CEE Annual Industry Report

# 2020 State of the Efficiency Program Industry

## BUDGETS, EXPENDITURES, AND IMPACTS

Consortium for Energy Efficiency

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## Purpose and Limitations

The purpose of this report is to provide a point in time report of US and Canadian program industry energy efficiency and demand response budgets, expenditures, and savings and an annual time series analysis. 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 annual electric and natural gas DSM program industry budgets, expenditures, and impacts at the national level and, where appropriate, by Census region, across the United States and Canada based on data collected through a vast and comprehensive survey of DSM program administrators. CEE believes that using these data in conjunction with past survey efforts portrays an accurate representation of energy efficiency program industry trends over time. The limitations of the data are disclosed below.

There are many limitations to budget, expenditures, and savings data in the DSM industry. First, this survey represents self-reported data by an individual or group of individuals within each responding organization. Although CEE and our collaborator, the American Gas Association, 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 outside of these efforts. 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 collaborator have sought greater consistency in data collection from respondents over the years, however, the accuracy of the data is ultimately dependent upon each individual respondent's interpretation of the survey questions, ability to retrieve the relevant information, and verification of the data provided. Furthermore, variation in state policies and reporting requirements along with what we suspect is inconsistent use of terminology likely adds to variation.

Additional factors that 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 drivers that shape a program administrator's portfolio.

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 encourages reviewers to inquire as to the sufficiency of the method or quality of supplemental data for the specified purpose when using this information beyond the stated limits.

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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 extensive clarification and follow-up. CEE is also grateful to members who have provided feedback and insights on this work over the years.

 

CEE appreciates our continuing collaboration with the American Gas Association (AGA), which provides natural gas industry data collected from their members for a similar research effort. CEE extends special thanks to Sapna Gheewala and Paul Pierson of the American Gas Association for their coordination on survey development and the logistics of data collection.

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# Executive Summary

This report concludes CEE's fifteenth consecutive data collection effort and annual report publication. The primary purpose of the survey and accompanying report is to capture industry budgets, expenditures, and impacts over time to enable assessment of overall industry trends. This year's report highlights 2020 budget data[1] and 2019 expenditure and impact[2] data compared to previously reported figures to assess industry growth and observe significant changes.

In 2020, the *State of the Efficiency Program Industry Report* continues to illustrate the growth of the energy efficiency industry. Analysis of the data reported by US and Canadian program administrators continues to support the recent

[1] The budget data from survey respondents were collected during the summer and fall of 2020. This report does not capture changes made after that time.
[2] "Impact data" refers to annually reported energy savings data commonly referred to as "ex ante" savings estimates. Ex ante savings are forecasted savings figures used for program and portfolio planning and reporting purposes. DSM program evaluators often review and revise ex ante savings during program or portfolio impact evaluation studies.

trend of increasing demand side management (DSM[3]) program expenditures. In 2019, combined spending on gas and electric DSM programs across the United States and Canada totaled $9.3 billion from all sources and $8.7 billion from ratepayers. Industry expenditures are up three percent compared to 2018 expenditures from all sources and represent an six percent increase over the last five years. CEE member programs accounted for almost $6.5 billion, or about 70 percent, of these expenditures. US and Canadian DSM ratepayer-funded programs are estimated to have saved approximately 31,927 GWh of electricity and almost 500 million therms of gas in 2019, which represents 26.5 million metric tons of avoided $CO_2$ emissions.[4]

Other key findings from this year's industry data collection include the following, listed in US dollars (USD):

## Binational Trends: DSM Programs in the United States and Canada

- In 2020, US and Canadian combined gas and electric DSM program budgets from ratepayer funds totaled over $9.2 billion out of the $10.2 billion budgeted from all sources. This represents a one percent increase from 2019 ratepayer funded budgets.
- In 2019, US and Canadian program administrators spent $1.03 billion from all sources—over 91 percent of which came from ratepayers—on demand response programs. This represents a six percent increase over 2018 levels.
- Natural gas program expenditures in the United States increased over 14 percent between 2018 and 2019, totaling $1.77 billion.
- The largest sources of non-ratepayer funding budgeted for 2020 US electric DSM activity included wholesale capacity market revenues (two percent) and the Regional Greenhouse Gas Initiative (one percent of total budgets). US electric and gas program administrators also cited several miscellaneous sources,[5] while Canadian electric and gas program administrators reported 100 percent ratepayer funding for DSM programs

## Gas and Electric DSM in the United States:

- US gas and electric DSM expenditures totaled $9.3 billion from all sources and over $8.7 billion from ratepayers in 2019, representing an increase of about nine percent for expenditures from all sources and for for ratepayer funding as compared to 2018. This represents an six percent increase in US DSM expenditures over the last five years.

[3] For the purposes of this report, DSM programs encompass both energy efficiency (EE) and demand response (DR) funding.
[4] Calculated using the EPA Greenhouse Gas Equivalencies Calculator, "Greenhouse Gas Equivalencies Calculator," Environmental Protection Agency, accessed April 2021, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator
[5] Miscellaneous sources of funding included state funding and shareholder funding.

- US DSM expenditures in 2019 represented nearly 0.04 percent of US GDP and 2.55 percent of value added[6] by the US utility industry.
- Ratepayer-funded programs resulted in 40,814 GWh of gross incremental electric savings and over 500 million therms of gas savings in 2019.

### Gas and Electric DSM in Canada:

- Canadian gas and electric DSM program expenditures decreased slightly in 2019 relative to 2018 in US dollars, to $712 million USD from $720 million USD in 2018, but increased slightly when considered in Canadian dollars to $950 million CAD from $933 CAD in 2018, a one percent increase.
- Canadian DSM expenditures in 2019 represented 0.06 percent of Canadian GDP (or 0.04 of Canadian GDP in USD) and 2.2 percent of value added by the Canadian utility industry.
- In 2019, ratepayer-funded DSM programs resulted in 974 GWh of gross incremental electric savings and over 118 million therms of gas savings.

This is the eleventh consecutive year of collaboration with the American Gas Association (AGA). Working with AGA has streamlined data collection efforts and helped increase participation and response rates for this survey. The 2020 report reflects data for 332 utility and nonutility program administrators[7,8] operating efficiency programs in all 50 US states, the District of Columbia, and 10 Canadian provinces. More information regarding the 2020 data collection process can be found in Section 2.

[6] The US Department of Commerce Bureau of Economic Analysis defines value added, or the GDP-by-industry as "the contribution of a private industry or government sector to overall (cont. from previous page) GDPValue added equals the difference between an industry's gross output ... and the cost of its intermediate inputs." "Frequently Asked Questions: What is industry value added?" US Department of Commerce Bureau of Economic Analysis, accessed April 2021, bea.gov/faq/index.cfm?faq_id=184.

[7] Survey respondents include electric and gas CEE members, program administrators who are members of AGA, large program administrators who are not members of either organization, and some other program administrators identified through EIA Form 861 DSM data: "Electric power sales, revenue, and energy efficiency Form EIA-861 detailed data files," US Energy Information Administration, http://www.eia.gov/electricity/data/eia861/.

# 1 Introduction

Over the past fifteen years, CEE has collected data from demand side management (DSM) program administrators in the United States and Canada to provide insight to industry stakeholders regarding overall trends for the electric and natural gas efficiency program industry. In that time, the data have shown impressive growth in industry expenditures and showcase how energy efficiency and demand response initiatives continue to result in energy savings and demand reductions. Even amidst changes in the national policies affecting the energy industry, US and Canadian DSM expenditures increased 26 percent between 2011 and 2019 when adjusted for inflation. Thus, the sustained US and Canadian investment summarized in this report supports the value of gas and electric demand side management programs as a cost-effective means of energy resource acquisition and greenhouse gas mitigation.

This report presents trends in 2019 program expenditures and savings and 2020 budgets reported by US and Canadian DSM program administrators, both electric and natural gas. A total of 332 utility and nonutility program administrators operating efficiency programs in all 50 US states, the District of Columbia, and 10 Canadian provinces are included in this year's report.[9] While this effort constitutes one of the largest and most comprehensive surveys of program administrators in the United States and Canada and extensive ongoing attention is devoted to data standardization, CEE cautions against making representations and comparisons beyond those provided in this report. As previously indicated in the Purpose and Limitations and in the Terms of Use, limitations in the comparability and consistency of the data reduce their analytical usefulness below the state or sometimes the regional level. Section 2 clarifies these limitations and outlines the reasons why use of this information at any level—state, regional, national, or binational—should not extend beyond the intended purpose stated above.

## 1.1 Report Structure

The 2020 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.

[9] CEE improved the way we track and define response rates starting with the 2014 report. See Section 2.1 for more details on this change. Then, with the 2016 report, CEE streamlined the data collection process, details of which are also provided in Section 2.1.

- 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, presents regional and national data and analysis of natural gas and electric DSM programs.
- Section 4, Evaluation, Measurement and Verification, presents analysis of program expenditures in these areas.
- 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 2020 survey and discussed throughout the report.

Appendix B contains tables with electric energy efficiency expenditures by program type for each country, grouped by program category, which are also 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.

Additional data tables that accompany this report present energy efficiency and demand response program expenditures and budgets by state and province.[10] These tables also present energy savings aggregated and reported at the regional level for the United States and the national level for Canada. CEE does not report savings data by state or province due to the risk of misinterpreting program cost-effectiveness and because of limitations associated with comparing program 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 is posted in the CEE Forum.

# 2 Data Collection and Limitations

This section provides context regarding data collection efforts, in particular participant response rates, program funding, reporting periods, program categories, and exchange rate information. This section also states the limitations of the data required to properly interpret the results of this report.

[10] These tables are available at http://www.cee1.org/annual-industry-reports.

CEE collected data during the summer and fall of 2020, in conjunction with the American Gas Association (AGA).[11, 12] CEE collected all electric program data while CEE and AGA collaborated to collect 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 has streamlined data collection and expanded the sample pool of program administrators over the years, and AGA is a major contributor to this report. AGA also publishes additional information on natural gas 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 directly for more on these publications, which are available on their website.

CEE administers this survey annually via an online survey[13] to a variety of DSM program administrators, including investor-owned utilities, nonutility program administrators, municipal power providers, and co-ops. The survey frame included previous survey respondents, all member organizations of AGA and CEE,[14] nonmembers who were expected to have significant DSM programs, and some program administrators who submitted data to the Energy Information Administration (EIA).[15] Due to the constantly changing nature of the DSM industry, it is difficult to identify and survey every program administrator. Despite this challenge, CEE has continuously worked to make its sample frame as representative of the current industry as possible.

[11] 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 73 million residential, commercial, and industrial natural gas customers in the United States, of which 95 percent—over 69 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.

[12] CEE began collaborating with AGA in 2009 to increase the report's coverage of natural gas programs.

[13] 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.

[14] 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 www.cee1.org/content/members.

[15] 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 48 million Americans. For more information about APPA or its members, please visit www.publicpower.org.

## 2.1 Response Rates

Data for this report come from a voluntary survey administered 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, year–to-year changes 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 provided information in both 2019 and 2020, 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 has 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 have allowed CEE to uncover unreported information for program administrators who we expected to have significant DSM budgets, expenditures, or savings.

In 2020, this report reflects data from 330 utility and nonutility program administrators operating DSM programs in 50 US states, the District of Columbia, and 10 Canadian provinces. These figures include those organizations accounted for using the streamlined analysis described in the next section. In total, the data collected this year represents 13 more organizations than in 2019. As in the past, CEE concludes that this report represents the vast majority of large efficiency program administrators and that the data provided below sufficiently represent the DSM industry in 2019 and 2020.

## 2.2 2016 Data Collection Methodology Change

In 2016, in an effort to streamline the survey process and reduce the survey burden on respondents, CEE staff prioritized outreach to those electric program administrators that represent the majority of industry expenditures. For numerous smaller or historically unresponsive program administrators, information from the Energy Information Administration (EIA)[16] or responses provided in a previous survey year[17], adjusting for exchange rates and

[16] Data from the 2016 EIA Form 861 collection effort are available at "Electric power sales, revenue, and energy efficiency Form EIA-861 detailed data files," US Energy Information Administration, http://www.eia.gov/electricity/data/eia861/.

[17] Similar to past years, CEE carried over information from the previous year for a couple of large program administrators that did not respond in 2020, so as to estimate program activity rather than allow totals for these administrators to fall to zero. In 2020, data from 11 program adminsitrators was carried over from 2019 and adjusted by the average rate of change in received responses from 2019 to 2020 to account for general industry trends.

inflation, as appropriate, were incorporated. The organizations for which CEE substituted EIA information or for which CEE carried through information collectively represented less than five percent of total US and Canadian electric DSM expenditures in 2019. As a result, we conclude this process did not impact the US and Canadian natural gas results.

## 2.3 Funding Sources

In previous survey years, CEE asked respondents to provide 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 budget and expenditure figures using specifically defined categories that included both ratepayer and nonratepayer sources. In 2014, CEE and AGA also began asking gas survey respondents to report additional funding from nonratepayer sources.[18] These changes were intended 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 and identify the relative magnitude of funding from sources other than ratepayers.

CEE defines ratepayer funds as dollars secured through special regulator-approved benefit or on-bill tariff charges that are universally collected as supplemental charges to energy bills.[19] CEE defines nonratepayer funds as funds received from sources such as wholesale capacity market revenues, the Regional Greenhouse Gas Initiative (RGGI) proceeds, and dollars specifically allocated to weatherization assistance programs. As of 2015, CEE no longer asks respondents to report funds dispersed from the American Recovery and Reinvestment Act (ARRA), as no ARRA funds were reported in 2014 and we do not believe any significant sources of these funds exist at this point.

In this report, we disclose total figures that represent all funding sources in charts and graphs depicting historical trends. Where appropriate, the text specifically notes the percentage of 2020 budgets and 2019 expenditures and savings attributable to ratepayer funds only.

[18] Only natural gas program expenditures and savings derived from ratepayer dollars are identified in this report. In all, gas program administrators reported that 99.8 percent of expenditures in 2019 were made using ratepayer funding. One hundred percent of natural gas savings reported to CEE and AGA were presumably derived from ratepayer funding. Section 3.2, below, addresses nonratepayer sources of funding in 2020 budgets.

[19] More specifically, CEE clarified starting in the 2018 survey that ratepayer funds include "funds derived from system benefit charges, bill surcharges, utility revenues, budget carryover, and transfers from other program administrators that derive funds from any of the above."

## 2.4 Reporting Period

CEE asked respondents to provide data representing total program budgets for 2020 and total program expenditures and savings for 2019 that aligned with calendar years. CEE defined the budget year for this survey effort as beginning on January 1, 2020 and ending on December 31, 2020. Similarly, CEE defined the "expenditure and savings year" for this survey effort as beginning on January 1, 2019 and ending on December 31, 2019.

In some cases, respondents indicated that their organization 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. Therefore, please note that some portion of the 2020 industry budget figures and some portion of the 2019 expenditures and savings figures may include data that fall outside of the January 1 to December 31 reporting cycle. Any year identified in this report should be taken to mean the associated program year for all program administrators.

## 2.5 Reporting Categories

This publication groups data into customer classes, as in previous years. Electric customer classes in 2020 include residential, low income where separable from residential, commercial, industrial, commercial and industrial (C&I) where commercial and industrial were not separately reported or distinguishable, cross sector, and demand response. Since 2013, the category of evaluation, measurement and verification (EM&V) used in previous reports is included as part of the cross-sector class, which covers activities that span multiple customer classes. Customer classes in the gas data include residential, low income where separable from residential, multifamily where separable from residential and commercial, commercial, industrial, C&I where commercial and industrial were not separately reported or distinguishable, and other.

In 2013, CEE introduced more granular categories within each electric customer class. The categories used in 2013 were adapted, with a few minor changes, from a typology developed through another national research effort.[20] CEE has incorporated questions into the survey that ask respondents to report budgets, expenditures, and impact data by program type if possible.[21] In 2020, as in the six previous survey years, CEE also allowed respondents to provide rough percentage breakdowns of their budgets,

[20] Hoffman, Ian M., 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, http://emp.lbl.gov/sites/all/files/lbnl-6370e.pdf.
[21] CEE has incorporated program level questions for the electric survey only. CEE will continue work with our members and with AGA in the future to determine whether this approach is feasible for the gas program administrators surveyed.

expenditures, and impacts by program category, even if they could not provide exact dollar or MWh figures for programs. These changes aim to provide more specific information regarding the types of electric programs administered in the United States and Canada and allow for a more nuanced understanding of program offerings moving forward. See Electric Energy Efficiency Program Categoriesfor a list of the program categories used in 2020, which are consistent with the categories used in the previous four years.

