Benchmarking Canadian province and American state energy efficiency program savings and spending

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Efficiency Canada

Carleton University

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Abstract

The American Council for an Energy-Efficient Economy (ACEEE) has tracked state energy efficiency policy and performance in its State Energy Efficiency Scorecard since 2006. Efficiency Canada published the first Canadian provincial Scorecard in 2019. Both reports follow a similar approach, collecting annual data from information requests to program administrators and policymakers as well as from public databases, and benchmarking state/provincial performance across a range of comparable metrics.

Following the release of the first Canadian Scorecard, Haley et al. compared the results with the latest US Scorecard on a selection of program-related metrics. This report updates that comparison using data from Canada's 2021 Provincial Energy Efficiency Scorecard and the American State Energy Efficiency Scorecard 2021 Progress Report. It benchmarks states and provinces along easily comparable program metrics, including: net incremental electricity, natural gas and non-regulated fuel savings; electricity savings targets; and energy efficiency program spending.

The results show that the COVID-19 pandemic impacted energy savings and spending in both countries in 2020. However, despite drops in electricity savings and total program spending in both countries between 2018 and 2020, leading US states continue to achieve higher performances than Canadian provinces, particularly in electricity savings and targets. When considering median results, Canada is slightly ahead of the U.S. in natural gas and non-regulated fuel savings and efficiency program spending.

The benchmarking shows that opportunities to improve efficiency program savings and spending continue to exist across many jurisdictions. Both countries have increased commitments to energy efficiency in response to the impacts of the pandemic, the climate crisis, and inequality and rising energy costs.

Introduction

After the release of the 2019 Canadian Provincial Energy Efficiency Scorecard, Haley et al. produced a report[1] comparing results on a selection of metrics from the American Council for Energy-Efficient Economy's (ACEEE) State Energy Efficiency Scorecard.[2] This benchmarking aimed to present a North American perspective on the state of energy efficiency policy based on 2018 energy efficiency policy and program data.

This report compares results from the latest Canadian and American Scorecards, released in 2021, which report on 2020 energy efficiency policy and program data. Scorecard metrics compared in this report are net incremental electricity savings, natural gas and non-regulated fuel (NRF)[3] savings; electricity savings targets; and efficiency program spending. Unlike in the Scorecard reports, no points are awarded to provinces/states in this report. Instead, we benchmark the states and provinces on these metrics. We exclude jurisdictions from the analysis that achieved no results, or that did not report any, to produce median values reflecting the performance of jurisdictions with active efficiency measures. In three of four metrics (the exception being electricity savings), a greater percentage of states than provinces are excluded due to nil or non-reported results. For the list of jurisdictions we considered, see the appendices at the end of this report.

Table 1 summarizes the general findings. Median US electricity savings and electricity savings targets are well ahead of those in Canada, while Canadian median natural gas and NRG fuel savings and efficiency program spending slightly exceed those in the US. On all four metrics, the performance of leading states exceeds that of the best-performing provinces.

[1] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard."
[2] Berg et al., "The 2019 State Energy Efficiency Scorecard."
[3] Non-regulated fuels are fuels that are used for energy and heating purposes but are not regulated by a utility (e.g. propane, heating oil, wood).

Table 1. 2020 Canada-US Savings and Spending Comparison Results				
	Electricity Savings (% of Sales)	**Electricity Savings Targets** (Avg. % of Annual Forecasted Sales 2020-2025)	**Natural Gas & Non-Regulated Fuel Savings** (% of Sales)	**Efficiency Program Spending** ($CAD/Capita)
Median, All reporting jurisdictions				
Canada	0.43%	0.48%	0.40%	$25.24
US	0.67%	1.20%	0.35%	$22.55
Mean, Top 30% of jurisdictions				
Canada	0.71%	0.99%	0.70%	$66.55
US	1.58%	1.91%	0.80%	$73.65

We calculate median and mean based on jurisdictions that report some level of results, with each jurisdiction counting as one unit. We exclude those that do not report or whose results are zero. We present the median of each metric per country as well as the mean of the top 30% of performers per country. Because the number of reporting jurisdictions varies per metric, the number of jurisdictions represented in the top 30% performers also varies. We rounded to the nearest whole jurisdiction where necessary: electricity savings (3 [2.7] provinces, 14 [14.4] states), electricity savings targets (2 [2.4] provinces, 8 [7.5] states), natural gas and non-regulated fuel savings (3 [2.7] provinces, 10 [9.6] states), efficiency program spending (3 provinces, 15 [14.7] states).

2020: A Year in Review

The COVID-19 pandemic caused widespread disruptions to energy efficiency efforts in both Canada and the US. Administrators faced unprecedented challenges, including pausing efficiency programs during regional lockdowns, adapting to virtual environments, and facing supply chain challenges. Jurisdictions also saw unexpected drops in program participation. Thousands found themselves temporarily out of work, and extreme weather events exacerbated energy burdens and economic challenges. These include the winter storms that brought widespread power outages to Texas and an exceedingly hot summer in western Canada.

Most provinces did not meet their 2020 efficiency program spending budgets, and many missed low-income efficiency program spending targets. Administrators were forced to shift attention toward addressing the acute impacts of COVID-19, which affected the delivery and performance of efficiency programs. Canadian net incremental energy savings continued to decline. Between 2018 and 2020, energy savings declined by 34.3%. Electricity savings represented the most significant decrease (47.4%), largely due to the Ontario government's premature ending of the Conservation First Framework and the consequent cancellation of most residential programs. Canadian net incremental natural gas savings fell by 15.5% during the same timeframe.[4]

Between 2018 and 2020, US electricity efficiency program spending declined by $500 million USD while natural gas efficiency spending increased by $100 million USD. This resulted in an overall decrease in efficiency program spending from $8 billion USD to $7.6 billion USD. In the same time period, net incremental electricity savings fell 1.8% and natural gas and NRF net incremental savings rose by 0.4%, equating to a US energy savings decline of 1.1%.[5]

American states weathered the pandemic in vastly different ways. In 2020, more than half of states saw an electricity savings decline of 10% to 20% from the previous year. On the other hand, many states that typically ranked high on ACEEE's State Scorecard (such as Michigan and New York) reported significant increases in electricity savings. These states showed concerted efforts to adapt programs to the unique circumstances of the pandemic, such as directing funds toward programs that required less in-person contact in order to meet targets under their Energy Efficiency Resource Standards.[6] Due to the unique circumstances brought on by the pandemic throughout 2020, ACEEE chose to publish an unranked State Energy Efficiency Policy Progress Report rather than a formal Scorecard ranking in 2021.[7]

During the pandemic, in both Canada and the US, energy efficiency gained policy attention as a way to "Build Back Better," help people with energy costs, create new jobs, and reduce inequality. For example, Natural Resources Canada launched the Greener Homes program, which provides grants for residential energy efficiency improvements, and the Canada Infrastructure Bank earmarked $2 billion CAD in their budget for large building retrofits.[8] Likewise, the US signed a $1 trillion USD infrastructure bill which includes funding for energy codes, electrification, and energy-efficient retrofits.[9]

Canadian provinces introduced new energy efficiency initiatives. Municipal Property Assessed Clean Energy (PACE) funding programs were enabled by three provinces. This includes British

[4] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 35, 48.
[5] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report"; Berg et al., "The 2019 State Energy Efficiency Scorecard."2019
[6] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 13.
[7] For ease of readership, we will refer to the ACEEE Progress Report as the U.S. Scorecard.
[8] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 10.
[9] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," v.

