Consortium for Energy Efficiency

CEE Annual Industry Report 2021

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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.

Acknowledgements

This report was made possible by partnerships with the American Gas Association and Efficiency Canada, who shared the results of their utility surveys with CEE. Thank you to Sapna and James Gaede for your ongoing generous collaboration.

The correct citation for all years of Annual Industry Report data is as follows:

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For an individual year, please cite the detailed report. The 2021 report is cited as an example below:

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

Contents

Executive Summary

For the sixteenth consecutive year, CEE has investigated the size and scope of the demand side management (DSM) industry in the United States and Canada, for both gas and electric programs. The purpose of this report is to capture the total spent on, and energy saved by, DSM programs, and track trends in the industry over time.

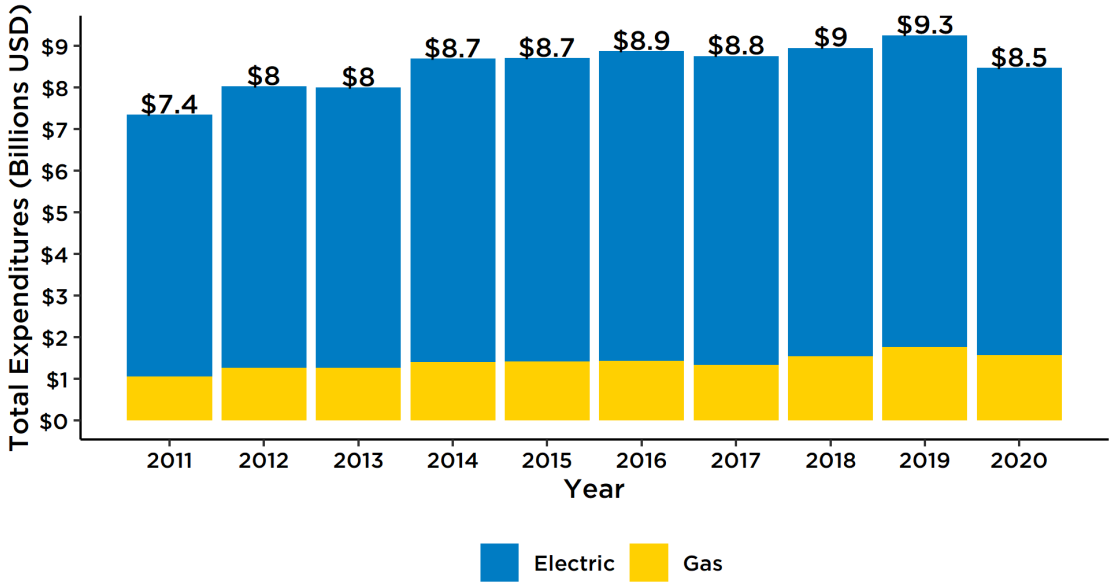
New Streamlined Data Collection Methodology

CEE modified our data collection approach this year to reduce the burden on program administrators and avoid duplicating compilation efforts of peer organizations. Instead of directly surveying program administrators, this year we report data collected by three other organizations: American Gas Association (AGA), Efficiency Canada, and the US Energy Information Administration (EIA). Because of the updated methodology, we caution against making comparisons beyond those provided in this year's report, particularly for demand response and Canadian data, because of the different reporting methods. Similar to past years, CEE carried over information from the previous year for program administrators that did not respond in 2021, so as to estimate program activity rather than allow totals for these administrators to fall to zero. Data carried over from 2020 was adjusted by the average rate of change in received responses from 2020 to 2021 surveys to account for general industry trends. Appendix A includes historical comparisons of the two methodologies.

North American Program Expenditures Decreased Modestly in 2020

In 2020, combined spending on gas and electric DSM programs across the United States and Canada totaled $8.5 billion, an almost nine percent decrease from 2019 spending. In real dollars, 2020 spending on DSM programs decreased about four percent from 2019 levels.

Figure 1. **US and Canadian Gas and Electric DSM Program Expenditures, 2011-2020**

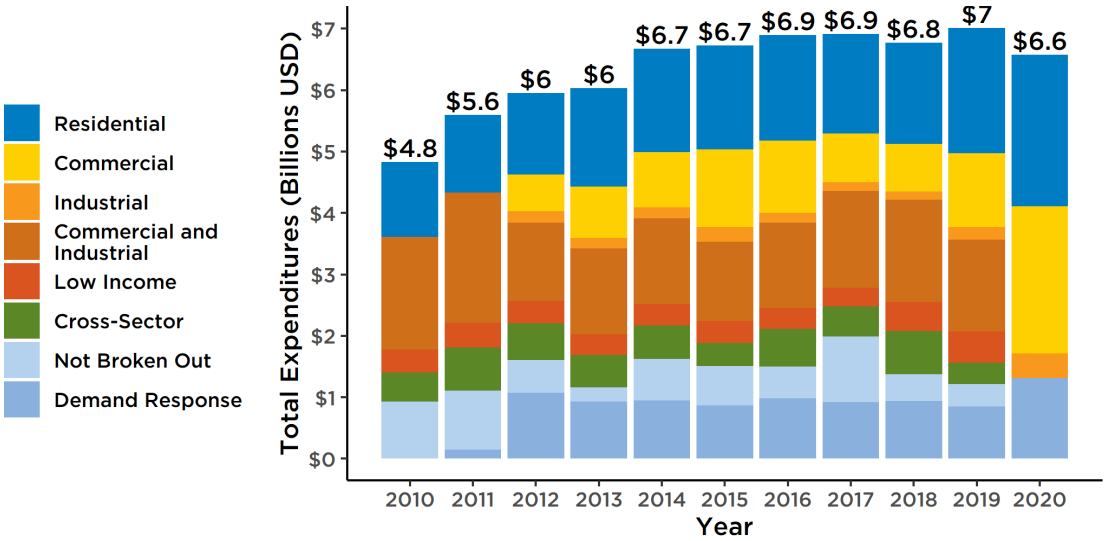


By all accounts, 2020 was not a typical year for any industry; the global COVID-19 pandemic and related economic and social impacts affected spending on, and energy saved by, DSM programs. However, the final story is more complex, and despite overwhelming challenges, the DSM industry continued to perform strongly, saving near-equivalent amounts of energy despite spending shortfalls observed in many jurisdictions.

