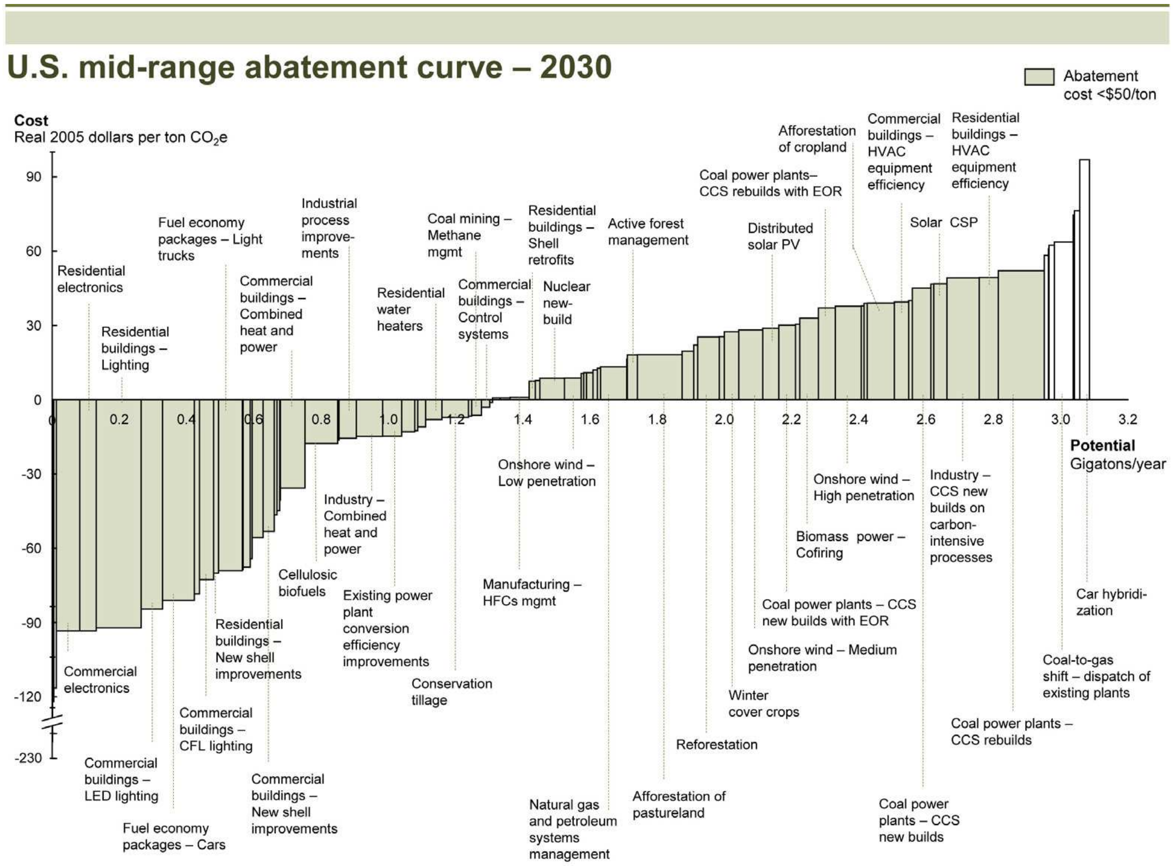
Considering all of the direct and economy-wide benefits of pursuing all cost-effective efficiency investments, including increased competitiveness, lower energy bills, job creation, and increases in gross state product, it is important to understand the relative size of the efficiency resource that is available to be harnessed. Efficiency potential studies have demonstrated that a very large cost-effective efficiency investment opportunity exists in every region of the country. As illustrated in Figure 15, McKinsey's 2009 report, "Unlocking Energy Efficiency in the U.S. economy found that cost-effective efficiency investments of $52 billion a year for ten years – i.e., $520 billion – would result in savings of $1.2 trillion.[41] Comparing $52 billion a year in potential with the less than $6 billion invested in efficiency by electric and natural gas programs[42] in 2010 (Figure 17) makes it clear the country has a large opportunity to save consumers money and boost the economy by enacting policies that will dramatically increase the annual level of efficiency program investments. Achieving such a large ramp-up in efficiency investment may seem daunting, but it would be accomplished if every state in the country were to invest in efficiency programs at the level of the leading states, such as Massachusetts, Rhode Island, and Vermont.

A second estimate of a large portion of the cost-effective efficiency potential in the U.S. was conducted by McKinsey & Company in their report titled "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost."[43] As part of this study McKinsey estimated how much potential there was to reduce greenhouse gas emission in the residential and commercial sectors at a net savings to consumers, i.e., cost-effectively. The McKinsey study found that more than 1,000 terawatts of electricity could be saved cost-effectively in buildings and appliances in the residential and commercial sectors by 2030.[44]

The categories of savings identified by the McKinsey report included both electric and thermal efficiency including efficiency potential in residential and commercial lighting (CFLs and LEDs), electronic equipment (in-use efficiency and reduced stand-by losses in computers, set-top boxes, televisions, and other devices), heating, ventilation, and air-conditioning equipment (initial installation, retrofits, and efficiency enhancing performance tuning), combined heat and power, building shell improvements (improved insulation, air sealing, roofs, etc. in new construction and retrofits), residential water heaters (switching to tankless, natural gas, etc.), and other opportunities including better building controls, appliances, and fuel switching.[45] Figure 30 is from McKinsey's 2007 report, which focuses on the magnitude and cost (negative and positive) of different abatement options to reduce greenhouse gas emission in the U.S. In so doing the report illustrates the size of cost-effective energy efficiency potential from commercial and residential electronics, residential buildings (lighting, water heaters, and shell retrofits), and commercial buildings (lighting, combined heat and power, shell improvements and control systems) in terms of cost saving means of achieving reductions in tons of Equivalent carbon dioxide (CO_2e).[46] All of these opportunities are found below the X-axis because implementing them would save consumers money, i.e., they are cost-effective.

[41] McKinsey & Co., "Unlocking EE in the U.S. Economy" (2009), pg. iii, available at http://www.mckinsey.com/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy.aspx
[42] This figure does not include additional efficiency investments facilitated by energy service companies (ESCOs) outside of the contours of efficiency programs.
[43] McKinsey & Company, "Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?" (December, 2007) sponsored by DTE Energy, Environmental Defense, Honeywell, National Grid, NRDC, PG&E, and Shell. Available at http://www.mckinsey.com/en/Client_Service/Sustainability/Latest_thinking/Reducing_US_greenhouse_gas_emissions.aspx.
[44] Id., pg. 30.
[45] Id., pg. 36.
[46] Id., pg. 20.

Figure 30: U.S. Mid-Range Abatement Curve – 2030 (Efficiency Opportunities are below the X-Axis)[47]



Source: McKinsey analysis

VII. Funding Efficiency Programs – Ratepayer, State, Regional, Federal, and Other Sources

In light of the fact that efficiency programs take years to develop brand awareness, contractor infrastructure, delivery channels, and nuanced and strategic program designs, one of the most important requirements for successful state efficiency program implementation is ensuring a stable, long-term funding source. Best practice efficiency policies are crafted carefully to avoid a boom-and-bust cycle of funding for efficiency efforts that invariably leads to poor program results and lower consumer value. An example of the negative effects caused by unstable efficiency program funding is the experience of New Jersey, which over the past 15 years has experienced funding fluctuations and ensuing problems with program implementation and contractor infrastructure. Mechanisms that deliver reliable, stable funding are essential to effective program delivery and maximizing savings for consumers.

In addition to stable funding, successful efficiency policies that maximize consumer savings are also designed to avoid the need for no more than a small fraction of overall program dollars to go towards paying for interest for large amounts of borrowed capital. That is, the best practice is to have the overwhelming majority of consumer funding for efficiency provided each year to actually go towards

[47] Id., pg. xiii.

efficiency program investments and efforts that directly result in consumer savings. Avoiding borrowing large amounts of money – either from outside entities or from the utility through rate-basing efficiency program expenses – on which consumers will then have to pay interest and/or a return on equity, ensures better results for consumers and that the money collected from consumers to fund efficiency programs actually deliver expected savings. Focusing almost all consumer dollars on procuring low-cost efficiency resources and not having it diverted towards paying large sums of interest and/or a return on equity owed to utilities or financial institutions furthers the overarching objective of using efficiency funds prudently to lower consumers' bills.

States with established and successful Efficiency Procurement, resource planning, and statutory or commission-established EERS policies deploy several different funding sources for efficiency programs in order to ensure funding stability year in, year out over a long term planning horizon. An example of an Energy Efficiency Procurement state that has succeeded in achieving stable funding for its efficiency effort is Massachusetts. After the utilities, Energy Efficiency Advisory Council, and PUC have determined the cost-effective amount of efficiency to be procured there are several different sources of funding relied upon to ensure those investments are made. In 2012 for example, the amount of cost-effective electric efficiency investment needed to fulfill the utilities' efficiency procurement statutory mandate is approximately $550 million, which will save consumers more than $1.5 billion over the life of the efficiency measures, create 69,000 job-years of employment, and increase gross state product by more than $9 billion.