Columbia's $2 million commitment to develop a PACE roadmap and pilot program in support of the post-pandemic economic recovery.[10] Adaptive solutions were implemented throughout the pandemic, including virtual energy audits to allow for safe social distancing and HVAC system upgrades to create healthier buildings. Many empty public facilities saw retrofit projects that would have been otherwise difficult if filled with patrons.

Several US states with leading energy efficiency performances passed legislation to further strengthen efficiency efforts. For example, Massachusetts enacted a climate-forward energy efficiency roadmap establishing a 2050 net-zero emissions goal, included new "avoided greenhouse gas" targets for utility energy efficiency programs and incorporated the social cost of carbon in program cost-benefit analyses. Illinois enacted the Climate and Equitable Jobs Act, setting 2045 carbon-free electricity goal, along with increased investment toward low-income programs, plans to develop a statewide stretch code, and utility reforms enabling electrification measures in efficiency programs.[11]

Benchmarking

Electricity Savings

This section compares provincial and state net incremental electricity savings as a percentage of residential, commercial, and industrial domestic sales to end-users. Incremental energy savings are the changes in energy use attributable to a particular energy efficiency program in the year that it was offered. Net savings are the energy savings associated with a program after estimates for free ridership, spillover, and other modifying impacts are considered.[12] Domestic sales data are reported via utility regulatory documents and through annual information requests in the Canadian Scorecard, with data being updated annually.[13] The American Scorecard uses data from state utility regulatory commissions and the US Energy Information Administration (EIA).[14] Fifty-seven jurisdictions (47 states, the District of Columbia, and 9 provinces) were included in this metric (see Appendix A). Four jurisdictions reported no savings (including one province, Saskatchewan) and were excluded from the comparison.

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[10] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 14.
[11] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," viii, 8.
[12] https://www.energy.gov/sites/prod/files/2015/01/f19/UMPChapter17-Estimating-Net-Savings.pdf
[13] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 39.
[14] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report." 18.

Canadian electricity savings were collected from annual demand-side management reporting and information requests to program administrators and jurisdictional policymakers. For any Canadian data reported as gross savings, Efficiency Canada applied a net-to-gross (NTG) ratio[15] of 0.872, based on an average of Canadian provinces reporting this ratio.[16] The NTG ratio used by the ACEEE for states only reporting gross savings was 0.839, which is also based on a ratio average among 15 states that reported both net and gross savings.[17]

In the previous comparison, the top three performing American states (Massachusetts, Rhode Island, and Vermont) recorded an average electricity savings of 2.64% of sales in 2018. The top two Canadian provinces, Ontario and Nova Scotia, ranking ninth and tenth, respectively, recorded an average of 1.37%. The remaining provinces ranked between 28th and 49th of 59 jurisdictions that reported savings, and achieved savings ranging from 0.20% to 0.68% of electricity sales.[18]

The 2020 data shows that the top three performing jurisdictions (Massachusetts, Rhode Island and Maryland) had an average saving of 2.16%. As in our previous comparison, only two Canadian provinces (Nova Scotia and Prince Edward Island) placed among the top 25 jurisdictions. Nova Scotia reported a savings of 0.86%, and Prince Edward Island (PEI) reported a savings of 0.76%. Seven of nine provinces reported savings of 0.52% or less. Only Québec and PEI saw an absolute increase in electricity savings between 2018 and 2020. Savings decreased in all other provinces. Savings also decreased in many US states, illustrating challenges faced across jurisdictions due to COVID-19.

[15] Net-to-gross ratio is the average percent difference between gross savings and total savings directly attributable to energy efficiency programs after free-ridership and interaction effects have been accounted for.
[16] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 248.
[17] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report."
[18] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard," 10.

