

Comparing Energy Efficiency Program Rebates and Incentive Levels

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ABSTRACT

This paper describes the methodology and results of a scoping study on energy efficiency program rebate and incentive levels for statewide programs to support program planning in Massachusetts. Research team members gathered rebate and incentive data on mature programs similar to those energy efficiency programs currently planned and offered in the State, and with emphasis on those programs and end-use components expected to yield the greatest energy savings in Massachusetts.

There were two major tasks conducted for this study. First, the research team conducted a review of available data on energy efficiency program rebates and incentives. Second, interviews were conducted with program administrators from other states. The team also conducted an internet search to identify any research available on appropriate incentives and rebates for the selected residential and commercial sector programs.

The primary focus was on statewide programs but also included major programs operated by individual administrators. The states of most interest for comparison to Massachusetts were those ranked in the top 10 of the American Council for an Energy-Efficient Economy's (ACEEE's) 2010 State Energy Efficiency Scorecard, namely California, Massachusetts, Oregon, New York, Vermont, Washington, Rhode Island, Connecticut, Minnesota, Maine, and Wisconsin.

The research team worked with an advisory group consisting of the Evaluation, Measurement, and Verification (EM&V) team leader for consultants to the Massachusetts Energy Efficiency Advisory Council, and the Massachusetts Program Administrators. The Program Administrators (PA's), led by NSTAR Electric and Gas Corporation, included Unitil, National Grid, Northeast Utilities, and Cape Light Compact.

Introduction

The research team, which included Tetra Tech and the Energy Center of Wisconsin (ECW) staff, conducted a high-level scoping study of statewide energy efficiency program incentive and rebate levels for comparison to Massachusetts' programs. The effort was undertaken to support fourth quarter 2010 statewide program planning.

The project began with an Internet search to review available research documents, program descriptions, and databases to support this analysis. Program incentive/rebate information was first drawn from the Database of State Incentives for Renewables and Efficiency (DSIRE) and from other sources on the Internet including program administrator and state regulator websites. Based on that initial review, the recommendation was made to summarize the DSIRE data as a starting point to develop a matrix of program end-use measure rebates and incentives.

The research team summarized the DSIRE data to characterize current energy efficiency programs by sector and by major end-use measures, and submitted a summary table for discussion with the advisory group. The results indicated there was a wide range of measure types but the rebates and incentives information was not of sufficient detail to make reasonable comparisons. In addition, the

program definitions did not always match those used for Massachusetts. For example, small business programs were not typically separate from the general category of commercial and industrial programs. At that point, the research team and advisory group decided that they needed to identify some specific program measures that were fairly prevalent and important to Massachusetts program design.

After reviewing a comprehensive list of programs and end-use measure groups, the study team decided to focus on those measures with the highest savings for statewide Massachusetts programs, while gathering readily available data for other end-use measures. The final list of programs for comparison of rebates and incentives included:

- residential lighting programs (specifically upstream market actor programs)
- residential HVAC programs including gas furnaces
- residential weatherization programs
- refrigerator appliance and recycling programs
- commercial/industrial prescriptive lighting programs
- commercial/industrial HVAC programs
- commercial/industrial custom measures program
- small business programs

Although these specific program and end-use categories were identified by the advisory group as having the highest priority, other end-use programs were included such as refrigerator recycling and efficient appliances where sufficient comparable data points were readily available.

The second task in the study was to conduct interviews with program contacts that were most knowledgeable about the process, policies, and current trends in establishing rebates and incentives for energy efficiency programs in their state. Program contact interviews were designed to glean insights into program function, histories, decision-making, and any notable regional peculiarities related to rebate/incentive programs. Program contacts were also asked whether any studies had been conducted on the effectiveness of their particular incentives with special attention given to examinations of incentive level adjustments or other program innovations and participation related outcomes.

The same top 10 states used as the high priority states for the market scan of rebates and incentives were targeted for the interviews. These included the top 10 of ACEEE's 2010 State Energy Efficiency Scorecard: (1) California; (2) Massachusetts; (3) Oregon; (4) New York; (5) Vermont; (6) Washington; (7) Rhode Island; (8) Connecticut (tie); and (8) Minnesota (tie); (9) Maine; and (10) Wisconsin.¹ This paper describes the overall findings and provides some examples of the detailed findings that are provided in the final project report.