As in past years, CEE based demand response program categories on those specified and defined by the US Federal Energy Regulatory Commission (FERC).[22] FERC defines several demand response program types and groups them into two major categories: "incentive-based programs," which tend to involve customer contracts with utilities to curtail load when necessary, and "time-based programs," which generally employ graduated pricing schemes that motivate customers to reduce load during system peaks.

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

The “not broken out” category includes respondent data not further divided into customer classes. These 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.

## 2.6 Other Data Limitations

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

With regard to budgets, considerable room exists for reporting error, and such errors are not always apparent. "Cycle budgets" provide a prime example and are discussed in more detail in Section 3.3. Annual budgets in this report also present limitations, as they illustrate a snapshot from within the data collection period, whereas expenditures and savings from the previous year have often been finalized by the time the survey is fielded.

The data in this publication do not reflect changes to program budgets after the fall of 2020, such as those due to newly approved programs or budget

[22] CEE sourced demand response terminology from the "2012 Assessment of Demand Response and Advanced Metering: Staff Report," Federal Energy Regulatory Commission, https://www.ferc.gov/legal/staff-reports/12-20-12-demand-response.pdf, December 2012.

cuts. In addition, carryover of unspent funds from 2019 could result in double counting. In light of the caveats outlined above surrounding annual budgets, this report follows previous ones and focuses on expenditures rather than budgets as the best indicator of energy efficiency program industry investment.

Finally, several issues limit the comparability of data—in particular the savings data—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; differences in accounting practices among program administrators; variations in formulas used to estimate gross and net program savings; and differences in the focus or goals of programs, which often affect the tracking and reporting of different performance data.

Each regulatory jurisdiction provides specific policies for program administrators in that jurisdiction, which can lead 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.

## 2.7 Currency Conversions and Corrections for Inflation

For ease of reading, all currency is reported in nominal US dollars (USD) unless otherwise specified. Where used, Canadian dollars (CAD) are also nominal unless otherwise specified. Real US dollars were calculated using the Bureau of Labor Statistics CPI Inflation Calculator,[23] and real Canadian dollars were calculated using the Bank of Canada CPI Inflation Calculator.[24] This report uses an average annual exchange rate of 0.7491 USD = 1 CAD for the 2019 expenditure and savings information (an average of the daily Federal Reserve[25] exchange rate for January 1, 2019 – December 31, 2019) and an average annual exchange rate of 0.7319 USD = 1 CAD for the 2020 budget

[23] "CPI Inflation Calculator," Bureau of Labor Statistics, accessed April, 30, 2021, http://www.bls.gov/data/inflation_calculator.htm.
[24] "Inflation Calculator," Bank of Canada, accessed April, 30, 2021, http://www.bankofcanada.ca/rates/related/inflation-calculator/.
[25] "Canada– Spot Exchange Rate, Canadian $/US$," last modified April, 30, 2021, http://www.federalreserve.gov/releases/h10/Hist/.

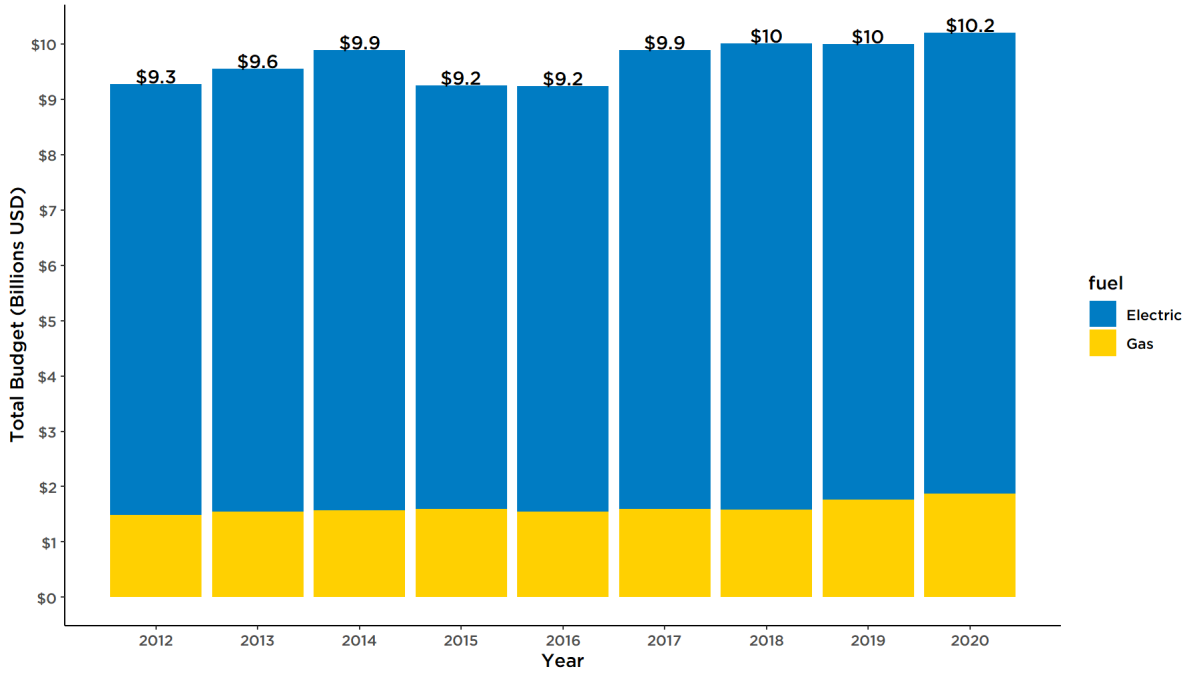
information (an average of the daily Federal Reserve exchange rate computed through June 2020).

# 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 $10.2 billion in 2020, representing an inrease of two percent over 2019 (Figure 1).[26] This trend is inline with progress over the last two years, where year-over-year percent change was in the zero to two percent range. In nominal dollars, 2020 program budgets increased by 0.01 percent over 2019

Figure 1. **US and Canadian DSM Program Budgets—Gas and Electric Combined 2011–2020**




Budgets derived exclusively from ratepayer funds accounted for 90 percent, around $9.1 billion, of the total 2020 budget figure. Figure 1 does not isolate demand response budgets, though in 2020 they represent approximately 10 percent of both the total DSM budgets from all sources, about $1.03 billion.

[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.

From 2012 to 2015, the percentage of both the total and ratepayer funded DSM budget figures allocated to demand response programs steadily decreased, dropping from 14 percent to 10 percent. That percentage has remained essentially stable from 2015 to 2020.

## 3.2 Funding Sources

In 2020, ratepayer dollars constituted 93.0 percent of funding for electric DSM programs in the United States. Remaining sources of funding included the wholesale capacity markets (two percent), the Regional Greenhouse Gas Initiative (one percent) and unidentified sources (four percent). Regional Greenhouse Gas Initiative (RGGI) funding constituted three percent of the total funding reported in the northeast region.

In 2020, ratepayer dollars constituted 100 percent of funding for natural gas energy efficiency programs in the United States.

In 2020, 100 percent percent of Canadian funding for both electric and natural gas DSM programs came from ratepayer funding.

## 3.3 Continued Program Funding

Since 2013, CEE has asked program administrators to report multiyear budgets, referred to in the survey and this report as "cycle budgets," that provide a glimpse into funding that has been set aside for DSM programs over the next several years. This is primarily a quality assurance procedure in that it allows CEE to verify that budgets for individual program years are not arbitrarily overreported and to estimate single-year budgets when program administrators do not allocate funds on an annual basis. In addition, because DSM activity may ramp up at the beginning of a cycle and down at the end of a cycle, this information explains—and anticipates—certain trends.

Roughly 47 percent of cycle budgets reported in this year's survey extend past the end of 2021—30 percent end in 2020, ten percent in 2021. Although procurement plans for supply-side energy resources may extend several decades into the future, this signifies that multiyear planning is also integral to DSM activity. Furthermore, in some areas, such as the Pacific Northwest and more recently California, DSM is already anticipated in resource plans spanning a decade or more.

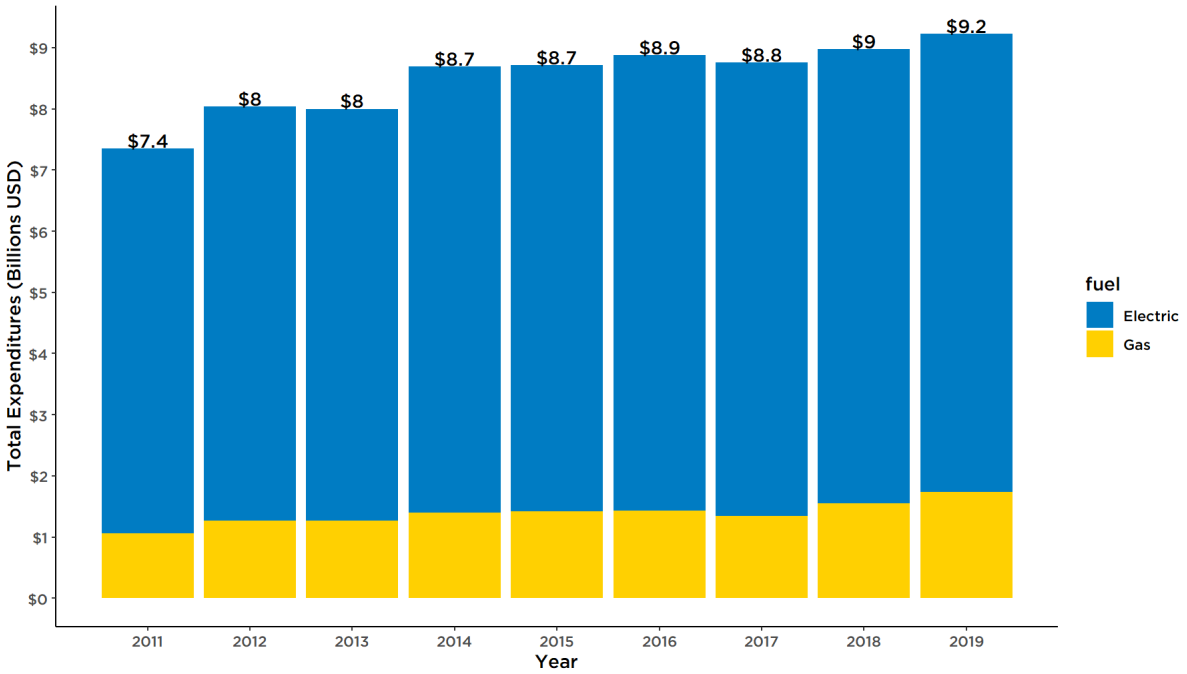
## 3.4 Combined DSM Expenditures in the United States and Canada

DSM expenditures of US and Canadian program administrators incorporated in this year's survey totaled over $9.2 billion USD in 2019 (a three percent increase over 2018), including $8.7 billion in expenditures from ratepayer funds, an increase of about eight percent compared to 2018. The real difference between 2018 and 2019 is similar, with total DSM expenditures increasing about five percent from all sources when inflation is taken into

account. Figure 2 below illustrates the historic trend of combined US and Canadian DSM expenditures over the years.

Figure 2. **US and Canadian DSM Program Expenditures—Gas and Electric Combined 2010–2018**




Although not isolated in Figure 2, demand response expenditures represent 10 percent of total expenditures in 2018 independent of funding source. This is roughly the same proportion of total DSM expenditures spent on demand response in 2018, which was also around 10 percent, though still less than the proportion spent on demand response from 2011 to 2013, when demand response accounted for between 13 and 14 percent of total DSM program expenditures.

CEE has previously noted that increases in the number of survey respondents year after year could explain some of the historical growth in budgets, expenditures, and savings.[27] As explained in Section 2.1, Response Rates, despite our best efforts, Figure 2 does not depict expenditures year after year from the exact same pool of survey respondents.[28] However, the streamlined

[27] Please note that as the CEE survey panel now contains most large program administrators in the United States, and most of the larger program administrators in Canada. For the 2021 survey effort, CEE reexamined the Canadian panel and was able to improve the representativeness of the data but securing information for additional program administrators. CEE believes that since 2012, the United States panel of survey respondents targeted each year for data is representative of DSM industry at large.

survey process described in Section 2.1, whereby electric responses from 2016to the present were supplemented with other information sources, in part resulted in an exceptionally similar pool of electric program administrators between those survey years.

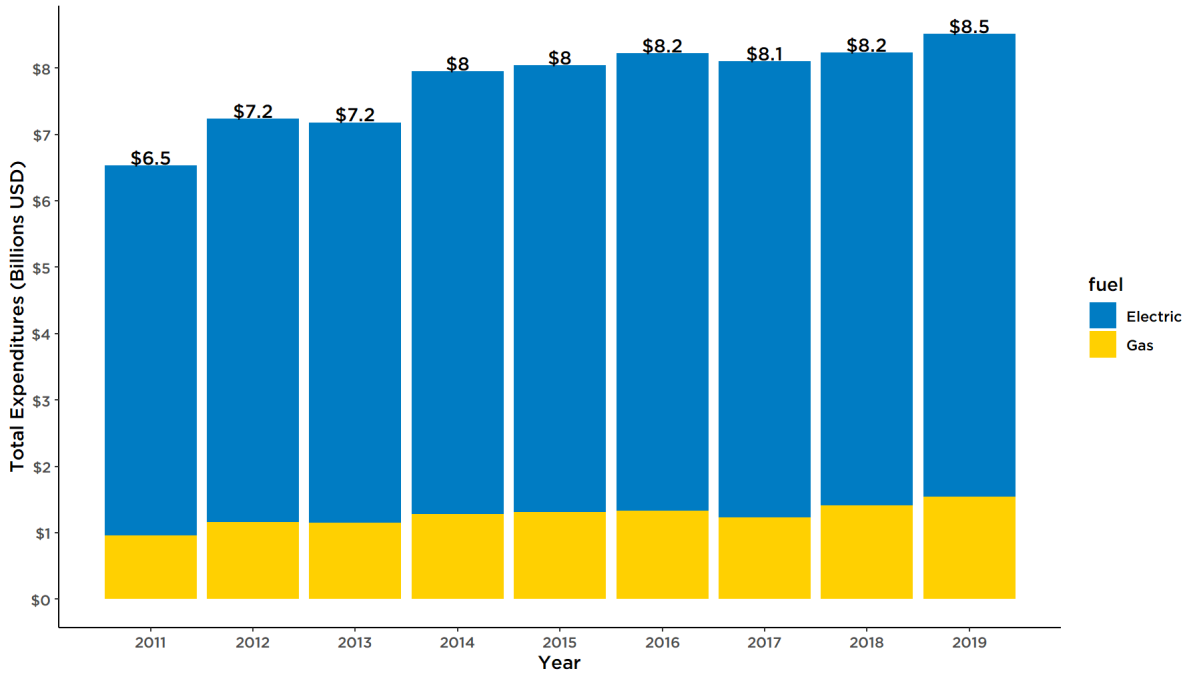
## 3.5 United States DSM Trends

US administrators spent nearly $8.5 billion[29] from all sources for gas and electric DSM programs in 2018, as illustrated in 0. This total includes both energy efficiency and demand response.

[29] $8.0 billion of these expenditures were derived solely from ratepayers, an approximate nine percent increase from 2018 in nominal dollars, or an eleven percent increase when adjusted for inflation. Comparing to 2016, the proportion of expenditures from ratepayers increased around eight percent to 2019 in nominal dollars, or five percent when adjusted for inflation.