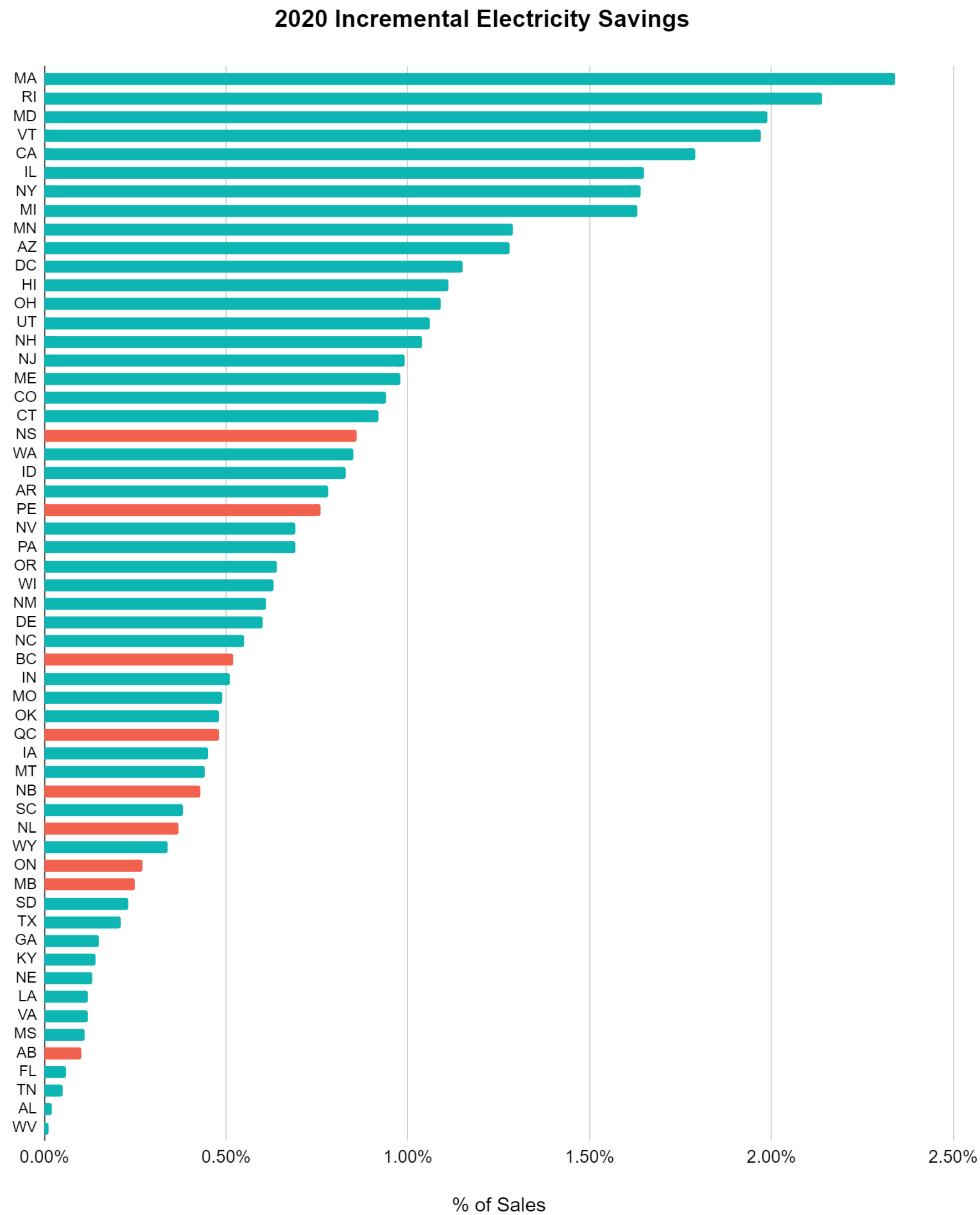

Figure 1. *North American incremental electricity savings as a percentage of domestic sales, 2020 (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings).*

Electricity Savings Targets

Both Scorecards evaluate state/provincial electricity savings targets, albeit in slightly different ways. ACEEE evaluates state energy efficiency resource standards (EERS). These are policies which set mandatory, multi-year (i.e., three or more) targets for electricity or natural gas savings. The targets may be annual (e.g., 1% or 2% incremental savings per year) or cumulative.[19] Savings targets may vary from year to year in a plan if the state intends to gradually increase the targets throughout the lifespan of the EERS. The 25 states with an EERS are included in our metric benchmarking and are listed in Appendix B.

In 2020, only three provinces had efficiency target policies approximating an EERS in the US (British Columbia, Manitoba, and Québec). The more common practice is to establish multi-year savings and spending targets through regulatory board proceedings for demand-side management or long-term utility resource plans.[20] Two of ten provinces (Alberta and Saskatchewan) did not have electricity savings targets in 2020. To compare Canadian savings targets with US EERS policies, we averaged each province's targeted annual incremental electricity savings over their planning period (as a percentage of annual forecasted sales).

In 2018, the data showed a difference in ambition between Canada and the US. The top 11 American states targeted 1.5% of sales or greater – to as high as 2.7% – while Canada's top performer, Nova Scotia, ranked 19th overall with a target of 1.1% of sales. All other Canadian provinces set their sights on electricity savings less than 0.8%.[21] In 2020, nine states set targets of 1.5% of sales or greater and an additional ten set targets between 1% and 1.4%. Canada's top performer was once again Nova Scotia, which set a target of 1.02% of sales and was ranked 17th among all jurisdictions. Seven of eight provinces set targets below 1% of sales (see Appendix B). The highest savings target was in Massachusetts, at 2.7%, and Canada's highest target was less than half of this level. Since 2018, seven provinces have increased their annual savings targets; only Nova Scotia and New Brunswick reduced their targets. In the case of Saskatchewan, reported no target at all.

It is important to note that Manitoba has a long-term, annual electricity savings target of 1.5%, which is set by provincial legislation (and is thus similar to an EERS). Savings from efficiency programs, load displacement, and codes and standards work are counted toward this target.

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[19] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report", 32.
[20] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 60.
[21] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard", 12.

Because the two Scorecards only consider savings from efficiency programs, or any savings from codes and standards directly attributable to program activity, Manitoba's saving target in this analysis equates to 0.71%.

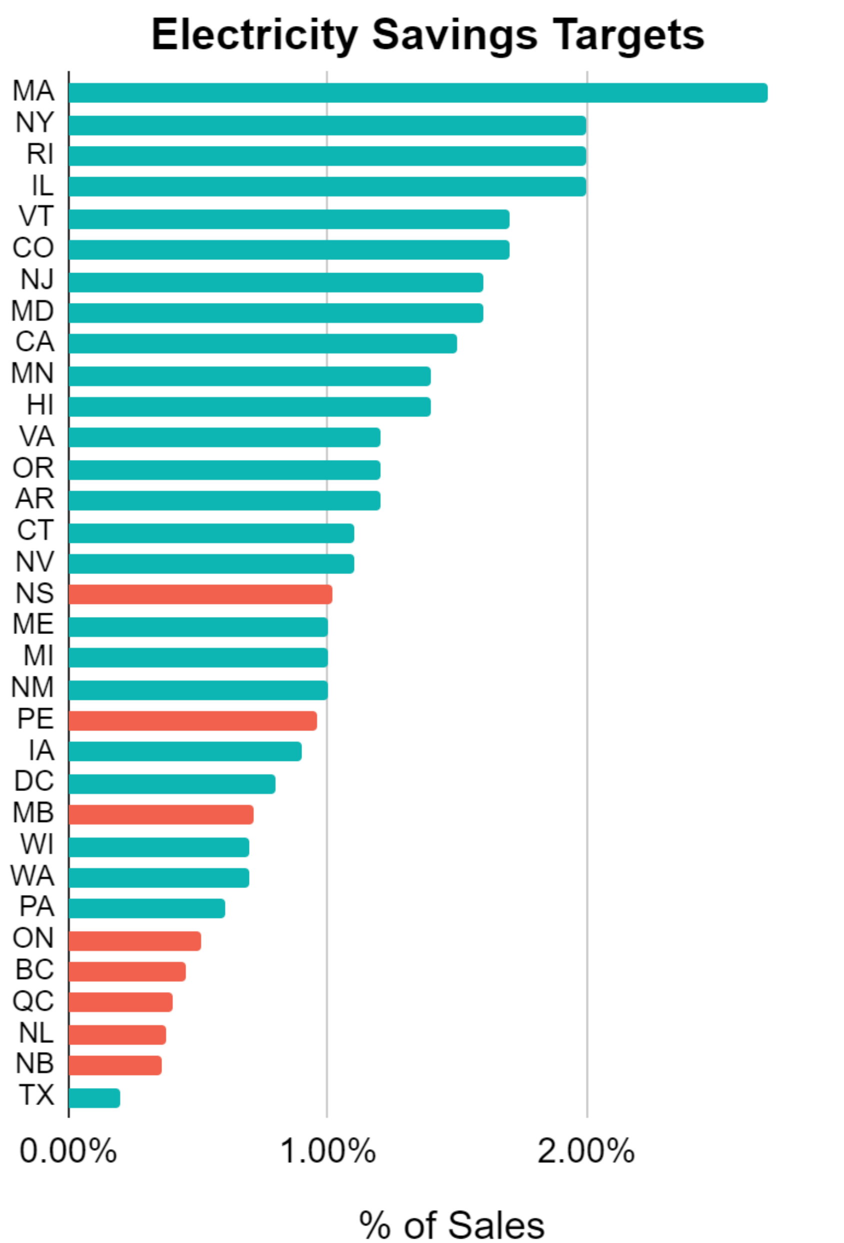

Figure 2. *North American average annual electricity savings targets as a percentage of annual forecasted sales over planning period, between 2020-2025 (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings target).*