The first stable source of funding Massachusetts will use to fund the $550 million electric efficiency program investment in 2012 is a system benefit charge of .0025 cents per kWh, which is applied to all electric customers across the state served by the state's four distribution utilities (National Grid, NSTAR, Western Massachusetts Electric Company, and Unitil). Importantly, as is the case with all of Massachusetts' efficiency program funding sources, every consumer sector contributes towards the needed amount of funding and in return the efficiency programs, energy audits, technical assistance, and rebates and incentives are offered to every consumer that is a distribution customer of the utilities (i.e., everyone except for those who live in cities or towns with municipally-owned electric companies). The goal in Massachusetts and other Energy Efficiency Procurement states is to have every distribution customer participate in the programs and achieve savings over the course of several years. Vermont has made great strides towards this goal with more than half of all customers participating over a five year period and Massachusetts is on track to have two-thirds of residential customers participate in the programs by the end of 2012 and then increase participation levels from there.[48] Established by the 1997 Electric Industry Restructuring Act, the electric efficiency system benefit charge has been in existence since 1998 and continues to generate roughly $125 million per year toward the state's efficiency procurement plan.

The second source of funding for efficiency programs relied upon in Massachusetts is ISO New England's Forward Capacity Market (FCM), a market which was created to help to ensure there is enough capacity to meet future peak loads in New England. Established in 2006, the FCM pays suppliers of capacity (generators, demand response, and now energy efficiency programs) to accomplish that goal. The FCM allows the region's energy efficiency programs to bid in the capacity value their efforts create in terms of substantially reducing peak demand. This means that in addition to capacity

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[48] See T. Woolf, "A Regulator's Perspective on Energy Efficiency," slide 18, presented on Sept 7. 2011 at an Efficiency Maine Symposium: In Pursuit of Maine's Least-Cost Energy. Available at http://www.efficiencymaine.com/docs/education/woolf-me-efficiency-symposium-20110906.pdf. In addition, Massachusetts' goal is to have half of all C&I customers participate by 2015 and more than two-thirds participate by 2017. Id. at slide 21.

payments made to generators, the FCM also disperses small, but regular payments to the efficiency programs for the capacity value they deliver by reducing peak demand and helping the region meet its capacity needs in that manner. For 2012, the FCM payment to Massachusetts' efficiency programs is projected to be approximately $12 million.

Third, as a member of the Regional Greenhouse Gas Initiative (RGGI), Massachusetts has received on average roughly $50 million in carbon emissions allowance value annually (26 million tons auctioned per year – the revenue will increase if RGGI tightens its cap to achieve the emissions reductions required by science to avoid the worst effects of climate change and allowance values rise accordingly). As RGGI was being implemented and states were able to make decision about the use of carbon proceeds, diverse business, consumer, environmental, and low income stakeholders, state legislators, and the Governor in Massachusetts recognized that devoting emissions allowance value to consumer efficiency programs was for many reasons the most economically beneficial use of such proceeds.[49] Accordingly, the Green Communities Act of 2008 requires at least 80% of all RGGI auction proceeds be used to support the state's efficiency procurement effort by going towards funding the utilities' consumer energy efficiency programs. Investing auction proceeds in efficiency programs lowers the cost of achieving emissions reductions by reducing the amount of electricity generation, yields large consumer savings, generates new employment, and increases in gross state product.[50] In 2012, RGGI emission proceeds are projected to generate $40 million in funding for Massachusetts' efficiency programs.

Fourth, Massachusetts like other states, makes substantial efforts each year to secure additional federal appropriations and to identify other sources of state or outside funding that could be invested in cost-saving efficiency programs. Since additional federal and state appropriations are by nature highly variable as government priorities and budgets shift from year to year, the Massachusetts utilities committed to identifying a modest amount of low interest loans and outside capital that can be used to fund the efficiency programs – with careful attention paid to not burdening consumers with having to spend a lot of money on interest payments. Massachusetts is planning on generating approximately $120 million for efficiency investments in 2012 from federal and state appropriations and other outside sources of capital.

Fifth, and of critical importance, is that in order to ensure stable, full funding for the $550 million in cost-effective electric efficiency program investments in 2012 that were identified and are required to be invested in by law, Massachusetts utilizes an Energy Efficiency Reconciling Factor (EERF). The EERF generates funding for the remainder that is needed to meet the planned for cost-effective efficiency program investments. Like the system benefit charge, the EERF is collected from all distribution customers and in 2012 is it anticipated to generate roughly $290 million for the cost-saving efficiency programs offered to all distribution customers.

[49] Devoting emission allowance value to consumer efficiency programs has been used to not only save consumers more money than RGGI costs, create local jobs, increase gross state product, but also in a virtuous cycle works to reduce electricity generation and thus emissions, which lowers the price of carbon allowances in the RGGI. As of September 2011, since RGGI began late 2008, it generated more than $125 million in efficiency investments in Massachusetts, saving consumers more than $390 million, creating over 5,400 job-years, and increasing gross state product by an estimated $800 million.

[50] Since the RGGI auctions began in late 2008, the 10 participating states have devoted more than half of all proceeds to energy efficiency investments. According to analysis by ENE and others, RGGI proceeds of more than $465 million have been invested in energy efficiency, saving consumers $1.2 billion, boosting regional economic activity by $2.7 billion, and creating more than 20,000 jobs-years. See http://www.env-ne.org/resources/detail/rggi-auction-tracker.

In Massachusetts, there has been wide support for these stable funding mechanisms for aggressive efficiency programs because there is a common understanding among stakeholders that the efficiency programs lower consumers' energy bills and return $3 in consumer savings for every $1 of efficiency investments. A large part of why the state has been so successful in establishing reliable, stable funding is because a diverse group of stakeholders came together at the outset and publically agreed on a basic economic fact – that consumers' energy bills are determined by two factors: (1) the price of energy *and* (2) the quantity of energy they consume (i.e., Cost = Price x Quantity). The funding strategy for efficiency in Massachusetts and other procurement and EERS states is essentially to lower consumers' bills (cost) by allowing a slight increase in the price of energy through efficiency charges in exchange for a much greater reduction in the quantity of energy consumed. The result of this strategy and a structured stakeholder role[51] is paying off – consumers' energy bills / energy costs are going down dramatically from what they would have been otherwise because the reduction in the quantity of energy consumed is on average three times larger than the small effect on price deployed to fund cost-effective efficiency programs.[52]

VIII. Financing Assistance for the Customer Portion of Efficiency Investments

Comprehensive energy efficiency programs are carefully designed to provide consumers with the essential information, technical assistance, and the incremental financial incentives/rebates and sometimes financing necessary to overcome all the market barriers and failures associated with efficiency and induce much greater adoption of energy efficiency measures, practices, equipment, and designs. One of the core tools deployed by the programs to help consumers implement efficiency measures in their homes or business is providing customers with a direct cash incentive or rebate when they decide to install a more efficient insulation, lighting, building materials, appliance, or heating-and-cooling system solution. However, in order to make sure program dollars are spent wisely and that the programs can reach as many consumers as possible, the programs are carefully designed to only provide rebates for a portion of the incremental upfront cost of the efficient product or measure.

As a rule of thumb, efficiency programs typically fund between 20-50% of the efficiency measures' incremental upfront cost depending on the product, market conditions, and other factors. Consequently, the programs rely on consumers to pay for the remaining 50-80% of incremental cost of the efficiency product or measure. In energy efficiency program terminology, the portion of the incremental cost of the efficiency measure that the customer is responsible for paying for upfront is called the "customer contribution."

Program experience over the years has demonstrated that many consumers will not implement efficiency measures even though the program's rebates plus the energy cost savings over the next few years will result in overall cost savings due to a lack of willingness or ability to pay for the identified "customer contribution" – their share of the upfront incremental cost. Efficiency program history also shows that certain sectors, notably small businesses and low- to moderate-income residential consumers, can experience acute lack of access to capital to fund the customer contribution of the investments identified during the program's audit. Residential consumers who are renters experience another problem in that they often pay the energy bills but do not own the property, creating a strong

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[51] Stakeholders in Massachusetts have a statutory defined and important program input and oversight role in the Energy Efficiency Advisory Council, which generates confidence in the savings achieved and consumer value created by the efficiency program investments.
[52] See DOER, "Energy Efficiency in Massachusetts: Our First Fuel," (2010), available at http://www.efficiencymaine.com/docs/education/woolf-me-efficiency-symposium-20110906.pdf.

disincentive to invest in upgrades to a building that do not own and are likely not to live in for a long period of time. Similarly, the owners of rental properties face a strong disincentive to invest in efficiency upgrades as well because tenants most often pay the energy bills.