Consistent Electric Savings in 2020, Decreased Expenditures

Spending on electric efficiency programs in the United States decreased to around $6.6 billion from $7.0 billion in 2019. Canadian DSM expenditures decreased to around $3.1 hundred million USD from $5.2 hundred million USD in 2019. US and Canadian DSM programs have saved approximately 31,438 GWh (29,669 in the US and 1,739.4 in Canada) which is consistent with 2019 savings of 31,678.3 GWh (29,990 in the US and 1688.3 in Canada).

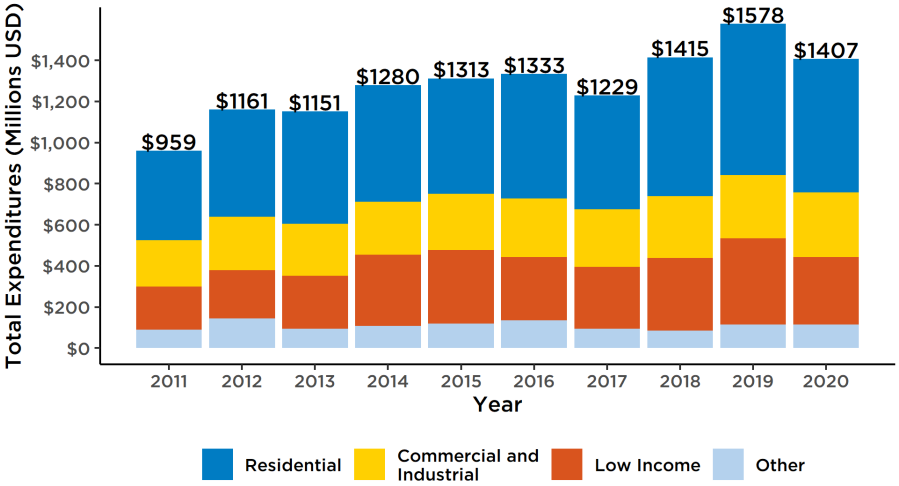
Figure 2. US Electric DSM Expenditure by Sector, 2010-2020



Consistent Gas Savings in 2020, Decrease in Expenditures

Gas expenditures in the United States decreased to about $1.4 billion from $1.6 billion in 2019. Canadian spending decreased as well, to $166 million USD from $192 million USD in 2019. In North America, natural gas savings amounted to 395 million therms (324 million in the US and 71 million therms in Canada). The 395 million therms saved in North America in 2020 is consistent with the 405 million therms (320 million therms US and 85 million therms in Canada) saved in 2019.

Figure 3. US Natural Gas Program Expenditures by Sector, 2011-2020



1 Introduction: The Story of COVID-19 and DSM in 2020

The year 2020 was extraordinary. The global COVID-19 pandemic changed so much about our lives, including how, when, and where we used energy, and how we engaged with demand side management (DSM) programs. It also impacted the financial stability of many, impacting the demographics of energy customers served by energy efficiency programs. The unusual circumstances arising from the pandemic did not impact all DSM programs in one direction, nor were the changes experienced universally among jurisdictions and populations.

During 2020, many saw their work life transition from office spaces to living rooms, impacting energy consumption in the residential sector; simultaneously, CEE members anecdotally observed that empty office buildings and industrial facilities offered a unique opportunity to engage in significant energy efficiency upgrades without having to disrupt normal activities.

According to research conducted by Efficiency Canada, "the pandemic disrupted energy efficiency programs, particularly in participation levels, which is reflected in most program administrators failing to meet spending budgets and savings targets established pre-pandemic." There were also anecdotal reports from CEE members that safety concerns around entering homes sparked or accelerated program administrators' efforts to offer virtual program delivery, including strategies such as do-it-yourself installations and remote home inspections.

"[T]he pandemic disrupted energy efficiency programs, particularly in participation levels, which is reflected in most program administrators failing to meet spending budgets and savings targets established pre-pandemic." -Efficiency Canada[1]

Some jurisdictions, such as British Columbia, were inspired to temporarily adjust incentive levels, which in their case "appears to have largely negated any detrimental impacts from the pandemic" in terms of program participation and program benefit.[2] While many program administrators reported early in the pandemic that they had to suspend many programs, they also reported many customers' desire to participate in programs and save energy in their homes increased. The multitude of complex and interacting factors impacting North American DSM programs in 2020 contextualizes observed changes in DSM program spending and savings.

