Benchmarking 2021 Canadian province/territory and American state energy efficiency program savings and spending

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Efficiency Canada

Carleton University

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Table of Contents

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Efficiency Canada is housed at Carleton University's Sustainable Energy Research Centre, which is located on the traditional unceded territories of the Algonquin nation. Learn more about Carleton's Indigenous faculty, students, and research initiatives at the Centre for Indigenous Support and Community Engagement and the Office of Indigenous Teaching, Learning, and Research.

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 and territorial 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. An updated benchmarking report was released in 2022 by Nippard et al.

This report follows the same structure as the report by Nippard et al. and compares program-related data from the 2022 Canadian Energy Efficiency Scorecard and the 2022 State Energy Efficiency Scorecard (both covering outcomes from 2021). It benchmarks states and provinces/territories on a selection of comparable metrics, including net incremental electricity, natural gas and non-regulated fuel savings; electricity savings targets; and energy efficiency program spending.

The results show that overall national energy savings in Canada increased from 2020 to 2021. During this time, the US saw a slight decrease in overall national energy savings. Overall efficiency program spending increased slightly in both countries, though neither reached the 2018 spending levels observed in the original benchmarking report by Haley et al.

Leading US states continue to be more ambitious than leading Canadian provinces/territories in pursuing both electricity and natural gas/non-regulated fuels savings. Canadian provinces/territories had a higher median natural gas/non-regulated fuel savings rate and

efficiency program spending per capita, while American states achieved a higher median electricity savings rates and electricity savings targets.

This benchmarking shows opportunities to increase efficiency program savings and spending are likely to continue to exist across many jurisdictions in both countries. Both countries have seen increased commitments to energy efficiency in response to the climate crisis, inequality, and rising energy costs.

Introduction

After the release of the 2019 Canadian Provincial Energy Efficiency Scorecard, Haley et al. produced a report comparing results on a selection of metrics from the American Council for Energy-Efficient Economy's (ACEEE) State Energy Efficiency Scorecard.[1] 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. In 2022, Nippard et al. released an updated version of this report benchmarking 2020 energy efficiency policy and program data from the 2021 Canadian and American Scorecards.[2]

This report compares the most recent 2022 Canadian and American Scorecards, which are based on 2021 data.[3] Scorecard metrics compared in this report are net incremental electricity savings, natural gas and non-regulated fuel (NRF)[4] savings; electricity savings targets; and efficiency program spending. This report compares performance between US states and

[1] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard."
[2] Nippard and Annabelle Linders, James Gaede, Brendan Haley, "Benchmarking Canadian Province and American State Energy Efficiency Program Savings and Spending."
[3] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories"; Subramanian, et al., "2022 State Energy Efficiency Scorecard."
[4] 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).

Canadian provinces/territories but does not award points based on results (as is done in both the US and Canadian Scorecards). We also report median results, excluding jurisdictions that achieved no results, or that did not report any. For the list of jurisdictions we considered, see the appendices at the end of this report.

Table 1 summarizes the general findings across states and provinces/territories. In 2021, median state electricity savings and electricity savings targets were well ahead of provinces, while Canadian median natural gas and NRF savings, and efficiency program spending were well ahead of those in the US. Similarly, the performance of the top 30% of states exceeds that of the top performing provinces/territories in both electricity savings and electricity savings targets, while the top 30% of provinces/territories exceed leading states in natural gas and NRF savings, and efficiency program spending.

Table 1. 2021 Canada-US Savings and Spending Comparison Results

	Electricity Savings (% of Sales)	**Electricity Savings Targets** (Avg. % of Annual Forecasted Sales Over Planning Period)	**Natural Gas & Non-Regulated Fuel Savings** (% of Sales)	**Efficiency Program Spending** ($CAD/Capita)
Median, All reporting jurisdictions				
Canada	0.48%	0.46%	0.42%	$37.53
US	0.65%	1.20%	0.22%	$22.37
Mean, Top 30% of reporting jurisdictions				
Canada	0.85%	0.85%	0.60%	$94.13
US	1.51%	1.73%	0.59%	$74.70

We calculate median and mean based on jurisdictions that report some level of results, and 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 vary per metric, the number of jurisdictions represented in top 30% performers also varies. We rounded to the nearest whole jurisdiction where necessary: electricity savings (3 provinces/territories, 14 [14.4] states), electricity savings targets (3 provinces, 8 [7.5] states), natural gas and non-regulate fuel savings (3 [2.7] provinces, 10 [9.9] states),

efficiency program spending (3 [3.3] provinces/territories, 15 states).

Note: We have excluded the Yukon's natural gas and NRF savings (3.33%) from the Canadian median and mean calculations, treating it as an outlier. Meaningful comparison of this metric becomes more challenging in very small jurisdictions, however the Yukon savings match significant per capita investments.

The previous benchmarking reports by Haley et al. and Nippard et al. compared energy efficiency program data from 2018 and 2020 respectively. During that time, Canadian annual incremental energy savings (electricity, natural gas and NRF) fell 47.2%, from 21.7 PJ to 14.3 PJ. Electricity savings represented the largest decrease (from 11.89 PJ to 6.28 PJ), due in large part to the Ontario government's premature ending of the Conservation First Framework and the consequent cancellation of most residential programs. Incremental natural gas savings fell from 8.46 PJ to 7.2 PJ over the same period.[5] In the US, incremental electricity savings fell 1.9% (from 97.7 PJ to 95.8 PJ) between 2018 and 2020 and natural gas and NRF savings rose by 0.4% (from 48.6 PJ to 48.8 PJ), equating to an overall incremental energy savings decline of 1.1%, between 2018 and 2020 (146.3 PJ to 144.6 PJ).[6]

Canadian energy savings rebounded in 2021, reversing the downward trend seen over the past few years. Total incremental energy savings (electricity, and natural gas and NRF) increased 30.5% between 2020 and 2021 (from 14.3 PJ to 18.7 PJ). Electricity savings represented the most significant increase (from 6.28 PJ to 9.30 PJ) due in large part to efficiency program results in Ontario and Alberta.[7] Nevertheless, total energy savings in Canada remain 16.2% lower than in 2018 (18.7 PJ vs 21.7 PJ). In the US, incremental electricity savings fell 2.4% between 2020 and 2021 (from 95.8 PJ to 93.5 PJ) and incremental natural gas and NRF

[5] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 35, 48.
[6] Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report"; Berg et al., "The 2019 State Energy Efficiency Scorecard."2019
[7] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 37, 38.

