2021 Canadian Provincial Energy Efficiency Scorecard

James Gaede, Brendan Haley, Micaila Abboud, Mohamed Nassar

Efficiency Canada

Carleton University

The 2021 Provincial Energy Efficiency Scorecard

James Gaede, PhD; Brendan Haley, PhD; Micaila Abboud; Mohamed Nassar

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

c/o Carleton University
1125 Colonel By Drive
Ottawa, ON K1S 5B6
https://www.efficiencycanada.org

Facebook: https://facebook.com/EfficiencyCanada
Twitter: https://twitter.com/EfficiencyCAN
LinkedIn: https://linkedin.com/company/efficiency-canada
Instagram: https://instagram.com/efficiencycanada

Table of Contents

Tables

Figures

About the Authors

James Gaede is Senior Research Associate with Efficiency Canada. He has a PhD in Political Science from Carleton University, and has published research on energy forecasting, carbon capture and storage, and energy storage. Previously, he held postdoctoral fellowships at both the University of Waterloo and Carleton University.

Brendan Haley is Efficiency Canada's Policy Director. He has a PhD in Public Policy from Carleton University, a Master of Environmental Studies from York University, and a Bachelor of Science in Economics from Dalhousie University. Before joining Efficiency Canada on a full-time basis in September 2018, Brendan was a Banting Postdoctoral Fellow at Dalhousie University.

Micaila Abboud joined Efficiency Canada as an Assistant Policy Research Analyst intern in May 2021. She is currently attending Memorial University of Newfoundland for her Master's in Marine Spatial Planning and Management. She graduated from Memorial with a Diploma of Technology in Marine Environmental Studies and a Bachelor of Technology with a concentration in Engineering and Applied Sciences.

Mohamed Nassar joined Efficiency Canada as an Assistant Policy Research Analyst from January to April 2021. Mohamed is a recent graduate of the Sustainable Energy Engineering and Policy Masters program at Carleton University. He is currently a Policy Analyst at the Office of Energy Efficiency at Natural Resources Canada. Prior to that, Mohamed led the Kuwait Energy Outlook (KEO) production, the first economy-wide outlook of energy consumption and production in Kuwait.

Acknowledgments

This report is supported through the generous contributions of the Jarislowsky Foundation, McConnell Foundation, Donner Canadian Foundation, Ivey Foundation, Trottier Family Foundation, and Borealis Foundation. The authors gratefully acknowledge the respondents to their information request who provided valuable information, reviewed drafts of the report, and shared their advice.

We wish to thank individuals who acted as peer reviewers and subject matter experts, who include: Mathieu Cote, Kent Elson, Jean-Marc Fagelson, Rebecca Fiissel Schaefer, Geneviève Gauthier, Christine Gustafson, Joanna Kyriazis, Peter Love, Andrew Pride, and Ted Ross.

We also thank James Glave of Glave Strategies for reviewing, proofreading and copyediting; R&G Strategic for translation and design; and the staff at Efficiency Canada for supporting the Scorecard production and release. The authors take full responsibility for all final decisions regarding the Canadian Provincial Scorecard methodological design, as well as any error or omissions.

Executive Summary

Efficiency Canada's 3rd annual Provincial Energy Efficiency Report assesses policy and outcomes realized within the 18-month window between January 2020 and June 2021. We broadened our assessment window in this year's edition to accommodate calendar and fiscal reporting periods, and to capture more recent policy developments introduced or implemented by provincial governments in the first half of 2021. We are releasing it alongside our online policy database, available at https://database.efficiencycanada.org, which includes qualitative descriptions of the various policy contexts across Canada. We produce the Scorecard and database to inform and inspire leadership amongst policymakers and energy efficiency professionals.

This report's period of analysis coincides with the onset and continuation of the global COVID-19 pandemic and associated public health measures that impacted energy efficiency program delivery and performance. Considering this, we delayed our information gathering process by approximately one month to ensure we would be able to acquire comprehensive and comparable 2020 data from all provinces. We also undertook more in-depth internal research to track energy efficiency program results at the program level, including budgets and spending, and targeted and achieved net annual incremental energy savings. Our information request also asked respondents to describe the pandemic's impact on program delivery. We provide responses to this questioning in Appendix B to this report.

Our research shows that many program administrators struggled to meet spending budgets and savings targets. Lockdowns disrupted programs that required on-site interaction or direct installation, and some program administrators also reported challenges stemming from supply chain disruptions or contractor shortages. Though we do not track program participation directly, many administrators reported lower than projected participation across program portfolios, though in some pandemic-related public health measures may have boosted participation (e.g., among commercial or institutional building managers) in buildings that were not in active use. Many administrators experimented with virtual program outreach or inspections/auditing. Programs in British Columbia appear to have been least impacted, due to temporary increases in incentives intended to drive up participation.

In 2020-21 the federal government launched several new programs that aim to improve energy efficiency and that will impact provincial policies and programs in the coming years. These new federal programs include the Canada Infrastructure Bank's inclusion of large building retrofits in its growth plan and earmarking of $2 billion in funding for building retrofits. Natural Resources Canada (NRCan) also launched the Greener Homes Program for residential energy efficiency improvements, consisting of a $5,000 grant and a $40,000 interest free loan. The government assigned the latter of the two to the Canada Mortgage and Housing Corporation, though details remain pending at time of writing. NRCan is also providing support for energy auditor training. The Green and Inclusive Community Buildings program focused on upgrading public buildings.

Additionally, in June 2021, the federal government announced its intention to use a combination of investment and regulations to require all new car and light truck sales to be zero-emissions by 2035.

Methodology

The 2021 Scorecard retains the overall scope and structure of previous reports. We track 54 metrics across 18 topics, and categorize them within five policy areas: Energy Efficiency Programs, Enabling Policies, Buildings, Transportation, and Industry. This represents an increase in scope of 12 metrics and two topics above and beyond our 2020 Scorecard. We continue to score provinces out of a total of 100 points; top-scoring thresholds in each metric represent best-in-class benchmarks and best practice policy. We encourage readers to think of a perfect score of 100 points as "summiting a mountain all provinces can climb." Scores should not be interpreted as percentage grades.

Major changes to topics and weighting this year include the following:

- **Energy Efficiency Programs** (decreased in weighting by two points)
    - We removed our metric that tracked program spending against energy end-use demand and allocated all points to program spending per capita. The total value of the program spending section remains unchanged.
    - We revised our energy savings target section methodology, which reduced the total weight of the section by two points.

- **Enabling policies** (no change in weighting)
    - We decreased the weighting for financing and market creation by two points.
    - We redeveloped our approach to training and professionalization by moving energy advisors to the Buildings chapter and categorizing tracking of Certified Energy Managers and support for community energy management (a new metric this year) under the Support for energy management topic.
    - We included three new training and professionalization metrics, each worth one point: workforce readiness plans and strategies, efforts to improve energy literacy in the building workforce, and professionalization in energy efficiency programming.

- **Buildings** (decreased in weighting by one and a half points)
    - We reduced points for adoption and enforcement of older national model building codes (a decrease of one point).
    - We formalized what was formerly a bonus point for activities to develop energy efficiency requirements for alterations to existing buildings at half a point.
    - We introduced a metric to track mandatory building performance standards policies (two points).
    - We moved tracking of energy advisors to the Buildings chapter (two points).
    - We removed tracking of appliance and equipment market transformation altogether (a decrease of three points).

- **Transportation** (increased in weighting by three and a half points)
    - We increased the points for consumer incentives for electric vehicles by a half point to consider incentives for used vehicles and speciality vehicles, such as e-bikes.
    - We introduced a new topic tracking public transportation with three metrics: provincial funding, ridership per capita, and electrification of public transport fleets. We assigned each of these metrics one point.

- **Industry** (no change in weighting)
    - We did not make any adjustments to this chapter.

Overall results

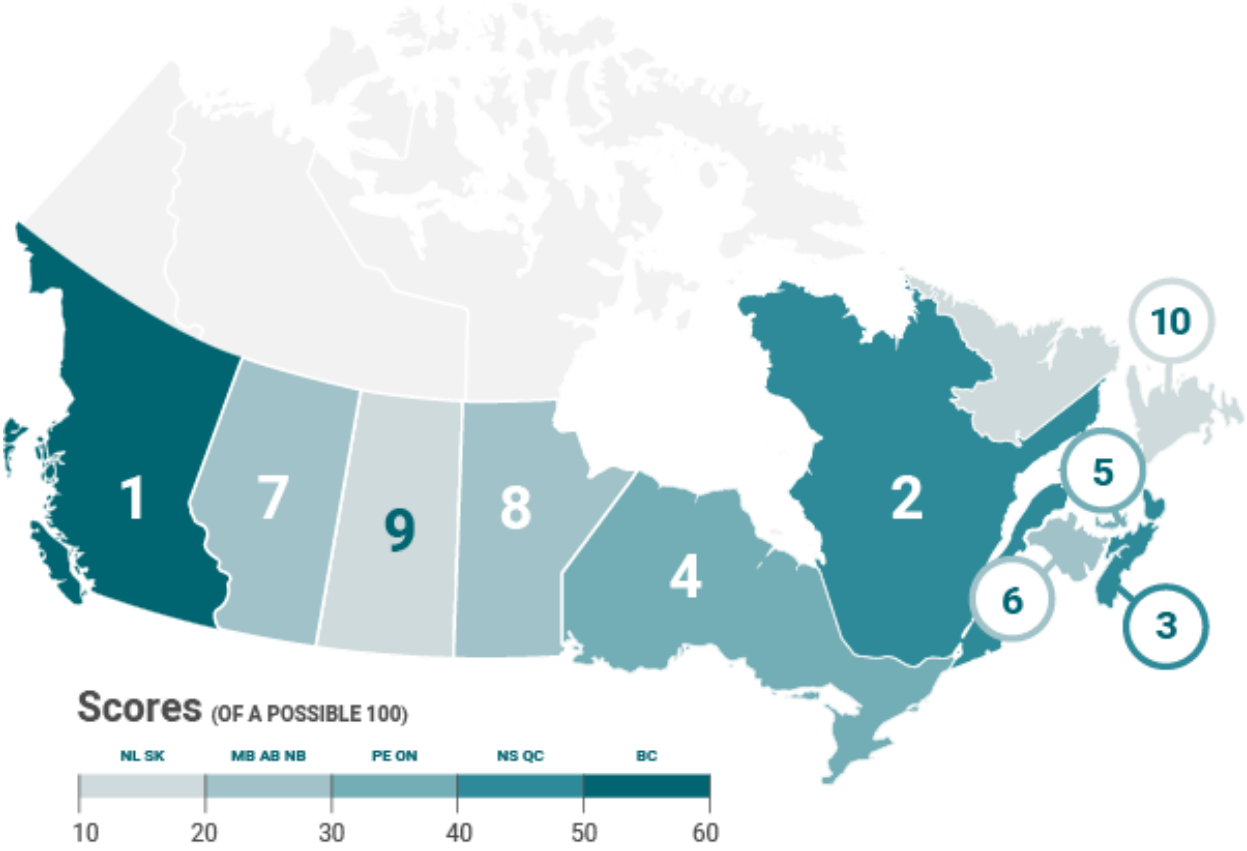

Figure 1. Map of Canada showing provincial scores

This year, British Columbia, Québec and Nova Scotia retain the top three spots, respectively. British Columbia continues to lead in Enabling Policies and Buildings, and Québec again places first in Transportation. Prince Edward Island again placed first in Energy Efficiency Programs. Manitoba fell below New Brunswick. Programs in Manitoba appear to have been most impacted by the pandemic. Newfoundland and Labrador fell back to last place this year, in part because of lower program performance as well as improved scoring for Saskatchewan in Enabling Policies.

The table below shows scores for each province by policy area. We depict ranking changes in parentheses. Due to adjustments made to topics and metrics, changes in specific policy areas and in overall score may not be directly comparable with previous scores.

Table 1. Overall scoring results*							
Rank	Province	Programs (38 points)	Enabling (17 points)	Buildings (17.5 points)	Transport (20.5 points)	Industry (7 points)	Total (100 pts)
1 (-)	BC	10	14	11	15	6	55
2 (-)	QC	12	9	4	18	6	48
3 (-)	NS	15	11	5	5	6	41
4 (-)	ON	8	13	6	7	6	39
5 (-)	PE	19	5	3	7	4	36
6 (+1)	NB	8	9	2	5	4	27
7 (+1)	AB	3	7	3	4	6	21
8 (-2)	MB	7	7	2	2	4	21
9 (+1)	SK	3	9	3	1	3	18
10 (-1)	NL	5	3	1	3	1	13

** Scores rounded to nearest whole number. Totals might not sum due to rounding. Alberta and Manitoba are separated by a half point.*

Notable developments

Energy efficiency programs

- Canada-wide net annual incremental program energy savings are on a downward trend, having fallen roughly 38% from their peak in 2017.
- Only British Columbia and Alberta met or exceeded the electricity savings rates (as a percentage of domestic sales) they achieved in 2019.
- For provinces where we were able to track electricity savings targets against realized savings, only British Columbia met or exceeded targets for 2021.
- Net annual incremental natural gas and non-regulated fuels savings (as a percentage of end-use demand) from programs were down nearly 0.1 percentage points from 2019.
- In provinces where we were able to track natural gas savings targets against realized savings, only FortisBC and Énergir exceeded their 2021 savings targets.
- All provinces except Manitoba, New Brunswick, and Ontario spent less on low-income programs relative to 2019 levels.

Enabling policies

- In January 2021, Fondaction and Econoler launched SOFIAC, which offers Québec businesses financing and technical support for energy-efficient infrastructure updates. The province provided $5.5 million in funding support for the project.
- Prince Edward Island and Saskatchewan both passed PACE enabling legislation; Stratford and Charlottetown (PEI) and Saskatoon (SK) launched PACE financing programs.
- In September 2020, British Columbia allocated $2 million in economic recovery funding for the development of a PACE Roadmap and Pilot Program.
- A single research project at the University of New Brunswick (in partnership with Saint John Energy) accounted for more than half of that province's energy-related NSERC grants. The project aims to reduce peak demand through machine learning forecasting and demand-side solutions such as thermal energy storage.
- Alberta Innovates and its partners established the Green Buildings Technology Network. Small and medium-sized construction firms will use its network of test buildings to develop new innovations in energy-efficient construction via testing, commercializing and adoption of new products and technologies.
- In March 2020, British Columbia's Home Performance Stakeholder Council established a Registered Contractor List for those participating in the province's CleanBC Better Homes program or the joint-utility Home Renovation Rebate program.
- The New Brunswick Energy and Utilities Board approved NB Power's advanced metering infrastructure proposal in September 2020.
- The Ontario Energy Board and Enbridge concluded an Integrated Resource Planning framework agreement. The agreement allows for consideration of non-pipe alternatives, though only for large projects and excluding consideration of electricity-based alternatives.

Buildings

- New Brunswick formally adopted the National Building Code (2015) and the National Energy Code for Buildings (2011) but has postponed enforcement of both codes until January 1, 2022.

- In British Columbia, a November 2020 mandate letter from the Premier to the Minister of Finance directed her to work with the Ministry of Energy, Mines and Low Carbon Innovation to require inclusion of energy ratings in home real estate listings.
- The City of Winnipeg established a voluntary Building Energy Disclosure Project (BEDP), which aims to help commercial and institutional building owners better understand the energy performance of their buildings and support overall greenhouse gas reductions.
- Both British Columbia and Nova Scotia launched voluntary building performance benchmarking and disclosure programs for both residential and commercial/industrial buildings in 2020.

Transportation

- In June 2021, the federal government announced that it would use a combination of investments and legislation to ensure that all new passenger vehicle sales in 2035 will be zero-emissions vehicles.
- In November 2020, Québec announced that it would ban the sale of new gasoline-powered vehicles after 2035.
- In the first half of 2021, Nova Scotia, Prince Edward Island, and New Brunswick launched new electric vehicle consumer incentive programs.
- Newfoundland and Labrador launched electric vehicle consumer incentives later in 2021, though they are retroactive for vehicles purchased as earlier as May 2021. The joint-utility 2021-2025 conservation and demand management plan (yet to be approved, at time of writing) also includes incentives for both residential and commercial vehicles and charging stations.
- British Columbia launched a CleanBC Go Electric Fleets Program in early 2021 to support public and private light-duty fleets in the transition to zero-emission vehicles (ZEVs).
- Prince Edward Island established a $25 million Active Transportation Fund to support investments in walking and biking paths, connecting existing trails, and other items.

Industry

- In 2020, Efficiency Manitoba launched a strategic energy management initiative that includes both a salary path (for an embedded energy manager) and a performance path (with incentives based on realized energy savings).

Recommendations

As with our previous scorecards, we have identified strengths and opportunities for improvement in each province. These are outlined in the table below.

Table 2. Provincial strengths and opportunities

Province	Strengths	Opportunities
AB	Municipal program support Public transit electrification Industrial energy management	Energy efficiency resource standards Building codes
BC	Flexible response to COVID Transportation electrification	PACE financing Performance standards for existing buildings Target all cost-effective energy efficiency
MB	Clear mandate for Efficiency Manitoba	Transportation and heating electrification Net-zero energy-ready building code
NB	Smart grid plans Energy efficiency research	PACE financing Industrial energy efficiency
NL	Electrification strategy	PACE financing Energy poverty programs Industrial energy management
NS	Low-income energy efficiency Transportation electrification policies	Energy efficiency resource standard Net-zero energy-ready building codes that enable municipal leadership
ON	Building energy reporting Grid modernization	Performance standards for existing buildings Non-pipe alternatives
PE	Program savings Low-income energy efficiency	Energy efficiency resource standard Building energy rating and disclosure
QC	Transportation electrification Heating decarbonization planning	Energy poverty and heat stress Energy rating and disclosure Industrial energy management
SK	PACE financing	Energy efficiency resource standard Carbon price revenues

Federal policy recommendations

Recent commitments from the federal government could lead to a doubling of annual program spending across Canada. Nevertheless, there are still several areas where the federal

government can support and catalyze better provincial energy efficiency performance. This year we identify the following four areas for action:

1. **Take leadership to stop the stalling of building codes.** The 2020 national model codes have yet to be released, and a model "retrofit code" for existing buildings – originally targeted for 2022 – is now planned to be delayed until 2030. The federal government can exercise leadership by clearly defining net-zero building standard goals, increasing resources for code development and research, and providing more resources to provinces and utilities for activities such as training and code compliance, to facilitate more rapid code adoption.

2. **Transform building retrofits** - Trends in national program spending and savings suggest diminishing opportunities in "low hanging fruit," measures like lighting upgrades. Plus, if Canada is to achieve its net-zero emissions target, the government must place all buildings on an accelerated path to zero emissions. The federal government should take a mission-oriented approach to transforming and facilitating a deeper savings-oriented building retrofit process.

3. **Expand the scale and scope of low-income energy efficiency.** Present levels of investment in low-income energy efficiency programs are far below what would be required to retrofit the 20% of Canadian households that currently experience energy poverty. Unfortunately, the recently launched federal government programs overlooked this critical policy gap. Additional federal government resources could leverage existing provincial delivery systems to deliver on national objectives of reducing energy poverty and greenhouse gas emissions.

4. **Promote energy management systems in industry.** Most provinces have comprehensive industrial efficiency programs, but do not require certification under recognized standards such as ISO-50001. Certification helps to ensure that a company has developed effective energy management systems and that they remain in place. A federal initiative to increase certification that leverages provincial programs could lead to quick results, and help enable the Net-Zero Accelerator in its quest for comprehensive industrial transformations.

Introduction

This report is Efficiency Canada's third Provincial Energy Efficiency Scorecard; within it, we evaluate provincial energy efficiency policy and outcomes realized between January 2020 and June 2021. We release it alongside an updated database of provincial and territorial energy efficiency policies, freely available at database.efficiencycanada.org. We produce both the scorecard and database to inform and inspire leadership amongst policymakers and energy efficiency professionals.

Each of our scorecards builds on the previous edition, and with each we work to improve on our transparent and comprehensive methodology. In the chapters that follow, we share insights into our methods for collecting information on a wide-range of energy efficiency-related topics, and our approach to normalizing and benchmarking this information across highly varied provinces with unique energy system contexts. We offer informative, comparative summaries of provincial policies and energy efficiency achievements. Finally, we rank the provinces on their respective efforts to improve energy efficiency.

Our publicly available policy database is a useful companion to the Scorecard. It summarizes key policy areas in each province and helps highlight provincial best practices. The database also includes provincial administrative models, cost-effectiveness testing methods, and policy frameworks for appliance and equipment standards. The database is searchable by jurisdiction and policy area, allowing users to easily compare developments across Canada.

In this introduction, we reflect on the impact of the COVID-19 pandemic on energy efficiency in Canada, provide a thorough discussion of the methodological approach and principles that guide the production of the Scorecard, and outline the scoring results for 2020 provincial policy and energy efficiency achievements.

COVID-19: A year in review

The global COVID-19 pandemic began shortly before we issued our information request to provincial efficiency program administrators and governments for last year's 2020 Scorecard. In that report, we noted that we would not know the full impact of the pandemic on energy efficiency until our 2021 report, as much of the data we track is for the year prior to publication. Nevertheless, at the time, we did observe that the pandemic was giving rise to new approaches

to program administration and education, and that it had increased awareness of societal resilience, indoor air quality, thermal comfort, and social justice - all challenges energy efficiency can help solve.

Consequently, energy efficiency has figured prominently in plans to recover and rebuild from the detrimental impacts of the pandemic. In Canada, the Task Force for a Resilient Recovery recommended a $55 billion investment over five years, with climate resilient and energy efficient buildings making up more than half of that investment.[1] "Cutting Energy Waste" is the first chapter of Canada's enhanced climate plan. The Canada Infrastructure Bank took on building retrofits as part of its mandate and the federal government has re-entered the residential efficiency program landscape with the Greener Homes Program.

The pandemic has set Canada back, however. In our information request to provincial program administrators and governments, we asked about the impact of COVID-19 on program administration and delivery. We also undertook more extensive research to track demand-side management savings and spending targets and outcomes at the program level, and also expanded our questioning to information request respondents on these issues. We modified our report production schedule to better ensure that we would be able to capture a complete picture of program outcomes in 2020, as respondents on fiscal year reporting periods typically are not able to produce verified program results for several months after our primary information gathering period in April/May.

Based on this research, we offer the following general observations regarding the impact of COVID-19 on energy efficiency program administration and delivery in Canada:

- Programs with on-site or direct install components were paused during lockdown periods, which varied in duration from province to province. Many program administrators modified their program delivery methods to accommodate this, including conducting virtual energy assessments, or virtual consultations with program participants.
- Several program administrators noted that they suspended or were otherwise unable to carry out certain marketing and outreach activities, such as trade shows or retailer

[1] "Insights & Recommendations," Task Force For Resilient Recovery, 2020, https://www.recoverytaskforce.ca/.

events. Additionally, the closure of non-essential retail impacted customers' ability to purchase certain upgrades (e.g., smart thermostats), except through eligible online retailers.

- Several program administrators reported that supply chain disruptions, limited customer resources, and changed priorities due to reduced energy consumption (e.g., during office closures) curtailed program participation and delivery.
- Programs for low-income, Indigenous Peoples, and remote communities may have been more negatively impacted than residential, commercial, or industrial programs serving the broader population. Many of these programs have onsite or in-person components and appear to have less amenable to virtual substitutes. Additionally, non-essential travel restrictions may have limited program delivery in remote communities.
- Some program administrators reported that certain programs experienced greater than expected participation under pandemic-related restrictions, as building owners and managers took advantage of empty offices or schools to pursue efficiency improvements or retrofits. Most program administrators reported lower participation, however, particularly in the first half of the year.

As mentioned above, early in 2021 we expanded our efforts to collect program-level savings and spending figures, including both budgets/targets and actuals. We asked about the pandemic's impact in our information request. Nevertheless, the data we have on this is somewhat limited. In the program section of this year's Scorecard, we provide tables showing the difference between budgets/targets at the outset of 2020 and the realized values by program administrator, where we were able to attain these data.[2] The results suggest that most program administrators fell short of spending and savings targets. The important exceptions are the FortisBC and Énergir natural gas utilities, and BC Hydro's electricity savings programs. We do not collect participation data, so we cannot comment on performance in that regard.

It is important to note that falling short of spending or savings targets in one year may not be due to the pandemic; we did not conduct an extensive historical review to determine typical performance in meeting targets. Nevertheless, the results shown below do suggest that some adaptations may have been more effective than others. For instance, as part of the BC Restart Plan, BC Hydro, FortisBC, and the Province of British Columbia doubled incentives on select

[2] This does not include any adjustments to targets in the middle of the year.

programs. For program administrators for which we have data, BC Hydro and FortisBC were among the few to meet and exceed savings and spending targets.

Furthermore, program administrators reporting on a calendar year basis may have had an edge over those operating on a fiscal year basis (i.e., April 1, 2020 – March 31, 2021). The former group would have had nearly one full quarter of programs operating free of pandemic-related impacts. Based on our records, program administrators reporting on a fiscal year include: BC Hydro, Efficiency Manitoba, New Brunswick Power, efficiencyPEI, and SaskEnergy. Énergir's reporting period runs from October 1, 2019 to September 30, 2020, and therefore had nearly two full quarters before the pandemic.

Overall, the pandemic appears to have temporarily suppressed program participation in most provinces, but many programs bounced back following the lifting of restrictions. The implications of this are that Canada-wide program savings and spending figures contained in Scorecard 2021 may be marginally lower than they might otherwise have been, absent the pandemic.

We hope to now see program administrators increase their savings and spending targets to make up for the lost time and opportunities associated with the pandemic in 2020. The pandemic also led to experimentation with new approaches, such as virtual delivery methods and program evaluations, that program administrators could be expand upon in future years.

For the long-form responses to our question about pandemic-associated program impacts, please see Appendix B.

Methodology

We base our Scorecard upon three sources of information: An information request issued to provincial government representatives, utilities, and energy efficiency program administrators in May/June 2021; our own independent desk research, both to verify or clarify information received in the request, or to address issues not covered in the request; and publicly available datasets provided by government agencies such as Statistics Canada and Natural Resources Canada.

We developed and distributed the information request as a Microsoft Excel document. We organized the request into five sections (energy efficiency programs, enabling policies, buildings, transportation, and industry), comprising 11 parts, covering 41 topics. Many questions also included sub-questions. We distributed requests separately to different contacts in each province, though in some instances provincial respondents worked together to return a joint request.

Respondents replied throughout the summer, and we compiled, analyzed, and evaluated them as we received them. We circulated a draft report with initial findings to information request respondents and subject-matter-expert advisors in September 2021 for peer review and a final accuracy check. We revised the Scorecard based on this feedback and prepared the final report for release in the fall of 2021.

Time period covered

This Scorecard captures energy efficiency policies and performance in the most recent year (12 months) for which complete data is available. For most indicators, this period occurs within the 18-month window following January 2020. This window is longer than one-year for two reasons: for one, we need to accommodate program administrators on fiscal year reporting periods (typically ending March 31); and, second, we allow a policy implementation grace period of six months into Year Two. This helps to ensure that our Scorecard reflects a current picture of the energy efficiency policy landscape in the year it is published.

Figure 1 below summarizes the period coverage of the Scorecard. For reference, “Scorecard year” is the year of the data we report (2020, in this report), and “Production year” is the version year of the published Scorecard (this is the 2021 Scorecard).

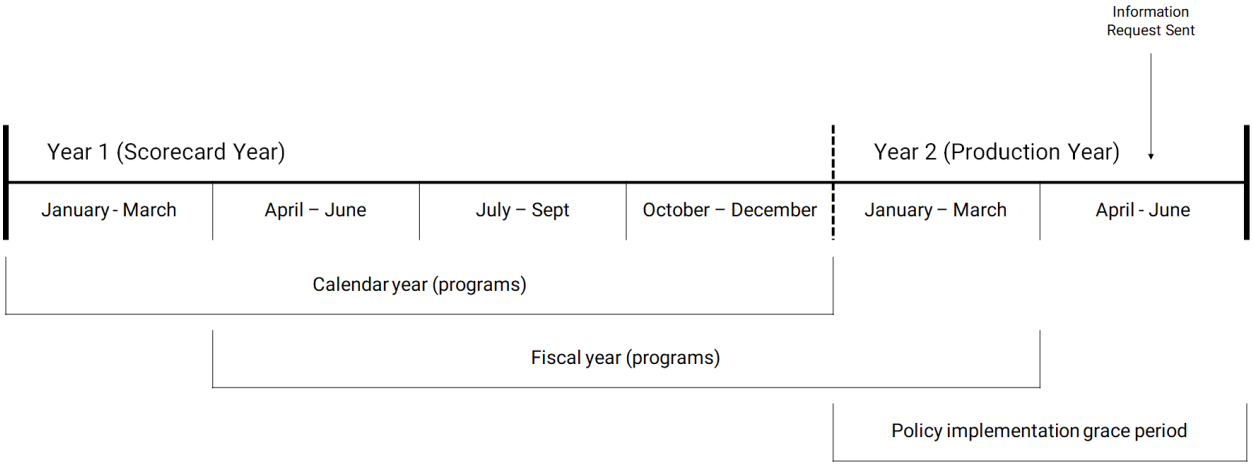

Figure 2. Scorecard coverage period

In previous years, we have issued our information request to program administrators and governments in April of Year Two. However, a consequence has been that select program administrators on fiscal year reporting periods have been unable to report Year One verified programs data within our production period. For those administrators, we have reported prior year data instead. This year, in consideration of the implications of comparing 2019 data for select program administrators with 2020 data for the others (which would have been impacted by the pandemic), we delayed our information request by one month in the hope we would be able capture Year One data for all program administrators. Therefore, all program data reported in this report are 2020 data.

In cases where we obtained data from third parties, we used the latest information available or over a series of years that best fit the context of the metric being tracked. For instance, some information came from the 2016 Canadian Census, while Statistics Canada's energy demand data so far only runs to 2019. When tracking research and development expenditures, pilot projects, and building code compliance studies, we used a longer time frame consistent with the period over which such activities normally unfold, to ensure a relevant and up-to-date analysis.

This report also tracks qualitative policy indicators for each jurisdiction surveyed via yes or no questions on the presence of specific policies, such as a particular building code or a provincial carbon price. To receive full points on such metrics, the respective policy must have been active or implemented within the above 18-month window. We awarded partial points in some cases, for example if a province cancelled a policy, or reported planned activities that it has not yet

implemented. Should a province cancel a policy earlier in our time period, we may award no points.

Topics and scoring

This Scorecard tracks 54 separate metrics, representing 16 topics across energy efficiency programs, enabling policies, buildings, transportation, and industry. Total scoring is out of 100 points. We encourage readers to think of a perfect score of 100 points as "summiting a mountain that all provinces can climb." The scores are not percentage grades. We provide an overview of the policy areas, topics and scoring weights in Table 4.

Our choice of topics, metrics, and scoring methodology reflects the following considerations:

- **Measurable:** Could we objectively measure policy performance?
- **Comparable**: Were the policy areas relevant and replicable across provinces?
- **Actionable:** Could provinces improve outcomes and/or add to the policy mix?
- **Data availability:** Could we access either quantitative or qualitative data?
- **Consensus:** Was there general agreement on the importance of this policy area?
- **Capacity:** Do we have the financial and human resources necessary to analyze information in time?

Most topics include both "outcome" metrics, which measure the performance of a jurisdiction (such as energy savings achieved, or number of energy efficiency-related certifications), and "policy" metrics based on a qualitative yes/no assessment. Some metrics include both policy and outcome components and are thus "mixed". In general, we applied more weight to outcome metrics. Maximum scores for each metric represent "stretch" goals; they reflect best-in-class policies and performance consistent with the ambition needed to grapple with climate change, energy poverty, and productivity challenges, while meeting national policy goals.

Table 3. Points available by metric type

Metric type	Points available
Policy	43
Outcome	49
Mixed	8
Total	100

We use the energy savings potential of policy areas— as identified in a 2018 IEA/NRCan efficiency potential study—to inform their relative weighting.[3] This study found that the largest proportion of potential savings by 2050 comes from buildings (28%), followed by transportation (25%). The researchers identified a further 12% of the potential savings in the industrial sector (excluding the mining, oil and gas sector, which accounted for 21% of potential savings). They identified the remaining 14% of savings in "other" sectors, including energy supply and agriculture.

We more heavily weighted "cross-cutting" energy efficiency programs and enabling policies that enable or lead directly to energy savings in buildings, transportation, and industry. To do so, we consulted the ACEEE scorecard and energy efficiency experts, and used our own judgement. We weighted the remaining topics and metrics for buildings, transportation, and industry according to the residual savings potential of activities in each sector.

Major changes to topics and weighting this year include the following:

- **Energy Efficiency Programs** (decreased in weighting by two points)
    - We removed our metric that tracked program spending against energy end-use demand and allocated all points to program spending per capita. The total value of the program spending section remains unchanged.
    - We revised our energy savings target section methodology, which reduced the total weight of the section by two points.

- **Enabling policies** (no change in weighting)
    - We decreased the weighting for financing and market creation by two points.
    - We redeveloped our approach to training and professionalization by moving energy advisors to the Buildings chapter and categorizing tracking of Certified Energy Managers and support for community energy management (a new metric this year) under the Support for energy management topic.
    - We included three new training and professionalization metrics, each worth one point: workforce readiness plans and strategies, efforts to improve energy

[3] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050," Insight Series 2018 (Paris: International Energy Agency, 2018).

literacy in the building workforce, and professionalization in energy efficiency programming.

- **Buildings** (decreased in weighting by one and a half points)
    - We reduced points for adoption and enforcement of older national model building codes (a decrease of one point).
    - We formalized the bonus point for activities to develop energy efficiency requirements for alterations to existing buildings at half a point.
    - We introduced a metric to track mandatory building performance standards policies (two points).
    - We moved tracking of energy advisors to the Buildings chapter (two points).
    - We removed tracking of appliance and equipment market transformation altogether (a decrease of three points).

- **Transportation** (increased in weighting by three and a half points)
    - We increased the points for consumer incentives for electric vehicles by a half point to consider incentives for used vehicles and speciality vehicles, such as e-bikes.
    - We introduced a new topic tracking public transportation with three metrics: provincial funding, ridership per capita, and electrification of public transport fleets. We assigned each of these metrics one point.

- **Industry** (no change in weighting)
    - We did not make any adjustments to this chapter.

In addition to the above, we changed the evaluation and scoring methodology and weighting of some metrics within these topic areas. We detail these revisions in the relevant sections below.

We believe this scoring approach is transparent and offers valuable insights into areas of provincial policy strength. However, we also caution that this assessment is unique to Canada; readers should not compare provincial scores with those of states in the American Council for an Energy-Efficiency Economy (ACEEE) scorecard. Comparison on individual metrics may be

instructive, however. An example is a comparison of state and provincial program savings and targets we previously published.[4]

In future reports, we will continue adjusting the allocation of points to reflect emerging trends in energy efficiency and updates in the policy landscape. We therefore ask readers to view the Scorecard as an evolving indicator, and not a standardized index.

[4] Brendan Haley, "Energy Efficiency Programs Are 'Shovel-Ready,'" Efficiency Canada (blog), May 11, 2020, https://www.efficiencycanada.org/energy-efficiency-programs-are-shovel-ready/.

Table 4. Policy areas, topics, and metrics weighting	
Energy efficiency programs	**38**
Program savings	18
Program spending	10
Equity and inclusion	4
Energy efficiency targets	6
Enabling policies	**17**
Financing and market creation	4
Research, development and demonstration and program innovation	3
Energy management capacity	3
Training and professionalization	3
Grid modernization	4
Buildings	**17.5**
Building codes	11.5
Performance, rating and disclosure	4
Energy advisors	2
Transportation	**20.5**
Zero-emission vehicles	8.5
Transport electrification infrastructure	7
Active transportation	2
Public transport	3
Industry	**7**
Support for energy management	4
Energy management systems / Strategic energy management	3
Total	**100**

Scope and limitations

The Scorecard focuses on provincial policies and outcomes. We do not consider the role of federal policy except where it might enable provincial action. Similarly, our scoring excludes local government activity, except where provincial actions might enable or impede municipal efficiency initiatives, such as project funding through local improvement charges and/or Property Assessed Clean Energy (PACE) programs.

Nevertheless, important local government policies might be in place, especially if there is a provincial policy leadership vacuum. We suggest those interested in local government energy efficiency policies and programs consult the QUEST Smart Energy Communities Benchmark, which tracks policy areas such as local transportation and land use planning that complement our provincial focus.[5]

The Scorecard measures policy best practices and performance, not overall energy intensity. We also focus more on the role of governments and other public organizations (e.g., efficiency program administrators) than the private sector. However, public policy and the private sector are intertwined, and we report indicators where private sector actors contribute to public policy success, and/or where policy influences the private sector. For instance, private sector actors are involved in electric vehicle charging, the decision to acquire training and certifications, and financing. In future editions, we aim to work alongside organizations like the ACEEE to seek out reliable information on the private sector's contribution to energy savings.

The Scorecard's transportation section focuses primarily on the integration of private transport with buildings and grids. We track progress in vehicle electrification and novel policy areas such as the development of EV-ready building codes. We focused on electrification and passenger vehicle efficiency to align with the largest efficiency potential identified in the IEA/NRCan national potential study noted above. A broader set of policies and indicators could include freight transport, and urban design. The QUEST Smart Cities Benchmark and the Pembina Institute's work on freight transport provide more information on these policy areas.[6]

---

[5] "Smart Energy Communities Benchmark," QUEST, 2020, https://smartenergycommunities.ca/.

[6] For example, see Lindsay Wiginton et al., "Fuel Savings and Emissions Reductions in Heavy-Duty Trucking: A Blueprint for Further Action in Canada" (Calgary, AB: Pembina Institute, April 2019), https://www.pembina.org/reports/freightclimateblueprints.pdf.

Several of the chapters below include discussion of future considerations for improved benchmarking, scoring, and information collection. Data limitations prevent scoring in some metrics (e.g., energy management system participation rates, workforce development and capacity); we discuss these in more detail where applicable. We were also able to find datasets that helped illuminate the state of play in areas such as university-based R&D. At times, we used such data for scoring or provided it for illustrative purposes only.

Overall results

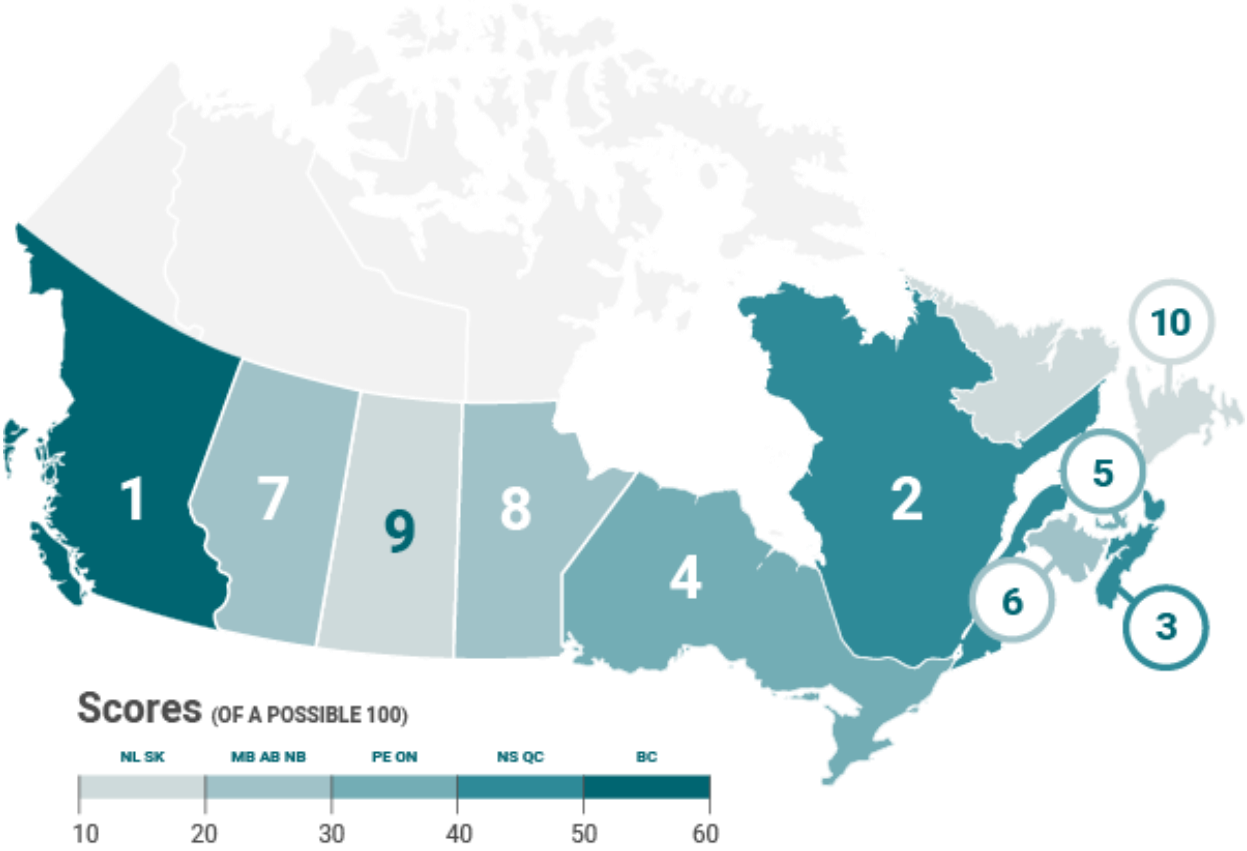

Figure 3. Map of Canada showing provincial scores

This year, British Columbia, Québec and Nova Scotia retain the top three spots, respectively. British Columbia continues to lead in Enabling Policies and Buildings, and Québec again places first in Transportation. Prince Edward Island again placed first in Energy Efficiency Programs. Manitoba fell below New Brunswick. Programs in Manitoba appear to have been most impacted by the pandemic. Newfoundland and Labrador fell back to last place this year, in part

because of lower program performance as well as improved scoring for Saskatchewan in Enabling Policies.

The table below shows scores for each province by policy area. We depict ranking changes in parentheses. Due to adjustments made to topics and metrics, changes in specific policy areas and in overall score may not be directly comparable with previous scores.

Table 5. Overall scoring results*

Rank	Province	Programs (38 points)	Enabling (17 points)	Buildings (17.5 points)	Transport (20.5 points)	Industry (7 points)	Total (100 points)
1 (-)	BC	10	14	11	15	6	55
2 (-)	QC	12	9	4	18	6	48
3 (-)	NS	15	11	5	5	6	41
4 (-)	ON	8	13	6	7	6	39
5 (-)	PE	19	5	3	7	4	36
6 (+1)	NB	8	9	2	5	4	27
7 (+1)	AB	3	7	3	4	6	21
8 (-2)	MB	7	7	2	2	4	21
9 (+1)	SK	3	9	3	1	3	18
10 (-1)	NL	5	3	1	3	1	13

** Scores rounded to nearest whole number. Totals might not sum due to rounding. Alberta and Manitoba are separated by a half point.*

Energy Efficiency Programs

Energy efficiency programs secure energy savings through various strategies such as audits, retrofits, training for building tradespeople, "people-centred"[7] or behavioural efficiency strategies, and customized industrial programs. Natural gas and electric utilities, governments and government agencies, and energy efficiency utilities such as Efficiency Nova Scotia and efficiencyPEI administer these programs.[8]

These entities generally develop and deliver programs under a regulatory framework that recognizes efficiency as an energy-system resource on par with power plants, wind turbines, transmission lines, and similar infrastructure. Efficiency resources, however, often provide energy services at a much lower cost and at lower risk than new sources of supply,[9] and deliver numerous co-benefits such as improved comfort, more income in the local economy, and reduced energy poverty.