The Industry Scan

The research team gathered program data from websites and identified rebates that were similar enough to those offered in Massachusetts to warrant comparison. The states most used for comparison were selected because of the maturity and longevity of their energy efficiency programs. Information about each program was drawn from the DSIRE² website, and from individual program websites from each state. These data were compiled and listed, and when appropriate, graphed to allow a quick comparison.

¹ The *2010 State Energy Efficiency Scoreboard* is available from the American Council for an Energy Efficient Economy, is a comprehensive state energy efficiency policy scorecard to document best practices, recognize leadership among the states, and provide a roadmap for other states to follow.

² DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency.(www.dsireusa.org)

These comparisons provided some valuable information on types of rebate and incentive programs by measure type and program administrator. At the same time, it is important to note that there are many factors that should be considered when making direct comparisons of program rebates and incentives that are not included with the incentive level data. Some of these factors include:

- savings goals for the state, portfolio, and individual program or end-use group within a program
- program and measure cost-effectiveness
- effectiveness of program design, marketing, and delivery
- size of the target end-use market
- regional market barriers—product availability, infrastructure development to deliver measures, energy costs to end user
- available budget
- program and end-use measure uptake (participation levels) relative to goals
- measure adoption curve point
- level of market transformation
- free-ridership and spillover levels
- regulatory requirements and policy decisions
- economic conditions in the region
- firmographics and psychographics of customer base

In addition, there is little or no research on exactly how increasing or decreasing incentive levels affect the level of participation with all of these other factors in play.

Table 1 indicates states that were primarily included in the review of residential program rebates and incentives. These included a combination of statewide programs and individual major utility programs although not all of these program administrators.

Table 1. Programs Included in Residential Energy Efficiency Incentive Comparison

State	Program Administrators	
California	Pacific Gas & Electric Company San Diego Gas & Electric	Sacramento Municipal Utility District Southern California Edison
Connecticut	Connecticut Clean Energy Fund Connecticut Light and Power	United Illuminating company
Maine	Efficiency Maine	
Massachusetts	Mass Save Program	
New York	NYSERDA	
Oregon	Oregon Energy Trust	
Rhode Island	National Grid	
Vermont	Efficiency Vermont	
Washington	Avista Utilities	
Wisconsin	Focus on Energy	

The same states were the focus of the industry scan of commercial sector energy efficiency program rebates and incentives although Minnesota was also included. Table 2 lists commercial sector programs studied.

Table 2. Commercial Sector States and Programs Studied

State	Programs Studied
California	PG&E Non-Residential EE Programs
	SMUD Commercial Energy Efficiency Rebate Program
	Southern California Edison Non-Residential Energy Efficiency Rebates
Connecticut	CEEP Commercial and Industrial Rebate Program
	Connecticut Light & Power Commercial Energy Efficient Rebates
	Norwich Public Utilities Commercial Energy Efficiency Rebate Program
	Unitil Commercial EE program
Maine	Efficiency Maine Business Program
Massachusetts	Mass Save Program Administrators Program and Materials
	Bay State Gas Commercial Energy Efficiency Program
	Berkshire Gas Commercial Energy Efficiency Rebate Program
	National Grid (gas & electric) commercial energy efficiency programs
	NSTAR Business Solutions and Commercial Energy Efficiency Rebate Programs
	Western Massachusetts Electric Commercial EE Rebates
Minnesota	Interstate Light and Power (Alliant) BEERP
	MN Power’s Power Grant Energy Efficiency Program
	Xcel Energy Business EE Rebate Program
New York	NYSERDA Commercial Lighting Program
	National Fuel Small Commercial Conservation Program
	NYSEG/RG&E Commercial & Industrial Efficiency Program
Oregon	Energy Trust Business Energy Efficiency Rebate for Existing Buildings
	Columbia River PUD Commercial Energy Efficiency Rebate Programs
	Avista Utilities Prescriptive Commercial Incentives Program
Rhode Island	National Grid (Gas) Commercial Energy Efficiency Programs
Vermont	Burlington Electric Department Commercial Energy Efficiency Rebate Program
	Efficiency Vermont various programs
Washington	Avista Utilities Commercial Energy Efficiency Incentives Program
	Avista Utilities (Gas & Electric)—Commercial Food Equipment Rebates
	Puget Sound Energy Commercial EE Equipment Rebate Programs & Commercial HVAC
Wisconsin	We Energies—Multi-family, Non-Profit, & Small Business EE Rebate Program
	Focus on Energy Business Program Incentive—Retrofit

