CEE Annual Industry Report

2013 State of the Efficiency Program Industry

BUDGETS, EXPENDITURES, AND IMPACTS

For more information, contact:
Hilary Jane Forster
Principal Program Manager
Evaluation, Research, and Behavior
reports@cee1.org

Consortium for Energy Efficiency
98 North Washington Street, Suite 101
Boston, MA 02114

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PURPOSE AND LIMITATIONS

The purpose of this report is to annually provide a time series trend analysis, a point in time report for the US and Canadian program industry on trends in energy efficiency and demand response industry budgets, expenditures, and savings. While this effort constitutes a large and comprehensive survey of program administrators, and while extensive ongoing attention is devoted to data standardization, CEE cautions against making representations and comparisons beyond those provided in this report.

The report documents electric and natural gas DSM program industry trends at the regional and national level in the United States and Canada based on data collected through a survey of DSM program administrators. CEE believes that using these data to analyze trends at the national and regional level accurately portrays the annual state of the industry. The limitations of the data are disclosed below.

There are many limitations to budget, expenditures, and savings data. First, these data are reported by an individual or group of individuals within each responding organization. Although CEE and our collaborators work closely with each responding organization to help respondents properly interpret survey questions and enter the correct information, the accuracy of the data is not verified with any third party. Second, respondents provide data at different times during the data collection period from June to October, and not all program administrators report their information according to the calendar year. CEE and our collaborators have sought greater consistency in data collection from respondents over the years, however, the accuracy of the data are ultimately dependent upon each individual respondent's interpretation of the survey questions and ability to retrieve the relevant information. Furthermore, variation in state policies and reporting requirements and inconsistent use of terms complicate our efforts.

Additional factors that tend to affect the viability of comparisons or analytical inferences include differences in regulatory structures, weather effects, customer demographic differences, electric and gas rates, the duration of program experience, and underlying interests given a particular program administrator model.

Given the wide variation in the circumstances surrounding individual data points, we do not believe these data are suitable for comparisons at any level other than the levels represented within this report. CEE notes that when this information is used beyond the stated limits, reviewers are encouraged to inquire as to the sufficiency of the method or quality of supplemental data for the specified purpose.

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ACKNOWLEDGEMENTS

CEE would like to thank the gas and electric energy efficiency and demand response program administrators in the United States and Canada that participated in this year's industry data collection. We appreciate the time and effort given by all survey respondents throughout the data collection process, including for extensive clarification and follow-up. CEE is also grateful to several members who have provided feedback and insights on this work over the years.

CEE appreciates the continuing collaboration with the American Gas Association, which provides natural gas industry data collected from their members for a similar research effort. CEE also appreciates the continued contributions and financial support of the Edison Foundation Institute for Electric Innovation. CEE extends special thanks to Mariam Arnaout of the American Gas Association and to Adam Cooper of the Edison Foundation Institute for Electric Innovation for their coordination on survey development and the logistics of data collection.

Finally, CEE would like to recognize its collaboration with Ian Hoffman and Megan Billingsley of Lawrence Berkeley National Laboratory in refining a program category typology for use in this and future reports.

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Also, please state clearly in your analysis that whereas you are "using CEE data, the analysis is yours alone."

EXECUTIVE SUMMARY

This report concludes CEE's eighth consecutive data collection effort and annual report publication. The primary purpose of this survey and accompanying report is to compile data for industry stakeholders that provide insight regarding overall growth trends for the electric and gas demand side management (DSM)[1] industry. This year's State of the Efficiency Program Industry report highlights 2013 budget data[2] and 2012 expenditure and impacts[3] data compared to previously reported figures to assess industry growth and observe significant changes. This is the fifth consecutive year of collaboration with the American Gas Association (AGA) and the Edison Foundation Institute for Electric Innovation. Working with these collaborators has streamlined data collection efforts and has helped increase participation and response rates for this survey. Data were obtained from 361 utility and nonutility program administrators[4] operating efficiency programs in 48 US states, plus the District of Columbia, and seven Canadian provinces.

This report shows that US and Canadian combined gas and electric DSM program budgets reached $9.6 billion in 2013, representing a 2% increase over 2012 DSM budgets. US and Canadian combined gas and electric DSM program expenditures reached $8.0 billion in 2012, representing a 9% increase over 2011 expenditures. CEE member programs accounted for 81%, nearly $6.6 billion, of these expenditures. US and Canadian DSM programs are estimated to have saved approximately 27,000 GWh of electricity and 425 million therms of gas in 2012, which represents 21 million metric tons of avoided CO_2 emissions.

This year, CEE began asking electric survey respondents to report budget and expenditure figures using specifically defined funding categories that included both "ratepayer" and "non ratepayer" sources. "Ratepayer funds" were defined as dollars secured through special regulator-approved benefit or on-bill tariff charges that are universally collected as supplemental charges to energy bills. One example of ratepayer funds is system benefit charges, or SBC funds. "Non ratepayer funds" were described as funds received from sources such as wholesale capacity market revenues, the Regional Greenhouse Gas Initiative (RGGI) proceeds, dollars specifically allocated to weatherization assistance programs, and funds dispersed from the American Recovery and Reinvestment Act (ARRA). Therefore, in the charts and graphs depicting historical trends in this report, we have disclosed total figures

1 DSM Programs encompass both energy efficiency (EE) and demand response (DR) funding.

2 The budget data collected from survey respondents occurred during the summer and fall of 2013. If changes to budgets were made after the fall, these changes are not captured in this report.

3 "Impact data" refers to annually reported energy savings data commonly referred to as "ex ante" savings estimates. Ex ante savings are forecasted energy savings figures used for program and portfolio planning and reporting purposes. Ex ante savings are likely to be reviewed and revised during program or portfolio impact evaluation studies conducted by DSM program evaluators.

4 Survey respondents include electric and gas CEE Members, program administrators who are members of AGA or the Edison Foundation Institute for Electric Innovation, large program administrators who are not members of any these organizations, and some other program administrators identified through the EIA Form 861 DSM data (www.eia.gov/electricity/data/eia861/).

for 2013 budgets and 2012 expenditures that represent all funding sources. (The budget and expenditure totals cited in the previous paragraph include funds from all sources.) The percentage of 2013 budgets and 2012 expenditures attributable to only ratepayer funds is noted in the text where appropriate. Specific details and analysis for each fuel type and each country are presented in Sections 3 through 5 of this report.

Key findings from this year's industry data collection are listed below in US dollars (USD):

- US and Canadian combined gas and electric DSM program budgets from ratepayer funds totaled $9.4 billion out of the $9.6 billion from all sources, which represents a 1% increase over 2012 budgets.
- US and Canadian combined gas and electric DSM program expenditures from ratepayer funds reached $7.8 billion out of the $8.0 billion from all sources, which represents a 6% increase over 2011 expenditures.
- US and Canadian program administrators spent over $1.13 billion from all sources—and over $1.11 billion from ratepayers—on demand response programs in 2012, representing increases of 9% and 7% over 2011, respectively.[5]
- Natural gas program expenditures in the United States and Canada rose 16% in 2012, to just over $1.2 billion.
- CEE member programs accounted for 81%, nearly $6.6 billion, of expenditures from all sources, as reported above, and 82%, $6.4 billion, of expenditures from ratepayer funds only.
- US gas and electric DSM expenditures rose to $7.2 billion from all sources and $7.0 billion from ratepayers in 2012, representing increases in inflation-adjusted expenditures of 8% and 5% since 2011, respectively.
- Canadian gas and electric DSM program expenditures decreased slightly in 2012 to $800 million. Please refer to Section 3.5 for information regarding this decrease.

5 CEE adjusted the definitions for demand response programs in the 2013 survey. For more information, please see Section 2.4.

CONTENTS

FIGURES

1 Introduction

Energy efficiency and demand response programs, collectively referred to as demand side management (DSM)[6] programs, help the United States and Canada meet future energy needs by lowering the demand on electric and natural gas infrastructure instead of by adding new supply. Demand side management programs save money for businesses and consumers, mitigate environmental impacts associated with the production and distribution of energy, reduce energy price volatility, and stimulate economic growth. These programs boost economic opportunities for new businesses that produce highly efficient products and services, and they advance cutting edge technologies in real-time metering, monitoring, and remote operation and signaling capabilities. Innovative efficiency programs also offer ways for program administrators to interact with their customers and to improve customer satisfaction. Most importantly, DSM programs allow energy producers and suppliers to invest in a lower risk and lower cost demand side resource.[7]

In the decades since energy providers and regulators first recognized energy efficiency and demand response as a priority for system reliability, DSM programs have become a key component of US and Canadian electric and natural gas resource portfolios. Outside of the system capacity afforded by energy efficiency and demand response programs during peak events, the DSM industry has recognized a multitude of additional benefits that accrue to consumers and business, the energy delivery infrastructure, and society as a whole.[8]

The primary purpose of this report is to compile data for industry stakeholders that provide insight regarding overall growth trends for the electric and natural gas demand side management (DSM) industry. This report provides trends in 2012 program expen-

6 For the purposes of this report, the terms "demand side management" or "DSM" refer to both energy efficiency and demand response programs, the term "energy efficiency" includes low income programs, and the term "demand response" refers to incentive- and time-based programs, unless otherwise stated (see Section 2.4 below for more details on these demand response categories). Finally, the terms "savings" and "impacts" are used interchangeably.

7 Ron Binz, Richard Sedano, Denise Furey, and Dan Mullen, "Practicing Risk Aware Regulation: What Every State Regulator Needs to Know," Ceres, April, 2012, www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation/view.

8 Jim Lazar and Ken Colburn, "Recognizing the Full Value of Energy Efficiency: What's Under the Feel-Good Frosting of the World's Most Valuable Layer Cake of Benefits," Regulatory Assistance Project, September, 2013, raponline.org/document/download/id/6739.

ditures and savings and 2013 budgets reported by US and Canadian DSM program administrators, both electric and natural gas, via an online survey during the summer and fall of 2013.[9] CEE administers this survey annually to a variety of DSM program administrators, including investor-owned utilities, nonutility program administrators, municipal power providers, and co-ops. In 2009, CEE began collaborating with the American Gas Association (AGA)[10] to increase the report's coverage of natural gas programs, as well as with the Edison Foundation Institute for Electric Innovation (The Institute for Electric Innovation)[11] to support data collection from electric programs.

A total of 361 utility and nonutility program administrators operating efficiency programs 48 US states (plus the District of Columbia) and seven Canadian provinces responded to this year's survey.[12] Whereas this effort constitutes one of the largest and most comprehensive surveys of program administrators in the United States and Canada, and whereas extensive ongoing attention is devoted to data standardization, CEE cautions against making representations and comparisons beyond those provided in this report. As indicated in the Purpose and Limitations and in the Terms of Use, there are limitations to the comparability and consistency of the data that reduce their analytical usefulness below the state or sometimes regional level. Section 2 below clarifies these limitations and outlines the reasons why use of this information at any level—state, regional, national, or binational—should be limited to the intended purpose stated above.

In previous survey years, respondents were asked to provide CEE with budget and expenditure figures from ratepayer funded sources, as well as to list other sources of funding in the survey. Respondents often listed other sources, such as the American Recovery and Reinvestment Act (ARRA), without providing any supporting data figures to indicate the significance of the additional funding. In 2013, CEE began asking

9 The electric survey collects information about demand response programs, but the natural gas survey does not because comparable demand response programs do not exist for natural gas.

10 The American Gas Association, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 71 million residential, commercial, and industrial natural gas customers in the U.S., of which 94 percent—over 68 million customers—receive their gas from AGA members. AGA is an advocate for natural gas utility companies and their customers and provides a broad range of programs and services for member natural gas utilities, pipelines, marketers, gatherers, international natural gas companies, and industry associates. Today natural gas meets more than one-fourth of the United States' energy needs. To find out more, please visit: www.aga.org.

11 The Edison Foundation Institute for Electric Innovation focuses on advancing the adoption and application of new technologies that will strengthen and transform the power grid. The Institute's members are the investor-owned electric utilities that represent about 70 percent of the U.S. electric power industry. The membership is committed to an affordable, reliable, secure, and clean energy future. The Edison Foundation Institute for Electric Innovation promotes the sharing of information, ideas, and experiences among regulators, policymakers, technology companies, thought leaders, and the electric power industry. It also identifies policies that support the business case for the adoption of cost-effective technologies. The Institute is governed by a Management Committee of electric industry Chief Executive Officers. It has a permanent Advisory Committee of leaders from the regulatory community, federal and state government agencies, and other informed stakeholders. In addition, the Institute has a Strategy Committee of senior electric industry executives and a Partner Roundtable of more than 30 smart grid technology company partners.

12 CEE has improved the way we track and define response rates for this report and future efforts. See Section 2.1 for more details on this change.

electric survey respondents to report budget and expenditure figures using specifically defined funding categories that included both "ratepayer" and "non ratepayer" sources. This was done to identify the relative magnitude of funding from sources other than ratepayers.

"Ratepayer funds" were defined as dollars secured through special regulator-approved benefit or on-bill tariff charges that are universally collected as supplemental charges to energy bills. One example of ratepayer funds is system benefit charges, or SBC funds. "Non ratepayer funds" were described as funds received from sources such as wholesale capacity market revenues, the Regional Greenhouse Gas Initiative (RGGI) proceeds, dollars specifically allocated to weatherization assistance programs, and funds dispersed from the American Recovery and Reinvestment Act (ARRA).

In this report, we have disclosed total figures that represent all funding sources in charts and graphs depicting historical trends. The percentage of 2013 budgets and 2012 expenditures attributable to only ratepayer funds is noted in the text where appropriate.[13]

1.1 Report Structure

The 2013 State of the Efficiency Program Industry report is divided into eight sections.

This section, included under the heading of **Introduction**, provides an overview of the report's scope, key assumptions, and structure.

Section 2, Data Collection and Limitations, describes the report's methodology and includes detailed information on data collection methods, survey response rates, and the limitations of the data presented in this report.

Section 3, Demand Side Management Program Funding in the United States and Canada in the United States and Canada, presents regional and national data and analysis of natural gas and electric DSM programs.

Section 4, Evaluation, Measurement, and Verification, presents analysis of evaluation, measurement, and verification program expenditures.

Section 5, Estimated Program Savings and Environmental Impacts, provides estimated national energy savings data from energy efficiency programs in the United States and Canada. These data are reported by country, fuel type, and customer class.

Appendix A provides a list of the electric energy efficiency program categories used in the 2013 survey and discussed throughout the report.

13 Please note: CEE only collected information on energy efficiency and demand response programs derived from all funding sources for electric program administrators this survey year. Next year, CEE will work with our collaborators to determine whether this approach is feasible for gas data.

Appendix B contains tables with program level electric energy efficiency expenditures for each country, grouped by program category, which are discussed in Section 3 of the report.

Appendix C contains additional figures regarding electric demand response expenditures in the United States by program type. These figures also expand upon information in Section 3.

Energy efficiency and demand response program expenditures and budgets are also displayed by state and province in separate data tables that accompany this report.[14] Energy savings are aggregated and reported at the regional level for the United States and the national level for Canada. Savings data are not reported by state or province because of the risk of misinterpreting program cost effectiveness and because of the many limitations to the savings data, which are further explained in Section 2 of this report.