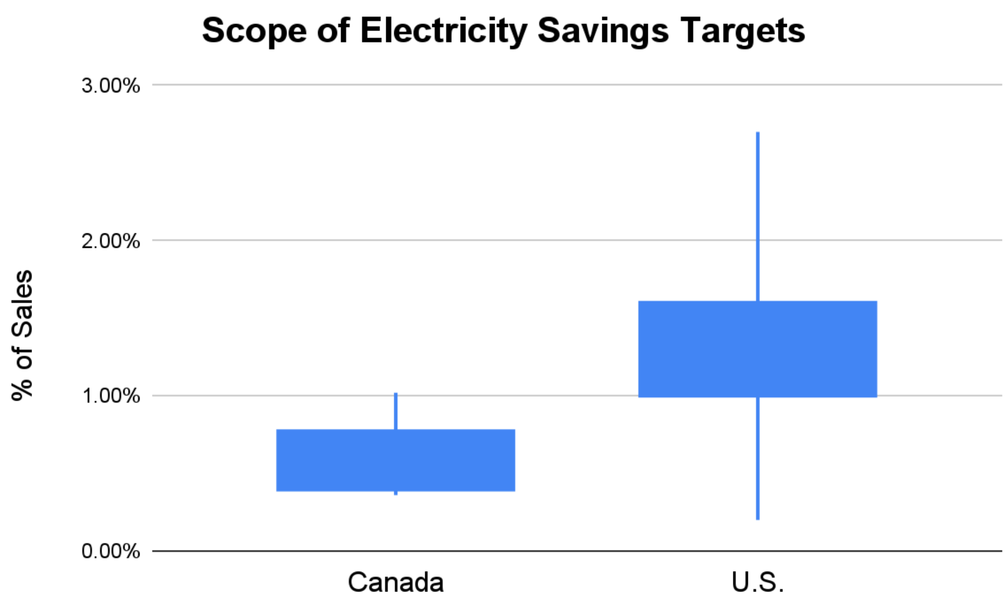

Figure 3. *The bulk of American states target savings above 1%, with leaders reaching toward 2.5%. In comparison, all but one Canadian province set savings targets below 1%.*

Natural Gas & Non-Regulated Fuel Savings

In the 2021 Canada and US Scorecards, net incremental natural gas and non-regulated fuel (e.g. wood, propane, heating oil) savings are combined in one metric. Because Atlantic Canadian provinces and states like Maine use little natural gas[22] and other provinces/states use proportionally less non-regulated fuels (NRFs), combining them allows comparison across jurisdictions with different fuel mixes. Forty-one jurisdictions reported savings in 2020: nine provinces, 31 states and the District of Columbia (see Appendix C). As with electricity savings, this report compares net incremental savings as a percentage of sales (or end-use energy demand or consumption for non-regulated fuels). Jurisdictions that reported no savings have been excluded from the metric comparison.

One complication in making this comparison is that the Canadian Scorecard uses a denominator that includes residential, commercial and industrial end-use energy demand for both natural gas and non-regulated fuels, while the American Scorecard excludes natural gas

[22] "U.S. Energy Information Administration - EIA - Independent Statistics and Analysis."

industrial sales and industrial consumption of non-regulated fuels. Because some Canadian provinces' natural gas consumption is primarily in the commercial and industrial sectors, it is necessary to add industrial sales to the US figures to more accurately compare Canadian and American consumption. ACEEE provided guidance on sourcing industrial equivalents of their residential and commercial natural gas sales and NRFs consumption data from the EIA.[23]

In fifteen jurisdictions, all or a portion of natural gas and NRF savings were reported as gross (see Appendix C). In these cases, an NTG ratio was applied. The Canadian Scorecard uses a natural gas NTG ratio of 0.828 and a ratio of 0.802 for NRFs, while the American Scorecard uses a natural gas and NRF ratio of 0.867.[24] These ratios are based on averages of states and provinces reporting gross and net savings.

The previous comparison could only compare natural gas savings because the Canadian Scorecard did not track NRF savings in 2018. We introduced this tracking in the 2020 Canadian Scorecard and can now compare Canada and the US on a combined natural gas and NRF savings metric. In the previous comparison, Québec ranked among the top ten jurisdictions in natural gas savings. Ontario followed in 15th place, while the remaining provinces ranked in the bottom half among the 39 jurisdictions that reported savings. Similar to the comparison of electricity savings, the top two performing states were Massachusetts and Rhode Island, which together averaged more than double the savings of Canada's second-place province.[25] Québec's top performance can be explained by provincial government programs that focused their greenhouse gas reduction efforts on natural gas efficiency and which operated alongside separate utility natural gas programs. Additionally, the natural gas market in Québec is dominated by industrial and commercial consumers, which provide ample opportunity for large-scale reduction.

One fewer state and three additional provinces (Nova Scotia, New Brunswick, Prince Edward Island) are included in the 2020 comparison. The addition of Atlantic Canadian provinces is due to the inclusion of NRF savings. The top jurisdiction was Vermont, with a savings of 1.16%. The top five performers averaged 0.97%. PEI and Québec ranked 5th and 7th place, respectively, with 0.87% and 0.81% savings (see Figure 3).

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[23] "U.S. Energy Information Administration (EIA)"; "United States - SEDS - U.S. Energy Information Administration (EIA)."
[24] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard."; Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 20, 21.
[25] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard," 10, 13.

The addition of NRF savings to the natural gas savings metric impacted performance rankings. Since the first comparison, Ontario fell from 15th to 23rd position, and Alberta fell from 26th to 36th position (Alberta's incremental natural gas savings also saw a significant decline during this time). Neither province reported NRF savings in 2020. There is a notable change of states in the top ten performers, though the average savings changed by just 0.04%. British Columbia moved upward from 24th to 13th position. This is explained by improved natural gas savings between 2018 and 2020.[26] Six of the nine reporting provinces saw a decrease in savings from the previous year, illustrating the disruptive impact of COVID-19 on efficiency efforts.

[26] Gaede, Haley, and Chauvin, "2020 Canadian Provincial Energy Efficiency Scorecard," 44; Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 42.