Figure 3. **US DSM Expenditures—Gas and Electric Combined 2010–2018**




2019 gas and electric DSM expenditures in the United States increased three percent over 2018 expenditures in nominal dollars, a five percent increase when adjusted for inflation. Over the past five years, US inflation-adjusted DSM expenditures have increased almost 15 percent. The $8.5 billion spent by US DSM program administrators represents 0.04 percent of 2019 US gross domestic product and 2.54 percent of the value added by the US utility industry to gross domestic product in 2019.[30]

In 2020, natural gas and electric DSM program administrators in the United States budgeted nearly $9.5 billion from all sources, an increaseof one percent relative to 2019

### 3.5.1 United States Electric DSM Trends

In 2019, US program administrators spent over $7.0 billion on electric DSM programs, a four percent increase compared to 2018 expenditures, or five percent when accounting for inflation.[31,32] Figure 4 below presents the

[30] Comparisons in this paragraph are based on data from the US Department of Commerce Bureau of Economic Analysis: https://www.bea.gov/iTable/index_industry_gdpIndy.cfm, Most recent update: April, 2021.
[31] In 2019, $6.7 billion of the total expenditures were derived solely from ratepayer funds. When adjusted for inflation, this represents an increase of five percent compared to the proportion of expenditures from ratepayers in 2018. In 2017, 90.6 percent of expenditures came from ratepayer funds, and in 2018, 87.3 percent of expenditures were derived from ratepayer funds.
[32]Inflation adjusted figures were based on the "CPI Inflation Calculator," Bureau of Labor Statistics, accessed May 2021, https://www.bls.gov/data/inflation_calculator.htm.

breakdown of US electric expenditures from 2010 to 2019 by customer class, which represents the sum of either program level data rolled up to customer classes or customer class data provided directly by respondents. "Not broken out"[33] contains data that program administrators could not allocate to a specific program or customer class.

Figure 4. **US Electric DSM Expenditures 2010-2019**

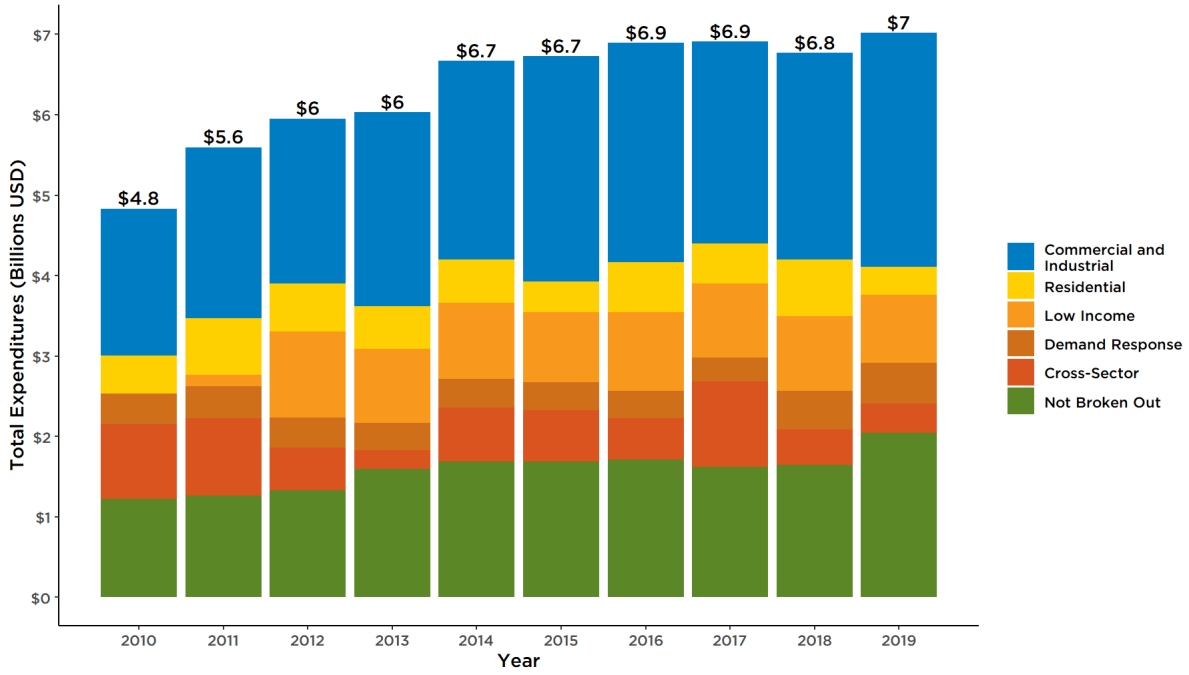
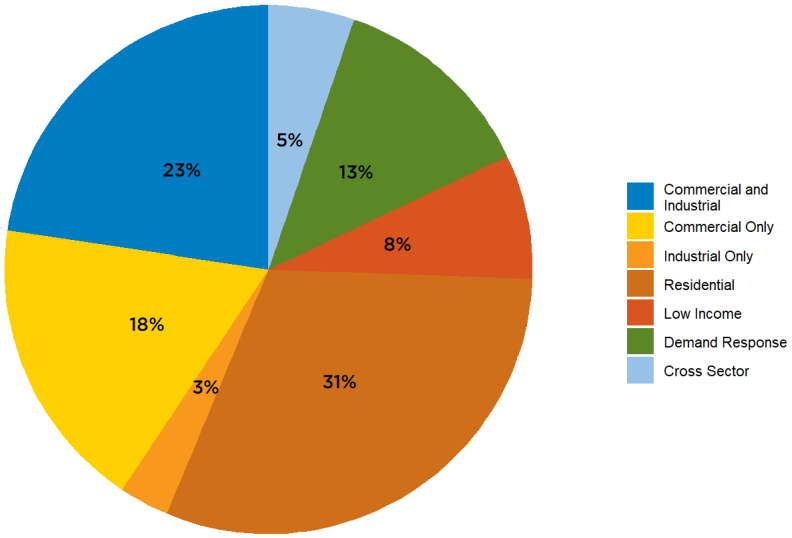



Figure 5 provides a more granular breakdown of 2019 US electric expenditures from all sources by customer class, with the “not broken out” class removed and with commercial and industrial spending separated into commercial, industrial, and C&I classes. Continuing the trend from previous years, the data illustrate that commercial and industrial efficiency programs received the largest share of electric program funding in the United States, comprising 44 percent of 2019 US electric DSM expenditures, a slight decrease in comparison to the 40 percent of 2018 US electric DSM expenditures these sectors constituted. The residential sector received the second largest share of 2019 DSM electric expenditures, 31 percent, an increase of about five percent compared with 2018. Demand response maintained a sizable portion of expenditures at 13 percent, a decrease of about one percent compared with 2017 and 2018 when demand response constituted 16 and 15 percent of total expenditures, respectivly. The remainder of spending was made up of cross sector, at five percent, and low income programs, eight percent.

Figure 5. **2019 US Electric DSM Expenditures by Customer Class**

[33] 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.




CEE also collected information on expenditure (cost) categories for electric energy efficiency programs, as depicted in 0.

Figure 6. **2019 US Electric Energy Efficiency Expenditures by Category**

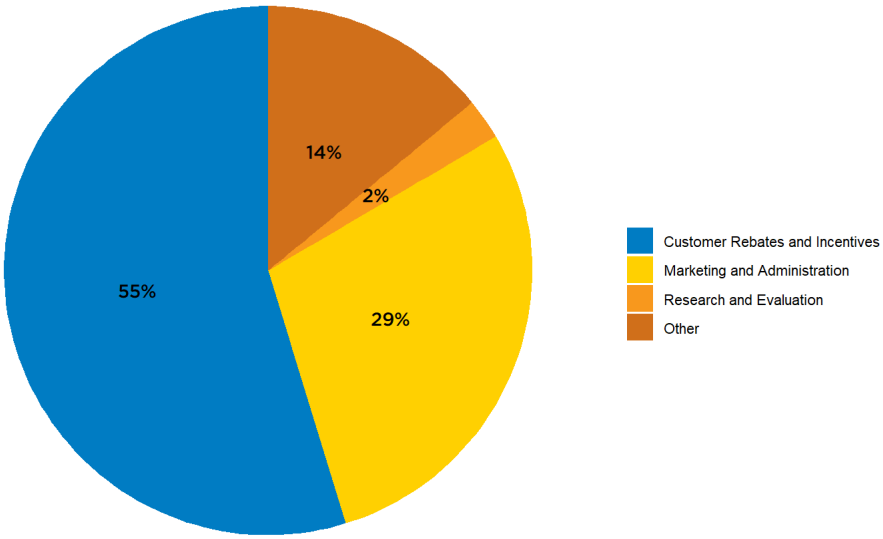



Figure 6 provides an overview of how US program administrators currently allocate electric energy efficiency program expenses, regardless of the targeted customer class. As in the past five years, customer rebate and incentive costs, sometimes classified as direct program costs, represented the largest share of US electric energy efficiency expenditures in 2019 . The "other" category contains all funds that US program administrators could not separate into one of the other three categories. Marketing and administration costs—often referred to as indirect program costs—represented 29 percent of 2019 energy efficiency program expenditures in the United States, a five percent increase in proportion relative to 2018.

### 3.5.2 United States Program Level Electric DSM Expenditures

Since 2013, CEE has incorporated questions into the US electric survey that ask respondents to report budgets, expenditures, and impact data at the program level when possible[34] (please refer to Section 2.5 for more details on program types). By collecting electric expenditures by program category, CEE intends to track and provide information to help better understand changes or trends in program offerings.

The data in this report represent 213 US electric program administrators, 102 of which provided energy efficiency or demand response expenditures directly in the survey for the program types listed. When data reported for

[34] Only electric respondents were asked to break their program expenditures down by the provided program typology. CEE will continue to work with members and with AGA in the future to determine whether this approach is feasible for the gas program administrators surveyed.

these program types are aggregated by customer class, they indicate an expenditure breakdown similar to that in Figure 5, which represents all 2019 expenditure data reported in the 2020 survey and includes expenditures from the remaining electric DSM program administrators that did not break out their information at the program level. Therefore, we conclude that the programmatic energy efficiency data we obtained in 2020 are representative of overall US electric expenditure trends.

Figure 7 lists the most common energy efficiency program types in terms of expenditures; these programs represent just over  percent of all the programmatic energy efficiency expenditures reported by respondents. Demand response program expenditures are not listed in this report but are discussed in general in Electric Demand Response Program Expenditures.

Figure 7. **Most Common US Electric Energy Efficiency Program Types by 2019 Expenditures**

| Customer Class | Program Type | 2019 Expenditures |
|---|---|---|
| **Residential** | Other | $512,340,948 |
| **Low Income** | - | $505,899,670 |
| **Commercial & Industrial** | Custom | $424,293,642 |
| **Commercial & Industrial** | Mixed Offerings | $362,467,529 |
| **Commercial** | Other | $304,421,943 |
| **Commercial & Industrial** | Prescriptive | $292,482,716 |
| **Commercial** | Other | $244,543,407 |
| **Residential** | Consumer Product Rebate – Lighting | $227,948,118 |
| **Commercial** | Prescriptive Lighting | $173,369,745 |
| **Residential** | Consumer Product Rebate – Appliances | $117,677,480 |

Unlike the previous five years where Commercial and Industrial Mixed Offerings program remain the most commonly funded program types, Figure 7 shows thatspending on low-income programs has taken over the top spot in terms of total spending. Commercial and Industrial Mixed Offerings Programs still represent a significant portion of total expenditures, as well as Prescriptive and Custom programs in the same class. For a full disclosure of the US electric energy efficiency program expenditures provided by survey respondents, please refer to List of US and Canadian Electric Energy Efficiency Program Category Expenditures.

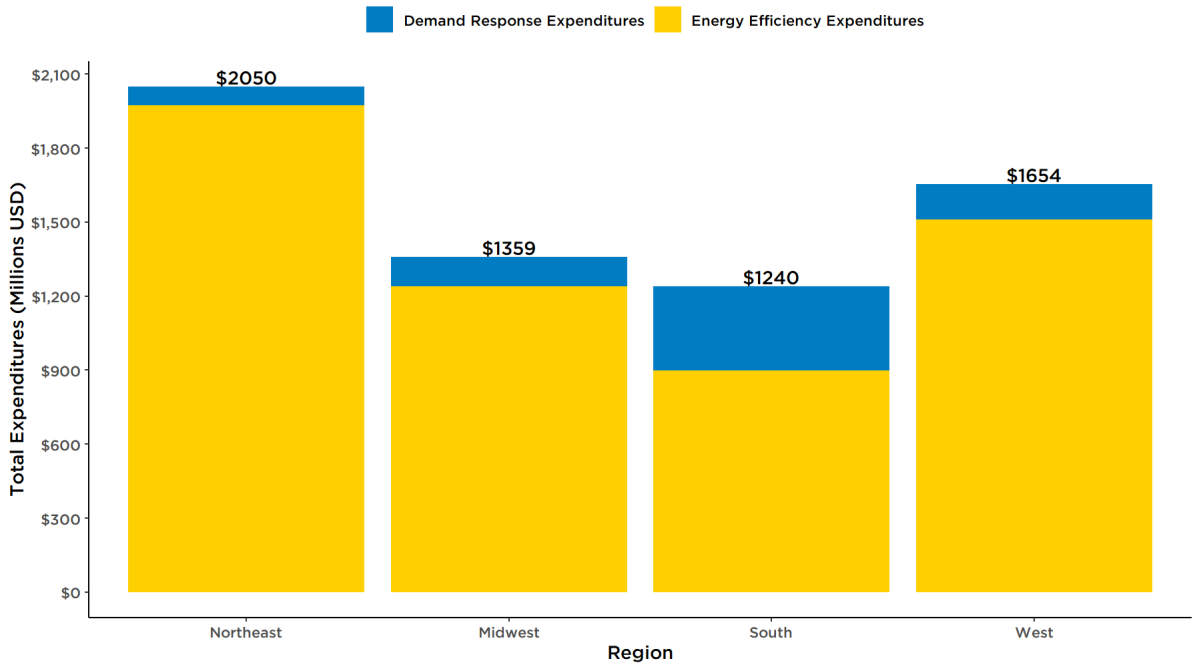
### 3.5.3 United States Electric Demand Response Expenditures

Consistent with 2017, approximately 51 percent of electric program administrators who reported 2018 energy efficiency program expenditures also provided demand response expenditures, which again suggests that the majority of US electric survey respondents administer both energy efficiency and demand response programs. Demand response expenditures represent

15 percent of US electric DSM expenditures in 2018 (see Figure 5), about the same percentage as in 2016 and 2017 (less by one percent). Demand response expenditures increased by eight percent compared to 2017 in nominal dollars, ten percent when accounting for inflation.

Figure 8 below provides a regional snapshot of DSM expenditures in the United States in 2018, separated into energy efficiency and demand response.

Figure 8. **US Electric Energy Efficiency and Demand Response Expenditures by Region, 2019**




Consistent with previous years, the South and West continue to lead in demand response expenditures. Data indicate that the South represents the highest proportion of demand response expenditures in 2019 (28 percent), followed by the West (nine percent), Midwest (nine percent) and Northeast (four percent). This regional breakdown is similar to 2017 and 2018 in rank order, but the proportion of the total coming from demand response programs is overall less. The Northeast (29 percent decrease, from $99 million to $77 million), South (52 decrease decrease, from $521 million to $342 million), Midwest (11 percent decrease, from $132 million to $119 million), and South (three percent decrease, from $149 million to $145 million) saw decreases in overall demand response spending from 2018 to 2019.