savings fell 1.98% (from 48.8 PJ to 47.9 PJ), equating to an overall incremental energy savings decline of 2.3% from 2020 to 2021 (144.6 PJ to 141.4 PJ).[8]

Canadian efficiency program spending increased by 0.4% over 2020 levels (from $1.13 billion to $1.14 billion CAD) and remains $77 million CAD below 2018 spending. A large increase in spending in British Columbia in 2021 was offset by a drop in spending in Alberta, Ontario, and Québec.[9] Spending in the US increased in 2021 by $62.1 million USD (0.8%) over 2020 levels and remains $404 million USD below 2018 spending.[10]

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.[11] Domestic sales data are reported via utility regulatory documents and through annual information requests in the Canadian Scorecard, with data being updated annually.[12] The American Scorecard uses data from state utility regulatory commissions and from the US

[8] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 35, 37; Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 18, 21.
[9] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 38, 49.
[10] Berg et al., "The 2019 State Energy Efficiency Scorecard"; Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report"; Subramanian, et al., "2022 State Energy Efficiency Scorecard."
[11] https://www.energy.gov/sites/prod/files/2015/01/f19/UMPChapter17-Estimating-Net-Savings.pdf
[12] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 41.

Energy Information Administration (EIA).[13] Fifty-eight jurisdictions (47 states, the District of Columbia, nine provinces, and one territory) were included in this metric (see Appendix A). Four jurisdictions reported no savings (including one province, Saskatchewan) and were excluded from the comparison.

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[14] of 0.872, based on an average of Canadian provinces reporting this ratio.[15] The NTG ratio used by the ACEEE for states only reporting gross savings was 0.809, which is also based on a ratio average among 18 states that reported both net and gross savings.[16]

In 2020, the top three performing American states (Massachusetts, Rhode Island, and Maryland) recorded an average electricity savings of 2.16% of sales. Two Canadian provinces, Nova Scotia and Prince Edward Island, were among the top 50% of jurisdictions, ranking 20th and 24th out of 57 jurisdictions that reported, with an average savings of 0.81%. The remaining provinces ranked between 32nd and 53rd and achieved savings ranging from 0.10% to 0.52%.[17]

In 2021, the top three performing jurisdictions (California, Massachusetts, and Michigan) recorded an average saving of 1.96%. Three Canadian provinces (Nova Scotia, Prince Edward Island, and Ontario) placed among the top 50% of jurisdictions. Nova Scotia reported a savings of 0.98%, Prince Edward Island (PEI) reported a savings of 0.86%, and Ontario reported a savings of 0.75% of sales. The remaining seven provinces/territories reported savings ranging

[13] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 35.

[14] 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.

[15] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 246.

[16] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 35, 169.

[17] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 38; Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 17, 18.

from 0.14% to 0.59%. Six out of ten provinces/territories and 20 out of 48 states saw an absolute increase in annual incremental electricity savings between 2020 and 2021.

2021 Incremental Electricity Savings

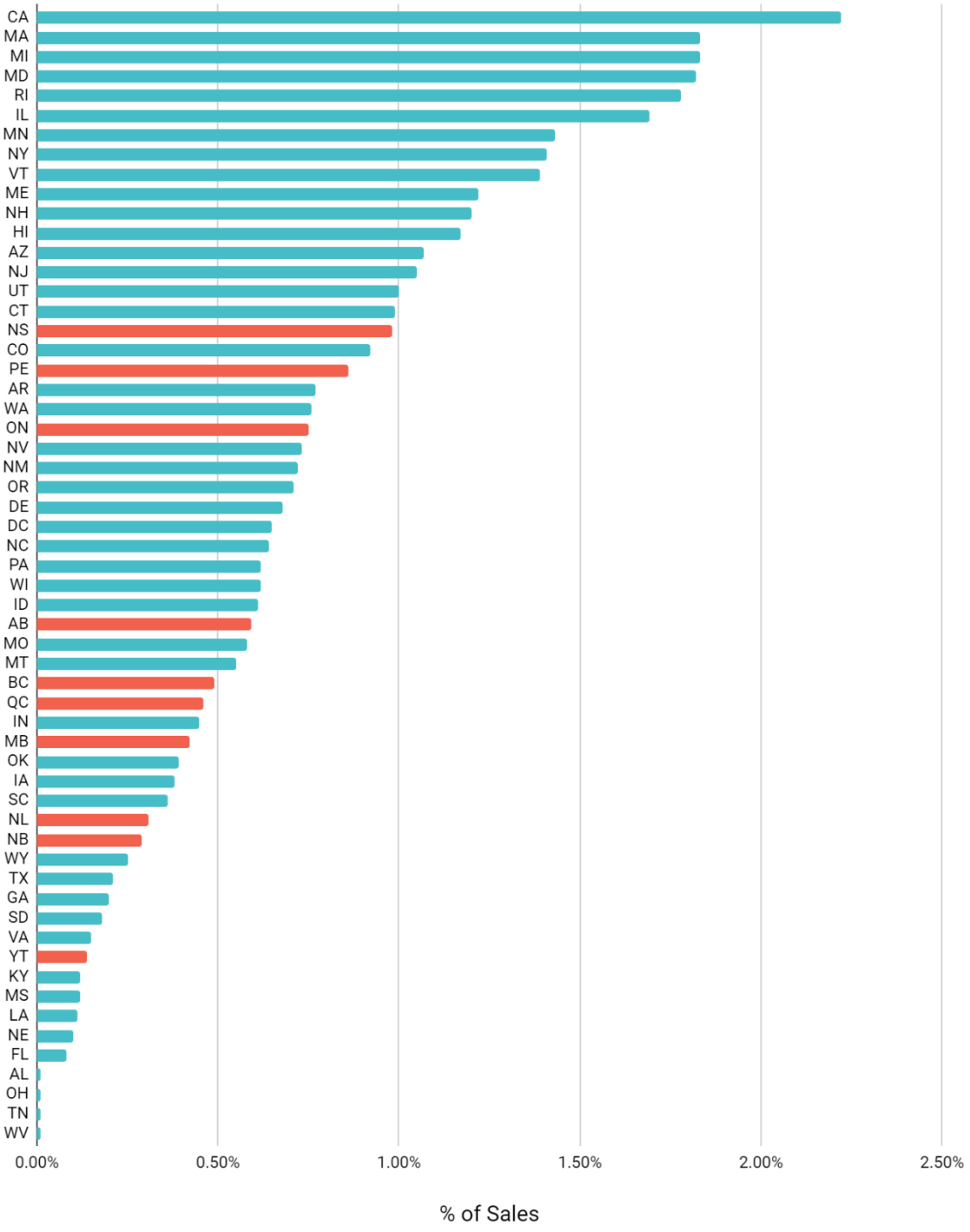

Figure 1. *North American incremental electricity savings as a percentage of domestic sales, 2021 (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings).*

Electricity Savings Targets

Both Scorecards evaluate state/provincial and territorial electricity savings targets. ACEEE evaluates state energy efficiency resource standards (EERS), which are policies that 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.[18] 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. Twenty-five states have an EERS and are included in our metric benchmarking (see Appendix B for the list of jurisdictions).

