Regional Energy Efficiency Database: Program Year 2011 Annual Report

Northeast Energy Efficiency Partnerships

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This report, which reflects the opinions and judgments of the NEEP staff, was developed in consultation with the REED Subcommittee and does not necessarily reflect the opinions and judgments of NEEP board members, NEEP Sponsors, or project participants and funders.

About NEEP

NEEP was founded in 1996 as a non-profit whose mission is to serve the Northeast and Mid-Atlantic to accelerate energy efficiency in the building sector through public policy, program strategies and education. Our vision is that the region will fully embrace energy efficiency as a cornerstone of sustainable energy policy to help achieve a cleaner environment and a more reliable and affordable energy system.

About REED

The Regional Energy Efficiency Database (REED) is a product of the Regional Evaluation Measurement & Verification (EM&V) Forum, a project of Northeast Energy Efficiency Partnerships. It is based on the EM&V Forum's Common Statewide Energy Efficiency Reporting Guidelines, developed in 2009 to 2010 and adopted by the EM&V Forum's Steering Committee. REED currently focuses on 2011 electric and natural gas ratepayer funded energy efficiency program data.

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

TABLE OF TABLES - APPENDIX C

I. EXECUTIVE SUMMARY

REED States Highlighted in Blue

Prior to the public launch of the Regional Energy Efficiency Database (REED) in February 2013 energy efficiency stakeholders across the Northeast and Mid-Atlantic states had to look to myriad sources for energy efficiency program results and associated information. With the introduction of REED, information about energy savings, demand savings, expenditures and cost of saved energy, avoided air emissions and job impacts for many Northeast and Mid-Atlantic states including Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont is available through a common, consistent dashboard. Delaware and the District of Columbia also support REED. Those jurisdicitons' program year 2012 data will be added to REED along with 2012 data from the other REED states by year-end 2013.

Managed by the Regional Evaluation Measurement and Verification (EM&V) Forum, REED was born out of the recognized need to increase consistency in EM&V practices, reduce EM&V costs for states and help to improve the credibility of energy efficiency resources. The REED dashboard is based on the EM&V Forum's Common Statewide Energy Efficiency Reporting Guidelines, and is an important tool in the EM&V Forum's effort to demonstrate energy efficiency as a growing, consequential and highly cost effective energy resource.

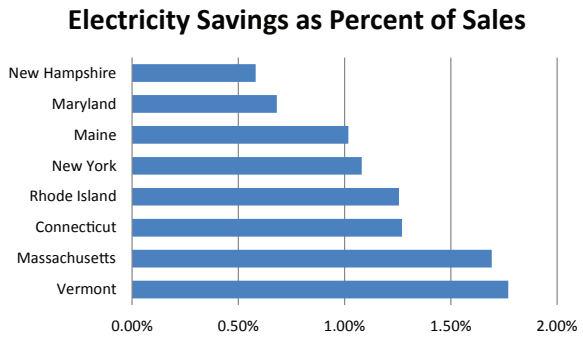
This REED Program Year 2011 Annual Report provides an overview of the high-level impacts of 2011 energy efficiency programs at the state and regional level. It provides for comparisons across states that can help strengthen the credibility of energy efficiency as a resource by increasing our understanding of similarities and differences in results across programs by type, sector and state.

Analysis of the data shows good news for efficiency, reveals common trends across the states and identifies some key differences as well:

- ***2011 Electric Energy Efficiency Program Energy Savings More than Doubled in a 3-Year Period to 3485.6 GWh.*** Net annual electric energy savings in the REED states increased by 250% between 2008 and 2011, while electric energy efficiency

program expenditures doubled over this time period to slightly over $1 billion.

- ***From 2008 to 2011, Natural Gas Energy Efficiency Program Energy Savings Doubled to Nearly 50 Million Therms.*** Net annual natural gas energy savings in the REED states increased from 24.6 million therms in 2008 to 49.6 million therms in 2011, slightly over a 200% increase. Program expenditures increased to nearly $200 million in 2011, driven by states like Massachusetts that are expanding their natural gas energy efficiency programs.
- ***The REED states' 2011 cost of saved electricity ranged from 2.8 to 4.3 cents per kWh.*** This is markedly lower than the comparable cost of electricity supply in the REED region, which is estimated to be about 10 cents per kWh.
- ***2011 Electric Energy Efficiency Program Savings Neared 2% of Retail Sales in Some States.*** In two REED states, Massachusetts and Vermont, net annual electric energy savings comprised upwards of 2% of retail electric sales. 2011 net annual natural gas energy savings reached over 1.3% of retail gas sales in one state, Vermont, with other states at less than 1% of sales.



- ***REED provides a snapshot of estimated avoided emissions associated with energy efficiency programs, an area of increasing interest to air agencies in the region given air quality planning efforts and current and potential future GHG emission regulations.*** REED's calculated emissions reductions for CO_2, NO_x and SO_2 are based on regional average annual emissions rates and annual energy savings, and do not capture the cumulative effect of program savings over the lifetime of the measures installed in 2011, nor the impact of programs from previous years.
- ***REED reported 2011 job creation impacts from energy efficiency programs for two REED states, Rhode Island and Vermont.*** Job creation data from program year 2011 was unavailable from the other REED states.
- ***Important differences exist in how states report program expenditures by cost categories, and energy and demand savings by program type categories.*** These differences are important to keep in mind when comparing program impacts across states. For example, REED's 'other' expenditure category includes different types of expenditures in each state.
- ***Several Energy Efficiency Program Types Dominated Annual Electric and Natural Gas Energy Savings.*** This report takes a more detailed look at the four electric program types and four natural gas program types that achieved the highest level of net annual energy savings:

- **Electric Program Types:** residential lighting and appliances; residential retrofit; C&I large retrofit; and C&I small retrofit (84% of annual electric energy savings collectively).
- **Natural Gas Program Types:** residential retrofit; large C&I retrofit, low income retrofit; and C&I large lost opportunity (79% of annual natural gas energy savings collectively).

Several states in the REED region have high energy savings goals that will continue to scale up in the future; moving forward, NEEP will continue to track progress towards these aggressive goals and provide an overview of each state's progress in future REED Annual Reports. In 2014 NEEP will issue a Program Year 2012 Annual Report that will provide a more robust analysis of differences in program impacts across states and will include two years of data that can begin to show REED data trends across time.

For more information about state energy efficiency policies and regional trends in the REED states, please see NEEP's Regional Roundup of Energy Efficiency Policy in the Northeast and Mid-Atlantic States.

II. INTRODUCTION

With the launch of the Regional Energy Efficiency Database (REED) in February 2013, energy efficiency stakeholders have a common dashboard to access energy efficiency program impact data and supporting information from several Northeast and Mid-Atlantic states.[1] REED is hosted by Northeast Energy Efficiency Partnerships (NEEP) through its Regional Evaluation Measurement & Verification (EM&V) Forum. It is the first database in the country to publicly provide data on the energy, environmental and economic effects of energy efficiency programs across multiple jurisdictions. REED users can generate state-level energy efficiency reports and download underlying program-specific data that can be used to analyze, compare or aggregate the impacts of state energy efficiency programs.

REED's goal to provide transparent and increasingly consistent data on energy efficiency impacts makes this resource particularly valuable as policymakers look to energy efficiency investments as a least-cost strategy to meet state and regional energy, economic and environmental policy goals. REED provides a reliable and accessible source of data that allows energy efficiency stakeholders to better understand the impact of energy efficiency programs across the region and have greater confidence in the credibility of energy efficiency as a resource.

REED is based on the Regional EM&V Forum's Common Statewide Energy Efficiency Reporting Guidelines, developed in 2009 to 2010 in recognition that states in the region had different reporting practices that made it difficult to compare and aggregate energy efficiency data. The EM&V Forum recognizes that states use different EM&V practices that inform reported program impacts. The Forum is separately addressing this area in 2013 to 2014 as part of its work to increase transparency and consistency in EM&V.

REED contains data that was submitted by each participating state as of January 2013, and in some cases was compiled by NEEP. The data does not reflect any adjustments that may have been made to 2011 program results after January 2013.[2] The data is correct to the best of NEEP's knowledge, but NEEP has not independently verified the accuracy of the data.

REED currently includes 2011 electric and natural gas ratepayer funded energy efficiency program data for eight states. Annual energy efficiency data for program year 2012 from these states, along with Delaware and the District of Columbia, will be added to REED in fall 2013.

1 Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

2 Several minor data corrections were made in 2013 as a result of the quality control process.

REED includes the following reports:

- Annual and Lifetime Energy Savings
- Summer and Winter Peak Demand Savings
- Avoided Carbon Dioxide (CO_2), Sulfur Dioxide (SO_2) and Nitrogen Oxides (NO_X) Emissions
- Energy Savings Compared to Retail Sales
- Total Program Expenditures
- Expenditure Categories as a Percent of Total Expenditures
- Job Creation Impacts
- Cost of Saved Energy
- Program Funding Sources
- Supporting Information for Reported Energy Efficiency Program Impacts

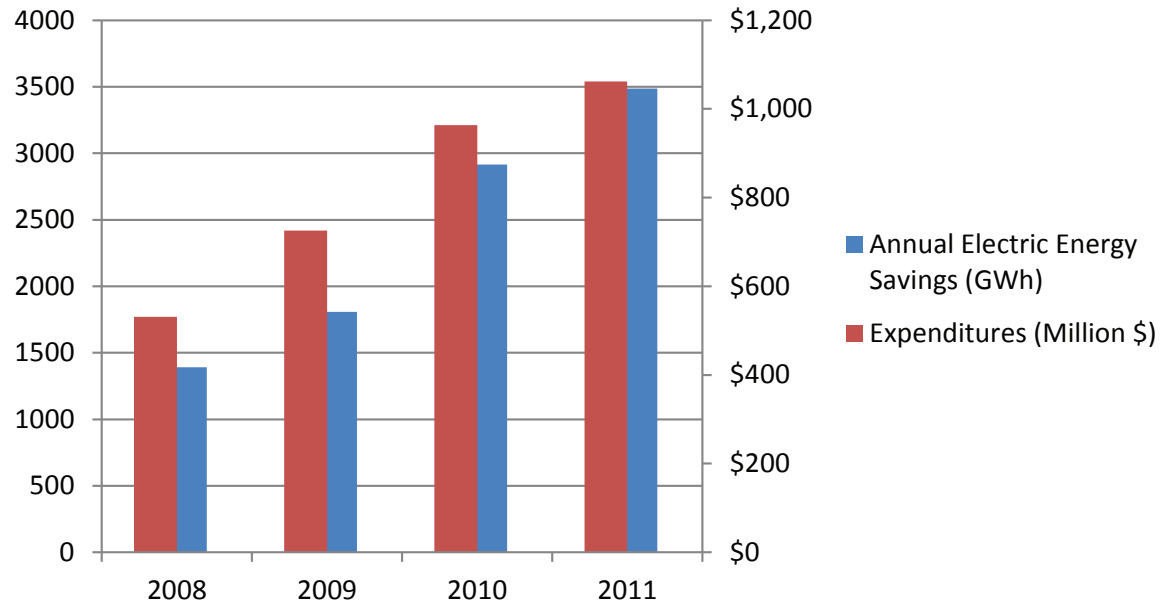
This REED Program Year 2011 Annual Report provides high-level impacts of 2011 energy efficiency programs at the state and regional level, and outlines some key differences in program results across states, based on review of the data and input from program administrators and other state representatives.

In order to develop this Annual Report, NEEP worked with energy efficiency stakeholders in each REED state to provide state-specific information and help flesh out explanations for differences in energy efficiency program impacts. This report represents a first step towards analyzing differences across states, but additional work is needed to more fully explain many key differences.

III. TOTAL ELECTRIC PROGRAM SAVINGS AND EXPENDITURES

The REED states saw considerable growth in the net annual energy savings achieved by their electric energy efficiency programs in 2011 compared with previous years.[3] This is due in large part to increased program funding and state policies over the period 2008 to 2011 that tie energy efficiency savings goals to energy sales (and in some cases peak demand sales). With these critical policies in place and associated higher level of savings, a number of states are making important progress towards meeting a considerable portion of their annual electricity and gas retail sales through energy efficiency, steadily moving to 2% of retail sales. This is significant because several REED states have set policy targets for energy efficiency savings in excess of 2% of sales.

Figure 1: Total Net Annual Electric Energy Savings (GWh) and Expenditures (Million $)



It is important to note that REED focuses on ratepayer funded energy efficiency programs. Since some of these programs are supported or co-funded in part by other sources, some of the program expenditures in REED are from Regional Greenhouse Gas Initiative (RGGI) Allowance Proceeds, American Recovery and Reinvestment Act (ARRA) funds, Wholesale Capacity Market Revenues, as well as some state specific funding mechanisms (See the 2011 Program Funding Report at www.neep-reed.org for a state-by-state breakdown of funding sources).[4] REED may expand in the future to include discrete reporting of all energy efficiency activities in a state (e.g. all Weatherization Assistance Program impacts, all state

3 While REED data collection begins with year 2011, NEEP has collected past years' data for comparison purposes. NEEP cannot confirm that the data is fully comparable given the absence of consistent reporting templates and parameters and supporting definitions prior to 2011. See Appendix C for source information for past years' data.

4 Connecticut uses funding obtained as part of its Class III Renewable Portfolio Standard (RPS) to fund its energy efficiency programs. Vermont uses revenue generated by a settlement with Green Mountain Power, known as the Green Mountain Power Energy Efficiency Fund.

public building efficiency projects, etc.) and examine program expenditures compared to program budgets.

A. Total Annual Electric Energy Savings and Expenditures

The total 2011 annual electric energy savings in the REED states is equivalent to powering 309,000 homes for one year.[7]

Figure 1 shows the REED region's energy efficiency programs achieved an unprecedented level of net annual electric energy savings[5] in the amount of 3,485.6 GWh in 2011, an increase of about 250% from 2008 annual energy savings. Program expenditures doubled in that time period, from $530 million to over $1 billion.[6]

Table 1 shows New York achieved the highest level of 2011 annual energy savings at 1,522 GWh, with Massachusetts following at 797,990 MWh. When considering savings compared to retail electric sales, 2011 annual energy savings ranged from a low of 0.58% of sales in New Hampshire to a high of 1.77% in Vermont. Massachusetts followed Vermont at 1.69%.

Vermont and Massachusetts' positions as the top states with respect to energy savings compared to retail sales is driven in part by these states' high electric energy savings targets. These targets are outlined in the Massachusetts Joint Statewide Three Year Energy Efficiency Plans (2010-2012 and 2013-2015) and the Vermont Public Service Board's Order re: Energy Efficiency Utility Electric Budgets for Demand Resources Plan.[8] Those states' 2012 targets of 2.4% in Massachusetts and 2.2% in Vermont require an increase in state annual energy savings from 2011 levels. For 2013-2015, Massachusetts has an even higher goal of 2.5% per year.

For more information on state electric program energy efficiency policies and savings goals, please see NEEP's 2012 Regional Roundup.

5 Annual Energy Savings reflects changes in energy use caused in the reporting calendar year by new program participants in existing energy efficiency programs and all participants in new energy efficiency programs (i.e. programs begun during the calendar reporting year). Reported Annual Energy Savings are annualized. The 2011 annual energy savings data in this report are meter level net savings data.

6 See Appendix C: 2008-2010 Energy Efficiency Program Savings and Expenditures.

7 According to the U.S. Energy Information Agency (US EIA), the average 2011 annual electricity consumption for a U.S. residential utility customer was 11,280 kWh. See: http://www.eia.gov/tools/faqs/faq.cfm?id=97&t=3.

8 VT Public Service Board Docket EEU-2010-06, Order Entered 8/1/2011. See: http://aceee.org/files/EEU-2010-06%20DRP.pdf.

Table 1: Total 2011 Annual Electric Energy Savings & Savings Compared to Retail Sales

State	Total Annual Energy Savings(MWh)	Annual Savings as a % of Retail Sales
New York	1,522,000	1.08%
Massachusetts	797,990	1.69%
Maryland	417,620	0.68%
Connecticut	376,920	1.27%
Maine	119,160	1.02%
Vermont	98,060	1.77%
Rhode Island	96,010	1.26%
New Hampshire	57,810	0.58%

Table 2 shows state level 2011 electric program spending ranged from a low of $18.7 million in New Hampshire to $404.2 million in New York. All states saw an increase in spending across this timeframe, however from 2010 to 2011 spending in Connecticut and Maine dropped and spending in New Hampshire and Vermont held steady. Connecticut's 2010 expenditures were high due to a large carryover of 2009 unspent funds and additional ARRA spending. For 2011 energy efficiency program budgets, see the Consortium for Energy Efficiency's (CEE) 2011 State of the Efficiency Program Industry Budgets, Expenditures and Impacts.

Table 2: 2008 - 2011 Electric Program Expenditures (Millions)

State	2008	2009	2010	2011
Connecticut	$81.5	$118.3	$158.2	$119.4
Massachusetts	$183	$240	$239.2	$283.9
Maryland[9]		$32.8	$81.5	$138.7
Maine	$14	$22	$25.1	$22.8
New Hampshire	$17.7	$18	$18.9	$18.7
New York	$185.1	$237.3	$376.7	$404.2
Rhode Island	$19.2	$31.7	$26.4	$36.5
Vermont	$30.3	$26	$37.3	$37.3
TOTAL	**$530.7**	**$726**	**$963.4**	**$1,061.5**

B. Summer and Winter Peak Demand Savings

REED collects peak demand savings data from electric energy efficiency programs, which is particularly important for system planning. Table 3 shows net summer and winter peak

9 Maryland's EmPOWER Programs were not running in 2008.

demand savings for each state.[10] REED allows for reporting of both summer and winter peak demand savings. The New England states report both summer and winter, but Maryland and New York report only summer peak demand savings. New York and Maryland achieved the highest level of summer peak demand savings mostly due to their large size and relatively warm climate. New York and Maryland also report demand savings from residential demand response programs. In Maryland, the surcharges for the energy efficiency and demand response programs were merged together in 2011 to form the EmPOWER Maryland surcharge. Given this merged structure, the Maryland demand response programs have been included in REED. In New York, Long Island Power Authority runs a residential demand response program as part of its energy efficiency program portfolio. When considering winter peak demand savings, Massachusetts and Connecticut achieved the highest levels at 113 MW and 73 MW, respectively.