For more information on this report, or to obtain the Annual Industry Report brochure or graphics produced for this report, please visit cee1.org. For members, the report will be posted in the CEE Forum.

Context is necessary to properly interpret the results of this report. The section below is dedicated to providing context regarding participant response rates, program funding, reporting periods, program categories, exchange rate information, and the limitations of the data.

14 These tables are available at www.cee1.org/annual-industry-reports.

2 Data Collection and Limitations

CEE collected data during the summer and fall of 2013 in conjunction with AGA and The Institute for Electric Innovation. The survey frame included previous survey respondents, all member organizations of AGA, The Institute for Electric Innovation, and CEE,[15] nonmembers who were expected to have significant DSM programs, and some program administrators who submitted data to the Energy Information Administration (EIA).[16] Because the DSM industry is constantly changing, it is difficult to identify and survey every program administrator. CEE has continuously worked to make its sample frame as representative of the current industry as possible.

CEE collected all electric program data with support from The Institute for Electric Innovation. CEE and AGA both collected gas program data, with AGA collecting the majority of the information. CEE only collected natural gas efficiency information from organizations that are not AGA members, including statewide program administrators.

Collaboration with AGA and The Institute for Electric Innovation has streamlined data collection and expanded the sample pool of program administrators over the years, and both organizations are major contributors to this report. AGA and The Institute for Electric Innovation also publish additional information on DSM programs, including a summary of budgets and expenditures as reported here, energy savings data, information on program implementation and evaluation, and regulatory information. Please contact AGA or The Institute for Electric Innovation directly for more on these publications, which are also available on their respective websites.

2.1 Response Rates

This is a voluntary survey that is administered annually to program administrators in the United States and Canada. Because responding organizations may vary by state or province from year to year, caution should be used in comparing data and inferring trends, especially at the state or provincial level. Despite numerous attempts to follow up, not all organizations included in the sample frame respond to the survey each year. Thus, the changes from year to year in the data reported here cannot be entirely attributed to new or expanded programs and new program administrators. Where appropriate, the analyses below include comparisons of only those respondents who

15 CEE members include electric and natural gas efficiency program administrators from across the United States and Canada. For more information on CEE membership, please visit cee1.org/content/members.

16 There are many community-owned electric utilities operating efficiency programs in the United States that are not included in this report. The American Public Power Association (APPA) is a nonprofit organization created to serve the nation's more than 2,000 community-owned electric utilities that collectively deliver power to more than 46 million Americans. For more information about APPA or its members, please visit: www.publicpower.org.

provided information in both 2012 and 2013, alongside the analyses of all data collected.

In 2013, CEE began asking respondents to provide public regulatory documents, program plans, and implementation or evaluation documents in the survey. This allowed us to verify information provided by survey respondents and, in some cases, to update inaccurate information or to supplement what we received with public data not provided in the survey. Most importantly, these supplemental documents allowed us to uncover unreported information for program administrators who were expected to have significant changes to their budgets, expenditures, or savings since last year. In a handful of cases, CEE supplemented partial responses to the survey with data from the Energy Information Administration (EIA).[17]

This year CEE, in collaboration with AGA, obtained data from 361 utility and nonutility program administrators operating DSM programs in 48 US states plus the District of Columbia and seven Canadian provinces. This represents 42 more respondents than last year, based on the new method of tracking program administrators. Finally, only a few known large DSM program administrators did not provide data to CEE or AGA this year. Therefore, CEE concludes that the vast majority of large efficiency program administrators are represented in this report and that the data provided below sufficiently represent the DSM industry in 2012 and 2013.

2.2 Funding Sources

In previous years, respondents were asked to provide CEE with budget and expenditure figures from ratepayer funded sources, as well as to list other sources of funding in the survey. Respondents often listed other sources, such as the American Recovery and Reinvestment Act (ARRA), without providing any supporting data figures to indicate the significance of the additional funding. In 2013, CEE began asking electric survey respondents to report both budget and expenditure figures using specifically defined funding categories that included both ratepayer and non ratepayer sources.[18] This was done in an attempt to improve the consistency and clarity of survey terminology and reporting categories, as well as to obtain a more comprehensive picture of the industry's financial landscape.[19]

17 Data from the 2013 EIA Form 861 collection effort are available: www.eia.gov/electricity/data/eia861/.

18 Please note that CEE only collected information on energy efficiency and demand response programs derived from all funding sources for electric program administrators this survey year. Next year, CEE will work with our collaborators to determine whether this approach is feasible for gas data.

19 "Ratepayer funds" were defined as dollars secured through special regulator-approved benefit or on-bill tariff charges that are universally collected as supplemental charges to energy bills. One example of ratepayer funds is system benefit charges, or SBC funds. "Non ratepayer funds" were described as funds received from sources such as wholesale capacity market revenues, the Regional Greenhouse Gas Initiative (RGGI) proceeds, dollars specifically allocated to weatherization assistance programs, and funds dispersed from the American Recovery and Reinvestment Act (ARRA).

In this report, we have disclosed total figures that represent all funding sources for charts and graphs depicting historical trends. The percentage of 2013 budgets and 2012 expenditures attributable to only ratepayer funds is noted in the text where appropriate.

2.3 Reporting Period

CEE asked respondents to provide data representing total program budgets for 2013 and total program expenditures and savings for 2012 that aligned with calendar years. CEE defined the "budget calendar year" for this survey effort as beginning on January 1, 2013 and ending on December 31, 2013. Similarly, CEE defined the "expenditure and savings calendar year" for this survey effort as beginning on January 1, 2012 and ending on December 31, 2012.

In some cases, respondents indicated that their organization's reporting cycles did not align with calendar years and that figures reported were not adjusted accordingly. In these cases, CEE requested supplemental information regarding the specific start date and end date for annual budget figures and annual expenditures figures. CEE did not adjust their reported annual figures to align with the calendar year reporting cycle, however.[20] Therefore, please note that some portion of the 2013 industry budget figures and some portion of the 2012 expenditures and impacts figures will include data that may fall outside of the January 1 to December 31 reporting cycle.

2.4 Reporting Categories

This publication groups data into customer classes, as in previous years. Electric customer classes in 2013 include residential, low income where separable from residential, commercial, industrial, C&I where commercial and industrial were not separately reported or distinguishable, cross-sector, and demand response. Notably, the category of EM&V used in previous reports is now included as part of cross sector, which covers activities that span multiple customer classes. Customer classes in the gas data include residential, low income, where separable from residential, commercial, which includes industrial if the two are not separable, industrial, other, and the new class of multifamily where separable from residential or commercial.

In 2013, CEE introduced more granular categories within each electric customer class to begin to better understand what types of electric programs and possibly equipment are most common in the industry. CEE has incorporated questions into the survey that ask respondents to report budgets, expenditures, and impact data at the program level if possible.[21] This change is intended to provide more specific and useful information

20 Respondents that provided figures that did not coincide with the calendar year definition of reporting cycles did not account for enough variation to warrant adjustments.

21 CEE incorporated program level questions for the electric survey only. Next year, CEE will work with our collaborators to determine whether this approach is feasible for the gas program administrators surveyed.

regarding electric program categories moving forward, which will allow for a more nuanced understanding of program offerings throughout the US and Canada. See Appendix A for a list of the program categories, which constitute a slightly modified version of those developed through a recent national research effort.[22] CEE also updated demand response program categories terminology in the 2013 survey to reflect the terms specified and defined by the US Federal Energy Regulatory Commission (FERC).[23]

Highlights of collected program level data are presented in the appropriate sections below, but they are only representative of respondents who choose or were able to provide information broken out into the specified program categories. Respondents who could not report at this level of granularity were asked to break their budgets, expenditures, and savings into customer classes, as in the past.

Respondent data that were not further divided into customer classes are included in the category called "not broken out." These not broken out data appear in the binational and national aggregated totals and charts in this report but, by definition, are not included in the analysis of data by customer classes or program types.

2.5 Other Data Limitations

CEE makes every attempt to collect data that are consistent with the definitions and data requirements outlined in the terminology section of the survey. When staff identifies outlying values in the data, we contact respondents and work with them to obtain accurate information. Nevertheless, we believe that improvements resulting from the switch to an online survey format have reduced errors over the past couple years.

Budgets are an area in which there is considerable room for reporting error and in which such errors are not always apparent. "Cycle budgets" are a prime example; see Section 3.2 below for more information on cycle budgets. Another issue is that budgets in this report represent a snapshot from the time the data were collected, whereas expenditures and savings are from the previous year and are generally known by the time the survey is fielded.

Changes to program budgets after the summer of 2013, such as those due to newly approved programs or budget cuts, are not reflected in these data. In addition, some dollars reported in 2013 may represent carryover of unspent funds from 2012, which could result in double counting. Improvements made to the survey in 2013 are expected to increase CEE staff ability to recognize and correct such issues in the future. In

22 Ian M. Hoffman et al., "Energy Efficiency Program Typology and Data Metrics: Enabling Multi-state Analyses Through the Use of Common Terminology," Lawrence Berkeley National Laboratory, August, 2013, emp.lbl.gov/sites/all/files/lbnl-6370e.pdf.

23 CEE sourced demand response terminology from the "2012 Assessment of Demand Response and Advanced Metering: Staff Report," Federal Energy Regulatory Commission, December, 2012.

light of the caveats surrounding annual budgets that are outlined above, as in 2012, this report focuses on expenditures rather than budgets as the best indicator of industry investment.

Finally, there are several reasons why the data—particularly the savings data—presented in this report may not be comparable across the United States and Canada. These include, but are not limited to, variations in regulatory requirements or program administrator practices for reporting performance data; differences in the interpretation of the terms used in the survey, even when standard definitions are provided; and differences in the focus or goals of programs, which often affect which performance data are tracked and how they are reported.

Each regulatory jurisdiction provides specific policies for program administrators in that jurisdiction, which leads to different assumptions and methods for cost-benefit tests, net-to-gross factors, savings equations, avoided transmission and distribution system line losses, measure persistence, and incremental savings reporting between states and provinces. For example, some program administrators may only account for incremental savings resulting from installation of efficient equipment using existing codes as a baseline, whereas others are allowed to account for savings using the efficiency of the replaced equipment as a baseline. These different baseline assumptions may lead to significant variations in the savings claimed by different program administrators for the same efficient equipment in the same replacement scenario. CEE believes that for these reasons, savings data in particular should only be aggregated at the US census region level in the United States and at the national level in Canada.

2.6 Currency Conversions and Corrections for Inflation

For ease of reading, all currency is reported in nominal US dollars (USD) unless otherwise specified. Where Canadian dollars (CAD) are used, they are also nominal unless otherwise specified. Real US dollars were calculated using the Bureau of Labor Statistics CPI Inflation Calculator,[24] and real Canadian dollars were calculated using the Bank of Canada CPI Inflation Calculator.[25] This report uses the 2012 average annual Bloomberg Exchange Rate of 1.0004 USD = 1 CAD for the 2012 expenditure information and the 2013 average Bloomberg Exchange Rate through July 1, 2013, of 0.9875 USD = 1 CAD for the 2013 budget information.

2.7 Corrections to 2012 Data

Please note that the 2012 budgets and 2011 expenditures and savings appearing in this report and associated data tables are adjusted from last year's report where respondents corrected data.

24 Bureau of Labor Statistics CPI Inflation Calculator www.bls.gov/data/inflation_calculator.htm

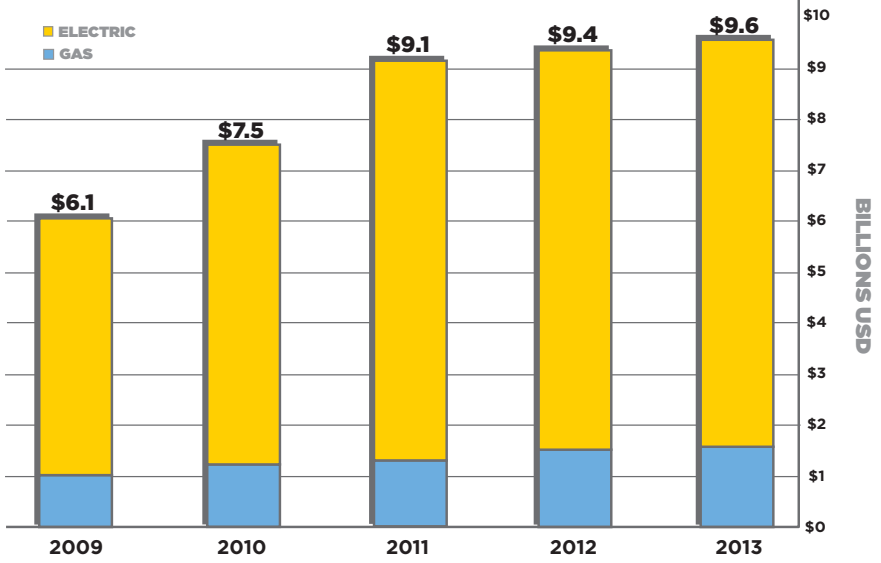
25 Bank of Canada Inflation Calculator www.bankofcanada.ca/rates/related/inflation-calculator/

3 Demand Side Management Program Funding in the United States and Canada

3.1 Combined DSM Budgets in the United States and Canada

US and Canadian electric and gas DSM program budgets— including both energy efficiency and demand response programs from all surveyed sources—reached nearly $9.6 billion in 2013, representing a 2% increase over 2012 (Figure 1).[26]

Figure 1 US and Canadian DSM Program Budgets—Gas and Electric Combined (2009–2013)



Budgets derived exclusively from ratepayer funds accounted for 98%, or $9.4 billion, of the total budget 2013 budget figure. Demand response budgets are not isolated in Figure 1, though in 2013, they represent 14% of the total DSM budgets from all sources, about $1.29 billion, and 13% of the ratepayer funded DSM budgets, about $1.27 billion. This is almost exactly the same as in 2012, when demand response budgets represented 14% of the total. Overall, electric and gas program budgets in the US and Canada continue to increase year after year, though the percent increase each year has decreased.