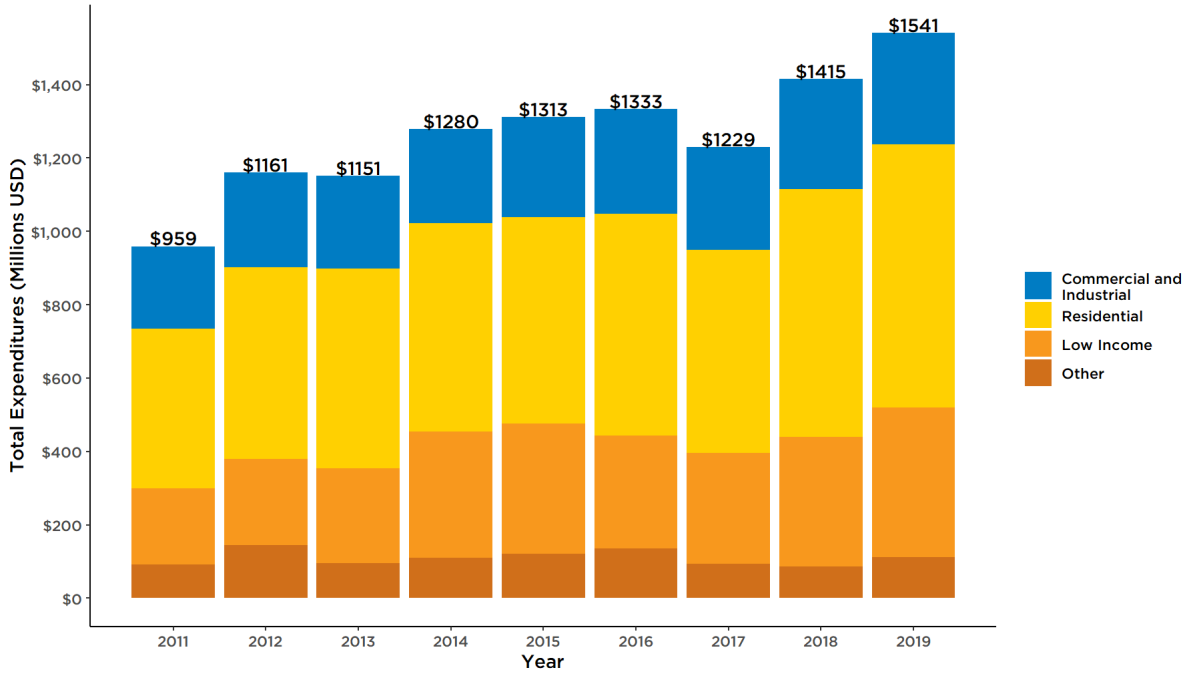
In 2013, CEE modified the demand response program categories to align with those used by FERC. (See Section 2.4 for more information.) FERC defines several demand response program types and groups them into two major categories: "incentive-based" programs and "time-based" programs. Electric Demand Response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

### 3.5.4 United States Natural Gas Trends

This section discusses natural gas energy efficiency program expenditures in the United States.[35] 0 shows that gas program expenditures for energy efficiency programs in the United States increased nine percent between 2018 and 2019. US gas program administrators spent $1.541 billion on natural gas efficiency programs in 2019, an eleven percent increase compared to 2018 after accounting for inflation. This represents a 30 percent increase over 2014 when adjusted for inflation.

[35] Please note that natural gas programs are only energy efficiency programs. Natural gas demand response programs have only reached the pilot stage in a select number of cases within the industry and these efforts are not captured in this report.

Figure 9. **US Natural Gas Expenditures 2011-2019**



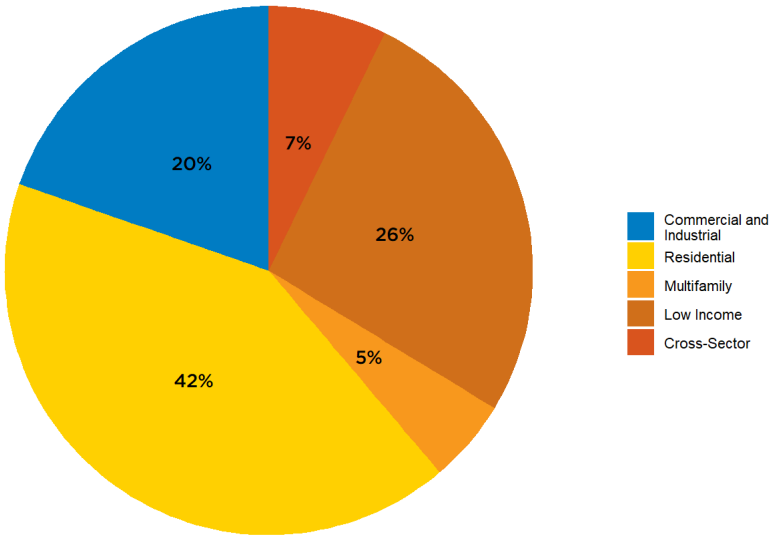

0 presents the magnitude of expenditures from 2011 to 2019 by customer class.[36] The customer class breakdown of 2019 natural gas expenditures is similar to that of 2018 expenditures for most categories.

0 provides a more granular breakdown of 2019 US gas expenditure by customer class. For ease of comparison with previous reports and with a concurrent report by AGA, we did not break commercial and industrial into separate classes in Figures 9 and 10, but multifamily expenditures are separated from residential expenditures in 0. Residential programs continue to represent the largest share of expenditures in 2019 at 42 percent, a decrease of one percent as compared to 2018. Low income and C&I programs follow, accounting for 26 percent and 20 percent of expenditures respectively. Cross-sector expenditures represented seven percent and multifamily expenditures five percent of total expenditures.

[36] For ease of year-to-year comparison, note that 0 combines the commercial and industrial customer classes into one commercial and industrial category, as well as the residential and multifamily customer classes into one residential category, for 2011 through 2019.

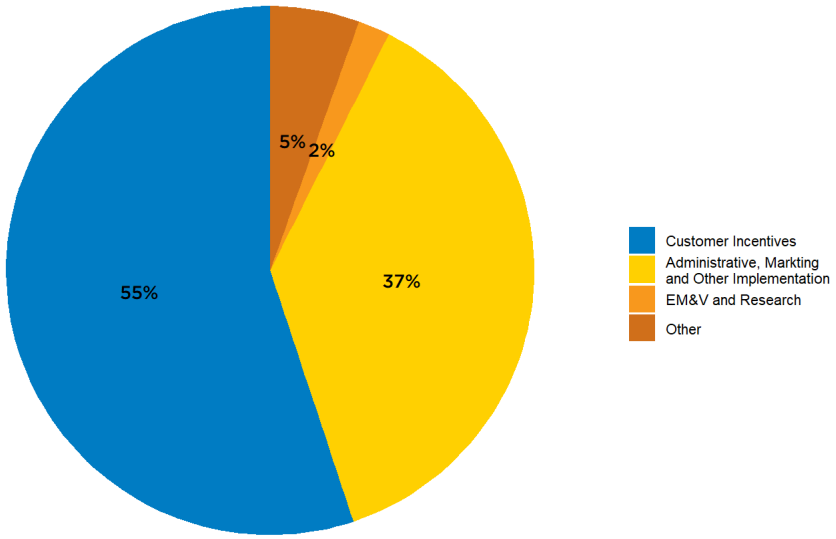
Figure 10. **2019 US Natural Gas Expenditures by Customer Class**




0 separates 2019 gas expenditures in the United States into expenditure categories, which are slightly different from the categories used for US electric programs.[37]

[37] The electric and gas surveys request this information in ways that are similar, though not identical.

Figure 11. **2019 US Natural Gas Expenditures by Category**




As in 2017 and 2018, customer incentives represented around half of expenditures in 2018 (55 percent) followed by administrative, marketing, and other implementation spending (37 percent). Research, evaluation, measurement, and verification accounted for five percent of the spending, while "other" expenditures accounted for two percent of spending. The "other" category contains all funds that could not be separated into the three specific categories; the proportion of funds identified as “Other” were unusually high in 2018 (24 percent), and the 2019 data showed a return to the proportion of expenditures recorded in the2017 report.

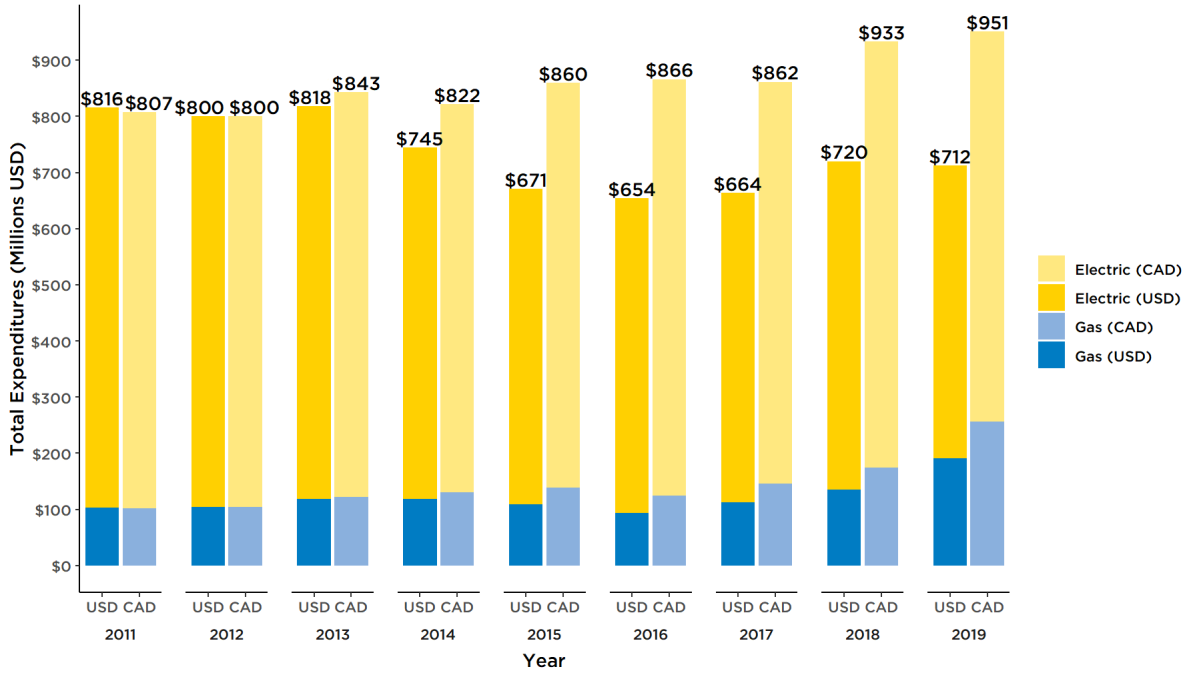
## 3.6 Canadian DSM Trends

In 2019, Canadian DSM expenditures reached $712 million USD, or $951 million CAD. This represents a slight decrease in overall spending of roughly one percent in USD, or an increase of about one-half of a percent when adjusted for inflation; when considered in CAD, expenditures increased about two percent between 2018 and 2019. Figure 12 below presents Canadian DSM expenditures—including both energy efficiency and demand response programs—from 2011 to 2019 in nominal US and Canadian dollars. Overall, Figure 12 illustrates stable investment by Canadian gas and electric DSM program administrators over the last five years.[38]

[38] This year CEE and AGA attempted to exand the panel of Canadian program adminsitrators represented in our dataset and successfully added several additional administrators that have previously not been captured. In these several cases we received data for 2019 expenditures and 2020 budgets as well as information for one or more back years. This report includes all previously unreported data where possible.

Figure 12. **Canadian DSM Expenditures—Gas and Electric Combined (2011–2019)**




The $951 million CAD spent by Canadian DSM program administrators represents 0.06 percent of 2019 Canadian Gross Domestic Product and two percent of value added by the Canadian utility industry in 2019.[39]

In 2020, reporting natural gas and electric DSM program administrators in Canada budgeted nearly $725 million, or roughly $968 million CAD, to energy efficiency and demand response programs.This represents an 15 percent increase over 2019 DSM budgets in inflation-adjusted USD.

### 3.6.1 Canadian Electric DSM Trends

CEE reports electric DSM trends by customer class and, as discussed in previous sections, asks survey respondents to report budgets, expenditures, and impact data at the program level when possible.[40] Respondents who were able to provide these data were asked to select a specific program type for each program (see Section 2.4 and Electric Energy Efficiency Program

[39] Comparisons in this paragraph are based on data from Statistics Canada: Statistics Canada. *Table 379-0031 Gross Domestic Product (GDP) at basic prices, by North American Industry Classification System (NAICS), Monthly* (table). CANSIM (database). Last updated April 20, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3610043401#timeframe. (accessed April 20, 2021).

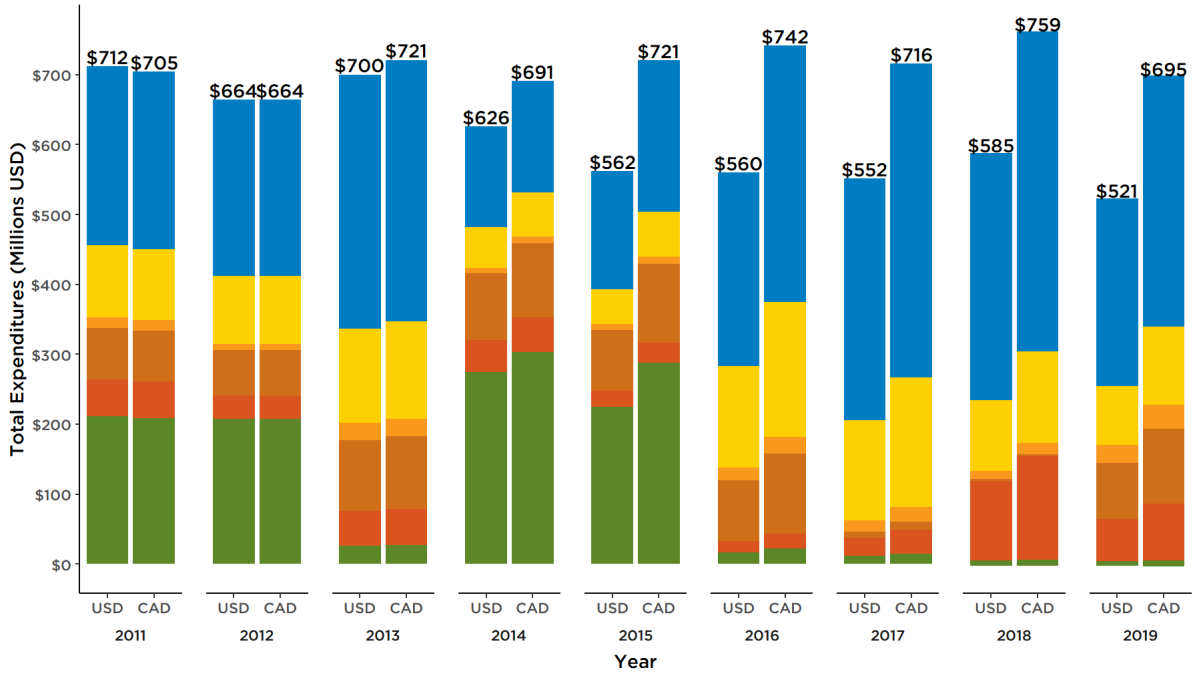
[40] Only electric respondents were asked to break their program expenditures down by the provided program typology. CEE will continue to work with members and with AGA in the future to determine whether this approach is feasible for the gas program administrators surveyed.

Categories for more information); CEE then aggregates these data in order to report figures for customer class comparisons.

Canadian electric DSM expenditures totaled nearly $521 million USD ($695 million CAD) in 2019, as shown in 0[41] below.

[41] 0 combines the 2019 customer classes of commercial, industrial, and C&I into the "commercial and industrial" category. Where possible, these categories are separated out in Figure 14.

Figure 13. **Canadian Electric DSM Expenditures 2010-2019**




The $695 million CAD spent on electric DSM programs in Canada in 2019 represent an eight percent decrease from 2019 expenditures, also a ten percent decrease when adjusting for inflation. 2019 shows a consistent trend in sector level trends with the exception of demand response. Demand response expenditures returned to proportions similar to 2016, reversing the significant decrease in reported DR expenditures in 2017 and 2018. This change was attributed to two large program administrators who reported a significant increase in their demand response spending in 2019 as compared to 2017 and 2018..

In 2011, CEE added the "not broken out" class to capture any expenditures program administrators could not allocate to individual customer classes,[42] which in some cases includes overall portfolio activities such as EM&V or administration and marketing. Expenditures for 2014, and 2015 allocated to the “not broken out” category were high due to at least one large program administrator not responding in those survey years. In these cases, CEE carried through the previous years’ total expenditures as to develop a “straight line” estimate instead of letting their expenditures drop to zero. The prior expenditures for such program administrators were carried into the respective survey year’s data as an estimate in the "not broken out" category. However, in 2017 through 2019this program administrator was able to

[42] See Section 2.4 above for more detail about the collection and differentiation of budgets, expenditures, and savings in the 2019 survey.

respond to the survey, showing a significant reduction in expenditures reported as “not broken out” and allocated other sector-level categories.