Table 3: 2011 Net Summer and Winter Peak Demand Savings

State	Net Summer Demand Savings Meter Level (MW)	Net Winter Demand Savings Meter Level (MW)
New York	434.9	
Maryland	130.3	
Massachusetts	103.4	113.4
Connecticut	42.4	72.5
Maine	14.7	34
Rhode Island	13.7	13
Vermont	13.6	18.3
New Hampshire	9.9	10

C. Cost of Saved Energy

The cost of saved energy from energy efficiency programs is an important metric that is often used to demonstrate energy efficiency's position as the lowest-cost energy resource. This metric is particularly important in today's policy environment in the REED region, in which many states are establishing aggressive energy efficiency energy savings goals that require significant increases in energy efficiency program funding. The cost-effectiveness of energy efficiency programs is an important component to ensuring energy efficiency's continued position as the go-to energy resource in the region.

REED reports state-level lifetime cost per kWh or therm and levelized cost per kWh or therm. The lifetime cost of saved energy is a simple calculation that does not discount costs to a net present value, using the following equations:

10 Each jurisdiction's definition of peak demand varies. Examples include: demand coincident with utility system peak load, demand coincident with ISO/RTO summer or winter peak, or according to performance hours defined by wholesale capacity markets.

- Lifetime Cost of Electric Energy Savings = Total Program Expenses / Lifetime Net kWh Savings
- Lifetime Cost of Natural Gas Energy Savings = Total Program Expenses / Lifetime Net Therm Savings

For all REED states, the levelized cost of saved energy for 2011 programs was less than 5 cents per kWh. This is considerably lower than the comparable cost of electric supply in New England, at 10.47 cents per kWh.[11]

The levelized cost of saved energy is based on a compound interest calculation that calculates equivalent annual net disbursements. It is thus an annualized value of efficiency and is often used to compare efficiency with supply-side resources. The levelized cost of saved energy is calculated in REED using the following equations:

- Levelized Cost of Electric Energy Savings = Total Program Costs x CRF / Incremental Annual Net kWh Savings
- Levelized Cost of Gas Energy Savings = Total Program Costs x CRF / Incremental Annual Net Therm Savings

Where: Capital Recovery Factor (CRF) = $i (1 + i)n / (1 + i)n - 1$
i = real discount rate
n = weighted average measure life for portfolio of programs

A key aspect of this calculation is the discount rate used. Using a discount rate of 6% to calculate the cost of saved energy for a particular program will result in a higher levelized cost of saved energy than if a rate of 3% were used to calculate the cost of saved energy for that same program. States participating in REED all agreed to use a real discount rate of 2.46%. This is the same discount rate used in the Avoided Energy Supply Costs in New England: 2011 Report and is based on February 2011 nominal rates of return for 30-year Treasury Bonds and the forecast long-term inflation rate (2.00%).[12]

For formal state reporting practices, however, each state selects its own discount rate to calculate the levelized cost of saved energy. A range of discount rates is used across the states,[13] including: a utility's weighted average cost of capital or weighted cost of debt and equity, a 12-month rolling average rate on a long-term Treasury note, an average homeowner's discount rate, and/or some average of all of these. This means that in many cases REED's cost of saved energy does not match the cost of saved energy in formal state-specific Annual Reports and other publications. This is an issue that the EM&V Forum plans to address with the Steering Committee in 2014, and may result in the development of Cost of Saved Energy Guidelines.

11 Comparable cost of electric supply as provided in the Avoided Energy Costs in New England: 2013 Report by Synapse Energy Economics, Inc. See Page 1-6: http://www.synapse-energy.com/Downloads/SynapseReport.2013-07.AESC.AESC-2013.13-029-Report.pdf.

12 Synapse Energy Economics. Avoided Energy Supply Costs in New England: 2011 Report. August 11, 2011. See: http://www.synapse-energy.com/Downloads/SynapseReport.2011-07.AESC.AESC-Study-2011.11-014.pdf.

13 Discount rates used for formal state reporting practices ranged from about 2% - 7%.

Average measure life dramatically influences the cost of saved energy, as longer lasting energy efficiency measures deliver more substantial energy savings compared to measures with a shorter lifespan. It's important to note when comparing results across states that assumptions about measure life and program lifetime savings differ across the REED states. For more information, see Section VII below, which provides a comparison of the state-level average measure life for several electric and natural gas program types, including information about how differences in average measure life are influenced by each state's Technical Reference Manual (TRM).

For 2011, the cost of saved energy in REED was calculated using program administrator costs but not participant costs, as not all states participating in REED collected participant cost data.

Table 4: Electric Program Cost of Saved Energy and Average Measure Life

State[14]	Levelized Cost of Saved Energy ($/kWh)	Lifetime Cost of Saved Energy ($/kWh)	Average Measure Life (years)
Connecticut	$0.043	$0.039	8.22
Maine	$0.025	$0.022	8.52
Maryland	$0.038	$0.034	9.55
Massachusetts	$0.032	$0.027	13.27
New Hampshire	$0.032	$0.028	11.57
Rhode Island	$0.039	$0.034	11.22
Vermont	$0.039	$0.034	11.21

Table 4 shows the state-level lifetime and levelized costs of saved energy for electric energy efficiency programs, as well as the average measure life for each state's programs. The lifetime and levelized cost of saved energy for the natural gas programs are provided in Section IV below.

Connecticut has the highest cost of saved energy amongst electric programs, at $0.043 for levelized. In 2011, Connecticut was the state with the lowest average measure life. This was primarily driven by residential lifetime savings. Maine has the lowest cost of saved energy, at $0.025 for levelized, even though it has a short average measure life compared to other states. This can be explained in part by its focus on residential lighting and appliance programs, which include measures like efficient light bulbs that are much lower cost to implement than many other efficiency measures but still deliver substantial energy savings.

14 New York is not included in Table 4 because it did not submit lifetime energy savings for its electric programs.

IV. TOTAL NATURAL GAS PROGRAM SAVINGS AND EXPENDITURES

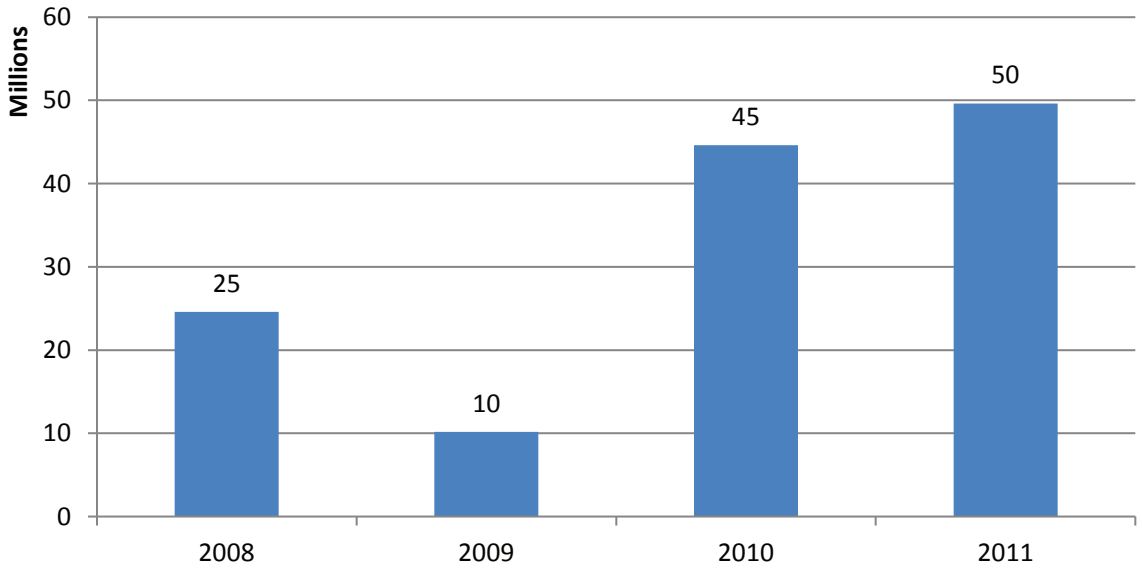
Like the electric programs, the 2011 natural gas energy efficiency programs also witnessed growth in annual energy savings when compared to previous years. This growth was supported by robust investment in natural gas energy efficiency programs, driven by state policies promoting the role of energy efficiency as a key component in meeting energy needs.

The total regional 2011 annual natural gas energy savings is equivalent to annual greenhouse gas emissions from nearly 55,000 passenger vehicles.[15]

A. Total Annual Natural Gas Energy Savings and Expenditures

Figure 2 shows 2011 annual energy savings from natural gas programs in the amount of 49.63 million therms, which is slightly over two times the magnitude of 2008 annual energy savings. The dip in savings from 2008 to 2009 occurred because the New York State Energy Research and Development Authority (NYSERDA) netted out from their gas savings the increased gas use caused by the installation of combined heat and power (CHP) systems, causing negative overall gas savings values for the state in 2009, but adding to electric savings in that year.

Figure 2: Total Annual Natural Gas Energy Savings (Million Therms)



In 2011, the region collectively spent $199.8 million on natural gas energy efficiency programs. Massachusetts spent over $100 million on its programs, and New York followed by

15 According to the Greenhouse Gas Equivalency Calculator. See: http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

spending $62 million. We were not able to obtain comparable 2008 to 2010 expenditure data for New York, but Figure 3 shows a nearly three-fold increase in natural gas program spending for the six New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) from 2008 to 2011.

Figure 3: Total New England Natural Gas Program Expenditures (Million $)

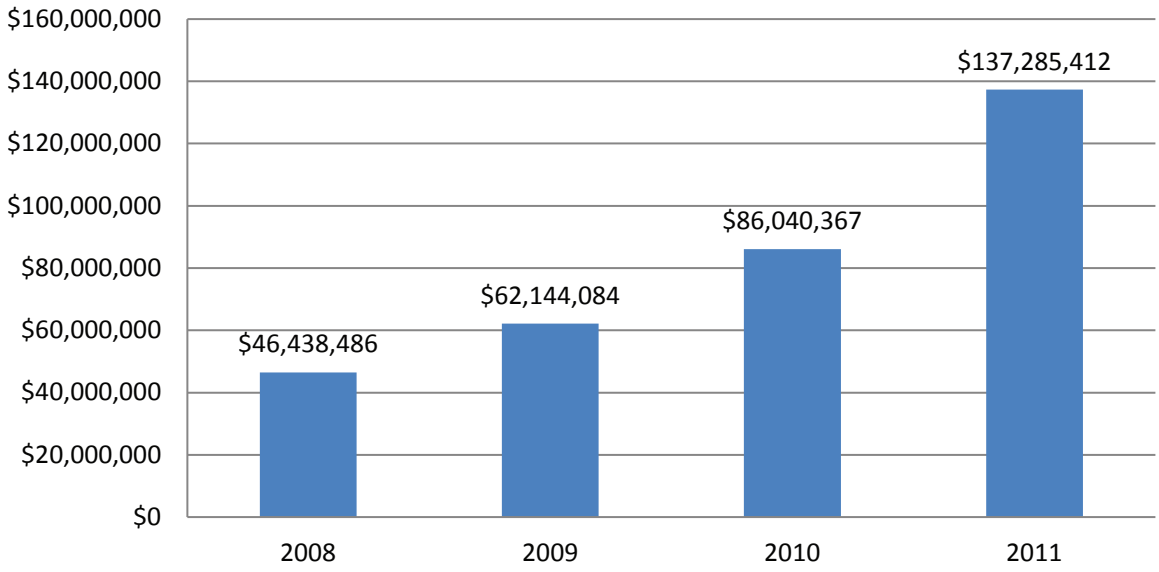


Table 5 shows New York achieved the highest level of energy savings at 26.7 million therms, with Massachusetts following at 15.2 million therms.[16] Natural gas savings compared to retail sales were lower overall than for electric programs. Vermont achieved savings of 1.31% of statewide retail gas sales, and Massachusetts followed with 0.60% of retail gas sales. The 2013-2015 Massachusetts plan calls for natural gas savings of 1.1% of retail sales starting in 2013 and increasing in subsequent years, which will necessitate continued ramp-up of Massachusetts' natural gas programs.

Vermont achieved such a high level of savings due to the focus and design of its programs. Vermont Gas offers comprehensive home energy audits by its in-house staff through its residential programs that focus on a "whole house" approach rather than fixed rebates. Vermont Gas ensures that measure installations are performed to demanding specifications with well-trained contractors and provides contractor oversight through project completion. Vermont Gas does offer fixed rebates in its equipment replacement programs for residential and commercial programs as well as custom rebates. In many cases, fixed rebates are easier to process and administer but typically yield lower savings. The custom projects require more customer interaction and typically have a longer lead time to complete, but

16 It is important to note that access to gas as a source of heating is uneven across the region, which may impact the mix of programs and level of savings achieved.

typically result in greater savings for less cost per therm. Due to its unique size, Vermont Gas has become quite adept at balancing its portfolio of fixed rebates with customized rebates and achieving high savings.

For more information on state natural gas program energy efficiency policies and savings goals, please see NEEP's 2012 Regional Roundup.

Table 5: Total 2011 Annual Natural Gas Energy Savings & Savings Compared to Retail Sales

State	Total State Energy Savings (therms)	Annual Savings as a % of Retail Sales
New York	26,744,100	0.35%
Massachusetts	15,181,170	0.60%
Connecticut	3,216,540	0.28%
Rhode Island	1,196,140	0.34%
Vermont	1,110,810	1.31%
Maryland	979,580	0.06%
New Hampshire	938,440	0.42%
Maine	258,920	0.07%

At the state level, natural gas program spending generally increased from 2008 to 2011, as shown in Table 6.

Massachusetts experienced a particularly dramatic increase in natural gas program spending from 2010 to 2011. Expenditures rose from $61 million in 2010 to nearly $106 million in 2011. This was due to an aggressive ramp-up in natural gas program energy savings goals as outlined in the 2010-2012 Massachusetts Joint Statewide Three-Year Gas Energy Efficiency Plan. Large increases in Massachusetts program spending were needed to bolster the programs and help meet the higher savings targets called for in the plan.

Table 6: Total Natural Gas Program Expenditures (Millions)

State[17]	2008	2009	2010	2011
Connecticut	$5.9	$9.4	$11.8	$19.4
Massachusetts	$28.5	$40.5	$61.4	$105.8
Maine	$0.44	$0.59	$1.3	$.83

17 Maryland is not included in Table 6 since Maryland's natural gas program administrator, Baltimore Gas and Electric, does not separately report the costs associated with its 2011 natural gas programs publicly under EmPOWER Maryland.

18 We were not able to obtain 2008 to 2010 expenditures data for all New York natural gas programs.

19 Rhode Island's natural gas programs were launched in July 2007 and were approved for 18 months, as opposed to the calendar year. The 2008 figure presented in Table 6 reflects expenditures during the July 2007 to December 2008 time period. Rhode Island expenditures in 2011 were affected by a large negative carryover in 2010 that reduced the amount available to spend in 2011.

New Hampshire	$2.4	$3.4	$4.5	$4.6
New York[18]				$62.5
Rhode Island[19]	$7.1	$6.3	$5	$4.8
Vermont	$1.8	$1.9	$2	$1.9
TOTAL	**$46.4**	**$62.1**	**$86**	**$199.8**

B. Cost of Saved Energy

Table 7 shows the state-level lifetime and levelized cost of saved energy figures for natural gas energy efficiency programs, as well as the average measure life for each state's programs. The cost of saved energy across states for gas programs has a much broader range than for electric programs.

Massachusetts has the highest cost of saved energy for natural gas programs, at $0.61 per therm for levelized, with Connecticut the second highest. This can be explained in part by both states' relatively low average measure life compared to other states. Massachusetts also allocated over 20% of its natural gas program expenditures to its low income retrofit program, which resulted in relatively low savings and a high average annual cost per therm saved. It is also rapidly ramping up its natural gas programs, which may have a high upfront cost. Vermont's cost of saved energy is quite low compared to other states, at $0.12 for levelized.

Table 7: Natural Gas Program Cost of Saved Energy and Average Measure Life

State	Levelized Cost of Saved Energy ($/therm)	Lifetime Cost of Saved Energy ($/therm)	Average Measure Life (years)
Connecticut	$0.48	$0.40	15.21
Maine	$0.20	$0.16	20.30
Massachusetts	$0.61	$0.51	13.72
New Hampshire	$0.36	$0.29	17.22
Rhode Island	$0.35	$0.29	13.58
Vermont	$0.12	$0.10	16.99

V. DETAIL ON ELECTRIC AND NATURAL GAS PROGRAM EXPENDITURES

The section below provides more detail on each state's electric and natural gas program expenditures, including a breakdown of how energy efficiency program spending was allocated to the six REED expenditure categories and per capita expenditures.

A. Expenditures by Key Categories

REED breaks expenditures into six expenditure categories according to the following definitions:

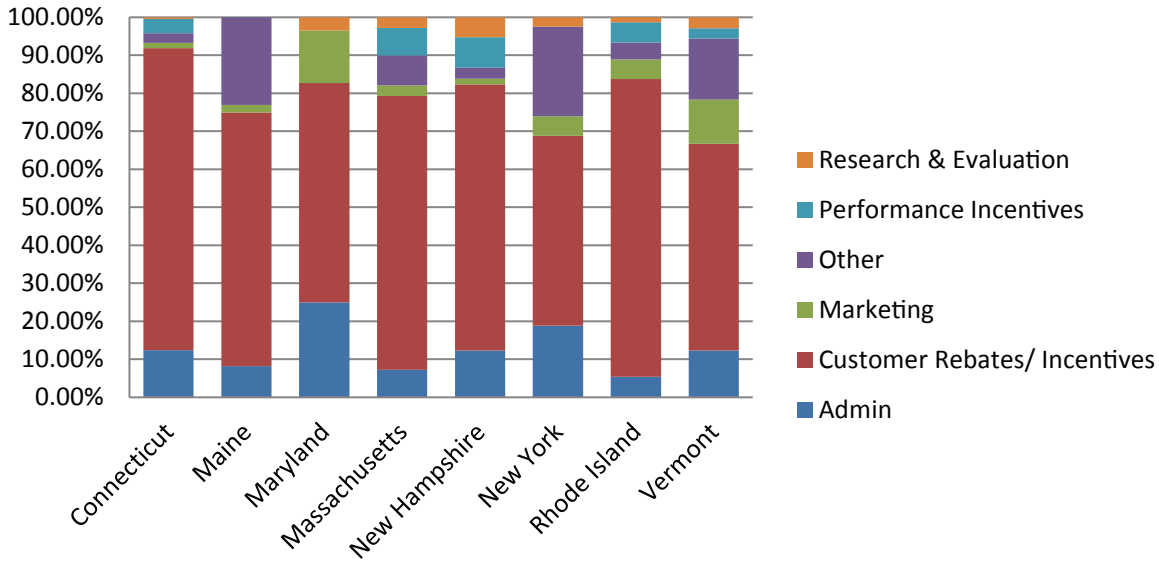
- **Administration:** Program administration and costs associated with implementation of programs, including direct installation costs, and program implementation contractor services. This does not include program marketing costs (defined below).
- **Customer Rebates and Incentives:** Direct financial rebates and incentives paid to customers to support investment in energy efficiency (i.e., incremental cost of higher efficiency equipment, or portion thereof). Financial rebates do not include direct installation.
- **Marketing:** Costs to program administrators associated with marketing, e.g., increasing customer awareness of programs.
- **Other**: Includes other cost or savings not identified or included in the other categories.
- **Performance Incentives:** Utility shareholder or program administrator incentives earned for achieving specific performance metrics.
- **Research and Evaluation:** Costs related to evaluation, measurement and verification (EM&V) activities, and research or studies to support EM&V activities.