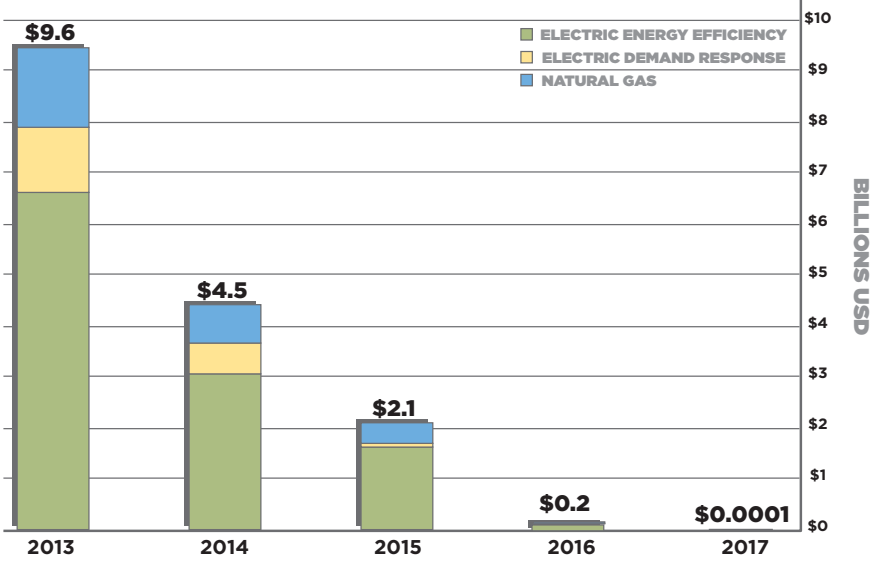
3.2 Future Program Funding

For the first time this year, CEE asked program administrators to report multiyear budgets, referred to as "cycle budgets", that provide a glimpse into funding that has been set aside for DSM programs over the next several years. Figure 2 below is an estimate—based on the new information collected this year—of funding that has

26 Percentage changes in combined US and Canadian data are not adjusted for inflation. Data are adjusted for inflation for each individual country, however, and are identified throughout the report.

already been earmarked for DSM. Figure 2 provides a sense of when program administrators will be revising their program portfolios and securing new funding from ratepayers and from other sources.[27]

Figure 2 US and Canadian Future Program Funding (Estimate) (2013–2017)



This figure shows that roughly 44% of all cycle budgets reported in this year's survey extend past the end of 2013—18% will end in 2014, 17% in 2015, and 2% in 2016 and 2017[28]. Over half, or 56%, of the cycle budgets reported were either for one year only or simply ended in 2013.[29] In all, about $6.9 billion remain to be spent between 2014 and 2017. Although procurement plans for supply-side energy resources may extend several decades into the future, Figure 2 signifies that multiyear planning is also integral to DSM activity.

3.3 Combined DSM Expenditures in the United States and Canada

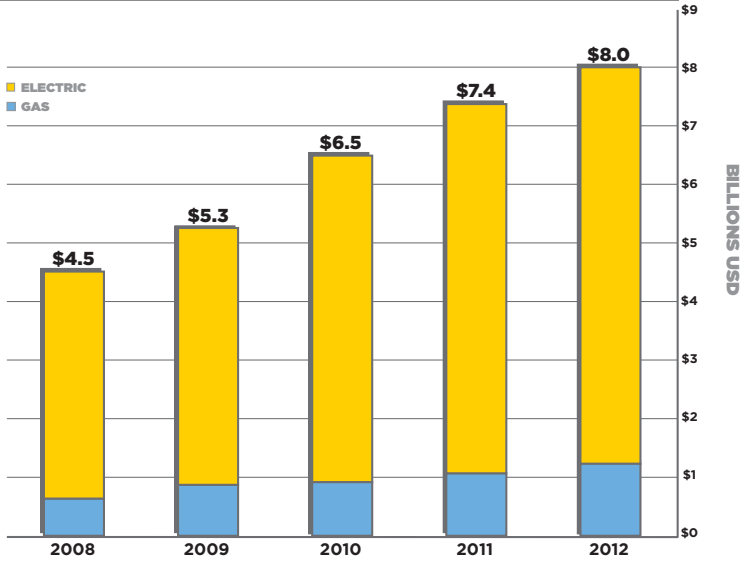
American and Canadian program administrators who participated in this year's survey spent $8.0 billion US in 2012, a 9% increase over 2011, as shown in Figure 3 below. Of that number, $7.8 billion was derived exclusively from ratepayers.

27 Funds remaining for DSM activities past the end of 2013 were evenly distributed among the remaining years in that program administrator's program cycle.

28 Seven percent, totaling about $159 million, did not have a specific end year but will almost certainly be exhausted by 2017. These funds do not appear in Figure 2.

29 Please note this reference is describing program administrators with multiyear program cycles; however, the current program cycle's last approved year ends in 2013.

Figure 3 US and Canadian DSM Program Expenditures—Gas and Electric Combined (2008–2012)



Demand response expenditures are not isolated in Figure 1, but they represent 14% of total expenditures in 2012 (regardless of funding source). This is the same as in 2011.

CEE noted in last year's report that at least some of the historical increases in budgets, expenditures, and savings over the years could be attributed to an increase in number of survey respondents compared to the previous year.[30] As discussed in Section 2.1, it is important to note that despite our best efforts, Figure 3 does not depict expenditure comparisons year after year from the same pool of survey respondents.[31] Strictly comparing survey respondents in the US and Canada who participated in both 2012 and 2013 surveys, expenditures have increased in 2012 for these program administrators.[32] This direct expenditure comparison from the same survey respondents indicates that there was clear growth in the industry beyond the effects of drop-offs or new respondents between 2012 and 2013 survey years.

30 Please note that as the CEE survey panel now contains most large program administrators in the US and Canada, and CEE believes that since 2012, the panel of survey respondents targeted each year for data is representative of DSM industry at large. Therefore, CEE believes that increases due to new respondents are no longer expected to have a large impact. However, the effects of a "large" respondent not participating in subsequent years could potentially cause notable variation.

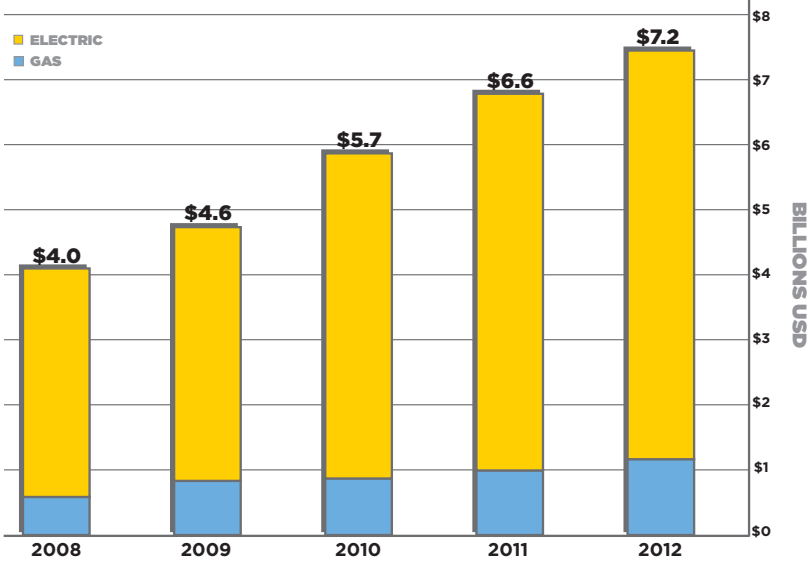
31 As stated in Section 2.1, where appropriate, CEE will provide supplemental analyses that include comparisons of only those respondents who provided information in both 2012 and 2013, alongside the analyses of all data collected, because responding organizations may vary from year to year. Thus, the year-to-year changes in the historical trend graphs cannot be entirely attributed to new or expanded programs.

32 Survey respondents that provided both 2011 and 2012 expenditure data spent $460 million more on DSM programs in 2012 than in 2011. This increase dwarfs both the expenditures lost from those program administrators who participated last year but not this year, about $30 million, and the additional expenditures from new respondents this year, about $1 million.

3.4 United States DSM Trends

US administrators spent about $7.2 billion[33] from all sources for gas and electric DSM programs in 2012, which includes both energy efficiency and demand response (Figure 4).

Figure 4 US DSM Expenditures—Gas and Electric Combined (2008–2012)



These expenditures represent a 10% increase, 8% when adjusted for inflation, over the $6.6 billion spent in 2011. Comparing just those program administrators who responded in both 2012 and 2013, expenditures increased by over $200 million, or 4%—2% when adjusted for inflation. Although not depicted in Figure 4 above, in 2013, natural gas and electric DSM program administrators in the United States budgeted about $8.6 billion from all sources, representing a 3% increase when adjusted for inflation.

3.4.1 United States Electric DSM Trends

The $6.1 billion spent on US electric DSM programs in 2012 represents an increase of 9% over 2011 expenditures, or 6% when adjusted for inflation.[33] Figure 5 below presents the breakdown of US electric expenditures from 2008 to 2012 by customer class, which in 2012 represents the sum of either program level data rolled up to customer classes or customer class data provided directly by respondents.

33 $5.9 billion out of the 2012 expenditures was derived solely from ratepayers. This represents roughly a 5% increase over 2011 expenditure figures, and a 3% increase when adjusted for inflation.

Figure 5 US Electric DSM Expenditures (2008-2012)

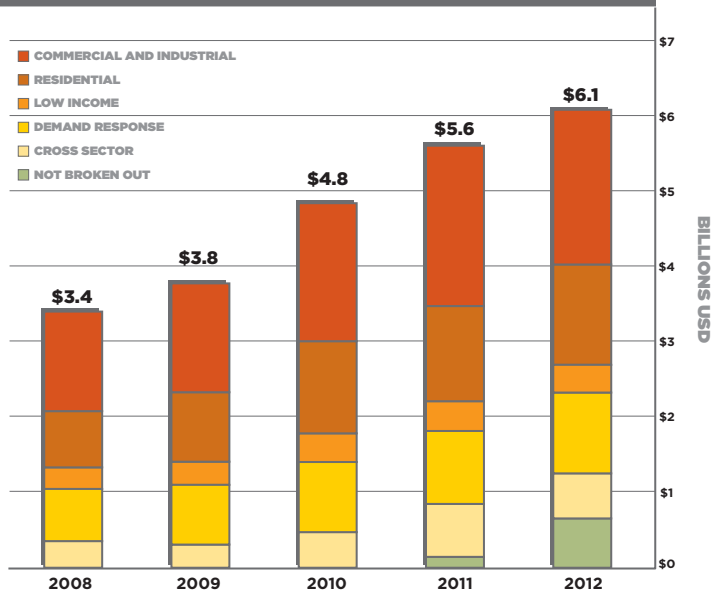
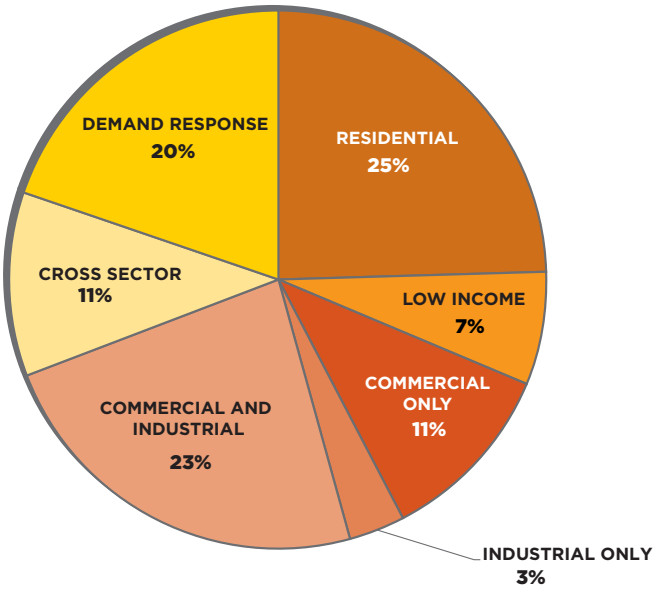


Figure 5 indicates that the proportion of US electric expenditures represented by each customer class, including demand response, has remained largely the same over time. Commercial and industrial programs have experienced the largest change in their share of expenditures: a drop of 5% since 2008 to 34%.[34] The data continue to show that commercial and industrial efficiency programs receive the largest share of electric program funding in the US, followed by residential efficiency, demand response, and low income programs.

Figure 6 2012 US Electric DSM Expenditures by Customer Class



34 Please note that the "not broken out" class was added in 2011 to capture any expenditure figures that could not be allocated to individual customer classes, which in some cases includes overall portfolio activities such as EM&V or administration and marketing.

Figure 6 provides a more granular breakdown of 2012 US electric expenditures from all sources by customer class, with the not broken out class removed and with commercial and industrial separated into commercial, industrial, and C&I classes.

CEE also collected information on expenditure (cost) categories for energy efficiency programs, as depicted in Figure 7 below.

Figure 7 2012 US Electric Energy Efficiency Expenditures by Category

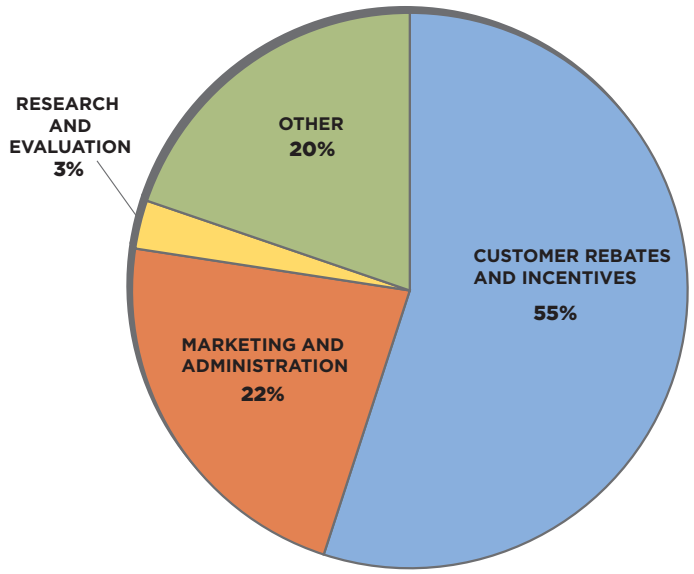


Figure 7 provides an overview of how US program administrators are allocating energy efficiency program expenses, regardless of which customer class is being targeted. Customer rebate and incentive costs, sometimes classified as direct program costs, represented more than half of US electric energy efficiency expenditures in 2012. Marketing and administration costs—which represented nearly a quarter of 2012 energy efficiency program expenditures in the United States—are often referred to as indirect program costs when reported to regulatory agencies. The other category—20%—contains all funds that could not be separated into the previous three categories. Although not depicted in Figure 7, program administrators who responded to the survey in both 2012 and 2013 spent roughly 81% of the ratepayer funds that were budgeted for electric DSM in 2012.

3.4.2 United States Program Level Electric DSM Expenditures

In 2013, CEE introduced more granular categories for each electric customer class to begin to better understand what types of electric programs and possibly equipment are most common in the industry. CEE has incorporated questions into the US electric survey that ask respondents to report budgets, expenditures, and impact data at the program level if possible[35] (please refer to Section 2.4 for more details on program

35 CEE incorporated program level questions for the electric survey only. Next year, CEE will work with our collaborators to determine whether this approach is feasible for the gas program administrators surveyed.

categories). By collecting electric expenditures by program category, CEE intends to track and provide information to help better understand changes or trends in program offerings.

Of the 171 US program administrators who participated in the 2013 electric survey, roughly 75% provided program level expenditures. These data, aggregated back up to the customer class level, indicate a customer class breakdown similar to that in Figure 6, which includes the remaining 25% of expenditure data that was not provided on the program level. Therefore, we conclude that the program level data we obtained in 2013 are representative of overall US electric expenditure trends. Figure 8 lists the most common program types in terms of expenditures; these programs represent just over 50% of all the program level expenditures reported by respondents.