Key Findings from the Industry Scan

The Massachusetts project report provides comparative data on the list of program and measures that were selected by the advisory group. This paper includes the overall key findings and some examples (residential lighting, small business, and custom commercial programs) of the comparative data available in the full project report.

In comparing Massachusetts to other programs, residential incentives and rebates were not consistently higher or lower than those in the other states programs. Massachusetts rebates fell into the mid-range for upstream market actor residential lighting programs. Massachusetts incentive levels were comparatively higher than other industry programs for residential gas furnace incentives and for hot water boiler rebates. Massachusetts weatherization incentives fall in the upper half of offerings, but these are complex programs and difficult to compare.

For the commercial sector, Massachusetts rebates examined for lighting were on the low end of lighting rebates offered in other states. Custom rebates comparisons are less straightforward, but Massachusetts rebates appear moderate relative to the other similar programs.

The Massachusetts small business incentive at 70 percent of installed cost of existing building projects is higher than two other state programs and is also higher than the Massachusetts cap on custom incentives for large commercial projects. Recent evaluations conducted by the research team indicate that the small business sector is unique. In particular, aggressive approaches may be needed to get these customers to adopt energy efficiency measures.

Residential high efficiency lighting incentive comparisons. One of the residential program measures considered high priority for the industry scan was CFLs with an emphasis on a specific type of program—those that incentivized the upstream market actors.

Residential energy efficient lighting programs appear to be moving from direct customer rebates to the upstream approach of offering manufacturers and/or retailers incentives to lower retail store prices for standard compact fluorescent lights (CFLs) and specialty CFLs. Although the research team attempted to gather specific incentives by type of bulb, many program sources provided average incentives for upstream market actors, usually segmented by standard CFL and specialty CFL. The incentives often vary by particular bulb and also depended on the contract with a particular retailer or manufacturer.

Figure 1 shows the maximum allowed incentive level by state and program implementer. Incentive ranges varied among the companies, from \$0.25 up to \$2.75 per standard CFL bulb. California is shown having the highest maximum incentive levels for a standard CFL bulb in comparison to programs in the rest of the country. Massachusetts is at the mid-range of programs. With the exception of PG&E and Southern California Edison, whose data were from 2006–2007 programs, the data are from 2009–2010. A number of companies stated that their incentive levels for standard CFLs decreased in 2010 or will be decreasing in 2011.

Specialty CFLs were also reviewed. The average incentive range for specialty bulbs, defined as globe, reflector, dimmable, and three-way bulbs, begins at \$1.00 per bulb up to as high as \$4.00 per bulb, depending on the type and wattage. Most programs offered the specialty bulbs between \$2.00 and \$3.00 on average with the lowest being \$1.50 and the highest average being \$3.50. Again, Massachusetts is in the mid-range of incentives for specialty CFL.