For this year's scorecard, we collected information and allocated scores for the following policy areas or metrics:

- **Program savings** (18 points total)
    - Net annual incremental savings from electricity efficiency programs (nine points)
    - Net annual incremental savings from natural gas and/or non-regulated fuels efficiency programs (six points)
    - Electricity capacity savings (three points)

---

[7] Karen Ehrhardt-Martinez and John A. Laitner, "Rebound, Technology and People: Mitigating the Rebound Effect with Energy-Resource Management and People-Centered Initiatives," in ACEEE Summer Study on Energy Efficiency in Buildings, 2010, 7–76.

[8] For a discussion of the evolution in program administration, see Brendan Haley et al., "From Utility Demand Side Management to Low-Carbon Transitions: Opportunities and Challenges for Energy Efficiency Governance in a New Era," Energy Research & Social Science 59 (January 2020).

[9] Ron Binz et al., "Practicing Risk-Aware Electricity Regulation" (CERES & Regulatory Assistance Project, 2014), https://www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation-2014-update?report=view; Annie Gilleo, "New Data, Same Results – Saving Energy Is Still Cheaper than Making Energy," American Council for an Energy Efficient Economy, December 1, 2017, https://www.aceee.org/blog/2017/12/new-data-same-results-saving-energy.

- **Program spending** (ten points total)
    - Efficiency program portfolio spending per capita, all fuels (ten points)

- **Supporting equity and inclusion** (four points total)
    - Low-income program spending (two points)
    - Indigenous program spending (two points)

- **Energy efficiency targets** (six points total)
    - All cost-effective mandate (one point)
    - Long-term energy efficiency resource policies (one-quarter point)
    - Electricity savings targets (two and three-quarter points)
    - Natural gas / non-regulated fuels savings targets (two points)

We weigh electricity more heavily than natural gas/non-regulated fuel (NRF) savings because these programs typically have greater energy savings potential (following the ACEEE methodology).[10]

However, compared to the U.S. scorecard, we place relatively greater weight on natural gas and NRF savings compared to electricity because Canadian provinces with lower-carbon electricity systems may choose to prioritize fossil fuel savings or fuel switching / strategic electrification to meet climate goals.

[10] U.S. figures show electricity programs can achieve three times the primary energy savings of natural gas programs. Weston Berg et al., "The 2020 State Energy Efficiency Scorecard" (Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), December 2020).

Table 6. Energy efficiency programs scoring summary					
Province	Program savings (18 points)	Program spending (10 points)	Equity and inclusion (4 points)	Savings targets (6 points)	Total (38 points)
PE	6	9.5	2.25	0.75	18.5
NS	6	5.5	2	1.5	15
QC	6	4	0	1.75	11.75
BC	4.75	3.5	0.75	0.75	9.75
ON	4	2	1	1	8
NB	4.25	2.5	0.5	0.25	7.5
MB	3.75	1.5	0.5	1	6.75
NL	2.75	1.5	0	0.5	4.75
AB	2	0.5	0.25	0	2.75
SK	2	0.5	0	0.25	2.75

Canada-wide savings and spending

Across Canada, we found that net annual incremental energy efficiency savings in 2020 were down approximately 38% from their 2017 peak of 23 petajoules achieved in 2017.[11] This is largely due to the large drop in electricity savings in Ontario in the wake of the government's premature ending of the 2015-2020 Conservation First Framework, which cancelled most of the province's residential electricity efficiency programming. Yet, the drop in electricity savings in Ontario was not solely in the residential sector – commercial and industrial savings have also dropped considerably, from 1,105 GWh combined in 2017, to 313 GWh in 2020. Overall, Ontario has gone from accounting for 58% of national electricity savings in 2017, to 18% in 2020.

Natural gas savings have remained more constant over this period, though 2020 saw a large drop in Ontario (~14%), and from government programs in Québec (~72%), from 2019 results. The principal reasons for these declines are unclear. Spending on natural gas programs dropped approximately 18% in Ontario from 2019 but was up by approximately 67% in Québec

[11] Due to data revisions and more extensive tracking of energy efficiency savings and spending conducted for our 2021 Scorecard, this figure – and others in this section – may not match those reported in our previous report.

(government programs only). Program spending by the Province of Québec is included in the "multi-fuel" category in the figure showing program spending levels below. Savings in Alberta fell from a high of 607 GJ in 2017 to 187 GJ in 2020, while natural gas savings in British Columbia (FortisBC) have doubled over the same period.

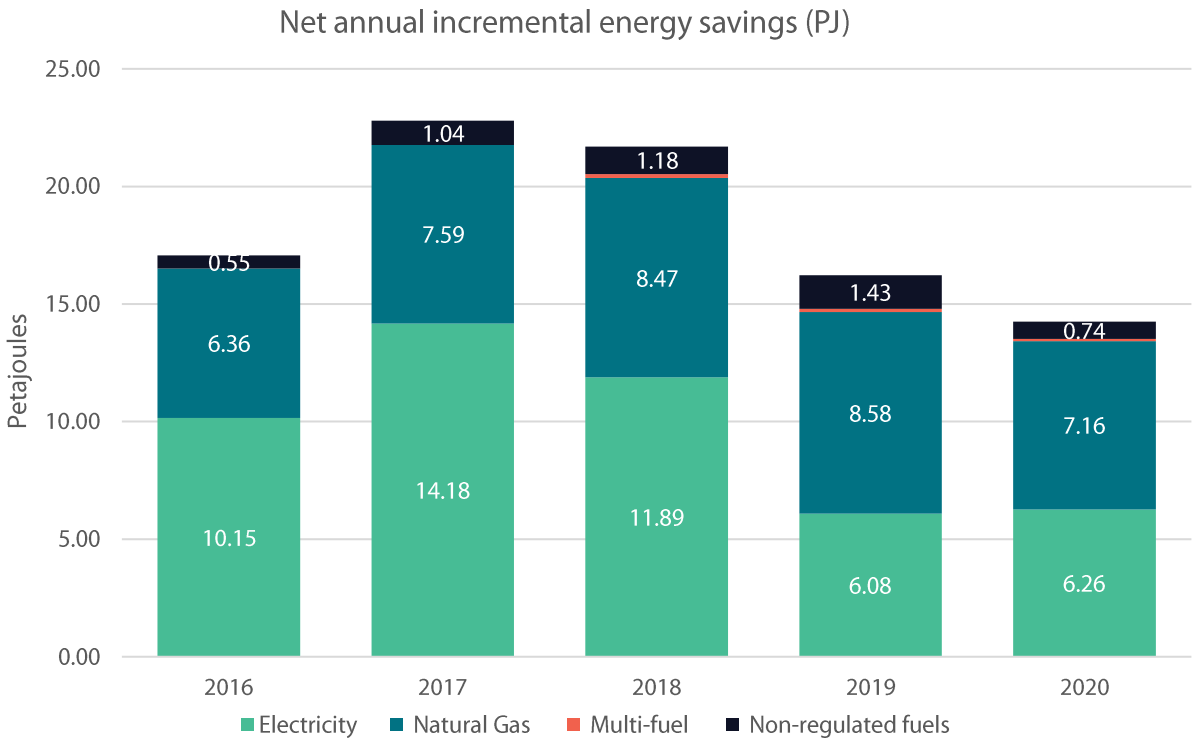

Figure 4. Net annual incremental energy savings, 2016-2020 (Petajoules)

Energy savings figures for 2020 are subject to revision and may change in future scorecards, but the data nevertheless show a downward trend. At the same time, program spending—while down from its peak in 2018—has not seen a similar overall decrease, as reduced spending on electricity programs has been offset by increased spending on "multi-fuel" programs. We classify program spending as multi-fuel where we are not able to differentiate between fuels, i.e., spending on programs, innovation, codes and standards, or enabling strategies by program administrators targeting savings in more than one fuel. Spending on transportation, demand response, and distributed generation programs is not included in the figure below.

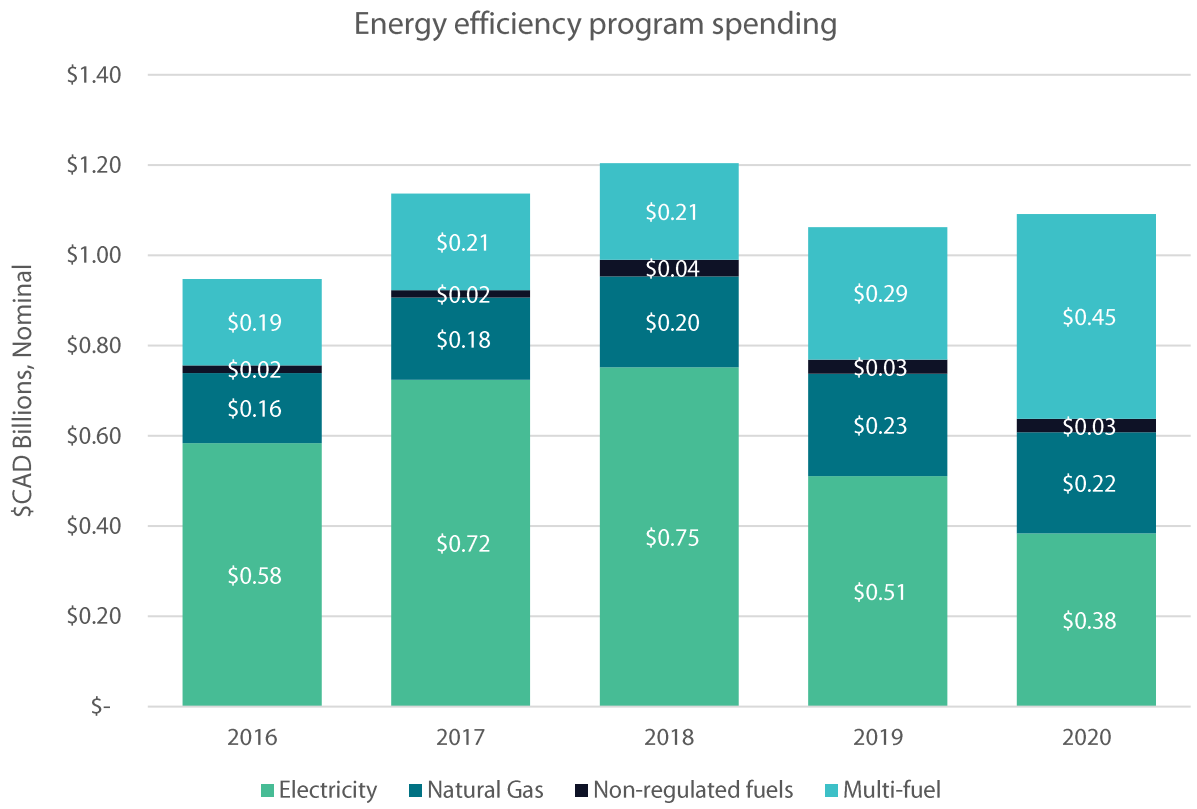

Figure 5. Energy efficiency program portfolio spending, 2016-2020 ($CAD billions, nominal)[12]

Reductions in energy savings coupled with relatively consistent program spending are suggestive of several possible explanations. Some program administrators may be shifting program strategies to focus more on enabling and energy management activities rather than traditional, incentive-based savings programs. Alternatively, program administrators in more mature program environments may be targeting deeper savings in home and building retrofits, as "shallower" low-cost savings (e.g., lighting) are increasingly realized. Further research into program measures and participation could help determine the plausibility these two possible explanations.

[12] Note that the spending data in this chart include related activities, whereas Appendix E shows only program spending

Program savings

Our Scorecard tracks net incremental energy savings from electricity, natural gas and non-regulated fuels (e.g., propane, heating oil, wood), and electricity capacity savings programs across Canada.

Incremental savings are those realized in the year a program was run and exclude cumulative savings from measures undertaken or installed in previous years. "Net" savings refer to those directly attributable to program activities, including "spillovers" that can occur when program activities promote greater participation, and exclude savings from free riders or weather.[13]

The savings presented below exclude savings from related activities, which include codes and standards, rate design, distributed generation or load displacement, innovation and research and development, transportation fuel savings programs, and demand response. For electricity savings reported at the generation level, we adjusted figures using the average line loss factor provided by respondents to convert savings to the meter level. In instances where respondents only reported gross savings, we adjusted figures using Canadian average net-to-gross ratios of 87.2% for electricity, 82.8% for natural gas, and 80.2% for non-regulated fuels savings (based on estimates from data received from respondents).[14] We provide further details on scoring methodology in the subsections below.

Electricity efficiency programs

We scored net annual incremental electricity savings at the meter level as a percentage of domestic electricity sales on an eight-point scale, with savings exceeding 2.5% as the top threshold. Canadian jurisdictions that reach this level of energy savings will capture significant

[13] Free riders are energy efficiency program participants who would have taken energy saving actions on their own without inducement from the program. Spillover refers to additional energy savings that occur because a program participant implements additional measures beyond those targeted by the program, or due to non-participants engaging in energy savings activities because of the program's influence.

[14] We calculated NTG values using net and gross figures provided by the following respondents between 2016 and 2019. Electricity: Efficiency Nova Scotia, IESO, Newfoundland Power, Newfoundland and Labrador Hydro, and Energy Efficiency Alberta. Natural gas: Énergir, SaskEnergy, and Energy Efficiency Alberta. Non-regulated fuels: Energy Efficiency Alberta. We excluded Enbridge-provided net and gross values from the natural gas calculation as outliers (averaging 43.9% between 2016 and 2018).

economic benefits, according to a 2018 economic impact study produced for Clean Energy Canada and Efficiency Canada.[15] In past years, leading U.S. states have met or exceeded this top threshold, and discussions of aggressive electricity savings suggest a target of 3% a year.[16] We awarded provinces an additional point if an independent third-party has evaluated their net savings figures.

[15] Dunsky Energy Consulting, "The Economic Impact of Improved Energy Efficiency in Canada: Employment and Other Economic Outcomes from the Pan-Canadian Framework's Energy Efficiency Measures" (Vancouver, BC: Clean Energy Canada and Efficiency Canada, April 3, 2018).

[16] C Neme and J Grevatt, "The Next Quantum Leap in Efficiency: 30 Percent Electric Savings in Ten Years" (Montpelier, VT: Regulatory Assistance Project, 2016).

Table 7. Electricity savings scoring methodology

Savings as a % of domestic sales (>=)	Score	Evaluated by a third party
2.50%	8	
2.34%	7.5	
2.19%	7	
2.03%	6.5	
1.88%	6	
1.72%	5.5	
1.56%	5	
1.41%	4.5	
1.25%	4	1
1.09%	3.5	
0.94%	3	
0.78%	2.5	
0.63%	2	
0.47%	1.5	
0.31%	1	
0.16%	0.5	

Table 8. Net incremental electricity savings

Province	Savings (GWh)	Domestic end-use sales (GWh)	Savings % of domestic sales	*2019-2020 % Points change*	Third-party evaluation (1 point)	Score (8 + 1 points)
NS	87.30	10,028.00	0.86%	*-0.22*	Yes	3.5
PE*	10.89	1,438.14	0.76%	*-0.21*	Yes	3
BC	281.20	54,431.00	0.52%	*0*	Yes	2.5
QC	826.38	171,446.00	0.48%	*0.15*	Yes	2.5
NB	49.70	11,470.00	0.43%	*-0.17*	Yes	2
NL	34.20	9,247.00	0.37%	*-0.11*	Yes	2
ON	343.42	128,165.62	0.27%	*-0.08*	Yes	1.5
MB*	53.30	21,701.00	0.25%	*-0.22*	Yes	1.5
AB	53.01	53,446.90	0.10%	*0.06*	Yes	1
SK	0.00	22,775.50	0	*-0.17*	N/A	0
Total	1,739.40	484,149.16	0.36%	*0.01*	-	-

** Savings from distributed generation are excluded. Results for distributed generation were 2.99 GWh in savings in PEI, and 94.13 GWh in savings in Manitoba. Had these savings been included, savings rates would have been 0.94% in PEI, and 0.68% in Manitoba.*

We derived savings and sales data from program administrator annual reporting and/or utility regulatory documents, as well as through our information requests to utilities and program administrators. Figures do not include data from smaller utilities. Values for previous years savings are updated with revised values from our information requests, if provided.

For Prince Edward Island, electricity sales are based on previous year's sales figures, forecasted assuming a 1% load growth rate. We provide a list of program administrators/utilities reporting savings and sales in Appendix A, and savings data in GWh per program administrator in Appendix C.

Electricity savings rates in 2020 remained more-or-less constant with 2019 values. Electricity savings in 2020 totalled 1,739.4 GWh, compared to 2019 savings of 1,687.9 GWh (using 2020 revised figures).

The pandemic may have contributed to lower savings. In our information request and in-house data collection efforts this year, we also tracked savings targets and spending budgets to compare actual results against planned. However, we were not able to find data for all program administrators. The results suggest that some program administrators fell short of their savings targets during the pandemic.

Table 9. Net incremental electricity savings, planned and actual (GWh)

Program Administrator	Planned	Actual	Difference
BC Hydro	224	255	31
FortisBC	32.31	25.94	-6.37
Efficiency Nova Scotia*	119.2	95.5	-23.7
Hydro-Québec	468.6	442.7	-25.9
Efficiency Manitoba~	164.0	53.3	-110.7

** Savings and targets at generator*

~ Planned and actual savings exclude codes and standards, and distributed generation

Natural gas and/or non-regulated fuels efficiency programs

This Scorecard combines program savings from natural gas and non-regulated fuels (NRFs) such as heating oil, propane, diesel, and wood into a single metric. Atlantic provinces use very little natural gas in buildings, and as such do not typically operate programs targeting natural gas savings (the exception being New Brunswick). Conversely, other Canadian provinces use proportionally much fewer NRFs than the Atlantic provinces. Combining natural gas and non-regulated fuels into a single metric allows us to compare provinces with different contexts.

This metric is calculated by combining natural gas and non-regulated fuels annual incremental savings by province (in Terajoules), and dividing them by distribution deliveries of natural gas (residential, commercial/institutional, and industrial) and end-use demand for select non-regulated fuels (diesel fuel oil, natural gas liquids, light fuel oil, and wood/wood pellets) in the

residential, commercial, public administration, and industrial-manufacturing end-use sectors.[17] The savings figures provided below include any savings from fuel switching toward lower carbon fuels.

Savings rates are scored on a five-point scale, using 1.75% savings over sales as the top threshold. A 2018 Canadian economic impact study, produced for Clean Energy Canada and Efficiency Canada, modeled this level of savings in its "aggressive" efficiency scenario.[18] Provinces receive up to one additional point if a third party evaluates the reported savings or adds another layer of oversight in addition to internal or third-party evaluation.

[17] End-use energy data excludes non-energy uses, and is obtained from the following Statistics Canada tables: Statistics Canada, "Table 25-10-0059-01: Canadian Monthly Natural Gas Distribution, Canada and Provinces," Government of Canada, 2019, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510005901; Statistics Canada, "Table 25-10-0029-01: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual," Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510002901; Statistics Canada, "Residential Use of Wood and Wood Pellets," Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510008301.

[18] Dunsky Energy Consulting, "The Economic Impact of Improved Energy Efficiency in Canada: Employment and Other Economic Outcomes from the Pan-Canadian Framework's Energy Efficiency Measures."

Table 10. Natural gas and non-regulated fuel savings scoring methodology

Savings as % of demand (>=)	Score	Evaluated by a third party
1.75	5	+ 1.0
1.58	4.5	
1.40	4	
1.23	3.5	
1.05	3	
0.88	2.5	
0.70	2	
0.53	1.5	
0.35	1	
0.18	0.5	

Table 11. Net incremental natural gas and non-regulated fuel savings

Province	Natural gas + NRF savings (TJ)	End-use demand (2019) (TJ)	Percentage of end-use demand	*% Points change*	Third-party evaluation (1 point)	Score (5 + 1 points)
PE*	45.20	5,225	0.87%	*0.03*	No	2.5
QC*	2,532.08	312,864	0.81%	*-0.34*	Yes	3
BC*	1,075.42	247,051	0.44%	*0.15*	Yes	2
NS*	160.30	38,191	0.42%	*-0.11*	Yes	2
NB	83.00	20,911	0.40%	*-0.26*	Yes	2
ON~	3,697.20	1,074,930	0.34%	*-0.06*	Yes	1.5
MB	146.63	86,849	0.17%	*-0.02*	Yes	1
AB	186.97	374,665	0.05%	*-0.01*	Yes	1
SK	23.38	82,149	0.03%	*0.01*	Yes	1
NL	-	14,349	-%	-	-	0
Total	7,950.18	2,257,185	0.35%	*-0.09*	-	-

** Net savings for Efficiency Nova Scotia, and PE, BC and QC government programs estimated using 0.828 and 0.802 net-to-gross ratios for natural gas and non-regulated fuels, respectively*

~ We note that Ontario natural gas programs have a low net-to-gross ratio compared to other jurisdictions. Gross savings were 0.97% of natural gas distribution deliveries in 2020.

We derived savings data from information requests to utilities and program administrators, and supplemented or verified the data via annual reports, utility regulatory documents, or other documents; these may not reflect true provincial totals (e.g., some smaller utilities are not included). We update values for previous years savings with revised values from our information requests, if provided. We provide a list of program administrators/utilities reporting savings in Appendix A. We report savings data in gigajoules per program administrator in Appendix C.

Overall, natural gas and non-regulated fuel savings dropped in 2020. Based on updated data received this year, natural gas and non-regulated fuels savings totaled 10,137 TJ in 2019, and dropped by approximately 2,186 TJ in 2020. Some of this decline may be due to the impact of the pandemic, though we have seen program administrators both fall short of and exceed planned savings levels.

Table 12. Net incremental natural gas and non-regulated fuel savings, planned and actual (TJ)

Program administrator	Planned	Actual	Difference
FortisBC	913.1	1,016.7	103.6
Efficiency Nova Scotia*	233.3	200.4	-32.9
Énergir	1,555.16	1,618.46	63.31
Efficiency Manitoba	310.32	146.63	-163.69

** Planned and actual are Gross savings*

Comparing savings rates reported this year with those reported last year seems to show a marginal overall improvement. We attribute this to the revised end-use deliveries/demand denominator composition we used this year. In particular, natural gas distribution deliveries used above are lower than the end-use final demand figures for natural gas we used last year.

Nevertheless, this revised method for estimating end-use demand better reflects natural gas sales figures provided by our information request respondents and makes our savings rates calculations more comparable to the method used by the ACEEE (which, unlike this report, excludes industrial natural gas use). This year we used 2019 savings and our revised end-use denominator to calculate values for percentage points change. This approach revealed the "true" change in savings over our previous report.

Fuel switching

In our 2020 Scorecard, we asked respondents to indicate whether their natural gas and/or non-regulated fuels energy savings included savings from fuel switching. We reported the results in a separate column in the metric table. This year, we again asked respondents to provide savings stemming from fuel switching. Five provinces reported fuel switching savings, and only three of those reported the value of those savings (which are included in the savings figures above). Table 13 below summarizes the responses to these questions.

Table 13. NG/NRF Program savings from fuel switching (2020)			
Province	Includes fuel switching?	Fuel switched from	Fuel switching savings
AB	No	-	-
BC	Yes	Natural gas; NRFs	40.3 TJ
MB	No	-	-
NB	Yes	NRFs	Unspecified
NL	Yes	NRFs	Unspecified
NS	Yes	NRFs	39.6 TJ
ON*	Yes	-	-
PE	Yes	NRFs	Unspecified
QC	Yes	Natural gas; NRFs; Transportation fuels	Unspecified
SK	No	-	-

** Natural gas DSM programs in Ontario do include some fuel switching measures, but the savings from these measures are not tracked separately from energy efficiency savings*

Electricity capacity savings

Whereas energy savings are the reduction in the actual amount of energy consumed by a measure over a given period (and thus measured by energy content, e.g., megawatt hours), capacity savings are a reduction in the maximum (peak) demand for energy at a specific time (and thus measured in megawatts).

Energy efficiency programs deliver both energy and capacity savings. Like energy savings, capacity savings help reduce system costs and avoid outages and may enable utilities to defer or avoid investment in new supply or distribution infrastructure. Utilities can also operate demand response programs to deliver additional capacity savings, though these may not lead to any reduction in energy consumption.

For this year's Scorecard, we asked respondents to delineate electricity capacity savings from efficiency and demand response programs, and to provide the annual peak demand. In its Utility Scorecard, the ACEEE scores utilities on peak demand reductions as a percentage of total peak

demand from energy efficiency programs only, using a scale with a top threshold of 2%. In 2020, it pegged the U.S. average at 0.81%.[19]

We scored this component with the same savings threshold as the ACEEE, but we also awarded a half point for savings from demand response, following the same scale, in recognition of its importance in managing grid constraints. These grid constraints are particularly relevant in the Canadian context. Some systems anticipate, or are experiencing, capacity constraints even though they experience bulk energy surpluses. Some regions are also aggressively deploying electric heat pumps, which can create peak power demands that demand side strategies can manage. We give preference to capacity savings from energy efficiency programs in our scoring methodology because these programs deliver both energy and capacity benefits, as well as customer benefits. In addition, utilities do not face potential throughput disincentives from demand response, while they could face disincentives from strategies that reduce peak demands through targeted energy efficiency. This is the rationale for ACEEE's only scoring on energy efficiency program savings in its utility scorecard.

The scoring methodology is explained in the following table.

Table 14. Capacity savings scoring methodology

Capacity savings / Peak demand (>=)	Score (Energy efficiency)	Score (Demand response)
2.00%	2.00	1.00
1.75%	1.75	
1.50%	1.50	0.75
1.25%	1.25	
1.00%	1.00	0.50
0.75%	0.75	
0.50%	0.50	0.25
0.25%	0.25	

[19] Grace Relf et al., "2020 Utility Energy Efficiency Scorecard" (Washington, D.C.: American Council for an Energy Efficiency Economy, 2020).

Table 15. Capacity savings (2020)			
Province	Capacity savings as a percentage of peak demand		Score
	From efficiency	*From demand response*	
MB	0.25%	3.64%	1.25
ON	0.22%	3.30%	1
SK	-	1.77%	1
NL~	0.58%	0.91%	0.75
NS	1.22%	-	0.5
PE*	0.87%	-	0.5
QC	0.24%	0.85%	0.5
BC*~	0.34%	-	0.25
NB	0.23%	0.25%	0.25
AB	-	-	0

** 2019 peak demand data was used for British Columbia and Prince Edward Island*

~Provinces with multiple electricity utilities: FortisBC did not report capacity savings; figures for NL are from Newfoundland Power only

Program spending

The Scorecard tracks program spending, as well as savings. While spending coincides with savings, the addition of a spending indicator picks up on several other factors. For instance, jurisdictions with higher spending could be going after more expensive and difficult to reach energy savings. Program administrators could be engaging in activities like codes and standards advocacy, market transformation, and innovation (termed “Enabling / Supporting” below) that are not recorded in energy savings figures. Jurisdictions might also have different evaluation protocols that result in different savings figures, and thus tracking spending helps control for those differences.

We evaluate this metric on a 10-point scale, based on provincial program spending per capita across all fuels.[20] The top threshold is $100, based on observed U.S. and Canadian top performance, decreasing by a half point for every $5 reduction (e.g., $95 = 9.5 points; $90 = 9 points). In previous years, we scored program spending both by spending per capita and spending per end-use energy demand to control for any potential bias that could be introduced by either measure. However, the differences between these two indicators are minor and per capita spending is the most intuitive. Thus, for the 2021 Scorecard, we chose to score only on per capita spending.

Table 16. Spending on efficiency programs and related activities, per capita

Province	Efficiency programs ($M)	Enabling / supporting ($M)	Total Spending ($M)	Total spending per capita	Score (10 points)
PE	$15.0	$0.4	$15.5	$96.90	9.5
NS	$50.2	$3.7	$52.9	$55.05	5.5
QC	$329.2	$47.0	$376.2	$43.87	4
BC	$130.9	$68.8	$199.7	$38.81	3.5
NB	$19.6	$1.3	$20.9	$26.71	2.5
ON	$329.8	$5.0	$334.8	$22.72	2
MB	$22.5	$4.0	$26.5	$19.24	1.5
NL	$8.6	$0.9	$9.5	$18.20	1.5
AB	$38.5	$0.0	$38.5	$8.69	0.5
SK	$7.0	$0.6	$7.7	$6.52	0.5
Total	$951.4	$130.7	$1,082.1	$28.6	-

As shown in Table 16 above, total spending on efficiency programs and enabling/supporting activities amounted to just over $1 billion in 2020, roughly equivalent to combined spending in 2019 (which we estimate at $1.03 billon). Our 2020 Scorecard reported $1.2 billion in spending in 2018 for programs and codes and standards (i.e., not including innovation, or

[20] Statistics Canada, "Table 17-10-0009-01: Population Estimates, Quarterly," Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901.

enabling/supporting initiatives, as in the figures above). Considering efficiency programs only, spending has declined by approximately 23% since 2018.

As with program savings, some of the drop in spending may be attributable to the COVID-19 pandemic. Table 17 below shows 2020 efficiency program budgets and spending for program administrators for whom we have budget data. To the best of our ability (not all program administrators report budgets and spending along similar categories) this data should reflect costs associated with energy efficiency programming (i.e., inclusive of administration and overhead costs), but excluding budgets and spending associated with enabling activities, rates, demand response, and codes and standards. As with savings targets and actual savings, many program administrators fell short of their projected spending.

Table 17. 2020 Efficiency program budgets and spending

Province	Program Administrator	Budget	Spending	Difference
BC	BC Hydro	$64.14	$53.64	-$10.50
	FortisBC	$61.20	$67.48	$6.28
MB	Efficiency Manitoba	$51.39	$22.5	-$28.89
NB	NB Power	$24.43	$19.62	-$4.81
NS	Efficiency Nova Scotia	$53.11	$50.17	-$2.94
ON*	IESO	$201.73	$90.09	-$111.64
	Enbridge	$113.13	$104.85	-$8.28
QC	Énergir	$27.75	$21.81	-$5.94
	Hydro-Québec	$55.30	$41.00	-$14.30
SK	SaskEnergy	$2.89	$2.84	-$0.05
	SaskPower	$6.80	$4.20	-$2.60

** Budgets and spending are for the interim framework only and does not include legacy framework wind down spending.*

Except for FortisBC natural gas programs, all program administrators fell short of their 2020 spending budgets.

Equity and inclusion

Improving energy efficiency provides many more benefits than reducing the costs of energy systems—it improves living standards and comfort and, by extension, physical and mental health. Efficiency also reduces customer bills, as well as indoor and outdoor environmental benefits, by reducing pollutants associated with energy use. All these benefits—reduced consumer costs, coupled with improvements in health, thermal comfort, and well-being—are particularly beneficial to low-income communities.

Unfortunately, not all communities are able to enjoy these benefits equally. Barriers such as the up-front cost of the improvements, split incentives (e.g., between a building owner and its tenant), skepticism of governments or utilities that administer efficiency programs, and accessibility (in cases of remote communities, or where language barriers exist) may push energy efficiency improvements out of reach in some communities. While programs targeting traditionally underserved and hard-to-reach customers yield larger benefits, realizing them is more capital-intensive and requires different outreach and engagement strategies. However, governments and energy efficiency program administrators across Canada must ensure that all may equally and inclusively share in the benefits that energy efficiency can provide.

Governments and program administrators need to invest extra effort and ingenuity to break down barriers to equity and inclusion. Actions could include:

- Legislating or requiring that efficiency programs target certain communities;
- Including provisions in cost-effectiveness testing to allow for lower program-screening thresholds, or inclusion of low-income program specific non-energy benefits, and/or
- Establishing long-term funding stability for these programs.

In our Scorecard and online policy database, we track such policies and program spending for two communities: Canadians experiencing energy poverty, and Indigenous Peoples and communities.

Low-income program spending

Energy poverty exists when high energy bills lead to inadequate energy services and social exclusion, preventing some households from gaining access to other necessities of life.[21] We can assess a given jurisdiction's level of energy poverty by defining an acceptable or sustainable "energy burden" as a percentage of income spent on energy costs. In Canada, energy poverty researcher Dr. Maryam Rezaei suggested a 6% threshold in 2017, roughly twice the national median energy burden.[22] This logic, based on a relative measure of poverty, is similar to the rationale for the 10% threshold established in the United Kingdom. A 6% threshold is also justified if we accept that households should spend no more than 30% of their income on all housing costs, and no more than 20% of total housing costs on energy bills.[23]

Table 18. Households spending more than 6% of after-tax income on home energy costs, by province*

Province	% of All Households	Number of households
Prince Edward Island	41%	23,640
Newfoundland and Labrador	38%	83,245
Nova Scotia	37%	147,085
New Brunswick	37%	114,790
Ontario	22%	1,138,065
Saskatchewan	21%	81,390
Canada	20%	2,810,905
Québec	18%	630,185
Manitoba	16%	74,435
Alberta	16%	237,425
British Columbia	15%	272,200

[21] B. Boardman, Fuel Poverty: From Cold Homes to Affordable Warmth (London: Bellhaven Press, 1991), https://www.energypoverty.eu/publication/fuel-poverty-cold-homes-affordable-warmth.

[22] Maryam Rezaei, "Power to the People : Thinking (and Rethinking) Energy Poverty in British Columbia, Canada" (University of British Columbia, 2017), https://doi.org/10.14288/1.0351974.

[23] Roger D. Colton, Direct Testimony and Exhibits before the Nova Scotia Utility and Review Board on Behalf of Dalhousie Legal Aid Service in the Matter of: An Application by Nova Scotia Power Inc. for Approval of Certain Revisions, to Its Rates, Charges and Regulations, vol. P-881, NSUARB-P-881, 2004.

** 2016 Census, custom tabulation from Statistics Canada for Canadian Urban Sustainability Practitioners (CUSP) network, available at http://energypoverty.ca/backgrounder.pdf*

The number of households in energy poverty can differ from the number of households considered to be low-income. Rezaei's doctoral thesis on energy poverty in Canada found that two-thirds of the Canadians who spend more than 6% of their income on energy were above the low-income cut-off.[24] The number of households experiencing energy poverty is the most relevant indicator for energy efficiency policy because it helps policy makers and program designers more effectively target households where upgrades could have the greatest impact.

Statistics on energy poverty are not routinely published. However, Rezaei worked with the Canadian Urban Sustainability Practitioners (CUSP) network to produce a custom tabulation based on the 2016 census. The table below shows the number of households that spent more than 6% of their after-tax income on home energy costs, including heat and electricity but not transportation.

We awarded a maximum of two points for low-income energy efficiency program spending per household in energy poverty, after asking information request respondents to list total energy efficiency program spending on low-income populations in the most recent year for which data was available—excluding other energy poverty reduction strategies. We did not specify an income cut-off, recognizing that the definition of low-income can differ by geographic area and that programs to alleviate energy poverty might target populations above standard poverty lines, as is appropriate given the demographics of energy poor households noted above. We divided the total spending figures by the number of households in energy poverty to compare program spending to reduce energy poverty across the provinces.

[24] Rezaei, "Power to the People."

Table 19. Low-income efficiency program spending scoring methodology	
Spending per Household (>=)	Score
$125	2
$109	1.75
$94	1.5
$78	1.25
$63	1
$47	0.75
$31	0.5
$16	0.25

Table 20. Low-income efficiency program spending				
Province	Program spending ($ millions)	Spending per household in energy poverty	*Annual change in program spending per household ($ millions)*	Score (2 points)
PE	$4.43	$187.39	*-$27.50*	2
NS	$9.59	$65.20	*-$43.58*	1
ON	$70.24	$61.72	*$23.53*	0.75
BC	$12.26	$45.04	*-$2.09*	0.5
MB	$3.17	$42.59	*$42.00*	0.5
NB	$3.70	$32.23	*$14.37*	0.5
AB	$6.00	$25.27	*-$7.16*	0.25
QC	$5.37	$8.52	*-$3.70*	0
NL	$0.46	$5.53	*-$7.68*	0
SK	$0.21	$2.58	*$1.11*	0
Total	$115.43	$41.19	*$8.76*	-

Indigenous communities

Indigenous communities are using energy efficiency to achieve objectives such as greater energy sovereignty, local security, and economic well-being.[25] The Pan-Canadian Framework on Clean Growth and Climate Change (PCF) calls for the federal and provincial governments to work in partnership with Indigenous Peoples to improve building standards and energy efficiency through building-renovation programs, in a manner that incorporates traditional knowledge and culture into building designs.[26] A specific focus on fostering Indigenous partnerships within energy efficiency policy strategies can be a pathway towards reconciliation, which is the responsibility of all Canadians.[27]

Energy efficiency portfolios should include a specific focus on working with relevant Indigenous Nations, for a number of reasons. The United Nations Declaration on the Rights of Indigenous Peoples outlines the Indigenous right to free, prior, and informed consent for any energy project that impacts Indigenous Nations or their territories, including energy efficiency projects. In addition, policy approaches in support of Indigenous housing have historically proven inadequate and often counterproductive. As of 2016, one in five Indigenous people in Canada lived in a dwelling that was in need of major repairs.[28] Previous government-directed housing initiatives that did not include meaningful partnerships with Indigenous Peoples, failed to build housing that fit local community needs for operational affordability and up-keep, taking into account local climatic and demographic contexts.[29]

---

[25] Nicholas Mercer et al., "'That's Our Traditional Way as Indigenous Peoples': Towards a Conceptual Framework for Understanding Community Support of Sustainable Energies in NunatuKavut, Labrador," Sustainability 12, no. 15 (January 2020): 6050, https://doi.org/10.3390/su12156050.

[26] Environment and Climate Change Canada, "Pan-Canadian Framework on Clean Growth and Climate Change: Canada's Plan to Address Climate Change and Grow the Economy." (Ottawa: Government of Canada, 2016), http://www.deslibris.ca/ID/10065393.

[27] Truth and Reconciliation Commission of Canada, "Honouring the Truth, Reconciling the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada" (Truth and Reconciliation Commission of Canada, 2015), http://www.trc.ca/assets/pdf/Executive_Summary_English_Web.pdf.

[28] Statistics Canada, "Census in Brief: The Housing Conditions of Aboriginal People in Canada" (Ottawa, ON: Government of Canada, October 25, 2017), https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016021/98-200-x2016021-eng.cfm.

[29] Katie Hyslop, "BC First Nation Gets Active about Passive Housing," The Tyee (The Tyee, January 9, 2017), https://thetyee.ca/News/2017/01/09/First-Nation-Active-Passive-Housing/.

Our Scorecard tracks Indigenous-specific energy efficiency programs. These programs can build relationships with specific Nations and/or outreach to urban communities through organizations such as Friendship Centres. As with programs to combat energy poverty, we asked respondents to indicate whether legislative or regulatory requirements existed to develop programming in partnership with Indigenous Peoples, whether provisions in cost-effectiveness testing procedures exist to remove regulatory barriers, and whether a stable, long-term funding arrangement exists to support these initiatives. Provinces with a dedicated program receive a half-point.

Table 21. Efficiency program spending – Indigenous peoples/communities, scoring methodology

Spending per individual (>=)	Score
$33.0	1.5
$27.5	1.25
$22.0	1
$16.5	0.75
$11.0	0.5
$5.5	0.25

We also track spending on these programs as a performance indicator to evaluate the emphasis provincial-level energy efficiency program portfolios place on improving energy efficiency in Indigenous communities. To benchmark spending across provinces, we divide total spending reported in our information request by the number of individuals in each province reporting "Aboriginal identity" in the 2016 census.[30] We awarded points based on the scale in Table 21.

We chose $33 per Indigenous individual as the top benchmark, considering that the Scorecard sets $100 per capita as the top score for total spending, which includes residential, commercial, and industrial markets as well as other program areas. Though the ratio of residential to non-residential program spending varies widely across Canadian program administrators, the nation-wide average is 43%, according to data collected for the Scorecard. Based on what one would expect

[30] Statistics Canada, "Aboriginal Peoples Highlight Tables, 2016 Census," Government of Canada, 2016, https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/abo-aut/Table.cfm?Lang=Eng&S=99&O=A&RPP=25. "Aboriginal identity" is the term used in the Census. It is based on respondents to the Census who report a single First Nations, Métis or Inuk identity or multiple Aboriginal identities. We note that some Indigenous individuals and Nations do not participate in the census for reasons such as not identifying as Canadian or seeing little benefit from providing the information. The 2016 Census is reported to have a 92.5% collection response rate, which is an increase from previous versions.

to see in a comparatively well-funded provincial energy efficiency portfolio, our top benchmark thus represents a somewhat conservative threshold for spending on Indigenous programs—in a program area likely to be heavily weighted towards homes. We note that this is a spending metric for the entire provincial Indigenous population, not a spending amount per program participant and thus, it is not a measure of the comprehensiveness of energy retrofits.

An important caveat: This metric only provides a partial view of Indigenous energy efficiency initiatives in Canada, as it only assesses provincial and/or program administrator spending. For instance, this approach would not capture Indigenous-led projects taking place without partnerships with provincial government agencies or program administrators.[31] We are also not capturing all energy efficiency upgrades supported by the federal government that do not involve a provincial-level government or utility partner.

[31] Indigenous Clean Energy, "Accelerating Transition: Economic Impacts of Indigenous Leadership in Catalyzing the Transition to a Clean Energy Future across Canada," June 2020.

Table 22. Summary of energy efficiency programming/initiatives for Indigenous communities			
Province	Legislative / regulatory requirements	Dedicated long-term funding	Description of program(s) and initiatives
AB	No	No	N/A
BC	No	Yes	BC Hydro & FortisBC - Indigenous Communities Conservation Program (ICCP), include salary support and training for energy champion positions; support for planning and policy development to assist communities to advance their energy and climate change goals. Included in BC Hydro's DSM as a dedicated program, for both integrated and non-integrated areas. Expenditures are approved in regulatory proceedings using 40% TRC adder - the same as low-income programming. The Province of British Columbia has a First Nations Clean Energy Fund (not exclusively energy efficiency); CleanBC Communities Fund (not only First Nations); CleanBC Indigenous Community Energy Coach Program & Heat Pump Incentive
MB	Yes	Yes	First Nation Insulation and Direct Install program; Indigenous Small Business Program; Indigenous Community Energy Efficiency program; Metis Energy Efficiency Offers Efficiency Manitoba created an Indigenous Energy Efficiency Working Group to work with First Nations communities, tribal councils, and the Manitoba Metis Foundation. The group provides feedback to assist in the design, delivery and implementation of Efficiency Manitoba's indigenous programming. Many programs aim to hire within local communities. Regulation directs that, if practical, at least 5% of budget for DSM is allocated to low-income or hard-to-reach customers, which includes Indigenous populations. The current three-year plan dedicates 6% of electricity funding and 30% of natural gas funding for these customer segments.

NB	No	No	No dedicated programs, but some programs funded by Low-Carbon Economy Fund provide higher incentives for Indigenous. NB Power works with Indigenous communities to facilitate program participation, efficiency learning, and skills and capacity. The First Nations Affairs team at NB Power provides a central point of contact and consultation with First Nation inquiries, though not strictly for efficiency-related matters.
NL	No	No	NL Hydro has no dedicated program. The Isolated Communities Energy Efficiency program for remote diesel-system communities serves Indigenous communities. The program provides residential and commercial direct installation with a focus on community knowledge and capacity building and hiring and training local representatives.
NS	No	Yes	Efficiency Nova Scotia administers the Mi'kmaw Home Energy Efficiency Project (launched in 2018). This program is delivered in partnership with each community, works with community-preferred contractors where possible, and has been endorsed by the Assembly of Nova Scotia Mi'kmaw Chiefs. The program is funded through the 2020-2022 DSM plan, with support from the federal government and the province until March 2023.
ON	Yes	Yes	March 2019 Ministerial Directives set out requirements for on-reserve First Nations programming. IESO programs include the First Nations Conservation Program, Conservation on the Coast, and Remote First Nations Energy Efficiency Pilot Program. In 2021, the latter will become a fully-fledged program, and the IESO will launch the First Nations Community Building Retrofit Program. The income-eligible Energy Affordability Program also serves grid-connected Indigenous communities. IESO also delivers a suite of energy support programs to assist Indigenous communities with community energy planning, building community capacity, and/or hiring Community Energy Champions. A September 30, 2020 Ministerial Directive set out requirements for the IESO to, under the 2021-24 CDM Framework, continue First Nation programs that were suspended under the Interim Framework

			due to the outbreak of COVID-19 to allow projects to be completed.[32] In 2021, the programs may evolve based on additional engagement with First Nation communities in Ontario. Enbridge does not offer dedicated Indigenous community programming, though support is included within its income-qualified programs. Enbridge works with band councils on various matters, including permission to deliver energy efficiency programs (specifically, the Home Winterproofing Program), which is delivered by an Indigenous-owned company.
PE	No	No	Though there are no dedicated programs, the EfficiencyPEI partnership with the Abegweit First Nation continued in 2020, providing free energy audits, and access to other efficiency programming. An experienced member of the community established a construction company to perform the upgrades.
QC	No	No	There are no dedicated Indigenous community energy efficiency programs offered in Québec.
SK	No	No	SaskPower ran the Northern Home Retrofit Pilot program in 2020/21, partnering with Peter Ballantyne Cree Nation (Assin'skowitiniwak) to provide free energy efficiency upgrades to qualified participants. Other initiatives included support for developing community energy plans, hiring a Community Power Rep, and a marketing campaign featuring energy efficiency information in Indigenous languages.