Figure 8 Most Common US Electric Energy Efficiency Program Types by 2012 Expenditures

CUSTOMER CLASS	PROGRAM TYPE	2012 EXPENDITURES
COMMERCIAL AND INDUSTRIAL	PRESCRIPTIVE	$367,250,152
LOW INCOME	-	$295,479,537
COMMERICAL AND INDUSTRIAL	CUSTOM	$197,624,901
CROSS SECTOR	MULTI-SECTOR REBATES	$169,438,446
COMMERCIAL ONLY	PRESCRIPTIVE	$162,724,868
RESIDENTIAL	CONSUMER PRODUCT REBATE/LIGHTING	$115,627,748
COMMERCIAL ONLY	CUSTOM	$85,029,670

Figure 8 shows that prescriptive and custom programs in the commercial and industrial classes constitute a large portion of the program level expenditures provided, followed by residential lighting programs. For a full disclosure of the US electric energy efficiency program expenditures provided by survey respondents, please refer to Appendix B.

3.4.3 United States Electric Demand Response Expenditures

Demand response expenditures in the US topped $1 billion in 2012, which represents an 11% increase over 2011 data.[36] Furthermore, approximately 60% of program administrators who reported 2012 energy efficiency program expenditures also provided demand response expenditures, indicating that more than half of the US electric survey respondents administer a mix of both energy efficiency and demand response programs. Figure 9 below provides a regional snapshot of DSM expenditures in the US in 2012, separated into energy efficiency and demand response.

36 2012 US electric demand response expenditures totaled $1.07 billion from all funding sources and just under $1.05 from ratepayer funded sources only. These totals represent 11% and 8% increases over 2011, respectively (9% and 6% when adjusted for inflation).

Figure 9 US Electric Energy Efficiency and Demand Response Expenditures by Region, 2012

The South and West continue to lead in demand response expenditures. Data indicate that roughly 42% of US demand response expenditures in 2012 occurred in the South, and 36% occurred in the West.

In 2013, CEE modified the demand response program categories to align with those used by FERC (see Section 2.4 for more information). FERC defines several demand response program types and groups them into two major categories: "incentive-based" programs" and "time-based" programs. Appendix C contains charts and supporting information regarding these two categories of demand response programs.

3.4.4 United States Natural Gas Trends

This section specifically discusses natural gas energy efficiency program expenditures in the United States.[37] Figure 10 shows that gas expenditures for energy efficiency programs in the US continued to increase in 2012. US gas program administrators spent $1.125 billion on natural gas efficiency programs in 2012, which represents a 17% increase over expenditures in 2011—15% when adjusted for inflation.

37 Please note that natural gas programs are considered to be only energy efficiency programs. Natural gas demand response programs do not exist within the industry.

Figure 10 US Natural Gas Expenditures (2008-2012)

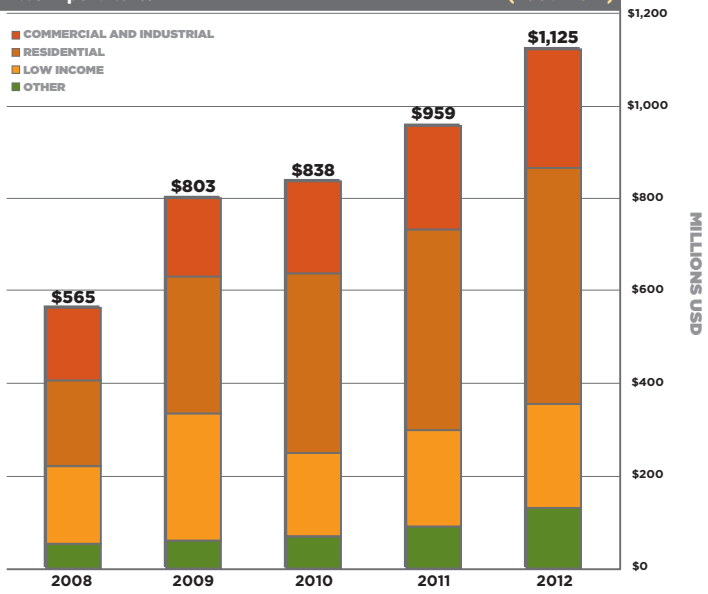


Figure 10 also presents the breakdown of expenditures from 2008 to 2012 by customer class.[38] The data show that residential efficiency programs receive the largest share of natural gas program funding in the US, followed by C&I and low income programs. Residential expenditures have increased their share of the total by 12% since 2008—up to 45%—as the commercial and industrial class has maintained a relatively stable share. Expenditures on low income programs have grown overall since 2008, yet the percentage of the total gas expenditures made up by low income in 2012 has dropped 10% compared to 2008 figures.

Figure 11 provides a more granular breakdown of 2012 US gas expenditures by customer class, with multifamily expenditures broken out from the residential class. For ease of comparison with previous years' reports and with a concurrent report produced by AGA, we did not break commercial and industrial into two separate classes in the figure below.

38 For ease of comparison between years, note that Figure 10 combines the 2013 customer classes commercial and industrial into one commercial and industrial category and combines residential and multifamily into one residential category.

Figure 11 2012 US Natural Gas Expenditures by Customer Class

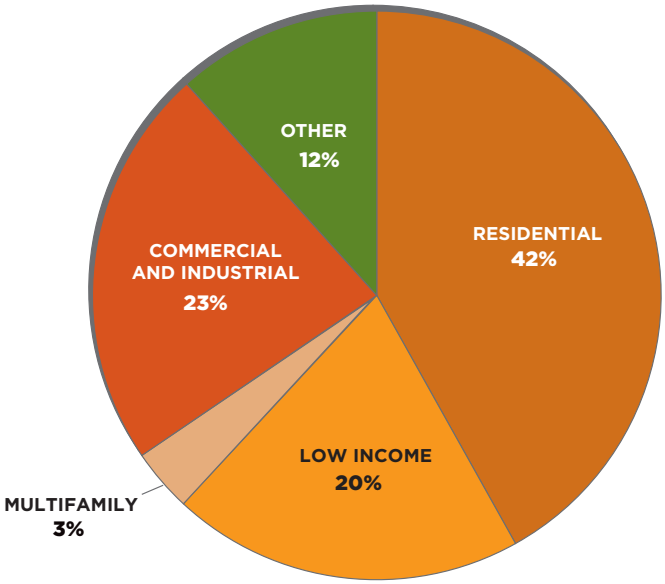
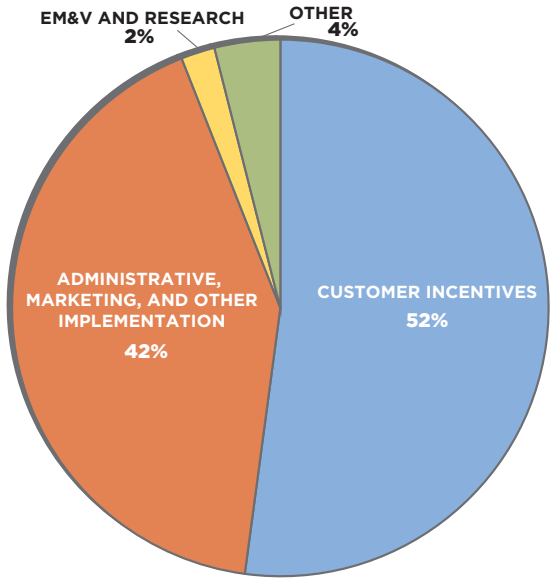


Figure 12 separates 2012 gas expenditures in the US into expenditure categories, which are slightly different from the categories used for US electric programs as the electric and gas surveys requested this information in slightly different ways.

Figure 12 2012 US Natural Gas Expenditures by Category



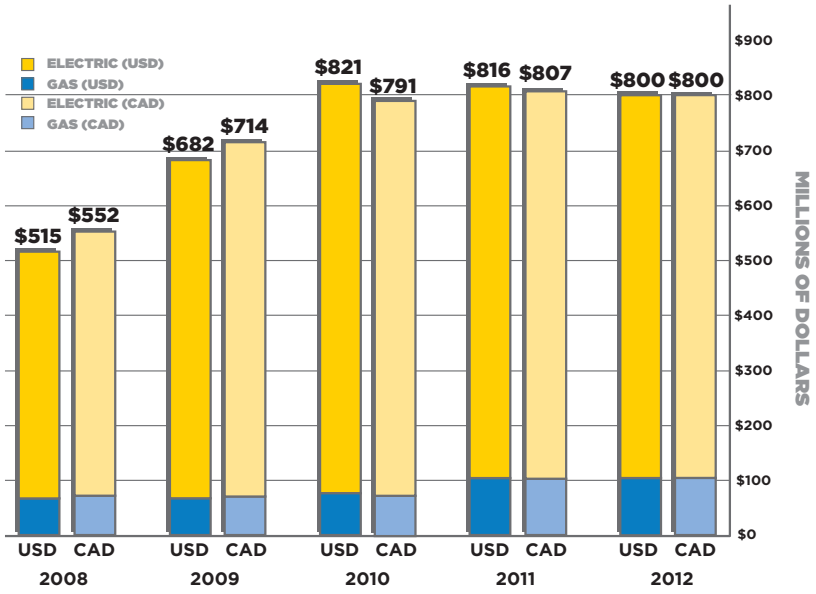
Customer incentives represented more than half of expenditures in 2012 (52%), followed by administrative, marketing, and other implementation spending (42%). Research, evaluation, measurement, and verification expenditures accounted for 2% of spending, and the other category (4%) contains all funds that could not be separated into these three categories.

Although not depicted in Figure 12 above, US natural gas program administrators budgeted nearly $1.5 billion for natural gas efficiency programs in 2013, which represents an increase of 6% over 2012 budgets in real dollars. Considering just those program administrators who responded to the survey in both 2012 and 2013, programs spent 83% of the funds that were budgeted for natural gas programs in 2012.

3.5 Canadian DSM Trends

Canadian DSM expenditures totaled $800 million in 2012 in both US and Canadian dollars. This represents a 1% decrease in expenditures between 2011 and 2012, or a 2% decrease when adjusted for inflation.[39] Figure 13 below presents Canadian DSM expenditures—including both energy efficiency and demand response programs—from 2008 to 2012 in nominal US and Canadian dollars.

Figure 13 Canadian DSM Expenditures—Gas and Electric Combined (2008–2012)



Fluctuations in Canadian expenditures over the past few years have been due in part to the need for CEE to estimate budgets and expenditures of at least one large program administrator.[40] In addition, another large program administrator indicated to CEE that a decrease in electricity demand in the US has recently led to an energy surplus, and DSM activity has thus been curtailed slightly. Nevertheless, the main takeaway from Figure 13 is that investments in Canadian DSM have increased substantially since 2008—for both electric and gas programs—and that they have remained near $800 million for the past few years.

39 All Canadian program administrators reported 100% ratepayer funding in the 2013 survey.

40 The estimated budgets and expenditures for this program administrator reported last year by CEE were updated in 2013 based on new information and on a decision to maintain a "neutral" flat line from the most recent data available.

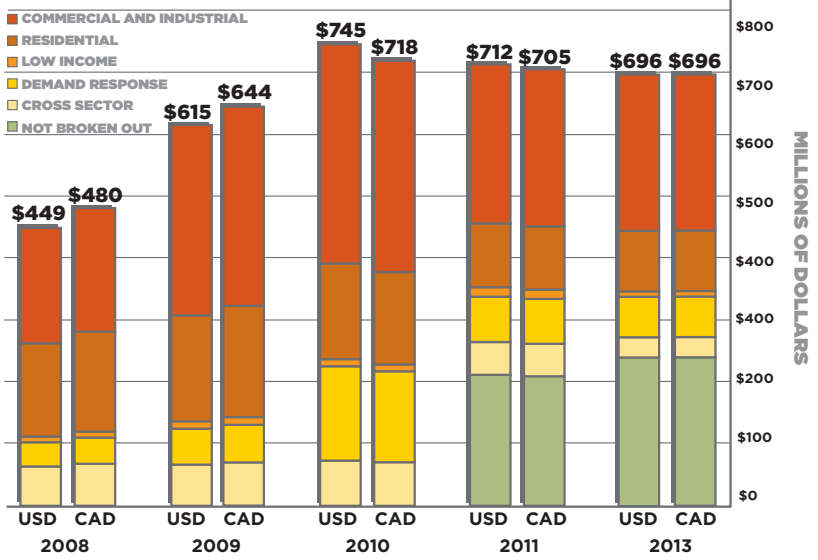
In 2013, reporting natural gas and electric DSM program administrators in Canada budgeted $978 million,$990 million CAD, on energy efficiency and demand response programs. Funding came exclusively from ratepayers and represents a decrease of 5% over 2012 DSM budgets when adjusted for inflation.

3.5.1 Canadian Electric DSM Trends

CEE reports electric DSM trends by customer class. As discussed in previous sections, in 2013, CEE began requesting program level data in the 2013 electric survey. Respondents who were able to provide this data were asked to select a specific program type for each (see Section 2.4 and Appendix A for more information), and program level data were then aggregated up to report figures for customer class comparisons.

Canadian electric DSM expenditures were $696 million in 2012, as shown in Figure 14[41] below. Note that the 2011 total in Figure 14 has been revised from the total reported in last year's report; this change is explained above in the introductory paragraphs to Section 3.5.

Figure 14 Canadian Electric DSM Expenditures (2008-2012)



The $696 million CAD spent on electric DSM programs in Canada in 2012 represent a 1% decrease from 2011 expenditures, or a 2% decrease when adjusted for inflation. The proportion of Canadian electric expenditures represented by each customer class has remained largely the same over time, except for the residential sector, whose share has dropped 20% since 2008 to 14%.

The "not broken out" class was added in 2011 to capture any expenditures that could not be allocated to individual customer classes, which in some cases includes overall portfolio activities such as EM&V or administration and marketing. The relatively large

41 Figure 14 combines the 2013 customer classes commercial, industrial, and C&I into commercial and industrial. These categories are separated out in Figure 15.

portion of Canadian expenditures that could not be broken out is due to at least one program administrator who did not respond in 2013 and whose previous expenditures were carried through to maintain a flat line. See Section 2.4 above for more detail about how budgets, expenditures, and savings were collected and differentiated in the 2013 survey.

2012 Canadian electric DSM expenditures[42] are depicted by customer class in Figure 15 below. This more granular breakdown of 2012 Canadian electric expenditures by customer class, with the not broken out class removed, illustrates that commercial and industrial programs again constituted the largest spending class in Canada in 2012. The share of expenditures represented by the three commercial and industrial customer classes in Canada, 55%, was noticeably higher than in the United States, 37%; Figure 14 indicates a trend in relatively high spending on C&I in Canada since 2008. The share of demand response expenditures declined in 2012, largely due to a change in one program administrator's data, but residential, low income, and cross sector expenditures maintained similar shares of total spending between years.