To solve this problem, comprehensive efficiency programs providing technical assistance and incentives are increasingly offering consumers complementary financing options to help them pay for their share of the efficiency measures over time – the customer contribution. Many efficiency programs have begun to offer small businesses and residential consumers low-interest loans so the customer contribution can be paid for over time, in concert with when the energy cost savings accrue. In addition, some programs offer an on-bill financing option so the loans for the customer contribution portion of a project can be repaid directly on the consumer's energy bills.

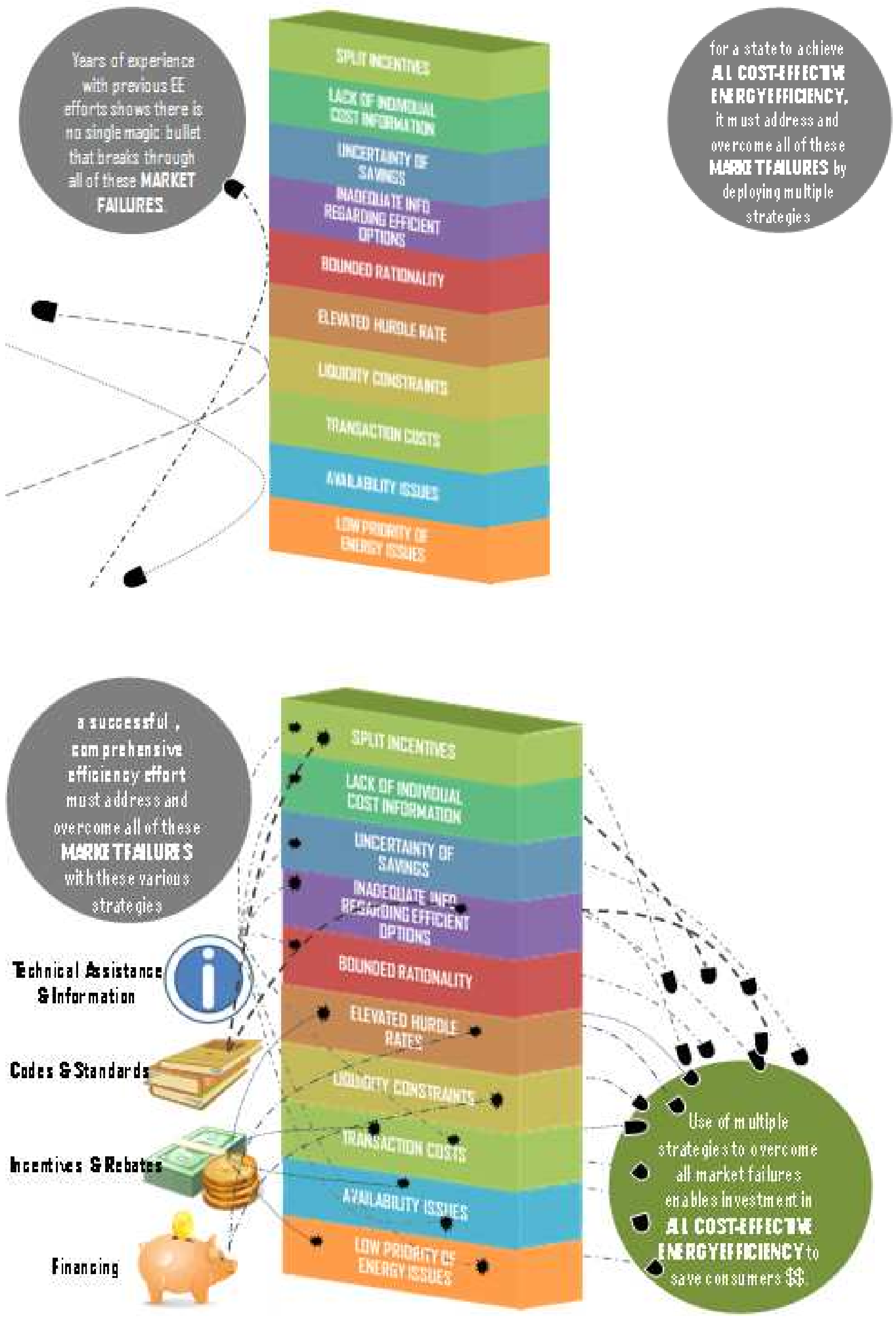
An example is the Clean Energy Works program in Oregon, which is a residential efficiency program that provides a comprehensive offering including technical assistance and information, financial incentives/rebates, and assistance with financing the customer contributions of efficiency measures. The program provides alternative underwriting processes and addresses deferred maintenance and other physical barriers to efficiency. The non-profit program Clean Energy Works Oregon (CEWO) started in June 2009 with a mission to reduce energy waste by encouraging Oregon homeowners to adopt energy efficiency measures in their home. In concert with offering technical assistance, information, and energy advisors and financial incentives and rebates, CEWO offers customers a low interest financing program – with on-bill repayment – to help them pay for the customer contribution portion of the efficiency improvements to their homes. The low interest loans are issued using non-traditional underwriting criteria (i.e., credit score and utility bill payment history in lieu of debt-to-income ratio) and are repaid through a line item on the utility bill. The case study below highlights the details of the Clean Energy Works' financing program in Oregon.[53]

[53] Email correspondence with Merrian Fuller, LBNL and Enterprise Cascadia, CEWO Lending and Servicing Guidelines (April 2011 version).

Case Study: Efficiency Financing as a Complement to Comprehensive EE Programs	
Comprehensive EE Program:	**Clean Energy Works Oregon (CEWO)**
Funded By:	ARRA, utility customer funds, foundations, and other sources.
Underwriting/Managed By:	Enterprise Cascadia, a Community Develop. Financing Insti. (CDFI)
Loan Amounts/Rates:	Up to $30,000 over 20 years, with an interest rate of 5.99%. On-bill loan payments.
Security:	Typically a subordinate lien on the property repaid over time. Under certain conditions, loans can be transferred with property ownership.
Loan Qualification:	The process has lower underwriting costs and is more inclusive because while it includes a credit check, *it uses utility bill repayment history rather than the borrower's debt-to-income ratio*.
Initial Results:	Application decline rate of 10%, whereas many other programs have decline rates of 30-40%. As of the 2nd quarter of 2011, there were 565 loans, with an average loan size of $12,500, $8.5 million dispersed or closed in total, with *zero loans defaulted*. Criticized assets equaled 2.1% of the outstanding portfolio.
Additional Comment:	An important, innovative feature is allowing deferred maintenance and physical barriers to efficiency to be eligible. Specifically, up to 20% of the loan can go towards non-energy improvements including water damage repair, improved ventilation, etc. In targeted Portland urban renewal areas the Portland Development Commission provides additional loan capital (without requiring a separate loan application) to allow non-energy improvements to reach 40% of the total project cost up to $10,000.

As is the case in Oregon, the best practice for efficiency financing programs is for them to be offered as a complementary offering that is part of a comprehensive efficiency program providing information, technical assistance, energy audits, and direct incentives/rebates for efficiency measures. This is because decades of efficiency research and program experience show that such programs are needed to overcome the myriad of market barriers and failures to efficiency implementation and that *solely providing consumers with efficiency financing (loans) is <u>not</u> an effective strategy* for delivering large scale energy savings. In order to achieve investments in all cost-effective efficiency resources, comprehensive programs' must offer: (1) technical assistance and energy audits; (2) rebates and incentives; and (3) financing – in concert with statewide efforts to (4) constantly improve codes and standards – to overcome all the barriers to efficiency such as split incentives, lack of individual cost information, consumer uncertainty of savings, inadequate information regarding efficient options, bounded rationality, elevated hurdle rates, liquidity constraints, transaction costs, availability issues, and low priority of energy issues. Figure 31 is an illustrative diagram showing how these four different tools are needed to overcome all the market barriers to achieving investment in all cost-effective efficiency resources, i.e., there is no single silver bullet that can overcome all the market barriers to cost-effective efficiency.

Figure 31: Overcoming Market Barriers to All Cost-Effective Efficiency



IX. Energy Efficiency Program Oversight and Administration

Historically, most consumer-funded, state-supervised efficiency programs have been structured to include stakeholder input and oversight over program administration. Frequently that oversight has been provided by stakeholder collaboratives that often grew out of litigated utility commission proceedings regarding the expenditure of efficiency program funds. Parties to the efficiency collaboratives were essentially self-appointed by virtue of their having intervened in a litigated utility commission case regarding efficiency program review. Utility commissions often allowed or directed the efficiency collaboratives to negotiate program designs, contentious issues, implementation priorities, and the allocation of funding between customer sectors and then submit unanimous settlement proposals for how the program would be run for that year.

Over time, what began as a logical outgrowth of litigation involving a relatively few number of parties interested in the efficiency programs grew more cumbersome, bureaucratic, and contentious, with more and more parties joining the negotiations. Often progress was blocked by one holdout seeking to extract program changes favorable to their own narrow interests, and willing to delay or even jeopardize a final settlement and overall progress indefinitely. In addition, as efficiency started being recognized as a strategic low-cost resource, the efforts and structures needed to ramp up efficiency investments dramatically necessitated a new and more systematic stakeholder input and oversight process in many states.