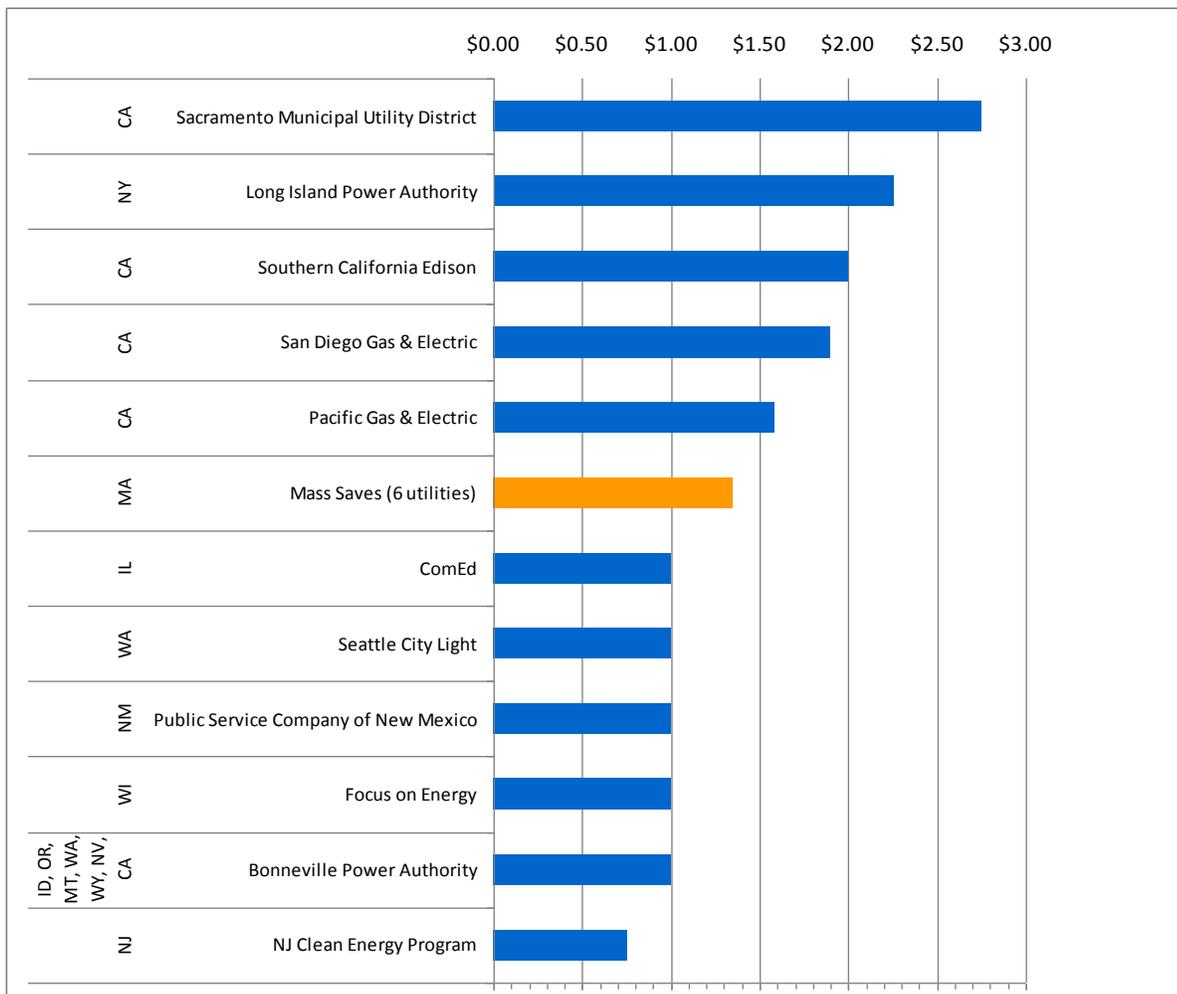


Figure 1. Residential Upstream Market Actors Standard CFL Incentive Level Comparison

Research team members also reviewed residential upstream lighting programs incentives for CFL light fixtures and light emitting diodes (LED) lighting. An incentive of \$10.00 per CFL fixture is shown as being the most common amongst the companies reported, with the lowest being \$5.00 per fixture and the highest being \$35.00 for a ceiling fan fixture. LED lighting varied greatly depending on the LED measure being rebated. Quality and reliability of LED technology is still not consistent among available products so incentives are limited.

Small business program incentives comparisons. Small business programs, which are a key sector for Massachusetts, were also a priority for the study of rebates and incentives. The rebates and incentives for Massachusetts may be higher for small business than for other commercial programs that target medium and large customers. In many cases, small business programs include direct install components and similar to custom programs, the rebates and incentives are on a percentage basis.