Not all states use the same expenditure categories as provided in REED and/or allocate their costs differently across programs. Furthermore, not all states define expenditure categories such as marketing and administration in the same way. To address this challenge, states were asked to allocate expenditures as best as they could to the REED expenditure categories, using the definitions above for each expenditure category (also provided in the REED Glossary). Given inconsistencies across states, the REED website and this report do not provide raw expenditures data at the program or program type level, but a state-level analysis is provided below.

1. Electric Energy Efficiency Program Expenditures

Figure 4 shows the contribution of each REED expenditure category to total 2011 electric program expenditures by state. The section below provides more details about each REED expenditure category.

Figure 4: 2011 Electric Program Expenditure Categories



Customer Rebates and Incentives

Customer Rebates and Incentives expenditures comprised the majority of electric program expenditures in all states. Expenditures in this category ranged from 50% of spending in New York to 79% of all spending in Connecticut. Some New York customer rebates and incentives were allocated to the 'Other' expenditure category. As such, the 50% figure understates New York's actual investment in customer rebates and incentives. See the New York 'Other' category below for more information.

Performance Incentives

Five of the eight states participating in REED utilized Performance Incentives for their electric programs, ranging from 2.7% to 8.1% of expenditures. Performance Incentives provide an opportunity for efficiency program administrators to earn a return associated with their investment in energy efficiency programs based upon their actual performance and achievement of savings and other targets. The states that provided performance incentives were Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont. New York, Maine and Maryland did not provide Performance Incentives for their 2011 electric energy efficiency programs.

Other

The Other expenditure category includes expenditures that fall outside the other five REED expenditure categories. Expenditures in this category ranged from 2% to 24%. Each state used the Other category for different purposes, as described below and on the REED State Observations page.

- **Connecticut:** 2.5% of expenditures. This primarily included funding items mandated by the State of Connecticut Public Utilities Regulatory Authority (CT PURA). For example, this category was used for funds allocated to the Institute for Sustainable Energy at Eastern Connecticut State University and other groups and agencies.
- **Maine:** 23% of expenditures. This included technical support expenditures.
- **Maryland:** did not use the Other category.
- **Massachusetts:** 8% of expenditures.
- **New Hampshire:** 2.85% of expenditures.
- **New York:** 24% of expenditures. The majority of New York's 'Other' category is comprised of NYSERDA SBC3 program Marketing, Implementation, and Customer Rebate and Incentives expenditures, with the remainder comprised of New York Energy Efficiency Portfolio Standard program Trade Ally Training expenditures and Long Island Power Authority Labor and Overhead expenditures.
- **Rhode Island:** 4.4% of expenditures. This is comprised of Rhode Island Energy Efficiency and Resource Management Council (EERMC) expenditures.
- **Vermont:** 16% of expenditures. This included technical assistance and information technology expenditures.

Administration

Electric program Administration expenditures across the states ranged from about 6% in Rhode Island to 25% in Maryland. Administration expenditures were also low in Maine[20] and Massachusetts, at less than 10%. Administration expenditures were relatively high in Maryland due in part to its inclusion of residential demand response programs, which are particularly costly to administer. Maryland Administration expenditures are comprised of utility administration; operations and maintenance (including the installation cost of demand response devices and outside services costs such as the payments made to contractors or the program implementers); and capital costs (including the cost of demand response devices).

Research and Evaluation

The Research and Evaluation category represents the smallest amount of expenditures in the region, ranging from about 0.5% to just over 5% of expenditures.

States are increasingly recognizing the importance of delivering thorough evaluation of energy efficiency programs in this era of increasing investments in energy efficiency programs, and therefore several have increased their level of evaluation expenditures. For example, in 2008 the New York Department of Public Service (NY DPS) established an Energy Efficiency Portfolio Standard with the goal of reducing electricity usage by 15% statewide by 2015 and also modified its evaluation framework by increasing evaluation budgets from

20 A small portion of Maine's Administration expenditures is comprised of evaluation expenditures, as evaluation expenditures were not separated out.

two to five percent of the overall program budget and requiring detailed evaluation and reporting guidelines, evaluation plans, and more frequent reporting.[21] In its 2010 to 2012 joint statewide electric and natural gas energy efficiency plans, Massachusetts recognized that the increased savings and expenditures associated with the plan needed to be subject to rigorous evaluation and monitoring and proposed a new comprehensive and transparent approach to evaluation and monitoring, featuring statewide program evaluation in several research areas. Massachusetts' 2013 to 2015 plan calls for even more extensive investment in EM&V, with an evaluation budget of nearly $70 million, or about 4.5% of the total energy efficiency program budget.

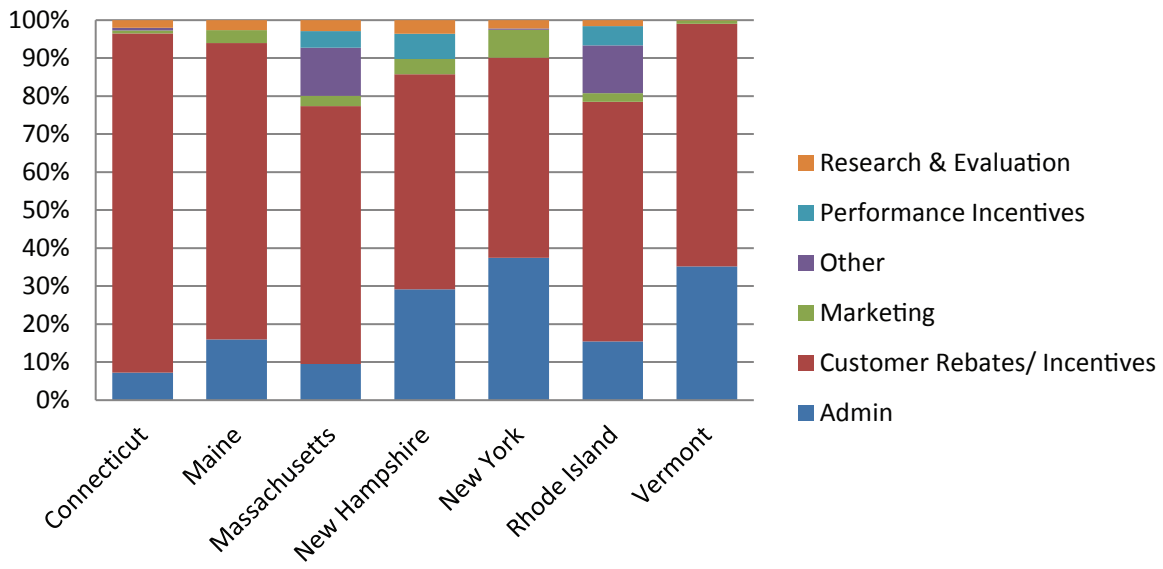
According to the State Energy Efficiency Action Network's (SEE Action) Energy Efficiency Program Impact Evaluation Guide, the primary challenges associated with setting an evaluation budget are balancing (1) the cost, time, and effort to plan and complete the evaluations, (2) the uncertainty of various impact evaluation approaches, and (3) the value of the information generated by the efforts. Taking a broader look at evaluation spending across the United States and Canada, CEE's 2011 Annual Industry Report showed total EM&V spending averaged about 3.6% of total program budgets for program administrators that responded to CEE's annual survey. The range of EM&V budgets varied significantly from very little to about 6%, which is consistent with the level of evaluation expenditures data states provided in REED.

2. Natural Gas Energy Efficiency Program Expenditures

Figure 5 shows the contribution of each REED expenditure category to total 2011 natural gas program expenditures by state. The section below provides more details about how each expenditure category contributed to total state and regional natural gas program expenditures.

21 07-M-0548: Energy Efficiency Portfolio Standard – Evaluation. See: http://www3.dps.ny.gov/W/PSCWeb.nsf/All/766A83DCE56ECA35852576DA006D79A7?OpenDocument.

Figure 5: 2011 Natural Gas Program Expenditure Categories



Customer Rebates and Incentives

Like electric programs, Customer Rebates and Incentives expenditures also comprised the majority of natural gas program expenditures in all states, ranging from 52% of spending in New York to 89% of all expenditures in Connecticut.

Performance Incentives

Three of the seven states with natural gas program expenditures provided Performance Incentives for their natural gas programs, ranging from 4.3% to 6.6% of expenditures. These states are Massachusetts, New Hampshire, and Rhode Island. Connecticut, Maine, New York and Vermont did not provide Performance Incentives.

Other

The Other category was used less for natural gas programs than it was for electric programs, with five of the seven states with natural gas program expenditures designating less than 1% of expenditures to Other. Massachusetts and Rhode Island designated their sales, technical assistance, and training funds to the Other category, which represented about 12% of each states' total expenditures.

Administration

Like the electric programs, there is also significant variation in natural gas program Administration expenditures across states. New York and Vermont had relatively high Administration expenditures at over 30% respectively. At the low end, Connecticut devoted only 7.2% of expenditures to Administration and Massachusetts only 9.4%. Massachusetts and Rhode Island maintained low Administration costs for both electric and natural gas programs.

Research and Evaluation

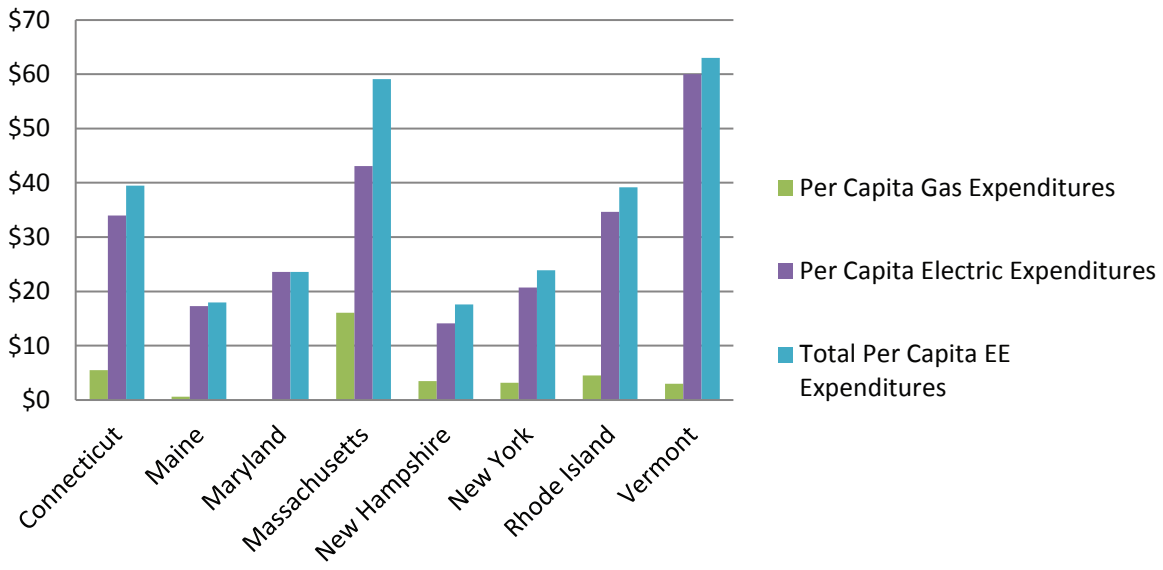
Natural gas program Research and Evaluation expenditures ranged from a high of 3.6% of expenditures in New Hampshire to less than 1% of expenditures in Vermont. Massachusetts also invested substantially in natural gas program evaluation with nearly 3% of expenditures allocated to this category. Vermont's research and evaluation expenditures were limited because Vermont regulators do not require Vermont Gas to have a formal EM&V plan. In 2011, Vermont Gas performed informal review annually on many accounts that participated in its program offerings and made corrections to measure assumptions as warranted. Vermont Gas is in the process of becoming the Appointed Energy Efficiency Utility for natural gas programs for the customers in its footprint. If Vermont Gas becomes an appointed entity, it would likely be required to engage in formal and frequent evaluation activities, which would increase evaluation expenditures in future years.

B. Per Capita Expenditures

In addition to total expenditures and expenditures by category, another way to examine and compare energy efficiency program expenditures by state is to consider expenditures on a per capita basis (dollar investment per person). Per capita spending normalizes the investment by each state, which helps to provide a fair comparison of investment in efficiency programs.

Figure 6 shows 2011 electric per capita expenditures, natural gas per capita expenditures and total energy efficiency program per capita expenditures in each state.

Figure 6: 2011 Energy Efficiency Program Per Capita Expenditures



When considering total investment (electric plus natural gas programs) in ratepayer funded energy efficiency programs on a per capita basis, Vermont and Massachusetts invested the most at around $60, while Maine and New Hampshire invested the least at around $18. Massachusetts and Vermont's substantial investment in energy efficiency programs resulted in programs that delivered a considerable amount of saved energy as compared to retail energy sales, which is consistent with the aggressive goals established in these states' policies.

2011 electric efficiency program per capita expenditures ranged from $14.09 in New Hampshire to $60.03 in Vermont. Vermont's relatively large investment in electric programs on a per capita basis resulted in the highest electric energy savings compared to retail sales, as previously discussed. Massachusetts' investment at $43.06 per capita resulted in the second highest electric energy savings compared to sales.

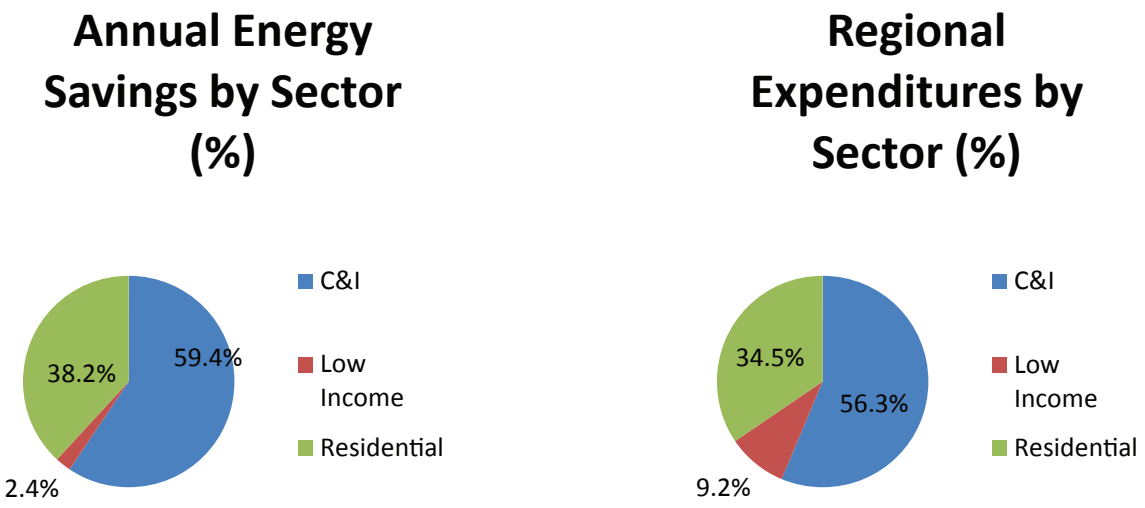
On the natural gas side, Massachusetts invested the most of all states on a per capita basis at just over $16, resulting in gas energy savings of 0.6% of retail sales. As mentioned previously, this relatively large investment in natural gas programs was driven by Massachusetts' aggressive energy savings targets. Vermont's natural gas programs stick out as very effective, with only a $3 investment per capita leading to gas energy savings of 1.3% of retail sales.

VI. ANNUAL ENERGY SAVINGS AND EXPENDITURES BY SECTOR

A. Annual Electric Energy Savings and Expenditures

Figure 7 shows that the Commercial and Industrial (C&I) sector produced 59.4% of the REED region's annual electric energy savings, with 38.2% coming from the residential sector and 2.4% from the low income sector. Savings largely followed expenditures by sector for the residential and C&I sectors. The low-income sector, however, represented 9% of expenditures but only 2.4% of savings.

Figure 7: 2011 Electric Annual Energy Savings and Expenditures by Sector



The discrepancy between expenditures in the low income sector and resultant savings can be attributed in part to state mandates to fund and provide low-income energy efficiency programs that may produce lower savings compared to expenditures than other programs. For example, in Massachusetts, energy efficiency program funds must be allocated to each customer class in proportion to these customers' contributions to those funds. As such, at least 10% of the funding for electric energy efficiency programs and at least 20% of the funding for gas energy efficiency programs must be spent on low-income residential demand-side management and education programs.[22] Connecticut's low income budget is allocated based on parity; the percentage of the energy efficiency budget for the low income sector is in alignment with the percentage of revenues received from the low income sector.

Figure 8 shows electric energy savings by sector in each state.

22 According to American Council for an Energy Efficient Economy's (ACEEE) State Energy Efficiency Policy Database. See: http://aceee.org/energy-efficiency-sector/state-policy/massachusetts/193/all/191.

- C&I sector savings ranged from a low of 25% in Maine[23] to a high of 69% in Massachusetts.
- Low Income sector savings ranged from a low of 1% in Maine to a high of 6% in Connecticut.
- Residential sector savings ranged from a low of 29% in Massachusetts to a high of 74% in Maine.