[32] Minister of Energy, Northern Development and Mines, "Ministerial Directive: 2021-2024 Conservation and Demand Management Framework" (Government of Ontario, September 30, 2020), https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework.

Table 23. Indigenous Peoples efficiency program spending				
Province	Indigenous program spending ($ millions)	Indigenous program spending per individual with Aboriginal identity	*Annual change in program spending ($ millions)*	Score (2 pts)
NS	$1.19	$23.11	*-$10.29*	1
ON	$3.57	$9.54	*$7.59*	0.25
BC	$2.54	$9.39	*$8.32*	0.25
PE	$0.02	$7.30	*-$56.29*	0.25
NB	$0.05	$1.70	*-$0.34*	0
MB	$0.22	$0.99	*$0.36*	0
NL	$0.03	$0.66	*-$3.94*	0
SK	$0.05	$0.31	*$0.08*	0
AB	-	-	-	0
QC	-	-	-	0
Total	$7.67	$4.58	*$2.51*	-

Energy efficiency targets

Energy efficiency targets give program administrators and energy system managers clear direction. They reinforce the concept of efficiency as a quantifiable energy resource, the potential size of which can be identified in advance (i.e., through resource planning), and then pursued through a portfolio of energy efficiency programs and related activities.

That said, the question of what constitutes a "target" is less straightforward. At a high level, a target is an ambitious objective that pushes program administrators to achieve more energy savings then they might otherwise have captured. In the United States, the ACEEE tracks energy efficiency resource standards (EERS), which are described as "quantitative, long-term energy savings target[s] for utilities," wherein "utilities must procure a percentage of their future electricity and natural gas needs using energy efficiency measures, typically equal to a specific

percentage of their load or projected load growth."[33] According to the ACEEE, EERS policies can more than triple spending and savings levels.[34] Our review of the most recent relevant state policies suggests that legislators or utility regulators typically establish EERS.

We fairly assume that the presence of a target is likely to lead to more energy savings than its absence. But what if this target, set 'outside' the utility or program administrator, i.e., by government or the utility regulator, amounts to less than what potential studies suggest is possible or traditionally achieved? Alternatively, what if this long-term target, initially considered ambitious, is over time shown to be considerably short of what the true potential for energy savings was when it was made? What happens if program administrators miss their targets (i.e., in what sense are they mandatory)?

Due to the complicated nature of energy efficiency targets, we distinguish between two main types in the 2021 Scorecard. These are:

1. **Long-term energy efficiency resource policies.** Long-term (greater than five years) energy savings targets that are either economy-wide (not applicable to a specific fuel) or that specify targets for electricity and natural gas/non-regulated fuels, and that are set either in legislation or a utility regulatory board ruling. In short, policies that are most similar to EERS in the United States.

2. **Fuel-specific savings targets.** Energy savings targets for electricity, natural gas, and/or non-regulated fuels that are set by the utility or program administrator and/or negotiated and approved as part of a demand-side management planning process with a planning cycle period of two to five years.

---

[33] American Council for an Energy Efficient Economy (ACEEE), "Energy Efficiency Resource Standards," State and Local Policy Database, 2020, https://database.aceee.org/state/energy-efficiency-resource-standards.

[34] Maggie Molina and Marty Kushler, "Policies Matter: Creating a Foundation for an Energy-Efficient Utility of the Future" (Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), June 9, 2015), https://aceee.org/policies-matter-creating-foundation-energy.

Long-term energy efficiency resource policies

The core objective of an energy savings target is to achieve higher savings than would have otherwise been accomplished in its absence. If legislated, or rooted in a concrete and actionable energy / climate change plan, they also communicate political support for energy efficiency. Accordingly, a strong "target" would be a level of savings at the top of the benchmarks set in the program savings scoring and/or a clear planning rule that clearly prioritizes energy efficiency above supply side resources, such as a regulatory requirement to pursue all cost-effective energy efficiency resources. For such a policy, we would award a full point, however our research shows that no such policy yet exists in Canada.

This leaves long-term savings targets set either in legislation, a regulatory planning rule, or in a concrete and actionable energy / climate change plan. In 2020, only three provinces possessed outside energy efficiency savings targets akin to a US-style EERS: British Columbia, Manitoba, and Québec (see Table 24 below for descriptions). We award provinces with such policies 0.25 points. Though they help to demonstrate political support for prioritizing investment in energy efficiency, their ambition is not always clearly linked to aggressive levels of energy efficiency above the norm, or actual cost-effective savings potential, and they carry the possibility that they will become even weaker over time.

Table 24. Long-term energy efficiency resource policies

Province	Description	Score (0.25 pts)
BC	British Columbia's 2008 Clean Energy Act set an objective for BC Hydro to reduce its expected increase in demand by at least 66% between 2008 and 2020 through energy efficiency and conservation. There are no legislated targets for natural gas savings. However, FortisBC voluntarily adopted this target, and subsequently increased it to 80%. Under the Utilities Commission Act, British Columbia utilities are required to consider cost-effective demand-side measures first, and to explain to the regulator why subsequently proposed supply-side investments could not be met with demand-side management. The 2019 Energy Statutes Amendment Act removed BC Hydro's former exemption from this requirement.	0.25

MB	The Efficiency Manitoba Act legislates long term energy efficiency savings targets over 15 years (2020-2035) of minimum net annual electricity savings at least equal to 1.5% of electricity consumption in the immediately preceding year, and minimum net annual natural gas savings equal to 0.75% of natural gas consumption in the immediately preceding year. Any shortfalls and surpluses in annual net savings carry forward over the 15-year period to reach cumulative annual percentage savings equal to 22.5% for electricity and 11.25% for natural gas.	0.25
QC	Government directive 537-2017 directed Transition énergétique Québec to create a 2018-2023 master plan that improves energy efficiency at least 1% per year, on average, and to reduce consumption of petroleum products by 5%. The province's 2030 Energy Plan calls for a 2030 objective to improve energy efficiency 15% from a 2013 base year. The resulting TEQ 2018-2023 Master Plan targeted an "economy-wide"[35] improvement in energy efficiency by about 1.2% per year, on average. TEQ states that the initiatives within the plan are expected to improve efficiency by 0.6% per year (9.9 petajoules), which is higher than the 0.4% or 7.3 petajoules achieved from 2012 to 2017. The plan also aimed to reduce petroleum use by 12% in 2023 relative to 2013 levels.	0.25

Aside from these select EERS-style policies, program administrators in most jurisdictions in Canada operate in a similar manner. A program administrator or utility first proposes energy efficiency savings targets and associated spending budgets to the regulatory board as part of a demand-side management plan that usually covers three to five years. The regulator and intervening stakeholders then assess the plan to consider issues such as cost-effectiveness, rate and bill impacts, and social equity. After a period of quasi-judicial review by the board, and potential negotiation with intervening parties, the regulator approves a plan. Each year, the program administrator or utility reports progress on achieving these plans to the regulatory board, and/or sometimes a provincial government ministry, for oversight and approval.

[35] In our 2020 Scorecard, we referred to this target as 'economy-wide' as it includes indirect changes from technological improvements and structural changes as well as the impact of initiatives outside of Québec.

As in previous years, we assess these plans by evaluating the targeted net annual incremental energy savings as a percentage of projected domestic sales (averaging both over the planning period reported by the program administrator) and score them using the same savings rate thresholds as in our program savings metrics above. We also award a quarter point for provinces able to provide targets for three or more years into the future.

Electricity savings targets

Provinces are awarded up to two and half points for electricity savings targets, based on the scale provided in Table 25. Savings targets provided here are for efficiency programs only. Though some jurisdictions include savings from related activities in their demand-side management plans, we do not include these in our metric. We award an additional quarter point for targets provided for three or more years into the future. (Note: we provide savings targets including codes and standards for illustrative purposes.)

Table 25. Electricity savings targets scoring methodology

Approximate annual incremental electricity program savings as % of sales (>=)	Score
2.50%	2.5
2.25%	2.25
2.00%	2
1.75%	1.75
1.50%	1.5
1.25%	1.25
1.00%	1
0.75%	0.75
0.50%	0.5
0.25%	0.25

Table 26. Electricity savings targets

Province	Years covered (0.25 points)	Avg annual savings / sales (2.5 points)	Target including codes and standards	Score (2.75 points)
NS	2021-2022	1.02%	-	1
PE	2021	0.96%	-	0.75
ON	2021-2024	0.51%	-	0.75
MB*	2021-2022	0.71%	1.04%	0.5
NL	2021-2025	0.38%	-	0.5
QC~	2021-2029	0.40%	-	0.5
BC	2021-2022	0.45%	0.93%	0.25
NB	2021-2022	0.36%	-	0.25
AB	-	-	-	0
SK	-	-	-	0

**Targets exclude savings from load displacement and emerging tech*

~Savings targets and sales averages for 2021-2025

Three provinces were able to provide targets extending more than three years into the future: Ontario, Newfoundland and Labrador, and Québec. In Ontario, the IESO's 2021-2024 Conservation and Demand Management Plan began, targeting a total of 2.7 TWh of electricity savings, and 440 MW of peak demand savings. In Newfoundland and Labrador, the utilities reported targets from their joint 2021-2025 Electrification, Conservation and Demand Management Plan (it had yet to be fully approved at time of writing). In Québec, Hydro-Québec provided targets extending to 2029, as part of its contribution in the province's Plan for a Green Economy, released in November 2020.[36]

While Newfoundland and Labrador's targets are broadly consistent with past performance under the previous plan, the Ontario's electricity savings rate targets are considerably below historical performance, e.g., 1% savings/sales in 2018 (IESO's budgets are set through provincial Ministerial Directive). Hydro-Québec's plan ramps annual savings up from 0.5 TWh in 2021 to 0.9 TWh between 2024 and 2029. Neither Alberta nor Saskatchewan have electricity savings targets.

Natural gas / Non-regulated fuels savings targets

In keeping with our natural gas and non-regulated fuels savings metric above, we combined targets for natural gas and non-regulated program savings targets per province. The savings targets cover programs only (excluding codes and standards, though we provide these for informational purposes). We used the same natural gas / non-regulated fuels denominator as in the savings metric above, but assumed no load growth (due to observed flat or declining demand in non-regulated fuels). We based scoring on the same threshold values used in the savings metric as well, with a maximum available score of 1.75 points, plus an additional 0.25 points for provinces able to provide savings targets for three or more years into the future.

[36] Government of Québec, "2030 Plan for a Green Economy," Government of Québec, 2020, https://www.Québec.ca/en/government/policies-orientations/plan-green-economy/.

Table 27. Natural gas and non-regulated fuels savings targets scoring methodology	
Annual Incremental natural gas/NRF savings as % of sales (>=)	Score
1.75%	1.75
1.50%	1.5
1.25%	1.25
1.00%	1
0.75%	0.75
0.50%	0.5
0.25%	0.25

Table 28. Natural gas / Non-regulated fuels savings targets

Province	Years covered	Avg annual savings / end-use demand*	Target including codes and standards	Score
QC	2021-2023	0.79%	-	1
BC	2021-2022	0.47%	-	0.25
ON~	2021	0.46%	-	0.25
NS	2021-2025	0.39%	-	0.5
MB	2021-2022	0.36%	0.56%	0.25
SK	2021-2025	0.05%	-	0.25
AB	-	-	-	0
NB	-	-	-	0
NL	-	-	-	0
PE	-	-	-	0

** We use the same combination of natural gas and non-regulated fuel end-use demand to estimate savings target rates as we do in our evaluation of incremental program savings, regardless of whether the program administrator reported targets for one or both fuels. For this reason, Manitoba's target does not match its legislated savings target of 0.75%.*

~ Natural gas savings targets in Ontario are based on prior year performance. The figure shown here is an approximation based on 2020 savings and spending, approved budgets for 2020-2021, 2020 sales, and a productivity factor of 2%.

Enabling Policies

Enabling policies refer to policies, regulations, and other activities that build supportive infrastructure and policy frameworks to advance provincial energy efficiency. They might cross several sectors and reinforce program strategies and other policy areas discussed in this Scorecard. Many of these policies are important for scaling up energy savings. They are also important to ensure the "energy efficiency resource" has the capacity to continuously renew itself and produce new energy savings opportunities as older strategies and technologies (e.g., lighting) mature.

For this policy area, we sought novel quantitative indicators to provide relevant snapshots of energy efficiency activity in the provinces. Other policy areas are qualitative and based on policy. In some areas, the scorecard presents initial research in areas that deserve more consideration, and we present data to illuminate the policy area discussed.

We collected information and allocated scores for the following policy topics and metrics:

- **Financing and market creation** (four points total)
    - Financing support programs (one point)
    - PACE legislation (one point)
    - Use of carbon price revenues (one point)
    - Capital mobilization (one point)

- **Research, development and demonstration and program Innovation** (three points total);
    - Efficiency research funding (one point);
    - Innovation and RD&D funding and activities (one and a half points);
    - Research institutes and initiatives (a half point);

- **Energy management capacity** (three points total)
    - Certified energy managers (two points)
    - Community energy planning (one point)

- **Training and professionalization** (three points total)
    - Workforce readiness plans and strategies (one point)
    - Initiatives to improve energy literacy (one point)
    - Professionalization in energy efficiency programming (one point)

- **Grid modernization** (four points total)
    - Advanced metering infrastructure (two points)
    - Non-wires alternatives (one point)
    - Conservation voltage reduction / volt-var optimization (one point)

We provide summary scoring results for these topics in Table 29.

Table 29. Enabling policies scoring results

Province	Financing (4 points)	RD&D (3 points)	Energy management capacity (3 points)	Training and professionalization (3 pts)	Grid modernization (4 points)	Score (17 points)
BC	2.75	2.5	2.75	2.5	3	13.5
ON	3	2.5	2.75	1.25	3.75	13.25
NS	3	2	2.75	0.75	2.25	10.75
QC	1.75	2.25	1.5	0.75	2.5	8.75
NB	1	2	2.5	1.25	1.75	8.5
SK	2.25	2.25	1.75	0.5	1.75	8.5
AB	1.25	2	1.75	0.5	1.25	6.75
MB	1	2.75	1.5	0.25	1.25	6.75
PE	2.25	1	0.5	0	0.75	4.5
NL	1.25	1.25	0	0	0.75	3.25

Financing and market creation

Energy efficiency programs mobilize private investment in energy efficiency improvements. The rate at which programs mobilize investment is referred to as the leverage ratio, which studies estimate can range from 1.4 to 2.2 times program expenditures.[37] Many programs leverage investment by providing incentives to individuals or businesses that reduce the up-front costs of new and more efficient technologies. That said, up-front costs are only one of several obstacles to private investment in energy efficiency. Other relevant barriers include high transaction costs that can be alleviated by innovative financing platforms, uncertainty about the risks, benefits, and potential return on investments in efficiency (particularly among potential financiers such as banks and credit unions), and the associated lack of ability or willingness of potential program participants to obtain third-party financing to cover the remaining costs of deeper energy efficiency improvements.[38]

Governments and program administrators have several options to address these barriers and mobilize private capital. For example, they can develop alternative repayment mechanisms for program participants, offer credit enhancements to incentivize private finance, issue bonds, or establish funds or trusts to support loan programs or efficiency projects. They can also create a specialized institution, such as a Green Bank. Governments can also use carbon pricing revenues to support institutionalized energy efficiency funding arrangements or loan programs.

Support for financing

Provincial governments can enable repayment mechanisms and credit enhancements to remove financing barriers to program participants and attract third-party financiers.[39] Repayment mechanisms address some specific challenges associated with energy efficiency investment by homeowners or building operators, such as the need for long-term lending, simplified purchase and repayment, and transferability of repayment obligations to the party

---

[37] International Energy Agency, "Market-Based Instruments for Energy Efficiency: Policy Choice and Design," Insight Series 2017 (Paris, France: International Energy Agency, 2017).

[38] Energy and Mines Ministers' Conference, "Financing Energy Efficient Retrofits in the Built Environment" (Winnipeg, MB: Energy and Mines Ministers' Conference, August 2016), http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2016/16-41/publications.gc.ca/collections/collection_2016/rncan-nrcan/M4-122-2016-eng.pdf.

[39] The Atmospheric Fund (TAF) and Dunsky Energy Consulting, "Energy Efficiency Financing Tools for the Canadian Context," TAF Technical Guidance Note (Toronto, ON, March 2017).

who benefits from the initial investment. Options include on-bill financing, where the program administrator sources capital and administers program and loans repaid via customer bills; on-bill repayment, where third-party lender provides capital and underwrites loans with repayment through utility bills; or providing “soft loans” with lower interest rates or longer repayment terms.

Local improvement charges (LICs) or Property Assessed Clean Energy (PACE) financing, where loans are repaid through property taxes, are other prominent repayment mechanisms. They attach repayment to the building receiving the upgrades, thereby enabling a consistent repayment schedule, even if the building changes ownership. We review provincial policies on PACE programming in the following section.

Credit enhancements help de-risk energy efficiency investments to attract more private finance participation. Examples include:

- Loan loss reserves, which involve establishing a reserve fund to cover a portion of the losses incurred by lenders due to borrowing defaults
- Loan guarantees, under which a government or public agency acts as a guarantor of loans to consumers, thereby improving borrowing terms
- Interest rate buy-downs, an arrangement in which a government or public agency reduces the interest rate on private loans.

For this Scorecard, we awarded up to one point for provinces that were able to demonstrate the existence of repayment mechanisms and/or credit enhancements to support financing for energy efficiency improvements.

We provide a summary of the results and scoring in Table 30.

Table 30. Energy efficiency financing support programs			
Province	Policy/Program(s)	Description	Score (1 pt)
BC	CleanBC Better Homes Low Interest Financing Program Heat pump loan program (FortisBC)	The province's CleanBC Better Homes Low-interest Financing Program offers financing for heat pumps ranging from $1,000 to $40,000, a 60-month amortization period, and rates between zero and 4.99% (depending on the efficiency of the heat pump). Further details are available here: https://betterhomesbc.ca/rebates/financing/ FortisBC offers a Heat Pump Loan program to help customers upgrade from an electric furnace or baseboards to a high-efficiency air-source heat pump. Participants can borrow up to $6,500 at 1.9% interest. Further details are available here: https://www.fortisbc.com/rebates/home/air-source-heat-pump-loan	1
MB	Home Energy Efficiency Loan (Manitoba Hydro)	The Home Energy Efficiency Loan provides residential customers on-bill financing to offset the large capital expenditures of some energy efficiency upgrades. The program supports technologies that may be eligible for Efficiency Manitoba incentive programs further reducing financial barriers and also supports emerging technologies that may not pass cost effectiveness testing or have incentive programs developed. Maximum terms range from five to 15 years, depending on the upgrade, with an interest rate of 4.8% for the first five years of the loan. Further details are available at https://www.hydro.mb.ca/your_home/residential_loan/	1
NL	Energy Efficiency Loan Program	Between 2017 and 2020, the Energy Efficiency Loan Program offered low-interest loans that could be financed on utility bills. Qualifying customers received financing from their utility for heat pumps, insulation or home energy assessments. Eligible applicants could receive financing for up to $10,000 over five years at an interest rate of prime plus 1.5%. The program had a total of 482 participants through its lifetime.	1

NS	Multiple programs (Efficiency Nova Scotia) Heat Pump Financing (NS Power)	In the non-residential sector, Efficiency Nova Scotia offers on-bill financing options for non-residential customers, as well as financing options for the Home Energy Assessment program for residential customers. NS Power also offers on-bill financing for heat pumps, with terms ranging from three to 12 years at an interest rate of 7%. More details are available at https://www.nspower.ca/your-home/energy-products/heat-pumps/financing	1
ON	Open Bill Access Program (Enbridge)	Enbridge provides a billing facility that allows third-party companies to utilize the utility bill to facilitate repayment of their charges related to products and services provided by these third parties. In April 2020, the Ontario Energy Board approved an application from Enbridge to continue this program until 2023.	1
PE	Energy Efficiency Loan Program	The Energy Efficiency Loan Program provides financing for homeowners who are approved applicants under either of efficiencyPEI's Energy Efficient Equipment Rebate and Home Insulation Rebate programs. Maximum loan value is $10,000, with a fixed interest rate of 5% per annum and a seven-year term.	1
QC	SOFIAC Compétivert	Fondaction and Econoler officially launched SOFIAC in January 2021. The Québec Ministry of Energy and Natural Resources supported this initiative with a start-up grant of $ 5.5 million. SOFIAC offers commercial and industrial businesses a financing and technical support solution to help them modernize infrastructure to improve energy efficiency. The 2021-2026 Green Economy Plan also contains a measure aimed at identifying the most promising forms of innovative financing and supporting their emergence.	1

SK	Appliance financing	SaskEnergy Network Members offer financing on natural gas appliances. Loan amounts range from $1,000 to $60,000, with one-to-five-year terms and up to a 15-year amortization period, but there is no on-bill repayment. In 2020-21, 460 participants accessed this financing, totaling $2.95 million.	1
AB	-	-	0
NB	-	-	0

Local improvement charges / PACE

Local improvement charges (LICs) allow municipalities to amortize the costs of local infrastructure improvements through property taxes. Similarly, with Property Assessed Clean Energy (PACE) financing, a building owner repays the cost of an energy retrofit through their own property taxes. LIC/PACE financing arrangements are thus repayment mechanisms, with the added benefit that the cost of the improvement is transferable in the event the property is sold.

Though LIC/PACE financing are local government initiatives, provinces and other actors still have important roles to play in enabling and implementing them. Provincial governments must pass or amend legislation enabling municipalities to create these programs, and they can support or provide funding for the initial loan. Program administrators can coordinate their program offerings with municipal initiatives and help implement the efficiency improvements. Other third-party organizations can also provide funding or administrative and implementation services.

PACE is one of the strategies encouraged by the Federation of Canadian Municipalities' "Community Efficiency Financing (CEF)" initiative.[40] CEF is capitalizing local financing programs for home energy upgrades, as well as providing grants to study the feasibility and design of new local government PACE, on-bill repayment financing or direct lending programs. Given the launch of this program in 2020, we will be interested to see if more provinces move to enable local government finance leadership.

We asked information respondents to outline provincial activities to enable or support LICs/PACE financing for energy efficiency, describe active LIC/PACE financing in their jurisdiction, and outcomes of any existing initiatives. We award up to one point to provinces that have passed PACE-enabling legislation and can demonstrate progress in establishing and maintaining active programs. We provide results in Table 31 below.

[40] "Community Efficiency Financing," Federation of Canadian Municipalities, 2020, https://fcm.ca/en/programs/green-municipal-fund/community-efficiency-financing.

Table 31. PACE enabling legislation and current program descriptions			
Province	Enabling legislation	Program descriptions	Score (1 point)
AB	Yes	The Clean Energy Improvement Program (CEIP) is a Property Assessed Clean Energy Program that makes it easier for property owners to overcome these barriers. Between January 1, 2019 and December 31, 2020, three Alberta municipalities passed CEIP enabling bylaws (two in 2019 and one in 2020).	1
NS	Yes	PACE financing programs are available more than 10 Nova Scotia municipalities. The provincial government offers financial support to assist municipalities in administering PACE programs and several organizations are now administering them on behalf of municipalities.	1
ON	Yes	Through the Home Energy Loan Program (HELP), Toronto homeowners can get a low-interest loan of up to $75,000 to cover the cost of home energy improvements,	1
PE	Yes	In early 2021, the municipalities of Stratford and Charlottetown in PEI, and the Town of Wolfville in Nova Scotia, launched Canada's first "multi-provincial" PACE program.	1
SK	Yes	In 2021, the City of Saskatoon introduced the Home Energy Loan Program to support energy efficiency, renewable energy, and reduced water use.	1
BC	-	The province allocated $2 million in economic recovery funding for the development of a PACE Roadmap and Pilot Program in September 2020. The District of Saanich is developing a PACE/LIC pilot program with funding from the Federation of Canadian Municipalities and the Real Estate Foundation of BC.[41]	0.5

[41] "Central Saanich to Launch PACE Financing Program for Homeowners Looking to Get off Oil Heating," District of Central Saanich, March 2, 2021, https://www.centralsaanich.ca/our-community/news/central-saanich-launch-pace-financing-program-homeowners-looking-get-oil-heating.

MB	-	-	0
NB	-	-	0
QC	-	-	0

Use of carbon pricing revenues

The act of pricing carbon emissions through a carbon tax or a cap-and-trade market increases the cost of products and services associated with the use of fossil fuels, thereby incentivizing lower-carbon alternatives. Carbon pricing can help reduce market barriers to energy efficiency, partly by increasing the cost of fossil fuel-based energy and related products. This should improve the return on investment for many energy efficiency technologies and processes.[42]

Governments can also invest carbon-pricing revenue in energy efficiency programs and demonstration projects.[43] For example, in 2016 the Regional Greenhouse Gas Initiative (RGGI), a Northeastern U.S. cap-and-trade market, invested 55% of its revenues in energy efficiency programming.[44] According to the Regional Energy Efficiency Database administered by the Northeast Energy Efficiency Partnerships, the Lawrence Berkeley National Lab, and the U.S. Department of Energy, the RGGI's contribution to overall electricity efficiency program funding in 2017 ranged from just over 2% in Rhode Island to approximately 9% in New Hampshire. Further, the initiative contributed approximately 15% for natural gas program funding in Vermont.[45]

[42] Lisa Ryan et al., "Energy Efficiency Policy and Carbon Pricing," Energy Efficiency Series (Paris: IEA/OECD, 2011).

[43] Steven Nadel, "More States and Provinces Adopt Carbon Pricing to Cut Emissions," American Council for an Energy-Efficient Economy (ACEEE), January 3, 2019, https://aceee.org/blog/2019/01/more-states-and-provinces-adopt.

[44] "The Investment of RGGI Proceeds in 2016" (The Regional Greenhouse Gas Initiative, September 2018), https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2016.pdf.

[45] Northeast Energy Efficiency Parternships, Lawrence Berkeley National Lab, and US Department of Energy, "Regional Energy Efficiency Database," 2017, https://neep.org/advanced-emv-forecasting-and-planning-solutions/regional-energy-efficiency-database.

In October 2016, the Government of Canada announced a pan-Canadian approach to carbon pricing. The federal plan went into effect on January 1, 2019.[46] All Canadian provinces and territories now have a carbon price in place, though the type of system and administration varies across jurisdictions (see Table 32 below).[47] In its 2021 Budget, the federal government committed to raise the floor carbon price to $170/tonne by 2030.

Table 32. Summary of carbon pricing system administration in Canada

Province	System type	Fuel charge administration	Industry system administration
AB	Carbon tax	Federal	Provincial
BC	Carbon tax	Provincial	
MB	Carbon tax	Federal	Federal
NB	Carbon tax	Provincial	Federal*
NL	Carbon tax	Provincial	Provincial
NS	Cap-and-trade	Provincial	
ON	Carbon tax	Federal	Federal*
PE	Carbon tax	Provincial	Federal
QC	Cap-and-trade	Provincial	
SK	Carbon tax	Federal	Provincial/federal

** In December 2020, the federal Minister of Environment and Climate Change issued a notice of intent to stand down the federal industrial pricing systems in Ontario and New Brunswick as these provinces work to transition to provincially administered systems. New Brunswick's provincial system was implemented on January 1, 2021, while Ontario's is slated to begin operation on January 1, 2022.*

[46] Environment and Climate Change Canada, "Pan-Canadian Approach to Pricing Carbon Pollution," Government of Canada, October 3, 2016, https://www.canada.ca/en/environment-climate-change/news/2016/10/canadian-approach-pricing-carbon-pollution.html.

[47] Steven Nadel, James Gaede, and Brendan Haley, "State and Provincial Efforts to Put a Price on Greenhouse Gas Emission" (Washington, D.C.: American Council for an Energy Efficiency Economy (ACEEE); Efficiency Canada, March 2, 2021), https://www.aceee.org/research-report/i2101.

Previous versions of the Scorecard evaluated provincial carbon pricing policies in different ways. For the 2021 Scorecard, we look only at the use of carbon pricing revenues to support energy efficiency improvements, and award up to one point for clear and formalized procedures to manage proceeds in a way that benefits energy efficiency and/or to provinces that were able to indicate actual spending amounts from carbon pricing revenues for energy efficiency. Discretion over the use of carbon pricing revenues is applicable only to provinces in which either or both fuel charges and industrial output-based pricing systems are provincially administered. In 2020, only two provinces did not administer either a fuel charge or industry pricing system (Manitoba and Ontario), and as such made a policy choice to have no discretion over the use of carbon price revenues raised in their jurisdiction.

Revenues from systems administered by the federal government are returned to the provinces through various means. Approximately 90% of revenues from federal fuel surcharges are returned to individuals through federal income tax rebates. The remaining 10% of revenues support energy efficiency improvements in small and medium sized enterprises and municipal buildings through the Climate Action Incentive Fund (CAIF).[48] The exact way proceeds from federally administered industrial output-based pricing systems in provinces that did not voluntarily adopt them are returned to the provinces has yet to be determined.

The remaining provinces did have discretion over the use of some portion of carbon pricing revenues in their jurisdiction. Table 33 summarizes the nature of this jurisdiction and provides a description of how funds are managed and, where applicable, allocations to energy efficiency.

[48] Environment and Climate Change Canada, “Climate Action Incentive Fund,” Government of Canada, September 15, 2020, https://www.canada.ca/en/environment-climate-change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund.html.

Table 33. Dedicated energy efficiency funding from carbon price revenues		
Province	Description	Score (1 pt)
NS	Nova Scotia hosted its first cap-and-trade auctions in June and December 2020. The province deposits proceeds into a green fund, which is legislated to be used to reduce GHG emissions, mitigate social and economic impacts, or adapt to the impacts of climate change. In our information request, the government reported that approximately 88% of the $28.7 million raised in 2020 would be used to support renewable energy and energy efficiency improvements. This includes $11.45 million over five years to expand the existing Affordable Multi-family Housing program, $3.5 million over three years for the Small Business and Not-for-profit Energy Solutions program, and $4.75 million for the HomeWarming program. SolarHomes also received funding.	1
NB	The province began collecting carbon pricing revenues on April 1, 2020. Approximately 55% of proceeds go to reducing the burden on the natural gas utility and compensating for a reduction in the fuel/diesel excise tax. The remaining portion goes to a Climate Fund, administered by the province. The province reported $25.9 million in revenues for 2020, of which approximately 45% went to supporting various energy efficiency-related programs and initiatives.	1
BC	BC launched the CleanBC Program for Industry in 2019, funded by the incremental carbon tax above $30 per tonne as paid by industry. There are two components: a CleanBC Industry Fund, which invests a portion of revenues into businesses working on emission reduction projects; and the CleanBC Industrial Incentive Program (CIIP), which reduces carbon tax costs for operators that can demonstrate world-leading emissions performance. Energy efficiency improvements are eligible under the Industry Fund, though the province did not report the amount of funding for energy efficiency improvements in 2020.	0.75

QC	Until 2020, the provincial government transferred all proceeds from its cap-and-trade system to the Fonds Vert ('Green Fund') to implement its climate change action plan and reduce greenhouse gas emissions. The province identified energy efficiency, particularly in transportation and buildings, as a core priority, and proceeds supported programs in both areas. Concerns were raised about mismanagement and underperformance of this fund, and in November 2020, the provincial government replaced the Fonds Vert with a new Electrification and Climate Change Fund, under the direct management of the Ministry of Environment and the Fight Against Climate Change. The province did not report the amount of funding for energy efficiency improvements in 2020.	0.75
AB	Proceeds from Alberta's industrial pricing system go into the Technology Innovation and Emissions Reduction (TIER) fund. The regulation detailing TIER does not specify exactly how this fund is to be used, but the province has committed to using it to support emissions-reduction programs for industry. In its information request response to Efficiency Canada, the province indicated that TIER funding supports some energy efficiency programs remaining after the closure of Energy Efficiency Alberta.	0.25
PE	Proceeds go into general government revenue and are used to offset reduced provincial fuel excise taxes, to reduce costs for drivers and public transit users, and to support electric vehicle incentives.	0.25
NL	Proceeds are used to offset reduced provincial fuel excise taxes. The province has committed to matching federal support from the Low Carbon Economy Leadership Fund for energy efficiency, fuel switching, and industrial process improvements (in the amount of $44.7 million), though it is unclear how carbon pricing revenues are earmarked for such purposes. The province did not report the amount of funding from carbon pricing revenues for energy efficiency improvements in 2020.	0.25
SK	Proceeds from Saskatchewan's provincially administered industrial pricing system go to the Saskatchewan Technology Fund, which can be used by the government to support emissions-reduction projects in regulated facilities. The criteria for determining eligible projects has yet to be published, but will be released before the first due date for compliance payments. The province did report that it would invest a minimum of $18 million in energy efficiency projects in schools, though a portion of this funding may come from the federal government's Climate Action Incentive Fund.	0.25
ON	No jurisdiction over carbon pricing systems and associated revenues in 2020	0
MB	No jurisdiction over carbon pricing systems and associated revenues in 2020	0

Capital mobilization

While both repayment mechanisms and credit enhancements use public policies to leverage private investment, governments can also take steps to mobilize private capital to support the programs themselves. For example, provincial governments might raise capital from bond markets by issuing green bonds to capitalize a loan program, a public energy efficiency project, or a municipal LIC program. Governments or private sources may establish revolving funds and/or trusts to provide a continuous source of capital for projects and programs. A specialized institution, such as a "green bank", can be created to spur clean energy markets and provide financing functions. These functions might include aggregating projects and issuing securities, centralizing program coordination, offering soft loans, or providing credit enhancements. We award up to one point to provinces that have taken steps to mobilize capital through such initiatives.

Table 34. Capital mobilization

Province	Description	Score (1 pt)
ON	The Ontario Financing Authority regularly issues green bonds, the proceeds of which are used to support projects in clean transportation, energy efficiency and conservation, clean energy and technology, forestry, agriculture, and land management, and climate adaptation and resilience. In 2020, the authority issued two bonds, raising a total of $2 billion, though official reporting does not indicate the amounts spent specifically on energy efficiency and conservation initiatives.[49]	1
BC	FortisBC announced in July 2020 it would complete a public offering of a Green Bond. Under the company's Green Bond Framework, proceeds from such bonds can be used to finance or refinance new or existing projects offering tangible environmental benefits. Eligible project categories include renewable energy; renewable natural gas; energy efficiency; pollution prevention and control; and clean transportation. On July 9, 2020, FortisBC Energy (the natural gas subsidiary of FortisBC) issued a $200 million, 30-year bond. These funds were used to support renewable natural gas projects (~$7 million), demand-side management initiatives (~$177 million),	0.5

[49] Ontario Financing Authority, "Green Bond Issues," Government of Ontario, 2020, https://www.ofina.on.ca/greenbonds/issues.htm.

and incentives for natural gas use in on-road transportation vehicles and LNG marine vessels (~$15 million) incurred up to 36 months prior to the bond issuance.[50]

Research and development, and program innovation

If Canada is to realize energy efficiency's full potential, the nation will need to continue research, development, and demonstration (RD&D) of novel energy efficiency technologies and experiment with innovative program designs and delivery methods. For the purposes of this report, RD&D and innovation activities span the range from fundamental or early-stage scientific and technology research, to piloting and demonstration activities of proven technologies and/or program strategies that are novel to a jurisdiction. The latter could incorporate innovations in logistics, technologies, market design, and marketing and administration.

According to the International Energy Agency, between 2010 and 2020 energy efficiency RD&D averaged 18.9% of all energy-related RD&D expenditures by Canadian federal, provincial, and territorial governments. That said, the share of RD&D expenditures on energy efficiency has been increasing in recent years, reaching an estimated 33% in 2020. This places energy efficiency first among other energy technologies in share of total RD&D expenditures.[51] In absolute terms spending on energy efficiency RD&D has increased relatively steadily since 2000, but more rapidly since 2016 (see Figure 6).

[50] FortisBC, "2021 Green Bond Impact Report" (Vancouver, B.C.: FortisBC, July 2021), https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/green-bond-impact-report.pdf?sfvrsn=6ee23660_0.

[51] International Energy Agency, "Energy Technology RD&D Budgets," IEA Data Services, 2021, https://www.iea.org/statistics/rdd/.

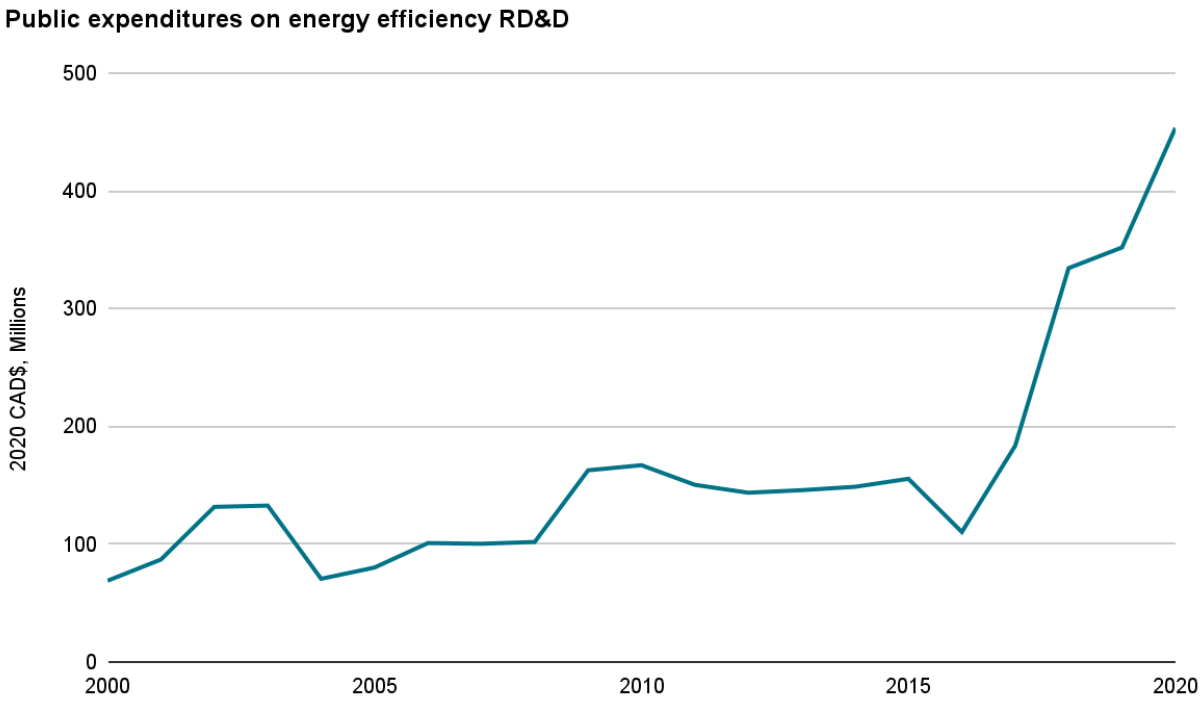

Figure 6. Public expenditure on energy efficiency RD&D

According to Statistics Canada's Research and Development in Canadian Industry (RDCI) survey, industry expenditures on all energy-related RD&D totaled $1.67 billion in 2018. Energy efficiency expenditures accounted for $279 million, or roughly 17% of the total—an increase of approximately four percentage points over 2017.[52] Neither the IEA database nor the RDCI offer provincial breakdowns of RD&D expenditures, so we have provided this information for illustrative purposes only, and not for scoring.

To score provinces on their energy efficiency-related RD&D and innovation activities, we looked at three different metrics: Research funding for energy efficiency at universities and colleges; whether DSM program administrators had dedicated funds to support RD&D and program

[52] Statistics Canada, "Table 27-10-0347-01 Industrial Energy Research and Development Expenditures by Area of Technology, by Industry Group Based on the North American Industry Classification System (NAICS) and Country of Control," Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2710034701&pickMembers%5B0%5D=2.1&pickMembers%5B1%5D=3.1&pickMembers%5B2%5D=4.42.

innovation; and the existence of dedicated research institutes, organizations, or provincially supported energy efficiency research projects.

Research funding

Though capacity varies across the country, research institutions in all provinces study energy resources, and energy efficiency is relevant across all the sub-categories noted above. For this reason, we regard the share of energy RD&D that a given province devotes to efficiency as a measurement of energy efficiency research intensity or priority. The International Energy Agency takes the same approach when presenting energy efficiency RD&D expenditures.

The Natural Sciences and Engineering Research Council (NSERC), a federal government agency, funds academic research. It maintains an online award database that can be filtered by area of application. The database lists energy efficiency as a subset of a broader category of energy resources that also includes electrical energy, energy resource production, exploration, processing, distribution, and use, energy storage and conversion, nuclear energy, and oil, gas and coal. The database can supply a summary table of funding by year, area of application, and province.[53]

Overall, NSERC funding for energy efficiency totaled $7.4 million in 2019-2020, accounting for roughly 12% of the total $60.6 million in funding for energy-related research. It is important to note that NSERC funding does not represent all RD&D funding for energy efficiency in each province, but there is no publicly available data source for province-wide energy efficiency RD&D expenditures.

To benchmark across the provinces, relative to their internal research capabilities, we considered funding for energy efficiency research as a proportion of funding for all energy resources research. Given the six sub-categories of energy resources in the NSERC database, we award a full point for research funding to provinces that exceed an energy efficiency RD&D intensity rate of 16.6% (100%/6), three-quarters of a point for rates between 12% and 16.5%, a half-point for 8% to 11.9%, and a quarter point for 4% to 7.9%. We award zero points to

[53] Natural Sciences and Engineering Research Council of Canada, “NSERC’s Awards Database,” Government of Canada, 2020, http://www.nserc-crsng.gc.ca/ase-oro/index_eng.asp.

provinces where the share of funding for energy efficiency RD&D falls below 4% of overall funding.

Table 35. NSERC funding for energy efficiency

Province	Total energy-related NSERC grants	Energy efficiency NSERC Grants	EE Research Intensity	Score (1 point)
NB	$709,603	$366,103	51.6%	1
MB	$1,205,202	$198,395	16.5%	0.75
QC	$13,675,248	$2,207,087	16.1%	0.75
SK	$1,126,837	$158,000	14.0%	0.75
ON	$22,044,690	$2,376,399	10.8%	0.5
AB	$12,572,151	$1,236,607	9.8%	0.5
BC	$6,392,023	$531,733	8.3%	0.5
NL	$803,846	$56,000	7.0%	0.25
NS	$1,839,269	$29,000	1.6%	0
PE	$71,000	$0	0.0%	0

New Brunswick's high research intensity value is due to a single large project at the University of New Brunswick, led by Prof. Eduardo Castillo-Guerra, investigating integrated dispatchable resources control systems in local electricity distribution networks.

Innovation and RD&D funding and activities

While RD&D for emerging technologies is important, so too is experimentation with new program delivery models or methods, and piloting technological improvements or processes that, while not necessarily unproven, are nonetheless new to provincial energy systems.