Figure 15 2012 Canadian Electric DSM Expenditures by Customer Class

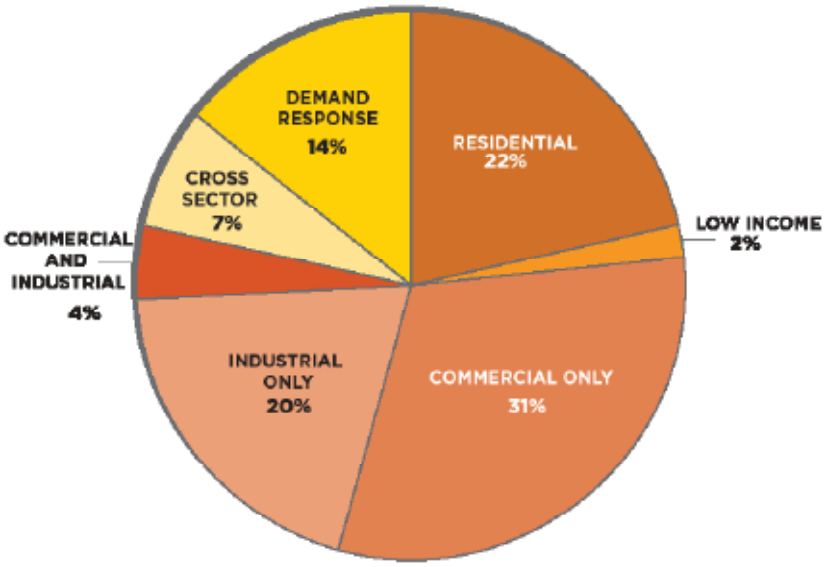
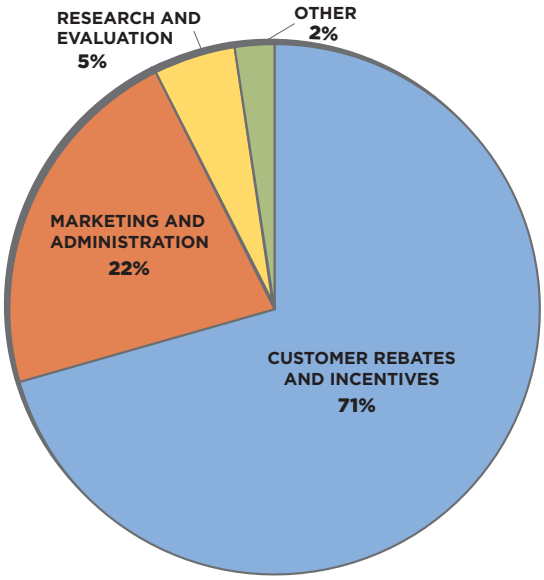


Figure 16 presents the classification of 2012 electric energy efficiency expenditures in Canada by expenditure category. Customer rebates and incentives represented almost three quarters of expenditures in 2012, followed next by marketing and administration—22%—and research and evaluation—5%. The other category—2%—contains all funds that could not be separated into the previous three categories.

42 DSM represents energy efficiency and demand response programs.

Figure 16 2012 Canadian Electric Energy Efficiency Expenditures by Category



Considering only those program administrators who responded to the survey in both 2012 and 2013, programs spent 76% of the ratepayer funds that were budgeted for electric DSM in 2012.

Finally, although not depicted in Figure 16 above, in 2013, Canadian program administrators budgeted nearly $862 million, $873 million CAD, for electric DSM programs. Funding came exclusively from ratepayers and represents a decrease of 6% from 2012 budgets when adjusted for inflation.

3.5.2 Canadian Program Level Electric DSM Expenditures

In 2013, CEE introduced more granular categories for each electric customer class to begin to better understand what types of electric programs and possibly equipment are most common in the industry. CEE has incorporated questions into the electric survey that ask respondents to report budgets, expenditures, and impacts data at the program level if possible[43] (please refer to Section 2.4 for more details on program categories). These data, aggregated back up to the customer class level, indicate a customer class breakdown similar to that in Figure 15, which includes data from the remaining three program administrators who were unable to provide information at the program level. Therefore, we conclude that the program level data we obtained in 2013 are representative of overall Canadian electric expenditure trends.

Figure 17 lists the most common program types in terms of expenditures; these programs represent just over 50% of all the program level expenditures reported by respondents.

43 CEE incorporated program level questions for the electric survey only. Next year, CEE will work with our collaborators to determine whether this approach is feasible for gas program administrators surveyed.

Figure 17 Most Common Canadian Electric Energy Efficiency Program Types by 2012 Expenditures

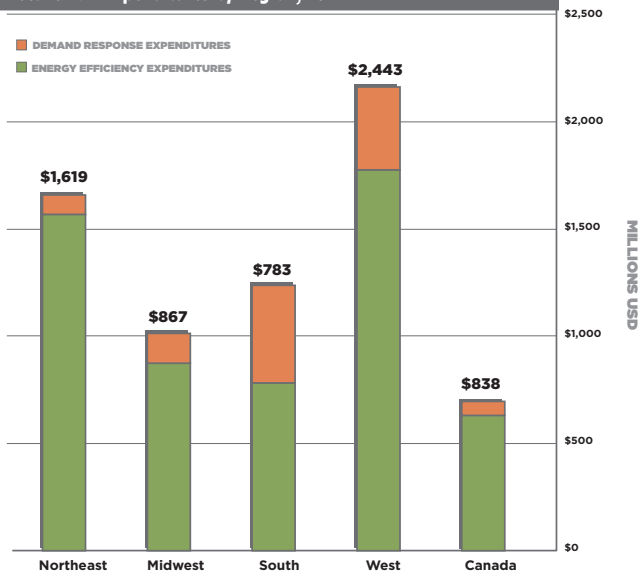
CUSTOMER CLASS	PROGRAM TYPE	2012 EXPENDITURES (USD)	2012 EXPENDITURES (CAD)
INDUSTRIAL ONLY	CUSTOM/INDUSTRIAL PROCESSES	$44,758,224	$44,740,321
COMMERCIAL ONLY	CUSTOM/RETROCOMMISSIONING	$32,012,633	$31,999,828
RESIDENTIAL	WHOLE HOME/DIRECT INSTALL	$13,963,511	$13,957,926
RESIDENTIAL	CONSUMER PRODUCT REBATE/LIGHTING	$8,603,893	$8,600,452

Figure 17 shows that custom programs in the commercial and industrial classes constitute a large portion of the program category expenditures provided, followed by residential whole home and lighting programs. For a full disclosure of the Canadian electric energy efficiency program expenditures provided by survey respondents, please refer to Appendix B.

3.5.3 Canadian Electric Demand Response

The Canadian electric program administrators that responded to this survey spent $65 million, $65 million CAD, on their demand response programs in 2011, which accounted for 9% of total electric DSM expenditures, including expenditure data that was not broken out.

Figure 18 US and Canadian Electric DSM Expenditures by Region, 2012



The percentage spent on demand response programs in Canada is between the percentages of expenditures devoted to demand response in the northeastern and western United States and is similar in absolute terms to the amount that was spent by program administrators in the Northeast.[44]

44 In 2013, CEE modified the demand response program categories to align with those used by FERC (see Section 2.4 for more information). FERC defines several demand response program types and groups them into two major categories: "incentive-based programs," which tend to involve incentives for contracting with utilities to curtail load when necessary, and "time-based programs," which generally employ graduated pricing schemes that incent customers to reduce load during system peaks. CEE is unable to break out the demand response spending in Canada

3.5.4 Canadian Natural Gas Trends

Canadian natural gas program expenditures in 2012 are slightly up in CAD from expenditures reported in 2011. Figure 19 shows that Canadian program administrators reported $104 million, $104 CAD, of expenditures for 2012, representing a 1% increase in CAD expenditures over 2011, 0.5% when adjusted for inflation.[45]

Figure 19 Canadian Natural Gas Expenditures (2008-2012)

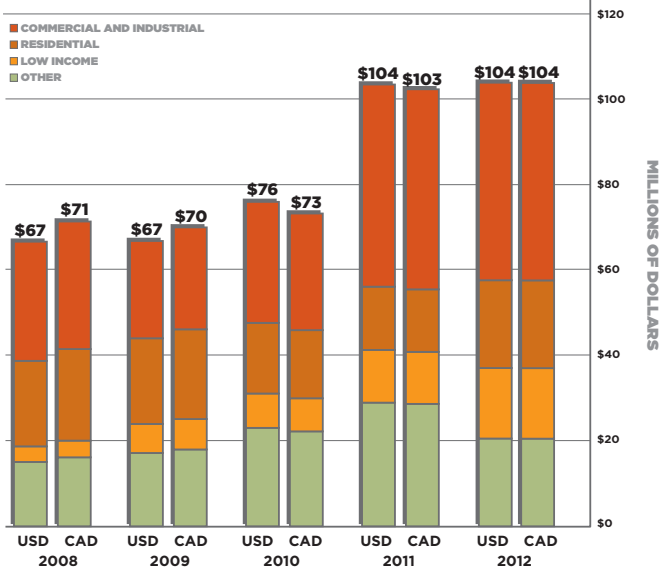


Figure 19 also presents Canadian gas program expenditures by customer class from 2008 to 2012 in nominal US and Canadian dollars. For ease of comparison between years, note that Figure 19 combines the 2013 customer classes commercial and industrial into one commercial and industrial category and combines residential and multifamily into one residential category. Whereas commercial and industrial programs continue to represent the largest percentage of expenditures in 2012, the figure above shows that residential and low income programs increased their share of total Canadian gas spending when compared with 2011.

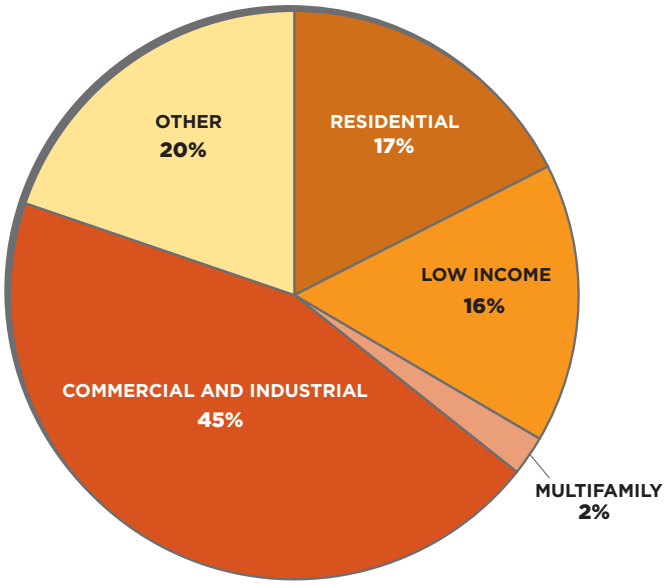
Over time, the trend in the relative share of Canadian gas expenditures represented by various customer classes has been opposite to that in the United States. Actual expenditures on residential programs have remained largely the same, but the share of residential programs has dropped 10% since 2008 to 20%. Commercial and industrial expenditures, on the other hand, have increased greatly and now represent 3% more, 45% overall, of total expenditures than in 2008.

into these categories because only a small portion of Canadian demand response expenditures reported this year were categorized by program type.

45 The overall numbers hide a sizeable increase in expenditures by program administrators who responded in both years; one large program administrator did not respond in 2013, but the loss of that administrator's expenditures were more than offset by increases from continuing respondents.

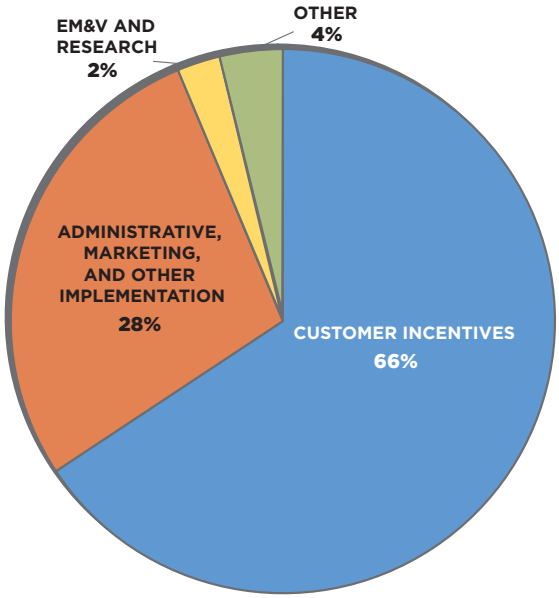
Figure 20 shows that commercial and industrial programs accounted for 45% of total Canadian natural gas efficiency program expenditures in 2012, followed by other programs, 20%, residential programs, 17%, and low income programs, 16%. For ease of comparison with previous years' reports and with a concurrent report produced by AGA, we did not break commercial and industrial into two separate classes.

Figure 20 2012 Canadian Natural Gas Expenditures by Customer Class



Canadian gas expenditure data in 2012 is broken out into slightly different cost categories in Figure 21 below compared to the categories used in the previous electric data sections provided in this report.[46]

Figure 21 2012 Canadian Natural Gas Expenditures by Category



46 The electric and gas surveys requested this information in slightly different ways.

Customer incentives represented roughly two thirds of expenditures in 2012, 66%, followed by administrative, marketing, and other implementation spending, 28%. Research, evaluation, measurement, and verification expenditures accounted for 2% of spending, and the other category, 4%, contains all funds that could not be separated into these three categories.

Canadian natural gas program administrators budgeted $116 million, nearly $118 million CAD, for programs in 2013, which represents a decrease of 1% from 2012 budgets when adjusted for inflation. Considering just those program administrators who responded to the survey in both 2012 and 2013, programs spent 96% of the funds that were budgeted for natural gas programs in 2012.

4 Evaluation, Measurement, and Verification

CEE, with AGA and The Institute for Electric Innovation, asked survey respondents to report spending on research and EM&V in 2012. Respondents to the electric survey were asked to provide an EM&V percentage that could be applied to their total energy efficiency expenditures, whereas respondents to the gas survey were asked to provide a dollar amount.[47] Figures 22 and 23 below present the EM&V expenditures for electric energy efficiency and gas programs in the United States and Canada.[48]

Figure 22 US and Canadian Electric EM&V Expenditures

COUNTRY	2012 EM&V EXPENDITURES (MILLIONS USD)	TOTAL 2012 ENERGY EFFICIENCY EXPENDITURES (MILLIONS USD)*	EM&V % OF TOTAL EXPENDITURES
UNITED STATES	$141	$5,001	3%
CANADA	$21	$423	5%
TOTAL	$162	$5,424	3%

* This table includes estimates of EM&V expenditures for electric EE programs that were derived by multiplying total reported expenditures (from all sources) by an EM&V percentage reported by respondents. Total 2012 expenditures only include data from those respondents who provided a percentage breakout of expenditures by category and are therefore smaller than total EE expenditures listed earlier in the report.

Figure 23 US and Canadian Natural Gas EM&V Expenditures

COUNTRY	2012 EM&V EXPENDITURES (MILLIONS USD)	TOTAL 2012 ENERGY EFFICIENCY EXPENDITURES (MILLIONS USD)	EM&V % OF TOTAL EXPENDITURES
UNITED STATES	$23	$1,161	2%
CANADA	$3	$104	3%
TOTAL	$26	$1,265	2%

Not all respondents allocate funding for evaluation purposes on an annual basis, and some respondents simply did not respond to this portion of the survey. Based on total energy efficiency expenditures, 98% of US and Canadian electric energy efficiency program administrators and 100% of US and Canadian gas program administrators provided 2012 EM&V data. EM&V expenditures comprised between 2-5% of the 2012 energy efficiency expenditures in the US and Canada, which is consistent with findings by other research efforts.[49]

Since evaluation and its related programs do not necessarily occur at the same time, caution is urged when comparing program expenditures to expenditures allocated for EM&V activities in any given year.