Figure 8: 2011 Electric Annual Energy Savings by Sector

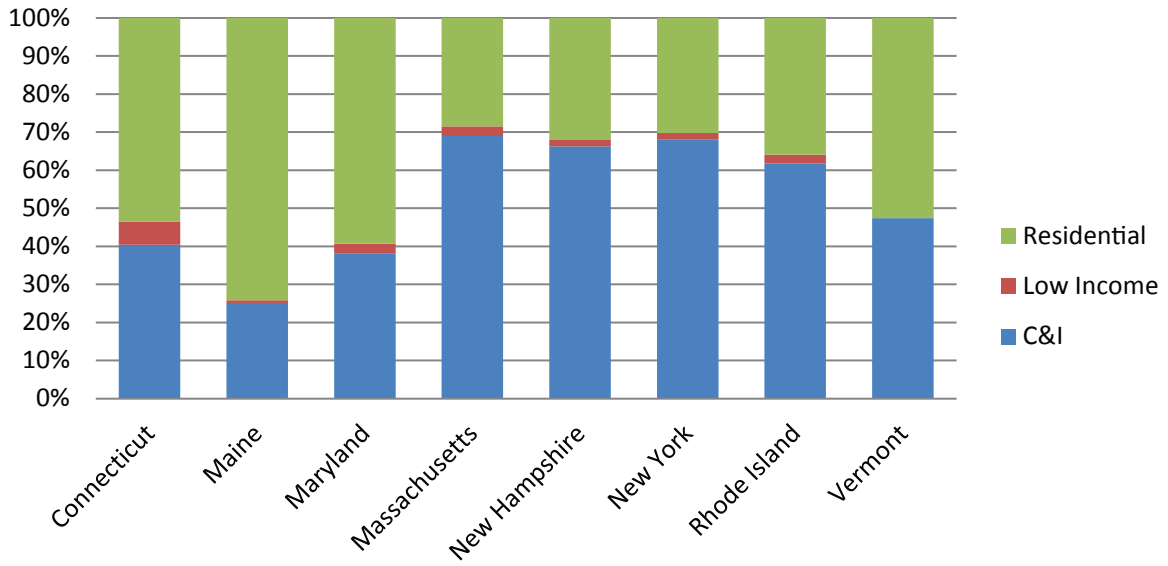


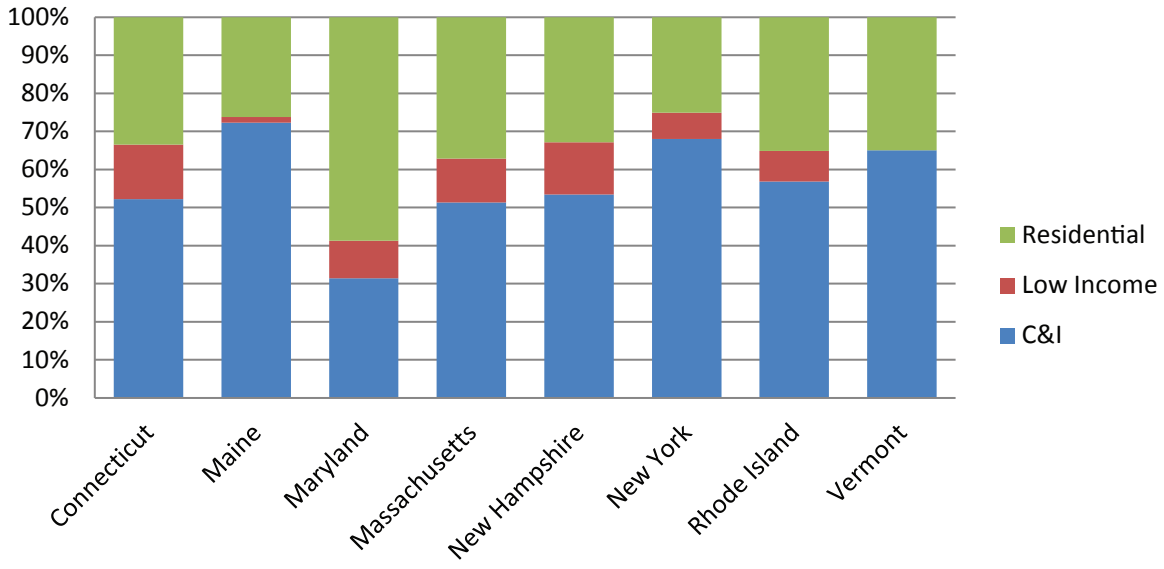
Figure 9 shows electric program expenditures by sector in each state.

- C&I sector expenditures ranged from a low of 31% in Maryland to a high of 72% in Maine.
- Low Income sector expenditures ranged from a low of 1% in Maine to a high of 14% in Connecticut and New Hampshire.[24]
- Residential sector expenditures ranged from a low of 25% in New York to a high of 59% in Maryland.

23 REED includes achieved, not committed, annual energy savings from PY 2011 programs. Maine's large C&I retrofit Competitive Bid program resulted in 33,502 MWh of committed savings but no achieved savings. If this program's committed savings had been included, Maine's C&I sector annual energy savings would have comprised 42% of state savings.

24 Vermont does not haves standalone low-income electric programs; they are folded into their residential and business program portfolio.

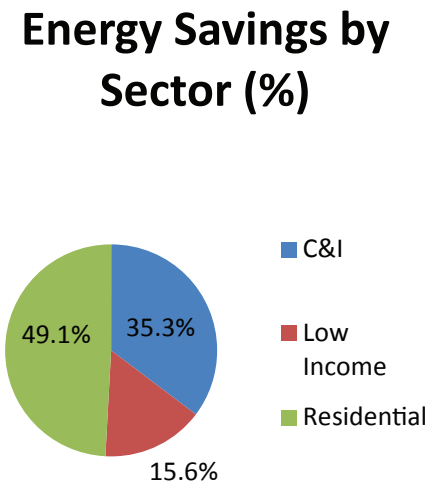
Figure 9: 2011 Electric Program Expenditures by Sector



B. Annual Natural Gas Energy Savings and Expenditures

Figure 10 shows the residential sector produced the largest amount of regional energy savings at 49.1%, with 35.3% coming from the C&I sector, and 15.6% from the low income sector. The low income sector played a much more prominent role for natural gas programs than it did for electric programs, where it represented only 2% of savings (see Figure 7). Expenditures by sector largely followed savings for all three sectors.

Figure 10: 2011 Natural Gas Annual Energy Savings and Expenditures by Sector



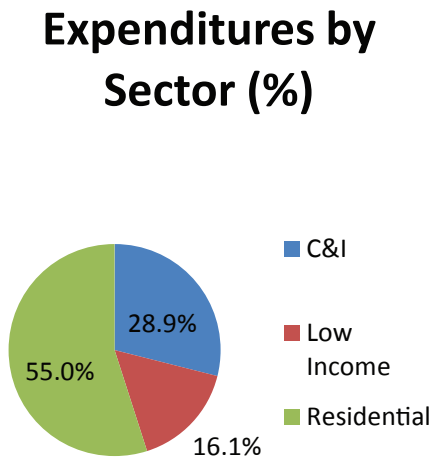


Figure 11 shows the percent of annual natural gas energy savings produced by each sector in each state.

- C&I sector savings ranged from a low of 21% in Maine to a high of 76% in Vermont and Rhode Island.[25]
- Low Income sector savings ranged from a low of 1% in Vermont to a high of 30% in Connecticut. The comparatively high amount of low income sector savings in Connecticut is due to its mature low income program offerings, while its programs in other sectors have been under development and growing over the past several years. Therefore, a higher percentage of gas savings came from the low income program offerings, which primarily included weatherization and water saving measures.
- Residential sector savings ranged from a low of 22% in Rhode Island and Vermont to a high of 80% in Maryland, with Maine also delivering considerable residential sector savings at 62%.

Figure 11: 2011 Natural Gas Annual Energy Savings by Sector

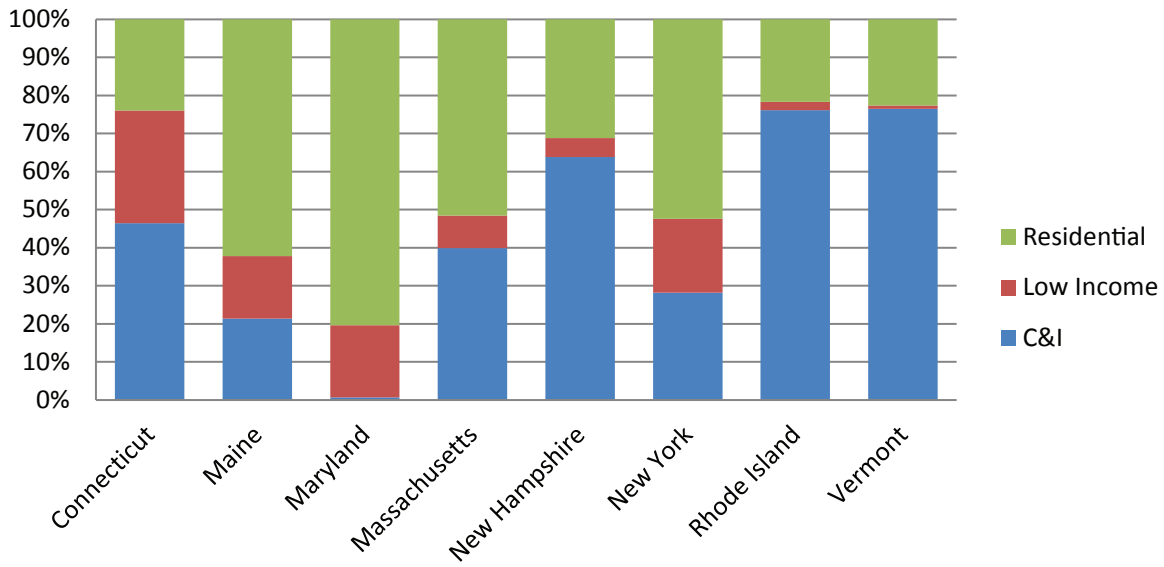


Figure 12 shows the percent of natural gas program expenditures allocated to each sector by state.[26]

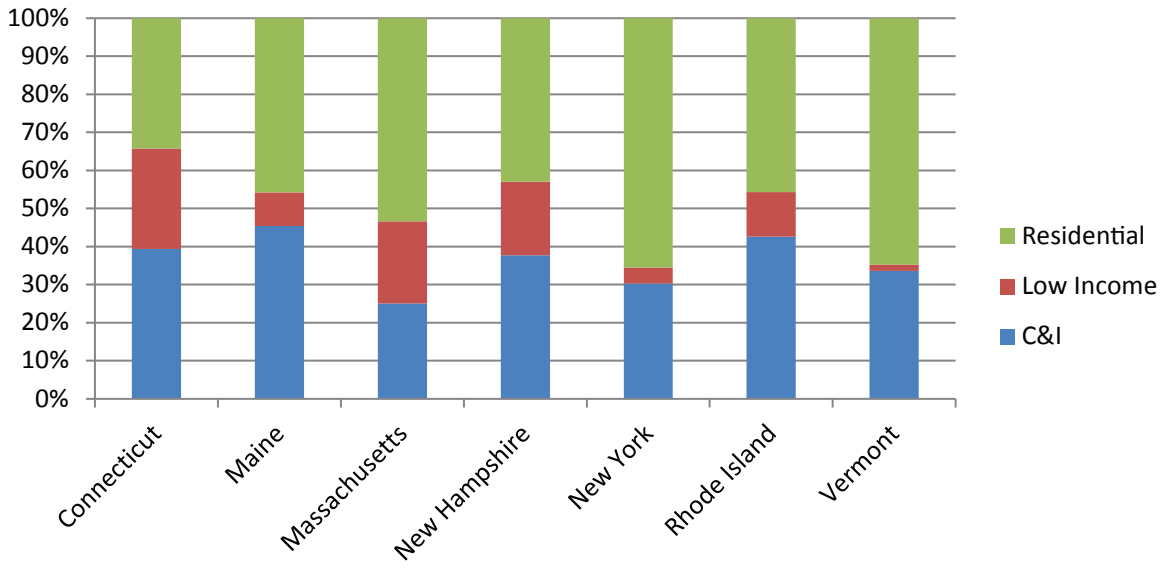
- C&I sector expenditures ranged from a low of 25% in Massachusetts to a high of 45% in Maine.
- Low Income sector expenditures ranged from a low of 2% in Vermont to a high of 26% in Connecticut.

25 Maryland does not offer C&I sector natural gas programs.

26 Maryland did not submit separate natural gas program expenditures.

- Residential sector expenditures ranged from a low of 34% in Connecticut to a high of 65% in New York and Vermont.

Figure 12: 2011 Natural Gas Program Expenditures by Sector



VII. ELECTRIC AND NATURAL GAS PROGRAM IMPACTS BY PROGRAM TYPE

Readers should note that there are other important reasons for differences in program impacts across states that this report does not address, such as differences in baseline assumptions. This report provides a starting point for analyzing program impacts across states; future REED Annual Reports will delve deeper into how different state practices influence program results.

The following section takes a closer look at the 2011 electric and natural gas program types that played the largest role in providing energy savings at the regional level.[27] For each program type, this section shows the differences across states with respect to net annual energy savings, expenditures, cost per kWh or therm, and average measure life and explains some of the drivers behind these differences.

When reviewing the results by program type presented in REED and in this report, it is important to keep in mind that REED's program type options do not neatly fit for all programs, as some programs cut across categories. States providing data to REED were asked to select the program type category that most closely fits each program, according to the program type definitions provided in the REED Glossary. Since each state made its own judgment calls in allocating programs to each program type, we recognize that states

27 The program level data informing this section is available for download to Excel format on the REED website (www.neep-reed.org).

may have categorized program types differently, which affects the results of the following program type level analysis.

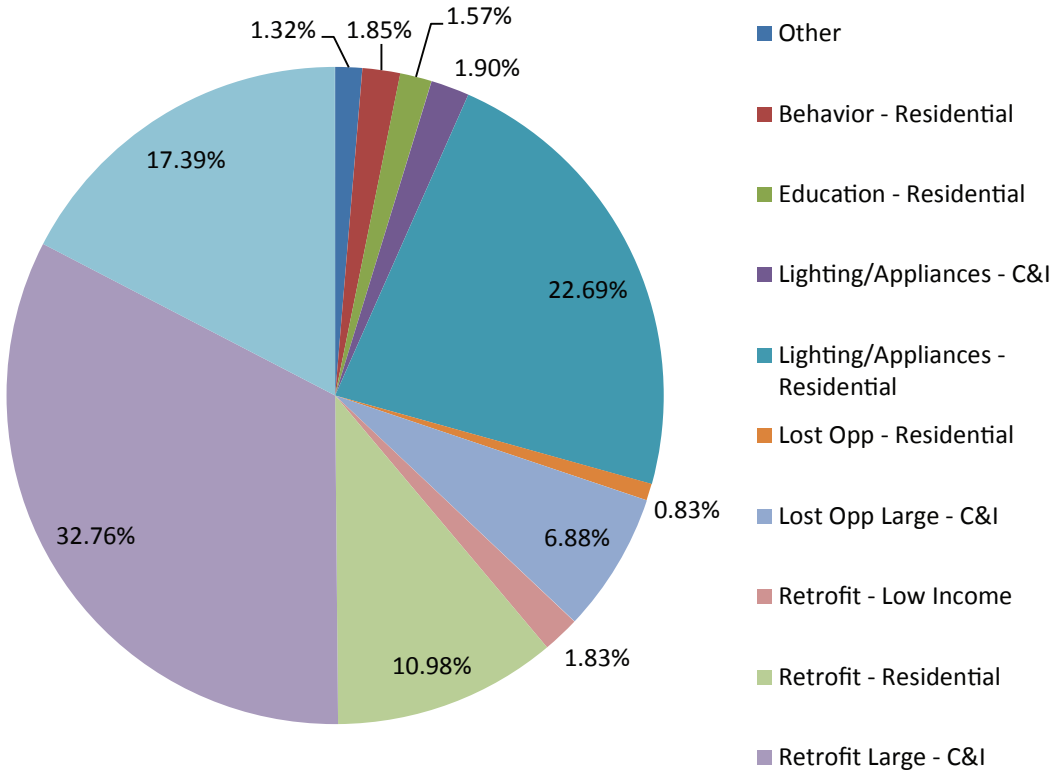
NEEP is working closely with other organizations throughout the country that collect energy efficiency data, such as CEE, the American Council for an Energy Efficient Economy (ACEEE), and Lawrence Berkeley National Laboratory (LBNL) to move towards using the same program type categories. As a first step towards this end, REED's current program type categories correspond with those used by ISO-NE for its 2013 Energy Efficiency Forecast data collection effort.

A. Annual Electric Energy Savings by Program Type - Regional Overview

Figure 13 shows that the following four electric energy efficiency program types comprised 84% of the region's 2011 annual energy savings:

- Residential lighting and appliances - 22.7%
- Residential retrofit - 11%
- C&I large retrofit (peak loads > 200-300 kW) - 32.8%
- C&I small retrofit (peak loads < 200-300 kW) - 17.4%

Figure 13: 2011 Annual Energy Savings by Program Type



The following program types contributing less than 1% of savings individually have been combined into the Other category and represent a total of 1.32% of savings: Low Income Behavior, Residential Demand Response, C&I Education, Low Income Lighting and Appliances, Low Income Lost Opportunity, and C&I Small Lost Opportunity.

Nine REED program types resulting in electric energy savings were offered by only one or two states. Examples of these program types include:

- **Residential Demand Response:** Maryland is the only state to achieve energy savings from its demand response programs in REED. These programs represent 0.23% of annual electric energy savings in REED.
- **Residential Behavior:** Massachusetts and New York offered Residential Behavior programs, representing 1.85% of annual electric energy savings in the region. Massachusetts also included a low income component to its behavior programs. The behavior program type is of increasing interest, with pilot programs being launched across the region. Questions about the savings potential of these types of programs are being answered through recent research. For example, Massachusetts conducted an impact evaluation of its Opower residential behavior program in 2011 and found savings of one to two percent of household energy consumption.

B. The Top Four Energy Saving Electric Program Types – A Closer Look

This section takes a closer look at the four electric program types that achieved the highest level of net annual electric energy savings:

Residential Lighting and Appliances: This program type includes residential programs that incentivize customers to replace existing lighting and consumer products and appliances with more efficient products that provide the same function.

All states reported annual energy savings from this program type, totaling 790,798 MWh (22.69% of total annual energy savings) as shown in Figure 14. Maryland (182,634 MWh), Connecticut (179,198 MWh), and Massachusetts (124,314 MWh) achieved the highest amount of annual energy savings from these programs.