Figure 14 below depicts 2019 Canadian electric DSM expenditures on a more granular level, broken out by customer class and excluding the "not broken out" category. Commercial and Industrial expenditures continue to constitute the largest proportion of spending in Canada in 2019 at about 40 percent. Residential represents the second highest proportion of total Canadian electric DSM spending at 30 percent and increase from the three percent observed in 2018.

Figure 14. **2019 Canadian Electric DSM Expenditures by Customer Class**

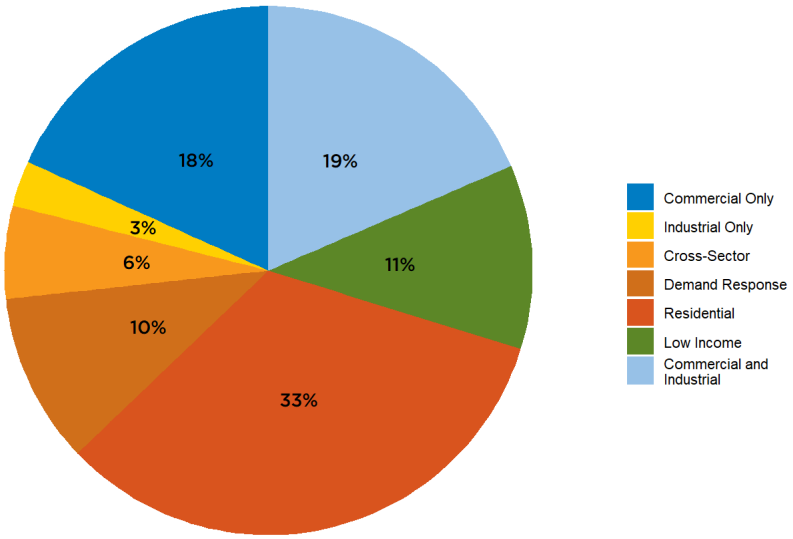
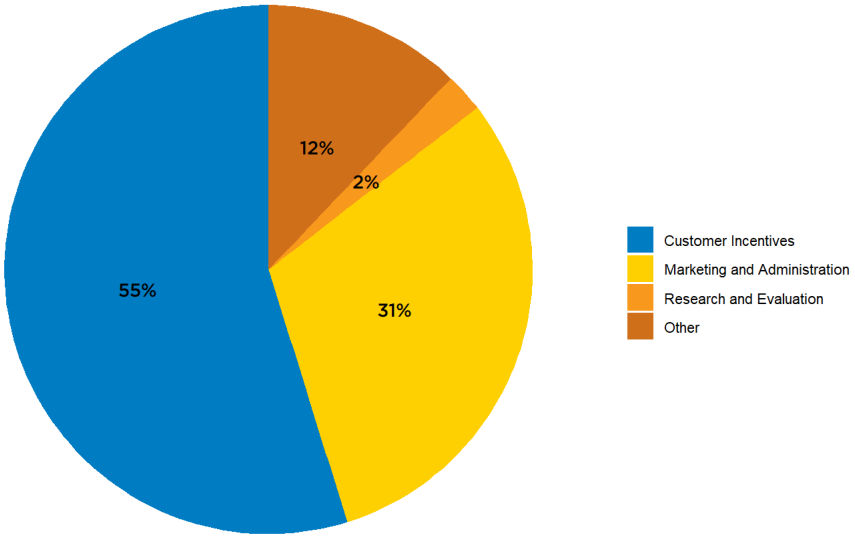



Figure 15 presents the classification of 2019 electric energy efficiency expenditures in Canada by cost category. Customer rebates and incentives represented just over half (55 percent) of 2019 expenditures, followed by marketing and administration (31 percent) and research and evaluation (two percent). The “other” category, which contains all funds that could not be separated into the previous three categories, represented 12 percent. This breakdown is very similar to 2018 ratios.

Figure 15. **2018 Canadian Electric Energy Efficiency Expenditures by Category**




### 3.6.2 Canadian Program Level Electric DSM Expenditures

Although not depicted in Figure 15 above, in 2019 Canadian program administrators budgeted $543 million (over $725 million CAD) for electric DSM programs. This represents a eight percent increase from 2019 budgets.

Since 2013, CEE has collected program administrator information in more granular categories for each electric customer class in order to begin to better understand what types of electric programs, and possibly what products and systems, 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 to customer class, indicate a breakdown similar to that in Figure 14, as all Canadian electric program administrators were able to provide program level data in this year's survey. Therefore, we conclude that the program level data we obtained in 2019 are representative of overall Canadian electric energy efficiency expenditure trends.

Figure 16 lists the most common energy efficiency program types in terms of expenditures, excluding program funding categorized as "other." Demand

[43] CEE incorporated program level questions for the electric survey only. CEE will continue to work with our members and with AGA in the future to determine whether this approach is feasible for the gas program administrators surveyed.

response program level expenditures are not listed in this report but are discussed in general in Electric Demand Response Program Expenditures.

Figure 16. **Most Common Canadian Electric Energy Efficiency Program Types by 2019 Expenditures**

| Customer Class | Program Type | 2018 Expenditures (USD) | 2018 Expenditures (CAD) |
|---|---|---|---|
| **Commercial & Industrial** | Mixed Offerings | $ 105,127,150 | $ 140,344,745 |
| **Commercial** | Prescriptive – Lighting | $ 45,431,687 | $ 60,651,303 |
| **Industrial** | Custom – Industrial or Agriculture Processes | $41,599,927 | $55,535,903 |
| **Cross Sector** | Other | $ 27,650,718 | $ 36,913,709 |
| **Low Income** | – | $ 26,357,123 | $ 35,186,760 |

For a full disclosure of the Canadian electric energy efficiency program expenditures provided by survey respondents, please refer to List of US and Canadian Electric Energy Efficiency Program Category Expenditures.

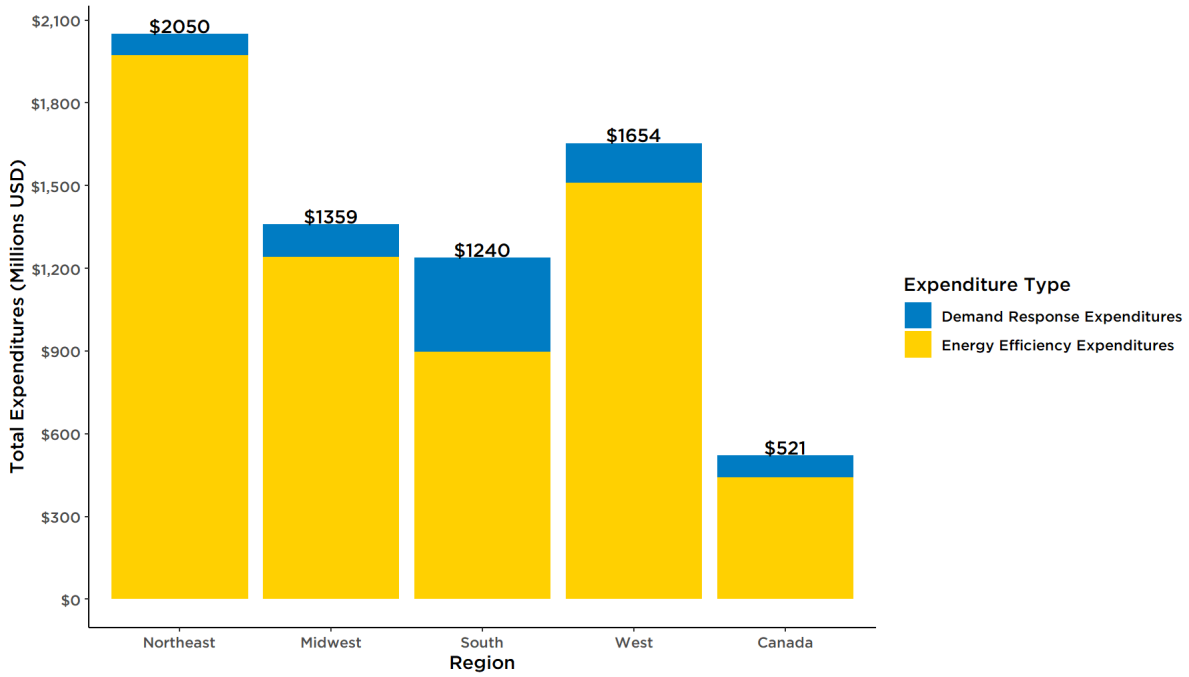
### 3.6.3 Canadian Electric Demand Response

The Canadian electric program administrators captured in this study spent just under $80 million USD, or around $107 million CAD, on their demand response programs in 2019, returning to demand response expenditures levels similar to those reported for 2016, when demand response expenditures were around $87 million USD ($115 million CAD). The demand response expenditures for 2017 and 2018 captured in the study totaled less than $10 million; we believe this to be the result of missing data in those years from some key Canadian program administrators and the dramatic increase in expenditures is unlikely to represent any real significant change in the Candian DSM program landscape.[44] Demand response accounted for about 15 percent of total Canadian electric DSM expenditures (see Figure 14).

[44] See footnote 40 in 3.6 section for discussion of efforts to expand the Canadian panel in 2020.

Figure 17. **US and Canadian Electric DSM Expenditures by Region, 2019**



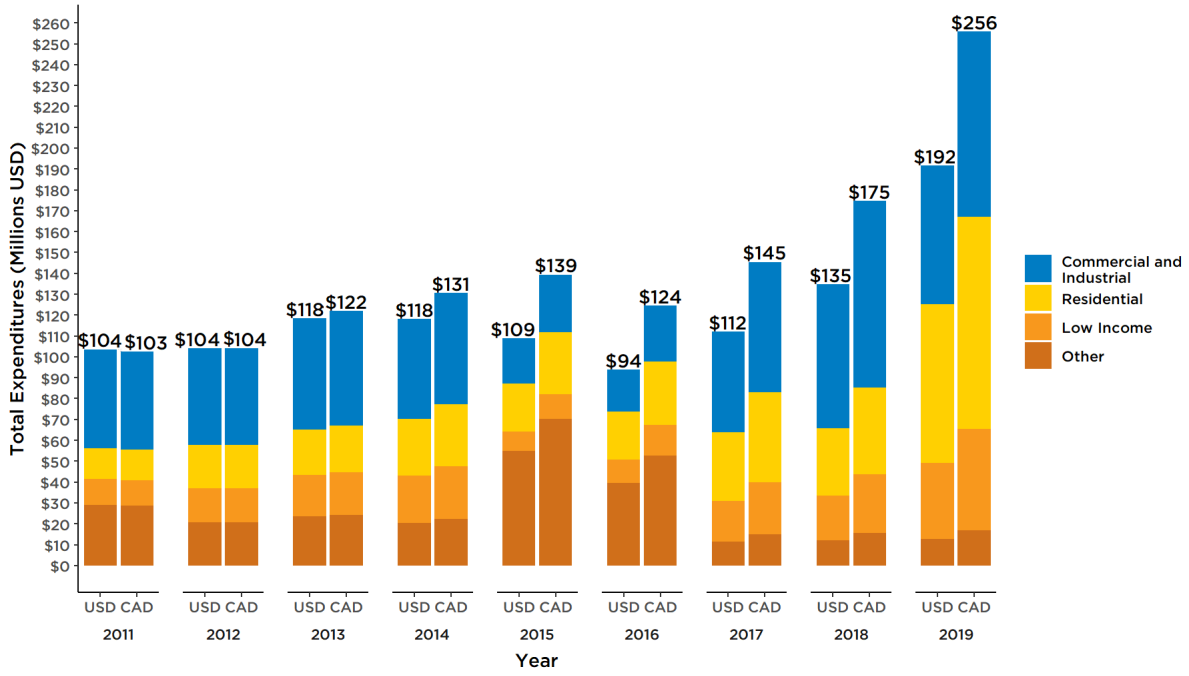

Similar to the 2019 report, Canadian demand response expenditures could not be broken out by program type in this year. See Electric Demand Response Program Expenditures for more information. [45]

### 3.6.4 Canadian Natural Gas Trends

In 2019, Canadian natural gas program expenditures (in CAD) increased by 42 percent compared to 2018 expenditures. 0 indicates that Canadian program administrators reported 2019 expenditures of $192 million USD, or $256, million CAD.

[45] In 2013, CEE modified the demand response program categories to align with those used by FERC. (See Section 2.4 for more information.)

Figure 18. **Canadian Natural Gas Expenditures 2010-2019**

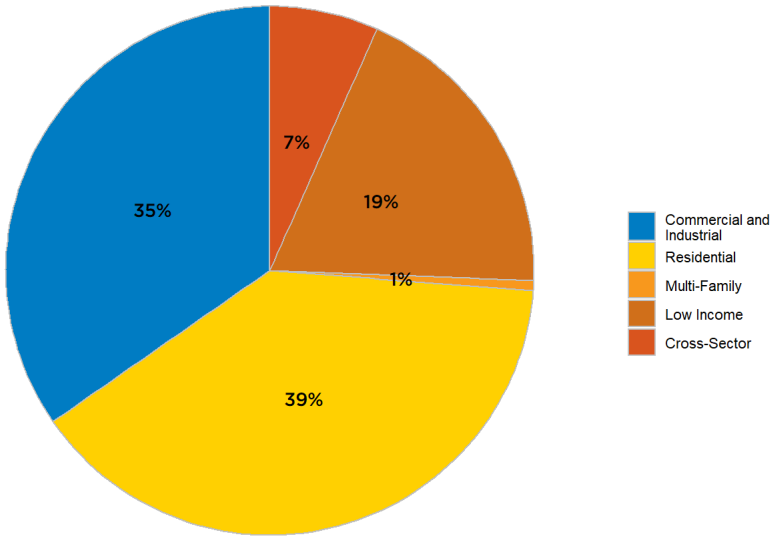



For ease of comparison between years, note that for 2013 onwards 0 combines the commercial and industrial sectors into one "commercial and industrial" customer class and the residential and multifamily sectors into one "residential" customer class, as these categories weren't broken out prior to 2013.

0 shows that unlike 2017 and 2018, where commercial and industrial programs continue to accounted for the largest share of Canadian natural gas efficiency program expenditures, residential program expenditures accounted for the largest share (39 percent) in 2019. Commercial and industrial expenditures accounted for the second largest proportion (35 percent) followed by low-income (19 percent), cross-sector (seven percent), and multi-family (one percent) program expenditures. For ease of comparison with previous years' reports and with a concurrent report by AGA, we did not break commercial and industrial into separate classes in 0 and0, but multifamily expenditures are separated from residential expenditures in 0.

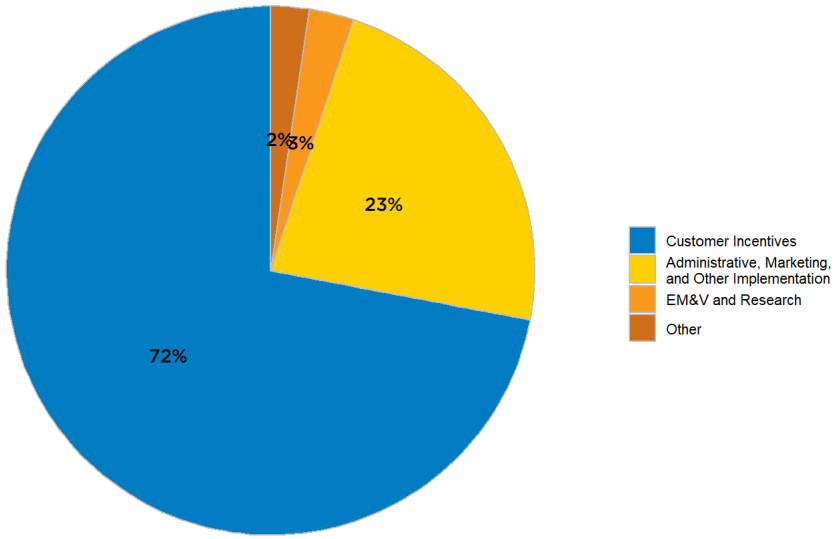
Figure 19. **2019 Canadian Natural Gas Expenditures by Customer Class**




In 0, Canadian gas expenditure data are broken out into slightly different cost categories than those used in the electric data sections of this report.[46]

[46] The electric and gas surveys request this information in ways that are similar, though not identical.