Rigorous evaluation, measurement, and verification is an essential element to ensure DSM investments from regulated entities are justifiable and cost-effective. But experimentation with new programs and processes can be difficult to justify under these frameworks, as they could potentially fail to produce the desired outcomes. Accordingly, it is important that efficiency program administrators include dedicated funding to support experimentation, program innovation, and pilot projects.

We assessed the extent of program administrator and government investment in energy efficiency and program innovation and RD&D by considering three elements:

1. The existence of dedicated innovation or enabling strategies funding that includes support for energy efficiency-related pilots and demonstrations
2. Technologically-related pilot and demonstration projects carried out in 2020
3. Program-related innovation activities, particularly pertaining to improvements in the scale and scope of building energy retrofitting.

We award provinces 0.5 points for evidence of each element.

Table 36 summarizes provincial funding and programs for energy efficiency RD&D and program innovation. With considerations for space, we note that this table may not refer to all energy efficiency-related innovation activities in each province, but we have tried to include activities with the most relevance to energy efficiency.

Table 36. Innovation and RD&D activities summary				
Province	Dedicated innovation funding (0.5 points)	Pilots & demonstrations (0.5 points)	Program innovation (0.5 points)	Score (1.5 points)
AB	Alberta Innovates funds research, development, and demonstration of new technologies to reduce the environmental footprint of many sectors in the province. There is no specific program or focus area on “energy efficiency”, however projects may have components which improve energy efficiency.	The province launched a $50 million TIER economic recovery program, seeking shovel-ready projects to reduce GHG emissions. In 2020 it selected twenty-three projects, which included process improvements in the oil and gas industry that reduce energy consumption. In 2019, Emissions Reduction Alberta announced 11 projects selected under its Industrial Efficiency Challenge. Since then, one project (using flow-control devices to reduce energy intensity) has been completed, and two were cancelled.	Alberta Innovates and partners established the Green Buildings Technology Network, a network of test buildings for small and medium-sized construction firms to develop new innovations in energy-efficient construction through testing, commercializing and adoption of new products and technologies.	1.5

BC	The province maintained a Building Innovation Fund ($8m in 2020-2021) to promote innovation in design, construction practices, systems, and materials/technologies. FortisBC included funding for an Innovative Technology program in its current DSM plan, alongside other funds such as the InnoTech program, and the Clean Growth Innovation Fund.	BC Hydro supported several pilot and demonstration programs in DSM, including the BC Local Energy Efficiency Partnership Program (LEEP) and piloting a demand response management system. FortisBC launched commercial gas heat pump and residential gas heat pump pilot programs and plans to launch a rebate program in 2021 to provide incentives for water and space heating applications of commercial gas heat pumps.	BC Hydro is participating in several activities to support and facilitate the province's electrification objectives, in part through building energy retrofits. Beginning in 2021, FortisBC will conduct a two-year study of deep energy retrofit pilots for residential and commercial buildings, and intends to partner with NRCan, the City of Kelowna and Lightspark to geo-spacially model building energy intensities.	1.5
MB	Efficiency Manitoba's current three-year DSM Plan includes an Innovation and Research Fund that was allocated $2.14 million to provide funding for pilot projects and research partnerships. In 2020, Efficiency Manitoba completed a draft strategy and public engagement. The Fund is due to be launched in 2021.	Efficiency Manitoba is providing funding for a feasibility study to convert Specified Risk Material (organic waste) from a cattle processing facility to an energy source using Rapid Organic Converter (ROC) technology. The process converts waste products to heat which is used to heat process hot water at the facility. This energy source will displace natural gas and reduce or eliminate the need to transport waste materials to landfill.	Efficiency Manitoba has a deep energy retrofit pilot program to target buildings requiring comprehensive upgrades and enhancements and is currently implementing a new demand-side management tracking system to optimize program delivery and deployment. In June 2021, Efficiency Manitoba began offering residential customers a virtual home energy assessment tool.	1.5

NS	Efficiency Nova Scotia includes an Enabling Strategies budget in its DSM plan. The budget can be used to support education and outreach, development and research, and other related activities.	In 2020, work continued on the locational DSM ("Klondike") pilot, for customers in the Kentville area. The province provided enhanced incentives through five existing programs.	The province continued its research into the feasibility of virtual energy audits to assess efficiency of electrically heated homes. The work included designing of the virtual audit report, configurating and installing the necessary back-end technology, and launching virtual audit reports more than 1,000 homes in 2020.	1.5
ON	With a $9.5 million budget, the IESO's Grid Innovation Fund supports projects that enable customers to manage energy consumption and/or reduce the costs associated with maintaining grid reliability. Enbridge Gas' OEB approved DSM Plan includes funding of up to $2.5 million annually for Research, Development, Innovation, and Pilot Program related spending.	The IESO, working with Alectra (and with funding from Natural Resources Canada) ran a first-of-kind in Canada (and likely North America) local capacity auction in 2020. The IESO's Grid Innovation Fund also supported several projects in energy efficiency, grid modernization, and training and professionalization. These includes a heat pump demonstration project for multi-unit residential buildings (administered by Toronto Atmospheric Fund) and a deep energy retrofit of the City of Toronto's Waterfront Neighbourhood Centre. Enbridge supported several pilot and demonstration activities in 2020,	Enbridge conducted a pilot program to test the accuracy and potential energy savings identified by virtual energy assessments compared to traditional in-person audits. Several projects funded by the IESO's Grid Innovation Fund concern program administration or delivery, including a strategic energy management project by the Toronto and Region Conservation Authority, and a project to enhance RETScreen for energy professionals in Ontario (with CanmetENERGY).	1.5

		involving technologies such as cold climate heat pumps, hydronic heating systems, artificial intelligence, gas heat pump furnaces, and virtual energy audits.		
SK	SaskEnergy has a dedicated budget for Technology Innovation, focused on energy savings and GHG reductions. The budget can be used for both end-use energy efficiency and transportation, as well as fuel switching and reducing GHGs associated with the fuel itself.	SaskEnergy invested in combined heat and power and heat pump technology development, including providing funding for the construction of the first net-zero multi-unit residential building in Saskatchewan with natural gas furnaces, solar panels, and electric heat pumps. SaskPower completed a Proof of Concept to demonstrate AI-powered data disaggregation technology using AMI data. The technology provides customer-centric solutions to help customers manage electrical use.	SaskPower ran a pilot program with the Peter Ballantyne Cree Nation to provide free home retrofits in the community of Southend. The utility conducted EnerGuide home audits on each participating home.	1.5

NL	None identified	NL Hydro concluded a pilot installation of 124 smart thermostats. The utility used the thermostats to control heating to complete demand response events in L'Anse au Loup. Newfoundland Power has been conducting a study on ductless mini split heat pumps. The results will be available in the fall of 2021.	NL Hydro plans to begin using SimpTek Technologies' Building360 platform to conduct virtual energy audits in isolated diesel-reliant communities. It aims to perform energy analyses of roughly half of commercial and residential customers in selected regions and identify the top 10% highest energy using residential and commercial customers and develop customized plans to reduce their energy consumption.	1
PE	efficiencyPEI included an enabling strategies fund in its 2018-2021 DSM Plan, totaling approximately $815,000 over the three years.	efficiencyPEI completed the Cold-Climate Heat Pump Study with NRCan and continued to support the STASH Energy Storage project with the City of Summerside Electric Utility.	None identified.	1

QC	The Hydro Québec Research Institute (IREQ) includes “energy use” as a core area of expertise. The Energy Technology Laboratory (LTE) in Shawinigan focuses on energy efficiency technological innovation. Hydro Québec also includes an innovation budget in its energy efficiency planning. The provincial government administers the Technoclimat program, to encourage innovation in energy efficiency, renewables, bioenergy and GHG emission reductions. On the natural gas side, the Natural Gas Technologies Centre (NGTC) does similar work as IREQ. Énergir also administers an Innovation program that provides up to $25,000 for experimental projects, and up to $250,000 for demonstration projects.	Hydro Québec invested in a 'test bench' to design control strategies for a large-capacity heat pump, the installation of an ultra-efficient electric oven in an industrial bakery, and the transformation of its Shawinigan laboratory to showcase equipment for commercial buildings. Hydro-Québec is also testing a central thermal storage technology with residential customers in Montreal West, using dual energy or fuel oil alone. With funding from the provincial government, a large-scale aggregation project (605 housing units) was launched in the northern village of Inukjuak. The project converts oil heating to dual-energy heating systems primarily powered by electricity.	None identified.	1

NB	NB Power includes an Enabling Strategies budget in its DSM planning, which can be used for planning, evaluation, and market transformation.	None identified.	None identified.	0.5

Research institutes

The final category we consider in our assessment of provincial RD&D and innovation activities is the existence of research institutes or provincially supported research projects for energy efficiency technology. With this metric we aim to capture specific RD&D initiatives for which energy efficiency is a core research theme, to begin building a better understanding of Canada's energy efficiency innovation system.

We asked survey respondents to identify energy efficiency research institutes and provincially supported research projects, and to provide comments or clarification about activities in this area that we were able to identify through desk research. Where possible or applicable, we sought to verify that initiatives were indeed actively conducting or supporting RD&D or innovation activities for energy efficiency or had supported clearly related projects within the past five years. For provinces that had one or more such institutes or projects, we awarded a half point.

We attempted to restrict this list to institutes or projects with a clear connection to a provincial government or industry, thereby excluding research institutes or groups based at Canadian universities or colleges, innovation incubators or accelerator centres, venture capital or angel investor groups or businesses, federal government programs, or other national-level initiatives. We also excluded provincial government departments or programs with no clear evidence or identification of energy efficiency research support. In some cases, we awarded partial points if identified institutes or provincial projects did not focus on energy efficiency specifically but supported research on closely related issues.

The resulting list does not give a complete picture of energy efficiency innovation. We highlight Canada's energy efficiency research and innovation system as a fruitful area for further research.

Table 37. Research institutes and projects

Province	Descriptions	Score (0.5 points)
BC	FortisBC supported a five-year smart energy research chair at the University of British Columbia Okanagan. https://news.ok.ubc.ca/2019/01/11/thinking-smart-about-energy-use/	0.5

	With support from CANARIE, the University of Victoria has engaged in another phase of development of BESOS: a cloud-based portal of modular, reusable software components for researchers to perform integrated building and energy systems analysis. In 2015, the UBC Pacific Institute for Climate Solutions (PICS), a research collaboration between four British Columbia universities, launched the "Energy Efficiency in the Built Environment" project. PICS recently extended this project to 2021.	
MB	The Building Efficiency Technology Access Centre (BETAC) at Red River college supports the building industry by helping clients address the challenges of designing and constructing durable, energy-efficient building envelopes, components, and assemblies in an environment with extreme conditions.	0.5
NB	The Smart Grid Innovation Network—a partnership between NB Power, the University of New Brunswick, and Siemens Canada—has supported RD&D in several smart grid related areas.	0.5
NS	Nova Scotia worked with the Canada Green Building Council to complete a skills gap analysis on understanding the workforce required to meet the 2030 Net Zero Energy Ready Building Code requirements. This project spurred a provincially funded NZER Workforce Coalition that including representatives of government, NGOs, and industry leaders.	0.5
ON	In 2019 the Ontario Energy Board (OEB) launched the OEB Innovation Sandbox. Utilities and other energy-sector companies can turn to the Sandbox for regulatory advice, or seek funding for new ideas, products, services and business models with demonstrable consumer benefits. The Independent Electricity System Operator (IESO) Grid Innovation Fund also supports several collaborative research and development initiatives with industry and academia.	0.5
QC	The Synchronex network of college scientific and technological experts includes an energy group that works with various research centres to offer integrated and innovative solutions to meet the needs of local businesses. For more details, see: https://synchronex.ca/site/web/en/experts/energy-team	0.5

	The InnovÉÉ supports research and development related to electricity technologies in small and medium-sized businesses. The Hydro-Québec Research Institute (IREQ) includes “energy use” as a core area of expertise. The Energy Technology Laboratory (LTE) in Shawinigan focused on energy efficiency innovation. The NGTC performs similar work as IREQ for natural gas.	
AB	None identified	0
NL	None identified	0
PE	None identified	0
SK	None identified	0

Energy management capacity

Energy management broadly refers to the practice of tracking energy use in an organization or facility and putting in place plans to reduce consumption. According to Natural Resources Canada, typical energy management objectives include:

1. Minimizing energy costs while maximizing building energy efficiency
2. Achieving more comfortable work environments for building occupants
3. Minimizing the environmental impact of a building’s energy consumption.[54]

Our Industry chapter tracks programs for energy management and energy management systems for industry specifically—though many of them are also relevant to commercial and institutional energy users, including municipalities. A critical enabling component of energy management practices is the existence of sufficient professional capacity to develop them. Often, this entails hiring Certified Energy Managers—specialists trained in the technical practice of energy management, but who can also help to educate, raise awareness, and build motivation within organizations to reduce energy consumption. As in previous Scorecards, we

[54] Natural Resources Canada, Energy Management Training Primer (Ottawa, ON: Government of Canada, 2016), http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2016/16-31/publications.gc.ca/collections/collection_2016/rncan-nrcan/M144-262-2015-eng.pdf.

track the population of Certified Energy Mangers per province as a way of assessing this professional capacity.

In municipalities, energy managers can help develop organizational energy management strategies, which are useful in reducing municipal energy use and greenhouse gas emissions. These strategies are important components of the broader practice of community energy planning, which involves integrating energy use considerations in land-use and infrastructure planning processes and identifying opportunities for local energy solutions at the building and/or neighbourhood scale.[55] In this Scorecard, we have therefore included a new metric to track programs and/or initiatives to facilitate municipal energy management and community energy planning. We offer further details on our methodologies for assessing these metrics below.

Certified Energy Managers

Certified Energy Managers (CEMs) can play important roles in energy efficiency program delivery, energy management, and evaluation, measurement, and verification of energy efficiency improvements. CEMs primarily work in commercial, institutional, and industrial buildings and facilities, and as such play a role in educating and motivating managers and employees to adopt conservation behaviors.

To benchmark the provinces on energy management capacity, we consulted the Association of Energy Engineers Certified Professionals Directory for data on its members. We tracked managers with a business address located in a province. Some of these practitioners might provide services within their larger region, especially in smaller or geographically proximate jurisdictions (e.g., the Maritimes or prairie provinces). We feel it is appropriate to provide extra credit to a province if its energy experts are also providing services to its larger region. However, it is important to recognize that province-specific figures may not fully reflect energy consumers' access to energy professionals.

[55] "Community Energy Planning," City of Toronto (City of Toronto, November 17, 2017), Toronto, Ontario, Canada, https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/community-energy-planning/.

We award up to two points for Certified Energy Manager certifications per province, which could include CEM, CEM-International (I & II), and Energy Manager in Training (including International) certifications.[56] We divide the total certifications listed in a given province by the number of businesses with more than 100 employees.[57] CEMs typically work in the commercial and institutional sectors, and in industrial facilities. To provide a consistent comparison that avoids biasing results against provinces with more small and medium sized businesses, we chose larger businesses likely to hire one or more CEMs. Of course, a CEM can be highly valuable to smaller companies or a consortium of small companies.[58] We used a per-business denominator because not all provinces had data to support a more relevant denominator based on the number of commercial-institutional buildings or total floor space in the sector.

We scored provinces using the following scale:

Table 38. Research institutes and projects

Certified Energy Managers per 100 large businesses (> 100 employees) (>=)	Score
9.5	2
8.3	1.75
7.1	1.5
5.9	1.25
4.8	1
3.6	0.75
2.4	0.5
1.2	0.25

[56] "AEE Certified Professionals Directory," Association of Energy Engineers, 2020, https://portal.aeecenter.org/custom/cpdirectory/index.cfm.

[57] Statistics Canada, "Table 33-10-0222-01 Canadian Business Counts, with Employees," Government of Canada, 2021, https://doi.org/10.25318/3310022201-eng.

[58] Seth Nowak, "Big Opportunities for Small Business: Successful Practices of Utility Small Commercial Energy Efficiency Programs" (Washington, DC: American Council for an Energy Efficiency Economy, 2016), aceee. org/researchreport/u1607.

Table 39. Certified Energy Manager certifications results

Province	Certified Energy Managers (July 2021)		Certified Energy Managers per 100 large businesses (> 100 employees) (>=)		Total (2 points)
	July 2021	*Year-over-year change*	2021 Scorecard	*Change from 2020 Scorecard*	
NS	57	*-19*	9.3	*-3.0*	1.75
ON	940	*-113*	9.1	*-1.0*	1.75
BC	291	*-21*	8.8	*-0.6*	1.75
NB	42	*-3*	8.2	*-0.6*	1.5
AB	152	*-60*	4.6	*-1.9*	0.75
SK	31	*3*	4.3	*0.5*	0.75
MB	30	*-5*	3.1	*-0.5*	0.5
PE	3	*0*	2.6	*0.0*	0.5
QC	141	*-5*	2.5	*-0.1*	0.5
NL	1	*-1*	0.3	*-0.3*	0

Community energy planning

In our information request, we asked respondents to identify any support provided to facilitate local / community energy planning and/or management. We award up to one point to provinces that could identify clear and defined initiatives to build energy management and planning capacity in municipalities or Indigenous communities. These are typically community energy managers who develop and implement community energy plans. Provinces may receive partial points for initiatives that do not clearly work toward both objectives. We describe provincial initiatives in this area in Table 40 below.

Table 40. Support for community energy management and planning		
Province	Description	Score (1 pt)
AB	The Municipal Climate Change Action Centre (MCCAC) offers the Municipal Energy Manager Program, which funds local governments to hire energy managers who in turn develop energy management plans, identify cost and energy saving opportunities, and implement renewable energy and energy efficiency projects. The MCCAC offers the Municipal Energy Champions Program to support smaller communities with a low capacity for energy management, climate change planning, or emission reduction projects. Recognizing that these smaller local governments may only require short-term support, this program offers free person-to-person outreach and advisory services to enable participation in energy management initiatives.	1
BC	With support from the federal government's Investing in Canada Infrastructure Program, the Province of British Columbia's Green Infrastructure - CleanBC Communities Fund provides support for increased capacity to manage renewable energy. The First Nations Clean Energy Business Fund capacity funding stream provides funding for community energy planning in Indigenous Communities. The New Relationship Trust also has a capacity funding stream that Indigenous communities can access for community energy planning purposes as well. BC Hydro's Sustainable Communities program supports community energy planning and management. Program support includes co-funded Community Energy Manager positions in 16 local governments—with specialities in sustainability, building, and transportation. BC Hydro supports a larger Community Energy Management network for all interested local government staff. BC Hydro also supports three topic specific Local Government Peer Networks focused on new Construction efficiency via the BC Energy Step Code, electric vehicles, and low carbon retrofits. FortisBC also supports Community Energy Specialists who actively participate in community energy planning.	1

MB	Efficiency Manitoba offers a Community Energy Efficiency Program. The program provides eligible local governments with two years of funding to hire an energy efficiency advocate who would develop and implement a community energy plan. It covers 80% of the advocate's salary up to a maximum of $40,000 each year. Manitoba Hydro has worked with specific communities, such as Dauphin and The Pas, who committed to a Community Energy Plan. Similarly, Manitoba Hydro targeted select First Nations including the Opaskwayak, Peguis, and Long Plain nations.	1
NB	NB Power works closely with the Francophone Municipalities Association and the Union of Municipalities of New Brunswick to identify mutually beneficial initiatives for NB Power and communities in NB—such as Project SauVÉ for municipal fleet EVs and EV ride sharing. The province's Environmental Trust Fund also supports municipalities and other organizations in protecting, preserving, and enhancing the natural environment. Though community energy management is not explicitly mentioned as an eligible project, it awarded several projects along those lines in 2021-2022.	1
NS	The province's Low Carbon Communities program funds community energy planning, feasibility studies, public engagement and awareness building, and demonstration projects.	1
ON	The IESO carries out some support activities to facilitate improved local energy management, such as working with local contractors and some local distribution companies, to assess local achievable potential for targeted energy efficiency savings. Enbridge has a municipal DSM team dedicated to local governments, and the company is partnering with the Region of Waterloo to support their implementation of a Community Energy Investment Strategy ("CEIS"). The province also supports community energy management through its Municipal Energy Plan program, which funds local governments to develop community energy plans. The plans are designed to align energy, the built environment, and land use planning to identify opportunities for community-wide energy efficiency savings.	1

QC	The Ministry of Energy and Natural Resources (MERN), through the Energy Management component of the EcoPerformance program, funds up to 75% of eligible costs (maximum of $ 310,000) to businesses, institutions, and municipalities, which includes support for hiring an energy manager.	1
SK	SaskPower is currently running a pilot program with five northern Indigenous communities. The pilot includes funding for community energy plans that would be developed for each participating community. The plans aim to assist the communities with energy management planning and help the utility examine future programming opportunities to support them.	1
NL	None identified	0
PE	None identified	0

Training and professionalization

In previous Scorecards, we approached the topic of training and professionalization by tracking numbers of residential energy advisors and Certified Energy Managers (CEMs). Our reasoning for using these two certifications as "barometers" for a broader training and professionalization regime was two-fold. First, these energy professionals often work in partnership with other people in the buildings workforce (e.g., general contractors, electricians, etc.), and second, energy advisors and CEMs can play important roles in educating and motivating homeowners and employees to adopt conservation measures. We are still tracking energy advisors and CEMs, though we have moved energy advisors to the Buildings chapter, and we now track of CEMs under a new 'energy management capacity' section, described above.

In response to feedback from our information request respondents and peer reviewers, we sought to expand our tracking of training and professionalization to better address provincial policies and initiatives related to "building workforce readiness" for the 2021 Scorecard. Recent studies by the Canada Green Building Council and EcoCanada, among others, have highlighted the urgent need to address looming workforce shortages, and the general low-level of "green literacy" and other energy efficiency-related skills gaps in Canada's building workforce.[59] Canada will need to address these challenges if it is to substantially reduce building-sector GHG emissions, and thus our ability to meet our climate goals for 2030 and beyond.

The building workforce is multi-faceted, comprising building owners and developers, engineers, architects, and designers, contractors and trades, building officials, and building managers and occupants. The training and professionalization ecosystem for this workforce is even broader, encompassing government, training and educational providers, manufacturers, industry and unions. The policy regimes that govern this sector are also complex, vary from province to province, and thereby are difficult to identify best practices for, let alone clear benchmarking. Provinces also have varying workforce regulatory and licensing practices which shape the context of energy efficiency related certification and quality assurance.

[59] Canada Green Building Council, "Canada's Green Building Engine: Market Impact and Opportunities in a Critical Decade" (Vancouver, B.C.: Canada Green Building Council, 2020).

Accordingly, for this Scorecard we have chosen to track three aspects of this policy area that are broadly applicable to all provinces, regardless of their specific building workforce regulatory and licensing practices: the existence of building workforce readiness plans and/or studies, energy-literacy initiatives, and professionalization strategies in energy efficiency programming. We provide further details in the following sections.

As this sector evolves and our internal capacity to track more fine-grained elements of building workforce training and professionalization policy develops, we expect that this section will become more comprehensive in future scorecards.

Workforce readiness plans and studies

In its recent study of building workforce skill needs and gaps, ECO Canada offered seven broad recommendations for government action. Its lead recommendation urged governments to develop labour market information and an industry outlook of workforce demand. According to the organization, poor labour market information limits insight into employment and occupational opportunities associated with energy efficient buildings, which also restricts the ability of job seekers, providers, and the broader training and educational providing system to effectively plan for future demand.[60]

We asked information request respondents to describe any strategies, plans or studies provinces have undertaken to address workforce requirements to achieve Canadian net zero energy ready building goals. We provide responses in Table 40, below. To score this metric, we assessed the extent to which responses demonstrated a concerted effort on the part of the province to study the issue, engage relevant stakeholders in consultation, and move toward a clear plan or strategy to address it. We award up to one point, based on this assessment.

[60] ECO Canada, "Assessment of Occupational and Skills Needs and Gaps for the Energy Efficiency Buildings Workforce" (Ottawa, ON: ECO Canada, February 2021).

Table 41. Building workforce readiness plans and studies		
Province	Description	Score (1 point)
BC	In 2018, the provincial government launched a Workforce Readiness initiative to identify the labour requirements created by its CleanBC plan. Following industry and inter-governmental consultations, the province extended the project's timeline to ten years and has broadened it to consider post-COVID economic and job recovery. A finalized plan is expected in late 2021. The project was funded through the Canada-BC Labour Market Development Agreement's Sector Labour Market Partnerships program as administered by the Ministry of Advanced Education, Skills and Training.	1
AB	The province contributed funding to a Canada Green Building Council (CaGBC)-led study of existing construction industry capacity and identify specific skills necessary to deliver on low-carbon buildings and homes, and to identify skills gaps in the building industry.	0.5
NS	The province commissioned CaGBC to assess existing construction industry capacity and identify the specific skills necessary to deliver low-carbon buildings as well as current skills gaps in the industry.	0.5
ON	The province contributed funding to a CaGBC-led assessment of existing construction industry capacity that identified the specific skills necessary to deliver low-carbon buildings as well as current skills gaps in the industry.	0.5
QC	Under its Master Plan, the provincial government has committed to attracting students to energy transition employment. The government has also supported the creation of the Québec Intelligent Energy Network (RQEI), which comprises researchers, academics, and colleges to promote collaboration on the creation and dissemination of knowledge to better meet energy challenges.	0.25
MB	None identified	0
NB	None identified	0
NL	None identified	0
PE	None identified	0
SK	None identified	0

Though several provinces have provided support for studies into building workforce requirements, only British Columbia reported efforts extending beyond study toward the development of a strategy. We note that this effort was carried out through the federal-

provincial Labour Market Development Agreement process, which all provinces also participate in. This suggests the federal government could encourage the development of similar initiatives in other provinces.

We awarded partial points to provinces that had supported a study, but that had not yet developed a plan or strategy. Québec's response indicated neither a study nor a strategy, but that the issue has been recognized as something that needs to be addressed.

Initiatives to improve energy literacy

Building or retrofitting for high-performance energy efficient buildings requires more than the technical skills associated with typical education and training programs for the building workforce. As the Canada Green Building Council has noted, there is also a need to increase overall levels of "green literacy" or better understanding of the broad implications of key building activities on the environment and the market infrastructure.[61] Green literacy entails wider acknowledgment of the reasons why we need to build more energy efficient buildings, develop the soft skills required to market these improvements, and pursue further technical training in advanced building and construction techniques. The need for greater literacy is relevant to the entire building workforce, from designers and architects, to construction trades, to building officials and operators.

Building green and energy literacy is a major challenge faced by provinces and will require concerted planning and strategies to define requirements, develop curricula, credentialling and certification programs, and to provide accessibly opportunities for retraining the existing workforce. For this Scorecard, we asked provinces to identify any such initiatives, including support for training provided by program administrators or provincial governments. We award up to one point to provinces that demonstrated they had taken concrete action to develop curricula and programs to improve green/energy literacy in the building workforce, preferentially as part of a clear and well-defined strategy. We awarded partial points where we found support for training, but not as part of a broader effort to up-skill the building workforce.

[61] Canada Green Building Council, "Trading up: Equipping Ontario Trades with the Skills of the Future" (Canada Green Building Council, 2019).

Table 42. Initiatives to improve energy literacy		
Province	Description	Score (1 point)
BC	A $4 million education and workforce training initiative enabled public post-secondary institutions to provide short-duration micro-credentials for re/up-skilling. Most relevant to energy efficiency are Camosun College's advanced skills for efficient building design, and Selkirk College's refrigeration skills courses.	1
NB	NB Power has worked with energy management service providers doing ASHRAE Level 2 audits to build capacity in treating a building as a complete system, and not a collection of various components. This includes training on RetScreen and other energy modelling platforms. NB Power is also facilitating the delivery of the Certified Building Commissioning Professional course. In the residential sector, NB Power has offered "house as a system" training for free as part of a four-day building science course several times in the past year. HRAI and Building Knowledge Canada have both offered courses to address knowledge gaps and energy literacy, with funding from the NB Climate Fund. While not mandatory, a newly launched Registered Energy Efficiency Builder (REEB) program, administered by the Canada Home Builder Association - New Brunswick and funded by the NB Environmental Trust Fund, requires builders to take energy efficiency training from NB Power (free of charge) to be listed on the registry.	1
ON	The IESO's Save on Energy Training and Support program provides financial incentives for a range of training courses (e.g., Certified Energy Managers; Advanced Building Recommissioning). The Grid Innovation Fund is also supporting EnerQuality's "ENERGY STAR Multi-family Buildings" pilot program to design and develop a third-party energy efficient certification program for mid- and high-rise residential buildings in the province.	0.5
QC	The provincial government reported that a study was being conducted to determine available training for energy efficiency, and that more is needed. The objective of the study is to develop non-diploma training on energy efficiency, though the timeline for production and release of this study is unclear.	0.25
SK	SaskPower in partnership with NRCAN provided various forms of Energy Efficiency training for more than 100 customers through the Canadian Institute of Energy Training (CIET). The types of training provided ranged from Certified Energy Manager training to Energy Efficiency for Building Operators training.	0.25

AB	None identified	0
MB	None identified	0
NL	None identified	0
NS	None identified	0
PE	None identified	0

Professionalization in energy efficiency programming

Identifying building workforce readiness and future requirements, developing plans and strategies to increase green/energy literacy in the building workforce, and providing training to existing workers are all important aspects of training and professionalization. These efforts involve a wide range of stakeholders, including provincial governments, education and training institutions, the construction industry, trade unions and more.

While training and capacity-building will be essential, so too will be creating demand for these skills and reinforcing professionalization across the building workforce. Energy efficiency programs can play an important role in this regard, as key points of entry for homeowners and building managers into the world of high efficiency building construction and retrofitting. One way in which efficiency programs can reinforce professionalization is to establish professional or trade networks consisting of companies that have the necessary technical and soft skills (and green/energy literacy) to ensure that efficiency improvements are implemented effectively. Alternatively, programs can require installation be performed by licensed professionals, or develop and put in place further credential/certification requirements that go above and beyond the minimum requirements associated with general trade licensing practices.

We award up to one point to provinces that demonstrated initiatives to improve or promote energy efficiency-related credentialling and professionalization within energy efficiency programming. We award additional points to clear, province-wide initiatives to identify, develop and implement credentialling or licensing requirements in energy efficiency programming that exceed existing standards, and/or are specific to energy efficient construction best practices. We may award partial points where respondents provided evidence of work underway to develop such requirements that have yet to be implemented, or where professional requirements within energy programming were equivalent to provincially licensed tradespersons.

Table 43. Professionalization in energy efficiency programming		
Province	Description	Score (1 point)
BC	BC Hydro, FortisBC, and the province have developed training and certification of Program Registered Contractors for insulation, HVAC, and Energy Advisors. This is being transitioned to a third-party model managed by the Home Performance Stakeholder Council. The Home Performance Stakeholder Council - Registered Contractor List, enacted March 2020, resulted in a managed list of Registered Contractors that can be used by participants of the CleanBC Better Homes and joint-utility Home Renovation Rebate Program. The list will include contractors installing energy efficient, lower-carbon home performance solutions for heating ventilation and air conditioning (HVAC, i.e. furnaces and heat pumps), insulation and air sealing, and fenestration, or providing energy advisory or general renovation contractor services for residential renovations in BC. The HPSC included the development of accreditation and certification criteria and required training in consultation with industry, the development of systems and protocols needed to manage the Registered Contractor list effectively and efficiently, and the promotion of the Registered Contractor list through continued and expanded engagement with the residential renovation community. Insulation incentives through the province's CleanBC Better Homes program and FortisBC now require homeowners to use a Program-Registered Contractor. Other incentives will be transitioned to this model in the coming year. In addition, BC Housing requires all Part 9 residential builders to earn a minimum of 20 points in its Continuing Professional Development program each year to remain eligible to work, see https://www.bchousing.org/licensing-consumer-services/builder-licensing/CPD.	0.5
MB	Efficiency Manitoba maintains a "Registered Supplier" list of professionals in a variety of areas, including general contractors, insulation installers, heating system installers, electricians, and more. There are no requirements related to energy efficiency-specific training or credentialing to become part of this network. Efficiency Manitoba's New Homes Programs requires Certified Energy Advisors complete an EnerGuide Rating of the modelled home.	0.25

NB	Several NB Power programs require certified Energy Advisors through registered Energy Management Service Providers (EMSPs). Heat pump installations must be done by an accredited professional, and contractors must be pre-qualified through an application. The Small Business Lighting program requires a licensed commercial or industrial electrician to do the retrofit work.	0.25
NS	Efficiency Nova Scotia maintains a “Preferred Partners” list of professionals in a variety of areas, including general contractors, insulation installers, heating system installers, electricians and more. There are no requirements related to energy efficiency-specific training or credentialling to become part of this network.	0.25
ON	The IESO’s Energy Manager program requires professional designation (Certified Measurement and Verification Professional; Certified Energy Manager, or Certified Energy Manager in Training), and direct-install programs (including Small Business Lighting and First Nations Conservation Programs) require installers/technicians to complete work in accordance with provincial regulations and licensing.	0.25
QC	The Recommissioning component of the MERN EcoPerformance program requires the use of a recommissioning agent who has completed four days of training and passed an NRCan competency exam. Énergir’s Recommissioning program has a similar requirement. The Novoclimat program requires the participation of general contractors and ventilation contractors certified according to the specific parameters of this energy efficiency program for the residential sector.	0.25
SK	SaskEnergy requires all plumbing, heating, electrical, air conditioning and ventilation work performed by or on behalf of SaskEnergy Network Members to be performed by licensed tradespersons or apprentices. Energy efficiency programs are only offered through Network Members.	0.25
AB	None identified	0
NL	None identified	0
PE	None identified	0

Grid modernization

Electricity grids, and the institutional structures that manage and govern them, evolved in the 20th century to deliver vast amounts of electricity from centralized generation plants to consumers spread out across a wide service area. Several recent developments have challenged this model, particularly increased integration of variable renewable sources of electricity, such as wind and solar power, either at grid scale or on or near homes and businesses. Consumer preferences have changed as well, as some end users have sought more information and control over their electricity consumption. Natural gas networks are undergoing similar transformations, as utilities and regulators explore peak shaving and "non-pipe" solutions to avoid more costly natural gas infrastructure, and to strategically retire pipes that are ageing, unsafe (e.g. Aldyl-A plastic pipes), or in neighbourhoods prioritized for electrification.[62]

As utilities and governments have come to appreciate the multiple benefits of demand-side management—including energy efficiency and demand response measures—they have adopted new practices and pursued new technologies to manage energy systems. Increasingly, they are recognizing the flexibility benefits of demand-side resources, that is, the ability to rapidly change energy demands at certain times, or in specific locations, to improve energy network efficiency. For example, demand-side flexibility might be a readily available, and cost-effective way to accommodate a higher share of renewable energy on a grid.[63]

Grid modernization broadly describes the introduction of new technologies and practices to enhance resiliency. System operators can implement multiple smart grid technologies and practices to modernize both electricity and natural gas grids. In this section, we focus on efforts taken in provinces to develop and strategically use advanced metering infrastructure to achieve energy savings. We also examine planning processes for and piloting of geo-targeted energy

---

[62] Justin Gerdes, "Can Non-Pipeline Alternatives Curb New York's Rising Natural Gas Demand?," October 17, 2018, https://www.greentechmedia.com/articles/read/can-non-pipeline-alternatives-curb-new-yorks-rising-natural-gas-demand.

[63] Jennifer Potter, Elizabeth Stuart, and Peter Cappers, "Barriers and Opportunities to Broader Adoption of Integrated Demand Side Management at Electric Utilities: A Scoping Study" (Berkeley, CA: Electricity Markets and Policy Group, Berkeley Lab, February 2018).

efficiency as a “non-wire” alternative in transmission or distribution grid planning, and the use of conservation voltage reduction (CVR) or volt-var optimization (VVO).

Advanced metering infrastructure

Utilities have traditionally measured electricity and natural gas consumption with simple meters at the customer’s location; these record only total consumption and thus require periodic, manual meter readings. A core component of grid modernization is the replacement of traditional meters with smart meters, which record consumption more frequently (often hourly) and communicate the information directly to the utility via a wired or wireless network. Smart meters are part of a broader advanced metering infrastructure, alongside the communications networks and data management systems that enable two-way communication between utilities and customers.

According to the U.S. Department of Energy, advanced metering infrastructure (AMI) provides several important functions associated with smart grids, including the ability to record consumption automatically and remotely. Yet one-way automated reading is, on its own, not equivalent to AMI. Other functions that can be provided include the ability to remotely connect and disconnect service, detect tampering, identify and isolate outages, and monitor voltage. When combined with more advanced two-way communicating meters and behind-the-meter technologies that provide information to the user and communicate with the meter, AMI also enables utilities to offer time-of-use-based rate programs and other incentives for customers to reduce or shift their energy consumption,[64] leading to both cost and energy savings.

For this Scorecard, we distinguish between two facets of provincial AMI infrastructure: AMI policies or initiatives and the extent of coverage; and activities to leverage AMI infrastructure to provide energy savings.

Policies and coverage

To score this component, we considered the extent to which provinces have taken action to implement advanced metering infrastructure, and evaluated current coverage in different end

[64] Office of Electricity Delivery and Energy Reliability, “Advanced Metering Infrastructure and Customer Systems: Results from the Smart Grid Investment Grant Program” (U.S. Department of Energy, September 2016).

use market segments (residential, commercial, industrial) in both electricity and natural gas systems. We awarded up to one point to provinces that have achieved comprehensive coverage in one or more market segments, in either electricity or natural gas, with two-way communication functionality. We award partial points for initiatives underway but with as-of-yet low coverage, or responses that did not indicate the extent of coverage.

Notable developments on this metric include NB Power's successful application to begin a smart meter roll-out program, targeting completion by 2024, and SaskEnergy completing its roll-out of two-way meters to all residential and non-residential customers.

Table 44. Advanced metering infrastructure policies and coverage		
Province	Description	Score (1 pt)
BC	Section 17 of the 2010 BC Clean Energy Act directed utilities to install advanced meters by the end of 2012. BC Hydro launched a program in July 2011, and FortisBC followed suit in 2014. A 2013 Direction to the British Columbia Utilities Commission (BCUC) set standards and conditions under which electricity consumers in the province can continue to use a legacy meter or choose to use a “radio-off” smart meter, rather than the standard smart meter model. Both BC Hydro and FortisBC reported widespread coverage (>99%) of two-way advanced metering infrastructure (AMI) in both residential and non-residential rate classes. FortisBC Energy Inc., (natural gas) does not have advanced metering in place for any but its largest commercial / industrial customers, though the utility applied to the BCUC to install AMI for all customers in May 2021.	1
ON	The province announced a Smart Metering Initiative in April 2004 with a target of complete coverage for all residential and small business ratepayers by 2010. Ontario has since completed a full deployment of one-way smart meters for residential and small business electricity customers with demand under 50kW. Interval meters have been mandated for electricity customers with demand over 50kW since August 21, 2020. Enbridge has piloted the use of one-way meters (automated meter reading, or AMR) and may be able to advance an AMI-specific application and a viable roll-out strategy to the Ontario Energy Board as soon as 2022/2023.	0.75
SK	SaskPower is currently installing AMI meters at commercial and industrial customer sites and has begun running AMI pilots for residential customers. To date, AMI coverage is approximately 77% for non-residential customers, and 1% for residential customers. SaskEnergy installed an additional 8,700 advanced natural gas meters in 2020, reaching nearly 100% of its residential and non-residential customers with two-way meters.	0.75

AB	Installation of AMI in Alberta is ultimately the decision of the distribution utilities. A recent report by the Alberta Utilities Commission (AUC) into the distribution system notes AMI infrastructure coverage varies from utility to utility. The report notes that EPCOR is one of the few utilities with interval-capable meters installed across its service territories. ATCO Electric has one-way meters installed in its territory and plans to install 2,000 AMI meters in the Grande Prairie region. ENMAX is replacing existing meters only after end-of-life; approximately 16% of its meters are now AMI. Fortis residential and small commercial meters are not capable of interval readings; the company plans to replace all cumulative meters over the next 10 years. EQUS was aiming for full AMI coverage by early 2021, and the City of Medicine Hat has replaced all electricity and natural gas meters with AMI meters.	0.5
NS	Regulatory actions related to Nova Scotia's AMI initiative began in 2015, with the installation of meters starting in 2019. Nova Scotia Power's $133 million AMI initiative is currently underway, with plans to have all meters be smart meters by 2021.	0.5
QC	Hydro-Québec reported that it had installed more than four million communicating meters in the province, an increase from 3.9 million in 2019. Two-way meters account for 88% of residential meters, and 12% of non-residential meters. Natural gas utility Énergir did not provide information on AMI.	0.5
MB	In January 2007, Manitoba Hydro launched a pilot project for the installation of advanced electricity and natural gas meters. The project concluded in 2009, and its final report highlighted the imperative to study anticipated benefits and project risks. The company analyzed various roll-out scenarios in 2019 but has yet to make an investment decision. Few customers, electric or natural gas, residential or non-residential, have two-way meters installed.	0.25
NB	In 2017 NB Power applied to the NB Energy and Utilities Board seeking approval to implement Advanced Metering Infrastructure; the board denied its request. NB Power reapplied in 2019 with a revised business case. The regulator approved this second application in September 2020. The project is underway with meter upgrades expected to begin in March 2022 and the project completing in 2024.	0.25

NL	Utilities in the province have installed one-way meters for many residential and non-residential customers, though two-way meter coverage remains lower. Just 20% of Newfoundland and Labrador Hydro's residential customers—and 1% of non-residential customers—have them installed.	0.25
PE	There have been smart meter pilot programs in Prince Edward Island, though widespread coverage does not yet appear to be in place. Summerside Electric is currently installing AMI meters, with 400 installed to date, which supports ETS heating to match wind generation. Maritime Electric aims to have smart metering rolled out across the island by 2025.	0.25

Leveraging AMI for energy savings

Advanced metering infrastructure (AMI) is an important component of grid management and modernization, but it can also be leveraged to facilitate energy savings and conservation. A recent ACEEE report emphasized that AMI needs complementary program strategies to leverage the technology to its full potential.[65] Such strategies can include:

1. Feedback to customers and use of behavioural insights to help them reduce energy use
2. Providing price signals such as time-of-use rates
3. Data disaggregation to target energy savings initiatives, evaluate programs, and use innovation program designs such as "pay for performance," and
4. Using grid connectivity to promote grid-interactive efficient buildings and use of conservation voltage reduction.

For this Scorecard, we asked information request respondents to identify activities in each of these four areas. To score this metric, we awarded a quarter point for clear evidence of activities by one or more utilities in each province for each area. We provide a summary of responses and scoring in Table 45.

[65] Rachel Gold and Dan York, "Leveraging Advanced Metering Infrastructure to Save Energy" (Washington D.C.: American Council for an Energy-Efficient Economy (ACEEE), January 9, 2020), https://www.aceee.org/research-report/u2001.