Figure 14: 2011 Electric Residential Lighting and Appliances Annual Energy Savings

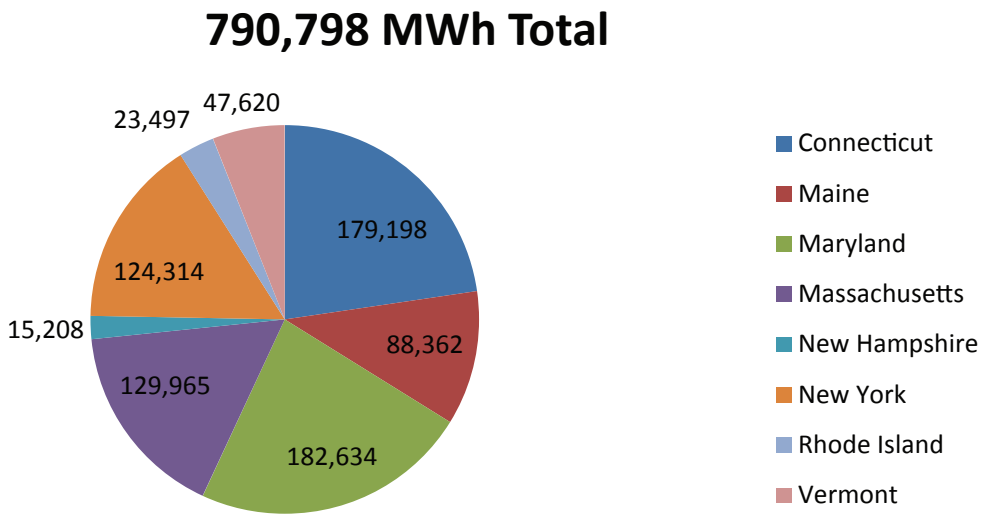


Table 8 shows that residential lighting and appliances programs contributed a large portion of the annual energy savings achieved in most states. On the high end, these programs accounted for 74% of annual electric energy savings realized in Maine.

Residential lighting and appliances programs were also particularly important in Connecticut, Maryland and Vermont, where they represented nearly half of these states' electric annual energy savings. On the low end, these programs represented only 8% of New York's annual electric energy savings. New York realized most of its residential sector savings from the residential retrofit program type and the majority of its overall savings from C&I retrofit programs.

Table 8 also shows the average annual cost per kWh saved and levelized cost of saved energy for residential lighting and appliances programs in each state. Average annual cost per kWh saved is calculated by dividing first year annual energy savings by total expenditures. Levelized cost of saved energy is calculated using the equation provided above in Section IIC.

Maine, Connecticut and Maryland had the lowest average annual cost per kWh saved and levelized cost of saved energy. These states are among those that also achieved a high percentage of their annual energy savings from this program type. One reason for Maine's low cost of saved energy is that it does not engage in paid advertising and instead directs funds to customer incentives. This pushes efficient bulbs down closer to, or below, the price of incandescent bulbs, which achieves greater sales.

For all states, the percent of annual energy savings achieved through these programs was greater than the percent of expenditures devoted to these programs. This was particularly evident for the states with a low cost of saved energy.

Table 8: Electric Residential Lighting and Appliances Program Type

State[28]	Annual Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / kWh Saved	Levelized Cost of Saved Energy
Connecticut	47.5%	11.4%	$0.08	$0.02
Maine	74.2%	26.2%	$0.07	$0.01
Maryland	43.7%	11.7%	$0.09	$0.01
Massachusetts	16.3%	12.6%	$0.28	$0.04
New Hampshire	26.3%	12.1%	$0.15	$0.03
New York	8.2%	4.4%	$0.14	
Rhode Island	24.5%	16.6%	$0.26	$0.04
Vermont	48.6%	20.0%	$0.16	$0.02

Interestingly, Table 9 shows that average measure life for residential lighting and appliances programs in each state varied by a factor of more than two, with Connecticut demonstrating an average measure life of 3.97 years and Massachusetts 8.15 years. Average measure life is calculated by dividing lifetime energy savings by annual energy savings.

Table 9: Electric Residential Lighting and Appliances Program Type Average Measure Life

State[29]	Average Measure Life (years)
Connecticut	3.97
Maine	6.98
Maryland	6.95
Massachusetts	8.15
New Hampshire	6.05
Rhode Island	7.51
Vermont	6.76

Differences in average measure life across states are due not only to the mix of measures used in programs, which varies by state, but also to different measure life assumptions provided in each state's TRM or Program Savings Documentation (PSD) for the same measure. States currently use different methods to come up with measure life assumptions, and there is a lack of measure life and persistence studies in the region that would promote greater consistency in measure life assumptions across the states. Differences in these assumptions

28 New York is not included in in the levelized cost of saved energy portion of Table 8 since it did not submit lifetime energy savings for electric programs.

29 New York is not included in Table 9 since it did not submit lifetime energy savings for electric programs.

across states have a significant impact on reported lifetime energy savings, as well as the cost of saved energy, as discussed in Section IIC above.

Table 10 compares measure life assumptions in the Massachusetts TRM and Connecticut PSD for several measures in residential lighting and appliances programs. The measure life assumptions for some lighting measures in Connecticut are lower than the measure life assumptions in Massachusetts, which partly explains the difference between Connecticut and Massachusetts' overall average measure life for this program type. Measure life assumptions for some appliances, however, are consistent across both states.

Table 10: Measure Life Assumptions for Electric Residential Lighting & Appliances Programs

MEASURE	MEASURE LIFE	
	CONNECTICUT[30]	MASSACHUSETTS[31]
CFL Bulbs	3, 4 or 5 years	7 years for markdown bulbs; 5 years for coupon bulbs
CFL Indoor Fixtures	16 years	20 years
Room Air Conditioning Unit	9 years	9 years
Refrigerators	12 years	12 years
Dehumidifier	12 years	12 years

Residential Retrofit: This program type includes residential programs that provide incentives, information and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states but Maine reported annual energy savings from this program type, totaling 382,568 MWh (10.98% of total annual energy savings), as shown in Figure 15. New York achieved the highest amount of annual energy savings from this program type at 255,762 MWh. Maryland (44,717 MWh) and Massachusetts (49,109 MWh) also contributed substantial annual energy savings from this program type.

30 UI and CL&P Program Savings Documentation for 2011 Program Year. See: http://www.dpuc.state.ct.us/dockhist.nsf/8e6fc37a54110e3e852576190052b64d/f97242bcc2f6fd828525785600587115?OpenDocument

31 Massachusetts Technical Reference Manual, 2011 Program Year – Report Version. See: http://ma-eeac.org/Docs/8.3_TRMs/3MA%20TRM%20202011%20REPORT%20Version%20FINAL%20DRAFT.pdf

Figure 15: 2011 Electric Residential Retrofit Annual Energy Savings

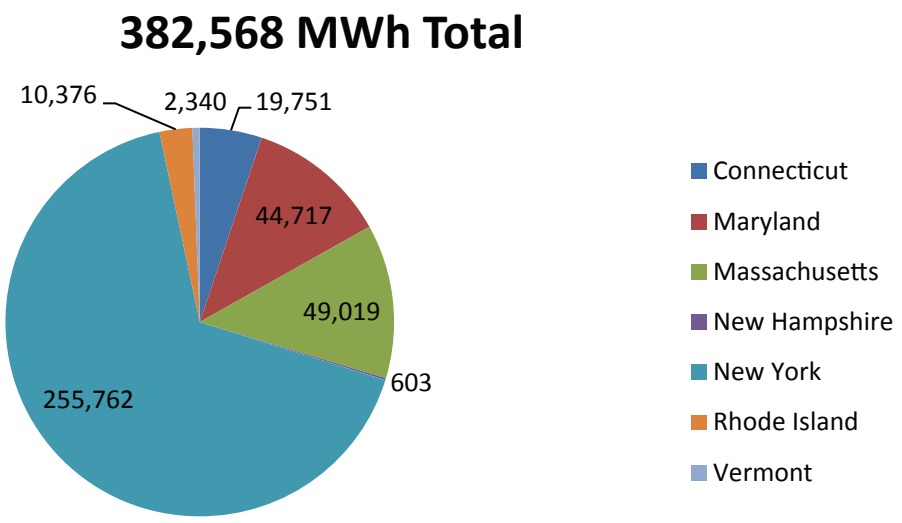


Table 11 shows that residential retrofit programs contributed around 10% or less of the annual electric energy savings achieved in most states. On the high end, these programs accounted for 16% of annual electric energy savings achieved in New York. Residential retrofit programs also played a strong role in Maryland and Rhode Island, accounting for just over 10% of annual electric energy savings in these states.

Table 11 also shows the average annual cost per kWh saved and levelized cost of saved energy for residential retrofit programs in each state. The range for this program type is significantly wider than the range for residential lighting and appliances programs.

Unlike the lighting and appliances program type, the percent of state energy savings realized from this program type was less than the percent of expenditures devoted to this program type for all states but New York.

Table 11: Electric Residential Retrofit Program Type

State[32]	Annual Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / kWh Saved	Levelized Cost of Saved Energy
Connecticut	5.2%	16.1%	$0.97	$0.12
Maryland	10.7%	12.7%	$0.39	$0.06
Massachusetts	6.1%	20.8%	$1.20	$0.14
New Hampshire[33]	1.0%	10.4%	$3.20	$0.26
New York	16.8%	16.3%	$0.26	
Rhode Island	10.1%	15.8%	$0.56	$0.06
Vermont	2.4%	8.4%	$1.34	$0.09

Like the residential lighting and appliances program type, average measure life for residential retrofit programs across the states varied by a factor of more than two, with Maryland demonstrating an average measure life of 7.1 years and Vermont 17.92 years, as shown in Table 12.

Table 12: Electric Residential Retrofit Program Type Average Measure Life

State[34]	Average Measure Life (years)
Connecticut	9.62
Maryland	7.11
Massachusetts	10.12
New Hampshire	15.02
Rhode Island	10.76
Vermont	17.92

Table 13 compares measure life assumptions provided in TRMs for some measures in electric residential retrofit programs in the states with the highest and lowest average measure life, Vermont and Maryland. Measure life assumptions for several measures are quite similar for both states, indicating the difference between each state's average measure lives is partly due to a different measure mix.

32 New York is not included in the levelized cost of saved energy portion of Table 11 since it did not submit lifetime energy savings for its electric programs.

33 New Hampshire's Average Annual Cost per kWh Saved is higher than other states because this program produced substantial fossil fuel savings, and this calculation only includes electric savings.

34 New York is not included in Table 12 since it did not submit lifetime energy savings for its electric programs.

Table 13: Measure Life Assumptions for Electric Residential Retrofit Programs

MEASURE	MEASURE LIFE	
	VERMONT[35]	MARYLAND[36]
Insulation	20 years (attic, basement wall, enclosed cavities)	25 years (attic)
Duct Sealing	15 years	20 years
Air Sealing	15 years	15 years
Water Heater Tank Wraps	6 years	5 years
Low Flow Faucet Aerators	9 years	5 years
Low Flow Showerhead	9 years	10 years
CFLs[37]	6.39 years	5.7 years
Refrigerator Retrofit	17 years	17 years

Small C&I Retrofit: This program type includes programs for non-residential customers with peak loads less than 200-300 kW that provide incentives, information and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states reported annual energy savings from this program type, totaling 606,042 MWh (17.39% of total annual energy savings), as shown in Figure 16. New York achieved the highest amount of annual energy savings from this program type at 367,022 MWh. Other states that also produced substantial annual energy savings from this program type were Massachusetts (87,836 MWh) and Vermont (38,922 MWh).

35 Efficiency Vermont Technical Reference User Manual (TRM): Measure Savings Algorithms and Cost Assumptions. Dated: 12/31/2011.

36 Mid-Atlantic Technical Reference Manual. See: http://www.neep.org/Assets/uploads/files/emv/emv-products/A5_Mid_Atlantic_TRM_V2_FINAL.pdf.

37 Measure life is based on a daily burn time of three hours.

Figure 16: 2011 Electric Small C&I Retrofit Annual Energy Savings

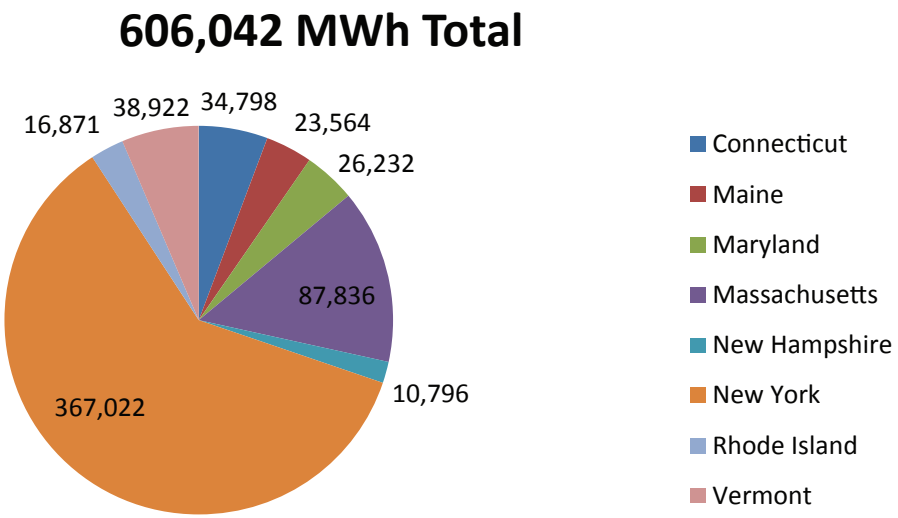


Table 14 shows the annual energy savings from small C&I retrofit programs ranged widely across most states. On the high end, these programs accounted for nearly 40% of electric annual energy savings realized in Vermont. Vermont did not offer a large C&I retrofit program, so all C&I retrofit savings were allocated to this program type. The small C&I retrofit program type also played a large role in Maine, where it accounted for nearly 20% of savings. This program type played less of a role in Connecticut, Maryland and Massachusetts, where small C&I retrofit programs represented around 10% or less of annual energy savings.

Table 14 also shows the average annual cost per kWh saved and levelized cost of saved energy for small C&I retrofit programs in each state, which is fairly consistent across the states. For most states, the level of expenditures and associated savings by state are more closely aligned for this program type than other program types.

Table 14: Electric Small C&I Retrofit Program Type

State[38]	Annual Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / kWh Saved	Levelized Cost of Saved Energy
Connecticut	9.2%	12.2%	$0.42	$0.04
Maine	19.8%	39.2%	$0.38	$0.03

38 New York is not included in the Levelized Cost of Saved Energy portion of Table 14 since it did not submit lifetime energy savings for its electric programs.

Maryland	6.3%	7.6%	$0.40	$0.04
Massachusetts	11.0%	15.1%	$0.49	$0.05
New Hampshire	18.7%	19.5%	$0.34	$0.03
New York	24.1%	28.8%	$0.32	
Rhode Island	17.6%	22.1%	$0.48	$0.05
Vermont	39.7%	56.6%	$0.54	$0.05

Average measure life in each state for small C&I retrofit programs was quite consistent across the region, ranging between 10.70 years in Maryland and 14.34 years in Vermont, as shown in Table 15.

Table 15: Electric Small C&I Retrofit Program Type Average Measure Life

State[39]	Average Measure Life (years)
Connecticut	12.42
Maine	13.15
Maryland	10.70
Massachusetts	12.36
New Hampshire	12.99
Rhode Island	11.67
Vermont	14.34

Table 16 compares the measure life assumptions provided in TRMs for several measures in small C&I retrofit programs in the states with the highest and lowest average measure life, Vermont and Maryland.

Table 16: Measure Life Assumptions for Electric Small C&I Retrofit Programs

MEASURE	MEASURE LIFE	
	VERMONT[40]	MARYLAND[41]
High Performance T8 Fixtures and Lamp/Ballast Systems	15 years	6 years for retrofit; 15 years for 'time of sale'
T5 Fixtures and Lamp/Ballast Systems	15 years	15 years
Lighting Controls	10 years	10 years

39 New York is not included in Table 15 since it did not submit lifetime energy savings for electric programs.

40 Efficiency Vermont Technical Reference User Manual (TRM): Measure Savings Algorithms and Cost Assumptions. Dated: 12/31/2011.

41 Mid-Atlantic Technical Reference Manual. See: http://www.neep.org/Assets/uploads/files/emv/emv-products/A5_Mid_Atlantic_TRM_V2_FINAL.pdf.

Refrigeration / efficient freezer	9 years	9 years
Efficient Motors	20 years	
HVAC Equipment: Unitary and Ductless Mini-Splits	15 years	

Large C&I Retrofit: This program type includes programs for non-residential customers with peak loads greater than 200-300 kW that provide incentives, information and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states but Maine[42] and Vermont reported annual energy savings from this program type, totaling 1,141,938 MWh (representing 32.8% of total annual energy savings), as shown in Figure 17. New York achieved the highest amount of annual energy savings from this program type at 528,438 MWh. Massachusetts (352,095 MWh), and Maryland (132,072 MWh) also achieved a large amount of annual energy savings from this program type.

Figure 17: 2011 Electric Large C&I Retrofit Annual Energy Savings

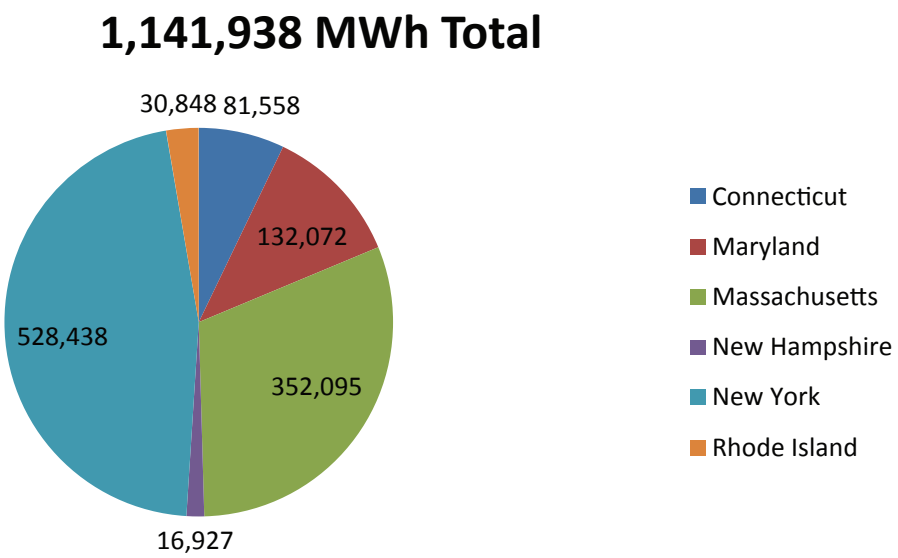


Table 17 shows that large C&I retrofit programs contributed a large portion of the total annual electric energy savings in each state. On the high end, these programs accounted for over 44% of annual electric energy savings realized in Massachusetts. At the low end,

42 REED includes achieved, not committed, annual energy savings from PY 2011 programs. Maine's large C&I retrofit Competitive Bid program resulted in 33,502 MWh of committed savings but no achieved savings.

this program type accounted for nearly 22% of savings in Connecticut, still a considerable amount in relation to other program types.