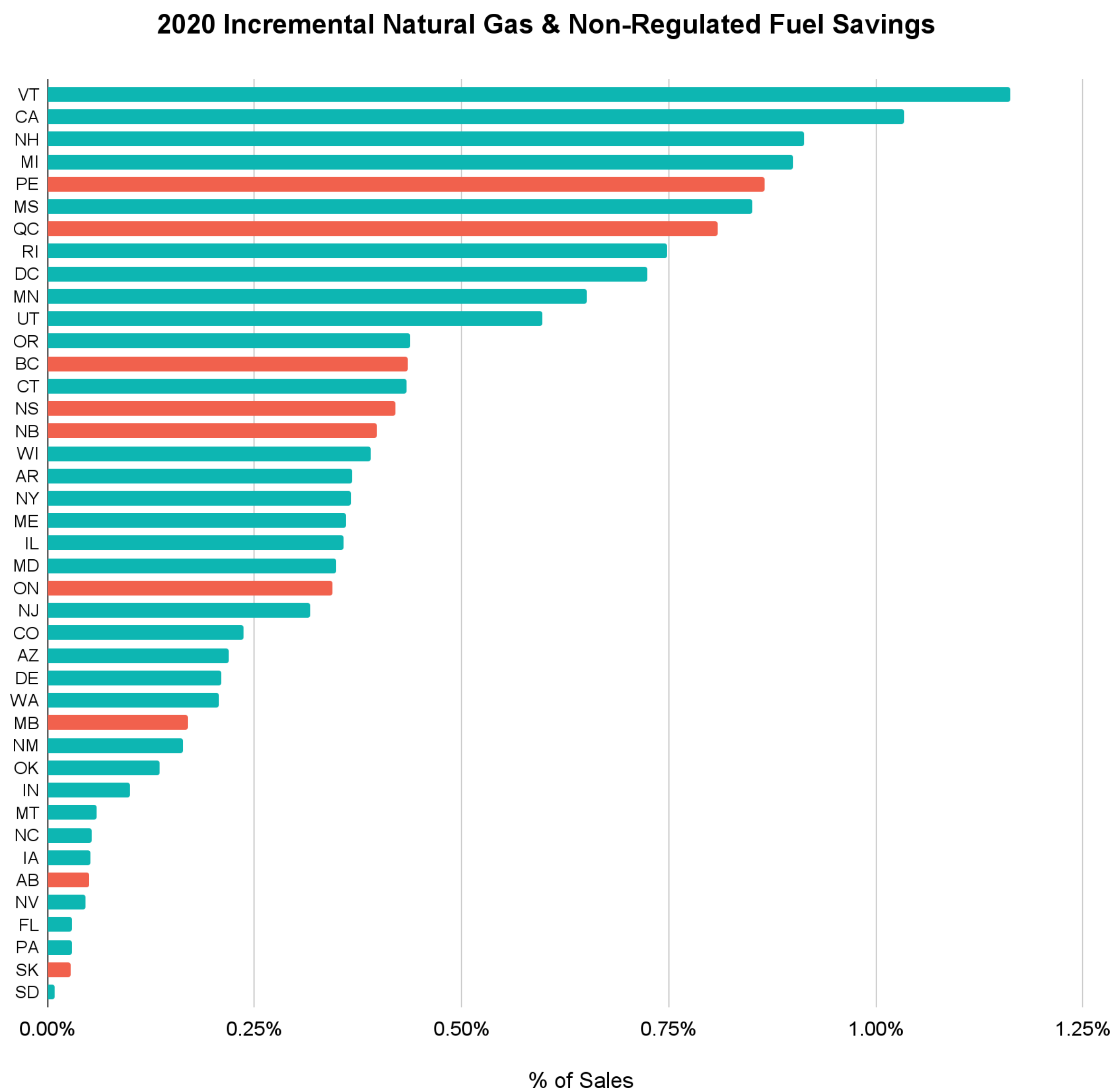

Figure 4. *North American incremental natural gas and non-regulated fuel savings as a percentage of domestic sales/end-use demand, 2020 (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings).*

Program Spending

An energy efficiency program spending metric is an additional indicator to contextualize a jurisdiction's energy efficiency efforts. While energy savings metrics allow us to see the direct results of efficiency programs, spending metrics can provide additional insight on energy savings efforts, as well as less easy-to-measure market transformation and enabling policies that may not be captured in savings metrics. These include codes and standards work, innovation or research and development, or public awareness, education and marketing. In total, 60 jurisdictions reported some level of program spending in 2020: ten provinces, 49 states and the District of Columbia. Because there was no spending reported in Alaska, the state was excluded from the comparison.

The Canadian Scorecard evaluates total spending on a per capita basis, regardless of fuel type. Canadian spending data include government-funded programs and utility ratepayer funded programs. The US Scorecard evaluates spending differently depending on fuel type. US efficiency spending that targets NRF savings or is blind to fuel type is summed with electricity efficiency spending and expressed as a percentage of electricity sales revenues. Natural gas spending is assessed per residential natural gas customer to correct for any bias in states where natural gas service is only available to a portion of the population. US spending data includes utility ratepayer-funded efficiency programs, the Regional Greenhouse Gas Initiative fund, and some California-specific government funds. Neither country's dataset includes spending on demand response, distributed energy, or transportation.[27] To compare Canada and US program spending, electricity, natural gas and NRFs spending were summed and converted to Canadian dollars ($1 CAD = $0.7454 USD).[28] We then divided total spending by total population to calculate a per capita metric.[29]

Our previous comparison noted that the Canadian Scorecard includes all funding sources (i.e., including provincial or federal government spending), regardless of the administration model. However, state spending data in the US Scorecard focus on ratepayer-funded efficiency programs while most government-led initiatives such as incentives for clean technology adoption are discussed separately. Our comparison of this metric is reasonable because spending in both countries largely comes from similar sources - either utility ratepayers or carbon pricing proceeds.[30]

The results show that top-performing states spend more on efficiency programs than leading Canadian provinces. Average per capita spending in the top three jurisdictions was $147.72 in

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[27] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 21, 22.
[28] "Annual Exchange Rates."
[29] Bureau, "State Population Totals and Components of Change"; Government of Canada, "Census Profile, 2021 Census of Population."
[30] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard," 9.

2020. The average spending of the top three performing Canadian provinces was $66.55. As shown in Figure 4, this includes PEI (4th) spending $99.79/capita, Nova Scotia (10th) spending $55.60/capita, and Québec (17th) spending $44.25/capita. The lowest ranking Canadian province was Saskatchewan, which ranks 50th overall in per capita spending at $6.71. Most Canadian provinces also failed to meet efficiency program spending targets in 2020 due to COVID-19 disruptions.[31] However, median per capita spending among Canadian provinces was slightly higher than median spending among US states ($25.24 CAD vs $22.55 CAD, respectively).

To control for any bias in the spending per capita metric, we also calculated spending per terajoule (TJ) of energy use. To do this, the total energy demand of residential, commercial, and industrial electricity, natural gas and NRFs end-use/sales consumption reported in the 2021 Canadian Scorecard (and for the equivalent year by the EIA) were converted to TJ.[32] US energy sales data was converted from million British thermal units to TJ (1 MmBTU = 0.001055063 TJ).[33] Spending was then divided by energy use in TJ.