Figure 20. **2019 Canadian Natural Gas Expenditures by Category**




As in previous reports, the year-to-year category breakdown of Canadian natural gas expenditures remained similar, with customer incentives representing almost three-quarters of expenditures in 2019 (72 percent, up two percent from 2018). This increase was offset largely by slight decreases in EM&V and research, and other implementation (from four percent in both categories 2018 to three and two percent in 2019, respectively). administratrive, marketing and other implementation expenditures accounted for 23 percent of spending, the same proportion as 2018.

Canadian natural gas program administrators budgeted $182 million (approximately $249 million CAD) for programs in 2020, which is an increaseof almost 30 percent as compared to 2018.

# 4 Evaluation, Measurement and Verification

CEE, along with AGA, asked survey respondents to report spending on research and EM&V in 2019. Respondents to the electric survey were asked to provide the percentage of their total 2019 energy efficiency expenditures allocated to EM&V, whereas respondents to the gas survey were asked to provide the dollar amount.[47] Figures 21 and 22 below present the 2019 EM&V

[47] As in the past five years, electric EM&V expenditures in this report exclude demand response.

expenditures for electric and gas energy efficiency programs in the United States and Canada.[48]

Figure 21. **US and Canadian Electric EM&V Expenditures**

| Country | 2019 EM&V Expenditures (Millions USD) | Total 2019 Energy Efficiency Expenditures (Millions USD) | EM&V % of Total Expenditures |
|---|---|---|---|
| United States | 134 | 6,125 | 2% |
| Canada | 16 | 441 | 3% |
| Total | 151 | 6,566 | 2% |

*Note:* 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 2019 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 22. **US and Canadian Natural Gas EM&V Expenditures**

| Country | 2019 EM&V Expenditures (Millions USD) | Total 2019 Energy Efficiency Expenditures (Millions USD) | EM&V % of Total Expenditures |
|---|---|---|---|
| United States | 31 | 1,578 | 2% |
| Canada | 5 | 192 | 3% |
| Total | 36 | 1,770 | 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. Among those program administrators that broke out their energy efficiency expenditures by category, 60 percent of US and Canadian electric energy efficiency program administrators and 66 percent of US and Canadian gas program administrators indicated 2019 EM&V expenditures. EM&V expenditures comprised between two and three percent of 2019 energy efficiency expenditures in the United States and Canada, which is roughly consistent with the proportions of between two and five percent reported in between 2016 and 2018.[49]

[48] Please note, however, that the total electric 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 and Local Energy Efficiency Action Network, State & Local Energy Efficiency Action Network's Evaluation, Measurement, and Verification Working Group, last modified December, 2012, https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf, 7-14.

Since programs and their evaluation procedures do not necessarily occur at the same time, CEE urges caution when comparing program expenditures to expenditures allocated for EM&V activities in any given year.

# 5 Estimated Program Savings and Environmental Impacts

CEE collected data on energy efficiency savings from gas and electric program administrators in 2019. In order to help respondents report their savings consistently across states and provinces, CEE used the Energy Information Administration (EIA) definitions of incremental savings. According to EIA Form EIA-861, incremental savings include all energy savings that accumulated in 2019 from new 2019 participants in existing energy efficiency programs and from all participants in new 2019 programs.

CEE collected two different categories of savings values in the survey: net incremental savings and gross incremental savings.[50,51] In keeping with previous reports, this report focuses 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 contain the fewest assumptions embedded in them. In addition, gross savings provide the most useful metric for energy system planners because they include all the savings that occur, regardless of whether they were directly caused by the particular program being evaluated. On the other hand, evaluators and regulators often use net savings to measure against savings goals or to plan subsequent programs because they include only those savings that resulted directly from the program under evaluation. In all tables, CEE intended to only aggregate gross savings figures, but because program administrators do not always report gross savings values in the survey, CEE uses net savings where gross savings were not available.[52]

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

[51] 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.

[52] CEE worked closely with our collaborator AGA to collect savings information from survey participants. This includes collection of "annual" savings, which are incremental savings plus savings in the current year from measures that were implemented in previous years but are expected to still achieve savings. In some cases, AGA has elected to emphasize different savings data collected jointly through this effort than what CEE has chosen to emphasize. For more information on what AGA has published specifically and why, please refer to the reports that are publicly available on their website.

Although CEE worked with survey respondents to ensure they reported savings data as consistently as possible, many organizations calculate and report savings according to requirements in their states or provinces, which may not align exactly with EIA definitions. Not all organizations adjust their estimates to reflect EIA definitions. Finally, due to 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.

### 5.1.1 Ratepayer Funded Electric Energy Efficiency Program Savings

Ratepayer funded energy efficiency programs save energy and reduce the amount of greenhouse gases emitted in the United States and Canada. As such, energy efficiency is well positioned as a cost-effective tool for meeting carbon dioxide reduction targets at both the state and national level. Reporting electric efficiency programs in the United States and Canada estimated incremental electricity savings of approximately 40,805 GWh in 2019 (see Figure 23). This is equivalent to over 28.8 million metric tons of avoided $CO_2$ emissions.[53]

As noted in Section 2.2 above, this report focused only on ratepayer funded programs in previous years. Since 2013, CEE and our collaborators have collected information on electric programs derived from all funding sources in order to provide a more comprehensive picture of the DSM industry. Figure 23 and 0 below show all electric energy efficiency savings by sector and totals for both ratepayer funded programs and for programs that received funding from other sources.

Figure 23. **US and Canadian Gross Incremental Electric Energy Efficiency Savings, 2019 (GWh): Ratepayer and All Sources Totals***

| | Residential | Low Income | C & I | Other | No Breakout | Ratepayer Total | All Sources Total |
|---|---|---|---|---|---|---|---|
| **United States**** | | | | | | | |
| Northeast | 1,708 | 65.9 | 1,916 | 53 | 913 | 4,655 | 5,483 |
| Midwest | 2,029 | 74.5 | 2,740 | 69 | 7,174 | 12,087 | 12,164 |
| South | 2,016 | 92.8 | 1,626 | 28 | 655 | 4,418 | 4,431 |
| West | 2,451 | 192 | 3,121 | 2,126 | 215 | 8,105 | 8,105 |
| **US Subtotal ****** | **10,086** | **425** | **11,012** | **2,276** | **8,957** | **32,755** | **33,672** |
| **Canada******** | **161** | **25.4** | **910** | **0** | **5,584** | **7,083** | **7,133** |

[53] Calculated using the EPA Greenhouse Gas Equivalencies Calculator, epa.gov/energy/greenhouse-gas-equivalencies-calculator. April 2019.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Binational Total** | 10,274 | 450 | 11,922 | 2,679 | 14,541 | 39,839 | 40,805 |

* Based on estimated total of all energy savings that accumulated from new participants in existing programs and all participants in new programs in 2019.

** One hundred (100) percent of electric survey respondents in the United States that reported EE programs reported a value for incremental energy savings. Of those that reported a value for incremental energy savings, 94 percent reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

*** The US subtotal includes savings from program administrtaors that were not assigned to a region during data collection. These program administrators represent very small programs that were summed and entered into the data together as one line without specific regional or other firmographic identification information. Therefore, the sum of the preceeding regional breakouts is not equivalent to the sum presented here in the US subtotal.

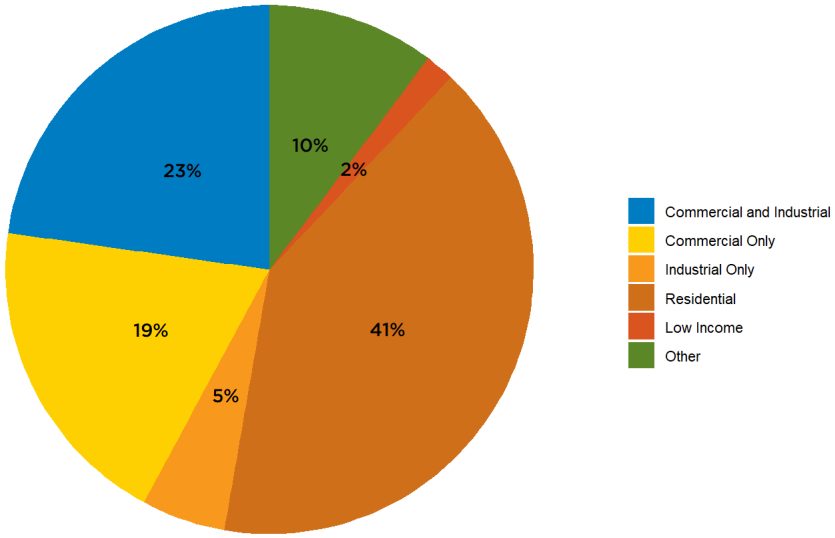
*** One hundred (100) percent of electric survey respondents in Canada that reported EE programs reported a value for incremental energy savings. Of those that reported a value for incremental energy savings, fifty-eight (58) percent reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

Figure 24 shows that across the United States and Canada, commercial and industrial electric programs together accounted for about half of the total energy savings (47 percent), followed by residential (41 percent), and low income (two percent). This breakdown is similar to that of US and Canadian electric energy efficiency expenditures, with the exception that the low income customer class makes up a smaller percentage of savings (two percent) than of expenditures (eight percent) and that the residential customer class makes up a larger percentage of savings (41 percent) than of expenditures (30 percent). These findings are also reasonably consistent with the last five years of survey results, reinforcing these relative relationships of savings and expenditures by sector. Low-income programs are generally mandated for the public benefit, and while they may not result in high savings, they may result in significant benefits for program administrators in the form of reduced arrearages and for customers in the form of lower energy bills and higher disposable income. This likely explains the difference in the proportions of expenditures and savings represented by low income programs.

As noted in Section 2.4, respondents to the survey may interpret the categories differently, and not all respondents broke their information out by customer class. Therefore, Figure 24 represents only those savings reported at the customer class level and does not include the savings reported as "No Breakout" in Figure 23.

Figure 24. **2019 US and Canadian Gross Incremental Electric Energy Efficiency Savings by Customer Class**




Based on the gross incremental savings figure for electric efficiency programs provided in Figure 23 above, in 2019 the value of electric energy efficiency savings across the United States and Canada was over $4.1 billion.[54,55]

[54] US electric retail values were calculated based on the average retail price of electricity to ultimate customer by end use sector across the United States in 2019 using data from the Electric Power Monthly December 2019 issue, which contains YTD 2019 data. Average electric rates used: $ 0.1268 per kWh (residential), $0.1032 (commercial), and $0.0638. (industrial). The residential retail rate was used for low income program savings. The rate for combined C&I programs was determined by taking the average of the commercial and industrial retail rates. The rate for "other" programs was determined by taking the average of the residential, commercial, and industrial retail rates. "Electric Power Monthly: Table 5.3. Average Price of Electricity to Ultimate Customers," Energy Information Administration, last modified March 2019, accessed April 2019, eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_03.

[55] Canadian electric retail values were calculated based on the average rate per kWh across major Canadian cities in 2019 using data from an analysis maintained by Hydro Quebec titled "Comparison of Electricity Prices in Major North American Cities." Average electric rates used: $ 0.1304 CAD per kWh (residential), $0.0934 CAD per kWh (large energy customers). The large energy customer rate was used for commercial, industrial, and C&I savings. The residential retail rate was used for low income program savings. The rate for "other" programs was determined by taking the average of the residential and the large energy customer retail rates. The residential figure is an average of the rates for 12 major cities in Canada, and commercial and industrial figures an average of those for the associate utilities of those cities and may not reflect the average electricity price for Canada as a whole. "Comparison of Electricity Prices in Major North American Cities," Hydro Quebec, accessed June 2021, https://www.hydroquebec.com/data/documents-donnees/pdf/comparison-electricity-prices.pdf.

Beginning in 2013, CEE asked respondents to provide estimates of capacity savings from their energy efficiency programs. Capacity savings estimates are depicted below in 0.

Figure 25. **2019 US and Canadian Electric EE Gross Incremental* Capacity Savings (MW)**

| | Residential | Low Income | C & I | Other | No Breakout | Ratepayer Total | All Sources Total |
|---|---|---|---|---|---|---|---|
| **United States**** | | | | | | | |
| Northeast | 44 | 8 | 105 | 44 | 648 | **849** | **847** |
| Midwest | 362 | 16 | 434 | 9 | 795 | **1,616** | **1,616** |
| South | 219 | 15 | 252 | 0 | 262 | **748** | **707** |
| West | 608 | 52 | 441 | 7 | 727 | **1,836** | **1,835** |
| **US Subtotal** | **2,091** | **91** | **2,282** | **61** | **2,433** | **6,957** | **6,912** |
| **Canada***** | 702 | 30 | 469 | 445 | 1,121 | 2,767 | 2,767 |
| **Binational Total** | **2,794** | **121** | **2,751** | **506** | **3,554** | **9,725** | **9,680** |

* Based on estimated total of all capacity savings that accumulated from new participants in existing programs and all participants in new programs in 2019.

** Eighty-four (84) percent of electric survey respondents in the United States that reported energy efficiency programs reported a value for incremental capacity savings. Of those that reported a value for incremental energy savings, 95 percent reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

*** Elghty-three (83) percent of respondents in Canada that reported energy efficiency programs reported a value for incremental capacity savings. Of those that reported a value for incremental savings, 60 percent 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 measure the amount of energy saved over time, capacity savings are measured in kilo-, mega-, or gigawatts and represent reductions in demand forecast to occur at a particular time, generally during hours of peak demand. 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.

### 5.1.2 Electric Demand Response Program Savings

Beginning in 2015, CEE asked demand response program administrators to report the number of events called for each of their demand response programs, the average savings per event, and each program target (summer peak, winter peak, another peak, or "non-peak," which refers to a target other than a peak). Survey respondents could designate their programs as having more than one target.[56] Respondents only reported eleven "other peak" programs and eight "non-peak" programs, and the majority of programs in each of these categories were identified as having multiple targets. Thus, the

[56] Note that program target is separate from program type, for example, direct load control. Savings by program type are not analyzed here.

savings for "other peak" and "non-peak" programs reported below are likely overestimates at the expense of summer and winter peak programs. CEE may consider soliciting more information on "other peak" and "non-peak" programs in the future in order to better estimate the associated savings.

For 2019, we report both the total number of events run and average MW savings per event below, grouped by region and program target. As in 2018 and 2019, in 2020 CEE did not ask respondents for their peak duration and therefore could not calculate total MWh savings from the total savings below. Together, CEE believes the number of events and average MW reductions per event provide a reasonable indicator of program activity in the industry. However, CEE also acknowledges that as demand response activity continues to shift with the evolution of the energy industry, we may need to revisit which metrics are most representative of demand response activity.

Figure 26. **Number of DR Events Called by US and Canadian Electric Program Administrators by Program Target and Region**

| | Summer | Winter | Other Peak | No Peak | All |
|---|---|---|---|---|---|
| **Northeast** | - | 136 | - | - | **136** |
| **Midwest** | 50 | 137 | 11 | 7 | **205** |
| **South** | 25 | 272 | - | - | **297** |
| **West** | 98 | 511 | - | 3 | **612** |
| **Canada** | - | - | - | - | **-** |
| **Total** | **173** | **1056** | **11** | **10** | **1,250** |

As shown in Figure 26, US and Canadian demand response programs called a total of 1,250 events in 2019.[57] The large majority of events occurred in the West and South regions, with 49 percent of events occurring in the programs in the West and 24 percent in the South. EIght-five percent of peaks observed in 2019 occurred in the winter,and 14 percent in the summer. Please note that CEE asks respondents to include programs run within their service territories and to exclude any programs run solely by or within the wholesale markets.[58]

Figure 27. **US and Canadian Electric Demand Response Average MW Savings by Region and Program Target**

| | Summer | Winter | Other Peak | No Peak | MW Subtotals |
|---|---|---|---|---|---|

[57] For reference, FERC reported that in 2014 the potential peak reduction from all retail demand response programs in the United States was 31,191 MW. "Demand Response & Advanced Metering Staff Report," Federal Energy Regulatory Commission, ferc.gov/legal/staff-reports/2016/DR-AM-Report2016.pdf, 14.

| | | | | | |
|---|---|---|---|---|---|
| **Northeast** | - | 5,151 | - | - | 5,151 |
| **Midwest** | 2,606 | 4,053 | 212 | 18.7 | 6,889.7 |
| **South** | 980 | 8,500 | - | - | 9,480 |
| **West** | 17,738 | 68,068 | - | 371 | 86,177 |
| **Canada** | - | - | - | - | - |
| **Totals** | 21,324 | 85,722 | 212 | 389.7 | 107,697.7 |

Figure 27 presents average MW savings by region and target. Demand response programs in the United States and Canada saved on average 86 MW per event in 2019.[59] In the United States, the West saved the most on average per event, 140.81 MW. Further, reported summer programs saved the most on average per event, 123.26 MW.