The initial market scan using DSIRE database identified only a limited number of energy efficiency programs where the small business sector was specifically targeted. In researching this activity, the research team then conducted an Internet search for “small business” and “small commercial” programs. Several small business programs were identified for further comparison, but a

number of them were from surrounding states that were covered by a Massachusetts program administrator. For example, National Grid administers programs in Massachusetts, Rhode Island, and New Hampshire.

For Massachusetts, the Small Business programs include free energy audits, incentives for up to 70% of the cost of installation of energy efficiency equipment with interest free financing of the remaining 30% of the cost. These appear to be more generous than the caps set for Large Commercial custom measures in Massachusetts but more analysis would be needed to make direct comparisons for small business and large commercial by measure or technology.

Discussions with research team staff directly leading process evaluations and free-ridership studies for small business programs in New England indicated that there is a need to target this sector with more aggressive approaches to achieve savings goals. There is evidence from 2009 free-ridership studies for National Grid’s programs in Massachusetts, Rhode Island, and New Hampshire that more than 90 percent of the small business program participants energy savings would not have occurred in the absence of the program based on the 5.4% free-ridership rate.

Figure 2 shows incentive levels for small business programs that are primarily for existing buildings or retrofits and are based on a percentage of total project costs. Details of these and other small business programs are included in the appendices to the final project report.

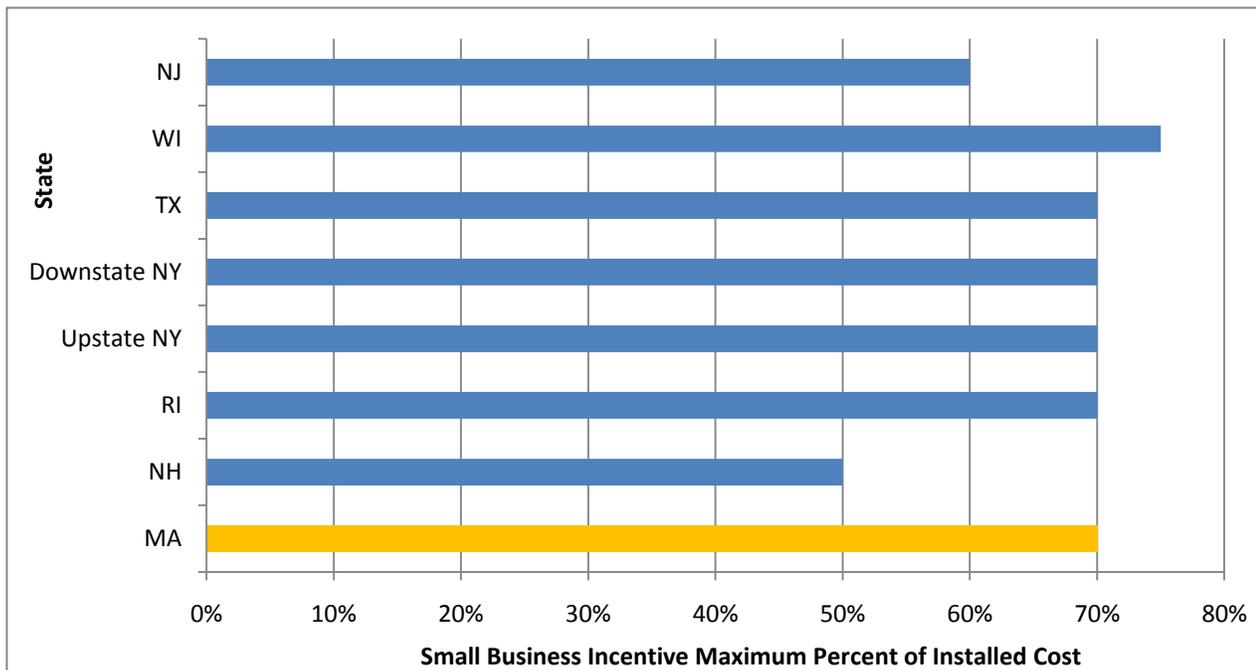


Figure 2. Small Business Programs Offered Within Various States: Incentive Levels Comparisons

Commercial custom program incentives comparison. The study also examined rebates listed as “custom” for several programs, which was again a high priority for the Massachusetts study. For the graph below (Figure 3) the research included only those rebates structured as a percentage of installed costs so they could be easily compared to Massachusetts rebates. The California program, offered by SMUD, has a much lower percentage of installed cost but the ceiling for some end-use custom measures

is as high as \$150,000. In some cases, custom programs paid incentives for a high percentage of the cost of the technical feasibility study while using prescriptive rebates. These programs were not compared.