Evaluating spending per energy use did result in some changes in rank, though the magnitude of change was relatively small for most jurisdictions. The average change in rank position between per TJ and per capita spending was plus or minus four spots. Energy-intensive provinces fared worse under the spending per energy use metric. Only 16 out of 60 jurisdictions changed positions by more than four, including six states that received a substantial change in rank: Wyoming, Iowa, and Oklahoma decreased in rank order by 17, 13, and 9 spots, respectively, when evaluated on a spending per energy use basis, while Arizona, Hawaii, and North Carolina rose in rank order by 12, 11, and 9 spots, respectively. No Canadian provinces changed positions by more than plus or minus five spots (see Appendices D.1 and D.2).

[31] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 48.
[32] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 22, 24; "United States - SEDS - U.S. Energy Information Administration (EIA)"; "U.S. Energy Information Administration (EIA)"; Canada, "Conversion Factors and Common Units to Be Used for North American Cooperation on Energy Information."
[33] "Energy Conversion Calculators - U.S. Energy Information Administration (EIA)."

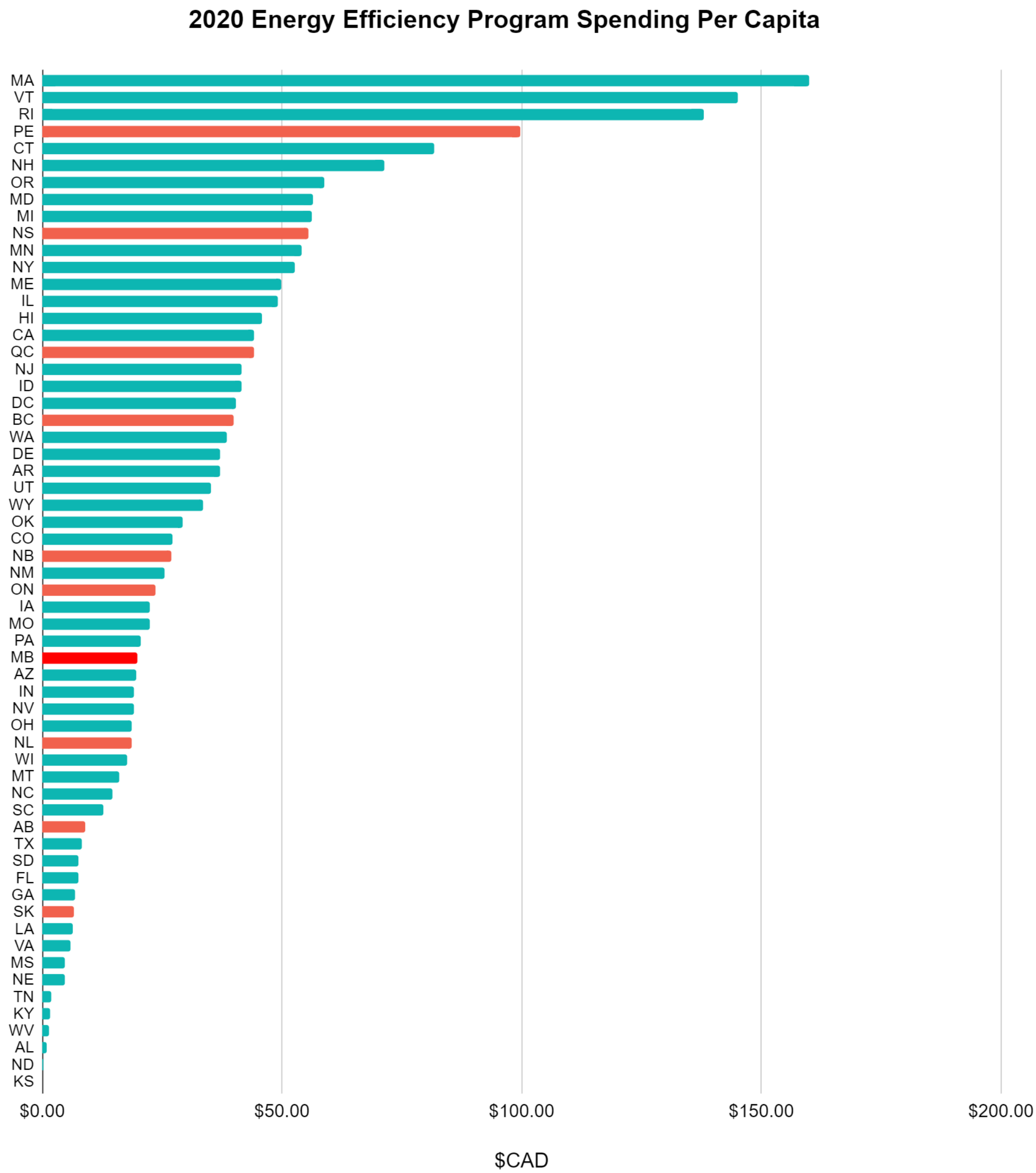

Figure 5. *North American energy efficiency program spending per capita, 2020 (red bars indicate Canadian provinces; includes spending on enabling policies; excludes jurisdictions that did not report or reported no spending).*

Conclusion

Since our previous Canada-US comparison, much has happened in the North American energy sector and state and provincial demand-side management practices. In March 2020, the world entered into a global pandemic. Much of the data compared in this analysis represents programs that were negatively impacted by COVID-19. In addition, the increasing prevalence of severe weather events, like those mentioned in Texas and western Canada, continue to heighten awareness of the impacts of climate change and the beneficial role energy efficiency can play in its mitigation. We undertook this comparison to assess the extent to which relative performance may have changed since our previous report, given these developments.

This analysis shows that both Canada and the US have experienced downward trends in savings and spending, and leading US states remain more ambitious than all Canadian provinces in program spending, energy savings and electricity savings targets. Average electricity savings of the top three performing states was triple that of the top three performing provinces, and average spending was more than double. However, median performance among provinces on two metrics (program spending and natural gas/NRF savings) was slightly higher than median performance among US states, suggesting that - while no province matches leading US achievements - on balance, Canada is keeping pace with the US in some aspects of energy efficiency performance.

In both countries, net incremental electricity and natural gas and NRF savings (as a percentage of sales) have declined since 2018. In Canada, this can be attributed both to the impacts of COVID-19, one result of which was a decline in efficiency program spending, and provincial policy developments in Ontario and Alberta that caused a substantial decrease in electricity savings. US efficiency program spending decreased compared to 2018 by $400 million USD and most Canadian provinces failed to meet their spending budgets in 2020 due to pandemic disruptions. The introduction of non-regulated fuel savings tracking in the 2020 Canadian Scorecard impacted overall savings performance rankings. This includes the addition of top-performing Atlantic provinces (Nova Scotia and PEI) in metrics where they were not present in the previous comparison and the fall in North American ranks of Alberta and Ontario (who did not report NRF savings in 2020).

This comparison continues to show the leadership of states like Massachusetts, Vermont, and California in efficiency program savings and spending. However, both states and provinces might wish to compare themselves across a broader geography. The recent International Energy Efficiency Scorecard used a different and wider set of policy metrics, which ranked the US 10th and Canada 13th.[34] There remain opportunities for improvement in mandatory building performance standards, building codes, vehicle kilometers traveled, and energy use per capita compared to other countries.