Table 45. Leveraging AMI to promote efficiency					
Province	Providing feedback (0.25 points)	Price signals (0.25 points)	Data disaggregation (0.25 points)	Grid-interactive buildings (0.25 points)	Score (1 point)
NS	Part of NS Power's use case for AMI was to achieve energy savings through bill alerts to customers, and to develop a customer energy management solution to provide energy use data, notifications, and end-use disaggregation.	NS Power is piloting Critical Peak Pricing and a new Time of Use Rate in 2021 for Residential, Small General, and General customers. Subscription will be limited for the pilot phase, and rates are intended to be opt-in.	EfficiencyOne's proposed use case for AMI was to support demand response activities, provide more sophisticated customer analytics capabilities, and additional data for use in measurement and verification of energy and demand savings	The NS Power Smart Grid demonstration project is piloting the use of grid-interactive vehicle charging (two-way charging) and behind-the-meter batteries.	1
ON	Several local distribution companies have run temporary pilots using real-time feedback to residential customers. For example, The Nudge Report created by Alectra includes tailored suggestions for lowering peak consumption as well as specific benchmarking comments so that users may analyze their consumption behavior month to month. However, we were unable to find projects currently in operation.	AMI infrastructure supports time-of-use and tiered rates for residential and small general service <50kW customers in Ontario	The IESO's Energy Performance Program, which currently has 200 participating commercial and institutional facilities, uses hourly usage data to offer pay-for-performance incentives.	The IESO allows distribution-connected customers to participate as Demand Response resources in its wholesale market, leveraging hourly usage data to verify performance after Demand Response activations.	1

NB	NB Power has had a customer energy portal available through NBPower.com for the past five years. The utility is decommissioning the service and will replace it with an AMI-enabled portal. It will go live in coordination with the overall AMI project, currently targeting 2022, and there are plans to implement a High Bill Alert feature.	NB Power's AMI meters will be configured to enable time-of-day rate price signals, once approved for implementation through the New Brunswick Energy and Utilities Board. The utility is also testing Time of Use Rates as part of the Smart Grid Atlantic research project.	Planning is underway to optimize the use of the data coming from AMI to enable better planning, targeted programming, and improved program evaluation, measurement, and verification.	-	0.75
BC	BC Hydro operates a Behaviour Program for residential customers and optimization offers for business customers that make use of enhanced customer energy usage data. In addition, the utility allows customers to access their energy use data online, to analyze trends or compare against similar buildings. In 2019 the electricity division of FortisBC started a Demand Response pilot for commercial	-	BC Hydro uses advanced metering data for a wide range of uses for load analysis in system planning, customer service, and program and rate design. The electricity division of FortisBC has also used AMI data for measurement and verification purposes, to confirm participants' DSM project savings.	-	0.5

	and industrial customers, that relayed their metering data via cellular modem to the DR pilot Implementer. This allowed participating customers to see their load profiles on the Implementer's software platform and their response to DR events. In 2020, FortisBC Energy Inc (gas) and 2021 (electric) launched MyEnergyUse online platform tied into account online and Home Energy Reports for customers to understand, measure and reduce their energy consumption.				
QC	Hydro-Québec's Hilo subsidiary provides real-time consumption for customers who have subscribed to a Hilo service (home automation network), transmits requests to customers to participate in periods of consumption reduction and offers a turnkey	Hydro-Québec offers several dynamic pricing rate options.	Hydro-Québec offers a load disaggregation tool for residential customers, but it only uses monthly billing data. A new tool is in development, with delivery scheduled for 2022, which will use complete data from the communicating meters and allow much greater precision. However, Hydro-	-	0.75

	solution for energy management.		Québec does not use this data to target energy savings or evaluate programs itself.		
SK	SaskPower's customer Portal supports data self-service for operational analysis. There are ongoing projects to renew the external SaskPower website, which will include a refresh of the self-serve customer portal. SaskEnergy has service agreements in place to provide AMI data for energy use monitoring.	SaskPower offers dynamic pricing for industrial customers.	-	-	0.5
MB	EnerTrend, an energy profiling tool developed by Manitoba Hydro, uses advanced interval metering to collect near real-time data on the energy consumption of large industrial and commercial facilities.	-	Efficiency Manitoba uses interval meter data to pay load displacement performance incentives, specifically for electric energy generated during specific on-peak hours.	-	0.5
PE	-	-	-	AMI is used in Summerside to support electric thermal storage to match wind generation.	0.25

AB	In its submission to the Alberta Utility Commission's distribution system inquiry, ENCOR noted that it was studying opportunities to leverage its AMI infrastructure to improve planning, optimize voltage, enhance demand response, and send price signals, to provide additional data analytics, and better understand load patterns.	-	-	-	0.25
NL	-	-	-	-	0

Non-wires / pipes solutions

Energy efficiency and demand response can avoid the need to build transmission infrastructure, especially when targeting specific geographies and coupled with other strategies such as energy storage or distributed generation. There are regulatory and institutional barriers to incorporating these "non-wires" alternatives in grid planning processes, such as limited familiarity with the practice among utilities and regulators.[66]

Following our approach in the previous Scorecard, we asked information request respondents to describe planning processes in place to require or allow non-wires/pipes solutions in the evaluation of options to meet local or regional transmission or distribution requirements. We also asked them to identify any non-wires/pipes solutions that emerged from a planning process as a recommended solution, and any relevant pilot and demonstration projects.

We award up to one point for provinces that currently have planning processes for the requirement of non-wires/pipes solutions for local and regional infrastructure and have existing or completed pilot projects that incorporate non-wires/pipes alternatives. We award a half point to provinces that are either in the process of establishing such planning processes, or have only completed pilot projects, but not both.

[66] IESO, "Barriers to Implementing Non-Wires Alternatives in Regional Planning," http://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/rpr/rprag-20181101-barriers.pdf?la=en.

Table 46. Non-wires/pipes planning processes, projects, and pilots and demonstrations			
Province	Planning processes	Projects, pilots and demonstrations	Score (1 point)
ON	Both non-wires and wires options may be evaluated as part of the IESO's Regional Planning Process to meet regional electricity system needs. The IESO, transmitters, distributors, and other stakeholders participate in different stages of this process. Non-wires options are studied specifically during the Integrated Regional Resource Plan (IRRP) stage. The IESO led an initiative to review and improve the efficiency and effectiveness of the Regional Planning Process. Findings and recommendations were published in the Regional Planning Process Review Final Report in Feb 2021. In August 2021, the Ontario Energy Board released a staff discussion paper on updating conservation and demand management guidelines for non-wires alternatives for electricity distributors. The paper proposes a requirement to consider alternatives in regional and local infrastructure planning but stops short of requiring them as a first option. Since then, the IESO has begun work on incremental improvements to how non-wire alternatives are studied in Integrated Regional Resource Plans and will communicate updates to stakeholders towards the end of 2021. A first-generation IRP framework recently issued by the OEB requires consideration of non-pipe alternatives, but only in	The pilots and approved projects we noted in our previous scorecard continue to operate in Ontario. These include the Brant Local Demand Response Pilot, Targeted Indoor Agricultural call for proposals, Greenhouse LED Incentive, Alectra Residential Solar Storage Potential, and York Region Non-wires Alternatives Demonstration Project. Updates include the OEB approving an additional $4.6 million in spending over the 2020-2024 period for a battery storage project that would defer distribution infrastructure as part of Toronto Hydro's Station Expansions Program. The IESO ran the local capacity auction for the York Region Non-Wires Alternatives demonstration in 2020 which procured 10 MW of local demand response and generation capacity for availability in summer 2021. The IESO, working with Alectra (with funding from Natural Resources Canada), ran a first-of-kind in Canada (and likely North America) local capacity auction in 2020 to evaluate the potential to procure peak capacity from local assets as a cost-effective means of deferring or off-setting new transmission and distribution infrastructure. Auction participation and clearing	1

	growth-driven projects or large replacement projects. The framework allows Enbridge to seek opportunities with the IESO or local electricity distributors to facilitate electricity-based alternatives to address system needs or constraints, but explicitly excludes funding and delivery of electricity-based alternatives from natural gas ratepayers.	prices suggest that local resources can be used to cost-effectively defer traditional infrastructure. Enbridge completed its Ingleside geo-targeted demand-side management project, and proposed two more pilot projects as part of its IRP process.	
NS	In 2016 the Nova Scotia Utility and Review Board (NSUARB) ordered EfficiencyOne and NS Power to begin investigating non-wires alternatives and locational DSM (geotargeting) techniques. Three reports on the topic have been provided under board proceeding number M07815, and provide conceptual design information and proposed preliminary techniques for economic comparison. In 2020 NS Power produced updated avoided costs of transmission and distribution reports, which are available publicly at the NSUARB. These avoided costs provide an enabling key piece of information for the development of further locational DSM activity in Nova Scotia.	Work continued on the locational DSM (“Klondike”) pilot in 2020, for customers in the Kentville area. Enhanced incentives were provided through five existing Efficiency Nova Scotia programs. Outcomes were negatively impacted by the COVID-19 pandemic, and the pilot has now closed. Evaluation is scheduled to take place in 2021.	0.75
QC	Hydro-Québec currently has a planning process that includes non-wires alternatives but is working on updating it to integrate the most promising alternative solutions.	Hydro-Québec’s four pilot projects from last year remain active. The utility is also rolling out the Lac-Mégantic Microgrid and two distributed solar power plants.	0.75

BC	BC Hydro's pilot work on selected substations is informing the development of a Non-Wires Alternative framework that the utility expects will provide potential alternatives to traditional capital-build solutions in substations to meet local or regional needs.	In 2020, BC Hydro's activities reflected a continuation of pilots and trials initiated in previous years. The pilots and trials have focused on managing peak loads on the system. All the technologies and processes BC Hydro is testing are proven, commercially available products, but their application is new and innovative to BC Hydro's system. The aim of the work is to inform program design (e.g., demand response trials, localised DSM pilots, connected home product trials, and distributed energy resource management systems). FortisBC is exploring partnering with the City of Kelowna, NRCan and other partners to geo-spatially model building energy intensities, which could support geo-targeting of neighborhoods for community retrofit plans. The utility also recently completed a demand-response pilot targeting large consumers and identified opportunities for a manually dispatched demand response program. In 2021, FortisBC launched a residential demand response program that will be completed in 2022.	0.5
MB	Distribution and transmission planning processes allow for, but do not require, non-wires/pipes solutions to be included in the evaluation of options to meet local/regional investment in infrastructure. Manitoba Hydro has started initial work on developing a location specific DSM marginal value to be used to identify system constraints that could benefit from geotargeting.	Some "smart wire" solutions have been recommended on the transmission system, and the utility is also exploring energy storage potential in the transmission system, but there appears to be no geo-targeting of energy efficiency nor demand response.	0.5

NB	-	NB Power conducted engineering analysis at four locations to evaluate the potential of non-wires alternatives to reduce the cost of serving sparse customer populations in remote areas of the province. The study involved residential load profile analysis, localized feeder current monitoring and obtaining equipment cost estimates. None of the areas proved financially viable and the project was closed, with plans to re-evaluate one of the locations in the future.	0.25
PE	The 2016-2017 Energy Strategy notes that geo targeted energy efficiency can avoid the need to build transmission and distribution capacity. The plan calls for developing a set of guidelines for when geo targeted energy efficiency should be considered and developing geo targeted energy efficiency protocols. efficiencyPEI reported that its 2022-2024 DSM plan will identify geo-targeted demand response and energy efficiency initiatives.	-	0.25
SK	SaskEnergy reported that it has shifted its strategy to target end-use energy efficiency prior to infrastructure investments in capacity expansions. SaskPower reported that its planning process for its transmission system considers the most cost-effective wires or non-wires solutions.	-	0.25

AB	The Alberta Utilities Commission (AUC) currently does not pursue non-wires/pipes alternatives beyond what would be justified by performance-based regulations. A recently released study by the AUC into the distribution system identified a number of barriers to non-wires alternatives and distributed energy resources (particularly energy storage).	-	0
NL	-	-	0

Conservation voltage reduction / volt-var optimization

The provinces could undertake many other grid modernization efforts that would directly or indirectly lead to greater energy efficiency, though such efforts may not be universally applicable. In this section, we evaluate initiatives to deliver electricity at lower voltages (conservation voltage reduction, or CVR) and manage reactive power and voltage levels (volt-var optimization, or VVO).

We awarded up to one point to provinces that have acted in one or more of these areas, depending on the extent of the initiative, its formalization, and the depth of experience gained through testing and/or piloting of relevant technologies and practices. Results are provided in Table 47 below.

Table 47. Conservation voltage reduction / volt-var optimization

Province	Description	Score (1 point)
BC	BC Hydro currently runs VVO in energy-conservation mode on 50 stations, optimizing voltages for almost half of distribution feeders and covering some of the largest distribution substations. In 2020, BC Hydro estimated it achieved approximately 189 GWh of energy savings through these activities, which are not considered in the utility's DSM plan.	1
ON	In 2014, the IESO Conservation Fund supported Hydro Ottawa on a demonstration project to assess whether Conservation Voltage Regulation could yield quantifiable electricity savings for customers. Additional LDCs have implemented VVO/CVR initiatives with funding from the Ministry of Energy Smart Grid Fund, including Entegrus, Hydro One, London Hydro, and EnWin. Entegrus is implementing a voltage regulation system, enabling conservation voltage reduction in the unincorporated community of Thamesville. Grid Edge Control Devices from Varentec Inc. will be installed to establish an integrated smart grid solution, facilitating high-level grid control and visualization, as well as energy conservation through voltage reduction. The IESO conducts routine voltage reduction tests for system optimization and reliability purposes, and in 2019 published a study that identifies protocols for evaluating energy savings and reductions as a result of voltage reduction. During	1

	a July 2019 test, the IESO found that a three percent voltage reduction resulted in an average reduction in provincial demand of 1.3%, and a 5% voltage reduction resulted in an average demand reduction of 1.94%.	
AB	The City of Lethbridge is piloting Conservation Voltage Reduction with the support of Alberta Innovates. For more information, see https://albertainnovates.ca/impact/newsroom/powering-up-electrical-grid-research-new-industry-consortium-pilots-smart-grid-tech-in-lethbridge/	0.5
NB	NB Power recently completed a conservation voltage reduction study as part of a Grid Modernization Research and Development Pilot Project, with Siemens, Natural Resources Canada, and the National Research Council. Approximately 5,000 NB Power homes and businesses in specific areas of the province were part of this one-year pilot project. The company plans broader CVR implementation in 2022/2023.	0.5
NL	Newfoundland Power uses conservation voltage reduction to manage peak load in the winter. Newfoundland and Labrador Hydro has CVR capability, but has yet to use it for energy conservation purposes.	0.5
QC	Hydro-Québec conducted the 'CATVAR' (1, 2) project between 2007 and 2016 to install and demonstrate equipment to manage distribution grid voltage and reactive power. The company cancelled the project in 2016 due to planned energy surpluses and less than expected energy savings (though the deployed equipment will be maintained on the network until end-of-life, and thus will continue to deliver some energy savings).	0.5
SK	SaskPower is planning a volt-var optimization pilot in 2021-2022. This pilot will leverage volt-var information acquired through AMI meters and smart substation metering and reclosers used to establish a dynamic volt-var baseline. This baseline will be used to implement measures to compensate for volt-var to reduce system losses.	0.25
MB	Manitoba Hydro uses neither conservation voltage reduction nor volt-var optimization.	0
NS	Nova Scotia uses neither conservation voltage reduction nor volt-var optimization.	0
PE	PEI uses neither conservation voltage reduction nor volt-var optimization.	0

Buildings

Canada's buildings sector is responsible for about 28% of end use energy demand and is the largest source of potential energy savings (28%), according to the IEA/NRCan national level energy efficiency potential study.[67] Buildings are also where we spend a significant amount of our time in our cold-climate country. They are a significant and often neglected component of Canada's infrastructure, and high-performance buildings are increasingly important for our quality of life, physical and mental health, and economic productivity.

Building sector policies are complex. Many strategies can influence the energy efficiency of our built environment, and the provinces have numerous opportunities to demonstrate leadership. We collected information and allocated scores for the following policy areas or metrics:

- **Building codes** (11.5 points total)
    - Houses and small buildings (three and a half points)
    - Commercial, institutional, and multi-unit residential buildings (three and a half points)
    - Building code adoption activities (one point)
    - Retrofit code development (half a point)
    - Building code compliance activities (three points)

- **Performance, rating and disclosure** (four points total)
    - Building performance standards (one point)
    - Mandatory rating and disclosure (two points)
    - Voluntary rating and disclosure (one point)

- **Energy advisors**
    - Numbers of energy advisors (two points)

We list overall scores by province and by topic in Table 48.

[67] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050," Insight Series 2018 (Paris: International Energy Agency, 2018).

Table 48. Buildings scoring results				
Province	Building codes (11.5 points)	Performance, rating and disclosure (4 points)	Energy advisors (2 points)	Total (17.5 points)
BC	9.5	1	0.5	11
ON	3.25	2	0.25	5.5
NS	2.75	1	1.25	5
QC	1.75	1.25	0.5	3.5
AB	2.25	0.25	0.25	2.75
SK	2.75	0	0	2.75
PE	1.5	0	1.25	2.75
NB	1	0.25	0.75	2
MB	1.25	0.25	0	1.5
NL	1.25	0	0	1.25

Building codes

Building codes set minimum standards for new construction, including energy efficiency requirements. Those that require higher energy efficiency performance effectively "lock in" significant energy savings and avoid the need for costlier, more difficult retrofits later.

The provinces and territories hold responsibility for adopting new building codes, and can further delegate that responsibility to local governments. The Canadian Commission on Building and Fire Codes (CCBFC), an independent committee of volunteers established by the National Research Council of Canada, develops model codes that provinces can adopt and amend. Section 9.36 of the National Building Code (NBC) establishes energy efficiency performance requirements for houses and small buildings.[68] The National Energy Code for Buildings (NECB) prescribes minimum performance levels for all types of buildings, and is the standard for

[68] Canadian Commission on Building and Fire Codes, "Long-Term Strategy for Developing and Implementing More Ambitious Energy Codes: A Position Paper" (National Research Council Canada, 2016).

commercial, institutional, and high-rise residential buildings (Part 3 of the National Building Code). Residential buildings are responsible for about three-fifths of total building energy use in Canada, with commercial and institutional buildings accounting for the balance.[69]

The 2015 NBC and the 2017 NECB are the most recent versions of these model codes, though Codes Canada, a unit of the National Research Council Canada, has been working to update both for 2020. It is doing so because the Pan-Canadian Framework on Clean Growth and Climate Change set a goal that all provinces will adopt a net-zero energy-ready building code by 2030.[70]

To work toward this goal, both the 2020 NBC and 2020 NECB are expected to be tiered codes—that is, a base code with specified incremental steps that work toward a longer-term performance target. [71] Tiered codes offer provinces, territories, and local governments more flexibility in code adoption and implementation. Jurisdictions wishing to adopt more ambitious efficiency and climate change strategies have clearly defined options to choose from. They present a clear path towards the top tier, which should be a net-zero energy-ready standard to follow the guidance from Canada's climate plan.

The anticipated national tiered codes will be like British Columbia's BC Energy Step Code, created in 2017. This Scorecard tracks existing tiered codes, but also identifies plans and activities underway to prepare for adopting the soon-to-be released updated national codes for both houses and small ("Part 9") buildings and larger and more complex commercial, institutional, and multi-unit residential ("Part 3") buildings.

---

[69] Natural Resources Canada, "Canada's Secondary Energy Use (Final Demand) by Sector, End Use and Subsector," in National Energy Use Database (Ottawa, ON: Government of Canada, 2019), http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=aaa&juris=ca&rn=2&page=0.

[70] Environment and Climate Change Canada, "Pan-Canadian Framework on Clean Growth and Climate Change."

[71] Kevin Lockhart, "What You Need to Know about the New Building Codes," Efficiency Canada (blog), February 4, 2020, https://www.efficiencycanada.org/what-you-need-to-know-about-the-new-building-codes/.

Houses and small buildings (Part 9)

We award provinces a half point if they have adopted and enforced either the 2012 revision to the National Building Code, or its 2015 version. We award similar points for both versions because they contain no significant differences with respect to energy efficiency.[72] We assign one point if we could find evidence that a province's standards exceeded the requirements of these model codes for houses and small buildings, one point if a province had formally adopted a stepped or tiered code, and one point for a firm date for implementing a net-zero energy-ready standard, particularly for homes and small buildings. We show scoring results in Table 49.

Table 49: Building codes - Houses and small buildings (Part 9)

Province	Meets NBC 2012/2015 (0.5 points)	Exceeds NBC 2012/2015 (1 point)	Stepped or tiered code (1 point)	NZER commitment (1 point)	Score (3.5 points)
BC	●	-	●	●	2.5
ON	-	●	-	-	1
AB	●	-	-	-	0.5
MB	●	-	-	-	0.5
NL	●	-	-	-	0.5
NS	●	-	-	-	0.5
PE	●	-	-	-	0.5
QC	●	-	-	-	0.5
SK	●	-	-	-	0.5
NB	○	-	-	-	0.25

The only development of note for Part 9 building codes was that New Brunswick formally adopted NBC 2015 in January 2021, a decision we listed as "pending" in our previous Scorecard. However, stakeholder discussions with the Department of Public Safety led to an extended grace period for implementation until December 31, 2021. Full implementation of NBC 2015 will not take place until January 1, 2022 and therefore receives partial points.

[72] Information request to National Research Council

Commercial, institutional and large multi-unit residential buildings (Part 3)

In 1997, Canada created the Model National Energy Code for Buildings, the country's first national standard for building energy performance. Fourteen years later, the federal government updated it and renamed it the National Energy Code for Buildings (NECB). The 2011 NECB achieved a 25% performance improvement over its predecessor.[73] The 2015 NECB included changes such as new thermal requirements for semi-heated buildings, and maximum allowable lighting power densities harmonized with the ASHRAE 90.1-2013 standard. This version had an average annual energy savings of 2.5% over the 2011 NECB. The National Research Council estimates that the 2017 version of the NECB achieves an average annual energy savings of 7.8% to 11.9% above the 2015 version.[74]

The ASHRAE 90.1 energy standard applies to all building types except low-rise residential. Some provinces reference versions of this standard. Our consultations with experts suggested the NECB is likely to be more stringent in Canada's heating-dominated climate. The NECB is also a better measure of energy efficiency because it is based on energy use, while ASHRAE 90.1 is based on energy cost. In our review of provincial standards, we did not find evidence that the adoption of a version of ASHRAE 90.1 would change relative rankings.

Considering the fact that provinces need to be moving to more recent energy efficiency codes, we no longer award points to provinces that have adopted and enforced NECB 2011, and we have reduced the scores for adoption/enforcement of the NECB 2015 and the NECB 2017 by half a point. We also looked for evidence that a province's building code was equivalent to one of these standards. We award a province one point if it had adopted a tiered or stepped code for commercial, institutional, and large residential buildings, and another point for committing to a net-zero energy-ready building code in the future.

---

[73] Natural Resources Canada, "Canada's National Energy Code," Government of Canada, March 6, 2018, https://www.nrcan.gc.ca/buildings/canadas-national-energy-code/20675.

[74] National Research Council information request. This is a broad average over several climate zones and building archetypes.

Table 50. Building codes - Commercial, institutional, and multi-unit residential (Part 3)						
Province	2011 NECB (0 points)	2015 NECB (0.5 points)	2017 NECB (1.5 points)	Stretch or Step Code (1 point)	NZER commitment (1 point)	Score (3.5 points)
BC	-	●	-	●	●	2.5
AB	-	-	●	-	-	1.5
NS	-	-	●	-	-	1.5
ON*	-	-	●	-	-	1.5
SK	-	-	●	-	-	1.5
PE	-	●	-	-	-	0.5
QC	-	●	-	-	-	0.5
NB	○	-	-	-	-	0
MB	●	-	-	-	-	0
NL	-	-	-	-	-	0

** Ontario specific code deemed to be roughly equivalent to NECB 2017 for scoring purposes*

As with Part 9 codes, the only development of note for Part 3 building codes was that New Brunswick formally adopted—but has yet to enforce—NECB 2011 in January 2021.

Building code adoption activities

As noted above, the Canadian Commission on Building and Fire Codes (CCBFC), an independent committee of volunteers established by the National Research Council of Canada, is currently finalizing new versions of the NBC and NECB. Final publication of the new codes was originally expected at the end of 2020, though the latest official date is December 2021, due to COVID-associated delays. Both updated codes have pre-specified tiers, with gradually improving levels of energy efficiency.[75]

[75] Tiers for Part 3 buildings are all performance-based, though the Part 9 code will have both performance and prescriptive-based tiers. See Kevin Lockhart, "What You Need to Know about the New Building Codes," *Efficiency Canada* (blog), February 4, 2020, https://www.efficiencycanada.org/what-you-need-to-know-about-the-new-building-codes/.

The Regulatory Reconciliation and Cooperation Table (RCT), established under the Canadian Free Trade Agreement (CFTA), works to reduce barriers to trade between Canadian provinces and territories. In 2019, the RCT endorsed the Construction Codes Reconciliation Agreement, which aims to reduce or eliminate variations in provincial building codes and to establish a standardized period of adoption of new model codes as they are published. This Agreement was ratified by all provinces and territories in 2020, effectively binding provinces and territories to implement the 2020 National Codes within 24 months of publication, and to implement subsequent codes within 18 months of publication. We award 0.25 points for the ratification of this Agreement.

Provinces can still take steps to accelerate adoption of more energy efficient codes, by undertaking studies and consultations with provincial stakeholders regarding the requirements of the impending code updates, by introducing additional requirements through amendments, and/or by indicating an intention to implement a code tier above the baseline (i.e. Tier 1). Accordingly, we also award 0.25 points to provinces that reported some preparatory activities outside of the RCT process, and 0.5 points for provinces that indicated an intent to adopt a higher-than-base code tier.

Table 51 summarizes the results below.

Table 51. Building code update plans and activities

Province	Ratified CCRA (0.25 points)	Target code tier (0.5 points)		Update activities description (0.25 points)	Score (1 point)
		Part 9	*Part 3*		
BC	•	Equivalent to Tier 3 by 2022	Equivalent to Tier 2 by 2022	Work is underway to prepare for the 2022 BC Building Code, which incorporates a new baseline requirement of 20% improvement in efficiency following the current provincial step code structure. This equates to Step 3 for Part 9 buildings in the NBC 2020, and roughly Tier 2 in NECB 2020.	1.00
NS	•	Tier 1	Tier 1	In 2019/2020, the government commissioned an independent assessment of the strengths, assets, barriers, and challenges involved in implementing a building performance path and a potential tiered building energy code like that in British Columbia. This was called the Tiered Building Energy Code Readiness Assessment.	0.5
AB	•	-	-	-	0.25
MB	•	-	-	-	0.25
NB	•	-	-	-	0.25
NL	•	-	-	-	0.25
ON	•	-	-	-	0.25
PE	•	-	-	-	0.25
QC	•	-	-	-	0.25
SK	•	-	-	-	0.25

While only British Columbia indicated an intent to adopt a code with efficiency requirements exceeding Tier 1 in the National Model Codes, it remains possible that local governments, typically the “authorities having jurisdiction” over building code enforcement) could be permitted to adopt energy efficiency requirements exceeding the provincial code. Indeed, the anticipated tiered code structure of the new model codes should encourage municipalities to adopt upper tiers, as is currently done in British Columbia. We asked respondents to indicate whether municipalities in their province had the authority to adopt steps or tiers above the provincial code. Table 52 summaries the responses. Note: We do not score these response, but instead provide them for informational purposes only.

The responses received indicate divergence regarding provincial government positions on the ability for their municipalities to adopt more advanced building codes. Restrictions on upper tier adoption by municipalities could fail to take full advantage of the tiered design of the 2020 model building codes to accelerate climate action and better buildings. Only BC has a clear path for municipalities to adopt more advanced codes under standardized tests and metrics.

Table 52. Can municipalities adopt steps or tiers above provincial code?

Province	Description
AB	-
BC	Yes. Municipalities can write by-laws or implement policies and programs that require new buildings in one of their municipalities to be constructed to one of the steps in the BC Energy Step Code. There are four steps for large buildings, and five steps for houses and small buildings. Every step is evaluated using the same tests and metrics.
MB	No. Under the Act only the province has the authority to establish construction standards.
NB	-
NL	Yes. The Municipalities Act (Sect 414 (3)) allows municipal councils to adopt standards that exceed the requirements of the National Building Code of Canada, plus supplements and amendments. The province has not provided performance criteria, or a formal program, for a stretch or step code.
NS	No. They are not enabled to do this.
ON	-

PE	-
QC	Yes. The municipalities can adopt higher requirements than provincial building codes through local regulations.
SK	-

Retrofit code development

Although the National Building Code does state applicability to existing buildings, in practice most jurisdictions often apply it only to the design and construction of new buildings. The absence of clear code requirements for when alterations or renovations are made to existing buildings has led to a patchwork of different approaches across the country and represents a missed opportunity for improving energy efficiency. In recognition of this, the Pan-Canadian Framework on Clean Growth and Climate Change outlined a specific goal to develop a model code for existing buildings that would help guide energy efficiency improvements during renovations.

In 2016, the CCBFC and the Provincial and Territorial Advisory Committee on Codes (PTPACC) convened a joint task group to explore the development of a new building code for alterations to existing buildings. This group issued its final report in 2020, recommending that the issue be addressed through a new Part in the NBC, National Plumbing Code (NPC), and NECB; that requirements should be partially or fully harmonized with any such existing practices in leading Canadian jurisdictions; and identifying a number of principles that should guide the development of this new Part.[76]

We asked respondents to indicate whether they have or are currently developing energy efficiency requirements for alterations to existing buildings and/or building retrofits. We award half a bonus point to provinces that were either planning or actively developing an alteration/retrofit code or were able to provide an anticipated date for implementation of such a code. Participation in the federal joint task group does not receive a bonus point.

[76] Joint CCBFC/PTPACC Task Group on Alterations to Existing Buildings, "Final Report - Alterations to Existing Buildings Joint CCBFC/PTPACC Task Group on Alterations to Existing Buildings" (Ottawa, ON: National Research Council Canada, April 2020).

Table 53. Provincial energy efficiency requirements for alterations to existing buildings		
Province	Description	Score (0.5 points)
BC	In British Columbia, the Building and Safety Standards branch (BSSB) of the Ministry of Municipal Affairs and Housing has been working to develop guidelines for an alteration to existing buildings code since 2019. The BSSB convened two consultation sessions with stakeholders and issued a summary report in 2019.[77] The process has now moved into its second phase, consisting of further stakeholder consultation to discuss policy options. The objective is to introduce a code for alterations to existing buildings by 2024.	0.5
NS	The province is currently working with the federal joint task group but has yet to commit to a timeline for adopting the code.	0
ON	The province is currently working with the federal joint task group but has yet to commit to a timeline for adopting the code.	0
QC	The TEQ's Master Plan specified that the province would develop a voluntary standard that applies to existing buildings, and which would be adopted between 2023 and 2028. No updates on this progress were provided in our information request this year.	0
AB	-	0
MB	-	0
NB	-	0
NL	-	0
PE	-	0
SK	-	0

[77] Building and Safety Standards Board, "Alterations to Existing Buildings Project" (Victoria, BC: Government of British Columbia, Fall 2019), https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/reports/wwh_alterations_to_existing_buildings_web_final_may2020.pdf.

The only change since our previous Scorecard is that the process of developing guidelines for alterations to existing buildings has progressed to second stage policy consultations in British Columbia.

Code compliance and enforcement

Building energy codes only save energy if builders comply with them and building officials enforce them. Creating a robust policy framework for code compliance can also help build capacity for more stringent energy codes in the future. The energy efficiency provisions of building codes can be neglected, as compliance with fire and plumbing regulations tend to present more immediate concerns. But low compliance rates mean a jurisdiction will not achieve its energy saving and GHG reduction goals. Building owners would also face significant long-term costs and lower-performing buildings, reducing confidence in builders and policymakers.

Consistent with the methodology used by the ACEEE, this Scorecard awarded a province one point if it had conducted a compliance study within the past five years. If a province conducted a study, we asked for the compliance rate (we recognize that scoring provinces on their compliance rates might not provide an accurate picture of performance, since more stringent building codes are likely to have lower compliance rates.) We award one point if a province could clearly demonstrate that specific resources were dedicated to compliance with energy efficiency standards, either in terms of budgets or full-time equivalent personnel.

We award up to one extra point for evidence of relevant activities, including code training and technical assistance for building officials and/or the design and building community; involvement of utilities in promoting compliance; creation of tools such as energy models to promote compliance; and/or the presence of a stakeholder group or collaborative prioritizing code compliance. We award a quarter point for activities in each of these areas. We summarize these activities and scores in Table 54.

Table 54. Compliance activities scoring results							
Province	Compliance study in last 5 years (1 point)	Dedicated resources (1 point)	Other activities (1 point total, 0.25 points each)				Score (3 points)
			Code training & technical assistance	*Utility involvement*	*Compliance tools*	*Stakeholder group or compliance collaborative*	
BC	●	-	●	●	●	●	3
MB	-	-	-	●	●	-	0.5
NB	-	-	●	●	-	-	0.5
NL	-	-	-	-	●	●	0.5
ON	-	-	-	-	●	●	0.5
QC	-	-	●	-	●	-	0.5
SK	-	-	●	-	●	-	0.5
NS	-	-	-	-	-	●	0.25
PE	-	-	●	-	-	-	0.25
AB	-	-	-	-	-	-	0

Performance, rating and disclosure

There are two broad approaches to improving energy efficiency in buildings. The prescriptive approach establishes rules on how a building must be constructed, while the performance-based approach sets requirements on how it must perform. Within the latter approach, there is a secondary difference. One approach assesses performance on absolute, or "operational," measures (e.g., evaluating thermal energy demand intensity, or TEDI, the annual heat loss from a building's envelope and ventilation after accounting for all passive heat gains and losses). Another approach involves assessing the modelled performance against a "reference" building of the same type, or an "asset" rating.[78]

[78] Steven Nadel and Adam Hinge, "Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals," An ACEEE White Paper (Washington, D.C.: American Council for an Energy Efficiency Economy, June 2020).

Evaluating the energy-use performance of an either new or existing building is a crucial first step toward building performance benchmarking. The practice of benchmarking involves enabling building owners or operators to understand how their energy use stacks up against similar buildings, to identify measures to undertake to improve performance, and to build a business case for undertaking the improvements. But this information is not only useful to the building owner. If disclosed publicly—in real estate listings, for example—it can help to integrate the value of energy efficiency into real estate financing and/or lending and insurance markets, helping alleviate owner concerns of realizing a return on their investments. Comprehensive energy-use performance databases could also spur innovation in information and communications technology, inform energy efficiency policy and program design, and streamline energy efficiency upgrades and retrofits for specific buildings.

The value of energy-use performance rating and disclosure has been widely recognized. In its discussion of existing building retrofits, the Pan-Canadian Framework on Clean Growth and Climate Change set a goal that federal, provincial, and territorial governments would require "labeling of building energy use by as early as 2019."[79] The final report of the Expert Panel on Sustainable Finance also identified energy rating and disclosure policies as an important driver for a private building retrofit market. The Panel recommended a mandatory labeling and public disclosure program for building performance, and disclosure requirements on residential homes at the point of sale, lease, or transfer.[80]

For this Scorecard, we evaluated building performance, rating, and disclosure initiatives in three interrelated categories:

- Building performance standards
- Mandatory rating and disclosure initiatives
- Voluntary rating and disclosure initiatives

---

[79] Environment and Climate Change Canada, "Pan-Canadian Framework on Clean Growth and Climate Change," 17.

[80] Expert Panel on Sustainable Finance and Environment and Climate Change Canada, Final Report of the Expert Panel on Sustainable Finance: Mobilizing Finance for Sustainable Growth. (Ottawa, ON: Government of Canada, 2019), http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2019/19-24/publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf.

We explain these categories in detail below.

Building performance standards

If Canada is to meet its climate change goals, governments will need to require widespread, comprehensive, and deep energy efficiency retrofits in existing buildings. The scale of this challenge is daunting, and will require novel and innovative approaches to policy and program design.[81] Mandatory building performance standards could play an important role in increasing the speed and scope of building retrofitting.

A building performance standard is, in short, a requirement for existing buildings (or buildings of a certain class or sub-type, e.g., rental properties) to meet a specified energy efficiency and/or carbon emissions performance target. This target may be expressed as an established energy rating system level and/or benchmarking system level (e.g., EnerGuide; total energy demand intensity, thermal energy demand intensity, GHG intensity). A building owner would need to pursue a retrofit if their building falls under a performance baseline, while a permit for alterations is the likely trigger in the previous section on "retrofit codes." A recent ACEEE study identified a number of such standards in place worldwide, and outlined a number of key policy and design decisions.[82]

For this Scorecard, we awarded up to one point for the existence of mandatory, whole-building performance standards, depending on the scope of application (i.e., what types of buildings are included) and the stringency of the standard (i.e., the performance improvement it requires). We asked information request respondents to identify any existing performance standards in their province, with a further qualification that the standard must apply to the building itself, and not a business or industry (thereby excluding any GHG emissions reduction targets set in industrial output-based carbon pricing systems). No province currently has any building performance standards in place.

---

[81] Brendan Haley and Ralph Torrie, "Canada's Climate Retrofit Mission: Why the Climate Emergency Demands an Innovation-Oriented Policy for Building Retrofits" (Ottawa, ON: Efficiency Canada, 2021).
[82] Nadel and Hinge, "Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals."

Mandatory rating and disclosure

We awarded up to two points to provinces that have established mandatory, province-wide home or building energy rating and disclosure policies. Provinces may receive partial points for initiatives that are not province-wide, or in which both energy rating and disclosure are not mandatory (for example, if energy ratings are mandatory, but disclosure is not). We do not consider requirements for energy benchmarking or auditing in energy efficiency programming as mandatory, unless all buildings of a certain type must participate in the program.

We summarize scoring results in Table 55, and detail program descriptions are provided in Table 56.

Table 55. Mandatory energy rating and disclosure initiatives

Province	Building types	New/Existing	Participation (1 point)		Scope (1 point)	Score (2 points)
			Rating	*Disclosure*		
ON	Part 3	New/Existing	Mandatory	Mandatory	Province-wide	2
BC	Part 9	New	Mandatory	Voluntary	Province-wide	0.5
MB	Part 3	Existing	Voluntary	Mandatory	City of Winnipeg	0.25
NB	Part 3	Existing	Mandatory	-	Government buildings	0.25
QC	Part 3	New/Existing	-	Mandatory	Government buildings	0.25

Table 56. Mandatory rating / disclosure initiatives - Descriptions	
Province	Description
BC	In jurisdictions referencing the BC Energy Step Code in building bylaws, new buildings must undergo energy modelling and airtightness testing. For Part 9 buildings, this typically results in an EnerGuide label. In his November 2020 mandate letter, the Premier directed the Minister of Finance to work with the Ministry of Energy, Mines, and Low Carbon Innovation to require inclusion of energy ratings in home real estate listings.
MB	The City of Winnipeg has established a voluntary Building Energy Disclosure Project (BEDP), which aims to help commercial and institutional building owners better understand the energy performance of their buildings and support overall greenhouse gas reductions. By committing to participate, building owners agree to disclose key energy performance metrics to the public. More details are available at https://winnipeg.ca/sustainability/building-energy-disclosure.stm
NB	New Brunswick's 2016 Climate Action Plan set an objective to require energy performance identification for all publicly funded new construction and major building renovations. Only aggregate GHG emissions are disclosed publicly, though departments can voluntarily disclose more if they choose.
ON	Ontario requires annual reporting on water and energy use for commercial, light industrial, and multi-residential buildings with more than 10 units and buildings that are 100,000 square feet or larger, with some exemptions. Public sector organizations are also required to report and make public their annual energy use and GHG emissions, and develop five-year conservation and demand side management plans. The province discloses data via its Open Data website: https://data.ontario.ca/
QC	Government buildings must disclose energy use data to be included in an annual, government-wide energy report. Aggregated data is available here: https://transitionenergetique.gouv.qc.ca/affaires/secteurs/secteur-institutionnel/portrait-de-levolution

Voluntary rating and disclosure

We awarded up to one point to provinces with fully voluntary, province-wide rating and disclosure initiatives. We awarded partial points based on the scope of the initiative.

We summarize scoring results in Table 57 and provide program descriptions in Table 58.

Table 57. Voluntary energy rating and disclosure initiatives

Province	Building types	New/Existing	Scope	Score
NS	Part 9 / Part 3	Existing	Province-wide	1
QC	Part 3	Existing	Province-wide	1
BC	Part 9 / Part 3	Existing	12 municipalities	0.5
AB	Part 3	Existing	City of Edmonton; City of Calgary	0.25
BC	Part 3	Existing	City of Vancouver	0.25

Table 58. Voluntary rating / disclosure initiatives - Descriptions

Province	Description
AB	Both Calgary and Edmonton have building energy benchmarking programs for large commercial and residential buildings, using Energy Star Portfolio Manager. Edmonton's program launched in 2017, while Calgary's began in 2020. Neither program has mandatory disclosure requirements, though Edmonton requires property owners disclose to receive access to rebates for building energy audits. Program details for Edmonton, as well as an annual report with aggregated results, are available here: https://www.edmonton.ca/programs_services/environmental/building-energy-benchmarking-program. More information on Calgary's initiative can be found here: https://www.calgary.ca/uep/esm/energy-savings/building-energy-benchmarking-program.html
BC	As part of its Energy Retrofit Strategy for Existing Buildings, the City of Vancouver administers a building benchmarking program for municipal buildings (mandatory), with voluntary participation from large public sector, institutional, commercial, and residential buildings.

BC	In 2020, building performance software developer OPEN Technologies launched Building Benchmark BC, a voluntary benchmarking and disclosure program for both residential and commercial/industrial buildings. Natural Resources Canada and the Province of British Columbia both provided partial funding support. Details are available at buildingbenchmarkbc.ca
NS	In April 2020, in collaboration with Efficiency Nova Scotia and the Canada Green Building Council, the Province of Nova Scotia launched a voluntary energy benchmarking program for large buildings. Residents can opt-in to having their EnerGuide labels and Homeowner Information Sheets uploaded to the ViewPoint real estate listing website.
QC	The Building Energy Challenge (Défi-Énergie en immobilier) is a program for commercial and institutional buildings to voluntarily disclose energy-use data to competitors. The program is coordinated by BOMA Québec and supported by the City of Montreal, Ministère de l'Énergie et des ressources naturelles, Énergir and Hydro-Québec.

Energy advisors

We track numbers of energy advisors per province, as energy advisors can play important roles in delivering residential energy efficiency programs and homeowner education and awareness, and in facilitating deeper building retrofitting. For this Scorecard, we moved this metric from the Enabling Policy chapter into this section.

In prior scorecards, we distinguished between energy advisors for existing houses and energy advisors for new construction, in reflection of the now-outdated EnerGuide 0-100 rating system. Given that provinces should have by now made the transition to the updated EnerGuide v15 system, we no longer distinguish between existing / new buildings, and count only certifications under the new system.[83] To normalize across the provinces, we divided total certifications by the number of single-detached and single-attached households.[84]

This approach excludes apartments and mobile homes and other moveable dwellings. Energy advisors have been less active in these segments, and there is a need to train and certify advisors for multi-unit residential buildings. We excluded apartments, because an energy advisor could serve many apartment units, and thus an advisor-per-building metric would not present a useful benchmark for provinces with many multi-unit residential dwellings. We score provinces on energy advisors per 10,000 houses using the values in Table 59.

[83] Natural Resources Canada, "Number of Active Energy Advisors by Province - by Program" (Natural Resources Canada, June 1, 2021).

[84] Building counts are available in Natural Resource Canada's comprehensive energy use database. The most recent data year available is (and was in our 2020 Scorecard) 2018. Natural Resources Canada, "Residential Sector, Total Households by Building Type and Energy Source," in *National Energy Use Database* (Ottawa, ON: Government of Canada, 2018), http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/databases.cfm.

Table 59. Energy advisor scoring methodology

Energy advisors per 10,000 houses (single detached and attached) (>=)	Score
4	2
3.5	1.75
3	1.5
2.5	1.25
2	1
1.5	0.75
1	0.5
0.5	0.25

Table 60. Energy advisor certifications results

Province	Energy advisor certifications, ERS v15 (July 2021)	Houses, single detached and attached (thousands)	Energy advisor certifications per 10,000 houses (single detached and attached)	Score (2 points)
PE	13	47.6	2.7	1.25
NS	80	305.5	2.6	1.25
NB	43	252.2	1.7	0.75
QC	290	2030.6	1.4	0.5
BC	152	1210.6	1.3	0.5
ON	375	3952.1	0.9	0.25
AB	56	1221.3	0.5	0.25
SK	12	353.5	0.3	0
NL	6	185.3	0.3	0
MB	6	366.8	0.2	0

Transportation

Transportation accounts for 29.3% of total energy consumption in Canada and stands to deliver 26% of the country's potential energy savings by 2050.[85] Achieving these savings would avert the release of 1.5 gigatons of GHG emissions through 2050, or one-third of the total potential emissions reductions.[86]

Light-duty passenger vehicles account for almost half of Canada's transport energy demand. While several current and possible future policies and initiatives could improve passenger vehicle energy efficiency, electrification of personal transport will play a particularly important role. According to the U.S. Department of Energy, electric vehicles convert 59% to 60% of electrical energy received from the grid to power at the wheels, while conventional vehicles convert only 17% to 21% of the energy in gasoline to power.[87]

Scores for the transportation category reflect provincial policies and performance in energy efficiency—primarily in personal transportation—thereby targeting the integration of private transportation with buildings and electricity grids, though we also consider active transportation strategies and funding. New this year is a review of public transportation initiatives, including provincial funding, ridership levels, and fleet electrification. We have also expanded our review of vehicle incentives to include consideration of incentives for used and non-automotive vehicles, and for commercial fleet electrification.