In 2021, only three provinces had efficiency target policies approximating an EERS in the US (British Columbia, Manitoba, and Québec).[19] 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] In 2021, all provinces had some level of electricity savings target and, as a result, are included in this metric. No territory had an electricity savings target in 2021. 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).

[18] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 41.

[19] 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. Because the two Scorecards only consider savings form 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%.

[20] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 66.

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 highest ranked province, Nova Scotia, ranked 17th overall with an electricity savings target of 1.02% of sales. All other Canadian provinces targeted savings between 0.36% and 0.96%.[21]

In 2021, eight states targeted savings of 1.5% or greater and an additional eleven targeted savings between 1.0% and 1.4%. New York set the highest savings target at 2% of sales. Canada's top performer was once again Nova Scotia, which targeted savings of 1.1% and was ranked 14th among all jurisdictions. The nine remaining provinces set targets ranging from 0.02% to 0.74% (see Appendix B).[22] Between 2020 and 2021, six out of ten provinces saw a percentage point increase (ranging from +0.02% to +0.20%) in their average annual electricity savings target. Three of 25 states saw a percentage point increase in their targets over the same timeframe.

Some states have moved toward a fuel-neutral framework and have prioritized investments in fossil fuel savings rather than electricity. This is a result of efforts to optimize climate benefits, particularly in states with "grids comprising higher levels of low-carbon renewables, historically strong energy efficiency programs, and more mature energy efficiency markets."[23] For example, Massachusetts led this metric in 2020 with a target of 2.7%, but reduced their electricity savings target to 1.1% in 2021.

[21] Gaede et al., "The 2021 Provincial Energy Efficiency Scorecard.," 63.

[22] Ontario's electricity savings target (0.56%) was calculated before the increase resulting from the October 2022 ministerial directive to increase the electricity conservation demand management programming budget through 2025; "2021-2024 Conservation and Demand Management Framework."
[23] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 42.

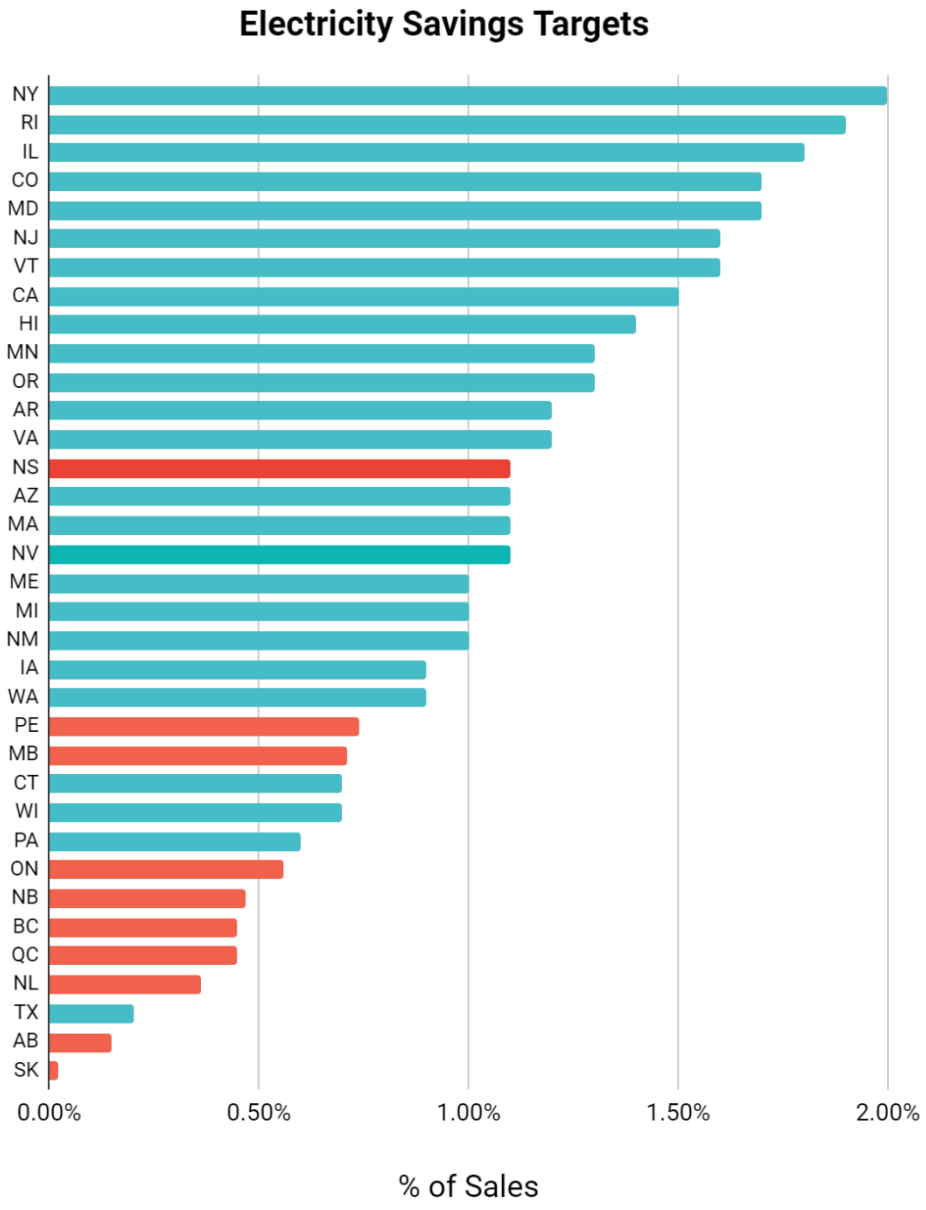

Figure 2. *North American average annual electricity savings targets as a percentage of annual forecasted sales over the planning period (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings target).*