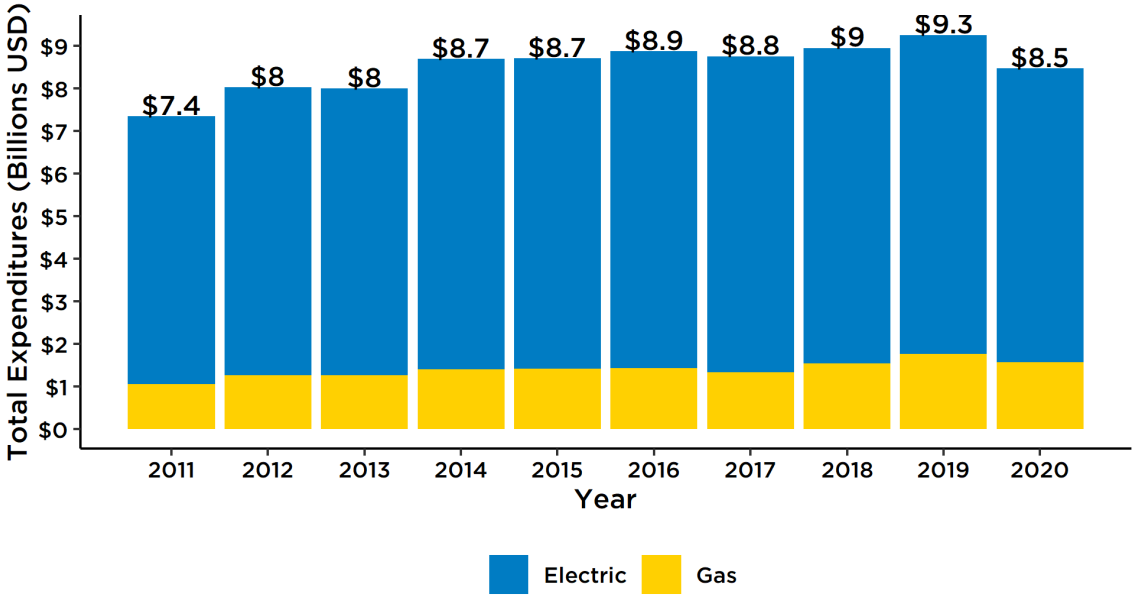
[1] Gaede, J., Haley, B., Abboud, M., Nasser, M., 2021. The 2021 Provincial Energy Efficiency Scorecard. Efficiency Canada, Carleton University, Ottawa, ON.

[2] Gaede, J., Haley, B., Abboud, M., Nasser, M., 2021. The 2021 Provincial Energy Efficiency Scorecard. Efficiency Canada, Carleton University, Ottawa, ON.

2 North American Expenditures

By all accounts, 2020 was not a typical year for any industry; the global COVID-19 pandemic and related economic and social impacts affected spending on, and energy saved by, DSM programs. However, the final story is more complex, and despite overwhelming challenges, the DSM industry continued to perform strongly, saving near-equivalent amounts of energy despite spending shortfalls observed in many jurisdictions. In 2020, combined spending on gas and electric DSM programs across the United States and Canada totaled $8.5 billion, roughly a nine percent decrease from 2019 spending. In real dollars, 2020 spending on DSM programs decreased about four percent from 2019 levels.

Figure 4. US and Canadian Gas and Electric DSM Program Expenditures, 2011-2020



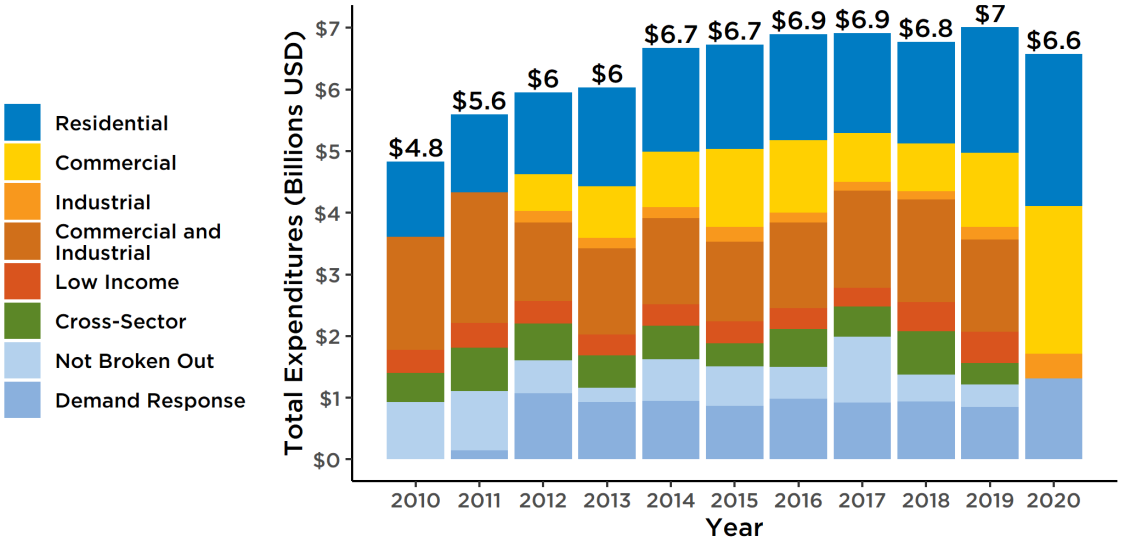
Beyond the influence of COVID-19 on reduced expenditures this year, the decrease in North American expenditures is also influenced by a shift in methodology to rely on third party data provided by Efficiency Canada. Efficiency Canada reports muti-fuel spending in addition to gas, electric, and unregulated fuels. This year, multi-fuel expenditures reported by Efficiency Canada were not included in this figure. We highlight this to emphasize these numbers slightly underrepresent the Canadian contribution to DSM expenditures, resulting in a deflation of North American expenditures as a whole. Should spending include Canadian multi-fuel expenditures, North American DSM spending would amount to approximately $8.8 billion USD.

3 Changes in Electric Savings and Expenditures

3.1 Spending on Electric Programs in 2020

In 2020, US electric energy spending decreased by a little over six percent from 2019 levels, from $7.0 billion to $6.6 billion. The 2020 figures were derived from a different source (EIA Form 861) than the previous data points, which were derived from CEE's Annual Industry Report survey. As a result, the sector breakdowns between 2020 and previous years are not identical, as EIA captures fewer categories than the previous survey. While overall US electric expenditures fell approximately six percent, combined residential and low-income expenditures only fell about three percent compared to 2019 figures. Combined commercial and industrial expenditures also only fell approximately four percent. Although demand response expenditures appear to have increased year over year, we cannot confidently compare demand response in 2020 because of the methodology change and differences in historical demand response reporting between CEE and EIA (see Appendix A.)