---

[85] Natural Resources Canada, "Canada's Secondary Energy Use (Final Demand) by Sector, End Use and Subsector."

[86] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."

[87] Office of Energy Efficiency & Renewable Energy, "All-Electric Vehicles," U.S Department of Energy, 2019, http://www.fueleconomy.gov/feg/evtech.shtml.

We collected information on the following policy areas or metrics:

- **Zero-emission vehicles** (eight and a half points total)
    - Zero-emissions vehicle mandate (two points)
    - Electric vehicle incentives (two and a half points)
    - BEV/PHEV registrations per total vehicle registrations (four points)

- **Transport electrification infrastructure** (seven points total)
    - Policies to support public charging stations (two points)
    - Availability of public charging (including fast DC charging) stations (four points)
    - Support for battery electric (BEV) and plug-in hybrid electric vehicles (PHEV) in building codes and/or municipal bylaws (one point)

- **Active transportation** (two points total)
    - Active transportation plans or strategies (one point)
    - Dedicated funding for active transportation (one point)

- **Public transportation** (three points total)
    - Provincial funding (one point)
    - Ridership (one point)
    - Electrification (one point)

This Scorecard does not include measures related to commercial and freight transportation, nor urban form considerations that would make cities more amenable to energy-efficient personal mobility. The QUEST Smart Energy Communities Benchmark includes more information on personal transportation and urban design issues.[88]

We present summary scoring results for these topics in Table 61.

[88] "Smart Energy Communities Benchmark."

Table 61. Transportation scoring summary					
Province	Zero emission vehicles (8.5 points)	Transportation electrification (7 points)	Active transportation (2 points)	Public transportation (3 points)	Total (20.5 points)
QC	7.5	6.5	2	1.5	17.5
BC	8	4	2	1	15
PE	1.5	3.25	2	0.25	7
ON	1.5	3	1	1	6.5
NB	1.5	2.25	1	0.25	5
NS	1.25	1.25	2	0.25	4.75
AB	1	1	0.5	1	3.5
NL	1	0.75	0.5	0.25	2.5
MB	0.5	0.5	0	0.75	1.75
SK	0	0.5	0	0.25	0.75

Zero-emissions vehicles

Zero-emission vehicle mandates

Governments can promote energy efficiency in personal vehicle transportation by adopting mandates requiring that zero-emission vehicles comprise a minimum share of all new vehicles sold in a given jurisdiction.

In June of 2021, the federal government announced a zero-emission vehicle sales mandate for all new light-duty cars and passenger trucks. This announcement strengthened a former federal ZEV sales target by making sales goals mandatory and moving up the 100% zero-emission sales deadline from 2040 to 2035.[89] The federal government states that it will use a combination of investments and legislation to assist Canadians and industry in transitioning to 100 percent zero-emission vehicle sales by 2035. It will also collaborate with partners to set

[89] Luke Sarabia, "Canada Mandates 100 per Cent of New Cars, Passenger Trucks Be Zero-Emission by 2035," Electric Autonomy Canada (blog), June 30, 2021, https://electricautonomy.ca/2021/06/29/federal-zev-mandate-2035/.

interim targets for 2025 and 2030, as well as any other obligatory measures that may be required in addition to Canada's light-duty vehicle greenhouse gas emissions standards.[90]

If the federal government introduces a national ZEV mandate, we anticipate future scorecards will track provinces that introduce regulations that exceed federal regulations. However, it remains unclear exactly how the federal government expects to meet its 2035 goal. Provincial governments took the lead by introducing their own ZEV mandates, and to date only provincial rules are currently in force. For this Scorecard, we thus award two points to a province with a legislated ZEV mandate. In Canada, British Columbia and Québec have ZEV mandates in place, the details of which are described in Table 62, below.

We awarded the full two points to the two provinces with mandates in place that meet and/or exceed the present federal government targets mentioned above.

Table 62. Provincial ZEV mandates

Province	Description	Score (2 points)
QC	Québec introduced its Zero-Emission Vehicle Standard in October 2016 and it entered into force in January 2018. The standard established a credit/debit system that requires manufacturers to earn ZEV credits equivalent to 3.5% of light-duty vehicle sales and leases by 2018 and 22% by 2025. In November 2020, the province announced that it would ban the sale of new gasoline-powered vehicles after 2035.[91] The ZEV Standard will soon be tightened to allow Québec to reach its targets.	2

[90] Government of Canada, "Building a Green Economy: Government of Canada to Require 100% of Car and Passenger Truck Sales Be Zero-Emission by 2035 in Canada," June 29, 2021, https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html.
[91] Allison Lampert, "Quebec to Ban Sale of New Gasoline-Powered Cars from 2035," Reuters, November 16, 2020, sec. Environment, https://www.reuters.com/article/us-autos-canada-emissions-idUSKBN27W289.

BC	British Columbia announced its intention to pass a ZEV mandate by 2020 in its Fall 2018 CleanBC climate strategy. The Zero-Emission Vehicles Act, passed in May 2019, implemented a credit/debit system for auto manufacturers, requiring them to meet an escalating annual percentage of new light-duty ZEV sales and leases. In July 2020 the province introduced regulations for the Act, which included phased targets to be met each year, as well as compliance requirements. In October 2021, the province released its CleanBC Roadmap to 2030 plan, which raises targets to 26% by 2026, 90%% by 2030, and 100% by 2035.	2

Electric vehicle incentives

Consumer incentives are another form of transportation electrification policy support. The up-front purchase cost of battery electric or plug-in electric hybrid vehicles (BEV/PHEVs) vehicles can be a barrier to consumer uptake, despite generally having much lower operating costs than conventional vehicles.[92] Governments can reduce these barriers by offering financial incentives to consumers, such as tax credits, rebates, and sales tax exemptions. As of May 1, 2019, the federal government offers purchase incentives of $5,000 for BEVs and long-range PHEVs, and $2,500 for shorter range PHEVs.[93]

In previous scorecards, we tracked and awarded points based on the presence of consumer incentives and incentives for commercial fleet incentives. We continue this practice this year, with some modifications.

For consumer incentives, we now include consideration of incentives for used vehicles, and non-automotive or specialty vehicles (e.g., e-bikes). Incentives for used vehicles are important from both an equity and efficacy perspective. Furthermore, our research indicates that more provinces have introduced consumer incentives. Therefore, we score this metric with

---

[92] Natural Resources Canada, “2019 Fuel Consumption Guide” (Ottawa, ON: Government of Canada, 2019).

[93] Transport Canada, “Incentives for Purchasing Zero-Emission Vehicles,” Government of Canada, 2021, https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles/incentives-purchasing-zero-emission-vehicles.

consideration of the scale of the incentives. We award up to a half-point for new vehicle incentives (a full half point for incentives matching or exceeding the federal incentives; partial points for incentives below the federal amount); a half point for incentives that include used vehicles (no consideration of the incentive amount); and a half point for incentives for non-automotive / specialty vehicles.

We provide results in Table 63 below.

Table 63. Consumer incentives

Province	New vehicles (0.5 pts)	Used vehicles (0.5 pt)	Non-automotive / Speciality-use (0.5 pts)	Score (1.5 pts)
BC	Up to $6,000 (SCRAP-IT); $1,500 - $3,000 (CleanBC);	Up to $3,000 (SCRAP-IT)	Yes (CleanBC Specialty Use Vehicle Incentive)	1.5
QC	Up to $8,000	Up to $4,000	Yes (up to $2,000 for electric motorcycles; $500 for electric scooters)	1.5
NB	$2,500 - $5,000 (Plug-in NB)	$1,000 - $2,500 (Plug-in NB)	-	1
PE	Up to $5,000	Up to $5,000	-	1
NS	$2,000 - $3,000 (EVAssist)	$1,000 - $2,000 (EVAssist)	Yes ($500 for e-bikes)	0.75
NL	$2,500	$2,500	-	0.5
ON	-	Up to $2,000 (Plug N Drive)	-	0.5
AB	-	-	-	0
MB	-	-	-	0
SK	-	-	-	0

There have been several developments in provinces offering vehicle incentives since our previous scorecard, including recently announced incentives in Nova Scotia, Prince Edward Island, New Brunswick, and Newfoundland and Labrador. In February 2021, Nova Scotia announced new direct-to-consumer incentives of $3,000 for new EVs, $2,000 for used EVs and new PHEVs, and $1,000 for used PHEVs.[94] In April 2021, Prince Edward Island began offering $5,000 to residents who purchase a new or used EV. The Government of New Brunswick announced new direct-to-consumer incentives in July 2021, wherein purchasers of used battery electric vehicles may get up to $2,500, while purchasers of used plug-in hybrid electric vehicles may receive up to $1,000.

Newfoundland and Labrador's 2021 budget committed $500,000 for an electric vehicle adoption accelerator program, which will encourage the purchase of electric vehicles through a $2,500 rebate to their residents.[95] This rebate program launched in September 2021, just outside our window for consideration, but is retroactive for vehicles purchased after May 31, 2021 and so we award it points. In their new 2021-2025 conservation and demand management plan, both utilities in Newfoundland and Labrador have also proposed vehicle incentives for both residential and commercial vehicles. None are yet in place, however.

On commercial fleet incentives, we are modifying our approach to consider commercial and/or non-light duty vehicle incentives and the broader fleet efficiency initiatives of which incentives may be a part. Accordingly, this metric now includes consideration of programs for medium or heavy-duty vehicles, in either commercial or municipal fleets. To score this metric, we award up to one point based on the eligibility scope of the program—the types of organizations and types of eligible vehicles.

[94] Nova Scotia Department of Energy and Mines, "Low Carbon Communities and Connect 2," Nova Scotia, accessed June 5, 2020, https://novascotia.ca/low-carbon-communities/.

[95] Luke Sarabia, "Newfoundland and Labrador Joins the Ranks of EV Rebate Provinces and Territories," Electric Autonomy Canada, June 8, 2021, https://electricautonomy.ca/2021/06/08/newfoundland-and-labrador-ev-rebate/.

Table 64. Commercial fleet & non-light duty vehicle incentives		
Province	Description	Score (1 pt)
BC	The province launched its CleanBC Go Electric Fleets Program in early 2021; it is intended to support public and private owners of light-duty fleets transition to ZEVs. The program takes a multi-pronged approach to address various barriers to ZEV adoption in fleets via financial and technical support. The province offers rebates to B.C.-registered companies, Indigenous and local governments, and public sector organizations with light-duty fleet vehicles. B.C. Ministries and Crown Corporations are ineligible. Indigenous communities and businesses are eligible for increased rebates for some of the program offers. In the medium/heavy-duty vehicle space, British Columbia also offers commercial fleet managers a Specialty Use Vehicle Incentive, which offers rebates on the purchase of eligible ZEVs that do not fit into the light-duty vehicle/passenger vehicle rebate program. Finally, the province also has the Go Electric Commercial Vehicle Pilot Program, which offers up to one-third funding for the costs of piloting medium/heavy-duty and off-road ZEVs and infrastructure in commercial fleets in B.C. (including marine ports, airports, trucking, tourism, forestry, etc.)	1
QC	Québec's Transportez Vert program provides $10,000 for commercial electric vans and trucks, and up to $100,000 for electric buses. The province will integrate the program into the Ministry of Transport's Ecocamionnage program, which also provides vehicle incentives and support for other aspects of commercial freight emissions reduction, including incentives for used vehicles.	1
AB	The Municipal Climate Change Action Centre offers local governments funding to purchase or lease electric fleet vehicles. Passenger vehicles can be funded up to $14,000 and can be combined with the federal incentive. Funding for medium to heavy-duty vehicles, such as electric garbage trucks, will cover 30% of costs, up to $300,000. Non-road vehicles can receive 30% of costs up to $50,000. The program is for municipalities only, not commercial fleets.	0.5
NS	Fleet operators are also eligible to receive incentives through Nova Scotia's EVAssist program. Eligibility requirements follow the federal iZEV program—businesses are limited to 10 vehicles per year, and light, medium and heavy-duty vehicles are eligible, provided they are fully electric, or fully powered by hydrogen. The program is not available to local governments.	0.5

NB	As of July 2021, New Brunswick's EV rebate program applies to commercial LDV fleets that meet the same EV criteria as the iZEV program. Commercial entities can access 10 vehicle incentives per calendar year.	0.5
NL	The TakeCharge consumer EV incentives that launched September 1, 2021 (retroactive to May 1, 2021) are also available to businesses, non-profit organizations, and municipalities. The utilities' proposed 2021-2025 Electrification, Conservation and Demand Management plan includes incentives for commercial and municipal electric vehicles and charging stations.	0.5
MB	-	0
ON	-	0
PE	-	0
SK	-	0

Electric vehicle registrations

Battery electric and plug-in electric hybrid vehicles registrations provide a quantitative indicator of personal transportation electrification. As in previous years, this Scorecard scores on BEV/PHEV registrations as a share of all new motor vehicle registrations, using only the most recent year.[96] This provides a dynamic annual accounting and is consistent with federal and provincial sales mandates.

The federal ZEV target is 10% of all vehicle sales to be ZEVs by 2025. We use this value to set the top threshold for this metric (e.g., >=10% ZEV / All passenger vehicles merits 4 points). Lower thresholds are set by halving the threshold above (e.g., >=5% gets 3 points; >=2.5% gets 2; and >=1.25% gets 1).

[96] Statistics Canada, "Vehicle Registrations, by Type of Vehicle," Government of Canada, 2021, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2010002101&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=3.1.

Table 65. BEV/PHEV registrations scoring methodology

Percent of all passenger vehicle registrations that are BEV/PHEVs (>=)	Points
10%	4
7.5%	3.5
5.0%	3
3.8%	2.5
2.5%	2
1.9%	1.5
1.3%	1
0.6%	0.5

Table 66. BEV/PHEV registrations scoring results

Provinces	Percent of all passenger vehicle registrations that are BEV/PHEVs			Scoring (4 points)
	2019	2020	*% points change*	
BC~	7.8	8.4	*0.6*	3.5
QC	5.9	6.8	*0.9*	3
ON	1.2	1.8	*0.6*	1
AB*	0.2	0.6	*0.4*	0.5
PE	0.6	0.8	*0.2*	0.5
MB	0.6	0.7	*0.1*	0.5
NS*	0.2	0.3	*0.1*	0
NB	0.4	0.5	*0.1*	0
SK	0.4	0.4	*0*	0
NL*	0.4	0.1	*-0.3*	0

** Due to data sharing limitations, BEV/PHEV registrations for Newfoundland and Labrador, Nova Scotia, and Alberta are from 2018 Q4 – 2019 Q3, and obtained from Electric Mobility Canada. We calculated the percentage of BEV/PHEVs using 2018 Q4 – 2019 Q3 sale numbers from the same Statistics Canada table as the other provinces.*

~ Includes territories

Transport electrification infrastructure

Support for vehicle charging

Canadian governments and other actors can help reduce barriers to vehicle electrification by setting targets and/or providing support to increase the availability of public charging infrastructure for BEV/PHEVs. Range anxiety is a well-documented barrier for potential buyers, second only to cost concerns.[97] Therefore, policies and programs to support the installation of private and public charging infrastructure can reduce barriers to BEV/PHEV uptake. Level 2 or Level 3 (Fast DC) chargers are particularly important on highways to promote convenience and make BEV/PHEVs competitive with energy-dense petroleum fuels.[98]

The federal government established the Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative in its 2016 budget, with $96.4 million directed to support a coast-to-coast charging network for electric vehicles, natural gas stations along key freight corridors, and stations for hydrogen fuel cell vehicles in metropolitan centres. Budget 2019 included an extra $130 million over five years (April 2019 to March 2024) to help Canada meet its zero-emission vehicle (ZEV) target, and Budget 2021 committed $56.1 million over five years to develop codes and standards for retail charging and fueling stations. As of March 2020, the program had approved funding for 837 EV fast chargers.[99]

In this Scorecard, we awarded a half point to provinces that support private charging stations in homes or workplaces, a half point for efforts by governments or utilities to increase availability of public charging stations, and one point if initiatives include or prioritize Level 3 charging stations. We award partial points for policies or programs that were cancelled during the period under review, or to provinces that do not have their own standing programs, yet still partnered

---

[97] Ona Egbue and Suzanna Long, "Barriers to Widespread Adoption of Electric Vehicles: An Analysis of Consumer Attitudes and Perceptions," *Energy Policy*, Special Section: Frontiers of Sustainability, 48 (September 1, 2012): 717–29, https://doi.org/10.1016/j.enpol.2012.06.009.

[98] Level 2 chargers have an output of 240 volts (AC) and can take up to five hours to charge enough for 200 km of range. Level 3 chargers deliver 400 volts (DC) and take ~30mins to reach 80% of 200km range.

[99] Government of Canada, "Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative," March 2021, https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/electric-and-alternative-fuel-infrastructure/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352.

with the federal government. We did not award points for initiatives that sought only to remove regulatory barriers to private investment, with the expectation that the outcome-based metric on public charging availability should capture the impacts of all policy approaches.

Table 67. Support for public/private electric vehicle charging infrastructure

Province	Support for private charging (0.5 points)	Support for public charging (0.5 points)	Prioritize level 3 charging (1point)	Score (2 points)
BC	●	●	●	2
QC	●	●	●	2
ON	-	●	●	1.5
NB	●	●	○	1.5
PE	○	○	○	1
NS	-	○	○	0.75
AB	-	●	-	0.5
MB	●	-	-	0.5
NL	○	○	-	0.5
SK	-	-	-	0

In Ontario, the Ivy Charging Network, a partnership between Hydro One and the Ontario Power Generation, is currently constructing Ontario's largest EV fast charger network with 160 chargers at 70+ locations. In Alberta, with support from the provincial government, the Peaks-to-Prairies initiative set out to establish a network of 20 Level 2 charging stations; it was completed in 2020. The MCCAC is also planning to launch a program to support public charging in 2021. In Newfoundland and Labrador, the utilities' 2021-2025 conservation plan includes an electrification component, which proposes residential and commercial vehicle and charging port incentive programs (Level 2 chargers). As of writing, this plan had not yet been approved and the programs had not been launched.

NB Power operates the e-Charge network, which was launched in 2017 and provides public, networked Level 2 and DC fast charging stations across the province. The program allows businesses to join the network, though there are no financial incentives provided for installing the chargers. NB Power also reported that they are working with customers in the long haul

trucking industry to pilot a 175kW charging station at their distribution depot. The usage data from this charging station will be shared with NB Power to inform and understand the impact of logistics adoption of EVs on the NB Power's distribution system. As of July 1, 2021, the province also provides 50% of the installation cost of L2 network-capable home charges, up to a maximum of $750.

NS Power installed a cross-province network of 12 DC fast charging stations on 100-series highways. There are no current incentives or programs to incentivize either public or private charging, though NS Power is piloting an initiative called Smart Grid Nova Scotia, which encourages customers to install a home EV charger and to give the utility the ability to control charging cycles. The goal is to shift EV charging demand to off-peak times.[100] Similarly, in Prince Edward Island, the province applied for federal funding to support the installation of six DC fast charging stations, but no other form of private or public charging currently exists. The province did report it had applied for more federal funding to support an EV charging incentive program for businesses, institutions, and multi-unit residential buildings.

Hydro-Québec launched the Electric Circuit in March 2012. Under the program, the utility coordinates an international call for tenders and testing to provide EV charging infrastructure and related services to partners such as municipalities, institutions, and businesses. Partners can choose standard or fast-charging stations. EV drivers can become members to charge from all stations in the network. The Québec government offers financial assistance, up to a maximum of $600 for home charging, and 50% rebates up to $5,000 are available for workplace or multi-unit residential charging. The Transportez Vert program also offers financial assistance for the installation of DC fast charging to promote the electrification of fleets.

Manitoba Hydro has a home energy efficiency loan for the installation of residential-use Level 2 chargers, with $3,000 as the maximum loan amount.

[100] "Electric Vehicle Smart Charging Pilot," NS Power, 2021, https://www.nspower.ca/cleanandgreen/innovation/smart-grid-nova-scotia/chargepoint-home-flex-ev-charging-system.

Public charging availability

In addition to the policy metric above, we scored provinces on the availability of public charging infrastructure by comparing the total number of EV charging stations with the extent of the provincial road network.[101] Measuring charging station availability against public road infrastructure is a useful metric, as it allows us to assess the extent of the charging network that exists to counter range anxiety. We chose to score on numbers of stations, rather than individual ports, to provide a fairer comparison across rural and urban jurisdictions, recognizing that densely populated regions could in theory provide sufficient charging availability with fewer stations and more ports, while sparsely populated regions would require more stations but fewer ports.

To establish benchmarking thresholds, we considered the average range of EVs available in Canada and looked for international best practices and studies of the necessary charging availability to counter range anxiety. According to a study by the Canadian Energy Regulator, the average electric vehicle range in Canada nearly doubled between 2013 and 2019, from 219kms to 386kms.[102] An analysis of U.S. charging corridors found that stations spaced about 70 miles apart (112 kilometres) was sufficient to give drivers the confidence needed for long-range trips.[103] In its state energy efficiency policy scorecard, the ACEEE uses a per capita measure to score on EV charging availability, awarding top points to states with more than 30 charging stations per 100,000 people.

Given the above, one could assume that one station per 100 kms would be sufficient, yet this doesn't account for population density, number of charging ports per station, factors that could reduce EV range, or the peculiarities of provincial road networks. Looking at gasoline stations

---

[101] Data on publicly owned roads includes highways, arterials, and collector road infrastructure, with local road infrastructure removed, as these generally represent small sized, rural roads. Infrastructure Canada, "Inventory of Publicly Owned Road Assets," Government of Canada, 2021, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410017601.

[102] Canada Energy Regulator, "NEB – Market Snapshot: Average Electric Vehicle Range Almost Doubled in the Last Six Years," Government of Canada, June 25, 2019, https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2019/market-snapshot-average-electric-vehicle-range-almost-doubled-in-last-six-years.html.

[103] Eric Wood et al., "National Plug-in Electric Vehicle Infrastructure Analysis." (US Department of Energy, September 2017), https://www.nrel.gov/docs/fy17osti/69031.pdf.

per public road kilometres is instructive. Using the same Statistics Canada data for public road networks, and statistics on gasoline stations in each province from Innovation, Science and Economic Development Canada,[104] it is evident that the numbers of gas stations per 100 kilometers varies from province to province, and averages roughly four stations.

Table 68. Gasoline stations per 100 kms of public-owned roads

Province	Gasoline stations	KMs of public-owned roads	Gas stations / 100 kms of roads
AB	1,758	86,501	2.0
BC	1,574	61,437	2.6
MB	489	29,946	1.6
NB	370	9,797	3.8
NL	327	6,444	5.1
NS	429	9,946	4.3
ON	3,549	83,757	4.2
PE	86	1,116	7.7
QC	3,069	47,886	6.4
SK	656	76,217	0.9
Canada	12,307	413,047	3.9

Despite increases in EV range, it is a reasonable assumption that most gasoline vehicles exceed the average range of EVs in Canada. Accordingly, we chose to set our top threshold for scoring this component at ~1.5x the average number of gasoline stations per 100 kms of road in Canada—or six EV charging stations per 100 kms of road network. Based on this maximum threshold, we score provinces using the methodology outlined in Table 66 below, or a quarter point per every 0.5 stations per 100 kms.

[104] Innovation, Science and Economic Development Canada, "Gasoline Stations - 4471 - Businesses - Canadian Industry Statistics," Government of Canada, 2021, https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/4471.

Table 69. EV charging stations scoring methodology	
Stations per 100 kilometres of public roads	Score
6	3
5	2.5
4	2
3	1.5
2	1
1	0.5

We obtained data on electric vehicle charging stations from the Natural Resources Canada (NRCan) Electric Charging and Alternative Fuelling Stations Locator. The online database reveals all publicly accessible and currently available public charging stations across Canada.[105] Listings include both networked charging stations (those part of one of ten different charging networks),[106] data for which is uploaded automatically through an API), and non-networked stations (data for which must be submitted manually to the database). Each station may have one or more Level 1, Level 2, or Fast DC charging ports, or some combination thereof.

An independent third-party verifies the NRCan database, but the resource might not include all charging stations in each province. Other charging station database services may have different numbers, though in some instances this may be due to their inclusion of unverified, self-

[105] Natural Resources Canada, "Electric Charging and Alternative Fueling Stations Locator," Government of Canada, 2021, https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-and-alternative-fuels/electric-charging-alternative-fuelling-stationslocator-map/20487#/analyze?country=CA&fuel=ELEC&ev_levels=dc_fast&status=E.

[106] These networks include the ChargePoint Network; Le Circuit Électrique; EV Connect; FLO; GE WattStation; Greenlots; SemaCharge Network; Tesla Superchargers; and some SunCountry Highway stations.

reported, non-networked stations. We are nevertheless confident that the NRCan database provides a fair basis for comparison across the provinces.

We show scoring results in Table 70 below.

Table 70. Electric vehicle charging stations per 100 kilometres of public-owned roads

Province	Charging stations		KMs of public-owned roads	Stations / 100 kms	Score (3 points)
	July 2021	*Year-over-year change*			
QC	2,808	*480*	47,886	5.9	2.75
PE	44	*10*	1,116	3.9	1.75
ON	1,593	*300*	83,757	1.9	0.75
BC	1,093	*191*	61,437	1.8	0.75
NB	127	*1*	9,797	1.3	0.5
NS	96	*11*	9,946	1.0	0.5
NL	39	*15*	6,444	0.6	0.25
AB	225	*15*	86,501	0.3	0
MB	52	*9*	29,946	0.2	0
SK	60	*16*	76,217	0.1	0

The results reveal that only Québec approaches our top threshold of six stations per 100 kms of public roads, and has added nearly 500 new stations since our previous Scorecard. Yet, the results also show that the availability of EV charging stations does not yet meet or exceed the availability of gas stations in any province.

In addition to charging stations, we also score provinces on the availability of DC fast-charging. The presence of DC fast chargers is also important, particularly on roadside charging stations, because they can restore an 80% charge on a typical vehicle in about thirty minutes.[107] For this Scorecard, we award a quarter point for every 0.25 fast chargers per 100 kilometers of public road, up to a total of one point.

[107] Jeff Turner, "EV Fast-Charger Expansion: Making the Economics Work for Utilities.," May 21, 2020, https://electricautonomy.ca/2020/05/21/ev-charging-economics-for-utilities/.

Table 71. Fast DC charging availability				
Province	Stations with DC fast charging		Stations / 100 kms	Score (1 point)
	July 2021	*Year-over-year change*		
QC	403	*119*	0.84	0.75
PE	6	*-1*	0.54	0.5
NB	40	*-3*	0.41	0.25
ON	305	*30*	0.36	0.25
BC	172	*27*	0.28	0.25
NL	14	*14*	0.22	0
NS	21	*-4*	0.21	0
AB	49	*5*	0.06	0
MB	13	*0*	0.04	0
SK	21	*11*	0.03	0

The number of charging stations with fast DC charging capability expanded in most provinces in the past year and a half. One notable development was the construction of 14 new stations (up from zero last year) in Newfoundland and Labrador, forming a fast-charging network across Newfoundland (from St. John's to Port aux Basques).[108]

Support for BEV/PHEVs in building codes and municipal bylaws

Governments can further remove barriers to BEV/PHEV adoption with building code regulations that require supporting infrastructure in new-home construction. They can also empower local governments to create their own EV charging requirement rules (e.g., energized electrical outlets capable of Level 2 charging or higher) in new developments or renovations through zoning bylaws. Such provisions can help reduce barriers to potential BEV/PHEV buyers because the infrastructure to support home charging will already be in place. It is also an example of how transportation is becoming more closely integrated with buildings, which is of particular interest to energy efficiency policy.

[108] "Electric Vehicles," Newfoundland & Labrador Hydro, September 2021, https://nlhydro.com/electricvehicles/.

However, it may be more practical to include EV charging infrastructure in municipal zoning bylaws, rather than provincial building codes. This is because zoning bylaws offer more flexibility as they relate to land use, not just buildings. As a result, these bylaws can encompass parking lots that would not be captured by building codes, as well as different types of use at these parking lots (short term at a restaurant, longer at an office building, etc.)[109] Local governments in every province technically have the ability to include EV charging infrastructure requirements in their bylaws, unless the province explicitly forbids it (though, to the best of our knowledge, this is not the case in any province). However, when provinces officially clarify this via legislation or official statements, they provide municipalities with the certainty and support they need to make changes.[110]

Consequently, this year we asked respondents about the existence of explicit provisions for municipalities to make their own decisions. We awarded one point to provinces that indicated support for BEV/PHEV infrastructure in their building codes or that have explicitly allowed municipalities to include requirements in their bylaws. We awarded partial points if a province reported that municipalities can write such bylaws, even if none have yet elected to do so.

[109] Charles Benoit, "EV Group Says Zoning Law, Not Building Code Is Best for EV Infrastructure.," Electrek, February 14, 2020, https://electrek.co/2020/02/14/ev-group-says-zoning-law-not-building-code-is-best-for-ev-infrastructure/.

[110] Brendan McEwen, "'EV Readiness' Requirements Framework," April 11, 2019, https://cleanairpartnership.org/cac/wp-content/uploads/2019/10/NRCan-EV-Readiness-Requirements-Framework-Final-Report-4-11-2019-McEwen-Climate-and-Energy.pdf.

Table 72. EV charging requirements in building codes or municipal by-laws		
Province	Description	Score (1 pt)
BC	British Columbia is the only province that has explicitly defined EV chargers as "out of scope" for its Provincial Building Code Act. Out of scope is defined as "matters…local government can regulate…if they have authority to do so in other statutes." This is important, and a valuable decision for other provinces to follow, as it gives municipalities the clear permission to implement EV charging in their bylaws. The City of Vancouver has its own building code but has also chosen to adopt EV charging requirements in its parking bylaws. The bylaw requires residential and commercial parking spaces to be equipped with a set number of EV ready parking spaces, in addition to requirements for new dwellings with garages, that must be equipped with EV charging capability. The bylaw offers developers two tiers to base their installation around, with varying levels of power required, under the assumption that drivers will charge their vehicles around the city. BC Hydro provided coaching for the implementation of EV-ready bylaws and supported the development of an updated best practice guide on EV-ready requirements for both residential and non-residential new buildings. It is also piloting the concept of E-Mobility Managers. These full-time staff will be responsible for advancing transportation electrification within local governments using available levers such as community plans, land use plans, policy and bylaws, zoning, permitting, and building code compliance	1
QC	Québec changed its electricity code in 2018 to include an obligation to install basic wiring for EV charging in single dwellings with garages, carports, or parking areas. Municipalities have the power to include EV/PHEVs in their bylaws, and two municipalities have done so for high-rise residential buildings—the City of Sainte-Rose and the City of Laval.	1

ON	In 2017 Ontario revised its building code to include provisions for EV charging (section 3.1.21) in Part 3 and Part 9 buildings. The provisions went into force on January 1, 2018 but were subsequently revoked by an amending regulation passed on May 2, 2019. Local governments have the power to include EV/PHEVs in their bylaws, but none have yet done so.	0.5
SK	Local governments can include EV/PHEVs in their bylaws, but none have yet done so. There are no EV Ready provisions in Saskatchewan building codes.	0.5
AB	The City of Calgary has included BEV/PHEVs in its bylaws, but the province did not explicitly state that all municipalities had this power, or if any others had acted this way.	0.5
PE	The PEI 2016-2017 Energy Strategy states that the government will consider "mandating that new homes be pre-wired for electric charging and link this measure to the adoption of the National Building Code." It also examines the feasibility of requiring or encouraging outdoor parking in new multi-unit residential developments to be equipped with EV chargers.	0
NS	In the 2021 Premier mandate letters, the premier directed the Department of Energy and Mines to work with the Ministers of Infrastructure and Housing and Municipal Affairs to invest in electric vehicle charging infrastructure on provincial and municipal government buildings, and work toward electric vehicle fast chargers in all new commercial developments. After a change in government in late 2021, it is unclear if this is still a priority.	0

Active transportation

Active transportation refers to forms of transportation where people physically power their own mobility through walking, biking, skateboarding, and similar modes. Such active transportation modes were one of several other forms of sustainable transportation we looked at in our previous Scorecard. Cycling is one of the most efficient forms of transportation,[111] and combining modes of sustainable transportation where there is a focus on reducing vehicular traffic will increase energy efficiency, while providing public health co-benefits.

[111] David Dodge, "The Most Efficient Transportation on the Planet," Huffington Post, January 29, 2013, https://www.huffingtonpost.ca/david-dodge/bike-lanes-vancouver_b_2567888.html.

A 2014 federal report on active transportation noted that local governments typically take the lead on active transportation initiatives, but provinces can assist the process through legislation, regulation, and policies.[112] This helps to establish consistent goals and regulations across the province and can establish funds for municipalities to improve and extend their active transportation infrastructure. Many provinces therefore have policies and legislation specifically designed to promote active transportation.

In this Scorecard, we awarded up to two points for provincial active transportation plans or strategies. We score provinces on active transportation plans or strategies (up to one point) and the existence of dedicated funding to support it (up to one point). We award partial points where we were able to find evidence of a plan but no dedicated funding, or where there was funding but not part of a plan, or a currently active and dedicated initiative to expand active transportation infrastructure. We provide results Table 73 below.

Table 73. Active transportation strategies and funding

Province	Description	Score (2 points)
BC	As part of its CleanBC plan, the province introduced its "Move. Commute. Connect" active transportation strategy. The strategy aims to double the percentage of trips taken by active transportation by 2030 through funding for community projects, education and awareness, policy and regulatory adjustments, and research. Additionally, the province offers the BC Active Transportation Infrastructure Grant Program, with two options for Indigenous and local governments.	2

[112] Government of Canada, "Mobilizing Knowledge on Active Transportation," accessed July 14, 2021, https://www.canada.ca/en/public-health/services/health-promotion/healthy-living/physical-activity/mobilizing-knowledge-on-active-transportation.html.

NS	In 2013, Nova Scotia developed a “Choose How You Move” active transportation plan as part of its broader Sustainable Transportation Strategy, which is still in place. The province established the “Connect2” grant program under this strategy, which aims to make all trips under two kilometres possible using sustainable modes of transportation. The province is also building out the Blue Route, a Nova Scotia-wide cycling route along provincial highways connecting communities. This has been underway since the early 2010s.	2
PE	Prince Edward Island developed an Active Transportation Strategy in 2020 as part of its broader Sustainable Transportation Action Plan. The strategy establishes an Active Transportation Fund of $25 million to support investments in walking and biking paths, connecting existing trails, and other items.	2
QC	Québec introduced a Sustainable Mobility Plan in 2018, which included active transportation as a core component. The plan initially allocated $125.2 million between 2018 and 2023 for active transportation infrastructure. The province‘s Plan for a Green Economy, launched in November 2020, budgets $60 million over four years for the development of active transportation in urban areas.	2
NB	New Brunswick released its 20-year “From Surfaces to Services” sustainable transportation plan in 2017, which includes active transportation as an important component. However, there does not appear to be a dedicated funding program to support its development.	1
ON	Though Ontario does not currently have an active transportation strategy, the province launched a #CycleON Action Plan in 2018 and is still implementing items under this plan, such as the province-wide cycling network (see http://www.mto.gov.on.ca/english/safety/province-wide-cycling-network.shtml). In recently published regional transportation plans for Northern and Southwestern Ontario, the province commits to working with local governments to support active transportation connections. Since 2018 the province has allocated approximately $94 million to local governments under the Ontario Municipal Commuter Cycling Program. Recipients have until December 31, 2021 to invest the funding in eligible commuter cycling infrastructure. There is no other dedicated provincial funding for active transportation.	1

AB	Alberta does not currently have an active transportation plan or strategy. Budget 2021 established the Strategic Transportation Infrastructure Program (STIP), which provides funding to municipalities to support local infrastructure projects, though active transportation does not appear to be a core objective. The budget also allocated approximately $1.2 billion over three years through the Municipal Sustainability Initiative to support municipal infrastructure, including recreation and sport facilities. The federal government recently announced more than $9 million in funding for active transportation projects in Alberta, with funding contributions from municipalities. The funding is part of the federal government's Investing in Canada Infrastructure program.	0.5
NL	The province does not yet have an active transportation strategy. In October 2020, the province announced an agreement with the federal government to jointly support active transportation upgrades in St. John's, as part of the federal government's Investing in Canada Infrastructure program.	0.5
MB	In 2012, Manitoba launched a four-year active transportation plan; it ended in 2016. The province has neither an active transportation strategy nor any dedicated funding programs to support one.	0
SK	The province has neither an active transportation strategy nor dedicated funding to implement one. A non-profit organization called Active Saskatchewan worked to build networks of individuals and organizations to foster more physical activity but was dissolved in 2021. The organization was funded in part by the Community Initiatives Fund created by the provincial government. In May 2021 the province and the federal government announced more than $50 million in funding for infrastructure projects, as part of the federal government's Investing in Canada Infrastructure program. Projects include expanding active transportation networks.	0

We have seen few new developments in this area since our previous Scorecard. Notable developments include Prince Edward Island launching its Active Transportation Strategy and associated fund, and the expansion of active transportation funding in Québec as part of its Plan for a Green Economy. We have also re-assessed Manitoba's active transportation strategy,

which we awarded full points to last year. The strategy appears to have ended in 2016, and the province did not report any dedicated funding for active transportation.

Active transportation in several provinces is benefiting from investment from the federal government, through its Investing in Canada Infrastructure program.

Public transportation

With this year's Scorecard, we are introducing benchmarking and scoring on public transportation provincial policy and outcomes. Previous scorecards have focused largely on the connection of personal vehicle transportation with energy grids. As discussed above, electrification of personal vehicle transportation represents an efficiency improvement over fossil fuel-powered vehicles. Yet, a far more energy efficient mode of transportation is public transit, which can move a far greater number of people for a given unit of energy than a personal automobile. Furthermore, access to effective public transit is important from an equity standpoint as well, since not all Canadians can afford personal, electric automobiles.

We reached out to the Canadian Urban Transit Association (CUTA) to inquire about the availability of data on three key metrics of provincial public transit outcomes. These are:

- Provincial funding for public transit
- Ridership levels per capita
- Electric transit vehicles

These metrics were chosen to complement each other in pursuit of a comprehensive picture of public transit support and effectiveness in each province. We have thus weighted each metric to be worth one point, for a total of three points available for this topic. We provide further details on our benchmarking and scoring methodology for each metric below.

Provincial funding

Provinces can play an important role in supporting public transit by providing operating and capital funding support, which can help boost ridership and service levels. Yet, this metric on its own is not a comprehensive measure of provincial public transit effectiveness, as provincial transit systems may have different administrative structures. For instance, a large proportion of total public transit funding in Québec and British Columbia comes from 'other' sources, which

refers to the ARTM and Translink crown corporations. Consequently, there is significant variation in the total share of public transit funding that provinces provide.

Table 74. Provincial public transit funding scoring methodology

Provincial funding per capita (>=)	Score
$1,000	1
$100	0.75
$10	0.5
$1	0.25

Provincial support is thus only a partial indicator of how well funded public transit systems are, which is why we include a performance metric (i.e., ridership) below. To score this metric, we calculate provincial funding support (including both capital and operating funding) per capita, using estimates of the municipal population in each province. According to CUTA, this is the population of the municipalities that their member transit services have rights to operate in. Given the variance in levels of provincial funding, we have chosen a logarithmic scoring scale. Results and scoring methodology are summarized in the tables below.

Table 75. Provincial public transit funding per capita (municipal population)

Province	Operating contribution ($M)	Capital contribution ($1M)	Provincial share of total public transit funding	Provincial funding per capita	Score (1 point)
ON	$1,316.95	$4,468.71	60.6%	$438.45	0.75
QC	$437.94	$580.63	35.1%	$267.73	0.75
BC	$525.53	$77.60	29.3%	$142.86	0.75
AB	$27.98	$255.08	20.3%	$91.90	0.5
MB	$39.71	$2.10	7.0%	$51.29	0.5
PE	$0.48	$0.00	29.1%	$9.70	0.25
NS	$0.00	$2.00	2.5%	$4.50	0.25
NB	$0.00	$0.67	7.5%	$2.10	0.25
NL	$0.18	$0.04	1.2%	$1.41	0.25
SK	$0.00	$0.00	0.0%	$0.00	0

Ridership

Ridership refers to the total number of "linked trips," or trips from origin to destination. (Trips using transfers are only counted once). This is a useful performance metric because it gives an indication of active usage of public transit in each province, which is not strictly tied to service levels (e.g., the number of buses on the road).

To evaluate this metric we calculate ridership per capita, using the population estimates for provincial service areas (which is marginally smaller than municipal population estimates). To establish a scoring methodology, we reason that, in a highly effective public transit system, 25% of commuters would use the system twice per workday, approximately 75% of the time. This works out to a top threshold of approximately 100 trips per capita (service area population), per year.

Table 76. Ridership per capita scoring methodology

Ridership per capita (>=)	Score
100	1
75	0.75
50	0.5
25	0.25

Table 77. Provincial public transit ridership per capita (municipal service area population)

Province	Ridership (Millions)	Municipal service area population (Millions)	Ridership per capita	Score (1 point)
QC	290.7	3.80	76.42	0.75
BC	152.9	4.17	36.71	0.25
ON	406.3	11.38	35.70	0.25
AB	103.9	3.04	34.16	0.25
MB	25.5	0.77	33.23	0.25
SK	6.1	0.24	25.44	0.25
NS	8.3	0.35	23.95	0
NL	1.9	0.14	14.35	0
NB	2.8	0.29	9.67	0
PE	0.5	0.05	9.43	0

Electric bus transit vehicles

To score this component, we used a slightly modified methodology as used in our benchmarking of electric passenger vehicle registrations. We use the same fleet percentages, but awarded only up to one point.

Table 78. Electric vehicles in provincial public bus transit fleets scoring methodology

EV share of fleet	Score
10%	1
5%	0.75
2.5%	0.5
1.25%	0.25

Table 79. Electric vehicles in provincial public bus transit fleets

Province	Fleet size	EVs	EV share of fleet	Score (1 point)
AB	2,457	52	2.12%	0.25
ON	7,299	31	0.42%	0
QC	3,678	9	0.24%	0
BC	2,153	-	-	0
MB	658	-	-	0
NB	113	-	-	0
NL	54	-	-	0
NS	352	-	-	0
PE	15	-	-	0
SK	121	-	-	0

Industry

Industry accounts for 39% of total energy end use in Canada, more than any other end-use sector. At the same time, it is the only end-use sector to have experienced lower overall energy-consumption growth compared with the end-use sector since 1990.[113] While this sector (excluding oil and gas) offers less energy-saving potential than buildings and transportation, there is still considerable opportunity to reduce energy intensity. According to the International Energy Agency, by 2050 appropriate policies could decrease industrial energy intensity by 38%.[114]

We include several sub-sectors within the industrial sector, including:

- Energy-intensive heavy manufacturing industries such as iron and steel, cement, aluminum, chemicals and petroleum refining, and pulp and paper
- Less energy-intensive light manufacturing, such as textiles, automobiles, and electronics, and
- Non-manufacturing industries such as mining,[115] forestry, and construction.