Based on the National Grid website, the Massachusetts Program Administrators offer up to 45% of the project cost for existing facilities. Efficiency Maine’s incentive of 35% of total project cost for retrofit projects is lower than Massachusetts.³

Other California program rebates (not included in Figure 3) described as “custom” are structured to pay the customer based on energy savings and peak load reduction, and were split up into subcategories, each with their own specific rebate formula. These programs were split into subcategories of lighting, HVAC and other. The two lighting-specific “custom” rebates offered \$0.05/kWh rebates for energy savings and one also offered \$100/peak kW demand reduction. The other two HVAC “custom” rebates offered \$0.15/kWh rebate for energy savings and \$100/kW demand reduction.

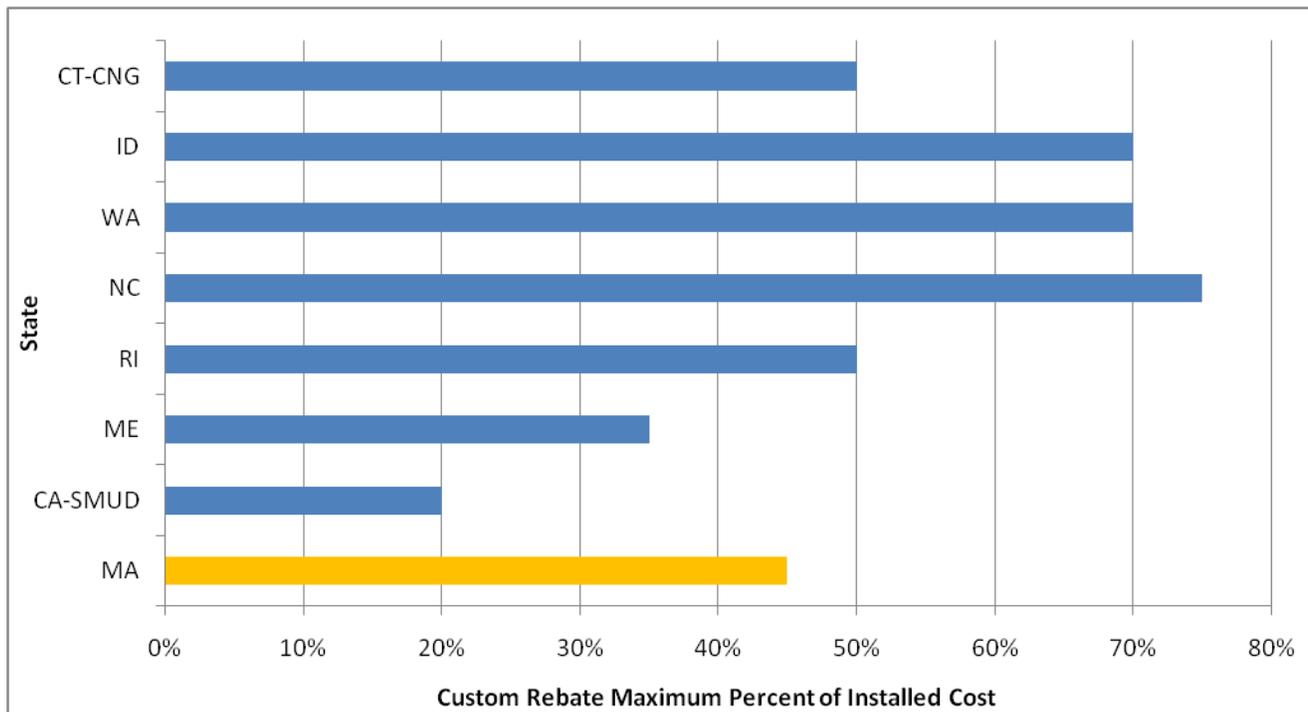


Figure 3. Custom Rebate Incentives by State

Interviews with Utility, State and Regional Program Administrators

The second task in the study was to conduct interviews with individuals most knowledgeable about the process, policies, and current trends in establishing rebates and incentives for energy efficiency programs in their state. Program contact interviews were designed to glean insights into program function, histories, decision-making, and any notable regional distinctions related to rebate/incentive programs. Program contacts were also asked whether any studies had been conducted

³ The Massachusetts PA’s also offer up to 75% of the additional cost for new construction or renovation projects under the Custom Program. Efficiency Maine has a similar incentive of 75% of the incremental cost for new construction and renovation projects.

on the effectiveness of their particular incentives with special attention given to examinations of incentive level adjustments or other program innovations and participation related outcomes. There were no studies cited in the interviews.

The same top 10 states used as the high priority states for the market scan of rebates and incentives were targeted for the interviews. The interviews were conducted with individuals to gather information on key states and their processes and recent experience in developing energy efficiency program budgets and incentive levels.⁴

The research team contacted program planners, administrators, and policymakers in the chosen states to request interviews. An interview guide was developed and approved by the advisory group with the following topics:

- Program status (including expected upcoming changes)
- Process for establishing budgets and rebates/incentive levels
- History of incentive levels
- Changes in incentive levels and any effects on program performance
- Effects of free-ridership and spillover, if any, on levels of rebates and incentives
- Other insights

Key Findings from the Interviews with Utility, State and Regional Program Administrators

The project report provides a summary of all of the interviews. For purposes of this paper, we provide the overall findings and then put them in context in terms of the specific statewide long-term and short-term goals for each key state included in our review.