In 1998, Connecticut became the first state to establish a different model for input into, and oversight of, consumer energy efficiency programs. As part of comprehensive energy reform legislation the state created an appointed efficiency stakeholder council called the Energy Conservation Management Board (ECMB)[54] – with a clear statutory role to oversee programs, provide input into program planning and budgeting for growing efficiency investments, and conduct evaluation, measurement, and verification. The ECMB's authorizing legislation provided for designated slots to represent different stakeholder positions, establishes super-majority voting rules, includes a clear requirement that program administrators must report efficiency program results and other requested information regularly to the ECMB, and provides funding for the council to hire its own expert consultants to conduct program planning with the utilities and provide independent evaluation, measurement, and verification of the programs. Several other states such as Massachusetts and Rhode Island have established their own similar, statutorily-established efficiency councils in order to improve the effectiveness of the input, oversight, and EM&V that is provided by stakeholders.

The appointed stakeholder council model has many benefits, which are particularly important as states move towards treating efficiency as a cost-saving resource and pursuing investment in all-cost effective energy efficiency. First, as a body typically appointed by the executive branch and confirmed by the state Senate, the members of efficiency council's simultaneously represent their designed stakeholder group and serve the public at large. Second, the establishing legislation is carefully crafted to balance the composition of the Council to ensure that diverse stakeholder interests are represented. For example, Rhode Island's Energy Efficiency and Resource Management Council (EERMC), which was established in 2006, includes representatives of residential consumers, large commercial and industrial users, small commercial and industrial users, low income consumers, and environmental interests along with an expert in energy law and an expert in building codes.

[54] The ECMB is also referred to as the Energy Efficiency Board or EEB.

Third, the underlying legislation establishes a clear set of objectives for the Council regarding maximizing consumer benefits from cost-effective efficiency programs, which focuses all of the stakeholders on a common mission and goal. Fourth, the super-majority or majority voting rules of efficiency councils both ensures that many diverse stakeholders will have to agree that a certain course of action is the public's best interest and simultaneously avoids the problem experienced in many collaboratives of one self-appointed interest blocking progress indefinitely or extracting unreasonable concessions from all other parties when decisions are made based on consensus.

Fifth, the councils are provided with funding to hire expert consultants to conduct program oversight, EM&V, and efficiency program planning that is independent of the utilities or the designed 3rd party administrator on behalf of the diverse stakeholder interests represented on the council and the public at large. In many states, the councils are charged with verifying the cost-effectiveness of the programs as a way to ensure the programs maximize consumer benefits. The councils rely on their expert consultants to conduct such professional, independent oversight.

Sixth, the councils provide a natural and effective forum from which to disseminate information and educational resources about the results of the programs widely, as well as to receive public input regarding opportunities and ideas for program improvements. The councils work to educate the public and every consumer sector about the cost-savings opportunities provided by the efficiency programs and help to establish increased access to, and participation in, the programs. An example of this key public information and access role of efficiency councils are the Connecticut ECMB's Annual Legislative reports that provide a clear summary of different program offerings and the verified results of the programs.[55] As quasi-state entities, council meetings are typically held monthly and are posted in accordance with open meetings laws. Members of the public are welcome to attend and provide input during the public comment section of the meetings.

In addition to the important oversight role provided by efficiency councils, collaborative, or similar stakeholder bodies, state utility commissions (or the boards of munis and coops) provide the final regulatory and oversight role over the effectiveness of the efficiency programs. Program planning, negotiations, cost-effectiveness evaluations, and EM&V is typically conducted by the efficiency council first and then reviewed and approved in a more binding legal context at the state utility commission. An example of this is the approval of Massachusetts' 3-year Efficiency Procurement Plan, which was drafted by the utilities with substantial input and approval from the Efficiency Council and its consultants, and then subsequently approved in an official docket at the utility commission.[56]

There is a particularly valuable role independent efficiency councils can serve with regard to evaluation, measurement, and verification. Historically, many utility or 3rd party program administrators have contracted with EM&V consultants – that they manage – to review and examine the effectiveness, assumptions, and results of their efficiency programs. While contractual precautions can be, and often are, taken to ensure the hired EM&V consultants have the autonomy and independence they need to formulate uncensored conclusions, the arrangement of having program administrators hire and manage their own EM&V consultants is structurally a suboptimal way to ensure the most rigorous and independently determined results. Even if the results of EM&V studies are subsequently reviewed by an appointed stakeholder council and/or other consumer advocate such as the state Attorney General or Consumer Counsel – and then the public utility commission for verification and oversight – it is simply not ideal to have a program administrator hiring and managing their own EM&V reviewer.

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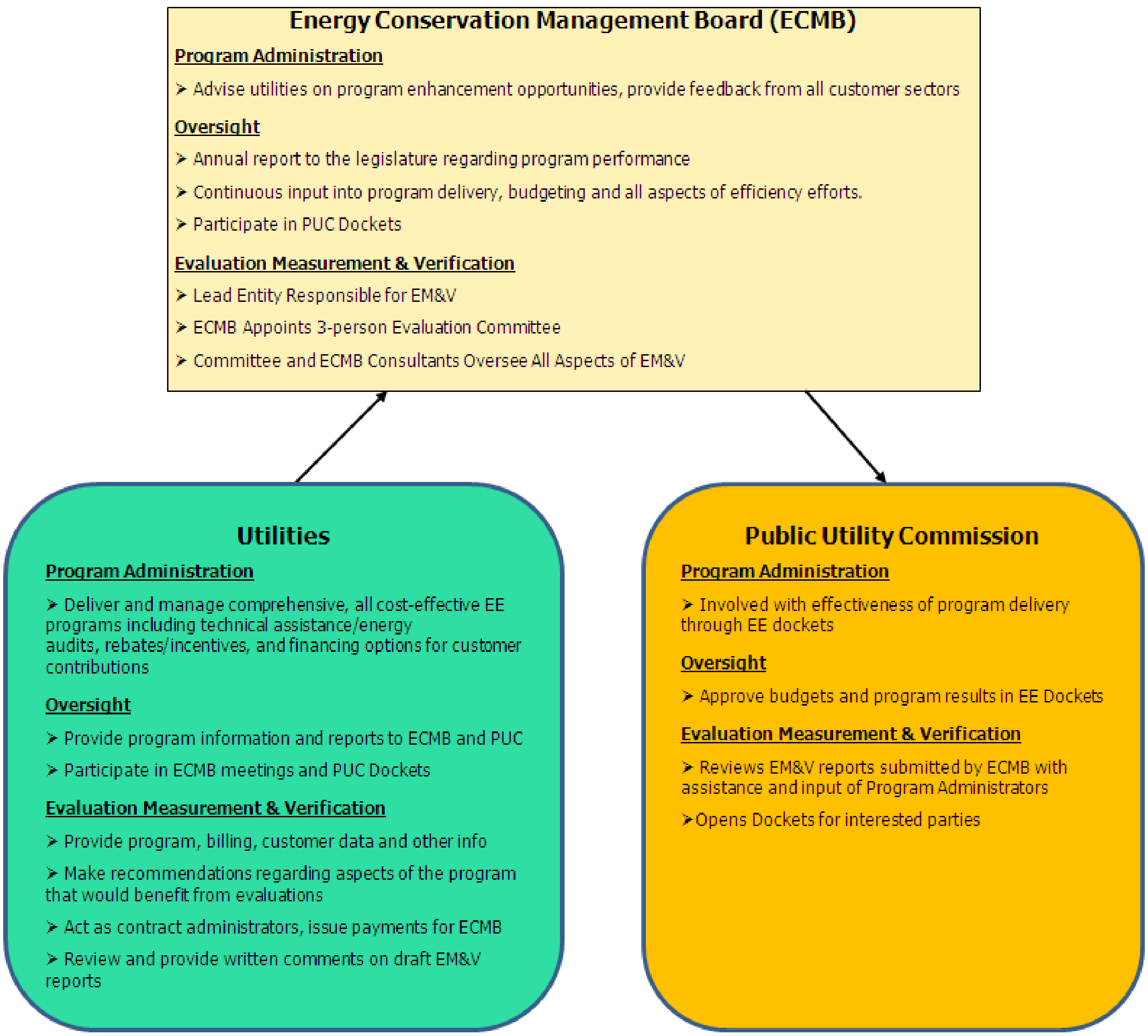
[55] See http://www.ctsavesenergy.org/files/2010%20Annual%20Legislative%20Report%20Final.pdf
[56] See http://www.ma-eeac.org/docs/DPU-filing/1-28-10%20DPU%20Order%20Electric%20PAs.pdf

The preferred best practice policy for EM&V is to have such services hired and managed directly by the efficiency oversight bodies, whether it is an efficiency council or collaborative, Attorney General, Consumer Counsel, or public utility commission. This arrangement has been a growing trend given the structural advantage of a having an outside group in charge of EM&V from outset to avoid potential conflicts and the temptation for overly favorable self-evaluation. Entrusting efficiency oversight bodies with primary responsibility for hiring, managing, and conducting EM&V takes on heighted importance as states invest more heavily in efficiency as a resource through Efficiency Procurement or EERS policies. The best practice in terms of maximizing the credibility, independence, and authoritative value of such critical EM&V program reviews is to have an efficiency council conduct EM&V directly and then file the results with the utility commission for review. Figure 32 is a flow chart that illustrates how one state, Connecticut, organizes efficiency program administration, oversight, and EM&V reporting.