Potential efficiency savings vary across these subsectors. Less energy-intensive manufacturing industries promise the greatest savings, along with pulp and paper (together these account for around two-thirds of cumulative savings by 2050), while the cement industry is at the other end of the scale, accounting for 2% of total savings.[116] These industries tend to be concentrated in different provinces. For instance, nearly 80% of mining energy consumption is in Alberta, 82% of iron and steel energy consumption is in Ontario, and 80% of smelting and refining (i.e., aluminum production) energy consumption occurs in Québec.[117]

---

[113] Natural Resources Canada, "Canada's Secondary Energy Use (Final Demand) by Sector, End Use and Subsector."

[114] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."

[115] Includes oil and gas production

[116] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."

[117] Natural Resources Canada, "Comprehensive Energy Use Database," Government of Canada, 2016, https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm.

The consequence is that potential efficiency savings in the industrial sector vary significantly from province to province, as do the technologies and processes that might be adopted to achieve them. Accordingly, we have based our industrial scoring on energy management programs that are broadly applicable across industry subsectors and provinces. For this Scorecard, we distinguish between support provided for the various components of energy management and programs to support implementation of comprehensive energy management systems.

We show the scoring summary for these indicators in Table 80.

Table 80. Industry scoring summary

Province	Support for energy management (4 points)	Energy management systems (3 points)	Total (7 points)
BC	4	2	6
QC	4	2	6
NS	3.5	2.25	5.75
AB	3.5	2	5.5
ON	4	1.5	5.5
MB	3	1	4
NB	3	1	4
PE	3.5	0	3.5
SK	1	2	3
NL	1	0	1

Components of energy management

All industrial sectors can implement facility and/or organization energy management. The approach consists of several separate but often closely related components, including energy monitoring and/or benchmarking, energy consumption assessments and potential efficiency improvements, expert energy use management and/or oversight, energy efficiency plan

development and implementation, and capacity-building initiatives for managers and employees in the workplace. We describe these services, and our scoring methodology, below and in the associated scoring summary table.

Tracking, monitoring, and benchmarking

Often the first step toward comprehensive energy management is to put in place a means for tracking energy consumption and monitoring energy use patterns. We award a half point to provinces with programs to support benchmarking, including ENERGY STAR® for Industry certification. We award one point to provinces with programs to support the installation and use of an energy management information system (EMIS).

An EMIS is a comprehensive, combined software/hardware solution for measuring and managing energy use in a facility. It typically includes data analysis and reporting tools, and software for monitoring, optimization, and decision support.[118] An EMIS helps an organization plan, make decisions, and take effective actions to manage energy use and costs; it is an integral support for facility energy management. However, an EMIS can be costly to install and technically complex to operate. Expert auditing may be necessary to ensure the system is implemented and working properly.

Natural Resources Canada administers an ENERGY STAR® for Industry certification that is available to industry partners and based on energy performance indicators. To receive the certification, a participant must be a member of the Canadian Industry Partnership for Energy Conservation (CIPEC), satisfy a facility type description, and receive a rating of 75 or higher on the measurement of an energy performance indicator specific to their industry. The participant must also satisfy some environmental criteria, including no violations across a year of federal and/or provincial environmental and air quality regulations. Unlike the two EnMS certification standards described further below, the ENERGY STAR® certification benchmarks only performance, not the existence of EnMS policies or procedures in the organization.[119]

---

[118] Office of Energy Efficiency, "ISO 50001 Energy Management Systems Standard," Natural Resources Canada, December 12, 2017, 50001, https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/iso-50001-energy-management-systems-standard/20405.

[119] Office of Energy Efficiency, "ENERGY STAR for Industry Certification," Natural Resources Canada, August 1, 2017, https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-industry/19858.

Assessment

The next step in improving an industrial facility's energy efficiency is to conduct some form of energy consumption assessment. An energy audit is a comprehensive assessment that helps determine where, when, why, and how a facility is using energy. It provides information to improve efficiency and reduce costs and is therefore important to verify savings achieved through the efficiency improvements that follow.[120] We awarded provinces with support programs for energy audits a half point.

While a company typically conducts an energy audit for an entire facility, it often undertakes an energy efficiency feasibility study on a single system within the facility. This feasibility study ascertains the costs and benefits of making efficiency improvements to that system, and helps the business inform investment decisions. We awarded provinces with support programs for energy efficiency feasibility studies a half point. Every province provides support programs for energy audits and feasibility studies, the only metric where this is the case.

Management

Many businesses and industry organizations lack the expertise or resources needed to manage and oversee energy consumption and related energy efficiency initiatives. Organizations should therefore embed a dedicated, professional energy manager as an integral part of overall organizational energy management. Alternately, they could provide access to expert energy management consultants to program participants as needed. This could be a less comprehensive approach in a large industry, or a relevant adaptation in a small-medium industry.[121] We award a half point each for either strategy.

---

[120] Natural Resources Canada, "Conducting an Energy Audit," Government of Canada, December 12, 2017, https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/conducting-energy-audit/20401.

[121] Neal Elloitt, "Energy Efficiency Programs for Small and Medium-Sized Industry" (Washington D.C.: American Council for an Energy-Efficient Economy (ACEEE), February 10, 2000), https://www.aceee.org/research-report/ie002.

Capacity-building

Industrial organizations can build capacity to achieve their energy efficiency goals with an embedded energy manager. They can further support energy management by putting in place training, education, or awareness programs for other managers and employees. We awarded a half point to provinces with industrial efficiency programs that supported such training and education initiatives within an organization, whether they were tied to a larger energy management incentive program, or not.

Table 81. Support for energy management

Province	Tracking, monitoring, and benchmarking		Assessment		Management		Capacity Building	Total (4 points)
	Benchmarking (0.5 points)	*EMIS (1 point)*	*Energy audits (0.5 points)*	*Feasibility studies (0.5 points)*	*Embedded energy managers (0.5 points)*	*Provision of expert consultation (0.5 points)*	*Workforce training and awareness (0.5 points)*	
BC	●	●	●	●	●	●	●	4
ON	●	●	●	●	●	●	●	4
QC	●	●	●	●	●	●	●	4
AB	-	●	●	●	●	●	●	3.5
NS	-	●	●	●	●	●	●	3.5
PE	●	●	●	●	●	●	-	3.5
MB	●	-	●	●	●	●	●	3
NB	-	●	●	●	-	●	●	3
SK	-	-	●	●	-	-	-	1
NL	-	-	●	●	-	-	-	1

Energy management systems (EnMS)

An energy management system (EnMS) combines assessment, management, measurement and verification, and capacity-building into a comprehensive plan or strategy. It tracks and reports specific efficiency goals or targets over a period of years. According to the Clean Energy Ministerial (CEM) Energy Management Working Group, energy management systems could save up to 30% of total energy use in industry.[122]

An EnMS requires an organization to:

- Conduct an energy review which involves analyzing energy data and identifying areas of significant energy use and energy performance improvement
- Establish an energy baseline
- Establish measurable, time-bound energy objectives and targets
- Establish an action plan to achieve energy objectives and targets
- Implement the action plan
- Check performance
- Monitor, document and report all the above

The components of energy management that we evaluated in the previous section may be integral to the development of an EnMS, but they do not necessarily equate to support for the development of an EnMS on their own, or even when combined. Accordingly, we consider support for EnMS development and implementation as a separate endeavour, best accomplished through dedicated programs, or by leveraging participation in the above component programs to work toward EnMS development.

Several international standards exist to guide the development of an EnMS, and certification under these standards is a further step that can be taken to verify energy savings performance and/or the existence of a management system. The most widespread is the ISO-50001 standard, which informs the process and requirements for implementing a rigorous and effective EnMS, and helps organizations develop policy, fix targets to meet that policy, gather data and measure results, review effectiveness, and (importantly) continually improve energy

[122] Office of Energy Efficiency, "ISO 50001 Energy Management Systems Standard," 50001.

management.[123] The U.S. Department of Energy has developed a more stringent standard, based on ISO-50001, called Superior Energy Performance 50001 (SEP 50001). This combines third-party performance verification with ISO-50001 certification.[124] Under SEP 50001, three optional tiers—Silver, Gold, and Platinum—recognize elevated savings performance above the requirements of the ISO standard.

This year we also asked respondents for information on the incorporation of "ISO 50001 Ready" status within their programming. The United States Department of Energy developed the 50001 Ready initiative to offer a no-cost way for participants to receive recognition for establishing a business practice around energy.[125] Unlike ISO 50001, it is not a certification program, and does not require any third-party audits or verification. The program collaborates with utilities and other organizations to assist and facilitate the installation of energy management systems that are deemed 50001 Ready.[126] Participating in the 50001 Ready program provides organizations with the tools to implement and maintain a structured, continual improvement based EnMS.

For the 2021 Scorecard, we asked respondents to identify industrial programs that offered EnMS/SEM development support, and to specify whether they are based on internationally recognized standards and whether they require certification. We also asked respondents if they offer participants additional support to attain certification if programs require such certification, or support attainment of ISO-50001 ready status. We also asked information respondents to provide outcomes of these activities, including numbers of certifications associated with EnMS program activity, numbers of participants and an estimate of the amount of energy consumption for industrial program participants with an EnMS in place.

---

[123] "ISO 50001 - Energy Management Systems" (International Organization for Standardization (ISO), 2018), 50001, https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100400.pdf.

[124] US Department of Energy, "ISO 50001," Better Buildings Initiative, 2019, https://betterbuildingssolutioncenter.energy.gov/iso-50001.

[125] U.S Department of Energy, "About the 50001 Ready Program," Better Buildings, accessed August 20, 2021, https://betterbuildingssolutioncenter.energy.gov/iso-50001/50001Ready/about.

[126] U.S Department of Energy, "50001 Ready," accessed August 23, 2021, https://www.energy.gov/eere/amo/50001-ready-program.

We scored EnMS/SEM program support as follows:

- Support for the development of an EnMS as a standalone program, or as part of a program portfolio where there is clear evidence that program portfolios are designed to leverage participation up to a comprehensive EnMS, including all the requirements noted above (1 point)
- One or more of these programs is informed by the ISO-50001 standard, in whole (half a point) or in part (a quarter point)[127]
    - We may award one quarter point as a bonus for programs informed by more stringent standards (i.e., SEP-50001)

- Certification under an internationally recognized standard is a program requirement (0.5 points for ISO-50001 Ready; 1 point for ISO-50001; 1.5 points for SEP-50001)
    - If certification is not required, we award a half point if support is provided for program participants wishing to pursue certification

We summarize programs and scoring in Table 82 and offer a discussion of our findings, including program outcomes, below. This includes a look at certifications achieved through program activities and evaluation of the percentage of industrial demand that was reported by information respondents to currently have an EnMS in place.

[127] As noted above, an EnMS comprises multiple different components, colloquially summarized by the "Plan-Do-Check-Act" procedure, all of which is informed by the ISO-50001 standard and similar standards. We interpret "in whole" to entail identified programs informed by such standards on all components. "In part" suggests standards are used to inform one or more components, but not all. For instance, some provinces noted that ISO-50001 informs measurement and verification practices in energy management programming.

Table 82. EnMS/SEM program results

Province	Program descriptions	EnMS / SEM Support (1 point)	Informed by standard (0.5 points)	Certifications		Score (3 points)
				Required (1.5 points)	*Additional support (0.5 points)*	
NS	Efficiency Nova Scotia reported three industrial energy management programs: The Strategic Energy Management (SEM) program, the Energy Management Information Systems (EMIS) program, and an energy management program specifically for large industrial customers. The SEM program is designed to work with industrial customers to help customers to find savings through operational and behavioural changes, while identifying capital projects that can be incentivized through Efficiency Nova Scotia's Custom and Business Energy Rebate programs. These programs are informed by the SEP-50001 and the International Performance Measurement and Verification Protocol (IPMVP). They do not require certification to receive the incentives.	•	• (+0.25 points for SEP-50001)	-	•	2.25

AB	After the closure of Energy Efficiency Alberta, the Government of Alberta assumed responsibility for some programs. These include the On-site energy managers program, and both the Strategic Energy Management (SEM) and Strategic Energy Management for Large Final Emitters (SEM-LFE) programs. The SEM programs are cohort programs, supported with additional funding from Natural Resources Canada, where participants receive guidance and peer support for the implementation of strategic energy management in their operations. SEM-LFE enables organizations to achieve ISO-50001 Ready recognition.	●	●	-	●	2
BC	BC Hydro has a Strategic Energy Management offering for industry, which includes an industrial energy manager program for large industrial consumers, and a cohort option for medium-sized industrial customers (based on annual electricity consumption). The utility also provides a sub-offer called the Energy Monitoring and Targeting Level 2. This allows for energy managers to set savings targets for facilities. BC Hydro will pay up to $80,000 in facility monitoring, specific system monitoring, and/or advanced modelling to help organizations meet their energy targets. FortisBC provides additional support to program participants that are also natural gas customers. BC Hydro's SEM programs are aligned with ISO 50001 requirements, but do not require certification. Additional support is available for participants that wish to pursue certification. In 2021, FortisBC launched its own SEM program in its electric service territory, for both electric and natural gas customers.	●	●	-	●	2

	Between 2015 and 2020, the provincial government provided matching funding to federal incentives for companies developing energy management systems under the B.C. - Natural Resources Canada ISO-50001 Implementation Incentive (up to a total combined $80,000 of funding). The program did not require ISO 50001 certification yet was informed by its requirements. As of October 2020, the government reported the program as fully enrolled and had stopped accepting applications.				
	Énergir reported that it has the Energy Management System (Système de gestion de l'énergie). Implementing EMS with Enegir allows for organizations to have energy savings through behavioral and operational changes at all levels of an organization, from senior management to staff on the floor. They give technical and financial assistance throughout the process, and offer grants of up to $350,000. This financial help is distributed throughout many important stages of the EMS implementation.				
QC	Hydro-Québec offers the Electric Power Management Systems Program (Programme Systèmes de gestion de l'énergie électrique, or SGÉÉ)), which involves consultation with experts from the Hydro Québec. In addition to allowing customers to receive financial assistance from Hydro-Québec, an electricity management system (EMS) can assist customers in determining the actions to take to control of their energy usage and inform users the status about recurring savings.	•	•	-	• 2

	The provincial government offers the EcoPerformance energy management program, which provides funding for different stages of an EnMS, such as conducting an energy audit, hiring an energy manager, and providing training on ISO-50001. EcoPerformance aims to reduce greenhouse gas emissions and the energy consumption of businesses by financing projects or measures related to energy consumption and production, as well as improving processes. Financial assistance for large commercial and institutional consumers has increased from $40 / tCO2 to $60 / tCO2. Financial assistance for large industrial consumers has increased from $40 / tCO2 to $50 / tCO2, and up to $60 / tCO2 for participants who have achieved ISO 50001 certification. The TEQ Master Plan includes an objective to provide additional financial incentives to program participants with an ISO-50001 Energy Management System certification, leading towards making the certification mandatory for all large enterprises that participate in incentive programs between 2023 and 2028.				
SK	SaskPower's Industrial Energy Optimization Program included an energy management track that provided incentives for the development of energy management systems, energy management information systems, sub-metering, and planning and implementation for ISO 50001 certification. The program was cancelled in 2021.	•	•	-	•	2

ON	The IESO does not have an EnMS/SEM program, but does offer an embedded energy manager program, which provides up to $150,000 in performance-based annual incentives toward hiring energy managers. The program does promote and has provided training webinars on 50001 Ready and ISO 50001. Enbridge Gas currently administers two energy management programs: the Comprehensive Energy Management program (Enbridge rate zone), and the Strategic Energy Management SEM program (Union rate zone). The CEM program provided incentives for the installation of an EMIS, funding for energy awareness and efficiency training in the organization, and financial assistance for Certified Energy Manager training. The SEM program was carried over from Union Gas, and offered similar incentives. Though there were participants still enrolled in the program in 2020, 2018 was the last year for new enrollment.	●	-	-	●	1.5

MB	Efficiency Manitoba launched a Strategic Energy Management Initiative in 2020 with a salary path (support for an embedded energy manager) or a performance path (incentives based on realized energy savings). The program aims to help participants develop a strategic energy plan, targets, and key performance indicators. Energy efficiency specialists support planning and implementation activities. The program is not based on internationally recognized standards and does not require ISO-50001 certification, but instead aims to develop the internal capacity and processes that could help lower barriers to certification.	●	-	-	-	1

NB	The EMIS track of New Brunswick's Industrial Energy Efficiency Program offers financial assistance to qualifying large industrial customers with an average monthly demand of 2 MW or more. The support helps those customers analyze and roll out new EMIS systems or optimize existing ones. NB Power provides technical and financial support for scoping and feasibility studies, and for implementation of technical changes at the customer's facilities that address the wide range of customer requirements and energy efficiency initiatives. A Strategic Energy Management program is being piloted in 2021 and will be implemented under the Energy Management track of the program if cost-effective and if there is sufficient customer interest. The pilot program is based on the SEP-50001 standard but will not require certification. We have awarded partial points for this pilot program.	○	○ (+0.25 pts for SEP-50001)	-	-	1
NL	Newfoundland and Labrador does not have an industrial energy management program.	-	-	-	-	0
PE	EfficiencyPEI offers a Small Businesses Energy Solutions program and a Custom Energy Solutions program, which provide incentives to help with energy efficiency advice and rebates. Larger organizations (consuming more than 350,000 kWh per year) may qualify for customized energy solutions, which may include financing for a feasibility study and access to an onsite energy manager. There is no comprehensive EnMS/SEM program.	-	-	-	-	0

EnMS program eligibility, participation, and performance

In addition to energy management program details, we also requested information about eligibility requirements and participation in EnMs/SEM programs. We asked respondents to list EnMS programs and to provide information on program start dates, the level of participation (e.g., Meter, Premise, Account, Customer, or Other) and numbers of participants since the year the program began. Finally, we also asked respondents to provide figures for total annual industrial energy consumption, and total annual industrial energy consumption with an EnMS in place. We summarize this information in the following tables.

As in our 2020 Scorecard, the data we received on EnMS implementation and outcomes may not capture all industrial facilities with an EnMS (which may or may not have resulted from provincial program activities). We do not consider this information comprehensive enough to merit scoring, and thus provide it only for illustrative purposes. We will continue to refine our methodology for assessing energy management support and performance in future scorecards.

Table 83. Approximate share of industrial demand with an EnMS

Province	Organization	Reported industrial energy consumption			Share
		Total	*With EnMS*	*Unit*	
BC	BC Hydro	19,000	7,800	GWh	41.05%
	Province of British Columbia	440	225	PJ	51.14%
MB	Efficiency Manitoba*	5,556	132	GWh	2.37%
NB	NB Power	390	5	GWh	1.28%
NS	Efficiency Nova Scotia	927	46	GWh	4.96%
ON	Enbridge	2,260	192	MM3	8.51%
QC	Province of Québec*	559,294	650	TJ	0.12%

** Did not report total industrial energy consumption. We used estimates of total energy end-use from Statistics Canada (cite), matching the fuel type to the fuel type reported. For Manitoba, we used industrial demand of primary electricity, and for Québec we used all fuels.*

Table 84. EnMS program eligibility and participation					
Province	Program administrator	Program name	Eligibility criteria	Participant level	Total participants (Year program began)
AB	Alberta Environment and Parks	SEM	To qualify, existing commercial, institutional, industrial facility(ies) must have a GHG emissions profile greater than 5,000 tonnes.	Facilities (of same organization)	14 (2018)
		SEM-LFE	Participants must be large final emitters, and must provide full and accurate usage data and other information upon request.	Facility	58 (2018)
BC	BC Hydro	Industrial energy manager	This program targets large industrial customers with more than 20GWh of annual consumption.	Customer	50 (2009)
		SEM Cohort	This program targets mid-size industrial customers with between four and 20GWh of annual consumption.	Site	12 (2016)
	Province of British Columbia	ISO 50001 Implementation Incentive	Participation is limited to facilities engaged in energy consuming processes that physically or chemically transform materials or substances into new products. To receive cost-shared assistance, the company needs to be a member of the Canadian Industry Partnership for Energy Conservation (a “CIPEC Leader”).	Premise	12 (2015)

MB	Efficiency Manitoba	Strategic Energy Manager Initiative	The program targets participants with 20 GWh or greater annual consumption of electricity/natural gas equivalency at identified facilities.	Customer	5 (2020)
NB	NB Power	EMIS	Eligibility requirements for EMIS participation are for industrial customers only. This would include all industrial energy consumption although there has not been significant uptake at this time. SEM eligibility is reserved for industrial facilities with 25GWh or more of energy consumption. This represents approximately 60% of industrial energy consumption. A SEM program is not yet offered in New Brunswick but is planned to be implemented.	Customer	2 (2017)
NS	Efficiency Nova Scotia	Strategic Energy Management	SEM and EMIS program eligibility are based on annual kWh consumption and a stated interest to more effectively manage energy use. Participants are expected to consume at least five GWh/year.	Customer	18 (2015)
		EMIS	Same requirements as the SEM program. Facilities that do not reach the eligibility threshold above are still eligible for a variety of programs to assist in energy management. This program includes Efficiency NS's Custom Retrofit and Business Energy Rebates programs.	Customer	6 (2015)

ON	Enbridge Gas	Comprehensive Energy Management Program	Eligible participants must be industrial customers in legacy Enbridge Gas Distribution territory and in rates 100, 110, 135, 145, or 170.	Account	30 (2016)
		Strategic Energy Management	Same requirements as the CEM program.	Account	6 (2016)
QC	Énergir	Energy management system	The applicant must be either an Énergir customer or in the process of becoming one. The financial assistance is intended for industrial buildings. Any application for a building intended for another use will be subject to a special review by Énergir. The financial assistance is for owners of buildings or groups of buildings with natural gas consumption of at least two million cubic metres (m^3) per year. With Énergir's approval, some buildings with lower annual natural gas consumption may be eligible.[128]		23 (2020)
	Québec	EcoPerformance - Energy management	This program's eligibility criteria changed in January 2021. A qualifying participant must work in the following primary or secondary sectors: commercial, institutional, municipal, industrial, or manufacturing.	Other	66 (2013)

[128] Energir, "Energy Efficiency Program – Energy Audit and Implementation," accessed August 29, 2021, https://www.energir.com/~/media/Files/VGE/EE_SGE/GuideParticipant_SGE_EN.pdf?la=en.

	Hydro-Québec	Energy Management System (EMS) Program	The facility or building where the project is to be carried out must be in Québec, and the electricity bill for the past 12 months must exceed $750,000. Projects must also pertain to industrial activities and involve real-time electricity consumption measurement. A project must also align with the implementation of an EMS calibrated for continuous improvement.	Premise	24 (2015)

Energy Efficiency in the Territories

Canada's territories present a challenge for tracking and benchmarking energy efficiency policy and outcomes. In previous years, we have excluded the territories in our regular scoring due to data limitations and the unique context of their energy systems. On the first challenge, despite our best efforts and those of our contacts in each territory, we have still struggled to acquire the data and information necessary to score each territory alongside the provinces. This is in part due to resource constraints both at Efficiency Canada and in the territories. However, in some cases, it is also a consequence of less standardized reporting practices in the territories, or to our lack of contacts with access to the information needed to calculate our metrics. On the second challenge, the smaller populations, colder climates, more decentralized energy and transportation systems, and varying governance arrangements can produce metric results quite different than those observed in the provinces, leading to concerns about the comparability between the territories and the provinces.

To address these challenges, Efficiency Canada coordinated with Carleton University graduate student Mohamed Nassar. In the summer of 2021, Mr. Nassar conducted a directed studies course on energy efficiency in the territories. Though he developed the course content and methodology in conjunction with his supervisor, we consulted on the development of some items. This included suggesting both potential approaches to tracking and benchmarking key policy areas and regional stakeholders who might provide further insight.

Through Mr. Nassar's efforts and the informational contributions of contacts and stakeholders in the territories, we can provide a more extensive review of energy efficiency policy and outcomes in the territories. In this chapter, we review the following policy areas and metrics, to the best of our ability:

- Energy efficiency programs
    - Program administration details
    - Electricity and natural gas / non-regulated fuel savings
    - Program spending per capita, all fuels
    - Low-income program spending

- Enabling policies
    - Support for financing
    - Research, development and demonstration

- Buildings
    - Building codes
    - Building code update activities
    - Energy rating and disclosure

- Transportation
    - Electric vehicle incentives
    - Electric vehicle charging infrastructure

The list of metrics is shorter than those considered for the provinces, and significant information gaps and limitations remain. We are therefore not able to conduct a full scoring of these results, though where are able to do so, we compare performance with provincial averages. Readers should consider that these comparisons for illustrative purposes only.

Energy efficiency programs

In this section, we review developments in the administration of energy efficiency programs in the territories, program savings results, and program spending (including spending on low-income programs).

Program administration

Energy efficiency programs in Yukon have been administered by the Government of Yukon's Energy Branch since 2001, currently under the "Good Energy" brand.[129] Yukon Energy, in partnership with ATCO, also offered programs under the inCharge brand beginning in 2013. However, disputes at the territorial utility regulatory board raised in 2017/2018, over whether the utility had been approved to deliver these programs beyond 2015, led to a ruling that discontinued utility programs. Yukon Energy applied for leave to appeal this decision in the courts; this leave was granted in July 2020. The territory's most recent climate change plan notes a role for collaboration on energy efficiency between territorial utilities and government,

[129] Yukon, "Good Energy Rebates," Yukon, June 17, 2021, https://yukon.ca/en/good-energy-rebates.

and Yukon Energy included budgets for a new portfolio of demand-side management programs in its 2021 rate application.

In the Northwest Territories, the Arctic Energy Alliance (AEA) administers energy efficiency programs which are funded through the territorial government and federal contributions from the Low-Carbon Economy Leadership fund. The NWT Public Utility Board (PUB) regulates all energy from public utilities. AEA programs tackle both residential and commercial customers and offer both financial and non-financial incentives to help increase energy efficiency uptake in the territory.

In Nunavut, the Climate Change Secretariat, created in 2016, oversees efficiency strategies while the Qulliq Energy Corporation (QEC) operates standalone power systems sized to meet municipal demands. In 2005, QEC created the Nunavut Energy Center to run energy efficiency programs; the centre closed in 2009. The Utility Rates Review Council (URRC) regulates energy in the territory. Information about energy efficiency programs in Nunavut is not publicly available on either the utility or the regulator's website. In its decision on QEC's 2018/19 rate application, the URRC called for QEC to bring demand-side management or conservation initiatives for review and approval directly to the government, without waiting for its next rate application.

Program savings

We were able to attain annual program savings results from the Yukon government (via information request), and the AEA's 2020-2021 annual report. Results were reported as (for Yukon) or assumed to be (for the AEA) gross savings, and as such we applied our standard net-to-gross ratios as used for the provinces. Savings are not evaluated by an independent third-party.

Table 85. Net incremental annual electricity savings, territories

Territory	Net annual incremental electricity savings (GWh)	Total domestic electricity sales, 2019 (GWh)	Savings as % of domestic sales	Canadian provincial average
YK*	0.44	71.8	0.61%	0.36%
NWT	1.66	-	-	

**Domestic electricity sales of Yukon Energy, from 2019 annual report*

These results suggest that Yukon achieves electricity savings that would place it among the top three provinces. We were not able to determine total domestic electricity sales in Northwest Territories, and as such are not able to calculate the metric.

To calculate our natural gas / non-regulated fuel savings metric, we use Statistics Canada's end-use demand figures for natural gas plant liquids and refined petroleum products in the residential, public administration, commercial and other institutional, and industrial (minus oil and gas) sectors.[130]

Table 86. Net incremental non-regulated fuels savings, territories

Territory	Net annual incremental fuel savings (TJ)	Total end-use demand, 2019 (TJ)	Savings % of end-use demand	Canadian provincial average
YK	28.6	964	2.97%	0.35%
NWT	3.1*	3,697	0.08%	

** Reported as avoided oil, propane and natural gas consumption*

Based on reported data, Yukon achieved very impressive non-regulated fuel savings rates in 2020, far exceeding the top Canadian province, Prince Edward Island, at 0.87%. The residential sector achieved more than 99% of the savings, stemming from Good Energy Residential and New Homes programs. However, our information request respondents in Yukon cautioned that the end-use energy demand figure used above may not be accurate.

Program spending

We attained program spending from Yukon (via information request) and Northwest Territories (via AEA's annual report). Results are summarized below.

[130] Statistics Canada, "Table 25-10-0029-01: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual."

Table 87. Efficiency program spending per capita, territories					
Territory	Efficiency programs ($M)	Enabling / supporting ($M)	Total spending ($M)	Total spending per capita	Canadian provincial average
YK	$7.66	$0.78	$8.44	$200.17	$28.6
NWT*	$6.10	$0.15	$6.25	$138.77	

** Program spending is total capital costs for programs; enabling is community energy planning.*

Both territories achieve impressive program spending per capita results. Approximately 60% of program spending was on residential programs. In its response to our information request, the government reported that constrained supply of building materials and reduced contractor availability impacted the ability to implement retrofit projects. However, demand for these programs remained high, and interest in other energy efficiency measures (e.g., appliances, heating systems) also remained consistent.

According to the AEA, spending on incentive programs dropped by $100,000 in 2020 compared with 2019. This was due to the COVID-19 pandemic, which adversely impacted program participation. Participation increased for the Energy Efficiency Incentive Program, which offers rebates to northerners who purchase energy-efficient products such as wood stoves, LED light bulbs, and ENERGY STAR® certified refrigerators. The program provided 1,000 more rebates than last year due to both increased demand for energy-efficient products and increased number of products offered under the program in recent years. The average rebate was lower than last year, which suggests residents are making smaller individual purchases of energy-efficient equipment.

Low-income programs

We are also able to estimate spending on low-income programs per household experiencing energy poverty in Yukon and Northwest Territories, using estimates of energy poverty from Canadian Urban Sustainability Practitioners.[131] Results are summarized in the table below.

[131] Canadian Urban Sustainability Practitioners (CUSP), "Energy Poverty in Canada: A CUSP Backgrounder," October 2019, https://energypoverty.ca/backgrounder.pdf.

Table 88. Low-income efficiency program spending, territories			
Territory	Program spending ($M)	Spending per household in energy poverty	Canadian average
YK	$0.63	$182.61	$29.73
NWT	$0.59	$155.85	

The AEA offers the Specified Income Home Winterization Program, which provides homeowners with the supplies, knowledge, and other resources to winterize their homes and save on heating fuel. It also provides LED light bulbs, low-flow shower heads, and faucet aerators to reduce the consumption of electricity and water. The GNWT Department of Infrastructure and the Government of Canada funded this $593,000 program. It is based on a community partnership, under which five organizations representing six communities partnered with AEA. Each community partner hired a community liaison worker on a temporary contract to ground the project in the community, raise awareness and capacity around winterization, and support local employment. The total value of incentives is $33,000, with 98 energy efficiency kits distributed and an average incentive of $340.

Though we do not report spending on energy efficiency programs for Indigenous Peoples here, Yukon does offer several programs for Indigenous communities. This includes the First Nation Energy Efficiency program, which provides support for home retrofits, and the Community Institutional Energy Efficiency Program, which provides financial and technical support to assist First Nations and municipalities to complete major energy upgrades to community buildings across Yukon (upgrades to HVAC equipment and controls, LED lighting and building envelopes are all included). As of May 2021, projects are underway in ten Yukon community locations, with eight First Nation governments, two First Nation development corporations, and six municipal governments collaborating on a total of 26 buildings.

Enabling policies

In this section, we review support for energy efficiency improvement financing, as well as research, development and demonstration initiatives.

Support for financing

There are multiple financing support programs offered under the Good Energy Rebate program offered by Government of Yukon. The Yukon Housing Corporation offers a soft loan program

called “Home Repair Program” to help residents upgrade or repair their homes. Though the program appears to target accessibility upgrades and emergency repairs, energy efficiency improvements are considered eligible upgrades, and residents can use the program in conjunction with Good Energy rebate programs. The program is income qualified (annual household income must be under $103,070).

Since 1984, Yukon has offered a Rural Electrification and Telecommunications loan program (RETP) to assist residents living in rural areas to extend electrical grid and telephone services (and later Internet) to rural properties. This program has since been modified to support on-site renewable energy systems (distributed generation) on rural properties. The loan is assessed against the property rather than the homeowner. Funding for individual projects is limited to 25% of the assessed value of the property, less any existing local improvements. Maximum funding is $50,000, excluding group projects.

Under the Nunavut Housing Corporation’s Home Renovation Program, participants can receive a forgivable loan to cover the cost of materials, freight, and labour, to a maximum contribution of $65,000, depending on household income, and provided that any amount exceeding $50,000 is used specifically for energy efficient improvements.

Research, development, and demonstration

In 2020, the Yukon government began a pilot project to evaluate the process, costs, and energy savings associated with deep energy retrofits in Yukon. This program included enhanced incentives and reporting requirements for homeowners wishing to reduce their home’s energy consumption by 40% or more. The outcomes of this program will inform future program delivery by providing improved guidance to homeowners interested in deep upgrades. The territory also engaged several owners of air-to-water and air-to-air heat pumps to monitor the efficiency of these systems in northern climates, and partnered with the Yukon Conservation Society to deliver their Electric Thermal Storage pilot project. (Other partners included Yukon University and Yukon Energy.) This program aims to deploy 50 electric thermal storage devices in Yukon homes and monitor their effectiveness to provide capacity demand management and grid services.

Yukon completed a study and feasibility assessment that used machine learning to develop a virtual home energy assessment tool that would provide residents an overview of their home's

expected energy consumption, along with recommendations for retrofits. The model's recommendations would include potential energy, cost, and GHG savings based on the territory's unique context. The AI model was trained throughout Yukon using EnerGuide for Homes assessments. Since completing this study, the virtual assessment has been designed into an online rebate program application portal to allow homeowners to conduct a virtual assessment of their home, learn about recommended actions, and apply for rebates all in one location. This tool was officially launched in the summer of 2021.

Buildings

In this section, we provide an overview of existing building codes, building code update plans, and energy rating and disclosure activities.

Building codes

Table 89. Existing building codes, territories

Territory	Houses and small buildings	Commercial, institutional, and multi-unit residential buildings	Notes
NT	NBC 2015	NECB 2017 (Yellowknife)	The City of Yellowknife adopted the NECB 2017 in September 2019
NU	NBC 2015	-	
YK	NBC 2015	NECB 2017 (Whitehorse)	The City of Whitehorse requires commercial construction to adhere to the 2017 edition of NECB and has requirements exceeding NBC 2015.

All territories have adopted the most recent version of the National Building Code, though none have adopted the National Energy Code for Buildings at the territorial level. Rather, action on the latter appears to have been taken at the municipal level, where most of the territorial population lives.

The City of Whitehorse regulated new construction through the Building and Plumbing Bylaw. Requirements under this bylaw include thermal insulation values of R-28 walls, R-60 attics, and a maximum of 1.5 air changes per house (@ 50 Pa). A certified Heating, Refrigeration and Air

Conditioning Institute of Canada designer must install heat recovery ventilator systems. The exceptions are residential accessory buildings and cold storage buildings. The City of Yellowknife has previously adopted an EnerGuide 80 standard, but dropped the requirement following the redesign of the federal EnerGuide rating system. In September 2019, a new by-law adopts standards 25% higher than the 2015 National Building Code.[132]

Building code update activities

We posed the same question regarding building code update plans as activities to the territories as we did the provinces. Only Yukon completed an information request.

In its response, Yukon indicated that it is committed to working with Government of Canada to develop and implement building codes suitable to northern Canada that will aspire to see all new residential and commercial buildings be net zero energy ready by 2032. Its Our Clean Future strategy also commits the territory to continue to require all new Government of Yukon buildings to be designed to use 35 per cent less energy than the targets in the National Energy Code for Buildings, in accordance with the Government of Yukon's Design Requirements and Building Standards Manual.

Energy rating and disclosure

The City of Whitehorse requires that all new homes constructed within city limits undergo an EnerGuide energy assessment. There is no mandatory disclosure of the results, though labels are affixed to the home's electrical service panel. Yukon Good Energy rebate program for new homes and insulation upgrades to existing homes also require EnerGuide assessments.

Transportation

In this section, we provide an overview of initiatives to support efficiency improvements in personal vehicle transportation through vehicle incentives, and support and policies concerning electric vehicle charging infrastructure. We are not able to track electric vehicle registrations in the territories as this data is not provided by Statistics Canada.

---

[132] Sarah Pruys, "Yellowknife Introduces New Energy Efficiency Rules," Cabin Radio, September 18, 2019, https://cabinradio.ca/21662/news/yellowknife/yellowknife-introduces-new-energy-efficiency-rules/.

Vehicle incentives

Though no territory has a full zero-emission vehicle mandate in place, in its Our Clean Future strategy, Yukon has committed to targets for ZEVs to comprise of 10% of light-duty vehicle sales, and 30% by 2030.[133]

Table 90. Electric vehicle incentives, territories

Territory	New vehicles	Used vehicles	Non-automotive / Specialty-use vehicles
NT	$5,000	-	-
NU	-	-	-
YK	$3,000 - $5,000	Up to $1,500 (to cover shipping costs)	Yes

Yukon provides the most comprehensive vehicle incentives through its Good Energy Clean Transportation program. The program provides incentives for both new and used hydrogen, electric, and plug-in electric vehicles, as well as motorcycles, zero-emission snowmobiles, e-bikes, and e-cargo bikes. In the Northwest Territories, the AEA launched the Electric Vehicle Incentive Program in June 2020, which provides rebates to reduce the cost of purchasing and using an electric vehicle. This program is only available in Yellowknife and Hay River, which are served by hydroelectricity. The program provided a total of five rebates, with a value of $26,000 with $5,100 average rebate value (four in Yellowknife and one in Hay River), in 2020.

Charging infrastructure

According to Natural Resources Canada's online electric charging and alternative fuelling stations database, there are presently six public charging stations in Yukon, and one in Northwest Territories.[134]

The AEA's Electric Vehicle Incentive program provides support for Level 2 charging station installations (up to $500). In 2020, Yukon began offering rebates for Level 2 chargers to homeowners, businesses, municipalities, and First Nations. Rebates cover 50% of costs up to

[133] Government of Yukon, "Our Clean Future: A Yukon Strategy for Climate Change, Energy and a Green Economy" (Whitehorse, YK: Government of Yukon, September 14, 2020), https://yukon.ca/sites/yukon.ca/files/env/env-our-clean-future.pdf.

[134] Natural Resources Canada, "Electric Charging and Alternative Fueling Stations Locator."

$750 for residential units and up to $4,000 for multi-unit residential buildings, commercial or institutional units. The territory's Our Clean Future strategy sets the following goals:[135]

- Continue to install fast-charging stations across Yukon to make it possible to travel between all road-accessible Yukon communities by 2027 and work with neighboring governments and organizations to explore options to connect Yukon with BC, Northwest Territories and Alaska.
- Require new residential buildings to be built with the electrical infrastructure to support Level 2 electric vehicle charging beginning on April 1, 2021 (The City of Whitehorse currently requires all new residential buildings in the greater Whitehorse area be built with the electrical infrastructure to support Level 2 electric vehicle charging.)
- Draft legislation by 2024 that will enable private businesses and Yukon's public utilities to sell electricity for the purpose of electric vehicle charging.

In 2019, the Government of Yukon installed the territory's first electric vehicle fast-charging stations in Whitehorse and Carcross, with financial support from the Government of Canada and in partnership with the Carcross/Tagish First Nation, Northern Vision Development, Yukonstruct, Yukon College Innovation and Entrepreneurship, and ATCO Electric Yukon. Additional fast-charging stations were built in Marsh Lake and Haines Junction in 2020, and the government has tendered proposals to construct six more fast charging stations in 2021. All chargers are currently free to users.

[135] Government of Yukon, "Our Clean Future: A Yukon Strategy for Climate Change, Energy and a Green Economy."

Conclusions

This is Efficiency Canada's third Scorecard. With each edition, we have refined our methodology, expanded the range of metrics we evaluate, and deepened our research into the policies and outcomes of provincial energy efficiency efforts. This edition tracks developments in 2020 and early 2021—the first years of the COVID-19 pandemic. Our research shows that 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.

At the same time, the energy efficiency sector as a whole demonstrated resilience in face of these challenges. Program administrators across the country adapted program delivery methods to use virtual technologies. In the case of British Columbia, time-limited adjustments to incentive levels by both utilities and the government appears to have largely negated any detrimental impacts from the pandemic. And, as more Canadians get vaccinated, the ensuing recovery offers abundant opportunities to ramp up efforts and gain back the ground lost during the pandemic, and then some.

However, our historical tracking suggests some worrying trends in energy savings and spending. With few exceptions, program administrators across Canada appear to be maintaining the status quo, if not ratcheting back program offerings and budgets. As shown in the appendices below, Canada as a whole has fallen quite far from its annual incremental savings peak in 2017/2018, for both electricity and natural gas. To some extent, static (or moderately declining) budgets achieving progressively lower savings levels might be expected, as provinces without long histories of demand-side management are less focused on low-cost measures. On the other hand, some provinces are ratcheting back their energy efficiency ambition.

Recent commitments on the part of the federal government could help to address falling spending and savings at the provincial level. Between the Canada Infrastructure Bank's Commercial Building Retrofits Initiative and Natural Resource Canada's Greener Homes Program, nation-wide annual spending on energy efficiency could double. This additional spending could complement existing provincial programs and help to achieve deeper and wider energy savings. For this to occur, it will be important to ensure that federal and provincial

programs administrators coordinate efforts to leverage up participation and the scale of improvements undertaken. There is a danger that the provinces might react to federal funding by ramping down provincial support, as seen this year in Manitoba. This can be mitigated through coordination, federal program design, and citizen pressure in support of energy efficiency.

With this report, we can safely say that building-related energy efficiency policy is largely stalled in Canada. The 2030 target for all new buildings to be net-zero energy-ready is rapidly approaching and the Liberal Party campaigned on a plan for new buildings to be “net zero emissions” by 2025. Yet, the updated national model codes—formally titled the “2020” versions—have yet to materialize. The Construction Codes Reconciliation Agreement aims to reduce variation in provincial building codes and encourages provinces to adopt the latest codes. But we also fear it could perversely cap ambitions as provinces and municipalities are moving towards higher performance net-zero energy ready codes and/or zero-carbon codes. To achieve a net-zero emissions economy, we will also need building performance standards that set requirements on the energy use performance and/or greenhouse gas emissions of existing buildings. For that reason, we added the policy to this year’s Scorecard.

There is also considerable opportunity for a more coordinated approach to building energy rating and disclosure. The relevant pieces are all there, but bringing them together, connecting them to performance standards, and establishing mandatory disclosure requirements and procedures will take some effort. Greater transparency and accessibility of energy use and performance data could facilitate innovation in connection with information and communications technologies, support more targeted energy efficiency programming and grid modernization, and bring energy efficiency into real estate markets.

Finally, there is the capacity gap. If our aim is to meet our objectives for reducing buildings-sector GHG emissions, workforce readiness and development efforts are falling short. We found a smattering of related provincial work underway, but it is a far cry from the concerted, coordinated national approach that is needed. Federal and provincial governments could potentially close this gap by leveraging their existing training agreements, developing clear workforce requirement strategies, and aligning funding to realizing them (e.g., as in British Columbia). Professionalization best practices for building workforce energy literacy remain unclear. We hope to improve our coverage of this important policy area in future scorecards.

Provincial highlights

With this Scorecard, we aimed to highlight province-specific energy efficiency policy contexts, as well as strengths and opportunities for improvement. We base both strengths and opportunities for improvement on a combination of Scorecard findings and our understanding of provincial policy contexts. Opportunities for improvement are a combination of areas where a province might score relatively lower and/or where the province is poised to take advantage of existing strengths. These are highlights; we encourage readers to drill down into specific topic areas above to understand a given province's relative performance and policy mix.