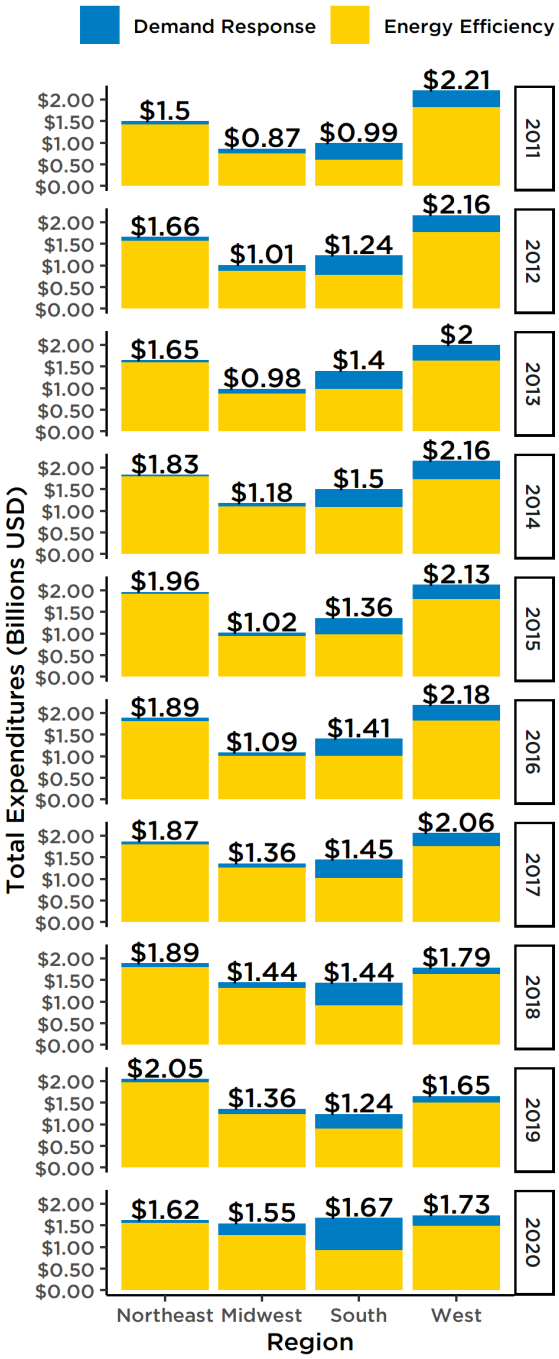
Figure 5. **US Electric DSM Expenditure by Sector, 2010-2020**



For the 2020 report, CEE leveraged data collected by Efficiency Canada to avoid over-burdening program administrators with duplicate efforts to understand industry spending and savings. For this reason, the methodology compared to prior years is not identical. Furthermore, Canadian spending reporting includes multi-fuel expenditures that cannot be directly broken out into gas and electric totals. However, Efficiency Canada also observed a decrease in spending in 2020 compared with previous years of their data collection. Part of what explains this decrease in Canadian DSM spending is a reduction in Ontario's electric DSM spending with the ending of the Conservation First framework, and the subsequent end of the interim framework; Ontario's spending on DSM decreased by over $100 million CAD between 2019 and 2020, accounting for a

large proportion in the decrease in overall spending. According to Efficiency Canada, the reduction in spending in 2020 was approximately $175 million CAD. They also note that many program administrators in Canada appear to be "maintaining the status quo if not ratcheting back program offerings and budgets," continuing a trend starting around 2018, suggesting that other factors beyond COVID-19 (such as reduced energy efficiency ambition at the provincial level as well as lower budgets achieving progressively lower savings) are at least partially responsible for the declining trend in DSM spending in the country.

Figure 6. **US Electric DSM Expenditures by Region and Type, 2011-2020**



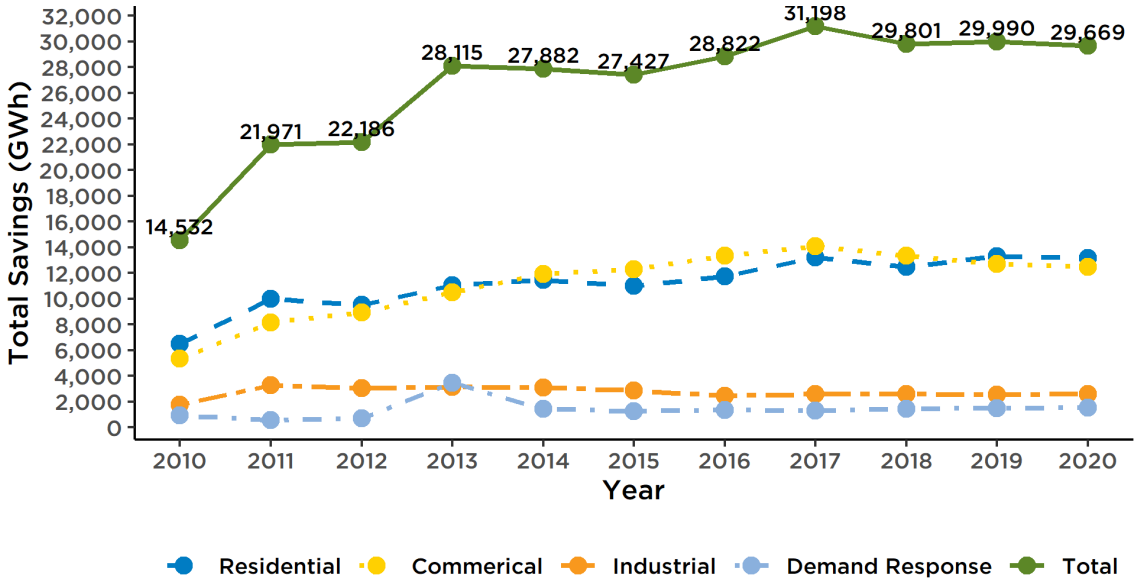
While overall US electric expenditures decreased between 2019 and 2020, due at least in part to the COVID-19 pandemic, the story becomes more complicated when considered at the regional level. As shown in Figure 7 to the left, total Demand Response (DR) expenditures in the Southern and Midwest regions both increased by over 100 percent from 2019 values, and total DR expenditures in the Western region increased by about 65 percent from 2019 levels. Only the Northeast saw a decrease in DR expenditures in 2020 (by about 14 percent compared with 2019 levels).