Figure 32: Flow Chart on Program Administration, Oversight, and EM&V Roles in CT



Program Design Spotlight: CT Home Energy Solutions – Integrating Electric & Thermal EE

There are many exciting examples of best practices in terms of delivering residential retrofit programs most effectively and efficiently. One challenge for such programs is that historically efficiency programs have focused on one energy source at a time – e.g., electric utilities' programs would provide customers one set of incentives, audits, and assistance for electric savings in a manner that was totally divorced and not integrated with efficiency offerings for reducing that customer's natural gas/thermal consumption. The result of such siloed program offerings is duplication of the cost it takes to get to consumers' homes to do energy audits, the administrative and overhead costs associated with running two efficiency programs, and increasing the hassle factor for consumers who might have to take multiple days off of work or childcare responsibilities in order to supervise different program visits to their home. Simply put, the best practice is to combine electric and thermal efficiency offerings in a seamless fashion so customers have all their efficiency needs addressed at once by one combined efficiency program.

One example of an effective combined electric and thermal efficiency program is Connecticut's Home Energy Solutions (HES) program. HES provides consumers with one combined thermal and electric energy assessment, makes on-the-spot electric and thermal improvements, including caulking and sealing of critical air leaks and replacement of inefficient incandescent light bulbs. In addition, after the visit the consumer is provided with a detailed assessment of all the electric and thermal measures they can undertake and a list of electric and thermal efficiency incentives that are provided by the efficiency programs for electric and natural appliances, HVAC systems, and insulation. The assessments are comprehensive and may include the following:

- "A blower-door test which pinpoints critical drafts and air leaks. After they are found, the contractor will professionally seal them during the visit.
- A duct test to assess air leaks within the ductwork system. The technician will seal those significant leaks.
- Hot water-saving measures including low-flow showerheads and faucet aerators will be installed.
- Rebates for qualifying central air conditioning systems and for replacement of certain inefficient appliances with qualifying energy-efficient models.
- Installation of energy-efficient compact fluorescent light bulbs.
- Incentives for insulation upgrades.
- A "kitchen table wrap-up" where the technician will review the work that was done in your home and tell you about additional resources that can help you save energy and money."[57]

[57] See http://www.cl-p.com/home/saveenergy/rebates/homeenergysolutions.aspx.

X. Political & Business Model Barriers to Energy Efficiency: Aligning Utility Incentives with Customers' Interests

Adjusting the way utilities collect revenue is essential step to achieving investment in all cost-effective efficiency. Historically, utilities' revenues have been linked to their volume of sales, meaning they make more money when usage increases and lose money when customers reduce their energy use through the implementation of cost-effective efficiency measures. Revenue decoupling is a different system of utility regulation that removes this disincentive to utility investment in efficiency programs by eliminating the link between utilities' revenues and their sales' volumes. In so doing it helps to remove utility opposition to the policies necessary to achieve all cost-effective efficiency and maximum consumer savings.

Revenue decoupling only changes the way utilities are compensated for their distribution costs. Consumers pay two major fees on their gas and electric bills: one for the energy they use and a second for the utility's cost of distributing/delivering the energy to them. Although distribution costs are fixed and approved by PUCs and municipal and co-operative boards (e.g., costs for poles, wires, substations), consumers have traditionally paid for them, in part, through a charge based on the amount of energy they use. This sets up a dynamic that undermines utilities' support of robust efficiency policies and programs. Under a system where fixed distribution costs are collected on a volume-basis there is a structural problem – large efficiency investments that generate consumer savings and reduced energy use, cause utilities to lose revenue.

With revenue decoupling, the distribution charges are adjusted periodically (typically annually) so that regardless of changes in consumer energy consumption the utility only collects the allowed distribution revenues and not more or less than the regulators approved. When implemented properly, revenue decoupling is helpful to utilities and consumers. Because decoupling makes utilities' revenues neutral to sales volume, it enables utilities to fully embrace investments in strong efficiency programs that reduce consumers' energy usage and save them money. Revenue decoupling enables the implementation of investment in all cost-effective efficiency resources, translating into savings for customers and reductions in emissions. The top three states in the 2011 State Energy Efficiency Scorecard's "Utility and Public Benefits Programs and Policies" section all have revenue decoupling in place.[58]

Revenue decoupling works both for states that have vertically integrated, fully regulated utilities (those that own distribution assets such as poles, wires, and substations and generation assets) and for restructured states with competitive energy markets and distribution utilities that do not own generation. Figure 33 illustrates the status of the 50 states with regard to restructuring. Figure 34 depicts the status of revenue decoupling across the country and illustrates that both vertically integrated and restructured states have revenue decoupling in place.

[58] See Sciortino et al., State Energy Efficiency Scorecard (ACEEE, October 2011), pg. 6, available at http://www.aceee.org/research-report/e115.

Figure 33: Status of Vertically Integrated (Grey) or Distribution-Only Utilities (Blue/Restructured)

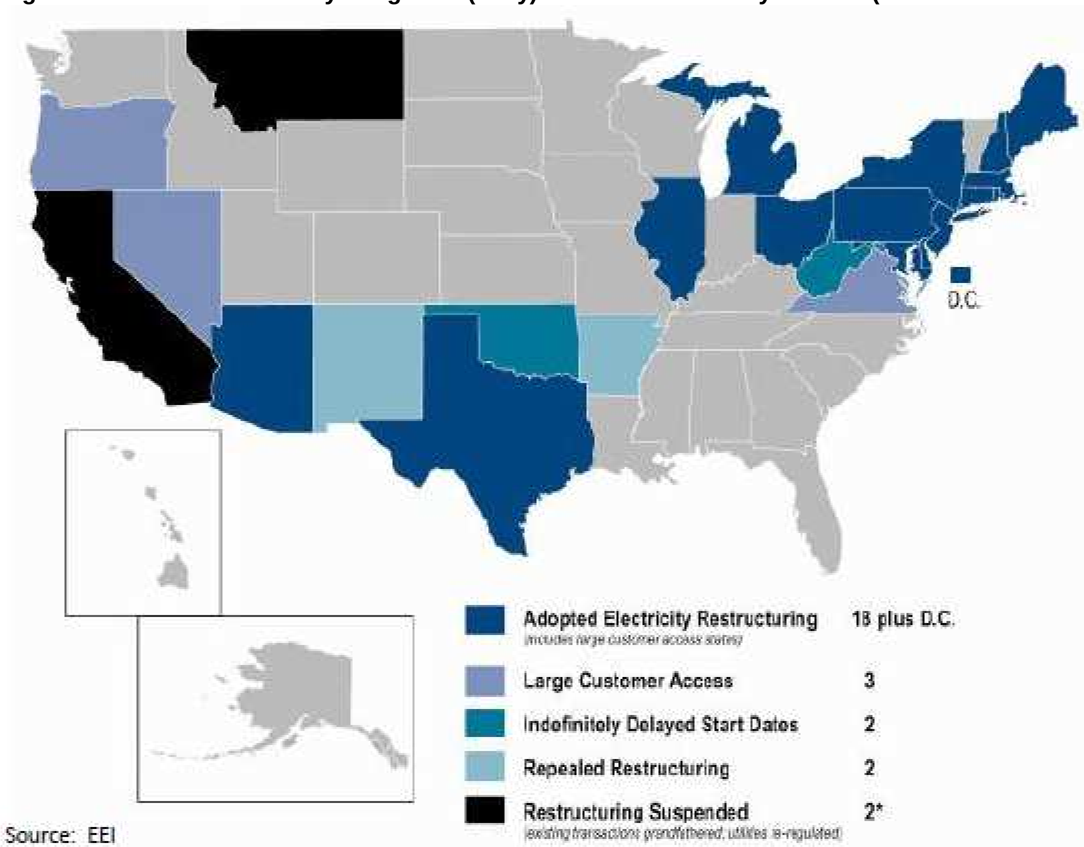
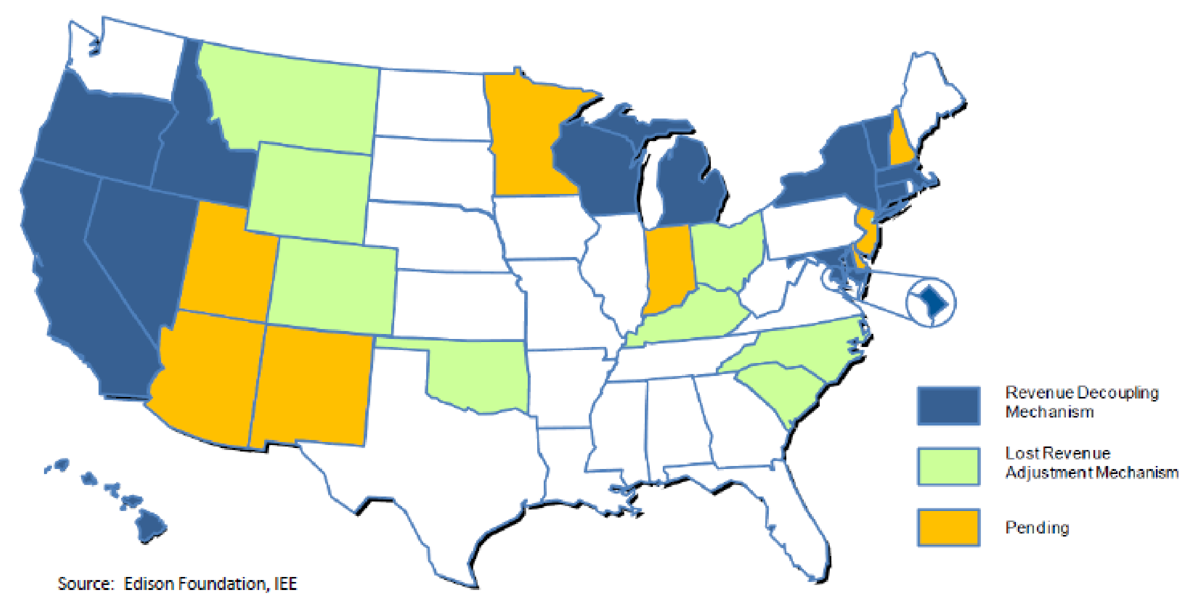