Finally, we hope and expect future spending and savings data to show an increase in energy efficiency efforts. These data only reflect the impacts of the first pandemic year. In response to the pandemic, increasingly severe climate impacts, and concerns over inequality and energy costs, both countries increased their commitment to energy efficiency.

[34] Subramanian et al., “2022 International Energy Efficiency Scorecard.”2022

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Appendix A: 2020 Incremental Electricity Savings

The table below shows provincial and state net incremental electricity savings as a percentage of domestic sales to end-users. Net incremental energy savings are the measurable differences to energy use attributable to an efficiency program. In the Canadian Scorecard, domestic sales data are reported via utility regulatory documents and through annual information requests. The American Scorecard uses data from the US Energy Information Administration (EIA). Canadian electricity savings were collected from annual demand-side management reporting, as well as through information requests to program administrators and jurisdictional policymakers. For Canadian data that were reported as gross savings, Efficiency Canada applied an NTG ratio of 0.872. American data were reported by the ACEEE's state contacts as net percentages of 2020 retail sales. For states that could not report a net percentage, the ACEEE used gross state electricity savings data from the EIA and then applied an NTG ratio of 0.839 for all states.

Area	Electricity Incremental Savings as % of 2020 Sales	North American Rank
Massachusetts	2.34%	1
Rhode Island	2.14%	2
Maryland	1.99%	3
Vermont	1.97%	4
California	1.79%	5
Illinois	1.65%	6
New York	1.64%	7
Michigan	1.63%	8
Minnesota	1.29%	9
Arizona	1.28%	10
District of Columbia	1.15%	11
Hawaii	1.11%	12
Ohio	1.09%	13
Utah	1.06%	14
New Hampshire	1.04%	15

Area	Electricity Incremental Savings as % of 2020 Sales	North American Rank
Delaware	0.60%	30
North Carolina	0.55%	31
British Columbia	0.52%	32
Indiana	0.51%	33
Missouri	0.49%	34
Oklahoma	0.48%	35
Québec	0.48%	35
Iowa	0.45%	37
Montana	0.44%	38
New Brunswick	0.43%	39
South Carolina	0.38%	40
Newfoundland and Labrador	0.37%	41
Wyoming	0.34%	42
Ontario	0.27%	43
Manitoba	0.25%	44

New Jersey	0.99%	16
Maine	0.98%	17
Colorado	0.94%	18
Connecticut	0.92%	19
Nova Scotia	0.86%	20
Washington	0.85%	21
Idaho	0.83%	22
Arkansas	0.78%	23
Prince Edward Island	0.76%	24
Nevada	0.69%	25
Pennsylvania	0.69%	25
Oregon	0.64%	27
Wisconsin	0.63%	28
New Mexico	0.61%	29

South Dakota	0.23%	45
Texas	0.21%	46
Georgia	0.15%	47
Kentucky	0.14%	48
Nebraska	0.13%	49
Louisiana	0.12%	50
Virginia	0.12%	50
Mississippi	0.11%	52
Alberta	0.10%	53
Florida	0.06%	54
Tennessee	0.05%	55
Alabama	0.02%	56
West Virginia	0.01%	57

Appendix B: 2020 Electricity Savings Targets

The table below shows each jurisdiction’s average annual electricity savings targets as a percentage of annual forecasted sales over a given planning period taking place between 2020-2025. The US Scorecard only included targets that met the qualifications of an Energy Efficiency Resource Standard (EERS): they must be three years or longer in length; the savings must be mandatory; and there must be enough funding to implement the policy in its specified time frame. The Canadian Scorecard includes long-term energy efficiency targets found in demand-side management plans. These are targets spanning three to five years, generally specific to fuel type, and are established either in legislation or a utility regulatory board ruling.

Area	Planning Period	Avg. Annual Electricity Savings Target as % of Annual Forecasted Sales Over the Planning Period	NA Rank *
Massachusetts	2020-2025	2.70%	1
New York	2020-2025	2%	2
Rhode Island	2020-2025	2%	2
Illinois	2020-2025	2%	2
Vermont	2020-2025	1.70%	5
Colorado	2020-2025	1.70%	5
New Jersey	2020-2025	1.60%	7
Maryland	2020-2025	1.60%	7
California	2020-2025	1.50%	9
Minnesota	2020-2025	1.40%	10
Hawaii	2020-2025	1.40%	10
Virginia	2020-2025	1.20%	12
Oregon	2020-2025	1.20%	12

Area	Planning Period	Avg. Annual Electricity Savings Target as % of Annual Forecasted Sales Over the Planning Period	NA Rank *
Maine	2020-2025	1%	18
Michigan	2020-2025	1%	18
New Mexico	2020-2025	1%	18
Prince Edward Island	2021	0.96%	21
Iowa	2020-2025	0.90%	22
District of Columbia	2020-2025	0.80%	23
Manitoba	2021-2022	0.71%	24
Wisconsin	2020-2025	0.70%	25
Washington	2020-2025	0.70%	25
Pennsylvania	2020-2025	0.60%	27
Ontario	2021-2024	0.51%	28
British Columbia	2021-2022	0.45%	29
Québec	2021-2025	0.40%	30

Arkansas	2020-2025	1.20%	12	Newfoundland and Labrador	2021-2025	0.38%	31
Connecticut	2020-2025	1.10%	15	New Brunswick	2021-2022	0.36%	32
Nevada	2020-2025	1.10%	15	Texas	2020-2025	0.20%	33
Nova Scotia	2021-2022	1.02%	17	North Carolina	-	Combined EERS/RPS	-

**NA = North American*

Appendix C: 2020 Natural Gas and Non-Regulated Fuel Savings

We show combined net incremental natural gas and non-regulated fuel (NRF) savings as a percentage of residential, commercial and industrial natural gas and NRF sales/end-use demand. Canada uses estimated end-use demand figures from Statistics Canada in place of sales data. Jurisdictions that report all or a portion of savings as gross (indicated by an *) have had a net-to-gross (NTG) ratio applied by their respective country. The Canadian Scorecard uses a natural gas NTG ratio of 0.828 and NRFs ratio of 0.802, and the American Scorecard uses a natural gas and NRF ratio of 0.867.