In general, most of the programs experienced some difficulty in meeting goals due to the economic downturn. The most prevalent response to lower uptake in programs was to increase incentives to commercial and industrial customers. Other approaches used by multiple programs, based on the interviews, were to find more creative ways of marketing the programs, focus on specialty lighting and other emerging technologies with significant market potential, and emphasize comprehensive approaches to energy efficiency at the customer site. It was not clear from the research whether those strategies worked or not.

Incentives and rebate levels were primarily lowered when integrated resource planning showed the measures were less cost effective compared to other resources. In some cases, the baselines increased—measures or efficient appliances or equipment became more standard practice. For example, spiral compact fluorescents and some ENERGY STAR[®] appliances are achieving much wider adoption without incentives and rebates. Free-ridership came into play in reducing incentives for measures, such as refrigerator recycling, where increasing the efficiency levels for the measure was not an option.

With few exceptions, program budgets for energy efficiency have increased and continue to increase in recent program plans. At the same time, the setting of incentives and rebate levels were often tied to specific energy savings goals and budgets established for the program. In many cases, the savings goals were established with data available from integrated resource planning studies or market potential studies. The program budgets were established and incentive and rebate levels were adjusted for expected or actual market uptake within target markets and end-use categories. There were also tradeoffs considered in terms of marketing dollars versus rebates or financial incentives.

⁴ The final list of interviews that were included in the project report were: Efficiency Vermont, Energy Trust of Oregon, Wisconsin Focus on Energy, Northwest Region—Bonneville Power Administration, Washington—Avista Utilities, and Connecticut—United Illuminating.

The programs typically did not adjust rebates or incentives to reflect ARRA funding. The ARRA funding is considered temporary and helpful in getting participant uptake in specific programs to meet program goals that are more difficult to achieve during economic turndown.

Comparison of State Energy Savings Targets

In considering the various approaches to establishing budgets, rebates, and incentives for energy efficiency programs, it is important to recognize any major differences in established goals and objectives. Table 4 summarizes the energy efficiency goals for states with programs used in this study, based on data compiled by ACEEE in its report of State Energy Efficiency Resource Standard (EERS) Activity dated August 2010. With the exception of California (2.6%), the short-term annual electricity percentage savings goal for Massachusetts at 2.4% is higher than Minnesota (1.5%), Oregon (0.8%), Vermont (2%), and Wisconsin (0.75%–1.5%). Although this information points out interesting differences in the target energy savings goals by state, a detailed analysis of the relationship of incentive levels to target savings goals was not included in the project scope.