Figure 34: Revenue Decoupling Status for Electric Utilities (exists in both vertically-integrated and restructured states)



Revenue decoupling removes a significant disincentive for utility investment in energy efficiency and demand-side programs by making them financially neutral to efficiency investments. However, to achieve investment in all cost-effective efficiency resources, a modest performance incentive is needed for utilities that serve as effective efficiency program administrators. A policy of revenue decoupling and a modest performance incentive – with the vast majority of efficiency program value remaining with consumers – enables utilities to regard efficiency programs as a profit center and motivates them to be full partners in achieving all cost-effective efficiency resources. Utilities with revenue decoupling but without a performance incentive for delivering successful efficiency programs will focus on increasing capital investments in power plants and transmission and distribution infrastructure as their means to earning profits and increasing shareholder value. Performance incentives should be scaled with the level of the utility's performance in achieving customer savings. Typically, revenue decoupling and a four to eight percent performance incentive for successful efficiency program delivery will maximize consumer savings and enable the utility to be a full partner in helping to pass required legislation, support effective regulatory processes and oversight, and deliver programs effectively.

Some recommendations from the Vermont Energy Investment Corporation (VEIC), Taylor & Associates, Inc., and Optimal Energy, Inc., who consult around the country on such issues, regarding performance incentives include the following:

- "Rewards of 4-8% are helpful in encouraging utility performance;
- Incentives should be based on actual measurable and verifiable performance to avoid perverse utility incentives;
- Multiple metrics should be used other than savings in order to discourage cream-skimming and to promote secondary policy objectives;
- Incentives should scale with performance to encourage performance even once goals have been met (or once it is clear that goals will not be met);
- Some states, especially in the West, impose penalties instead of or in addition to awards. Penalties may encourage extra effort to meet goals, though in practice they are very rarely incurred;
- Almost all performance incentives have a minimum threshold below which no incentive is given. Some also use additional minimum qualifying criteria that don't carry any financial incentive themselves;
- In order for shareholder incentives to actually encourage performance, goals must be set to be aggressive but reachable, and performance metrics must be verified by an independent third party."[59]

Figure 35, also from VEIC, Taylor & Associates, and Optimal Energy, depicts performance incentives in seven different states as a function of percentage of savings goals achieved. Note that California and New York have the highest performance incentives but also have substantial penalties for poor performance. Figure 36 provides evidence that the presence of efficiency policies and revenue decoupling but no performance incentives (the red bars – "other policies, but no PI") are not nearly as effective as efficiency policies, revenue decoupling, and performance incentives (the blue bars – "PI") at ensuring adequate efficiency investment by utilities and other program administrators.

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[59] See VEIC et al., New Hampshire Independent Study of Energy Policy Issues (VEIC, September 30, 2011), pg. 9-2, available at http://www.veic.org/Consulting/Project_Profiles/NewHampshireEnergyPolicyStudy.aspx.

Figure 35: Incentive Scaling with Performance by State[60]

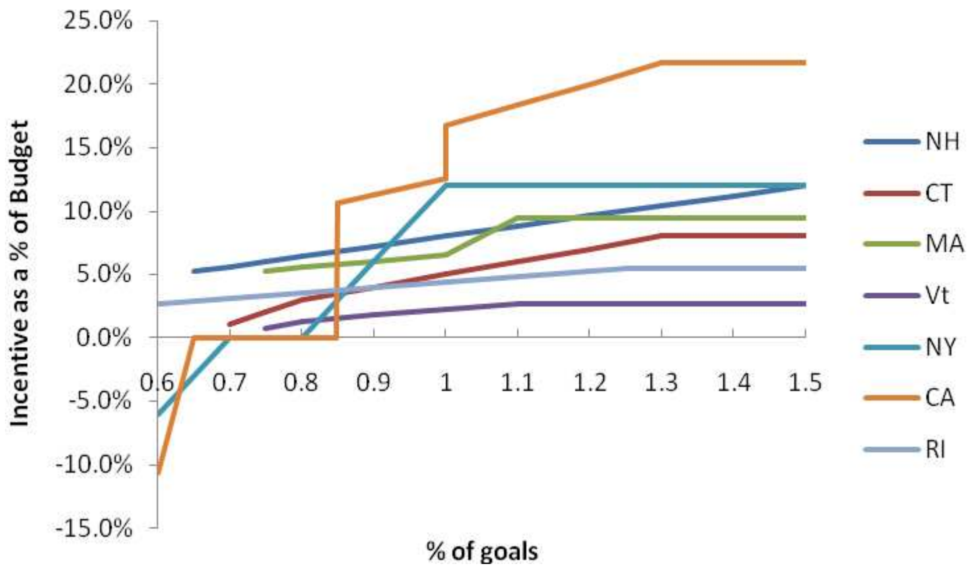
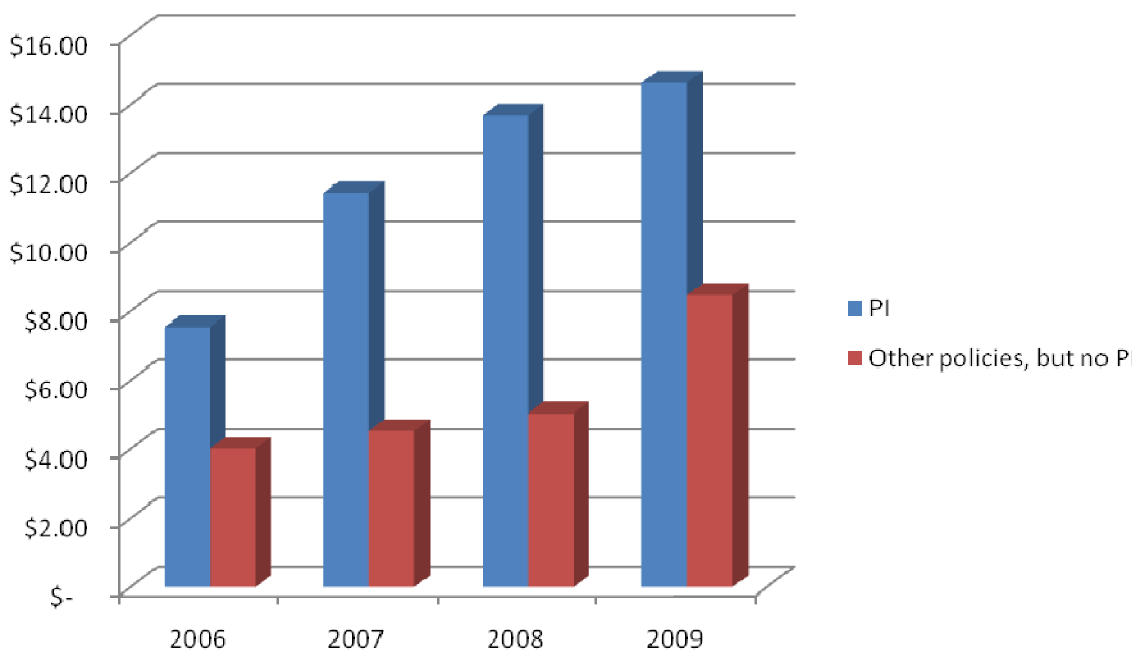