47 Like last year, electric EM&V expenditures in this report exclude demand response.

48 Please note, however, that the total expenditures in these figures only include data from program administrators who provided expenditure breakouts by category, so they may be smaller than the expenditure totals presented earlier in this report.

49 "Energy Efficiency Program Impact Evaluation Guide," State & Local Energy Efficiency Action Network's Evaluation, Measurement, and Verification Working Group, December, 2012, www1.eere.energy.gov/seeaction/pdfs/emv_ee_program_impact_guide.pdf, page 7-14.

5 Estimated Program Savings and Environmental Impacts

CEE collected data on energy efficiency savings from gas and electric program administrators in 2012.[50] In order to help respondents report their savings consistently across states and provinces, CEE used the EIA definitions of annual and incremental savings.

According to the EIA Form EIA-861, incremental savings include all energy savings that accumulated from new participants in existing energy efficiency programs and all participants in new programs in 2012. Annual savings are defined as all energy savings that accumulated during the 2012 calendar year that are (1) from participation in new program implemented in 2012, (2) from new participation in existing programs, and (3) from existing participation in previously implemented programs, including those terminated since 1992. CEE also used the term "annualized savings" in the survey. For the purposes of this report, annualized savings are defined as all energy savings that accumulated only during calendar year 2012 from existing participation in previously implemented programs. The purpose of including this definition was to make it clearer to survey participants what we were asking for in the survey. Annual savings figures were then calculated by adding together incremental and annualized savings values.

CEE collected four different categories of savings values in the survey: net annual savings, gross annual savings, net incremental savings, and gross incremental savings.[51],[52] For the second year in a row, the focus of this report is on gross incremental savings. We emphasize gross incremental savings because they are the most widely tracked savings in the industry. Gross incremental savings are also the most comparable across the United States and Canada because they have the fewest assumptions embedded in them. In addition, gross savings are the most useful metric for energy system planners because they include all of the savings that occur regardless of whether or not they were directly caused by the particular program being evaluated. Net savings, on the other hand, are often used by evaluators and regulators to measure against savings goals or to plan subsequent programs because they include only those savings that were a direct result of the program being evaluated.

Over the past few years, CEE has noticed that many organizations have not been able to provide annual savings figures. Therefore, CEE no longer includes annual savings fig-

50 CEE also collects data on energy savings from demand response programs. However, these data are not presented in this report because of inconsistencies that prevented our ability to draw a robust conclusion.

51 Gross savings generally include all savings claimed by a program, regardless of the reason for participation in the program.

52 Net savings exclude whatever is typically excluded in the jurisdictions of reporting organizations. This often includes, but is not limited to, free riders, savings due to government mandated codes and standards, and the "natural operations of the marketplace," such as reduced use because of higher prices and fluctuations in weather or business cycles. Also depending on the jurisdiction, net savings sometimes incorporate additional savings resulting from spillover and market effects, which may outweigh the factors noted above and result in values that are greater than gross savings.

ures in this report. In all tables, CEE intended to only aggregate gross savings figures, but because gross savings values were not always reported in the survey, net savings were used where gross savings were not available.[53]

Although CEE worked with survey respondents to ensure that savings data were reported as consistently as possible, many organizations calculate and report savings according to reporting requirements in their states or provinces, which may or may not be consistent with EIA definitions. Not all organizations were able to adjust their estimates to reflect EIA definitions. In addition, EIA definitions may be treated differently in different jurisdictions because each jurisdiction has its own reporting requirements that contain different embedded assumptions. Finally, because of the timing of the request and differing evaluation cycles across organizations and jurisdictions, savings were often reported prior to evaluation and are subject to change.

5.1 Ratepayer Funded Electric Program Savings

Ratepayer funded energy efficiency programs are saving energy and reducing the amount of greenhouse gases emitted in the United States and Canada. Reporting electric efficiency programs in the United States and Canada estimated incremental savings of approximately 27,000 GWh[54] of electricity in 2012 (Figure 24). This is equivalent to roughly 19 million metric tons of avoided CO_2 emissions.[55] CEE member programs accounted for 80% of these estimated savings.

As noted in Section 2.2 above, this report focused only on ratepayer funded programs in previous years. CEE and our collaborators began collecting information in 2013 on electric programs derived from all funding sources in order to provide a more comprehensive picture of the DSM industry. Figures 24 and 26 below show ratepayer funded energy efficiency savings by sector and totals for both ratepayer funded programs and for programs that received funding from other sources.

53 CEE worked closely with our collaborators, AGA and The Institute for Electric Innovation, to collect savings information from survey participants. In some cases, AGA and The Institute for Electric Innovation have elected to emphasize different savings data collected jointly through this effort from what CEE has chosen to emphasize. For more information on what AGA and The Institute for Electric Innovation have published specifically and why, please refer to their reports that are publically available on their respective websites.

54 As explained in Section 2.7 above, we have subsequently revised some data from last year's report based on new information obtained during the 2013 survey process. 2011 incremental savings should be roughly 28,000 GWh, as opposed to the 40,000 GWh reported last year. Thus, 2012 incremental savings are similar to 2011 incremental savings.

55 Calculated using the EPA Greenhouse Gas Equivalencies Calculator. February 2014, www.epa.gov/cleanenergy/energy-resources/calculator.html.

Figure 24 US and Canadian Electric Energy Efficiency Gross Incremental* Energy Savings (GWh)

COUNTRY	RESIDENTIAL	LOW INCOME	C&I	OTHER	NO BREAKOUT	RATEPAYER TOTAL	TOTAL
UNITED STATES**							
NORTHEAST	1,241	294	2,565	135	391	4,747	5,137
MIDWEST	2,491	142	2,977	731	940	7,344	7,386
SOUTH	1,738	64	1,608	183	195	3,798	3,801
WEST	2,538	86	3,031	2,562	596	9,031	9,040
SUBTOTAL, UNITED STATES	8,009	586	10,182	3,611	2,122	24,921	25,364
CANADA***	341	33	914	127	734	2,151	2,151
BINATIONAL TOTAL	8,350	619	11,096	3,739	2,856	27,071	27,514

The ratepayer numbers by customer class do not always add up to the ratepayer total because some respondents provided program level information that could not be allocated by sector.

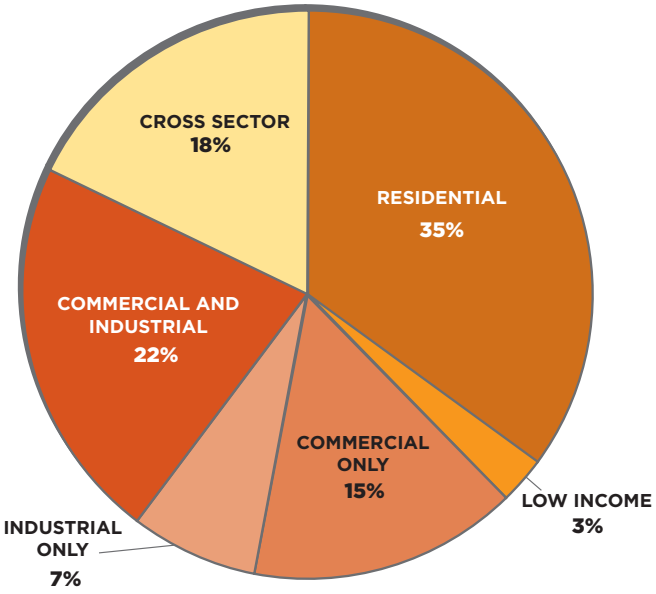
* Based on estimated total of all energy savings that accumulated from new participants in existing programs and all participants in new programs in 2012.

** Ninety-seven (97) percent of all electric survey respondents in the US reported a value for incremental energy savings. Of those that reported a value for incremental energy savings, eighty-seven (87) percent of respondents reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

*** All survey respondents in Canada reported a value for incremental energy savings. Of those that reported a value for incremental energy savings, two thirds reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

Across the United States and Canada, ratepayer funded commercial and industrial electric programs together accounted for almost one half of the total energy savings (44%), followed by residential (35%) and low income programs (three percent). "Other" programs accounted for 18% of the total energy savings and included programs not otherwise allocable by customer class (Figure 25). As noted in Section 2.4, respondents to the survey may interpret the categories differently, and not every respondent broke their information out by customer class. Therefore, Figure 25 and other charts that distinguish spending or savings by customer class are based only on those dollars that were broken out into the categories below.

Figure 25 US and Canadian Gross Incremental Electric Energy Efficiency Savings, Customer Class



Based on the gross incremental savings figure for electric efficiency programs and provided above, in 2012, the value of ratepayer funded electric energy efficiency savings across the United States and Canada was approximately $2.5 billion.[56],[57]

This year, CEE asked respondents to provide estimates of the capacity savings due to their energy efficiency programs. Capacity saving estimates are depicted below in Figure 26.

56 US electric retail values were calculated based on the average retail price of electricity to ultimate customer by end use sector across the US in 2012 using data from the Energy Information Administration's Electric Power Monthly January 2013 issue which has YTD November 2012 data. Accessed February 2014 www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_03.

Average electric rate used: $ 0.1188 per kWh (residential), $0.1009 (commercial), and $0.0667 (industrial). The electric rate for combined C&I programs was determined by taking the average of the commercial and industrial retail rates. The electric rate for "other" savings was determined by taking the average of the residential, commercial and industrial retail rates.

57 Canadian electric retail values were calculated based on the average rate per kWh across Canada in 2012 using data from a report published by Hydro-Québec titled: "Comparison of Electricity Prices in Major North American Cities." Accessed February 2014. www.hydroquebec.com/publications/en/comparison_prices/pdf/comp_2012_en.pdf

Average electric rate used: $ 0.1215 CAD per kWh (residential) and $0.0732 (commercial and industrial). The electric rate for "other" savings was determined by taking the average of the residential and the commercial and industrial electric rates. These figures are an average of the rates for 12 major cities in Canada and may not reflect the average electricity price for Canada as a whole.

Figure 26 US and Canadian Electric Energy Efficiency Gross Incremental* Capacity Savings (MW)

COUNTRY	RESIDENTIAL	LOW INCOME	C&I	OTHER	NO BREAKOUT	RATEPAYER TOTAL	TOTAL
UNITED STATES							
NORTHEAST	373	95	598	8	56	1,175	1,390
MIDWEST	317	14	476	134	268	1,221	1,226
SOUTH	566	23	414	86	130	1,230	1,232
WEST	322	12	310	293	1	984	985
SUBTOTAL, UNITED STATES	1,578	144	1,798	521	454	4,609	4,832
CANADA	46	2	247	4	3	417	417
BINATIONAL TOTAL	1,623	146	2,045	525	457	5,026	5,249

The ratepayer numbers by customer class do not always add up to the ratepayer total because some respondents provided program level information that could not be allocated by sector.
* Based on estimated total of all capacity savings that accumulated from new participants in existing programs and all participants in new programs in 2012.
** Seventy-eight (78) percent of all electric survey respondents in the US reported a value for incremental capacity savings. Of those that reported a value for incremental energy savings, eighty-three (83) percent of respondents reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.
*** Two thirds of respondents in Canada reported a value for incremental capacity savings. Of those that reported a value for incremental savings, half reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

Unlike energy savings, which are reported in kilo, mega, or gigawatt hours and are a measure of the amount of energy saved over time, capacity savings are measured in kilo, mega, or gigawatts and are a measure of savings that occurs at a particular instant. The capacity savings that result from energy efficiency programs can be very valuable, particularly in areas with constrained transmission capacity or high summer or winter peaks.

5.2 Ratepayer Funded Natural Gas Program Savings

Reporting natural gas efficiency programs in the United States and Canada estimated incremental savings of nearly 425 million therms of gas in 2012 (Figure 27). This is equivalent to 2.3 million metric tons of avoided CO_2 emissions. CEE member programs accounted for 85% of the total energy savings estimate.

Figure 27 US and Canadian Natural Gas Gross Incremental* Energy Savings (MDth)

COUNTRY	RESIDENTIAL	LOW INCOME	MULTI-FAMILY	C&I	OTHER	NO BREAKOUT	RATEPAYER TOTAL
UNITED STATES							
NORTHEAST	2,140	584	218	2,191	0	7	5,140
MIDWEST	5,110	626	927	9,178	468	0	16,309
SOUTH	592	29	0	98	0	0	719
WEST	2,401	364	470	5,947	1,268	0	10,451
SUBTOTAL, UNITED STATES	10,243	1,603	1,615	17,414	1,736	7	32,618
CANADA	400	203	390	8,788	0	0	9,782
BINATIONAL TOTAL	10,644	1,807	2,005	26,202	1,736	7	42,401

* Based on estimated total of all energy savings that accumulated from new participants in existing programs and all participants in new programs in 2012.
** Fifty-five (55) percent of respondents in the US reported a value for incremental savings. Of those that reported a value for incremental savings, ninty-eight (98) percent of respondents reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.
*** Seventy-one (71) percent of respondents in Canada reported a value for incremental energy savings. Of those that reported a value for incremental savings, eighty (80) percent reported gross incremental savings. For respondents that did not report gross incremental effects, CEE used net incremental savings in calculating totals.

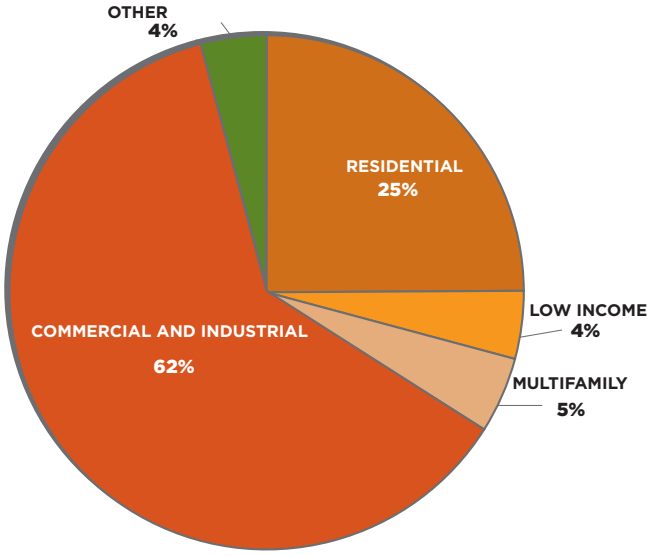
Across the United States and Canada, commercial and industrial programs accounted for the majority of energy savings (62%), followed by residential programs (25%). Multifamily programs came in at five percent, and low income programs represented four percent of total savings. "Other" programs accounted for four percent of the estimated natural gas energy savings and includes programs not otherwise allocable by customer class.