### 5.1.3 Ratepayer Funded Natural Gas Program Savings

Figure 28 indicates that natural gas efficiency programs in the United States and Canada resulted in estimated gross incremental savings of approximately 500 million therms of gas in 2019. This is equivalent to approximately 2.5 million metric tons of avoided $CO_2$ emissions.[60]

Figure 28. **2019 US and Canadian Incremental Natural Gas Savings (MDth)**

| | | Residential | Low Income | Multifamily | C & I | Other | No Breakout | Ratepayer Total |
|---|---|---|---|---|---|---|---|---|
| **United States **** | | | | | | | | |
| | Northeast | 3,760 | 758 | 544 | 4,233 | 25 | - | 9,320 |
| | Midwest | 3,109 | 440 | 394 | 6,396 | 64 | - | 10,404 |
| | South | 483 | 44 | 0 | 418 | - | - | 945 |
| | West | 3,373 | 224 | 165 | 2,378 | 5,173 | - | 11,313 |
| **US Subtotal** | | 10,725 | 1,466 | 1,103 | 13,425 | 5,262 | - | 31,982 |

[59] To get a sense of magnitude for average US and Canadian demand response capacity savings, 20 MW represents roughly a sixth of the peak capacity of a natural gas combined cycle generating unit in the United States, according to 2015 EIA Form 860, Schedule 3 data. In addition, using 2019 EIA Form 860, Schedule 3 data, the "total" DR savings of 107,698 MW is roughly equivalent to the combined net summertime capacity of the 98 largest power plants in the United States (or at least the ones that responded to the EIA data request). Data accessed at "Form EIA-860 detailed data," Energy Information Administration, accessed June 2020, eia.gov/electricity/data/eia860/.

[60] Calculated using the EPA Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator. June 2021.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Canada *** | 2,025 | 920 | 2 | 15,030 | 1 | - | 17,976 |
| Binational Total | 23,476 | 3,852 | 2,207 | 41,881 | 10,525 | - | 49,958 |

Notes:

* Based on estimated total of all energy savings that accumulated from new participants in existing programs and all participants in new programs in 2019.

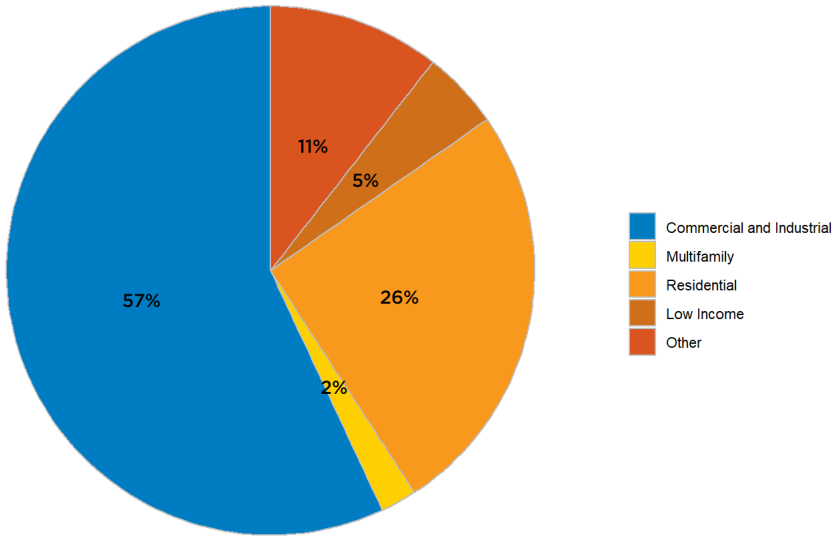
** Ninety (90) percent of all gas respondents in the United States that reported gas programs reported a value for incremental savings. Of those that reported a value for incremental savings, 91 percent reported gross incremental savings. For respondents that did not report gross incremental savings, CEE used net incremental savings in calculating totals.

** Eight-six (86) percent of all gas respondents in Canada that reported gas programs reported a value for incremental savings. Of those that reported a value for incremental savings, 83 percent reported gross incremental savings.

0 depicts gross incremental savings for US and Canadian natural gas programs broken out by customer class. Commercial and industrial programs accounted for the majority of energy savings (57 percent), followed by residential programs (26 percent), and "other" programs (11 percent). Low income programs represented five percent of savings, while multifamily programs represented two percent. This breakdown is somewhat different from that of US and Canadian gas energy efficiency expenditures, in which residential programs accounted for 39 percent of expenditures, commercial and industrial programs accounted for 35 percent, and low income programs accounted for 19 percent. These findings are similar to those from the last several years' surveys. This result may indicate high savings per dollar spent in the C&I sector, but it may also reflect a difference in reported savings type—gross or net—between program administrators with high residential and high C&I expenditures.[61]

[61] See the opening paragraphs of Section 5 for more information on the savings accounting scheme used in this report.

Figure 29. **2019 US and Canadian Gross Incremental Natural Gas Savings by Customer Class**




Based on the natural gas gross incremental savings provided in Figure 28 and the savings breakout in 0, in 2019 the value of natural gas energy efficiency savings across the United States and Canada totaled approximately $383 million.[62]

[62] Natural gas retail values for the United States and Canada were calculated based on the average retail price per thousand cubic feet across the United States in 2019 using data from the Energy Information Administration. Average natural gas prices used: $10.51 per Mcf (residential), $7.61 per Mcf (commercial), and $3.90 per Mcf (industrial). The residential retail rate was used for low income and multifamily program savings. The rate for combined C&I programs was determined by taking the average of the commercial and industrial retail rates. The rate for "other" programs was calculated by taking the average of the residential, commercial, and industrial retail rates. "Natural Gas Prices," Energy Information Administration, last modified May 2021, accessed June, 2021, https://www.eia.gov/naturalgas/monthly/pdf/table_03.pdf.

# Appendix A Electric Energy Efficiency Program Categories

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. If it was not possible to provide data on the program level, respondents were asked to provide rough percentage breakdowns of their budgets, expenditures, and savings into customer classes and then to provide further percentage breakdowns by common program types (again, if possible). This appendix provides the title and definition for each program type, grouped by customer class. CEE slightly modified some program categories in 2014 based on feedback from respondents and discussions with Lawrence Berkeley National Laboratory; similar modifications may occur in future years for the purposes of the CEE research effort.

## Residential Programs

**Appliance recycling:** Programs designed to remove less efficient appliances, typically refrigerators and freezers, from households.

**Behavior, online audit, feedback:** Residential programs designed around directly influencing household habits and decision-making on energy consumption through quantitative or graphical feedback on consumption, sometimes accompanied by tips on saving energy. These programs include behavioral feedback programs in which energy use reports compare a consumer's household energy consumption with those of similar consumers; online audits that are completed by the consumer; and in-home displays that help consumers assess their use in near real time. This program category does not include on-site energy assessments or audits.

**Consumer product rebate for appliances:** Programs that incentivize the sale, purchase and installation of appliances, e.g. refrigerators, dishwashers, clothes washers, and dryers, that are more efficient than current 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 along with chargers for phones, smart phones, and tablets. A comprehensive efficiency program to decrease the electricity use of consumer electronics products includes two foci: product purchase and product use. Yet not every consumer electronics program seeks to be comprehensive. Some programs 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:** Programs designed to provide or facilitate loans, credit enhancements, or interest rate reductions and buy downs. As with other programs, utility costs are included, such as the costs of any inducements for lenders, e.g. loan loss reserves, interest rate buy downs, etc. Where participant costs are available for collection, these ideally include the total customer share, i.e. both principal meaning the participant payment to purchase and install measures and interest on that debt. Most of these programs are directed towards enhancing credit or financing for residential structures.

**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, e.g. ENERGY STAR® Homes. These programs include new multifamily residences and new or replacement mobile homes.

**Prescriptive HVAC:** Programs designed to encourage the distribution, sale, purchase, and 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.

**Prescriptive 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 an existing baseline. Programs may be point-of-sale rebates or rebates to insulation installation contractors.

**Prescriptive pool pump:** Programs that incentivize the installation of higher efficiency or variable speed pumps and controls, such as timers, for swimming pools.

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

**Prescriptive windows:** Programs designed to encourage the sale, purchase, and installation of efficient windows in residential structures.

**Prescriptive other:** Residential programs that provide or incentivize a set of preapproved measures not included in, or distinguishable from, the other residential program categories, e.g. direct install, HVAC, lighting. For example, if a residential program features rebates for a large set of mixed, preapproved offerings, e.g. insulation, HVAC, appliances, and lighting, yet the relative contribution of each measure to program savings is unclear or no single measure accounts for a large majority of the savings, then the program should be classified simply as a residential prescriptive program.

**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 development of a simple engineering model 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 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. Education programs that supply kits by sending them home with school children are not included in this program category; they are classified as education programs.

**Whole home retrofit:** Whole home energy upgrade or retrofit programs combine a comprehensive energy assessment or audit that identifies energy savings opportunities with whole house 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, insulation of attic, wall, or basement, 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.

**Other:** Programs designed to encourage investment in energy efficiency activities in residences but are so highly aggregated, e.g. existing homes programs that include retrofits, appliances, and equipment, etc., and undifferentiated that they cannot be sorted into the residential program categories that are detailed above.

### Low Income

Low income programs are efficiency programs aimed at lower income households, based upon some types of income testing or eligibility. These programs most often take the form of a single family weatherization, but a variety of other program types are also included in this program category, e.g. multifamily or affordable housing weatherization, low income direct install programs.

### Commercial Programs

**Custom 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 retrocommissioning:** Programs aimed at diagnosing energy consumption in a commercial facility and optimizing its operations to minimize energy waste. Such programs may include the installation of certain measures, e.g. 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 facilities that includes energy performance commissioning should be categorized as "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 "Custom - Other".

**Custom other:** 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 may vary significantly from site to site. This category is intended to capture "whole building" approaches to commercial sector efficiency opportunities for a wide range of building types and markets, e.g. office or retail and a wide range of measures.

**Financing:** Programs designed to provide or facilitate loans, credit enhancements, or interest rate reductions and buy downs. As with other programs, utility costs are included, such as the costs of any inducements for lenders, e.g. loan loss reserves, interest rate buy downs, etc.. Where participant costs are available for collection, these ideally include the total customer share, i.e., both principal meaning the participant payment to purchase and install measures and interest on that debt. Most of these programs are directed toward enhancing credit or financing for commercial structures.

**Government, nonprofit, MUSH:** Government, nonprofit, and MUSH (municipal, university, school and hospital) programs cover a broad swath of program types generally aimed at public and institutional facilities and that include a wide range of measures. Programs that focus on specific technologies, e.g. HVAC and lighting have their own commercial program categories. Examples include incentives or technical assistance to promote energy efficiency upgrades for elementary schools, recreation halls, and homeless shelters. Street lighting is accounted for as a separate program category.

**New construction:** Programs that incentivize owners or builders of new commercial facilities to design and build beyond current code or to a certain certification level, e.g. ENERGY STAR® or LEED®.

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

**Prescriptive HVAC:** Commercial HVAC programs encourage the sale, purchase and installation of heating, cooling, or ventilation systems at higher efficiency than current energy performance standards, across a broad range of unit sizes and configurations.

**Prescriptive IT and office equipment:** Programs aimed at improving the efficiency of office equipment, chiefly commercially available PCs, printers, monitors, networking devices, and mainframes not rising to the scale of a server farm or floor. Programs for data centers are included in the industrial sector, under the “Custom Data Centers” category.

**Prescriptive lighting:** Commercial lighting programs incentivize the installation of higher efficiency lighting and controls. Typical measures might include T8 or T5 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.

**Prescriptive performance contract or DSM bidding:** Programs that incentivize or otherwise encourage energy services companies (ESCOs) and participants to perform energy efficiency projects, usually under an energy performance contract (EPC), a standard offer, or another arrangement that involves ESCOs or customers offering a quantity of energy savings in response to a competitive solicitation process with compensation linked to achieved savings.

**Prescriptive other:** Prescriptive programs that encourage the purchase and installation of some or all of a specified set of preapproved measures besides those covered in other measure-specific prescriptive programs, e.g. HVAC and lighting.

**Small commercial custom:** Custom programs applied to small commercial facilities. See the commercial "Custom" categories above for additional detail.

**Small commercial prescriptive:** Prescriptive programs applied to small commercial facilities. See the commercial "Prescriptive" categories above 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. Audit only programs have their own category.

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

**Other:** Programs not captured by any of the specific industrial or commercial categories but that are sufficiently detailed or distinct to not be treated as a General C&I 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.

### Industrial or Agricultural Programs

**Custom audit:** Programs in which an energy assessment is performed on one or more participant industrial or agricultural facilities to identify sources of potential energy waste and measures to reduce that waste.

**Custom data centers:** Data center programs are custom designed around large-scale server floors or data centers that often serve high tech, banking, or academia. Projects tend to be site specific and involve some combination of

lighting, servers, networking devices, cooling chillers, and energy management systems and software. Several of these may be of experimental or proprietary design.

**Custom industrial or agricultural processes:** Industrial programs that deliver custom designed projects that are characterized by onsite energy and process efficiency assessment and a site specific measure set focused on process related improvements that may include, for example, substantial changes in a manufacturing line. This category includes all energy efficiency program work at industrial or agricultural sites that is focused on process and not generic (such programs belong in the custom category) and not otherwise covered by the single measure prescriptive programs, e.g. lighting, HVAC, and water heaters).

**Custom refrigerated warehouses:** Warehouse programs are typically aimed at large-scale refrigerated storage facilities and often target end uses such as lighting, climate controls, and refrigeration systems.

**Custom other:** 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 may vary significantly from site to site. This category is intended to capture whole facility approaches to industrial or agricultural sector efficiency opportunities for a wide range of building types and markets.

**Financing:** Programs designed to provide or facilitate loans, credit enhancements, or interest rate reductions and buy downs. As with other programs, utility costs are included, such as the costs of any inducements for lenders, e.g. loan loss reserves, interest rate buy downs, etc.. Where participant costs are available for collection, these ideally include the total customer share. i.e., both principal meaning the participant payment to purchase and install measures and interest on that debt. Most of these programs are directed toward enhancing credit or financing for industrial or agricultural structures.

**New construction:** Programs that incentivize owners of builders of new industrial or agricultural facilities to design and build beyond current code or to a certain certification level, e.g. ENERGY STAR® or LEED®.

**Prescriptive agriculture:** Farm and orchard agricultural programs that primarily involve irrigation pumping and do not include agricultural refrigeration or processing at scale.

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

**Self direct:** Industrial programs that are designed to be 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 agricultural program categories but that are sufficiently distinct to the industrial and agricultural sector to not be treated as a C&I program, e.g. programs aimed specifically at an industrial subsector, but that are not clearly prescriptive or custom in nature.

### C&I Programs

**Audit:** Programs in which an energy assessment is performed on one or more participant 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 may vary significantly from site to site. This category is for programs that address both the commercial and industrial sectors and cannot be relegated to one sector or another for lack of information on participation or savings.

**Mixed offerings:** Programs that cannot be classified under any of the specific commercial or industrial program categories and that span a large variety of offerings aimed at both the commercial and industrial sectors.

**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, e.g. ENERGY STAR® or LEED®. This category should be used sparingly for those programs that cannot be identified with either the commercial or industrial sector on the basis of information available about participation or the sources of savings.

**Prescriptive:** Prescriptive programs that encourage the purchase and installation of some or all of a specified set of preapproved industrial or commercial measures but which cannot be differentiated by sector based upon the description of the participants or the nature or source of savings.