Given these trends, it may be that that the decline in DSM spending in 2020 is not solely an aberration due to COVID-19, and rather the changes are likely also part of the longer-term trend towards program administrators valuing the time and location of energy use above and beyond general kWh or therm energy savings realized by traditional energy efficiency programs. As noted in Appendix A, this increase in DR expenditure coincides with the methodology change. Next year's data will further highlight whether these changes are due to changes in reporting.

3.2 Where and How Much Energy was Saved in 2020

Despite declines in overall program spending in 2020, energy savings reported to the EIA were relatively flat between 2019 and 2020 (Figure 8). Based on Efficiency Canada's 2021 Scorecard report, net incremental electricity savings totaled 1,739.40 gigawatt hours. This is a 2.97% increase in electricity savings from 2019.[3] Energy saved by electric programs in the United States and Canada from 2020 equated to approximately 22 million metric tons of CO_2-equivalent emissions reductions. This is equivalent to the amount of carbon saved by eliminating the energy use of 4.3 million homes for one year or avoiding 55 million miles driven by an average gasoline-powered passenger vehicle[4], which is enough miles to circle the earth about 2.2 million times.

Figure 7. **US Energy Saved (GWh) from DSM Programs by Sector, 2010-2020. Based on data from EIA form 861**



[3] Given a change in methodology away from primary data collection, Canadian savings values are not comparable to past Annual Industry Reports.

[4] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

3.3 Grid and Renewable Infrastructure Trends

New in this 2021 report, we explored infrastructure and supply-side resources that support grid decarbonization and demand flexibility. As shown in Figure 9 and Figure 10, the prevalence of advanced meters (AMR/AMI)[5] has grown alongside the increase in solar and wind generation. These trends indicate both a greater capability and motivation to engage in demand response programs and an increase in the value of the time and location of energy saved.

Figure 8. Total Intermittent Renewable Nameplate Generation in the United States by Region and Technology, 2013-2020

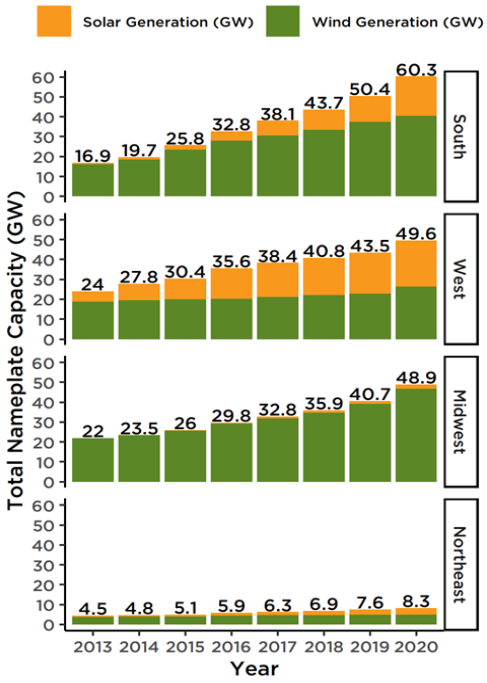
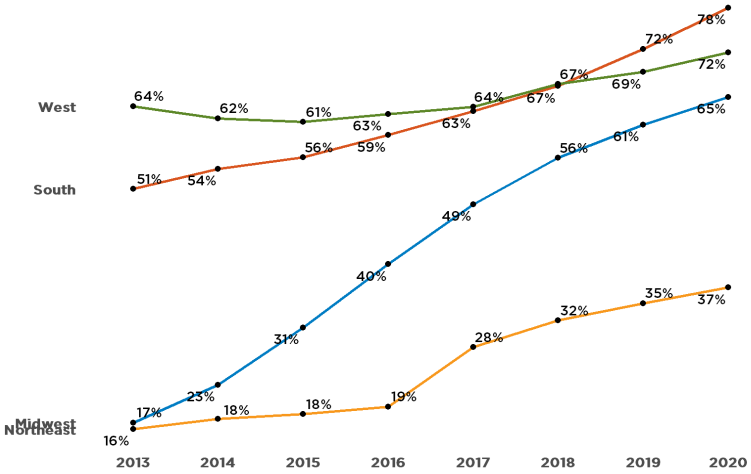


Figure 9. Proportion of all Electric Meters that are Advanced by Region, 2013-2020