Based on the gross incremental savings figure for natural gas efficiency programs in 2012, the value of natural gas energy efficiency savings across the United States and Canada was approximately $300 million.[58] Figure 28 depicts gross incremental savings figure for natural gas efficiency programs broken out by customer class.

58 Natural gas retail values for the United States and Canada were calculated based on the average retail price per therm across the United States in 2012 using data from Energy Information Administration: Natural Gas Annual Report, Table 24: Average Price of Natural Gas Delivered to Consumers by State. Accessed February 2014. www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

Average natural gas prices used: $1.05 per therm residential, $0.79 per therm commercial, and $0.38 per therm industrial. The value of "Other" savings was calculated by taking the average of the residential, commercial, and industrial values.

Figure 28 2012 US and Canadian Gross Incremental Natural Gas Savings, Customer Class



Appendix A Electric Energy Efficiency Program Categories

As noted in Section 2.4, CEE collaborated with Ian Hoffman and Megan Billingsley from Lawrence Berkeley National Laboratory (Berkeley Lab) to adapt the program categories developed through Berkeley Lab's cost of saved energy research for the CEE survey. Respondents who could provide data for individual programs were asked to select a customer class and then a program type for each program they identified. This appendix provides the title and definition for each program type, grouped by customer class.

Residential Programs

Appliance Recycling Programs designed to remove less efficient appliances (typically refrigerators and freezers) from households.

Behavior and Education Residential programs designed around directly influencing household habits and decision making on energy consumption through numerical or graphical feedback on consumption, sometimes accompanied by tips on savings energy. These programs include behavioral feedback programs in which energy usage reports compare a consumer's household energy usage with those of similar consumers; online audits that are completed by the consumer; and in-home displays that help consumers assess their usage in real time. These programs do not include onsite energy assessments or audits.

Consumer Product Rebate for Appliances Programs that incentivize the sale, purchase and installation of appliances, such as refrigerators, dishwashers, clothes washers and dryers, that are more efficient than those meeting minimum energy performance standards. Appliance recycling and the sale, purchase, and installation of HVAC equipment, water heaters and consumer electronics are accounted for separately.

Consumer Product Rebate for Electronics Programs that encourage the availability and purchase or lease of more efficient personal and household electronic devices, including but not limited to televisions, set-top boxes, game consoles, advanced power strips, cordless telephones, PCs and peripherals specifically for home use, as well as chargers for phones, smart phones, and tablets. A comprehensive efficiency program to decrease the electricity use of consumer electronics products includes two focuses: product purchase and product use. Yet not every consumer electronics program will seek to be comprehensive. Some programs will embark on ambitious promotions of multiple electronics products, employing upstream, midstream, and downstream strategies with an aggressive marketing and education component. At the other end of the continuum, a program administrator may choose to focus exclusively on consumer education.

Consumer Product Rebate for Lighting Programs aimed specifically at encouraging the sale, purchase and installation of more efficient lighting in the home. These programs range widely from point-of-sale rebates to CFL mailings or giveaways. Measures tend to be CFLs, fluorescent fixtures, LED lamps, LED fixtures, LED holiday lights and lighting controls, including occupancy monitors and switches.

Financing Financing programs for residential projects. As with other programs, utility costs also include the cost of any inducements for lenders, such as loan loss reserves, interest rate buydowns, etc.

HVAC Programs designed to encourage the distribution, sale, purchase, proper sizing and installation of HVAC systems that are more efficient than current standards. Programs tend to support activities that focus on central air conditioners; air source heat pumps; ground source heat pumps; and ductless systems that are more efficient than current energy performance standards, as well as climate controls and the promotion of quality installation and quality maintenance.

Insulation Programs designed to encourage the sale, purchase and installation of insulation in residential structures, often through per-square-foot incentives for insulation of specific R-values versus existing baseline. Programs may be point-of-sale rebates or rebates to insulation installation contractors.

Multifamily Multifamily programs are designed to encourage the installation of energy efficient measures in common areas, units or both for residential structures of more than four units. These programs may be aimed at building owners or managers, tenants, or both.

New Construction Programs that provide incentives and possibly technical services to ensure new homes are built or manufactured to energy performance standards higher than applicable code, such as ENERGY STAR® Homes. These programs include new multifamily and new or replacement mobile homes.

Other All residential programs not specifically captured in the other residential and low income program categorizations.

Pool Pump Programs that incentivize the installation of higher efficiency or variable speed pumps and controls, such as timers, for swimming pools.

Water Heater Programs designed to encourage the distribution, sale, purchase and installation of electric and gas water heating systems that are more efficient than current standards, including high efficiency water storage tank and tankless systems.

Whole Home Audits Residential audit programs provide a comprehensive, standalone assessment of a home's energy consumption and identification of opportunities to save energy. The scope of the audit includes the whole home although the thoroughness and completeness of the audit may vary widely from a modest examination and

simple engineering-based modeling of the physical structure to a highly detailed inspection of all spaces; testing for air leakage or exchange rates; testing for HVAC duct leakage; and highly resolved modeling of the physical structure with benchmarking to customer utility bills.

Whole Home and Direct Install Direct install programs provide a set of preapproved measures that may be installed at the time of a visit to the customer premises or provided as a kit to the consumer, usually at modest or no cost to the consumer and sometimes accompanied by a rebate. Typical measures include CFLs, low flow showerheads, faucet aerators, water heater wrap and weather stripping. Such programs also may include a basic, walk-through energy assessment or audit, but the savings are principally derived from the installation of the provided measures.

Whole Home Retrofit Whole home energy upgrade or retrofit programs combine a comprehensive energy assessment or audit that identifies energy savings opportunities with house-wide improvements in air sealing, insulation and, often, HVAC systems and other end uses. The HVAC improvements may range from duct sealing to a tune up to full replacement of the HVAC systems. Whole home programs are designed to address a wide variety of individual measures and building systems, including but not limited to: HVAC equipment, thermostats, furnaces, boilers, heat pumps, water heaters, fans, air sealing; attic, wall, and basement insulation; windows, doors, skylights, lighting, and appliances. As a result, whole home programs generally involve one or more rebates for multiple measures. Whole home programs generally come in two types: comprehensive programs that are broad in scope, and less comprehensive, prescriptive programs sometimes referred to as bundled efficiency programs. This category addresses all of the former and most of the latter, but it excludes direct install programs that are accounted for separately.

Low income Low income programs include all energy efficiency programs specifically identified by the program administrator as low income programs. Such programs may include, but not be limited to: low income weatherization of single-family homes, incentives for installation of energy saving measures in low income multifamily housing, and distribution of home energy efficiency kits containing direct install measures.

Commercial Programs

Audit Programs in which an energy assessment is performed on one or more participant commercial or industrial facilities to identify sources of potential energy waste and measures to reduce that waste.

Custom Programs designed around the delivery of site-specific projects typically characterized by an extensive onsite energy assessment and identification and installation of multiple measures unique to that facility. These measures are likely to vary significantly from site to site.

Custom Retrocommissioning Programs aimed at diagnosing energy consumption in a commercial or industrial facility and optimizing its operations to minimize energy waste. Such programs may include the installation of certain measures, such as occupancy monitors and switches, but program activities tend to be characterized more by tuning or retuning, coordinating and testing the operation of existing end uses, systems and equipment for energy efficient operation. The construction of new commercial or industrial facilities that includes energy performance commissioning should be categorized as Non-Residential New Construction. The de novo installation of energy management systems with accompanying sensors, monitors and switches is regarded as a major capital investment and should be categorized under Non-Residential Custom Whole Buildings.

Financing Projects designed to increase loan financing for commercial and industrial energy efficiency projects. As with other programs, program costs here are any costs paid by the program administrator out of utility-customer funds, including loan loss reserves or other credit enhancements, interest rate buydowns, but not including rebates. Where participant costs are available for collection, these ideally will include the total customer share, that is both principal (the participant payment to purchase and install measures) and interest on that debt. Most of these programs will be directed toward enhancing credit or financing for commercial structures.

Government, Nonprofit, MUSH MUSH (Municipal, University, School & Hospital), government, and nonprofit programs cover a broad swath of program types generally aimed at public and institutional facilities. Examples include incentives or technical assistance to promote energy efficiency upgrades for elementary schools, recreation halls and homeless shelters. Street lighting is accounted for separately.

New Construction Programs that incentivize owners or builders of new commercial or industrial facilities to design and build beyond current code or to a certain certification level, such as ENERGY STAR or LEED®.

Other Programs not captured by any of the specific industrial or commercial categories but are sufficiently detailed or distinct to not be treated as a General CI program. For example, an energy efficiency program aimed specifically at the commercial subsector but is not clearly prescriptive or custom in nature might be classified as Commercial: Other.

Prescriptive Prescriptive programs that encourage the purchase and installation of some or all of a program administrator-specified set of preapproved measures besides those covered in other measure-specific prescriptive programs on this list, including Commercial/Prescriptive: HVAC and Commercial/Prescriptive Lighting.

Prescriptive Grocery Grocery programs are prescriptive programs aimed at supermarkets and are designed around indoor and outdoor lighting and refrigerated display cases.

Prescriptive HVAC Commercial and industrial HVAC programs encourage the sale, purchase and installation of heating, cooling and chiller systems at higher efficiency than current energy performance standards, across a broad range of unit sizes and configurations. Most of these programs will be directed toward commercial structures.

Prescriptive IT or Office Programs aimed at improving the efficiency of office equipment, chiefly commercially available personal computers, printers, monitors, networking devices and mainframes not rising to the scale of a server farm or floor.

Prescriptive Lighting Commercial and industrial lighting programs incentivize the installation of higher efficiency lighting and controls, compared to the existing baseline. Most of these programs will be directed toward commercial structures. Typical measures might include T-8/T-5 fluorescent lamps and fixtures, CFLs and fixtures, LEDs for lighting; displays, signs and refrigerated lighting; metal halide and ceramic lamps and fixtures; occupancy controls; daylight dimming; and timers.

Small Commercial Custom Custom programs applied to small commercial facilities; see definition of custom programs for additional detail.

Small Commercial Prescriptive Prescriptive programs applied to small commercial facilities; see definition of prescriptive programs for additional detail. Such programs may range from a walk-through audit and direct installation of a few preapproved measures to a fuller audit and a fuller package of measures.

Street Lighting Street lighting programs include incentives or technical support for the installation of higher efficiency street lighting and traffic lights than current baseline.

Industrial Programs

Custom Programs designed around the delivery of site-specific projects typically characterized by an extensive onsite energy assessment and identification and installation of multiple measures unique to that facility. These measures are likely to vary significantly from site to site.

Custom Agriculture Farm- and orchard-based agricultural programs that primarily involve irrigation pumping and do not include agricultural refrigeration or processing at scale.

Custom Data Centers Data center programs are custom designed around large-scale server floors or farms that often serve high-tech, banking institutions or academia large-scale customers. Projects tend to be site-specific and involve some combination of lighting, servers, networking devices, cooling systems or chillers, as well as energy management systems and software. Several of these programs may be of experimental or proprietary design.

Custom Industrial Processes Industrial programs deliver custom designed projects that are characterized by an onsite energy and process efficiency assessment and a site-specific measure set that may include, for example, substantial changes in a manufacturing line. This category includes all energy efficiency program work at industrial sites that is not otherwise covered by the single-measure prescriptive programs below, such as lighting, HVAC, and water heaters. This category therefore includes, but is not limited to, all industrial and agricultural process efficiency, and all non-single measure efficiency activities inside and on industrial buildings.

Financing Projects designed to increase loan financing for commercial and industrial energy efficiency projects. As with other programs, program costs here are any costs paid by the program administrator out of utility customer funds, including loan loss reserves, other credit enhancements or interest rate buydowns, but not including rebates. Where participant costs are available for collection, these ideally will include the total customer share; that is, both principal (the participant payment to purchase and install measures) and interest on that debt. Most of these programs will be directed toward enhancing credit or financing for commercial structures.

Opt Out and Self Direct Generally large commercial and industrial programs that are designed and delivered by the participant, using funds that otherwise would have been paid as ratepayer support for all DSM programs. These programs may be referred to as "opt out" programs, among other names.

Other Programs not captured by any of the specific industrial or commercial categories but are sufficiently detailed or distinct to not be treated as a General CI program. For example, an energy efficiency program aimed specifically at the industrial subsector but which is not clearly prescriptive or custom in nature might be classified as Industrial: Other.

Prescriptive Prescriptive programs that encourage the purchase and installation of some or all of a program administrator-specified set of preapproved measures besides those covered in other measure-specific prescriptive programs on this list.

Prescriptive Motors Motors programs usually offer a prescribed set of approved, higher efficiency motors, with industrial motors programs typically getting the largest savings from larger, high powered motors (>200 hp).

Prescriptive Refrigerator Warehouses Warehouse programs are aimed at large-scale refrigerated storage. Typical end uses are lighting, climate controls and refrigeration systems.

C&I Programs

Audit Programs in which an energy assessment is performed on one or more participant commercial or industrial facilities to identify sources of potential energy waste and measures to reduce that waste.

Custom Programs designed around the delivery of site-specific projects typically characterized by an extensive onsite energy assessment and identification and installation of multiple measures unique to that facility. These measures are likely to vary significantly from site to site.

New Construction Programs that incentivize owners or builders of new commercial or industrial facilities to design and build beyond current code or to a certain certification level, such as ENERGY STAR or LEED.

Other Programs not captured by any of the specific industrial or commercial categories but are sufficiently detailed or distinct to not be treated as a General CI program. For example, an energy efficiency program aimed specifically at the commercial subsector but is not clearly prescriptive or custom in nature might be classified as C&I: Other.

Prescriptive Prescriptive programs that encourage the purchase and installation of some or all of a program administrator-specified set of preapproved measures besides those covered in other measure-specific prescriptive programs on this list.

Self Direct Generally large commercial and industrial programs that are designed and delivered by the participant, using funds that otherwise would have been paid as ratepayer support for all DSM programs. These programs may be referred to as “opt out” programs, among other names.

Cross Sector

Codes and Standards In codes and standards programs, the program administrator may engage in a variety of activities designed to advance the adoption, application or compliance level of building codes and end-use energy performance standards. Examples might include advocacy at the state or federal level for higher standards for HVAC equipment; training of architects, engineers and builders and developers on compliance; and training of building inspectors in ensuring the codes are met.

Market Transformation Market transformation programs include programs aimed primarily at reducing market barriers to the adoption of more efficient goods and services rather than acquiring energy savings, per se. Market transformation programs are gauged by their market effects, such as increased awareness of energy efficient technologies among customers and suppliers; reduced prices for more efficient models; increased availability of more efficient models; and ultimately, increased

market share for energy efficient goods, services and design practices. Example programs might include upstream incentives to manufacturers to make more efficient goods more commercially available, and point-of-sale or installation incentives for emerging technologies that are not yet cost effective. Workforce training and development programs are covered by a separate category. Upstream incentives for commercially available goods are sorted into the program categories for those goods, such as consumer electronics or HVAC.

Marketing, Education, Outreach (ME&O) These programs include most standalone marketing, education and outreach programs, such as development and delivery of in-school energy and water efficiency curricula, as well as statewide marketing, outreach and brand development.