**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. This category is to be used for self direct or opt out programs that address both large commercial and industrial entities but that cannot be differentiated between these sectors because the nature and source of the savings is not available or is also too highly aggregated.

**Other:** Programs not captured by any of the specific industrial or commercial categories and are sufficiently distinct to the industrial and commercial sectors but cannot be differentiated by individual sector.

### 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, builders, and developers on compliance; and training of building inspectors in ensuring the codes are met.

**Market transformation:** Programs that encourage a reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects that is likely to last after the intervention has been withdrawn, reduced, or changed. Market transformation programs are gauged by their market effects, e.g. 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, e.g. consumer electronics or HVAC.

**Marketing, education, and outreach:** Includes most standalone marketing, education, and outreach programs, e.g. statewide marketing, outreach, and brand development. This category also covers in-school energy and water efficiency programs, including those that supply school children with kits of prescriptive measures such as CFLs and low flow showerheads for installation at home.

**Multisector rebates:** Multisector rebate programs include those providing incentives for commercially available end use goods for multiple sectors, e.g. PCs, HVAC.

**Planning, evaluation, other program support:** These programs are separate from marketing, education, and outreach programs and include the range of activities not otherwise accounted for in program costs, but that are needed for planning and designing a portfolio of programs and for 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, e.g. 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 reflective programs include programs designed to lessen heating and cooling loads through changes to the exterior of a structure, e.g. tree plantings to shade walls and windows, window screens, and cool roofs. These programs are not necessarily specific to a sector.

**Voltage reduction transformers:** Programs that support investments in distribution system efficiency or enhance distribution system operations by reducing losses. The most common form of these programs involve the installation and use of conservation voltage regulation or reduction or optimization systems and practices that control distribution feeder voltage so that utilization devices operate at their peak efficiency, which is usually at a level near the lower bounds of their utilization or nameplate voltages. Other measures may include installation of higher efficiency transformers. These programs generally are not targeted to specific end users but typically involve changes made by the electricity distribution utility.

**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.

**Other:** This category is intended to capture all programs that cannot be allocated to a specific sector (or are multisectoral) and cannot be allocated to a specific program type.

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

Figure B-1. **US Electric Energy Efficiency Program Category Expenditures (in USD)**

| Customer Class | Program Type | 2019 Expenditures |
|---|---|---|
| **Residential** | Other | 512,370,507.11 |
| **Low Income** | Low Income | 505,899,670.40 |
| **Commercial and Industrial** | Custom | 424,293,642.17 |
| **Commercial and Industrial** | Mixed Offerings | 362,467,528.86 |
| **Commercial and Industrial** | Other | 304,430,165.65 |
| **Commercial and Industrial** | Prescriptive | 292,546,180.84 |
| **Commercial** | Other | 244,543,406.66 |
| **Residential** | Consumer Product Rebate - Lighting | 228,000,097.83 |
| **Commercial** | Other (Cannot Categorize) | 173,470,201.99 |
| **Commercial** | Prescriptive - Lighting | 173,369,745.05 |
| **Cross Sector** | Other | 130,054,446.27 |
| **Residential** | Consumer Product Rebate - Appliances | 117,677,479.65 |
| **Residential** | Prescriptive - Other | 113,775,478.74 |
| **Commercial** | Small Commercial - Prescriptive | 103,693,050.06 |
| **Residential** | Whole Home - Retrofit | 93,373,390.44 |
| **Residential** | Other (Cannot Categorize) | 91,441,619.76 |
| **Residential** | Whole Home - Audits | 89,782,435.21 |
| **Residential** | Prescriptive - HVAC | 86,984,987.48 |
| **Residential** | Behavioral/Online Audit/Feedback | 86,943,616.36 |
| **Commercial and Industrial** | New Construction | 82,112,903.88 |
| **Industrial** | Self Direct | 69,500,463.00 |
| **Cross Sector** | Planning/Evaluation/Other Program Support | 57,268,343.13 |
| **Residential** | New Construction | 57,167,672.64 |
| **Residential** | Appliance Recycling | 46,890,966.03 |
| **Residential** | Whole Home - Direct Install | 44,168,426.53 |
| **Cross Sector** | Marketing, Education, Outreach | 42,699,780.45 |
| **Cross Sector** | Multi-Sector Rebates | 42,150,945.19 |
| **Commercial** | Prescriptive - Other | 39,155,678.42 |
| **Industrial** | Other (Cannot Categorize) | 37,169,595.08 |
| **Industrial** | Custom - Industrial or Agricultural Processes | 36,610,195.49 |
| **Residential** | Multifamily | 35,077,160.23 |
| **Commercial** | Govt./Nonprofit/MUSH | 32,862,613.25 |

| | | |
|---|---|---|
| **Cross Sector** | Codes & Standards | 29,779,521.26 |
| **Commercial** | New Construction | 28,914,208.69 |
| **Commercial** | Custom - Other | 28,228,956.41 |
| **Other** | Other | 23,427,527.81 |
| **Commercial** | Custom - Retrocommissioning | 22,638,377.50 |
| **Commercial** | Street Lighting | 16,863,246.02 |
| **Commercial and Industrial** | Audit | 16,511,292.56 |
| **Cross Sector** | Other (Cannot Categorize) | 16,084,069.50 |
| **Cross Sector** | Market Transformation | 14,862,822.00 |
| **Commercial** | Prescriptive - HVAC | 13,545,880.45 |
| **Commercial and Industrial** | Other (Cannot Categorize) | 11,017,530.59 |
| **Commercial** | Custom - Audit | 9,506,778.95 |
| **Commercial and Industrial** | Self Direct | 9,040,009.41 |
| **Cross Sector** | Research | 7,799,755.27 |
| **Commercial** | Small Commercial - Custom | 6,672,856.00 |
| **Cross Sector** | Workforce Development | 6,267,801.83 |
| **Residential** | Prescriptive - Insulation | 5,793,808.33 |
| **Industrial** | Custom - Audit | 5,124,480.31 |
| **Residential** | Consumer Product Rebate - Electronics | 3,151,524.34 |
| **Industrial** | Prescriptive - Agriculture | 2,641,728.01 |
| **Industrial** | Other | 2,319,143.29 |
| **Residential** | Prescriptive - Water Heater | 2,118,753.62 |
| **Commercial** | Prescriptive - Grocery | 1,873,694.00 |
| **Industrial** | Custom - Data Centers | 1,793,142.67 |
| **Cross Sector** | Shading/Cool Roofs | 1,455,250.63 |
| **Commercial** | Prescriptive - Performance Contracting or DSM Bidding | 1,187,171.00 |
| **Cross Sector** | Voltage Reduction/Transformers | 1,090,316.60 |
| **Industrial** | Custom - Other | 1,042,467.00 |
| **Industrial** | Prescriptive - Other | 641,839.00 |
| **Commercial** | Financing | 565,539.00 |
| **Residential** | Prescriptive - Pool Pump | 465,356.00 |
| **Residential** | Financing | 72,133.00 |

Figure B-2: **Canadian Electric Energy Efficiency Program Category Expenditures (in USD and CAD)**

| Customer Class | Program Type | 2019 Expenditures USD | 2019 Expenditures CAD |
|---|---|---|---|
| Commercial and Industrial | Mixed Offerings | 105,127,149.57 | 140,344,744.68 |
| Commercial | Prescriptive - Lighting | 45,431,687.45 | 60,651,302.75 |
| Industrial | Custom - Industrial or Agricultural Processes | 41,599,927.09 | 55,535,902.66 |
| Cross Sector | Other | 27,650,718.32 | 36,913,708.95 |
| Low Income | Low Income | 26,357,123.24 | 35,186,759.53 |
| Residential | Whole Home - Retrofit | 22,091,833.64 | 29,492,597.90 |
| Industrial | Other (Cannot Categorize) | 19,050,685.00 | 25,432,664.47 |
| Cross Sector | Planning/Evaluation/Other Program Support | 15,556,287.46 | 20,767,643.75 |
| Residential | Other (Cannot Categorize) | 13,186,865.25 | 17,604,465.10 |
| Commercial | Custom - Retrocommissioning | 11,975,301.73 | 15,987,027.81 |
| Cross Sector | Other (Cannot Categorize) | 11,554,695.90 | 15,425,519.02 |
| Residential | Behavioral/Online Audit/Feedback | 10,322,181.82 | 13,780,112.73 |
| Commercial | Prescriptive - HVAC | 8,810,568.17 | 11,762,108.51 |
| Residential | Whole Home - Audits | 8,704,169.64 | 11,620,066.47 |
| Residential | Consumer Product Rebate - Lighting | 8,480,387.64 | 11,321,317.50 |
| Commercial and Industrial | New Construction | 8,150,088.27 | 10,880,367.84 |
| Residential | New Construction | 7,338,346.11 | 9,796,692.05 |
| Commercial | Other (Cannot Categorize) | 7,233,078.23 | 9,656,159.44 |
| Commercial | Other | 5,882,087.25 | 7,852,586.47 |
| Commercial | Small Commercial - Prescriptive | 5,370,730.04 | 7,169,924.60 |
| Commercial and Industrial | Self Direct | 5,288,568.31 | 7,060,238.69 |
| Industrial | Self Direct | 5,243,622.97 | 7,000,236.66 |
| Cross Sector | Codes & Standards | 4,255,929.09 | 5,681,665.34 |
| Residential | Whole Home - Direct Install | 4,187,300.65 | 5,590,046.36 |
| Cross Sector | Research | 3,406,787.08 | 4,548,060.76 |
| Commercial | Street Lighting | 3,233,949.26 | 4,317,322.26 |
| Residential | Other | 3,052,339.90 | 4,074,873.76 |
| Residential | Consumer Product Rebate - Appliances | 2,910,210.75 | 3,885,131.35 |

| | | | |
|---|---|---|---|
| Residential | Prescriptive - HVAC | 2,602,996.12 | 3,474,999.82 |
| Commercial | New Construction | 2,471,993.68 | 3,300,111.57 |
| Residential | Appliance Recycling | 2,452,577.53 | 3,274,191.00 |
| Residential | Consumer Product Rebate - Electronics | 2,419,557.45 | 3,230,109.20 |
| Industrial | Custom - Audit | 1,957,819.00 | 2,613,688.36 |
| Commercial and Industrial | Audit | 1,797,813.59 | 2,400,081.14 |
| Commercial | Small Commercial - Custom | 1,518,892.98 | 2,027,722.12 |
| Residential | Prescriptive - Insulation | 1,326,861.34 | 1,771,359.88 |
| Industrial | Prescriptive - Motors | 1,008,573.42 | 1,346,445.52 |
| Cross Sector | Marketing, Education, Outreach | 893,938.84 | 1,193,408.35 |
| Commercial | Custom - Other | 637,368.69 | 850,887.20 |
| Commercial | Custom - Audit | 371,358.02 | 495,762.96 |
| Cross Sector | Multi-Sector Rebates | 226,358.21 | 302,188.22 |
| Industrial | Prescriptive - Agriculture | 211,047.58 | 281,748.53 |
| Commercial and Industrial | Prescriptive | 205,116.30 | 273,830.26 |
| Commercial and Industrial | Custom | 179,781.36 | 240,008.11 |
| Commercial | Prescriptive - Grocery | 138,682.25 | 185,140.81 |
| Commercial | Prescriptive - Other | 104,896.49 | 140,036.81 |

# Appendix C Electric Demand Response Program Expenditures

In 2013, CEE modified the demand response program categories to align with those used by FERC. 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.
- Time-based programs, which generally employ graduated pricing schemes that incent customers to reduce load during system peaks.

## US Electric Demand Response Program Category Expenditures

Seventy percent of 2019 demand response program expenditures went to incentive-based programs, as shown in Figure C-1 below. Of those expenditures, one third (33 percent), went to direct load control programs, followed by interruptible load at 20 percent, emergency demand response at seven percent, and load as a capacity resource at four percent. "Other" incentive-based programs, or those that couldn't be categorized, accounted for 36 percent of expenditure (See Figure C-2.) Relative rankings within incentive-based program are similar to last year's with the exception that the proportion spent on Direct Load Control programs decreased from about half (46 percent) to about one third, with the difference shifting to tinterruptible load, emergency demand response, and other incentive-based programs. Interruptible load programs were 31 percent of reported expenditures in 2016, 25 percent in 2017, and 18 percent in 2018; it seems the proportion of expenditures on this program may have stabilized after having declined for the previous three years. For the second year in a row, the proportion of "other" incentive-based programs increased, from 10 percent of reported expenditures in 2016, 20 percent in 2017, 31 percent in 2018, to 36 percent in 2019. This is likely driven by program administrators more frequently being unable to break out incentive-based program expenditures.

Three percent of demand response expenditures went to time-based programs, about the same level as last year's results (four percent in 2017 and 2018). Of this spending, 60 percent was allocated to peak time rebate programs, 22 percent to critical peak pricing, 14 percent to real time pricing, and five percent to time-of-use pricing.

Figure C-1.

## 2019 US Electric Demand Response Expenditures: General Categorization

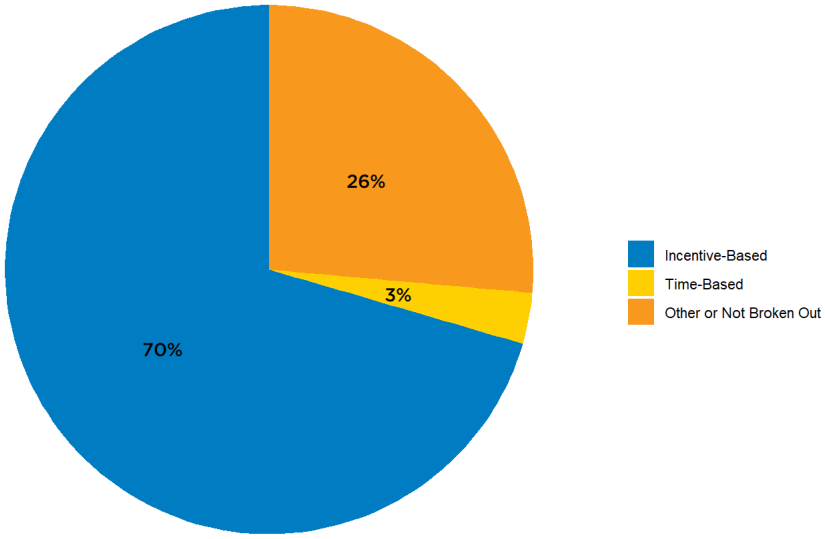



Figure C-2.

## 2019 US Electric Demand Response Expenditures: Incentive-Based Programs

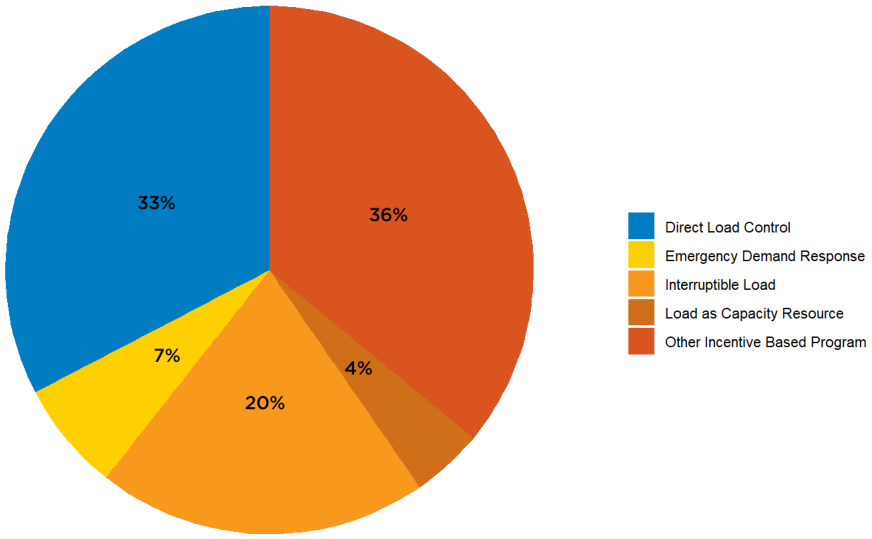



Figure C-3.

## 2019 US Electric Demand Response Expenditures: Time-Based Programs