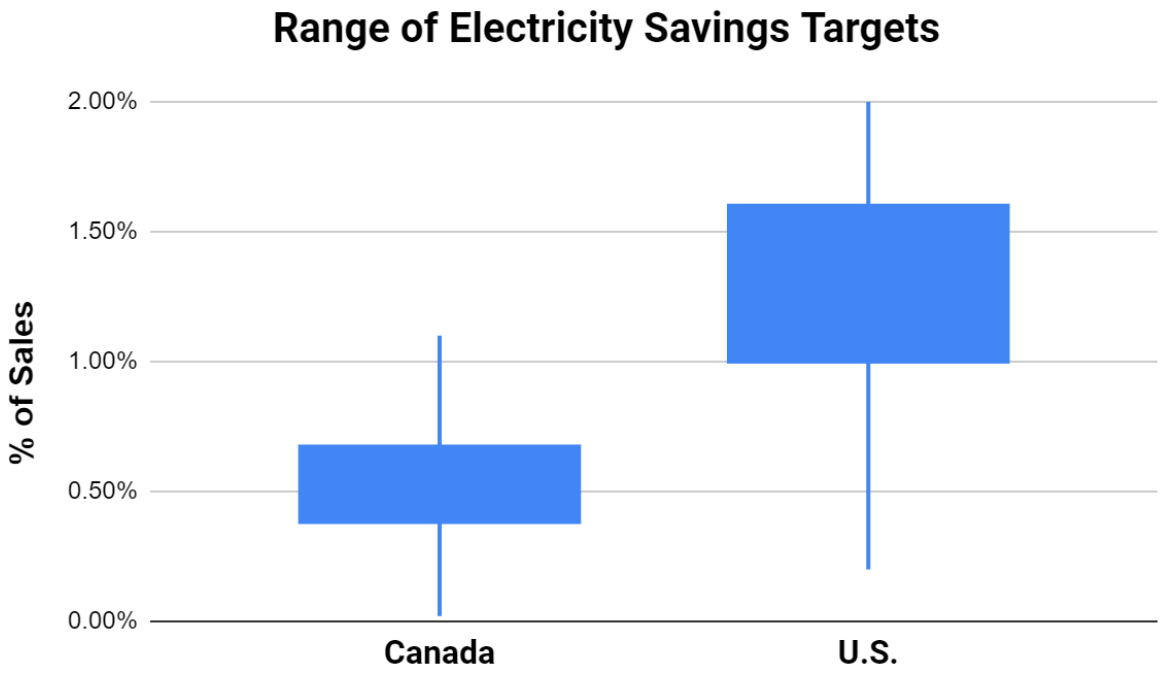

Figure 3. *In 2021 the bulk of American states targeted savings above 1% with leaders reaching toward 2%. In comparison, all but one Canadian province set savings targets below 1%.*

Natural Gas & Non-Regulated Fuel Savings

In the Canadian 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[24] and other provinces/states use proportionally less non-regulated fuels (NRFs), combining them allows comparison across jurisdictions with different fuel mixes. Forty-three jurisdictions reported savings in 2021: nine

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

provinces, one territory, 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.

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 industrial sales and industrial consumption of non-regulated fuels. Because some Canadian provinces' and territories' 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.[25]

In fifteen jurisdictions, all or a portion of natural gas and/or NRF savings were reported as gross (see Appendix C). For any Canadian data reported as gross savings, Efficiency Canada applied a net-to-gross (NTG) ratio of 0.828 for natural gas savings and NTG ratio of 0.802 for NRF savings. For any American data reported as gross savings, the ACEEE applied a NTG ratio of 0.906.[26] These ratios are based on averages of states and provinces reporting gross and net savings.

In 2020, the top performing jurisdiction was California, saving 0.91% of sales. Two provinces, Prince Edward Island and Québec, ranked among the top five jurisdictions saving 0.87% and 0.81% respectively. British Columbia, Nova Scotia, New Brunswick, and Ontario followed in 10th

[25] "U.S. Energy Information Administration (EIA)"; "United States - SEDS - U.S. Energy Information Administration (EIA)."
[26] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 44; Subramanian, et al., "2022 State Energy Efficiency Scorecard," 37.

to 13th positions and the remaining provinces ranked in the bottom half of the 41 jurisdictions that reported savings.[27]

In 2021, 43 jurisdictions reported savings: one more territory and state (the Yukon and Idaho) than in 2020. The top jurisdiction for the metric in the 2022 Canadian Scorecard was the Yukon (see Appendix C), saving 3.33% of sales. We note that the context for energy efficiency programming in the Canadian North is unique compared to most provinces and states due to the challenges of evaluating and verifying savings in small jurisdictions and the sensitivity of the metric to small changes in sales or savings. The Yukon's savings correspond with significant investments. However, to enable a useful visualization, we chose to exclude the Yukon's savings from Figure 4. After the Yukon, the top five ranking jurisdictions, four states and one province, averaged savings of 0.74%. Of these jurisdictions, Massachusetts had the highest savings rate at 0.93% of sales. Québec once again ranked amongst the top five jurisdictions saving 0.74%, while Prince Edward Island fell to 7th position saving 0.60% (see Figure 4). Québec's continued high rate of savings can be explained by provincial government programs that focused their greenhouse gas reduction efforts on natural gas efficiency which operate alongside separate utility natural gas programs. Additionally, the natural gas market in Québec is dominated by industrial and commercial consumers, providing ample opportunity for cost-effective energy savings. In 2021, two of ten Canadian jurisdictions (Alberta and Saskatchewan) ranked in the bottom half of jurisdictions.

[27] Nippard and Annabelle Linders, James Gaede, Brendan Haley, "Benchmarking Canadian Province and American State Energy Efficiency Program Savings and Spending," 16.