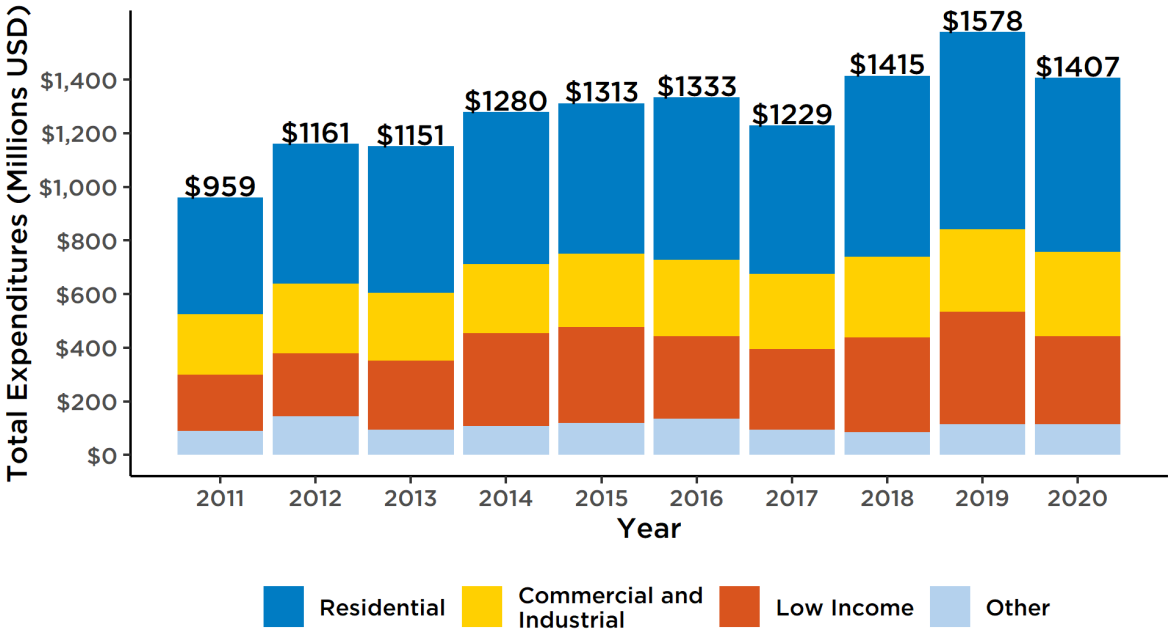
[5] "Advanced Metering Infrastructure (AMI): Meters that measure and record usage data at a minimum, in hourly intervals and provide usage data at least daily to energy companies and may also provide data to consumers. Data are used for billing and other purposes. Advanced meters include basic hourly interval meters and extend to real-time meters with built-in two-way communication capable of recording and transmitting instantaneous data." From EIA 861 Instructions

4 Changes in Natural Gas Savings and Expenditures

4.1 Spending on Natural Gas Programs in 2020

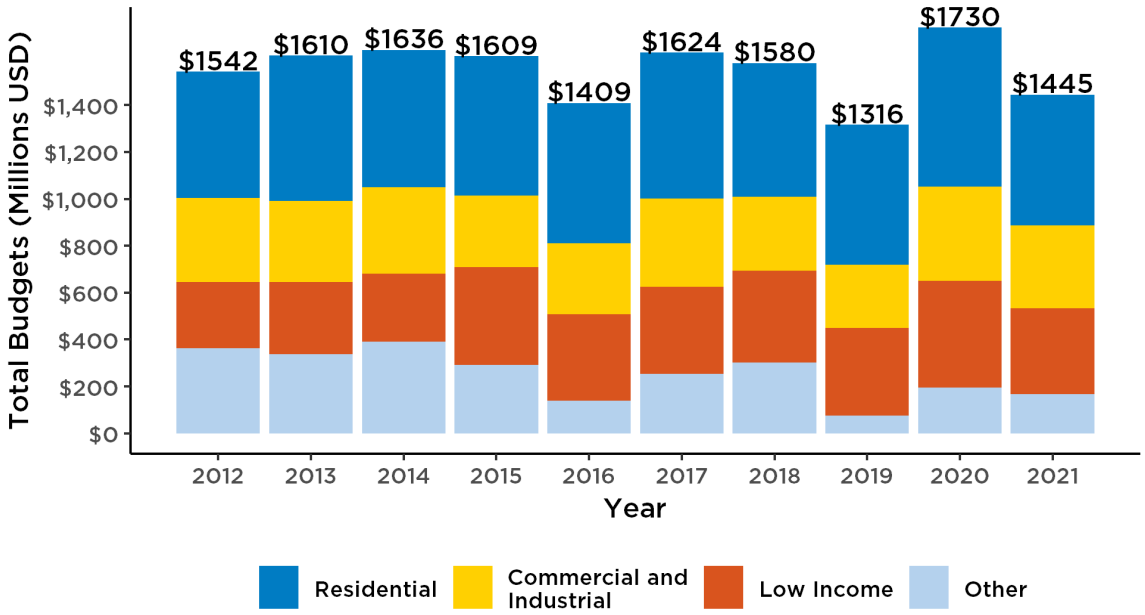
Spending on natural gas energy efficiency programs also declined. Total expenditures in the United States fell to about $1.4 billion, as compared to $1.6 billion observed in 2019. This represents an 11 percent decrease in spending over 2019, or an approximate nine percent decrease in real dollars. The year-over-year trend can be at least partially explained by the impacts of COVID-19. One survey respondent noted that four of their five programs did not meet spending budgets due to the pandemic and subsequent restrictions. Policy changes in many jurisdictions, such as revenue decoupling (e.g., Connecticut), rate caps for energy efficiency programs (e.g., Iowa), and even general cancellation of gas efficiency programs (e.g., South Dakota), also contributed to lower 2020 expenditures and 2021 budgets. However, while total spending on gas efficiency may have fallen relative to 2019, it still represents an 18 percent increase in overall spending over the last five years in real dollars.

Figure 10. US Natural Gas Program Expenditures by Sector, 2011-2020



Forward-looking budgets for natural gas programs also declined, as, in 2020, program administrators reported allocating $1.4 billion to gas efficiency programs in 2021, an approximate 16 percent decrease over budgets made in 2019 for program year 2020.