Area	2020 NG/NRF Incremental Savings as % of 2019 Sales	North American Rank
Vermont	1.16%	1
California	1.03%	2
New Hampshire*	0.91%	3
Michigan	0.90%	4
Prince Edward Island*	0.87%	5
Massachusetts	0.85%	6
Québec*	0.81%	7
Rhode Island	0.75%	8
District of Columbia	0.72%	9
Minnesota*	0.65%	10
Utah	0.60%	11
Oregon*	0.44%	12
British Columbia*	0.44%	13
Connecticut	0.43%	14
Nova Scotia*	0.42%	15
New Brunswick	0.40%	16
Wisconsin	0.39%	17

Area	2020 NG/NRF Incremental Savings as % of 2019 Sales	North American Rank
Maryland	0.35%	22
Ontario	0.34%	23
New Jersey*	0.32%	24
Colorado	0.24%	25
Arizona*	0.22%	26
Delaware	0.21%	27
Washington*	0.21%	28
Manitoba	0.17%	29
New Mexico	0.16%	30
Oklahoma	0.14%	31
Indiana	0.10%	32
Montana	0.06%	33
North Carolina	0.05%	34
Iowa*	0.05%	35
Alberta	0.05%	36
Nevada	0.05%	37
Florida*	0.03%	38

Arkansas	0.37%	18
New York	0.37%	19
Maine*	0.36%	20
Illinois	0.36%	21

Pennsylvania*	0.03%	39
Saskatchewan	0.03%	40
South Dakota*	0.01%	41

Appendix D.1: 2020 Energy Efficiency Program Spending (Per Capita)

We calculate per capita efficiency program spending by dividing total spending in Canadian dollars ($1 CAD = $0.7454 USD) by capita. To account for any bias in the per capita metric, we also calculate spending per energy use in terajoules (see Appendix B.2). We have included a column in this table to indicate how far the per energy use spending metric deviates from each jurisdiction's per capita spending metric.

Area	Efficiency Program Spending 2020 $CAD/Capita	NA Rank*	Rank Increase or Decrease vs $CAD/TJ
Massachusetts	$160.01	1	+1
Vermont	$145.11	2	-1
Rhode Island	$138.04	3	0
Prince Edward Island	$99.79	4	+1
Connecticut	$81.68	5	+2
New Hampshire	$71.27	6	0
Oregon	$58.76	7	+3
Maryland	$56.53	8	0
Michigan	$56.15	9	+6
Nova Scotia	$55.60	10	+1
Minnesota	$53.99	11	+7
New York	$52.60	12	0
Maine	$49.83	13	-4
Illinois	$49.11	14	+6
Hawaii	$45.74	15	-11

Area	Efficiency Program Spending 2020 $CAD/Capita	NA Rank*	Rank Increase or Decrease vs $CAD/TJ
Ontario	$23.54	31	+2
Iowa	$22.55	32	+13
Missouri	$22.39	33	-3
Pennsylvania	$20.51	34	-2
Manitoba	$19.74	35	+3
Arizona	$19.51	36	-8
Indiana	$19.24	37	+7
Nevada	$19.17	38	-7
Ohio	$18.75	39	-2
Newfoundland & Labrador	$18.61	40	-5
Wisconsin	$17.74	41	-2
Montana	$16.06	42	0
North Carolina	$14.62	43	-9
South Carolina	$12.86	44	-4
Alberta	$9.03	45	+3

California	$44.29	16	-3	Texas	$8.37	46	+3
Québec	$44.25	17	+5	South Dakota	$7.56	47	+3
New Jersey	$41.63	18	-2	Florida	$7.45	48	-7
Idaho	$41.60	19	+2	Georgia	$6.84	49	-3
District of Columbia	$40.43	20	-1	Saskatchewan	$6.71	50	+1
British Columbia	$39.93	21	-4	Louisiana	$6.46	51	+4
Washington	$38.39	22	-8	Virginia	$5.80	52	-5
Delaware	$37.19	23	+2	Mississippi	$4.81	53	-1
Arkansas	$37.05	24	+4	Nebraska	$4.72	54	-1
Utah	$35.24	25	-2	Tennessee	$1.96	55	-1
Wyoming	$33.46	26	+17	Kentucky	$1.67	56	0
Oklahoma	$29.22	27	+9	West Virginia	$1.50	57	0
Colorado	$27.09	28	-1	Alabama	$1.01	58	0
New Brunswick	$26.95	29	-3	North Dakota	$0.17	59	-
New Mexico	$25.53	30	-1	Kansas	$0.09	60	-

**NA = North American*

Appendix D.2: 2020 Energy Efficiency Program Spending (Per Terajoule of Energy Use)

We show spending per terajoule (TJ) of energy use to account for any potential bias that exists in the spending per capita metric. We calculate it by dividing total spending in Canadian dollars ($1 CAD = $0.7454 USD) by total TJ of energy use. The US uses energy sales data which we convert from million British thermal units to TJ (1 MmBTU = 0.001055063 TJ). Canada uses estimated end-use demand data (in TJ) from Natural Resources Canada in place of sales data as this is difficult to acquire. The resulting deviation from the spending per capita rank position has been indicated in Appendix B.1.

Area	2020 Energy Efficiency Spending $CAD/TJ	North American Rank
Vermont	$2,709.72	1
Massachusetts	$2,185.49	2
Rhode Island	$2,116.18	3
Hawaii	$1,889.23	4
Prince Edward Island	$1,480.44	5
New Hampshire	$1,422.93	6
Connecticut	$1,200.65	7
Maryland	$871.42	8
Maine	$866.16	9
Oregon	$743.21	10
Nova Scotia	$725.52	11
New York	$718.80	12
California	$691.01	13
Washington	$526.14	14
Michigan	$513.02	15
New Jersey	$506.82	16
British Columbia	$450.79	17
Minnesota	$445.49	18

Area	2020 Energy Efficiency Spending $CAD/TJ	North American Rank
Nevada	$237.32	31
Pennsylvania	$219.84	32
Ontario	$217.92	33
North Carolina	$207.44	34
Newfoundland	$199.42	35
Oklahoma	$198.83	36
Ohio	$163.71	37
Manitoba	$160.63	38
Wisconsin	$149.53	39
South Carolina	$147.38	40
Florida	$144.48	41
Montana	$129.45	42
Wyoming	$126.39	43
Indiana	$122.29	44
Iowa	$120.66	45
Georgia	$86.42	46
Virginia	$70.04	47
Alberta	$67.89	48

District of Columbia	$423.04	19	Texas	$61.10	49
Illinois	$412.92	20	South Dakota	$52.61	50
Idaho	$412.02	21	Saskatchewan	$46.30	51
Québec	$404.49	22	Mississippi	$39.35	52
Utah	$392.49	23	Nebraska	$31.83	53
Arizona	$351.46	24	Tennessee	$21.94	54
Delaware	$345.85	25	Louisiana	$18.07	55
New Brunswick	$336.00	26	Kentucky	$15.36	56
Colorado	$298.30	27	West Virginia	$10.74	57
Arkansas	$295.79	28	Alabama	$9.46	58
New Mexico	$288.02	29	Kansas	-	-
Missouri	$255.91	30	North Dakota	-	-

Note: *Spending per TJ could not be calculated for Kansas or North Dakota because of data limitations. However, because total spending in these states is substantially below 58th ranked Alabama (see Appendix D.1), the rank position change between spending per capita and spending per TJ would nonetheless be less than 4 spots as detailed in the report above.*