2021 Incremental Natural Gas & Non-Regulated Fuel Savings

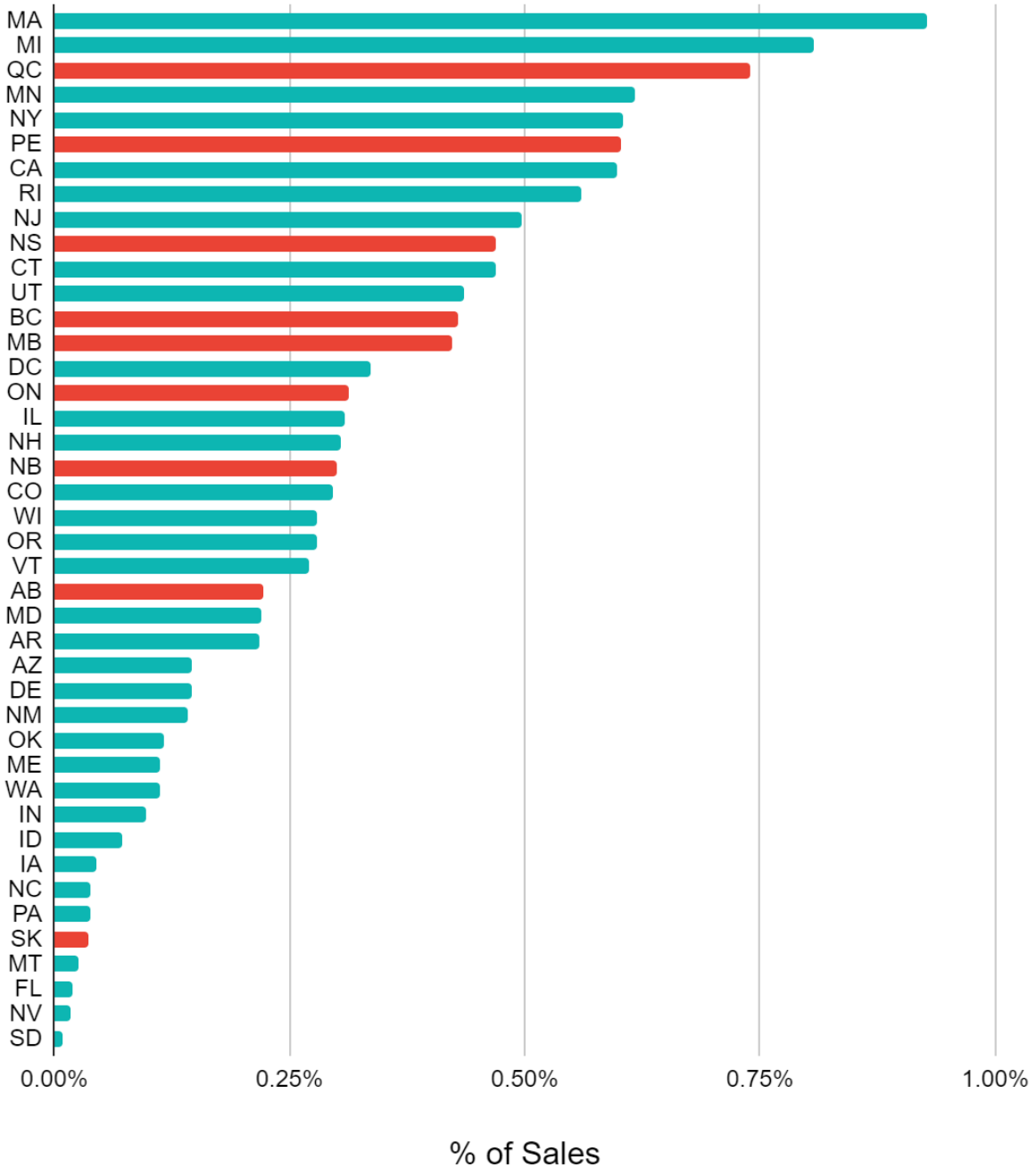

Figure 4. *North American incremental natural gas and non-regulated fuel savings as a percentage of domestic sales, 2021 (red bars indicate Canadian provinces; excludes jurisdictions that did not report or reported no savings).*

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, 61 jurisdictions reported some level of program spending in 2021: ten provinces, one territory, 49 states and the District of Columbia. Because there was no spending reported in Alaska, the state was excluded from this metric.

Canadian spending data include government-funded programs and utility ratepayer funded programs. US efficiency program spending data includes utility ratepayer-funds, Regional Greenhouse Gas Initiative funds, and some California-specific government funds.[28] The two Scorecards use a similar methodology to collect spending data, yet we acknowledge that non-utility spending data can be more difficult to access in both jurisdictions. Neither country's dataset includes spending on demand response, distributed energy, or transportation.[29] To compare Canada and US program spending, electricity, natural gas and NRFs spending were

[28] Subramanian, et al., "2022 State Energy Efficiency Scorecard," 38.

[29] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 37; Berg, Cooper, and DiMascio, "State Energy Efficiency Scorecard: 2021 Progress Report," 21.

summed and converted to Canadian dollars.[30] We then divided total spending by total population to calculate a per capita metric.[31]

In 2020, the top three jurisdictions, all US states, spent an average of $147.72/capita CAD ($1 CAD = $0.7454 USD). The top three Canadian provinces, Prince Edward Island, Nova Scotia, and Québec averaged $66.55 per capita, spending $99.79, $55.60, and $44.25 respectively. Median per capita spending among Canadian provinces was slightly higher than median spending among US states ($25.24 CAD vs $24.04 CAD, respectively).

In 2021, the results show top-ranking states continue to spend more on efficiency programs than leading Canadian provinces. Average per capita spending in the top three jurisdictions (all states) was $153.20 ($1 CAD = $0.7978 USD). The average spending of the top three performing Canadian provinces/territories was $94.13. This includes the Yukon (4th) spending $128.55/capita, PEI (6th) spending $85.27, and Nova Scotia (7th) spending $68.58/capita (see Figure 5). The lowest ranking Canadian province was Alberta in 55th position, spending $3.42/capita. Median per capita spending among Canadian provinces and territories was higher than median spending among US states in 2021 ($37.53 CAD vs $22.37 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 sales/end-use reported in the 2021 Canadian Scorecard and for the equivalent year by the EIA were converted to TJ.[32] US energy sales data

[30] "Annual Exchange Rates."

[31] Gaede et al., "2022 Canadian Energy Efficiency Scorecard: Provinces and Territories," 48; Bureau, "State Population Totals and Components of Change."

[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

was converted from 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 resulted 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. In 2021, 15 out of 61 jurisdictions changed positions by more than four. Comparatively, 21 out of 60 jurisdictions changed positions by more than four in 2020. In 2021 nine states saw a change in rank of more than double the average when evaluated on a spending per energy use basis, including Louisiana which decreased in rank order by 9 spots, Maine, Minnesota, and Wyoming by 10 spots, and Iowa by 12, while Florida increased in rank order by 10 spots, California and Arizona by 11, and Hawaii by 14 spots. No Canadian provinces changed positions by more than plus or minus four spots (see Appendices D.1 and D.2).

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)."