Table 17 also shows the average annual cost per kWh saved and levelized cost of saved energy for large C&I retrofit programs in each state. Most states are very consistent at $0.20 to $0.26, with Connecticut highest at $0.42. The average annual cost for Connecticut's large C&I program is higher than other states primarily due to the measure mix of installed projects, comprehensive projects, and a Connecticut Public Utilities Regulatory Authority requirement to use reserve accounting for customer signed projects.

Most states achieved a greater percentage of annual energy savings from this program type than their relative investment in this program type. This is most pronounced in Massachusetts where 24% of state program expenditures produced 44% of state annual energy savings.

Table 17: Electric Large C&I Retrofit Program Type

State[43]	Annual Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / kWh Saved	Levelized Cost of Saved Energy
Connecticut	21.6%	28.5%	$0.42	$0.04
Maine[44]		19.6%		
Maryland	31.6%	23.5%	$0.25	$0.02
Massachusetts	44.1%	24.4%	$0.20	$0.02
New Hampshire	29.3%	18.0%	$0.20	$0.02
New York	34.7%	26.4%	$0.20	
Rhode Island	32.1%	22.4%	$0.26	$0.03

The large magnitude of electric energy savings from this program type is not surprising given the high level of savings per participating customer when compared to savings per customer from other program types. For example, Connecticut's Large C&I Retrofit Energy Opportunities program encourages a more holistic, comprehensive approach within large facilities while improving the overall building performance of the facilities, an approach that typically produces substantial energy savings.

As with the small C&I retrofit programs type, average measure life is mostly consistent across the region, with four of the five states falling into a very tight range of 12.05 to 12.46 years, as shown in Table 18. The outlier is Massachusetts, with an average measure life of 16.49 years.

43 New York is not included in the levelized cost of saved energy portion of Table 17 since it did not submit lifetime energy savings for its electric programs.

44 Maine reported program expenditures for this program type, but no achieved annual energy savings. Also see Footnote 42.

Table 18: Electric Large C&I Retrofit Program Type Average Measure Life

State[45]	Average Measure Life (years)
Connecticut	12.05
Maryland	12.46
Massachusetts	16.49
New Hampshire	12.45
Rhode Island	12.33

Table 19 provides measure life assumptions for several measures in large C&I retrofit programs in Connecticut, the state with the lowest average measure life, and Massachusetts, the state with the highest average measure life. Both states use many of the same measure life assumptions. In Massachusetts, one program administrator completed several large custom combined heat and power (CHP) projects that partly explain Massachusetts' relatively higher average measure life.[46]

Table 19: Measure Life Assumptions for Electric Large C&I Retrofit Programs

MEASURE	MEASURE LIFE	
	CONNECTICUT[47]	MASSACHUSETTS[48]
Occupancy Sensors	9 years	9 years
Daylight Dimming	9 years	9 years
Lighting Fixtures	13 years	13 years
High Efficiency Unitary Equipment (AC and Heat Pumps)	13 years	
Energy Management System	10 years	10 years
Variable Frequency Drive	13 years	13 years
Electric Chiller	17 years	23 years
High Efficiency Air Compressors	13 years	13 years

C. Annual Natural Gas Energy Savings by Program Type - Regional Overview

Figure 18 shows the breakdown of regional natural gas energy savings by program type. Compared to the electric energy efficiency programs, there are fewer natural gas program types, with a more even distribution of savings. Several program types comprised the majority of annual energy savings, however, with four program types delivering 79% of total

45 New York is not included in Table 18 since it did not submit lifetime energy savings for electric programs.

46 NSTAR Electric 2011 Energy Efficiency Annual Report. See http://ma-eeac.org/Docs/5.1_Annual%20Reports/2011/Electric/NSTAR_Electric_2011%20Annual%20Report.pdf.

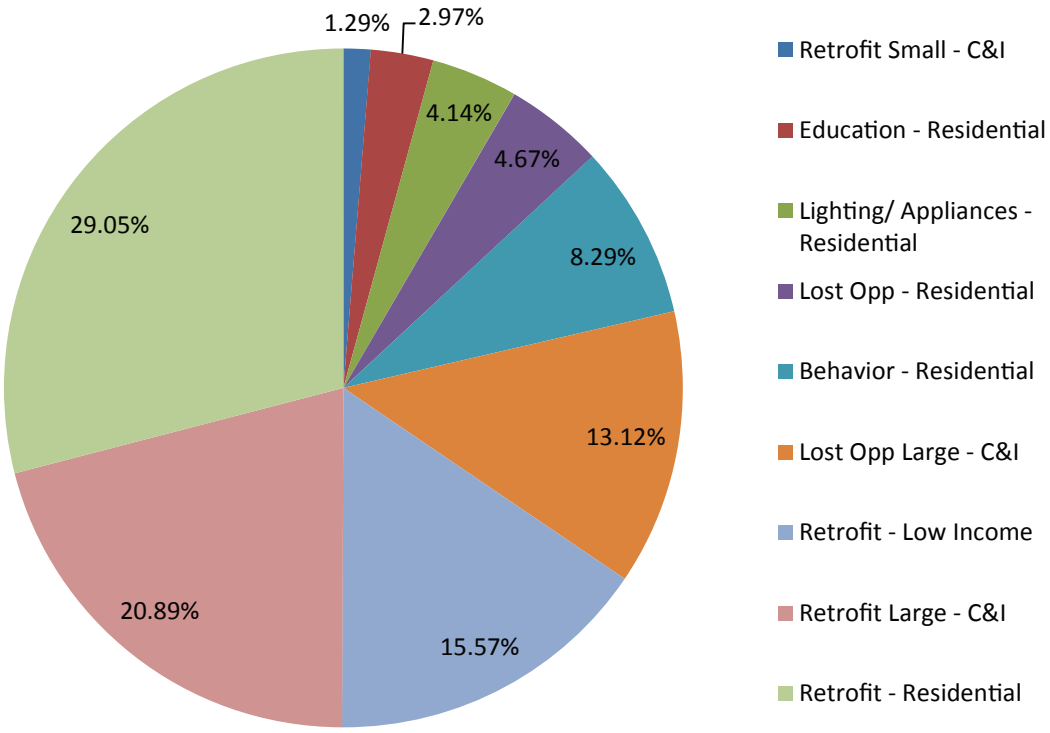
47 UI and CL&P Program Savings Documentation for 2011 Program Year. See: http://www.dpuc.state.ct.us/dockhist.nsf/8e6fc37a54110e3e852576190052b64d/f97242bcc2f6fd828525785600587115?OpenDocument

48 Massachusetts Technical Reference Manual, 2011 Program Year – Report Version. See: http://ma-eeac.org/Docs/8.3_TRMs/3MA%20TRM%20202011%20REPORT%20Version%20FINAL%20DRAFT.pdf

gas annual energy savings:

- Residential retrofit – 29.1%
- Large C&I retrofit - 20.9%
- Low income retrofit - 15.6%
- C&I large lost opportunity – 13.1%

Figure 18: 2011 Regional Natural Gas Annual Energy Savings by Program Type



Several other program types offered by the majority of states comprised a smaller amount of gas energy savings:

- **Residential Lost Opportunity:** 4.67%, offered by all states but Maine and Rhode Island.
- **Small C&I Retrofit:** 1.29%, offered by all states but Connecticut, Maryland and Rhode Island.

Two REED program types resulting in natural gas annual energy savings were offered by only one or two states yet still contributed substantial savings:

- **Residential Behavior:** 8.29%, offered by Massachusetts and New York. Both of these states included electric and natural gas behavioral programs in their 2011 program portfolios.

- **Residential Lighting and Appliances:** 4.14%, offered by Massachusetts and New Hampshire. While most lighting and appliances programs are focused on electric energy savings from lighting, these two states reported savings from this natural gas program type.

D. The Top Four Energy Saving Natural Gas Program Types – A Closer Look

This section takes a closer look at the four natural gas program types that achieved the highest level of net annual energy savings:

Residential Retrofit: This program type includes residential natural gas programs that provide incentives, information and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states reported annual gas energy savings from this program type, totaling 14,417,825 therms (representing 29.1% of total annual gas energy savings), as shown in Figure 19. New York achieved the majority of the total regional annual gas energy savings from this program type at 10,651,721 therms. Massachusetts also contributed substantial annual energy savings from this program type at 2,278,453 therms.

Figure 19: 2011 Natural Gas Residential Retrofit Annual Energy Savings

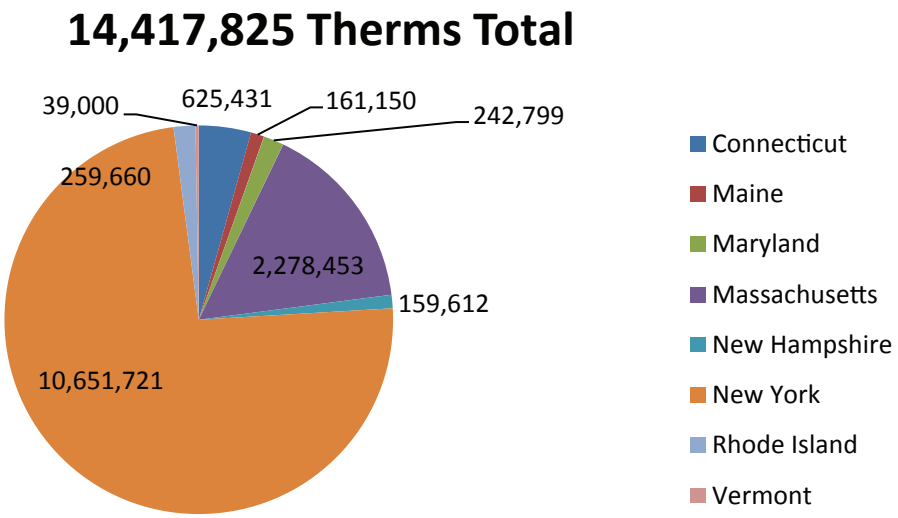


Table 20 shows that natural gas residential retrofit programs contributed significantly to annual gas energy savings in some states but did not play a prominent role in others. On

the high end, these programs accounted for over 62% of annual gas energy savings in Maine through that state's Home Energy Savings Program. Maine's natural gas program portfolio is very small, as natural gas is not as available or utilized as much in Maine as it is in other states in the region. As such, even though this program type was a large portion of Maine's gas energy savings, it constituted less than 1% of total annual gas energy savings in the region. At the low end, this program type accounted for only 3.5% of savings in Vermont. About 75% of Vermont's natural gas annual energy savings comes from the C&I sector (see Figure 11 above).

Table 20 also shows the average annual cost per therm saved and levelized cost of saved energy for natural gas residential retrofit programs in each state. There is a large range in average annual cost per therm across states, with Vermont at the top end at $10.70 per therm saved. The high cost per therm for Vermont's residential retrofit program is due to high overall costs for residential programs. Vermont's residential programs by design require more interaction with customers that result in higher costs, as part of Vermont's regulatory requirement. Vermont Gas serves all customer rate classes equally and cost effectively while balancing overall program costs and impact to rates. Twenty-two percent of Vermont's natural gas program expenditures are devoted to this program type.

The overall cost per therm saved for Vermont's natural gas programs, however, is the lowest of all states at $1.68 per therm. This is due to the low cost per therm saved for Vermont's large C&I retrofit program. The higher savings achieved through the commercial programs are mostly due to custom projects that stimulate customers to install measures that yield significant savings with less of an incentive. These customers are typically looking to invest in projects with a simple rebate that fits within their company or corporate guidelines. In Vermont, history has shown that the larger the project, the larger the potential for greater savings at lower cost for the program and overall portfolio.

Table 20: Natural Gas Residential Retrofit Program Type

State	Annual Gas Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / therm Saved	Levelized Cost of Saved Energy
Connecticut	19.4%	21.8%	$6.75	$0.48
Maine	62.2%	45.8%	$2.36	$0.15
Maryland[49]	24.8%			
Massachusetts	15%	20.5%	$9.54	$0.62

49 Maryland is not included in the expenditures, Average Annual Cost per Therm Saved or Levelized Cost of Saved Energy section of Table 20 since it did not submit natural gas program expenditures or lifetime energy savings.

50 New York is not included in the Levelized Cost of Saved Energy section of Table 20 since New York did not submit lifetime energy savings for its natural gas programs.

New Hampshire	17%	20.8%	$6.03	$0.38
New York[50]	39.8%	56.1%	$3.29	
Rhode Island	21.7%	45.1%	$8.25	$0.52
Vermont	3.5%	22.4%	$10.70	$0.65

State-level average measure life for natural gas residential retrofit programs is mostly consistent across the region, ranging from a low of 17.54 in Connecticut to a high of 21.31 in Vermont, as shown in Table 21. This is a much tighter range than the two-fold difference in average measure life for the electric residential retrofit programs, likely due to a similar measure mix and greater consistency in state TRMs for natural gas residential retrofit measures.

Table 21: Natural Gas Residential Retrofit Program Type Average Measure Life[51]

State[51]	Average Measure Life (years)
Connecticut	17.54
Maine	20.00
Massachusetts	19.47
New Hampshire	20.35
Rhode Island	20.21
Vermont	21.31

Table 22 compares measure life assumptions as provided in TRMs for measures that comprise a large amount of energy savings in natural gas residential retrofit programs in Vermont and Connecticut, the states with the highest and lowest average measure life.

Table 22: Measure Life Assumptions for Natural Gas Residential Retrofit Programs

MEASURE	MEASURE LIFE	
	VERMONT[52]	CONNECTICUT[53]
Attic, Floor or Wall Insulation	20 years	25 years
Air Sealing	15 years	20 years
Boiler replacements		15 years
Water Saving Measures		5 years

Large C&I Retrofit: This program type includes natural gas programs for non-residential customers with peak loads greater than 200-300 kW that provide incentives, information

51 New York and Maryland are not included in Table 21 since those states did not submit lifetime energy savings for natural gas programs.

52 Efficiency Vermont Technical Reference User Manual (TRM): Measure Savings Algorithms and Cost Assumptions. Dated: 12/31/2011.

53 UI and CL&P Program Savings Documentation for 2011 Program Year. See: http://www.dpuc.state.ct.us/dockhist.nsf/8e6fc37a54110e3e852576190052b64d/f97242bcc2f6fd828525785600587115?OpenDocument

and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states but Maine reported annual energy savings from this program type, totaling 10,367,928 therms (representing 20.9% of total annual gas energy savings), as shown in Figure 20. New York and Massachusetts achieved the highest amount of annual energy savings from this program type at 4,943,921 therms and 3,463,065 therms, respectively.

Figure 20: 2011 Natural Gas Large C&I Retrofit Annual Energy Savings

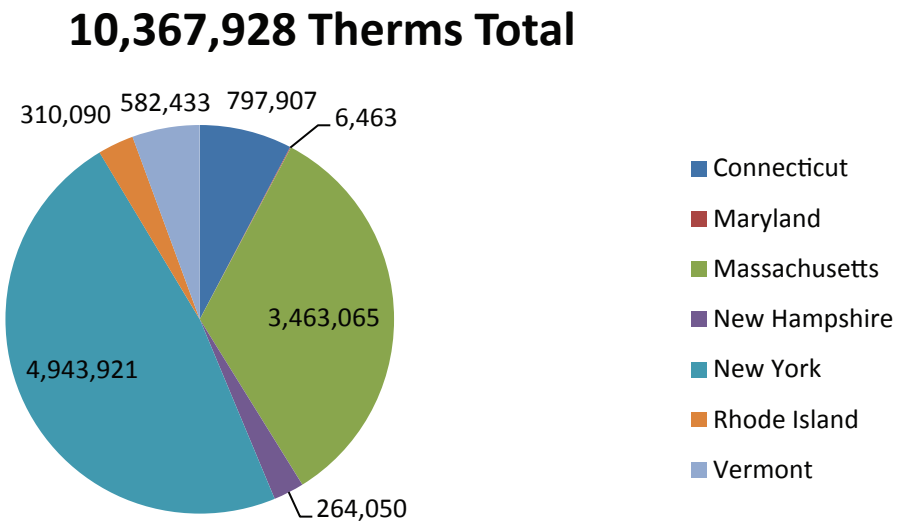


Table 23 shows that large C&I retrofit programs contributed significantly to annual gas energy savings in all states but Maryland, where it consisted of only ancillary savings from the electric large C&I programs. For many states, this program type accounted for 20% to 30% of annual natural gas energy savings. Like the large C&I retrofit electric programs, this program type achieves large savings due to the nature of its projects, which are targeted to non-residential customers with high energy use and generally have large savings potential. Vermont is the high outlier for this program type, with over half of its total annual gas savings resulting from this program type.

Table 23 also shows the average annual cost per therm saved and levelized cost of saved energy for natural gas large C&I retrofit programs in each state. The range is much smaller than residential retrofit programs. Vermont is lowest cost at $0.58 per therm. Eighteen percent of Vermont's natural gas program expenditures were allocated to this program type, resulting in over 52% of its annual natural gas energy savings.

Table 23: Natural Gas Large C&I Retrofit Program Type

State	Annual Gas Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / therm Saved	Levelized Cost of Saved Energy
Connecticut	24.8%	18.2%	$4.41	$0.46
Maine[54]		3.3%		
Maryland[55]	0.7%			
Massachusetts	22.8%	12.2%	$3.72	$0.35
New Hampshire	28.1%	16.2%	$2.83	$0.21
New York[56]	18.5%	29.3%	$3.71	
Rhode Island	25.9%	21.6%	$3.31	$0.39
Vermont	52.4%	18.3%	$0.58	$0.05

State-level average measure life for natural gas large C&I retrofit programs varies across the region, ranging from a low of 9.75 in Rhode Island to a high of 16.24 in New Hampshire, as shown in Table 24. This is a larger range than average measure life across states for the electric large C&I retrofit programs. The measures that comprised the majority of savings in New Hampshire natural gas large C&I retrofit programs were custom process heat recovery and custom controls: energy management systems. New Hampshire does not have a publicly available TRM, so measure life assumptions are not provided. In Rhode Island, this program type experienced a large number of steam trap installations with a measure life of three years.[57] The measure life assumption for Rhode Island is drawn from its 2012 TRM since Rhode Island did not have a TRM for its 2011 programs.