Figure 36: Utility Efficiency Investment Per Person in Relation to Presence/Absence of Performance Incentives[61]



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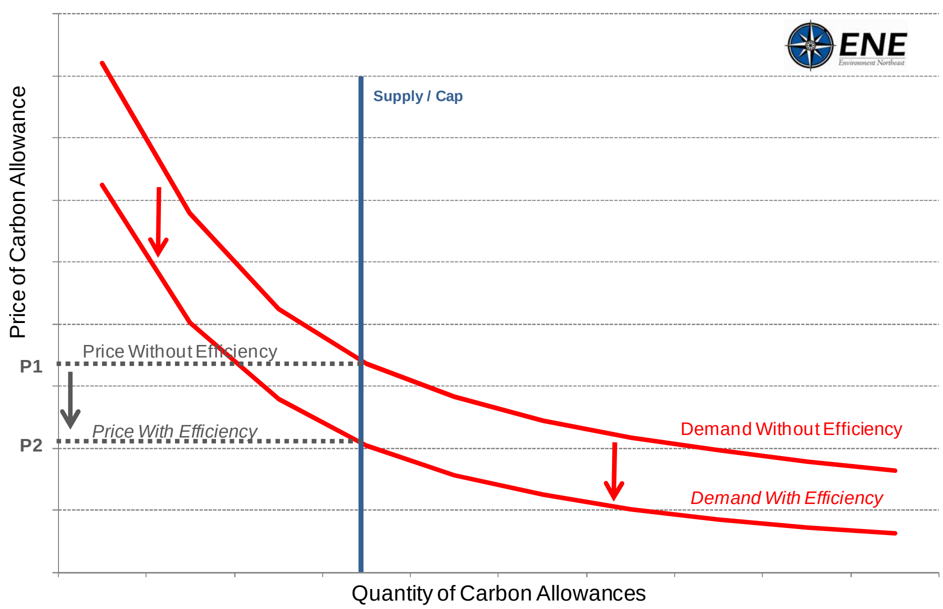
[60] Id at 9-15.
[61] Id at 9-12.

XI. The Role of Energy Efficiency in Emissions Trading Programs

Investments in energy efficiency reduce energy consumption and save consumers money on their bills. Additionally, reductions in electricity consumption bring down wholesale electricity prices, and lower nationwide consumption of natural gas and heating oil should similarly depress wholesale natural gas and heating oil prices. In a greenhouse gas carbon market trading system, efficiency investments also reduce the amount of carbon dioxide produced by power plants, lowering allowance prices and overall program costs. The following figures illustrate these supply and demand concepts graphically, and show that investing in energy efficiency is a very effective, low cost means of reducing emissions while providing lasting benefit to consumers.

Energy efficiency investments decrease demand for electricity. Lower electricity demand in turn reduces emissions associated with energy production. Reduced emissions then lead to lower demand for emissions allowances, lower prices for allowances, and lower overall carbon market program costs. Figure 37 is an illustrative diagram that depicts this important benefit of investing carbon allowance value in energy efficiency programs.

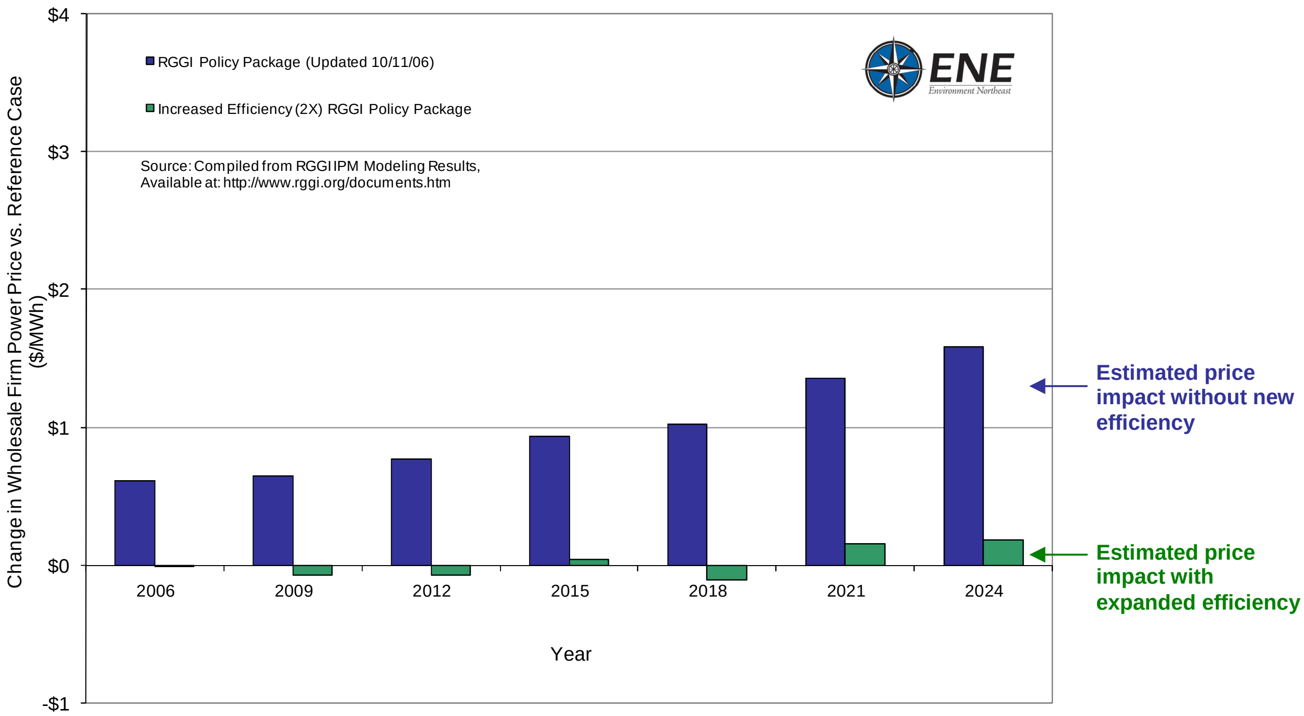
Figure 37: Energy Efficiency Reduces Carbon Prices



The results of extensive electric sector modeling for RGGI[62] illustrate the benefits of investing in efficiency, with lower energy consumption reducing prices for emissions allowances and the underlying cost of electricity. Figure 38 illustrates the beneficial effects of a model policy package where efficiency investments are doubled from historic levels under RGGI. This analysis led a diverse range of stakeholders including utilities, businesses, investors, and consumer and environmental groups to support moving ahead with a carbon market.

[62] RGGI stands for "the Regional Greenhouse Gas Initiative" and is a market-based, cooperative regulatory program among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. See http://rggi.org/.

Figure 38: Efficiency Benefits in Carbon Markets



A 2009 analysis of emissions reduction technologies by McKinsey & Co. illustrates that investing in efficiency is the most cost effective means of reducing emissions, with most efficiency investments having negative real costs (i.e., efficiency upgrades save more money than the initial outlay), as shown in Figure 30.

XII. Building Energy Codes & Compliance and Appliance & Equipment Standards

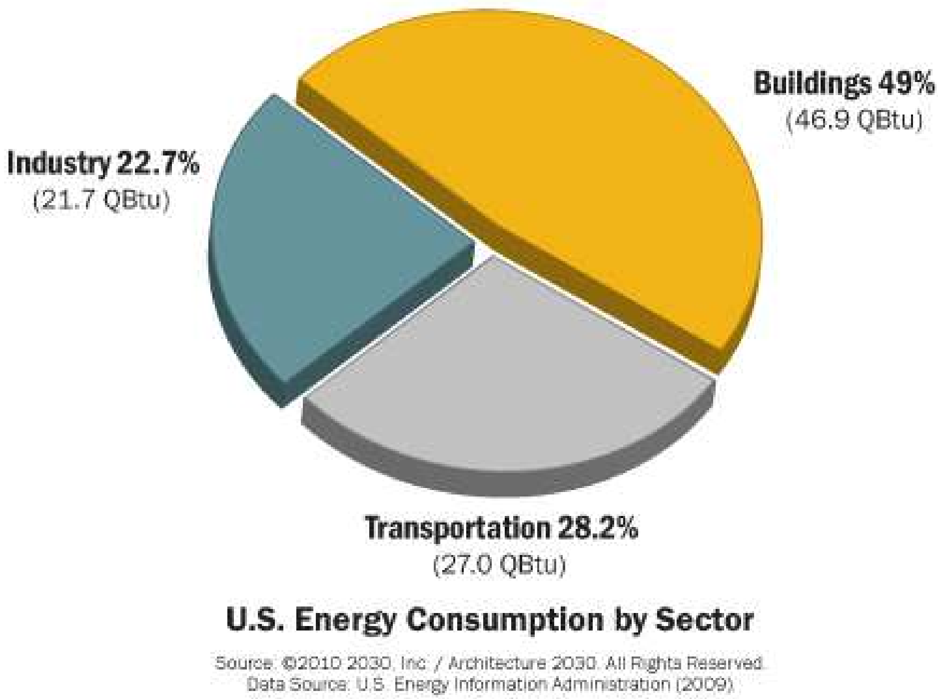
As illustrated in Figure 39, energy consumption in buildings represents roughly 50% of all U.S. energy use on an annual basis, which is almost double amount of energy consumed by the transportation sector (28%) and more than double the amount consumed by industry (23%).[63] While the primary goal of the energy efficiency programs discussed throughout this paper is reducing energy use in buildings, there are several important complementary best practices and strategies that should be pursued for buildings alongside efficiency programs. Such buildings-specific best practice efficiency policies include:

- State legislation requiring the use of the National Home Energy Label (currently under development) to provide key energy use information at the time of sale of all properties;
- State legislation requiring energy use disclosure at the time of a lease or rental when energy bills are paid by the tenant;
- State legislation authorizing municipalities to incentivize or adopt higher building efficiency standards than the State code (many states have municipal, county or state stretch code options);

[63] EIA 2009. AIA 2010 2030 Inc./Architecture 2030.