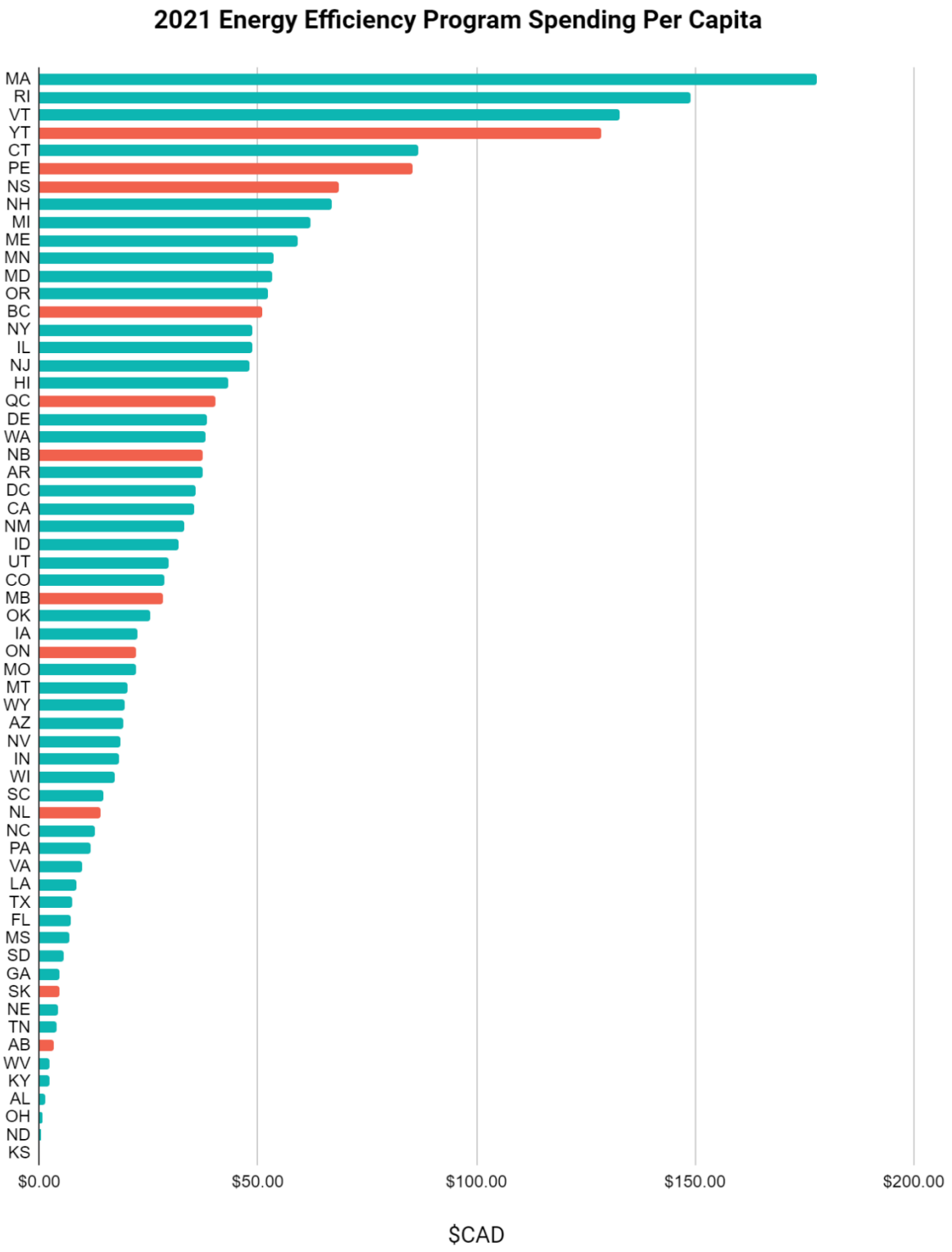
2021 Energy Efficiency Program Spending Per Capita
MA
RI
VT
YT
CT
PE
NS
NH
MI
ME
MN
MD
OR
BC
NY
IL
NJ
HI
QC
DE
WA
NB
AR
DC
CA
NM
ID
UT
CO
MB
OK
IA
ON
MO
MT
WY
AZ
NV
IN
WI
SC
NL
NC
PA
VA
LA
TX
FL
MS
SD
GA
SK
NE
TN
AB
WV
KY
AL
OH
ND
KS
$0.00
$50.00
$100.00
$150.00
$200.00
$CAD

Figure 5. *North American energy efficiency program spending per capita, 2021 (red bars indicate Canadian provinces; includes spending on enabling policies; excludes jurisdictions that did not report or reported no spending).*

Conclusion

We undertook this comparison to benchmark province/territory and state energy efficiency program savings and spending outcomes from the most recent Canadian and American Scorecards.

This year, our analysis shows that while Canada has rebounded somewhat from the impacts of the COVID-19 pandemic in 2020, energy savings have yet to return to 2018 levels. Improved electricity program results in Alberta and Ontario contributed to higher electricity savings, and there was a slight increase ($4.6 million) in efficiency program spending over 2020 spending in 2021.

Leading US states remain more ambitious than all Canadian provinces/territories in electricity savings, electricity savings targets, natural gas and non-regulated fuel savings, and program spending. Average electricity savings and electricity saving targets of the top three performing states were more than double that of the top three provinces/territories. Average program spending of the top three performing states was one and a half times that of the top three provinces/territories. Program spending remains below 2018 levels in both countries.

This report shows the continued leadership of jurisdictions such as Massachusetts, Rhode Island, California, and Nova Scotia in efficiency program savings and spending. This benchmarking also indicates that jurisdictions with strong savings targets, adequate budgets,

and/or clean energy legislation, routinely rank higher in energy efficiency program outcomes than those without.[34]

Bibliography

"Annual Exchange Rates." Accessed February 9, 2023. https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/.

Berg, Weston, Emma Cooper, and Marianne DiMascio. "State Energy Efficiency Scorecard: 2021 Progress Report." American Council for an Energy-Efficient Economy, February 2022. https://www.aceee.org/research-report/u2201.

Berg, Weston, Shruti Vaidyanathan, Eric Junga, Emma Cooper, Chris Perry, Grace Relf, Whitlock Andrew, Marianne DiMascio, Waters Corri, and Cortez Nadia. "The 2019 State Energy Efficiency Scorecard." Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), October 2019.

Bureau, US Census. "State Population Totals and Components of Change: 2020-2021." Census.gov. Accessed March 8, 2022. https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-total.html.

Canada, Natural Resources. "Conversion Factors and Common Units to Be Used for North American Cooperation on Energy Information." Natural Resources Canada, February 3, 2016. https://www.nrcan.gc.ca/energy/international/nacei/18057.

"Energy Conversion Calculators - U.S. Energy Information Administration (EIA)." Accessed March 8, 2022. https://www.eia.gov/energyexplained/units-and-calculators/energy-conversion-calculators.php.

Gaede, James, Brendan Haley, Micaila Abboud, and Mohamed Nassar. "The 2021 Provincial Energy Efficiency Scorecard." Efficiency Canada, Carleton University, 2021. https://www.scorecard.efficiencycanada.org/.