Table 4. Comparison of Energy Savings Goals by State

State	Reported Energy Saving Goals
California	7,000 GWh for 2010–2012 (2.6% of total retail electric sales)
Connecticut	Annual saving goals averaging 1.5% in recent Conservation and Load Management Plan
Massachusetts	Annual electricity savings target of 2.4% and natural gas savings target of 1.15% by 2012
Minnesota	1.5% of annual energy savings of electric and gas sales with 1% from energy efficiency by 2010 (plan enacted in 2007 legislation)
New York	Reduce forecasted electricity usage 15% by 2015
Oregon (Includes Northwest Energy Efficiency Alliance Programs)	2,242.6 GWh of electricity (0.8% of 2009 electric sales in 2010, ramping up to 1% in 2013 and 2014) and 22.5 million annual therms (0.2% of 2007 natural gas sales to 0.4% in 2014)
Vermont	360,000 MWh annually (6% of 2008 sales combined for 2009–2011)
Northwest	6,000 average MW of savings being cost effective and achievable by 2025
Wisconsin	Reduction in kWh between 0.75% and 1.5% annually, and a reduction in therms between 0.5% and 1.0% for Quadrennial Plan (Phase 2)

What Are the Conclusions and Implications for Future Studies?

The results from this study were useful to Massachusetts program administrators in determining whether the rebates or incentive levels for their programs were comparable to other similar programs. Preliminary results were shared with policy makers in Massachusetts to assist their decision-making on program incentives. Based on the study, the following conclusions are noted:

- There were a good number of residential upstream market actors standard and specialty CFL programs to review showing a fairly wide range of incentives levels for comparison.
- Both commercial and residential heating and cooling program rebates and incentives are difficult to compare due to the varying types of systems and efficiency levels included in energy efficiency programs.
- One appliance incentive that was very consistent among the states studied is the amount of incentive offered for recycling residential second refrigerators.
- Methods for calculating residential home weatherization incentives vary widely, making dollar for dollar comparison difficult.
- Commercial lighting program incentives are also difficult to compare—specific commonly-rebated prescriptive measure categories were specified for comparison purposes.
- Small business and commercial custom programs that specify incentives based on maximum percentage of installed cost were more easily compared than other commercial programs.

In addition to these findings, there are a number of lessons learned in conducting the study that may be of equal or greater value in the future. There was considerable interest from all of the program administrators interviewed in getting this type of information on the industry trends for rebates and incentives. Program planners and developers also want to know what is typical in the industry when planning new programs. Despite the barriers in finding consistency in structures of rebates and incentives, these comparisons could be made if more information were gathered to put them on a common basis of an incentive or rebate per kWh or KW or therm saved.

DSIRE is a good starting point for identifying which utilities and states are operating which types of rebate programs. DSIRE also provides links to help speed up the process of reviewing current data on websites. The downside is that DSIRE information on rebates and incentives is not always current and does not provide information on what changes are being planned. Our project team needed to review program websites, talk to program administrators, and review filed program plans to get complete, current, and accurate information.

Even with our fairly thorough analysis, we could not cover all of the program types that are being operated within the timeframe and budget available for the study. We found shortly after the initial scan of data sources that it was necessary to dig deeper into each program to be sure we were comparing programs that were similar enough in terms of rebate and incentive structures.

For some high priority programs and end uses, there are only a few data points on program rebates and incentives that could be used for comparison due to the differences in the structure of the rebates and incentives for prescriptive and custom programs. In other cases, the equipment and measures included, for example in custom programs, vary so it is difficult to make a one-to-one comparison.

In conclusion, we believe that this is a valuable exercise that should be continued on a regional and even a national basis. With that in mind, there is a need to develop one central source of this more detailed data on rebates and incentives.

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