Figure 11. **US Natural Gas Program Budgets by Sector, 2012-2021**



On the Canadian side, 2020 expenditures have remained consistent from 2019 to 2020, shifting from approximately $172 million USD to $140 million USD. However, Efficiency Canada reports approximately $290 million USD in undifferentiated multi-fuel spending in 2020 that has not been broken about between gas and electric spending, which could mean the values mentioned above could slightly underrepresent the size of Canadian natural gas spending.[6]

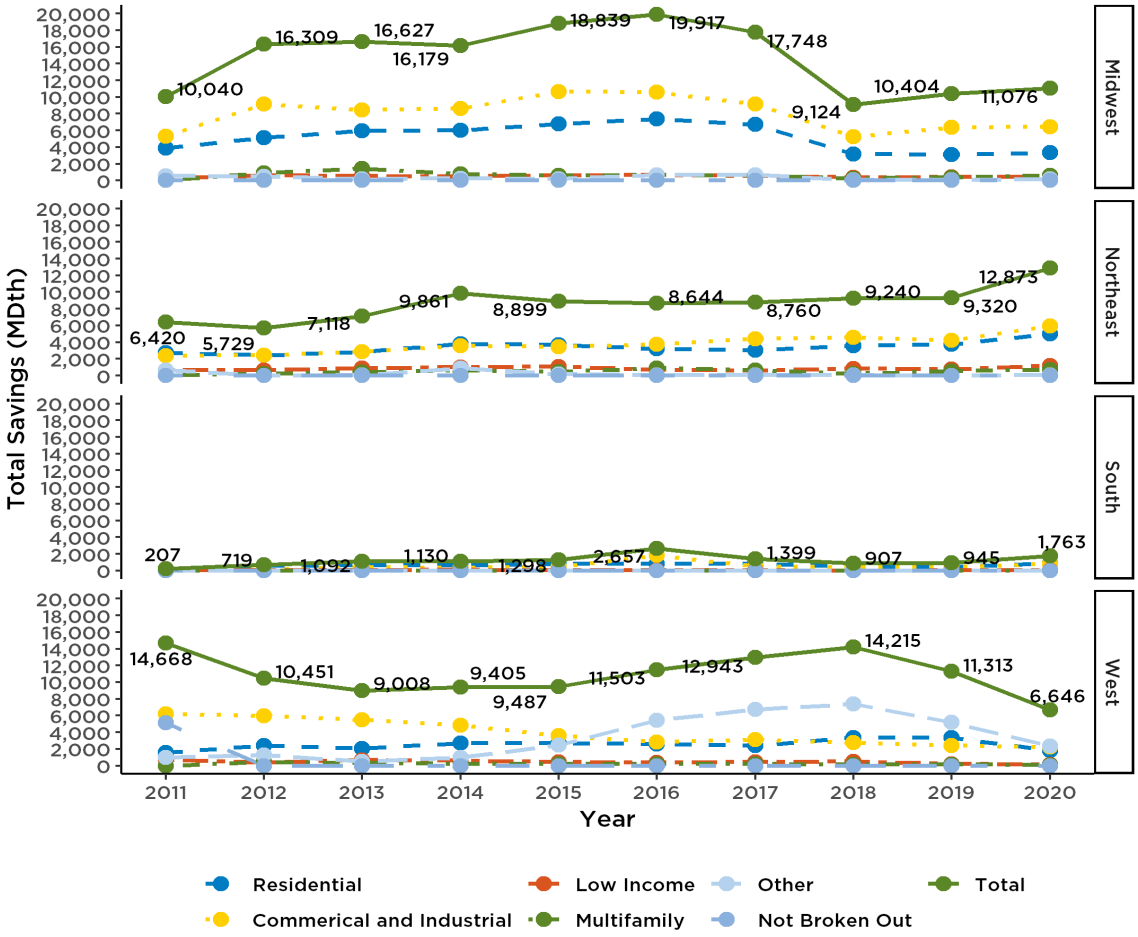
4.2 Where and How Much Natural Gas was Saved in 2020

Natural gas programs saved approximately 324 million therms in the United States and, 71 million therms in Canada over 2020. The combined 395 million therms of savings across Canada and the United States represents nearly 2.1 million metric tons of carbon dioxide emissions. To put that into perspective, that amount of carbon savings is equivalent to 5.2 billion miles driven by an average gasoline-powered car. Efficiency Canada reports a decline of approximately 14 million therms of savings from 2019 to 2020 which may reflect unprecedented impacts of the pandemic.

In the United States, the amount of energy saved by natural gas programs varied regionally, with the largest amount of savings coming from the Northeast and Midwest, where a larger proportion of households utilize natural gas as their primary heating fuel (see Figure 14).

[6] Please reference Efficiency Canada's report for more granular detail: Gaede, J., Haley, B., Abboud, M., Nasser, M., 2021. The 2021 Provincial Energy Efficiency Scorecard. Efficiency Canada, Carleton University, Ottawa, ON.

Figure 12. Total US Energy Savings (MDth) by Region and Year, 2011-2020



Although natural gas expenditures declined somewhat from 2019, natural gas savings declined less so, and savings declines were mostly in the west. Data from program administrators on budgets for 2021 suggests that this trend is likely to continue. This trend is prescient of increased focus on electrification as a path to decarbonization, which may lead utilities to continue to increase allocation of resources to demand management, beneficial electrification, and electric efficiency to offset accompanying increased load.

Appendix A Historical Comparison of Data Collection Methodology

As noted in the Introduction, this year we used a new data collection methodology relying on EIA 861 and data collected by the AGA and Efficiency Canada data rather than conducting primary data collection with members. This change was designed to reduce duplication of efforts and reporting burden for program administrators. To quantify the effects of the 2020 data collection methodology change on historical trends, we recalculated historical expenditures for 2011-2019 using the new 2021 methodology for 2020 EIA data.[7]

Results, displayed below, suggest that energy efficiency spending data from EIA is consistent across the old and new methodologies, but that the new methodology captures more demand response spending.