Gaede, James, Brendan Haley, and Madeleine Chauvin. "2020 Canadian Provincial Energy Efficiency Scorecard." Efficiency Canada, Carleton University, 2021. https://www.scorecard.efficiencycanada.org/2020.

Government of Canada, Statistics Canada. "Census Profile, 2021 Census of Population," February 9, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E.

[34] To explore the policies that help explain the savings results in this report, see the Efficiency Canada provincial policy database available at https://database.efficiencycanada.org/ and the ACEEE state policy database available at https://database.aceee.org/.

Haley, Brendan, James Gaede, Weston Berg, and Leslie Malone. “Canada’s First Provincial Energy Efficiency Policy Scorecard.” Efficiency Canada, Carleton University, 2020.

Subramanian, S, H Bastian, A Hoffmeister, B Jennings, C Tolentino, S Vaidyanathan, and S Nadel. “2022 International Energy Efficiency Scorecard.” Washington, DC American Council for an Energy-Efficient Economy, 2022. www.aceee.org/research- report/i2201.

“United States - SEDS - U.S. Energy Information Administration (EIA).” Accessed February 10, 2023. https://www.eia.gov/state/seds/seds-data-fuel.php?sid=US#DataFiles.

“U.S. Energy Information Administration - EIA - Independent Statistics and Analysis.” Accessed May 5, 2022. https://www.eia.gov/state/analysis.php?sid=ME.

“U.S. Energy Information Administration (EIA).” Accessed February 10, 2023. https://www.eia.gov/naturalgas/ngqs/#?report=RPC&year1=2020&year2=2020&company=Name&items=101TVL,102TVL,103TVL.

Appendix A: 2021 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 in 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 sales 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 reported as gross savings, Efficiency Canada applied a NTG ratio of 0.872. American data was reported by the ACEEE's state contacts as net percentages of 2021 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 a NTG ratio of 0.809 for all states.

Area	Electricity Incremental Savings as % of 2021 Sales	North American Rank		Area	Electricity Incremental Savings as % of 2021 Sales	North American Rank
California	2.22%	1		Pennsylvania	0.62%	29
Michigan	1.83%	2		Idaho	0.61%	31
Massachusetts	1.83%	2		Alberta	0.59%	32
Maryland	1.82%	4		Missouri	0.58%	33
Rhode Island	1.78%	5		Montana	0.55%	34
Illinois	1.69%	6		British Columbia	0.49%	35
Minnesota	1.43%	7		Québec	0.46%	36
New York	1.41%	8		Indiana	0.45%	37
Vermont	1.39%	9		Manitoba	0.42%	38
Maine	1.22%	10		Oklahoma	0.39%	39
New Hampshire	1.20%	11		Iowa	0.38%	40

Hawaii	1.17%	12		South Carolina	0.36%	41
Arizona	1.07%	13		Newfoundland	0.31%	42
New Jersey	1.05%	14		New Brunswick	0.29%	43
Utah	1.00%	15		Wyoming	0.25%	44
Connecticut	0.99%	16		Texas	0.21%	45
Nova Scotia	0.98%	17		Georgia	0.20%	46
Colorado	0.92%	18		South Dakota	0.18%	47
Prince Edward Island	0.86%	19		Virginia	0.15%	48
Arkansas	0.77%	20		Yukon	0.14%	49
Washington	0.76%	21		Kentucky	0.12%	50
Ontario	0.75%	22		Mississippi	0.12%	50
Nevada	0.73%	23		Louisiana	0.11%	52
New Mexico	0.72%	24		Nebraska	0.10%	53
Oregon	0.71%	25		Florida	0.08%	54
Delaware	0.68%	26		Tennessee	0.01%	55
District of Columbia	0.65%	27		Ohio	0.01%	55
North Carolina	0.64%	28		Alabama	0.01%	55
Wisconsin	0.62%	29		West Virginia	0.01%	55

Appendix B: 2021 Electricity Savings Targets

The table below shows each jurisdiction's average electricity savings targets as a percentage of annual forecasted sales over a given planning period taking place between 2020-2028. The US Scorecard only included targets meeting 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 eight 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*	Area	Planning Period	Avg. Annual Electricity Savings Target as % of Annual Forecasted Sales Over the Planning Period	NA Rank*
New York	2020-2025	2.00%	1	New Mexico	2020-2025	1%	18
Rhode Island	2020-2025	1.90%	2	Iowa	2020-2025	1%	21
Illinois	2020-2025	1.80%	3	Washington	2020-2025	0.90%	21
Colorado	2020-2025	1.70%	4	Prince Edward Island	2022-2024	0.74%	23
Maryland	2020-2025	1.70%	4	Manitoba	2022	0.71%	24
New Jersey	2020-2025	1.60%	6	Connecticut	2020-2025	0.70%	25
Vermont	2020-2025	1.60%	6	Wisconsin	2020-2025	0.70%	25
California	2020-2025	1.50%	8	Pennsylvania	2020-2025	0.60%	27
Hawaii	2020-2025	1.40%	9	Ontario	2022-2024	0.56%	28
Minnesota	2020-2025	1.30%	10	New Brunswick	2022-2025	0.47%	29
Oregon	2020-2025	1.30%	10	British Columbia	2022-2024	0.45%	30

Arkansas	2020-2025	1.20%	12	Québec	2022-2028	0.45%	30
Virginia	2020-2025	1.20%	12	Newfoundland	2022-2025	0.36%	32
Nova Scotia	2022	1.10%	14	Texas	2020-2025	0.20%	33
Arizona	2020-2025	1.10%	14	Alberta	2022-2023	0.15%	34
Massachusetts	2020-2025	1.10%	14	Saskatchewan	2022	0.02%	35
Nevada	2021-2022	1.10%	14	District of Columbia	-	Combined fuel-neutral goal only	-
Maine	2020-2025	1.00%	18	North Carolina	-	Combined EERS/RPS	-
Michigan	2020-2025	1.00%	18				

NA = *North American*

Appendix C: 2021 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 sales and NRF end-use demand/consumption. Efficiency Canada uses estimated end-use demand figures from Statistics Canada in place of sales data. The American Council for an Energy-Efficient Economy (ACEEE) uses consumption data from the Energy Information Administration (EIA). 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 0.906.