Multisector Rebates Multisector rebate programs include those providing incentives for commercially available end-use goods for multiple sectors, such as personal computers or HVAC.

Other Other cross sector programs that do not match the categories provided.

Planning, Evaluation, Other Program Support Non-ME&O support programs include the range of activities not otherwise accounted for in program-specific costs, but needed for planning and designing a portfolio of programs and otherwise complying with regulatory requirements for DSM activities outside of program implementation. These activities generally are focused on the front and back end of program cycles, in assessing prospective programs; designing programs and portfolios; assessing the cost effectiveness of measures, programs and portfolios; and arranging for, directing or delivering reports and evaluations of the process and impacts of those programs where those costs are not captured in program costs.

Research These programs are aimed generally at helping the program administrator identify new opportunities for energy savings, such as research on emerging technologies or conservation strategies. Research conducted on new program types or the inclusion of new, commercially available measures in an existing program are accounted for separately under cross cutting program support.

Shading and Cool Roofs Shading and cool roofs reflective programs include programs designed to lessen heating and cooling loads through general changes to the exterior of a structure. Examples could include planting trees to shade walls and windows, adding window screens, and the use of cool or reflective roofs. These programs are not necessarily specific to a sector.

Voltage Reduction Programs that support investments in pre-meter system savings, typically by the program administrator. The most common form of these programs are voltage regulation programs that reduce voltage, within reliability parameters, during

select time periods. Other measures may include purchase of higher efficiency transformers.

Workforce Development Workforce training and development programs are a distinct category of market transformation program designed to provide the underlying skills and labor base for deployment of energy efficiency measures.

Appendix B List of US and Canadian Electric Energy Efficiency Program Level Expenditures

Figure B–1 US Electric Energy Efficiency Program Level Expenditures

CUSTOMER CLASS	PROGRAM TYPE	2012 EXPENDITURES
COMMERCIAL & INDUSTRIAL	PRESCRIPTIVE	$367,250,152
LOW INCOME	-	$295,479,537
COMMERCIAL & INDUSTRIAL	CUSTOM	$197,624,901
RESIDENTIAL	OTHER	$193,269,516
CROSS-SECTOR	OTHER	$187,489,469
CROSS-SECTOR	MULTI-SECTOR REBATES	$169,438,446
COMMERCIAL ONLY	PRESCRIPTIVE	$162,724,868
RESIDENTIAL	CONSUMER PRODUCT REBATE/LIGHTING	$115,627,748
COMMERCIAL ONLY	CUSTOM	$85,029,670
RESIDENTIAL	WHOLE HOME/AUDITS	$73,447,607
RESIDENTIAL	WHOLE HOME/RETROFIT	$71,664,634
RESIDENTIAL	HVAC	$62,508,920
INDUSTRIAL ONLY	OTHER	$55,008,270
COMMERCIAL & INDUSTRIAL	NEW CONSTRUCTION	$53,868,178
COMMERCIAL ONLY	SMALL COMMERCIAL/CUSTOM	$48,670,461
COMMERCIAL ONLY	GOVT./NONPROFIT/MUSH	$47,943,526
RESIDENTIAL	CONSUMER PRODUCT REBATE/APPLIANCES	$47,158,260
RESIDENTIAL	APPLIANCE RECYCLING	$44,254,902
COMMERCIAL & INDUSTRIAL	OTHER	$40,459,279
RESIDENTIAL	NEW CONSTRUCTION	$36,749,160
RESIDENTIAL	BEHAVIOR/EDUCATION	$36,194,608
CROSS SECTOR	PLANNING/EVALUATION/OTHER PROGRAM SUPPORT	$36,089,632
INDUSTRIAL ONLY	CUSTOM	$30,974,855
CROSS SECTOR	MARKETING, EDUCATION, OUTREACH	$29,998,785
RESIDENTIAL	MULTIFAMILY	$28,031,231
COMMERCIAL ONLY	AUDIT	$23,111,300
COMMERCIAL ONLY	STREET LIGHTING	$19,635,491
COMMERCIAL ONLY	CUSTOM/RETROCOMMISSIONING	$16,949,294
INDUSTRIAL ONLY	CUSTOM/INDUSTRIAL PROCESSES	$11,867,512
RESIDENTIAL	WHOLE HOME/DIRECT INSTALL	$11,831,041
RESIDENTIAL	INSULATION	$9,492,318
CROSS SECTOR	CODES & STANDARDS	$7,487,428
RESIDENTIAL	CONSUMER PRODUCT REBATE/ELECTRONICS	$7,345,187
COMMERCIAL ONLY	SMALL COMMERCIAL/PRESCRIPTIVE	$6,596,786
RESIDENTIAL	FINANCING	$6,245,109
COMMERCIAL & INDUSTRIAL	AUDIT	$5,710,751
CROSS SECTOR	RESEARCH	$4,417,007
COMMERCIAL ONLY	PRESCRIPTIVE/GROCERY	$4,373,052
CROSS SECTOR	MARKET TRANSFORMATION	$3,714,050
INDUSTRIAL ONLY	PRESCRIPTIVE	$2,761,279
INDUSTRIAL ONLY	CUSTOM/AGRICULTURE	$2,714,541
COMMERCIAL ONLY	OTHER	$2,590,401
COMMERCIAL & INDUSTRIAL	SELF DIRECT	$1,476,577
COMMERCIAL ONLY	PRESCRIPTIVE/LIGHTING	$1,170,000
RESIDENTIAL	POOL PUMP	$1,074,524
CROSS SECTOR	SHADING/COOL ROOFS	$1,036,000
COMMERCIAL ONLY	PRESCRIPTIVE/HVAC	$888,864
INDUSTRIAL ONLY	PRESCRIPTIVE/MOTORS	$173,732
RESIDENTIAL	WATER HEATER	$164,627
COMMERCIAL ONLY	PRESCRIPTIVE/IT OR OFFICE	$102,304
CROSS SECTOR	VOLTAGE REDUCTION	$50,615

Figure B–2 Canadian Electric Energy Efficiency Program Level Expenditures

CUSTOMER CLASS	PROGRAM TYPE	2012 EXPENDITURES (USD)	2012 EXPENDITURES (CAD)
INDUSTRIAL ONLY	CUSTOM/INDUSTRIAL PROCESSES	$44,758,224	$44,740,321
COMMERCIAL ONLY	CUSTOM/RETROCOMMISSIONING	$32,012,633	$31,999,828
RESIDENTIAL	WHOLE HOME/DIRECT INSTALL	$13,963,511	$13,957,926
COMMERCIAL ONLY	OTHER	$12,787,692	$12,782,577
COMMERCIAL & INDUSTRIAL	OTHER	$9,003,553	$8,999,952
RESIDENTIAL	CONSUMER PRODUCT REBATE/LIGHTING	$8,603,893	$8,600,452
COMMERCIAL ONLY	STREET LIGHTING	$8,003,158	$7,999,957
COMMERCIAL ONLY	PRESCRIPTIVE/LIGHTING	$7,759,564	$7,756,460
INDUSTRIAL ONLY	OTHER	$7,684,510	$7,681,436
COMMERCIAL & INDUSTRIAL	CUSTOM	$6,702,645	$6,699,964
RESIDENTIAL	APPLIANCE RECYCLING	$5,601,857	$5,599,616
CROSS-SECTOR	MARKETING, EDUCATION, OUTREACH	$4,401,737	$4,399,976
COMMERCIAL & INDUSTRIAL	PRESCRIPTIVE	$4,101,619	$4,099,978
RESIDENTIAL	BEHAVIOR/EDUCATION	$4,001,579	$3,999,978
RESIDENTIAL	WHOLE HOME/RETROFIT	$4,001,579	$3,999,978
RESIDENTIAL	NEW CONSTRUCTION	$3,773,751	$3,772,242
LOW INCOME	-	$3,633,338	$3,631,884
CROSS-SECTOR	OTHER	$3,494,035	$3,492,637
RESIDENTIAL	OTHER	$3,291,117	$3,289,801
RESIDENTIAL	CONSUMER PRODUCT REBATE/ELECTRONICS	$3,001,184	$2,999,984
RESIDENTIAL	INSULATION	$2,033,164	$2,032,351
RESIDENTIAL	CONSUMER PRODUCT REBATE/APPLIANCES	$2,001,530	$2,000,730
INDUSTRIAL ONLY	CUSTOM	$521,214	$521,005
COMMERCIAL ONLY	PRESCRIPTIVE/HVAC	$149,175	$149,115
RESIDENTIAL	FINANCING	$124,694	$124,644
COMMERCIAL ONLY	NEW CONSTRUCTION	$115,934	$115,888
COMMERCIAL ONLY	PRESCRIPTIVE	$113,045	$113,000
COMMERCIAL ONLY	SMALL COMMERCIAL/CUSTOM	$101,040	$101,000
COMMERCIAL ONLY	CUSTOM/RETRO COMMISSIONING	$91,790	$91,753
COMMERCIAL ONLY	CUSTOM	$56,118	$56,096
COMMERCIAL ONLY	PRESCRIPTIVE/IT OR OFFICE	$5,652	$5,650
COMMERCIAL ONLY	SMALL COMMERCIAL/PRESCRIPTIVE	$168	$168

Appendix C US Electric Demand Response Program Expenditures

In 2013, CEE modified the demand response program categories to align with those used by FERC. (See Section 2.4 for more information.) FERC defines several demand response program types and groups them into two major categories:

- **Incentive programs**, which tend to involve incentives for contracting with utilities to curtail load when necessary
- **Time-based programs**, which generally employ graduated pricing schemes that incent customers to reduce load during system peaks

The southern and western US census divisions have notably large demand response expenditures compared to total DSM expenditures, 35% and 20%, respectively. In a 2009 report, [59] FERC found that the three southern census divisions and one western census division had the highest demand response potentials under a "full participation" scenario, primarily because "hotter regions with high central air-conditioning saturations…could achieve greater average per customer impacts from [direct load control] and dynamic pricing programs." Under a business as usual scenario, FERC found that regions with functioning wholesale markets—particularly the middle Atlantic (PJM) and New England (NE-ISO)—have the highest demand response potential, though their comparatively low air-conditioning load hampers cost effective deployment of connected technologies. Bloomberg New Energy Finance notes that in the SERC Reliability Corporation[60] region, which covers roughly two of the southern census divisions, "demand response potential derives from significant industrial activity, a high concentration of urban load [centers], and a hot climate" and that already in 2011, "interruptible load currently [made] up 60–70% of SERC's demand response profile."[61] These regional differences in climate and load characteristics likely explain the comparatively large demand response investment evident in the US south and west.

Nearly two-thirds of 2012 demand response program expenditures went to incentive programs, as shown in Figure C–1 below. Of those expenditures, over one-third (38%) went to direct load control programs, followed by interruptible load at 24% and emergency demand response at 16% (Figure C–2). Seven percent of demand response expenditures went to time-based programs (Figure C–3), of which over half (52%) went to peak time rebate programs, followed by real time pricing and critical peak pricing (both 7%).

59 Federal Energy Regulatory Commission. *A National Assessment of Demand Response Potential*. 2009.

60 www.serc1.org/Application/HomePageView.aspx

61 Hesser, T. G. *What's On the Horizon for US Demand Response?* Bloomberg New Energy Finance, 2011.

Figure C–1 2012 US Electric DR Expenditures: General Categorization

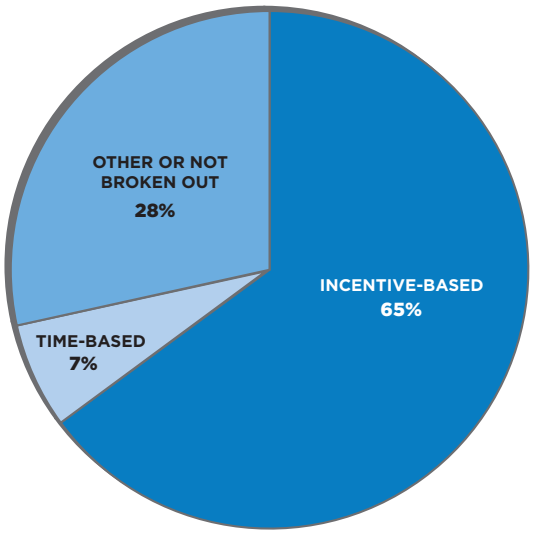


Figure C–2 2012 US Electric DR Expenditures: Incentive-Based Programs

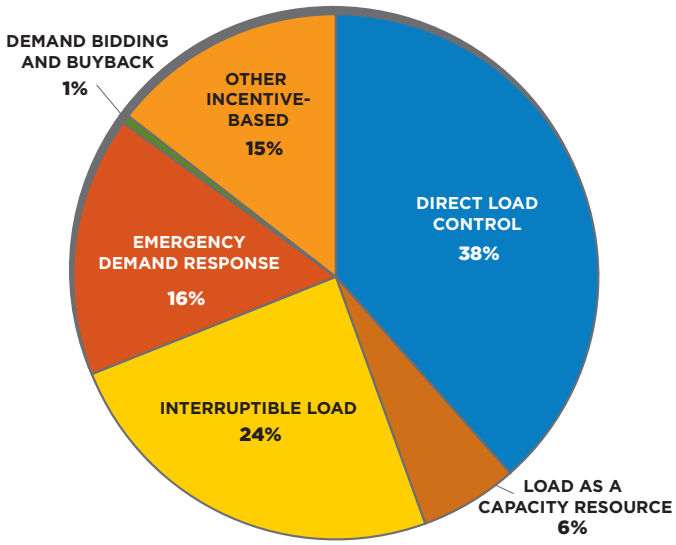
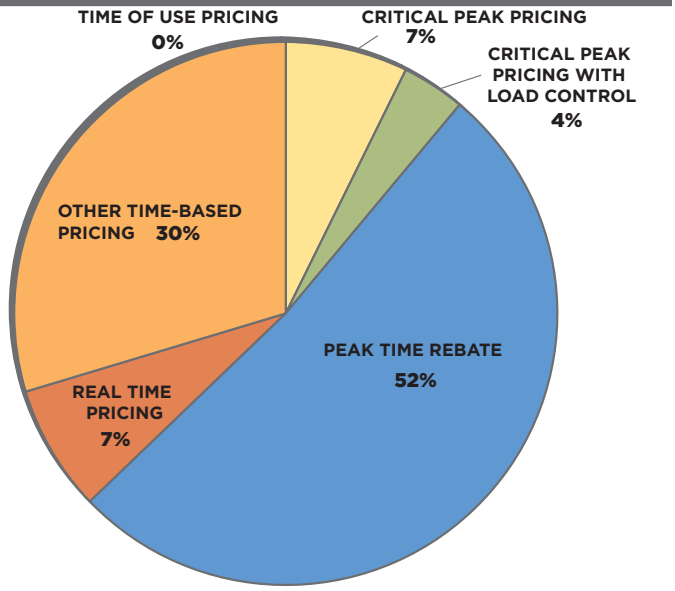


Figure C–3 2012 US Electric DR Expenditures: Time-based Programs



Consortium for Energy Efficiency
98 North Washington Street, Suite 101
Boston, MA 02114
cee1.org