Figure 13. **Total Electric DSM Expenditures from CEE's AIR and EIA Form 861 2011-2019**

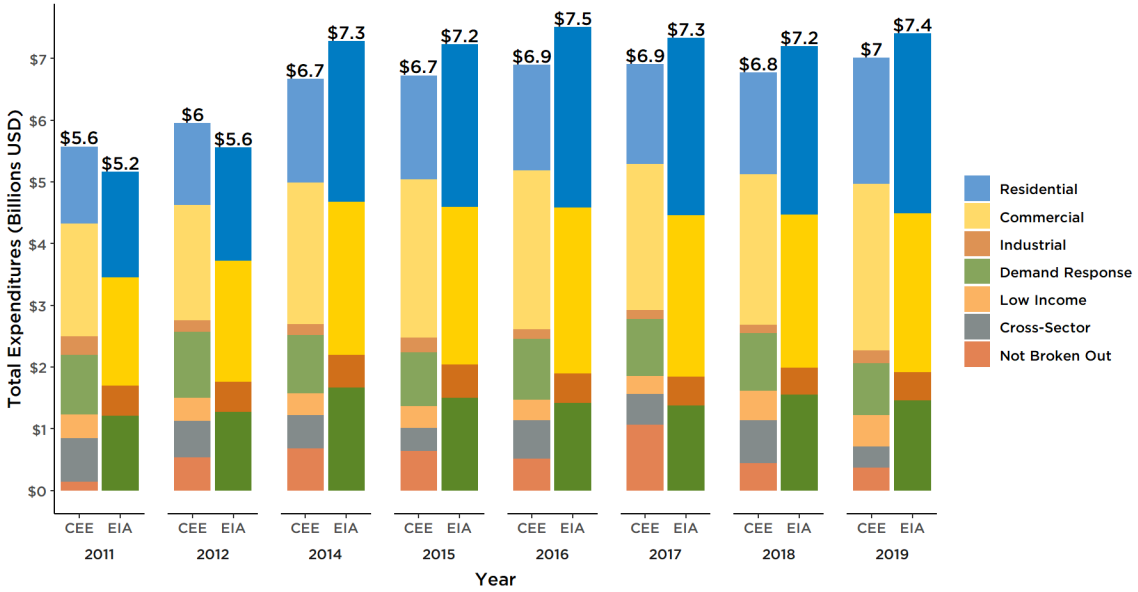


Figure 15 above plots the differences between CEE's primary survey results (as presented in previous reports) and data from EIA form 861, consistent with the new methodology. Overall expenditures are generally consistent across both methodologies year over year. There are some consistent differences in sector attribution, and this comparison highlights spending captured in EIA data that may not have been included in CEE's survey, specifically related to demand response.

[7] 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/.

Figure 14. **Percent Difference Between EIA Expenditures and CEE's AIR Total Expenditures 2011-2019**

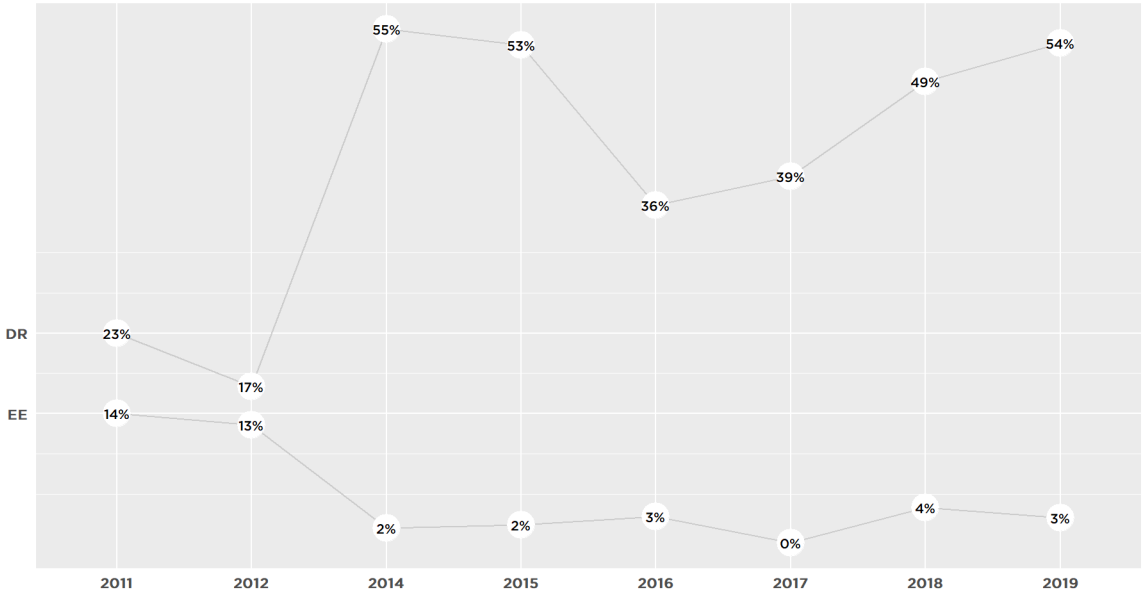


Figure 16 highlights the percent difference between EIA and Annual Industry Report expenditures over time, broken down by energy efficiency and demand response. Starting from 2014, a year after EIA data separated DSM expenditures into energy efficiency (EE) and DR expenditures, there is less than 5% difference between data sources in tracking of EE expenditures, but the EIA accounted for more DR spending than CEE's primary survey efforts. In transitioning data collection methodology, energy efficiency data can be compared across years, and this year's Annual Industry Report supports a more complete account of total DR expenditures.