Area	2021 NG/NRF Incremental Savings as % of 2020 Sales	North American Rank
Yukon*	3.33%	1
Massachusetts	0.93%	2
Michigan	0.81%	3
Québec*	0.74%	4
Minnesota*	0.62%	5
New York	0.60%	6
Prince Edward Island*	0.60%	7
California	0.60%	8
Rhode Island	0.56%	9
New Jersey*	0.50%	10
Nova Scotia	0.47%	11
Connecticut	0.47%	12
Utah	0.44%	13
British Columbia	0.43%	14
Manitoba	0.42%	15

Area	2021 NG/NRF Incremental Savings as % of 2020 Sales	North American Rank
Oregon*	0.28%	23
Vermont	0.27%	24
Alberta*	0.22%	25
Maryland	0.22%	26
Arkansas	0.22%	27
Arizona*	0.15%	28
Delaware	0.15%	29
New Mexico	0.14%	30
Oklahoma	0.12%	31
Maine*	0.11%	32
Washington*	0.11%	33
Indiana	0.10%	34
Idaho*	0.07%	35
Iowa*	0.05%	36
North Carolina	0.04%	37

District of Columbia	0.34%	16		Pennsylvania*	0.04%	38
Ontario	0.31%	17		Saskatchewan	0.04%	39
Illinois	0.31%	18		Montana	0.02%	40
New Hampshire	0.30%	19		Florida*	0.02%	41
New Brunswick	0.30%	20		Nevada	0.02%	42
Colorado	0.30%	21		South Dakota*	0.01%	43
Wisconsin	0.28%	22				

***** = *Reported all or a portion of savings as gross. A net-to-gross ratio was applied (the US ratio is 0.906 for natural gas and NRF; the Canadian ratio is 0.828 for natural gas and 0.802 for NRF).*

Appendix D.1: 2021 Energy Efficiency Program Spending (Per Capita)

We calculate per capita efficiency program spending by dividing total spending in Canadian dollars ($1 CAD = $0.7978 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 2021 $CAD/Capita	NA Rank	Rank Increase or Decrease vs $CAD/TJ	Area	Efficiency Program Spending 2021 $CAD/Capita	NA Rank	Rank Increase or Decrease vs $CAD/TJ
Massachusetts	$177.79	1	+1	Iowa	$22.46	32	+12
Rhode Island	$148.89	2	+1	Ontario	$22.30	33	+1
Vermont	$132.91	3	+3	Missouri	$22.29	34	-2
Yukon	$128.55	4	-3	Montana	$20.28	35	+4
Connecticut	$86.76	5	+2	Wyoming	$19.68	36	+10
Prince Edward Island	$85.27	6	-1	Arizona	$19.38	37	-11
Nova Scotia	$68.58	7	+1	Nevada	$18.60	38	-5
New Hampshire	$66.76	8	+2	Indiana	$18.14	39	+3
Michigan	$62.20	9	+6	Wisconsin	$17.20	40	+1
Maine	$59.16	10	+10	South Carolina	$14.68	41	-4
Minnesota	$53.64	11	+10	Newfoundland	$14.01	42	-2
Maryland	$53.15	12	-3	North Carolina	$12.80	43	-7
Oregon	$52.16	13	+3	Pennsylvania	$11.66	44	-1
British Columbia	$51.09	14	-1	Virginia	$9.87	45	0
New York	$48.90	15	-4	Louisiana	$8.67	46	+9

Illinois	$48.60	16	+3	Texas	$7.64	47	0
New Jersey	$48.15	17	-5	Florida	$7.25	48	-10
Hawaii	$43.14	18	-14	Mississippi	$6.93	49	-1
Québec	$40.46	19	+4	South Dakota	$5.46	50	+2
Delaware	$38.30	20	+5	Georgia	$4.64	51	-2
Washington	$38.20	21	-4	Saskatchewan	$4.63	52	-1
New Brunswick	$37.53	22	-4	Nebraska	$4.21	53	+1
Arkansas	$37.34	23	+7	Tennessee	$3.94	54	-4
District of Columbia	$35.61	24	-2	Alberta	$3.42	55	-2
California	$35.44	25	-11	West Virginia	$2.39	56	0
New Mexico	$33.22	26	-2	Kentucky	$2.31	57	0
Idaho	$31.99	27	+2	Alabama	$1.49	58	0
Utah	$29.47	28	-1	Ohio	$0.81	59	0
Colorado	$28.52	29	-1	North Dakota	$0.32	60	-
Manitoba	$28.25	30	+1	Kansas	$0.13	61	-
Oklahoma	$25.53	31	4				

NA = *North American*

Appendix D.2: 2021 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 = $0.7978 USD) by total TJ of energy use. The US uses energy sales/consumption data which we convert from 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	2021 Energy Efficiency Spending $CAD/TJ	North American Rank	Area	2021 Energy Efficiency Spending $CAD/TJ	North American Rank
Yukon	$2,467.49	1	Missouri	$224.10	32
Massachusetts	$2,079.92	2	Nevada	$221.74	33
Rhode Island	$1,902.02	3	Ontario	$206.71	34
Hawaii	$1,375.83	4	Oklahoma	$156.17	35
Prince Edward Island	$1,074.83	5	North Carolina	$149.61	36
Vermont	$1,058.82	6	South Carolina	$135.49	37
Connecticut	$989.45	7	Florida	$128.88	38
Nova Scotia	$822.88	8	Montana	$128.80	39
Maryland	$747.06	9	Newfoundland	$126.94	40
New Hampshire	$688.57	10	Wisconsin	$121.75	41
New York	$590.78	11	Indiana	$113.25	42
New Jersey	$577.57	12	Pennsylvania	$109.57	43
British Columbia	$566.64	13	Iowa	$104.13	44
California	$527.78	14	Virginia	$98.11	45
Michigan	$519.61	15	Wyoming	$62.67	46
Oregon	$507.17	16	Texas	$50.72	47

Washington	$410.04	17	Mississippi	$46.94	48
New Brunswick	$397.46	18	Georgia	$45.52	49
Illinois	$395.60	19	Tennessee	$32.69	50
Maine	$393.78	20	Saskatchewan	$32.63	51
Minnesota	$383.27	21	South Dakota	$31.94	52
District of Columbia	$358.97	22	Alberta	$29.23	53
Québec	$336.44	23	Nebraska	$24.16	54
New Mexico	$333.15	24	Louisiana	$21.56	55
Delaware	$328.62	25	West Virginia	$19.81	56
Arizona	$314.93	26	Kentucky	$18.85	57
Utah	$308.36	27	Alabama	$9.79	58
Colorado	$290.04	28	Ohio	$6.39	59
Idaho	$246.25	29	Kansas	-	-
Arkansas	$239.27	30	North Dakota	-	-
Manitoba	$231.47	31			

Note: *Spending per TJ could not be calculated for Kansas and North Dakota due to data limitations.*