- Amending states' building codes for new technologies by requiring that new construction include rough plumbing and wiring to facilitate the simple and economical installation of solar hot water; and
- Expanding incentives and support for additional cost-effective combined heat and power in the state – particularly for small to mid-size applications.

Figure 39: Building Energy Consumption (U.S. 2009)[64]



The efficiency programs in this paper provide technical assistance and incentives for highly efficient appliances and equipment to help consumers understand and chose to adopt these cost saving technologies in their home or business. In addition to technical assistance and incentives provided by efficiency programs, the states and federal government set minimum efficiency standards for appliances and equipment that are updated over time as technology improves. These standards save consumers billions of dollars and have been successfully implemented in states across the country. Typically, states establish standards first, which are then subsequently enacted federally and become the responsibility of the federal government. Figure 40 illustrates standards for a number of different appliances and equipment.

[64] EIA 2009. AIA 2010 2030 Inc./Architecture 2030.

Figure 40: Appliance & Equipment Efficiency Standards[65]

Energy Efficiency Standards Adopted and Pending by State

(updated November 2010 by Appliance Standards Awareness Project and Northeast Energy Efficiency Partnerships)

(X = adopted standard (with effective date shown); P = pending standard)

No shading = standard now preempted by equivalent or stronger federal standards; yellow (light shading) = state is implementing until federal standards take effect; blue (dark shading) = no federal preemption applies)

STATE *(year(s) of enactment)*	AZ *(2005/ 2009)*	CA *(var.)*	CT *(2004/ 2007)*	DC *(2007)*	MA *(2005)*	MD *(2004 /2007)*	NH *(2008)*	NJ *(2005)*	NV *(2007)*	NY[1] *(2005, 2010)*	OR *(2005/ 2007)*	RI *(2005/ 2006)*	WA *(2005/ 2009)*	VT *(2006)*	Federal standards (effective date)
Automatic commercial ice makers	X 2008	X 2007								X 2010	X 2008	X 2010	X 2008		Jan. 2010
Bottle-type water dispensers		X 2007	X 2009	X 2009		X 2009	X 2009			X (tbd)	X 9/2009	X 2008	X 2010		Pending in '11 bill
Ceiling fans and ceiling fan light kits		X 2006				X 3/2007				X					Jan. 2007
Commercial clothes washers	X 2008	X 2005/ 2007	X 7/2007			X 3/2007		X 2007/ 2010			X 2009	X 2007	X 2007		Jan. 2007
Commercial hot-food holding cabinets		X 2007	X 2009	X 2009		X 2009	X 2009			X (tbd)	X 9/2009	X 2008	X 2010		Pending in '11 bill
Commercial pre-rinse spray valves	X 2008	X 2006								X	X 2007	X 2007	X 2007		Jan. 2006
Commercial refrigerators and freezers	X 2010	X 2003/ 2006	X 7/2008			X 9/2005		X 2010		X 2010	X 2008	X 2010	X 2007		Jan. 2010/2012
Consumer audio and video products[2]		X 2006/ 2007								X (tbd)	X 9/2009				Not covered
Digital television adapters										X (tbd)					Not covered[3]
General service light bulbs		X[4] 2011							X[5] 2012						2012 – 2014/2020[6]
High intensity discharge lamp ballasts (mercury vapor)												X 2007			Jan. 2008
Illuminated exit signs	X 2008	X 3/2003	X 7/2006			X 3/2005		X 3/2007		X	X 2007	X 2007	X 2007		Jan. 2006
Large packaged AC >20 tons	X 2010	X 2006/ 2010	X 7/2009			X 8/2005		X 2010		X 2010		X 2010			Jan. 2010
Low-voltage dry-type transformers[7]	X 2008	X 3/2003	X 7/2006		X 1998	X 3/2005		X 3/2007		X 2003	X 2003	X 2007	X 2007		Jan. 2007
Medium-voltage dry-type transformers[8]					X 2008									X 2008	2010[9]
Metal halide lamp fixtures[10]	X 2008	X[11] 2006/08/ 10	X 2010	X 2009	X 2009	X 2009				X 2008	X 2008	X 2008	X 2009	X 2009	Jan. 2009
Pool pumps	X 2012	2006/ 08/10	X 2010							X (tbd)			X 2010		None
Portable electric spas	X 2012	X 2009	X 2009							X (tbd)	X 9/2009		X 2010		Pending in '11 bill
Portable light fixtures		X 2010								X (tbd)					Pending in '11 bill
Residential boilers					X (tbd)							X (tbd)		X (tbd)	Sept. 2012
Residential furnace fans					X (tbd)	X (tbd)	X (tbd)					X (tbd)		X (tbd)	Jan. 2017[12]
Residential furnaces[13]					X (tbd)	X[14] (tbd)	X (tbd)					X (tbd)		X (tbd)	Pending in '11 bill
Single-voltage external power supplies	X 2008	X 2007/ 7/2008	X 2008	X 2012	X 2008	X 2012				X (tbd)	X 2008	X 2007	X 2008	X 2008	July 2008[15]
State regulated incandescent reflector lamps (BRs, ERs and R20s)		X 6/07	X 2009	X 2009	X 2008	X 2009				X	X	X 2008	X 2008	X 2008	June 2008
Televisions		X 2011/ 2013								X (tbd)					None
Torchieres	X 2008	X 2003	X 7/2006			X 3/2005		X 3/2007		X	X 2007	X 2007	X 2007		Jan. 2006
Traffic signals (pedestrian)		X 2006								X					Jan. 2006
Traffic signals (vehicular)	X 2008	X 2003	X 7/2006			X 3/2005		X 3/2007		X	X 2007	X 2007	X 2007		Jan. 2006
Unit heaters	X 2008	X 2006	X 7/2006			X 9/2005		X 3/2007		X	X 2008	X 2007	X 2007		Aug. 2008
Walk-in refrigerators and freezers		X 2007	X 2009	X 2009		X 2009					X 9/2009	X 2008			Jan. 2009

While this report is focused on policy to advance efficiency programs, these complimentary building code and appliance and equipment policies can be essential to achieving all cost-effective efficiency. The efficiency programs can be used to test, demonstrate success with, and gather support for new standards before they are introduced through other policies or required under state law. For instance, efficiency programs can help consumers implement new cost-saving equipment and building technologies through the provision of technical assistance and incentives. This in turns allows for a proven track record of success to be established and for the contracting and real estate industries to become comfortable with the new equipment and building technologies. Such success and increased comfort levels can then enable a new state standard to be passed once stakeholders are supportive and are confident that the new technologies work, are cost-effective, and save consumers money.

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65 Appliance Standards Awareness Project, available at http://www.appliance-standards.org/sites/default/files/State_standards_status_gridNovember2010update.pdf

XIII. Conclusion

We know that as a country we are not spending our energy dollars wisely: each year we spend roughly $300 billion on electric supply that costs on average 5 to 10 cents per kWh, while we invest less than $6 billion in energy efficiency programs efficiency that deliver savings at a cost of 2 to 4 cents per kWh. Spending 50 times more on an electric resource that is two to three time more expensive is a wasteful habit that harms our competitiveness and unnecessarily burdens our consumers and businesses. Likewise, we spend roughly $50 billion per year on residential and commercial natural gas commodity supply and invest less than $2 billion annually in natural gas efficiency programs that are a much less expensive and plentiful resource.

The fundamental challenge of efficiency policy is to rationalize how our energy dollars are spent and ensure that we invest in all cost-effective efficiency resources before more expensive supply in order to save consumers money and improve our economy and environment. Establishing policies that would enable us to invest on the order of $50 billion per year in efficiency programs that are lower cost than supply would generate consumer savings of two to three times that amount, create hundreds of thousands of jobs, reduce emissions, increase our competitiveness, and grow our U.S. economy.