Table 24: Natural Gas Large C&I Retrofit Program Type Average Measure Life

State[58]	Average Measure Life (years)
Connecticut	11.16
Massachusetts	12.64
New Hampshire	16.24
Rhode Island	9.75
Vermont	14.30

54 Maine reported expenditures but no savings for this program type.

55 Maryland is not included in the expenditures, Average Annual Cost / Therm Saved or Levelized Cost of Saved Energy sections of Table 23 since it did not submit natural gas program expenditures or lifetime energy savings.

56 New York is not included in the Levelized Cost of Saved Energy section of Table 23 since New York did not submit lifetime energy savings for its natural gas programs.

57 Rhode Island Technical Reference Manual for Estimating Savings from Energy Efficiency Measures, 2012 Program Year. See: http://www.nationalgridus.com/non_html/eer/ri/2012%20RI%20Technical%20Reference%20Manual.pdf.

58 New York and Maryland are not included in Table 24 since those states did not submit lifetime energy savings for natural gas programs.

Low Income Retrofit: This program type is designed for households with income not more than a stated percentage of state or area median income or meeting low income requirements based on the number of family members in the household. These programs provide incentives, information and technical support to encourage customers to replace existing and operating equipment with more efficient equipment that provides the same function, or to add efficient equipment or systems to an existing facility (e.g., addition of thermal insulation).

All states reported annual energy savings from this program type, totaling 7,728,330 therms (15.6% of total annual gas energy savings), as shown in Figure 21. New York and Massachusetts again achieved a large amount of annual energy savings from this program type at 5,167,141 therms and 1,296,632 therms respectively.

Figure 21: 2011 Natural Gas Low Income Retrofit Annual Energy Savings

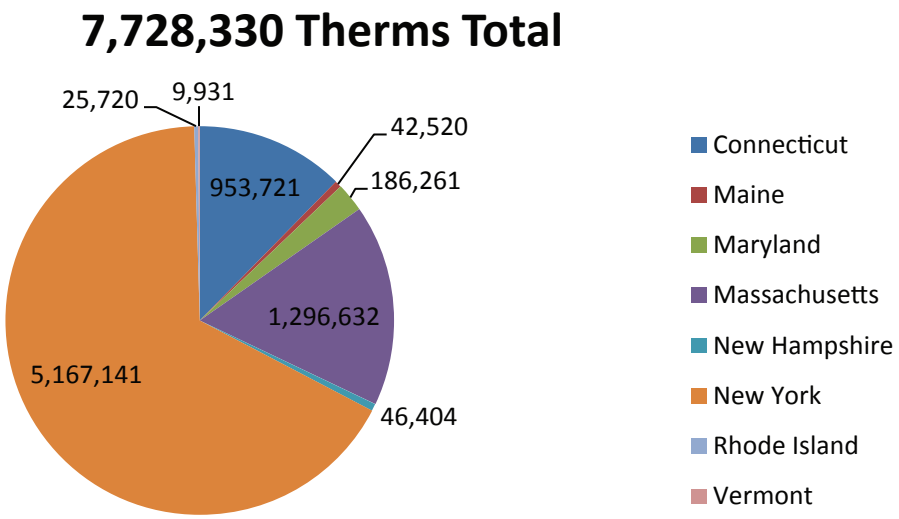


Table 25 shows that low income retrofit programs resulted in a wide range of natural gas energy savings in each state. Connecticut in particular focused on its low income retrofit programs, realizing nearly 30% of its total annual gas savings from these programs. Maryland also realized significant savings from its low income programs. For other states including Vermont, New Hampshire, and Rhode Island, this program type did not play a prominent role in their natural gas program portfolio. State-level expenditures towards this program type closely matched savings in Connecticut, but varied significantly for all other states. Table 25 also shows the average annual cost per therm saved and levelized cost of saved energy for natural gas low income retrofit programs in each state.

Table 25: Natural Gas Low Income Retrofit Program Type

State	Annual Gas Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / therm Saved	Levelized Cost of Saved Energy
Connecticut	29.7%	26.4%	$5.37	$0.42
Maine	16.4%	8.8%	$1.72	$0.09
Maryland[59]	19%			
Massachusetts	8.5%	21%	$17.15	$1.11
New Hampshire	4.9%	19.2%	$19.17	$1.28
New York[60]	19.3%	4.2%	$0.50	
Rhode Island	2.2%	11.7%	$21.59	$1.38
Vermont	0.9%	1.6%	$3.00	$0.18

State-level average measure life for natural gas low income retrofit programs varies across the region, ranging from a low of 15.54 years in Connecticut to a high of 25 years in Maine, as shown in Table 26. Average measure life for low income retrofit programs across states largely corresponds with average measure life for residential retrofit programs.

Table 26: Natural Gas Low Income Retrofit Program Type Average Measure Life

State[61]	Average Measure Life (years)
Connecticut	15.54
Maine	25.00
Massachusetts	19.61
New Hampshire	18.86
Rhode Island	20.00
Vermont	21.27

Table 27 compares measure life assumptions provided in TRMs for measures that produced the majority of savings in natural gas low income retrofit programs in the states with the highest and lowest average measure life, Maine and Connecticut.

59 Maryland is not included in the expenditures, Average Annual Cost per Therm Saved or levelized cost of saved energy sections of Table 25 since it did not submit natural gas program expenditures

60 New York's Average Cost per Therm Saved appears low because New York's electric low income retrofit programs produced ancillary natural gas savings that are included in New York's overall natural gas savings figures. New York is not included in the Levelized Cost of Saved Energy section because it did not provide lifetime energy savings for its natural gas programs.

61 New York and Maryland are not included in Table 26 since those states did not submit lifetime energy savings for natural gas programs.

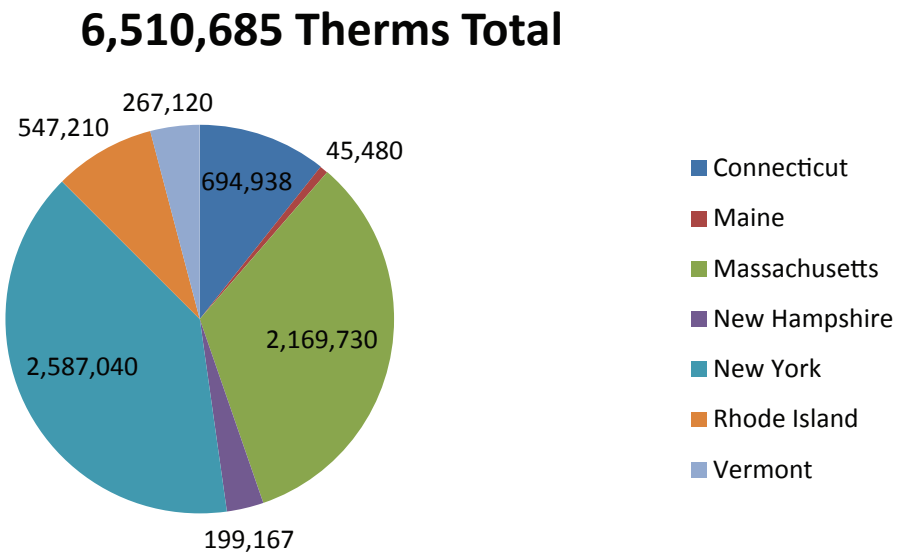
Table 27: Measure Life Assumptions for Natural Gas Low Income Retrofit Programs

MEASURE	MEASURE LIFE	
	MAINE[62]	CONNECTICUT[63]
Condensing or Hydronic Boilers	25 years	
Insulation		25 years
Air Sealing		20 years
Pipe Insulation		15 years
Caulking		10 years

Large C&I Lost Opportunity: This program type includes natural gas programs for non-residential customers with peak loads greater than 200-300 kW that capture energy efficiency opportunities at the time of a naturally-occurring market event, such as when a customer constructs, expands, renovates, or remodels a home or a building or makes an initial purchase of equipment, or replaces failed equipment. This includes new construction programs.

All states but Maryland reported annual energy savings from this program type, totaling 6,510,685 therms (representing 13.1% of total annual gas energy savings), as shown in Figure 22. New York and Massachusetts achieved the highest annual energy savings from this program type at 2,587,040 therms and 2,169,730 therms, respectively.

Figure 22: 2011 Natural Gas Large C&I Lost Opportunity Annual Energy Savings



62 GasNetworks Assumptions used for Maine programs.

63 UI and CL&P Program Savings Documentation for 2011 Program Year. See: http://www.dpuc.state.ct.us/dockhist.nsf/8e6fc37a54110e3e852576190052b64d/f97242bcc2f6fd828525785600587115?OpenDocument.

Table 28 shows that large C&I lost opportunity programs resulted in 10% to 46% of natural gas energy savings in each state, with Rhode Island on the top end. Vermont also realized significant savings from this program type, at 24% of total state annual gas savings. For other states, this program type constituted 10% to 20% of annual gas energy savings.

Table 28 also shows the average annual cost per therm saved and levelized cost of saved energy for natural gas large C&I lost opportunity programs in each state. The range for this program type was tighter than the low income and residential retrofit program types, but still varied across the states. State-level expenditures compared to savings tracked closely in several states. However, in Rhode Island about 20% of expenditures produced nearly 46% of annual gas energy savings.

Table 28: Natural Gas Large C&I Lost Opportunity Program Type

State	Annual Gas Energy Savings as a % of Total State Savings	Annual Expenditures as a % of Total State Expenditures	Average Annual Cost / therm Saved	Levelized Cost of Saved Energy
Connecticut	21.6%	21.2%	$5.90	$0.46
Maine	17.6%	24.3%	$4.44	$0.34
Massachusetts	14.3%	11.2%	$5.44	$0.35
New Hampshire	21.2%	9.6%	$2.22	$0.17
New York[64]	9.7%	0.7%	$0.17	
Rhode Island	45.8%	19.6%	$1.70	$0.16
Vermont	24.1%	15.4%	$1.07	$0.07

State-level average measure life for natural gas large C&I lost opportunity programs ranged from a low of 13 years in Rhode Island to a high of 20 years in Massachusetts, as shown in Table 29.

64 New York's Average Cost per Therm Saved appears low because New York's electric large C&I lost opportunity program produced substantial ancillary natural gas savings that are included in New York's overall natural gas savings figures. New York is not included in the Levelized Cost of Saved Energy section because it did not provide lifetime energy savings for its natural gas programs.

Table 29: Natural Gas Large C&I Lost Opportunity Program Type Average Measure Life

State[65]	Average Measure Life (years)
Connecticut	15.53
Maine	15.96
Massachusetts	19.91
New Hampshire	15.76
Rhode Island	13.03
Vermont	19.54

Table 30 compares measure life assumptions provided in TRMs for measures in natural gas large C&I lost opportunity programs in the states with the highest and lowest average measure life, Massachusetts and Rhode Island. In Rhode Island, measure life was strongly influenced by one very large custom process project, a thermal oxidizer.

Table 30: Measure Life Assumptions for Natural Gas Large C&I Lost Opportunity Programs

MEASURE	MEASURE LIFE	
	MASSACHUSETTS[66]	RHODE ISLAND[67]
High Efficiency Natural Gas Boiler	25 years	
Condensing Standalone Water Heater	15 years	
Combined High Efficiency Boiler and Water Heater	25 years	
Custom Thermal Oxidizer		10 years

65 New York and Maryland are not included in Table 29 since those states did not submit lifetime energy savings for natural gas programs.

66 Massachusetts Technical Reference Manual, 2011 Program Year – Report Version. See: http://ma-eeac.org/Docs/8.3_TRMs/3MA%20TRM%20202011%20REPORT%20Version%20FINAL%20DRAFT.pdf

67 Rhode Island Technical Reference Manual for Estimating Savings from Energy Efficiency Measures, 2012 Program Year. See: http://www.nationalgridus.com/non_html/eer/ri/2012%20RI%20Technical%20Reference%20Manual.pdf.

VIII. AVOIDED EMISSIONS

The avoided air pollution emissions that result from energy efficiency programs is an area of increasing interest across the region. This is driven in part by the United States Environmental Protection Agency's (US EPA) recent issuance of a guidance document, "Roadmap for Incorporating Energy Efficiency/Renewable Energy Policies and Programs into State and Tribal Implementation Plans." The Roadmap encourages jurisdictions designated as non-attainment[68] to consider incorporating energy efficiency and renewable energy into their State or Tribal Implementation Plans (SIP/TIP) to help achieve National Ambient Air Quality Standards (NAAQS). Jurisdictions can use REED as a source of energy efficiency data, underlying supporting documentation, and avoided emissions calculations to help support the incorporation of energy efficiency into their SIPs/TIPs.

The amount of avoided CO_2 emissions resulting from the 2011 energy efficiency programs in REED is equal to the amount of carbon sequestered annually by 1.3 million acres of U.S. forest.[69]

REED calculates avoided carbon dioxide (CO_2), sulfur dioxide (SO_2) and nitrogen oxides (NO_X) emissions using average annual emission rates for each participating region, provided by ISO-NE, PJM Interconnection (PJM) and NYSERDA for the New York Independent System Operator (NYISO) as follows:

- ISO-NE: CO_2 = 780 lbs/MWh, NOx = 0.42 lbs/MWh, SO2 = 0.95 lbs/MWh
- PJM: CO_2 = 1168 lbs/MWh, NOx = 1.32 lbs/MWh, SO2 = 5.25 lbs/MWh
- NYISO: CO_2 = 826 lbs/MWh, NOx = 0.81 lbs/MWh, SO2 = 1.78 lbs/MWh

REED's calculated emissions reductions do not capture the cumulative effect of program savings over the lifetime of the measures installed in 2011, nor the impact of programs from previous years. REED may ultimately use marginal emissions factors rather than average annual emission factors to calculate avoided emissions when such factors become available using a consistent methodology. REED provides avoided emissions for electric programs only.

Table 31 provides the avoided emissions for each state, as well as totals across all states for CO_2, NO_x and SO_2 emissions. States participating in REED collectively avoided 3.5 billion pounds of CO_2 emissions, 2.8 million pounds of NO_x emissions, and nearly 7 million pounds of SO_2 emissions as a result of their 2011 electric energy efficiency programs.

68 Non-attainment areas are jurisdictions with air quality that does not meet National Ambient Air Quality Standards. An area may be a non-attainment area for one pollutant and an attainment area for others.

69 According to the US EPA Greenhouse Gas Equivalency Calculator. See: http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results.

Table 31: Avoided Emissions from Electric Programs by State

State	Avoided CO_2 (lbs.)	Avoided NO_x (lbs.)	Avoided SO_2 (lbs.)
Connecticut	245,592,110	132,240	299,120
Maine	118,488,550	63,800	144,310
Maryland	699,625,780	634,910	2,155,040
Massachusetts	741,682,600	399,370	903,330
New Hampshire	43,977,220	23,680	53,560
New York	1,479,008,990	1,450,360	3,187,210
Rhode Island	85,000,140	45,770	103,530
Vermont	84,777,170	45,650	103,250
TOTAL	**3,498,152,560**	**2,795,780**	**6,949,350**

The avoided emissions achieved by the New England states were lower than those achieved in New York and Maryland. These differences partially result from New York and Maryland's larger populations. New York and Maryland's energy efficiency programs also resulted in comparatively larger emissions reductions per MWh because each has higher average annual emission factors than the ISO-NE region. The PJM factors (applied to Maryland) are higher due to a greater use of coal-fired power plants than the other regions, whereas the NYISO factors (applied to New York) are due to the use of marginally more petroleum for power generation than the other regions.[70]

70 For information on the electricity generation profiles of the states, see the U.S. Energy Information Agency's (EIA's) website at www.eia.gov.

IX. JOB CREATION IMPACTS

REED recognizes that job creation is an important metric for many policymakers and thus aims to include estimated annual job creation benefits generated by energy efficiency programs. Most states do not have available studies or data applicable to the 2011 program year, or did not wish to provide data given differences in methodologies employed across states. Rhode Island and Vermont reported job creation impacts, which are shown in Table 32.

The REMI (Regional Economic Models, Inc.) model is a dynamic forecasting and policy analysis tool that integrates several modeling approaches to answer "what-if" questions about the economic impact of public policy decisions.

Table 32: 2011 Energy Efficiency Program Job Creation Impacts by State

State	Program Sector	Net Full Time Equivalent Jobs (Job-Years)
Rhode Island	C&I	139
	Residential	196
Vermont	C&I	1161
	Residential	774

Where job creation impacts are reported, methodologies vary. Rhode Island estimated job creation impacts based upon economic impacts from energy efficiency expenditures using the REMI-based model for New England developed by Environment Northeast and reported job-years created for a single year.[71] Vermont estimated job impacts using a REMI-based model developed by Optimal Energy and reported job-years created over a 20 year period.[72]

The REMI (Regional Economic Models, Inc.) model is a dynamic forecasting and policy analysis tool that integrates several modeling approaches to answer "what-if" questions about the economic impact of public policy decisions.

NEEP encourages all states to report job creation impacts in future years. To facilitate the reporting of job impacts, the Regional EM&V Forum may conduct a regional job impacts study or develop a common methodology (or methodologies with focus ensuring transparency of methods used) for estimating job creation impacts in 2014.

71 Environment Northeast, Energy Efficiency, Engine of Economic Growth. See: http://www.env-ne.org/resources/open/p/id/964.

72 Optimal Energy, Economic Impacts of Energy Efficiency Investment in Vermont - Final Report. See: http://legislature.idaho.gov/sessioninfo/2011/interim/energy_public_optimal.pdf.

X. CONCLUSION

This REED Program Year 2011 Annual Report presents the high-level impacts of 2011 electric and natural gas energy efficiency programs at the state and regional level, and outlines and provides insight into reasons for some key differences in program impacts across states for several electric and natural gas program types that achieved a high level of annual energy savings.

The 2011 energy efficiency program data presented in this report demonstrates that energy efficiency is a growing, consequential, and highly cost-effective energy resource. REED effectively helps document the progress of energy efficiency programs in relation to state energy, economic and environmental policy goals. It also provides for comparisons across states that can help strengthen the credibility of energy efficiency as a resource by increasing our understanding of similarities and differences in results across programs by type, sector and state.

Future work on REED intends to help address some of the differences in energy efficiency program impacts identified in this report, including:

- Program type and expenditure categories: NEEP will continue to work with CEE, LBNL, ACEEE and others to move towards using the same program type categories in energy efficiency data collection efforts. REED subcommittee members in each state will inform work in this area to help ensure that any changes to REED's program and expenditure typology and associated definitions work for each REED state's programs.
- Measure life assumptions: NEEP will more thoroughly examine where and why states are using different measure life assumptions, and how these differences affect reported savings and the cost of saved energy.
- Baseline assumptions: NEEP will begin to examine differences in baseline assumptions across the REED states and how different baseline assumptions affect reported program results.
- EM&V Methods: NEEP will continue its work to better understand differences in EM&V methods used to evaluate programs. With support from the EM&V Forum Steering Committee, NEEP is currently conducting a project to develop a Model State Framework for EM&V Practices that will provide for transparency in state EM&V practices. The information collected from this effort may be incorporated into future versions of REED.

REED will be updated with Program Year 2012 data by year-end 2013, and NEEP plans to issue a REED Program Year 2012 Annual Report in 2014. The Program Year 2012 Annual Report will provide a more robust analysis of differences in program impacts across states and will include two years of data that can begin to show REED data trends across time.

NEEP welcomes questions and feedback from all REED users in order to help determine which data to include and questions to address in the Program Year 2012 Annual Report. Please provide your feedback to: reed@neep.org.

XI. APPENDIX A: REED DEVELOPMENT, LAUNCH AND NEXT STEPS

This appendix describes the process that NEEP undertook to develop and launch the Regional Energy Efficiency Database (REED), which began with the Common Statewide Energy Efficiency Reporting Guidelines project in 2009-2010 and culminated in the public launch of the REED website and associated outreach in the first half of 2013. This appendix also provides recommendations for future modifications and improved reporting and interface with state, regional and national energy efficiency impact databases.

Common Statewide Energy Efficiency Reporting Guidelines Project

Recognizing the importance of a common platform for the reporting of energy efficiency impacts, one of the first projects the Regional EM&V Forum undertook was the development of the Common Statewide Energy Efficiency Reporting Guidelines (Reporting Guidelines) in 2009-2010.

With the guidance of a subcommittee comprised of energy efficiency program administrators, public utility commission staff, federal agency staff, and other interested stakeholders, NEEP retained NMR Group, Inc. to produce a report, Common Reporting Guidelines for Energy-Efficiency Savings, Costs, and Emissions Impacts, that provides recommendations for the development of common guidelines and templates for reporting energy efficiency savings, costs, emissions, and job impacts. To inform their recommendations, the NMR team catalogued current and planned reporting practices from available energy efficiency documents in the Regional EM&V Forum region and compared them to reporting parameters and data needs the subcommittee identified as important to support multiple energy, economic and environmental policies or market drivers. The recommended reporting guidelines and templates primarily include data that are already reported and/or collected by energy efficiency program administrators in the region.

Based on the recommendations provided in NMR's report, NEEP Regional EM&V Forum staff developed a separate guiding document: the Reporting Guidelines, for Regional EM&V Forum Steering Committee review and approval. The Reporting Guidelines include recommended reporting templates for electric and natural gas energy efficiency program: 1) energy savings, 2) demand savings, 3) expenditures and cost of saved energy, 4) avoided air emissions, and 5) job impacts. They also include process recommendations for improved data exchange between energy efficiency stakeholders. Each reporting template in the Reporting Guidelines includes supporting definitions that closely match those used in the Regional EM&V Forum's Glossary of Terms and Acronyms.

In December 2010, the Reporting Guidelines were adopted by the Regional EM&V Forum Steering Committee. The Regional EM&V Forum's participant-driven, inclusionary process was critical to ensuring support for the Reporting Guidelines and a unanimous Steering

Committee decision in favor of adoption. By adopting the Reporting Guidelines, the Steering Committee encouraged their use or implementation by and in the participating Regional EM&V Forum states and acknowledged the criteria for adopting Regional EM&V Forum products, as follows: the product, if ultimately adopted and practiced by the states, serves the Regional EM&V Forum's goals and objectives to: 1) increase consistency in EM&V practices, 2) reduce EM&V costs for the states, and 3) help to improve the credibility of energy efficiency resources.

REED Development Process and Key Design Considerations

After the Reporting Guidelines were adopted in December 2010, the Regional EM&V Forum turned to the task of implementing them through the development of REED. In July 2011 a subcommittee of Regional EM&V Forum participants (known as the REED subcommittee) selected Peregrine Energy Group (Peregrine) as the REED contractor. Peregrine was tasked with developing a series of data collection forms in Excel format based on the Reporting Guidelines' reporting templates, an associated energy efficiency database, and a website to allow for interactive reporting of the data. The REED subcommittee continued to be actively involved in the project throughout REED's development, frequently weighing in on key issues to make the data collection forms and website more user-friendly and to maximize REED's value to various stakeholder groups.

REED's development was guided by several key objectives: 1) data collected for REED should be consistent with data collected by Independent System Operators and Regional Transmission Operators to support long-term energy efficiency, 2) REED should minimize states' reporting burden and avoid duplicative reporting requirements, and 3) REED should be built so that future changes and modifications can be readily implemented.

To address the first two objectives, the Regional EM&V Forum coordinated REED data collection with Independent System Operator – New England's (ISO-NE) data collection effort to support its 2013 Energy Efficiency Forecast. Before REED was in place, ISO-NE started to collect electric energy efficiency program impact data from the New England states to inform its 2012 forecasting efforts. As the REED data collection process got underway, rather than asking each state to submit its electric energy efficiency program data to both ISO-NE and to the Regional EM&V Forum for REED, ISO-NE agreed to send the data it collected from the New England states to Peregrine, and Peregrine set up a process through which the data was directly imported into REED. This cooperative process was important for two reasons: 1) it ensured that the same data are being used for both REED and ISO-NE, and 2) it significantly streamlined the REED data collection process and reduced states' reporting burden. New England states had to submit only natural gas program data for REED, a much smaller task than submitting both gas and electric. To address the third objective, the Regional EM&V Forum retained Peregrine for 2013 to implement any changes to REED going forward, some of which are described in the Future Modifications and Next Steps section below.

After Peregrine completed an initial draft version of the REED website and reports in the fall of 2012, the Regional EM&V Forum solicited feedback about the structure and format of the REED website and reports from energy efficiency stakeholders beyond the REED subcommittee. NEEP held a webinar in October attended by staff from Lawrence Berkeley National Laboratory (LBNL), the American Council for an Energy-Efficient Economy (ACEEE), US EPA Region 1, and Vermont Energy Investment Corporation, in which participants reviewed the REED website in real-time and were asked to provide feedback and suggestions for improvement. Invited participants covered the range of energy efficiency stakeholders likely to use REED, including energy efficiency analysts and researchers, energy efficiency program administrators, and air regulators. Feedback provided at the webinar session was incorporated into the final version of the REED website and reports to the extent possible, time and budget permitting. Suggestions that were incorporated into the final REED website included: showing energy and demand savings by program type, stacking expenditure categories by color, including links to job impact studies, allowing users to select lifetime or levelized cost of saved energy, adding an instructions tab to show how to access reports and underlying data, and including a standalone program funding sources report.

From December 2012 to February 2013, the Regional EM&V Forum engaged in a quality control process before launching the REED website publicly. External reviewers with familiarity with state energy efficiency program impacts reviewed the REED website and data. Staff from the Consortium for Energy Efficiency (CEE) compared the data in REED to the data they collected for their 2012 State of the Efficiency Program Industry Report. The designated contacts in each state who submitted their state's data reviewed the draft REED reports for accuracy. And finally, REED's use of the same electric program data that ISO-NE had already used for its 2013 Energy Efficiency Forecast provided additional quality assurance. The quality control process also revealed several data outliers that, though correct, would benefit from additional research and analysis into root causes. To this end, NEEP is issuing this REED Program Year 2011 Annual Report to outline and explore similarities and differences between state program impacts.

REED Launch and Public User Outreach

The REED website was launched publicly on February 20, 2013 at www.neep-reed.org. Regional EM&V Forum staff held two public user webinars in the weeks following the public launch in order to educate potential users about REED and encourage its use. The webinars drew nearly 200 people from across the country. Each webinar began with an overview of REED's development process and followed with a live tour of the REED website. Regional EM&V Forum staff showed participants how to access the REED reports, navigate the options to select data parameters of interest, and access underlying program level data. Webinar participants were also shown the state-specific information on REED's State Observations webpage that outlines key differences between states that influence each state's program impacts.

The Regional EM&V Forum engaged in other outreach efforts to ensure REED is a widely used

data resource, including issuing a press release, featuring REED on the Northeast Energy Efficiency Partnerships (NEEP) homepage, and highlighting REED in various NEEP and Regional EM&V Forum publications. This outreach effort has paid off, with nearly 3,000 people from across the United States accessing the REED website since its February launch date. The REED website has garnered attention beyond the REED states, with California, Virginia, Illinois and Florida amongst the top ten states in terms of number of people who have accessed REED.

Future Modifications & Next Steps

The Regional EM&V Forum sees REED as a resource that will evolve in the future based on feedback from the REED project subcommittee and REED users more broadly. To that end, the REED website home page specifically asks users to provide feedback to NEEP by email, and the Regional EM&V Forum has held multiple REED subcommittee meetings since the public launch to discuss future modifications. As a result of this feedback, Peregrine completed the following modifications to REED in the fall of 2013: adding a peak-to-energy ratio report, cleaning up the formatting of data downloads, more clearly labeling report parameters, and adding a webpage for energy efficiency forecasting information.

The REED subcommittee also recommended some changes that cannot be addressed this year due to budget constraints. The most significant of these suggested modifications is to incorporate measure level data. This would require considerable work, as the database is currently designed to collect and display program level data. Given the strong level of interest in REED providing more granular data, the Regional EM&V Forum will consider this modification in 2014.

Regional EM&V Forum staff is also working closely with other organizations that collect energy efficiency program data to move towards the use of consistent definitions for key energy efficiency terms and program categorizations. If consistent definitions and program categorizations become widely utilized, REED's interface with other state, regional and national energy efficiency impact databases will be substantially improved. Currently, the definitions in REED (and the Regional EM&V Forum's Glossary of Terms and Acronyms) closely match those used in the State and Local Energy Efficiency Action Network's Energy Efficiency Program Impact Evaluation Guide, an EM&V resource widely used across the country, and CEE's annual State of the Efficiency Program Industry Report. However, there are still some inconsistencies across the country in definitions for key terms that should be addressed going forward. The Regional EM&V Forum is working with LBNL, ACEEE, and CEE to develop a common typology for energy efficiency programs. This is a particularly important future step for REED, as REED's current program type definitions do not work well for all states given some programs cut across the program type categories. Developing a common typology for energy efficiency programs will increase the comparability of program results across states when examined at the program type level.

Two states in the REED region, New York and Massachusetts, are currently developing statewide energy efficiency program reporting databases. Regional EM&V Forum staff is coordinating with Regional EM&V Forum participants and REED subcommittee members in these states to ensure that these states' new databases streamline the REED data collection process and potentially eliminate the need for these states to manually fill out the REED data collection tables.

Ultimately, the Regional EM&V Forum would like to work closely with other organizations that collect energy efficiency data to develop a single data collection process through which energy efficiency program administrators need only provide their data one time, rather than multiple times to multiple parties. Collecting data at one time would not only reduce program administrators' reporting burdens, it would also ensure that consistent data is being used in all organizations that are doing similar work. This is not a short-term goal, but something the Regional EM&V Forum plans to pursue in the future.

Regional EM&V Forum staff is currently working with the data collection contacts in each REED state regarding Program Year 2012 data, and this data will be added to REED by year-end 2013.

XII. APPENDIX B: STATE ENERGY EFFICIENCY PROGRAM INFORMATION

CONNECTICUT	
2011 Energy Efficiency Plan	2011 Electric and Natural Gas Conservation and Load Management Plan
2011 Energy Efficiency Annual Report	2011 Report of the Energy Efficiency Board
2011 Energy Efficiency Evaluations	http://www.ctenergyinfo.com/eeb/reports-evaluation_studies.htm
EM&V protocols / methods used to support the reported savings are based on and/or include:	ISO-NE M&V Standards Connecticut utilities utilize independent third party evaluators

MAINE	
2011 Energy Efficiency Plan	Triennial Plan of the Efficiency Maine Trust 2011-2013
2011 Energy Efficiency Annual Report	2011 Annual Report of the Efficiency Maine Trust
2011 Energy Efficiency Evaluations	http://www.efficiencymaine.com/about/library/reports/
EM&V protocols / methods used to support the reported savings are based on and/or include:	ISO-NE M&V Standards (M-MVDR)

MARYLAND	
2011 Energy Efficiency Plan	Utility 2011 Annual Plans
2011 Energy Efficiency Annual Report	Public Service Commission of Maryland 2011 Annual Report
2011 Energy Efficiency Evaluations	EmPOWER Maryland 2011 Evaluation Report

MASSACHUSETTS	
2011 Energy Efficiency Plan	Massachusetts Joint Statewide Three-Year Electric and Gas Energy Efficiency Plan (2010-2012)
2011 Energy Efficiency Annual Report	The 2011 Report of the Massachusetts Energy Efficiency Advisory Council
2011 Energy Efficiency Evaluations	http://www.ma-eeac.org/EMV%202011.html
EM&V protocols / methods used to support the reported savings are based on and/or include:	ISO-NE M&V Standards (M-MVDR)

NEW HAMPSHIRE	
2011 Energy Efficiency Plan	2011-2012 CORE New Hampshire Energy Efficiency Programs Energy Efficiency Plan January 01, 2011 through December 31, 2012
2011 Energy Efficiency Annual Report	http://www.puc.nh.gov/Electric/coreenergyefficiency-programs.htm
2011 Energy Efficiency Evaluations	http://www.puc.nh.gov/Electric/Monitoring%20and%20Evaluation%20Reports/Monitoring_Evaluation_Report_List.htm

NEW YORK	
2011 Energy Efficiency Plan	System Benefits Charge Proposed Plan for New York Energy $martSM Programs (2006-2011)
2011 Energy Efficiency Annual Report	NYSERDA Annual Reports: http://www.nyserda.ny.gov/Publications/NYSERDA-Annual-Reports-and-Financial-Statements.aspx LIPA Reports & Studies: http://www.lipower.org/company/papers/reports.html
2011 Energy Efficiency Evaluations	NYSERDA: http://www.nyserda.ny.gov/Publications/Program-Planning-Status-and-Evaluation-Reports.aspx NY DPS: http://www.dps.ny.gov/EEPS_Evaluation.html
EM&V protocols / methods used to support the reported savings are based on and/or include:	NYSERDA: Various national and international best practices and methods. Also note, PUC guidelines came to be after much evaluation was already completed on SBC3 programs. LIPA: TRMs recommended by LIPA's Evaluation Contractor and EEPS Tech Manual.

RHODE ISLAND	
2011 Energy Efficiency Plan	Energy Efficiency Program Plan for 2011
2011 Energy Efficiency Annual Report	2011 Energy Efficiency Year-End Report
2011 Energy Efficiency Evaluations	http://www.rieermc.ri.gov/evaluationstudies/
EM&V protocols / methods used to support the reported savings are based on and/or include:	ISO-NE M&V Standards (M-MVDR)

VERMONT	
2011 Energy Efficiency Plan	Efficiency Vermont Annual Plan 2011
2011 Energy Efficiency Annual Report	Efficiency Vermont Annual Report 2011
2011 Energy Efficiency Evaluations	http://publicservice.vermont.gov/topics/energy_efficiency/eeu_evaluation#evaluation_'09-'11
EM&V protocols / methods used to support the reported savings are based on and/or include:	ISO-NE M&V Standards (M-MVDR)

XIII. APPENDIX C: 2008-2010 STATE ENERGY EFFICIENCY PROGRAM SAVINGS AND EXPENDITURES

Table 1: 2008 – 2010 Energy Efficiency Program Savings Source Information

State	Electric Savings Figures	Electric Savings Type	Gas Savings Figures	Gas Savings Type	Notes on Data
Connecticut	ISO NE EE Forecast Data	Net	Annual EEB Legislative Reports	unclear	Unclear if verified. Appears to exclude commitments.
Maine	ISO NE EE Forecast Data	Net	Unitil Annual Reports to PUC	unclear	Final reported data. Appears to exclude commitments.
Maryland	Utility & PSC Staff EmPOWER Annual Reports (2009-2010).	Gross	N/A	N/A	Final reported data. Appears to exclude commitments.
Massachusetts	ISO NE EE Forecast Data	Net	EEAC Reports (2010) & Utility Reports to PUC (2008-2009)	Net	Final verified data. Excludes commitments.
New Hampshire	ISO NE EE Forecast Data	Net	Annual PUC Gas EE Program Tracking Data	unclear	Unclear if verified. May include commitments.

State	Electric Savings Figures	Electric Savings Type	Gas Savings Figures	Gas Savings Type	Notes on Data
New York	State Energy Plan Assessment (2008-09), NYSERDA Annual Energy SMART and EEPS reports (2010), and PSC report on Utility EEPS programs (2010)	Net	State Energy Plan Assessment (2008-09), NYSERDA Annual Energy SMART and EEPS reports (2010), and PSC report on Utility EEPS programs (2010)	Net	Final verified data. Excludes commitments.
Rhode Island	ISO NE EE Forecast Data	Net	National Grid Annual Reports to the PUC	Net	Final verified data. Excludes commitments.
Vermont	ISO NE EE Forecast Data	Net	VT Gas Annual Report	unclear	Final verified data. Excludes commitments.

Table 2: 2008 – 2010 Energy Efficiency Program Expenditures Source Information

State	Electric Expenditure Figures	Gas Expenditure Figures	Notes on Data
Connecticut	ISO NE EE Forecast Data	Annual EEB Legislative Reports	Unclear if verified. Appears to exclude commitments.
Maine	ISO NE EE Forecast Data	Unitil Annual Reports to PUC	Final reported data. Appears to exclude commitments.
Maryland	Utility & PSC Staff EmPOWER Annual Reports (2009-2010).	N/A	Final verified data. Excludes commitments.
Massachusetts	ISO NE EE Forecast Data	EEAC Reports (2010) & Utility Reports to PUC (2008-2009)	Final verified data. Excludes commitments.
New Hampshire	ISO NE EE Forecast Data	Annual PUC Gas EE Program Tracking Data	Unclear if verified. May include commitments.

State	Electric Expenditure Figures	Gas Expenditure Figures	Notes on Data
New York	State Energy Plan Assessment (2008-09), NYSERDA Annual Energy SMART and EEPS reports (2010), and PSC report on Utility EEPS programs (2010)	State Energy Plan Assessment (2008-09), NYSERDA Annual Energy SMART and EEPS reports (2010), and PSC report on Utility EEPS programs (2010)	Final verified data. Excludes commitments.
Rhode Island	ISO NE EE Forecast Data	National Grid Annual Reports to the PUC	Final verified data. Excludes commitments.
Vermont	ISO NE EE Forecast Data	VT Gas Annual Report	Final verified data. Excludes commitments.