Alberta

Alberta takes the 7th place rank, where it hovers just above the lowest tier of provinces. Following the closure of Energy Efficiency Alberta in June 2020, the province transferred some programs to other agencies, including Emissions Reduction Alberta, the Municipal Climate Change Action Centre (MCCAC), and the provincial government's Environment and Parks department. Emissions Reductions Alberta also launched new initiatives, such as the Industrial Efficiency Challenge, and the Energy Savings for Business program. The latter program has a budget of $55 million and provides incentives to help small- and medium-sized businesses make energy efficiency improvements and develop onsite energy generation.

Alberta remains one of the few North American jurisdictions that has yet to integrate energy efficiency into electricity or natural gas service. This year's results show that the province's savings remain amongst the lowest in Canada. Electricity savings as a percentage of domestic sales dropped from 0.8% in 2017 to 0.1% in 2020. As program savings and spending dwindle, the province may be losing critical expertise. There are 60 fewer Certified Energy Managers in the province this year, compared with the previous.

Alberta municipalities are acting. Rocky Mountain House, Devon, and Edmonton enacted by-laws enabling repayment of energy upgrades through the property tax bill, with application intake starting in late 2021. This is a continuation of the Clean Energy Improvement Program, launched by Energy Efficiency Alberta and carried forward by the Alberta Municipal Services Corporation. The City of Edmonton runs a voluntary building energy benchmarking program for large commercial and residential buildings and is also a leader in electric buses. The Municipal Climate Change Action Centre (MCCAC) offers a suite of programs to support municipal energy

efficiency, including support for municipal fleet electrification and municipal energy managers. The MCCAC also launch a program to support public electric vehicle charging in 2021.

Strengths

- **Municipal program support**: Provincial funding helps enable municipal energy efficiency. This support includes the continuation of the Clean Energy Improvement Program that finances energy upgrades through a property tax bill, and Municipal Climate Change Action Centre programs. The City of Edmonton also manages a Building Energy Retrofit Accelerator that provides financial incentives for energy efficiency upgrades to commercial and institutional buildings.

- **Public transit electrification**: Alberta has the highest share of electric buses (2% of total). This is largely due to Edmonton, which has 40 out of the 52 buses electric buses in the province. That means 43% of all electric buses in the country in 2020 were in Edmonton.

- **Industrial energy management**: Emissions Reduction Alberta administers strategic energy management programs for industry, and revenues from the Technology Innovation and Emission Reduction (TIER) regulation fund them. However, without a clear framework to support energy efficiency, the longevity of these programs is uncertain.

Opportunities

- **Energy efficiency resource standards**: Alberta maintained some efficiency programs but has some of the lowest levels of spending and savings in Canada. Unlike almost all other jurisdictions in North America, the province does not integrate energy efficiency into its management of electricity and natural gas savings. As a result, Albertans pay more than they need to for energy generation, in both economic and environmental costs.

- **Building codes**: Alberta is currently ahead of other provinces in adopting more stringent building codes, and it has signed onto an inter-provincial agreement that calls on the province to adopt national model codes 24 months after publication. When Codes Canada publishes the forthcoming national model buildings codes, Alberta should adopt them quickly, provide resources to support compliance, and encourage leading

municipalities to adopt higher performance levels to avoid locking in energy inefficiencies and carbon emissions.

British Columbia

British Columbia takes the top place in the Scorecard for the third year in a row. The province places first in enabling policies and buildings and second in transportation. It ties for first in industrial energy efficiency and reports a relatively large share of industries benefiting from energy management.

B.C. is not standing still. In October 2021, the province released an updated Roadmap to 2030, which included plans to make progress in several areas covered in our Scorecard. This includes adding a zero-carbon new construction building code by 2030 – which will add carbon emissions performance to the existing BC Energy Step Code while advancing the end-goal date by two years. The plan also commits to accelerating the zero emission vehicle mandate, developing energy efficiency standards for new buildings by 2024, home energy labels at point of sale, requiring all space and water heating equipment to be at least 100% efficiency by 2030, and moving ahead with PACE (Property Assessed Clean Energy) financing that repays energy upgrades through property tax bills.

Few of these new policies are used in this year's scoring, meaning that BC will likely increase its scores in future years. Unfortunately, no other province has committed to either a net-zero energy ready or zero carbon building code, which is a significant factor in the province's top rank.

In the energy efficiency programs category, British Columbia trails Prince Edward Island, Nova Scotia, and Québec. However, British Columbia's programs appear to have been the least impacted by the pandemic. Indeed, the government and utilities reacted to the pandemic by temporarily expanding energy efficiency incentives. In 2020, BC Hydro and FortisBC saved more energy than planned, while almost all other utilities tracked (except Énergir in Québec) fell short of their targets.

Nevertheless, British Columbia still lags other provinces in electricity savings. In previous scorecards, this was explained by an electricity surplus that resulted in more moderate objectives. However, the results of a recent draft Integrated Resource Plan demonstrate the

continued value of demand side management and the benefits of increased savings. The analysis showed that transitioning to more aggressive energy efficiency would produce $1.2 billion in long-term total resource savings, compared with business as usual.[136] A preliminary recommendation plans to maintain current energy savings levels for three years and then ramp up to higher savings, which can stave off any new energy needs until fiscal 2029, and capacity needs until fiscal 2032.

Strengths

- **Flexible response to COVID**: BC Hydro and FortisBC are among the few utilities that exceeded their savings and spending targets in 2020; most other utilities missed their goals in the year of the pandemic. Both utilities, as well as the government's Better Homes program, introduced time-limited adjustments to incentives on some programs to counter lower participation rates. This included doubling incentives under the Better Homes program, and the utilities' Home Renovation Rebate program. Adjustments to FortisBC commercial programs remain in place until the end of 2021.[137]

- **Transportation electrification**: BC leads the country in electric vehicle registrations. In 2020, 8.4% of total vehicle registrations were electric vehicles. It has an electric vehicle mandate and incentives for new and used electric vehicles, as well as speciality vehicles like cargo e-bikes (for businesses) and port vehicles. In 2021 the province expanded its strategies to include commercial fleets.

Opportunities

- **Implement PACE financing:** PACE financing allows repayment of energy upgrades through property tax bills. The province has been kicking the tires on this policy through a roadmap and pilot program announced in September 2020, as well as a pilot in Saanich. The new CleanBC 2030 roadmap says the province will proceed with next steps

---

[136] Difference in Net Total Resource Cost savings in the Higher Plus and Base scenarios. BC Hydro, "DRAFT 2021 Integrated Resource Plan" (BC Hydro, 2021), https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/integrated-resource-plans/current-plan/draft-integrated-resource-plan.pdf.

[137] FortisBC, "We've Got Even Bigger Rebates," FortisBC, 2021, https://www.fortisbc.com/news-events/current-promotions/we-have-got-even-bigger-rebates.

yet does not provide an implementation date. Five provinces have already passed PACE finance enabling legislation, and municipalities and advocates identify this policy as one of the key tools to help cities lead in climate change.[138]

- **Performance standards for existing buildings**: British Columbia is a national leader in taking a performance-based approach to regulating new buildings. The province is now considering regulating performance when building alterations occur. To meet GHG reduction targets and to prioritize the buildings most in need of upgrades, existing buildings should be required to meet minimum energy and GHG performance standards. New York City, Washington state, and several European jurisdictions all take this approach. A GHG emission building standard is also part of Vancouver's Climate Emergency Action Plan, with a target date of 2025 for implementation. To create the infrastructure for building performance standards, the province should rapidly implement mandatory home energy labeling and large building energy reporting.

  Target all cost-effective energy efficiency: The BC Hydro Integrated Resource Plan showed that even more energy efficiency would be cost-effective. The plan to accelerate transportation electrification as well as building heating systems and industry strengthen the case for higher electricity savings. The interim decision-making framework also undervalues additional savings by only counting job creation from energy generation projects instead of the significant jobs produced per dollar invested in energy efficiency,[139] and not considering how electricity rate increases can be managed by increasing participation in bill-reducing programs.[140]

  Under the province's Utilities Commission Act, utilities are required consider cost-effective demand-side measures first, and to explain to the regulator why subsequently proposed supply-side investments could not be met with demand-side management.

---

[138] "Help Cities Lead," Help Cities Lead, 2021, https://www.helpcitieslead.ca/.

[139] Dunsky Energy Consulting, "The Economic Impact of Improved Energy Efficiency in Canada: Employment and Other Economic Outcomes from the Pan-Canadian Framework's Energy Efficiency Measures."

[140] Courtney Lane and Kenji Takahashi, "Rate and Bill Impact Analysis of Rhode Island Natural Gas Energy Efficiency Programs" (Synapse Energy Economics, Inc., October 2, 2020), https://www.synapse-energy.com/sites/default/files/Synapse%20RI%20Gas%20RBI%20Report-20-037.pdf.

This effectively prioritizes energy efficiency, yet the legislation does not require utilities to target all cost-effective energy savings. A clearer “all cost effective” requirement as seen in leading American states, would ensure beneficial energy savings in both electricity and natural gas fuels are not left on the table, and would help the province achieve its GHG reduction and electrification goals.

Manitoba

Efficiency Manitoba had the inconvenient task of assuming administration of energy efficiency programming right at the start of the pandemic (April 2020). Overall, the province falls to eighth place in this year’s ranking, compared to sixth place last year.

The pandemic negatively impacted Manitoba’s efficiency programs, as the province fell short of budgeted spending and savings targets (though it did achieve a modest improvement in electricity savings / domestic sales over the previous year).

Manitoba also achieved lower scores relative to other provinces in both the buildings and transportation policy areas. Almost all provinces except New Brunswick have now moved beyond the 2011 version of the National Energy Code for Buildings that Manitoba still uses. Because codes and standards play a significant role in the province’s energy targets, the province is well placed to place additional focus on updating building codes.

Despite Manitoba’s vast hydroelectric resources, the province has few policies to promote electric vehicle purchases and charging, and its active transportation strategy ended five years ago. The province could be doing more to leverage its clean electricity resources to improve efficiency in transportation and reduce greenhouse gas emissions.

Existing policies hamper more efficiency investments, leaving Manitoba in seventh place in per capita program spending. Like other provinces, Manitoba relies on federal funding to support some energy efficiency programs. However, this support reduced utility funding to Efficiency Manitoba, instead of being used to expand activities to achieve more energy savings and

emission reductions. [141] Manitoba also lacks control over carbon pricing revenues, which could be an additional energy efficiency funding source.

Strengths

- **Clear mandate for Efficiency Manitoba (targets):** Manitoba remains one of the few provinces with clear, long-term, legislated targets for both electricity and natural gas through the Efficiency Manitoba Act. There is still lots of room for the province to catch-up to jurisdictions such as Nova Scotia, Ontario, and British Columbia in program savings. Manitoba's program savings targets are in fourth place for natural gas and electricity, when we exclude savings from codes and standards.

Opportunities

Transportation and heating electrification: Efficiency Manitoba has a mandate to save both electricity and natural gas, and Manitoba Hydro provides both electricity and natural gas services (through its subsidiary, Centra Gas Manitoba). This administrative structure means the province is well placed to optimize the energy efficiency and GHG reduction value of electric heat pumps, while strategically using fuels to manage peak power demands. Manitoba could implement an integrated decarbonization strategy like that of Québec.

Net-zero building code: Manitoba has a history of leadership in adoption of energy efficient codes and standards, but this role has waned. With the expected publication of a national model building code that provides a path towards net-zero energy-ready new buildings, Manitoba can jump ahead and avoid locking in unnecessary energy waste and GHG emissions by swiftly adopting the new model code.

New Brunswick

New Brunswick moved up one ranking from last year to sixth place. Like most provinces, program spending fell short of what was planned in 2020 due to the pandemic. However, program spending targeted to low-income households increased 81% from last year's scorecard.

---

[141] Sarah Lawrynuik, "Federal Funds to Cut Hydro's Own Bill for Efficiency Programs," The Toronto Star, April 15, 2021, sec. Canada, https://www.thestar.com/news/canada/2021/04/15/federal-funds-to-cut-hydros-own-bill-for-efficiency-programs.html.

New Brunswick Power has been involved in significant strategic thinking on grid modernization over the years, through initiatives such as the Smart Grid Atlantic research project and PowerShift Atlantic, which demonstrated a virtual power plant to store renewable energy in electric water heaters. In September 2020 the regulator finally approved an application to install advanced metering infrastructure. The utility aims to begin meter upgrades in March 2022.

In January 2021 New Brunswick also formally adopted building codes for houses and small buildings, as well as those for larger buildings. However, building officials will not enforce the new codes until January 2022. Further, the province adopted the 2011 version of the National Energy Code for Buildings for commercial, institutional, and multi-unit residential properties, even though two more recent versions of the code are available.

Strengths

- **Smart grid**: New Brunswick will start installing smart meters in 2022. Most importantly, New Brunswick Power has plans to leverage these meters to support customer engagement and energy efficiency through high bill alerts, more detailed energy use data, and better targeting and evaluation of efficiency programs.

- **Energy efficiency research**: In 2019 and 2020, the Natural Sciences and Engineering Research Council (NSERC) awarded more than half of its energy-related grants for New Brunswick efficiency research projects. It awarded its most significant grant to the University of New Brunswick, which has partnered with Saint John Energy in a bid to reduce peak demand through machine-learning forecasting and demand-side solutions such as thermal energy storage.[142]

Opportunities

- **PACE financing**: Property Assessed Clean Energy financing enables repayment of energy upgrades through property tax bills. Action 35 of the 2016 Climate Action Plan identified PACE as an opportunity, and in 2021 local experts outlined a policy framework

[142] Eduardo CastilloGuerra, "Integrated Dispatchable Resources Control Systems for Peak Load Management in Local Electricity Distribution Networks," NSERC's Award Database, 2021, https://www.nserc-crsng.gc.ca/ase-oro/Details-Detailles_eng.asp?id=694836.

to bring the tool to New Brunswick.[143] New Brunswick could join Prince Edward Island, Nova Scotia, and several other provinces in enabling use of this tool to support energy efficiency and municipal energy plans.

- **Industrial energy efficiency**: New Brunswick maintained similar electricity savings as last year. This overall result hides a change in composition due to sunsetting of Home Energy Reports and a move towards programs less focused on lighting. Savings in the industrial sector made up the difference. The utility is piloting a Strategic Energy Management program in 2021 that could yield higher industrial energy savings and market transformation in the future.

- **Building rating and disclosure**: New Brunswick programs encourage EnerGuide labels, and the province has implemented mandatory energy reporting for government buildings. It is time to expand on these building blocks. By mandating that homes disclose energy performance at the time of their sale, and that all buildings report energy usage, customers will have more information, and program administrators will be able to target deeper energy savings more effectively.

Newfoundland and Labrador

Newfoundland and Labrador falls back to last place in this year's Scorecard. Promising policies have yet to appear in the Scorecard metrics, and other jurisdictions are not standing still. For example, Saskatchewan lifted itself out of last place this year largely by implementing property assessed clean energy (PACE) financing.

Newfoundland Power and Newfoundland and Labrador Hydro have a 2021-2025 Conservation and Demand Management Plan that will promote electrification, which has been the primary recommendation of previous Scorecards, as well as the findings from Muskrat Falls "rate mitigation" proceedings. The plan includes incentives for residential and commercial electric vehicles; installation of 28 new fast charging stations (there are 14 now); and switching to electric heat pumps in commercial buildings. This plan also includes a modified cost-benefit

[143] "Financing Energy Savings for New Brunswick Communities through PACE," Efficiency Canada, May 31, 2021, https://www.efficiencycanada.org/advocating-for-local-financing-options-in-new-brunswick/.

test for electric vehicle programs that considers the non-electric benefits from lower fuel and maintenance costs from electric vehicles.

The utility also plans to create a new low-income energy efficiency program in 2021. This could enable an increase in investments to reduce energy poverty. In 2020, Newfoundland and Labrador spent $6 for every household in energy poverty, while Prince Edward Island spent $187 and Nova Scotia $65.

Newfoundland and Labrador's plan to use more efficient and lower carbon electric transportation, while maintaining energy efficiency programs, should result in energy efficiency policy improvements. To maximize the effectiveness of this plan, and to keep up with other provinces, Newfoundland and Labrador will require more extensive enabling policies.

Strengths

- **Electrification strategy:** The province will reduce emissions and increase energy efficiency by replacing heating and transportation oil with electricity. This is a strategic use of the province's expected electricity surplus from Muskrat Falls, with potential to mitigate rates while reducing overall energy bills. The 2021-2025 Conservation and Demand Management Plan establishes a strategy to promote electrification, reduce peak power demand via efficiency and demand side resources, and appropriately evaluate costs and benefits

Opportunities

- **PACE financing:** Property Assessed Clean Energy (PACE) financing enables energy upgrades to be repaid through a property's tax bill. This provincial policy change can catalyze municipal retrofit strategies and will make municipal applications to the Federation of Canadian Municipalities Community Efficiency Finance (CEF) Initiative more competitive. To support electrification goals, this system could help finance commercial and residential electric vehicle charging stations and electric heat pumps.

- **Energy poverty programs**: Thirty-eight percent of households in Newfoundland and Labrador spend more than 6% of their income on energy. These households will be most impacted by rate increases from Muskrat Falls and are unlikely to be the primary participants in electric vehicle programs. The 2021-2025 Conservation and Demand Management Plan takes an important step in offering a low-income efficiency program;

however, it is focused on “shallow” energy savings and broad participation via energy-saving kits. Provincial and federal governments as well as utilities should coordinate to meaningfully reduce utility bills for those most vulnerable by targeting deeper energy savings per household and moving low-income households that rely on fuel oil towards more efficient heat pumps.

- **Industrial energy management:** There is no industrial energy management program offering in Newfoundland and Labrador, and the utilities’ 2021-2025 CDM plan does not appear to address this gap. This represents a missed opportunity because the 2020-2034 conservation potential study identified considerable efficiency potential in the province’s industrial sector. Newfoundland and Labrador should consider an Energy management system (ENMS)/Strategic Energy Management (SEM) offer, supported by carbon pricing revenues, that focuses on GHG reductions in industry, as per the Alberta SEM and SEM for large final emitters program approach.

Nova Scotia

Nova Scotia maintains its third-place rank in this year’s Scorecard. The province performed well in the programs category, but again lost the top spot in this category to Prince Edward Island – which has emulated several of Nova Scotia’s program strategies.

Significant policy developments over the past year include the introduction of customer incentives for electric vehicles in February 2021, a policy that included used vehicles and e-bikes. The province has one electric vehicle charging station per 100 km of road, while leading provinces have six (Québec) and four (Prince Edward Island).

In early 2021, Nova Scotia Power released its final Integrated Resource Plan, which included deep decarbonization scenarios. However, the plan undervalued the benefits of energy efficiency by not including a long-term carbon price. It also failed to consider benefits outside of the electricity system—in particular, the GHG reductions and customer bill savings that come from replacing heating and transportation fossil fuel with electricity.

Nova Scotia aims to meet 80% of its electricity needs with renewable energy by 2030. Increased energy efficiency can complement this goal. Reduced demand makes the energy generation goal easier to reach. Saving energy within the province also provides greater domestic

economic and social benefits than imports, while mitigating the risk of delays and unexpected cost increases. The province's cleaner electricity can also be used to its greatest advantage by electrifying transportation and using efficient electric heat pumps, coupled with building improvements.

Voters elected a new provincial government in 2021, and it promises to use an "Environmental Goals and Climate Change Reduction Act" as its guiding environmental framework. This is renewing a framework introduced in 2007 that triggered significant policy progress and coincided with the consultations that created Canada's first energy efficiency utility in Nova Scotia. The province can continue its progress by setting energy efficiency related policy goals. However, despite the province's traditional leadership in energy efficiency the version of the Act passed in November 2021 has few specific energy efficiency goals included.

Strengths

- **Low-income energy efficiency**: Nova Scotia is one of Canada's top spenders on low-income energy efficiency (trailing only Prince Edward Island). Since 2015, provincial funding for non-electrically heated homes and a "charitable contribution" from Nova Scotia Power have supported the province's signature HomeWarming program for low-income homes. The charitable contribution agreement may end as soon as 2024.

  This opens a window of opportunity for the province to maintain and grow its leadership by renewing its low-income efficiency policy. Other jurisdictions secure access to low-income energy efficiency by setting minimum budgets in program portfolios (Manitoba and Vermont), by valuing the social benefits of low-income efficiency in cost-effectiveness tests (British Columbia and Ontario), and by establishing long-term funds (Manitoba). To make a real difference, a low-income program can establish energy poverty reduction as its overarching goal. This will target deeper energy savings per household and enable fuel switching away from oil towards efficient electric heat pumps.

- **Transportation electrification policies**: The Province of Nova Scotia introduced new customer incentives for electric vehicles (including used vehicles and e-bikes) in 2021 and Nova Scotia Power is piloting support for home EV charging that can replenish vehicle batteries during off-peak hours. The above-mentioned Environmental Goals Act commits to mandating that 30% of light-duty vehicle sales are zero-emissions by 2030.

(The latest data show that only 0.3% of sales are electric.) To meet this goal, the province will need the full suite of applicable policy tools, including expanding charging infrastructure and incorporating EV charging into building codes and municipal by-laws.

Opportunities

- **Energy efficiency resource standard**: A policy framework based on environmental and climate change goals should include an energy efficiency resource standard (EERS). Like the standard that requires 80% of electricity from renewables, an EERS directs a utility and/or program administrator to meet a certain percentage of energy needs through energy savings. Jurisdictions that have adopted an EERS have captured three times the savings of those that have not.[144] An EERS in Nova Scotia should follow the trend towards all-fuel efficiency goals combined with specific standards for electricity and fossil fuels.[145]

- **Net-zero building codes that enables municipal leadership:** Nova Scotia can adopt a British Columbia style energy step code with a commitment to make all new buildings net-zero energy-ready. A national model code that provides "tiers" to move towards net-zero is expected soon, and Nova Scotia has a history of leadership and swift adoption of the latest codes. While the province's latest version of the Environmental Goals Act includes a commitment to adopt the 2020 National Energy Code for Buildings, it excludes low-rise buildings and does not commit to a date when all new construction should meet a "net zero" standard.

  Our Scorecard information request this year also indicated that the province has not yet enabled municipalities to adopt steps or tiers that are more advanced than the minimum code. The province should allow municipalities that are ready to mandate higher performing buildings. Enabling municipal leadership is a clear benefit of a tiered code framework that will lock in environmental improvements faster.

---

[144] American Council for an Energy Efficient Economy (ACEEE), "Energy Efficiency Resource Standards."
[145] Rachel Gold, Annie Gilleo, and Weston Berg, "Next Generation Energy Efficiency Resource Standards" (Washington, D.C.: American Council for an Energy Efficiency Economy, July 30, 2019), https://www.aceee.org/research-report/u1905.

Ontario

Ontario maintains its fourth-place ranking, while sliding behind in several metrics. We are now seeing the impact of reductions in energy efficiency ambition and programming resulting from the ministerial directives that replaced the previous Conservation First Framework. Total program spending per capita for all fuels is now roughly half what it was two years ago.

In 2017, Ontario led the country in electricity savings, spending approximately $435 million. The September 2020 Ministerial directive caps the IESO's four-year budget for 2021-2024 at $692 million, or roughly $173 million per year on average – about 40% of its annual budget in 2017 and 2018.[146] The resulting 2021-2024 conservation framework targets are, on average, about 686 GWh in annual electricity savings, down from more than 2,200 GWh in 2017.

Natural gas conservation policy has entered a limbo-like state, where demand-side management budgets and target mechanisms continue to be replicated one year to the next, absent a longer-term framework or adjustment for inflation. The Ontario Energy Board and Enbridge are now working toward a replacement framework for 2023-2027. Despite a significant ramp up in natural gas conservation called for in the province's 2018 Environment Plan, the Ontario Energy Board has indicated to Enbridge that it anticipates "modest budget increases" in the near term, a decision based partly on a November 2020 communication from the government.[147]

This scaling back of ambition on electricity and natural gas efficiency programs is perplexing, as a recent 2019 integrated efficiency potential study identified significant cost-effective savings potential for both fuels, across the residential, commercial, and industrial sectors.[148] Ontario's previous leadership in energy efficiency and continued efforts in areas like grid modernization means it maintains a robust institutional system for demand-side management and substantial human resources and capacity. The province should take advantage of this

---

[146] Minister of Energy, Northern Development and Mines, "Ministerial Directive: 2021-2024 Conservation and Demand Management Framework."

[147] Christine Long, "Post-2020 Natural Gas Demand Side Management Framework, Board File Number EB-2019-0003," December 1, 2020, 2020, https://www.oeb.ca/sites/default/files/OEBLtr-Post-2020-DSM-Framework-20201201.pdf.

[148] IESO, "2019 Conservation Achievable Potential Study" (Toronto, ON: IESO & OEB, 2019), https://www.ieso.ca/2019-conservation-achievable-potential-study.

capacity and expand its program offerings, lest it dwindle away - Ontario lost 113 certified energy managers between 2019 and 2020.

Ontario leads on planning procedures to consider non-wires alternatives in electricity resource planning, where several pilot and approved projects remain in operation. A recent Ontario Energy Board (OEB) discussion paper proposes requirements for consideration of non-wires alternatives in regional and local infrastructure planning but stops short of requiring them as first options. There has also been an active discussion on "non-pipe alternatives" before the OEB natural gas Integrated Resource Planning process. A first-generation framework was recently concluded that requires consideration of both demand and supply-side alternatives. However, demand side solutions will be considered only for growth-driven projects or large replacement projects, and proposals to reduce natural gas demand through strategic electrification was rejected by the OEB. In recent years, Ontario has been expanding its natural gas network without a plan for decarbonization.

Strengths

- **Building energy reporting:** Ontario remains the only province with mandatory requirements for both energy performance benchmarking and disclosure for large commercial, institutional, and light industrial facilities (>100,000 square feet). The province also requires broader public sector energy and GHG reporting. However, a recent report from Ontario's Auditor General raised concerns about low compliance rates and questionable data accuracy.[149] The province should follow the recommendations of the Auditor General to improve the completeness and accuracy of its energy-use and performance database.

- **Grid modernization:** Ontario leads in several aspects of grid modernization, particularly non-wires alternatives planning and the leveraging of advanced metering infrastructure to support energy efficiency in the electricity system. However, the province could be doing more to provide real-time feedback to residential customers; we were unable to identify any such initiatives in operation in 2020.

---

[149] Office of the Auditor General of Ontario, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings, 2020," November 2020, https://www.auditor.on.ca/en/content/annualreports/arreports/en20/ENV_reducinggreenhousegasemissions_en20.pdf.

Opportunities

- **Energy performance standards**: Ontario could build upon its framework for energy performance benchmarking and reporting to implement mandatory energy performance standards for large buildings, as seen in Washington state and New York City. The province should also move ahead with extending requirements for energy performance benchmarking to smaller facilities (previously delayed until 2023) and strengthen efforts to promote energy management, given its capacity in Certified Energy Managers.

- **Non-pipe alternatives:** The OEB's recent decision on Enbridge's IRP framework proposal establishes requirements for the consideration of non-pipe alternatives, though it remains to be seen how extensive these requirements could become. The decision rejected consideration of electricity-based alternatives within Enbridge's IRP process. This is a missed opportunity for the integration of gas and electricity strategies.

Prince Edward Island

Prince Edward Island ranks fifth overall in this year's Scorecard and takes a commanding lead in the programs area. PEI leads the country in program savings and spending, as well as investments in low-income energy efficiency. The province saw some decreases in savings levels compared to last year, however other provinces saw much more significant decreases in savings and spending likely due to the influence of the pandemic.

In early 2021, the provincial government enabled PACE (Property Assessed Clean Energy) financing, allowing repayment of energy upgrades over time on property tax bills. In July 2021, the municipalities of Stratford and Charlottetown joined with Wolfville in Nova Scotia to launch a program that finances up to $40,000 in upgrades, interest-free, for 15 years.

In April 2021, Prince Edward Island also offered residents $5,000 to purchase a new or used electric vehicle. These incentives should enable Islanders to take advantage of the second most comprehensive EV charging network as measured by stations per kilometer of road (behind Québec).

efficiencyPEI became an efficiency utility in December 2017, and has achieved initial success under its first three-year plan. It must now submit a new plan for 2021-2023. A study of efficiency potential shows that it is cost-effective and achievable to increase electricity savings to meet the target in the 2016/17 energy strategy to see annual savings equal to 2% of sales.[150] This would likely solidify Prince Edward Island's lead in program savings and put it on par with leading American states. "Enabling policies" are key to sustainably achieving higher savings levels, which include areas tracked in our Scorecard, such as training, building energy labels, R&D and program innovation.

Strengths

- **Program Savings**: efficiencyPEI's first three-year plan achieved nation-leading energy savings, even while commercial and institutional programs remained under development. Energy efficiency services are available for both electric and fossil fuel energy sources under the "efficiency utility" model, and the province is encouraging strategic electrification.

- **Low-income energy efficiency**: The 2016 Census indicates that Prince Edward Island has the highest rate of energy poverty in Canada; 41% of households spend more than 6% of their income on home energy costs. However, the province is doing more than any other to direct energy efficiency towards lower income residents, spending $187 per household in energy poverty in 2020. This is far ahead of Nova Scotia, which spent $65.

Opportunities

- **Energy efficiency resource standard**: Prince Edward Island's 2016/17 energy strategy called for achieving energy savings equal to 2% of sales for both electric and fossil fuels. This Scorecard shows Prince Edward Island achieved savings of just under 1% of sales for both fuel types in 2020. Yet, ramping up to 2% savings for electricity is both cost-effective and achievable according to a recent potential study, and the province must reduce fossil fuel use with equal or greater commitment. Provincial policymakers should therefore have confidence in establishing a resource standard for energy efficiency, like regulatory standards to achieve a certain percentage of energy generation with

[150] Dunsky Energy Consulting, "Prince Edward Island Energy Efficiency Potential Study: A Comprehensive Assessment of Energy Efficiency and Demand Response Opportunities 2021-2030" (Montreal, QC: efficiencyPEI, 2020).

renewables.

- **Building energy rating and disclosure**: Prince Edward Island's efficiency potential study highlighted that a supportive policy environment is integral to achieving efficiency goals at lower cost and preventing diminishing savings as efficiencyPEI moves to more complex energy saving strategies. One way to encourage more participation and to target the buildings with the highest energy savings opportunities is to require that all buildings label and/or report energy performance. PEI is one of the few provinces without a mandatory or voluntary energy rating and disclosure program.

  The province can help efficiencyPEI continue to save energy, at lower cost, by requiring homeowners to obtain and disclose an EnerGuide rating at the time of sale or renting. With the second highest number of energy advisors per home, the province has the capacity to implement such mandatory labeling. For large buildings, PEI can follow Ontario's lead in requiring large buildings to report energy performance.

Québec

For the third year in a row, Québec landed in second place overall. The province maintained its lead in transportation with the nation's most comprehensive charging network, and a new commitment to eliminate the sale of fossil-fuel passenger vehicles by 2035. Québec slipped behind British Columbia in sales of electric vehicles this year, however.

In a significant 2021 development, Hydro-Québec and Énergir jointly proposed to promote dual-energy systems in buildings. This framework seeks to maximize the energy efficiency and GHG reduction benefits of electric heat pumps, while strategically using fuel to avoid electric peak costs. The gas utility is integrated within an electrification strategy, with Hydro-Québec paying the gas utility for the value of peak reductions to the electricity system.

Also notable: In January 2021, the Société de financement et d'accompagnement en performance énergétique (SOFIAC) launched with support from Fondaction, a labour-sponsored investment fund, and a $5.5 million start-up grant from the Government of Québec. The SOFIAC initiative takes on the financial, as well as technical and organizational aspects of projects for large buildings and industry.

Québec still has significant energy savings on the table, and it needs to prioritize demand reductions. A recent analysis by HEC Montreal found potential to cost effectively capture 4.7 TWh of annual savings through improved insulation, and 5.9 TWh by installing heat pumps in electrically heated buildings alone. To put that into context, Hydro-Québec aims to export 9.45 TWh to Massachusetts per year.[151] The latest modeling on how to achieve net-zero highlights how managing energy demand can provide 20% of the reductions required by 2050, while mitigating risks associated with unexpected economic and technological changes, increasing the impact of other low-carbon solutions, and producing benefits such as better air quality, less noise, and more livable cities.[152]

Strengths

- **Transportation electrification**: Québec has the most extensive charging network in Canada with six EV stations per 100 km of road. This year the province added 119 new DC fast-charging stations. In 2020, 6.8% of Québec's passenger vehicle registrations were electric, behind British Columbia's 8.4%. Québec has strengthened its zero-emission vehicle mandate to ban the sale of fossil fuel cars after 2035.

- **Heating decarbonization planning**: While other jurisdictions fight political battles over electricity versus natural gas, Québec's utilities have come up with a joint plan that recognizes the energy efficiency and GHG benefits of electrification and the role on-site fuels can play in managing electric peaks. Provinces with extensive oil heating, such as Nova Scotia and Prince Edward Island, are achieving the most significant savings from electric heat pumps thus far. Québec is already amongst the top provinces in natural gas savings, and this framework promises to enable strategic electrification to play a larger role.

---

[151] Adrien Voegtlin, "Quantification du potentiel d'efficacité énergétique du parc de logements québécois : des térawattheures à portée de main !," Rapport d'étude de la Chaire de gestion du secteur de l'énergie (HEC Montreal, 2021), https://energie.hec.ca/cgse-hec-re052021/. Note that savings figures for insulation and heat pumps should not be added together due to interaction effects.

[152] Dunsky Energy Consulting, "Trajectoires de Réduction d'émissions de GES Du Québec – Horizons 2030 et 2050" (Préparé pour le ministère de l'Environnement et de la Lutte contre les changements climatiques, June 2019), http://www.environnement.gouv.qc.ca/changementsclimatiques/plan-action-fonds-vert.asp.

Opportunities

- **Energy poverty and heat stress**: While Québec is renowned for its low electricity prices, 18% of households spend more than 6% of their income on energy. This summer Québec experienced record-breaking heat, which created dangerous conditions for lower income populations that lack access to energy efficient buildings and air conditioning. Québec has the third lowest spending per household in energy poverty—investing $9 per energy poor household on average. (Nova Scotia spent $65, and Ontario spent $33.)

- **Building energy rating and disclosure**: Québec requires government buildings to report energy usage and has launched a voluntary Building Energy Challenge for commercial and institutional buildings. Making energy reporting mandatory across the province will ensure Québec is able to identify the buildings most in need of upgrades and attract investments from domestic funds as well as national funds such as the Canada Infrastructure Bank's Commercial Building Retrofit Initiative.

- **Industrial energy management**: Québec's energy transition Master Plan includes providing additional financial incentives for ISO-50001 Energy Management certification and making it mandatory for all large enterprises in the future. The new SOFIAC program adds additional supports for ISO 50001 certification, and Québec has relatively robust energy management policy supports, except for energy audits. Québec can follow the lead of countries such as Germany, which require energy audits or ISO-50001 certification.[153]

- **Electricity savings:** A 2021 updated net-zero emission reduction pathway report projects that widespread electrification will require a 65% increase in electricity production (137 TWh above 2016 levels by 2050). These electricity needs can be met through energy savings rather than controversial and risky new generation projects. In 2020, Québec saved 0.5% as a percentage of sales, while Nova Scotia, the leading province, saved 0.9%.

[153] Federal Ministry for Economics Affairs and Energy, "National Action Plan on Energy Efficiency (NAPE): Making More out of Energy," 2014, https://www.bmwi.de/Redaktion/EN/Artikel/Energy/national-action-plan-on-energy-efficiency.html.

Saskatchewan

Saskatchewan reclaimed its second-last position in 2020. The province continues to score at or near the bottom on electricity and natural gas program savings and spending. It ranks third in electricity capacity savings, which is solely due to demand response which avoids short-term costs yet does not capture long-term energy and GHG reduction benefits. There are no provincial requirements for utilities to consider efficiency in resource planning, and neither of the two utilities publishes targets for energy savings. Indeed, SaskPower is no longer targeting energy savings through efficiency programming, but continues to administer supporting initiatives focused on education and awareness.

In 2020, the province took steps to enable energy efficiency improvements in municipalities by passing PACE (Property Assessed Clean Energy) enabling legislation, which allows the repayment of retrofit costs via property tax bills. This provincial policy change has already prompted Saskatoon to launch a Home Energy Loan Program.

There has been some progress on advanced metering infrastructure, including near 100% coverage of natural gas customers with two-way meters. However, neither utility is yet leveraging this infrastructure to promote energy efficiency to a significant extent.

Saskatchewan adopted the most recent version of the National Energy Code for Buildings and signed the Construction Codes Reconciliation Agreement to reduce variations in building codes between the provinces, but in the absence of the still-pending national model code updates there is much that can still be done. For example, the province could pursue building energy performance standards, energy rating and disclosure initiatives, and/or support for code compliance.

Saskatchewan has the lowest electric vehicle (EV) charging availability, with 0.1 charging stations available per 100 km of road, while Québec has 6 stations per 100 km. Despite this lack of infrastructure for EVs, the province is the first government in Canada to charge an annual tax on electric vehicles. Citizen groups suggest delaying the tax until 1.3% of vehicles are electric.[154]

[154] Saskatchewanians for Sidewalk Sustenance, “Delay the EV Tax,” 2021, https://sidewalktax.ca/.

Strengths

- **PACE Financing**: In 2020, Saskatchewan passed enabling legislation to allow municipalities to implement programs to fund energy efficiency improvements through property tax bills. The City of Saskatoon recently implemented the Home Energy Loan Program (HELP) to support energy efficiency, renewable energy, and reduced water use through loans of up to $60,000, repaid through property taxes. To improve uptake of this financing solution, Saskatchewan could create a province-level program to help municipalities, as seen in Alberta and Nova Scotia.

Opportunities

- **Energy efficiency resource standards:** Saskatchewan should develop a stronger, clearer framework for treating efficiency as a resource in both the electricity and natural gas systems, along with more rigorous and transparent public planning and reporting procedures for demand-side management. SaskPower recently conducted a beneficial electrification potential study, but its results have yet to be made public. More public oversight and stronger guidelines would help Saskatchewan fully realize its energy efficiency potential and associated GHG reduction benefits.

- **Carbon price revenues:** Saskatchewan administers the output-based carbon pricing system for industry and allocates associated revenues to a Technology Innovation Fund, administered by Innovation Saskatchewan. The province should formally recognize energy efficiency as an eligible project under this initiative to increase public funding and support for industrial energy efficiency.

Federal policy implications

This year saw significant policy movement at the federal level which impacts provincial energy efficiency policy. This includes:

- The **Canada Infrastructure Bank (CIB)** included large building retrofits in its growth plan. The CIB earmarked $2 billion in funding for building retrofits and then worked with market experts to design a program. In 2021, the CIB launched a Commercial Building Retrofits Initiative, alongside one for public buildings. In last year's Scorecard, we recommended developing a financing platform with objectives to transform financial markets to value energy savings. Provincial governments and utilities can now boost their local energy savings by aggregating commercial and multi-unit residential building energy efficiency projects for investment from the CIB.

- The **Greener Homes Program** and $40k loans. Natural Resources Canada launched a residential homeowner energy efficiency program that offered up to $5,000 in grants combined with EnerGuide assessments and labels. Budget 2021 announced support for $40,000 interest free loans, though the government has yet to release program details. If combined with provincial and utility incentives and marketing, this policy mix will support more deep-energy retrofits. Coordination between federal and provincial programs will be important to achieve these deeper retrofits and to make sure federal funding entices more provincial efforts.

- **National Zero-Emission Vehicle (ZEV) Mandate**: Last year's Scorecard called for a national ZEV mandate. In June 2021, the federal government announced it would use a "a combination of investment and regulations" to require all car and passenger truck sales to be zero-emission by 2035.[155]

The federal government can still support and catalyze better provincial energy efficiency performance. This year we identify the following four areas for action.

[155] Government of Canada, "Building a Green Economy: Government of Canada to Require 100% of Car and Passenger Truck Sales Be Zero-Emission by 2035 in Canada."

1. **Take leadership to stop the stalling of building codes**: As we write this year's Scorecard, we have yet to see the 2020 national model codes for new buildings. The 2020 federal climate plan also calls for development of a model "retrofit" code by 2022, yet the most recent timeline provided by the Canadian Commission on Building and Fire Codes (CCBFC) does not anticipate developing a retrofit code until 2030.

   The delays in producing model building codes are stalling provincial policy progress. Only British Columbia has committed to making new building net-zero energy-ready and provides a path to get there with its BC Energy Step Code. BC is now moving forward with a zero-carbon building code. British Columbia is also the only province that is actively developing a code for building alterations.

   The delays are not surprising, given that the policy priorities that drive codes development is controlled by the provinces and territories through the Provincial/Territorial Policy Advisory Committee on Codes (PTPACC), which does not have a clear roadmap to achieve net zero buildings. A group of volunteers with building-industry connections then develop the codes. This model might have worked well when the task was producing accepted minimum health and safety standards. Today, the climate emergency calls for a policy framework where governments specify the required building performance levels and then work to transform markets to deliver them.

   To put building code development on track, the federal government can take leadership over the process, increase resources to the National Research Council of Canada, and provide resources to provinces, municipalities, and utilities for activities such as training and code compliance to facilitate more rapid adoption.

2. **Transform building retrofits**: As opportunities to improve efficiency in low-cost areas such as lighting diminish, provincial and utility energy efficiency portfolios need to chase deeper savings. Canada's net-zero emissions target means all buildings must be placed on a path towards zero emissions at a rapid timescale compared to typical renovation rates.

   Dominant provincial policy systems, largely based on utility demand side management, are well placed to ensure accountability and measurable results. However, restrictive cost-effectiveness tests—as well as a market structure that makes retrofits more

difficult and expensive than they need to be—is leading to missed opportunities for deeper energy savings.

The federal government should take a mission-oriented approach to transforming the retrofit process, with institutional structures focused on developing economies of scale and encouraging new business models that can retrofit buildings at lower cost, faster speeds, and higher performance. We outline such a strategy in "Canada's Retrofit Mission," a 2021 Efficiency Canada report.[156]

With a federal focus on retrofit process innovation and building economies of scale, provincial policy systems will see greater cost-effective energy saving opportunities and opportunities to engage local communities in large-scale retrofit projects.

3. **Expand scale and scope of low-income energy efficiency**: Every province targets at least some money towards low-income energy efficiency, with total funding in 2020 of $115 million dollars. This level of investment is far below what is required to retrofit the 20% of Canadian households that today find themselves in energy poverty.

   As it plans to increase its backstop carbon price to $170 per tonne, the federal government should urgently work to improve the energy efficiency and GHG performance of low-income homes. Low-income Canadians will not have the same opportunities to escape this price because they cannot afford the up-front costs or take on loans required to participate in new federal programs. The lack of federal support for low-income households is a policy gap that needs to be filled to achieve net-zero climate targets, while promoting justice and equality.

   Provincial policy systems can face constraints prioritizing deeper energy savings and switching towards zero-carbon fuels due to restrictive cost-effectiveness tests, fuel silos, and funding caps. However, the federal government can leverage these program delivery systems to achieve national objectives to reduce energy poverty and GHGs. This will require enough federal funding to direct these programs to achieve deeper savings per household and switching towards zero carbon fuel sources.

---

[156] Haley and Torrie, "Canada's Climate Retrofit Mission: Why the Climate Emergency Demands an Innovation-Oriented Policy for Building Retrofits."

4. **Promote energy management systems in industry**: Energy management systems promote continued improvement in performance and better energy intelligence for industry. This is why the Generation Energy Council introduced an objective to see 75% of industrial energy use benefitting from energy management system by 2030.

   We have done our best to track progress towards this goal, yet the federal government still does not produce the data that would make it straightforward to do so. With the approximate data we were able to collect, British Columbia might have 40 to 50% of industrial energy use benefiting from energy management, with other provinces below 10%.

   Most provinces have comprehensive industrial efficiency programs, but do not require certification under recognized standards such as ISO-50001. Certification is important as a guarantee that effective energy management systems have been developed and remain in place, continuing to deliver energy efficiency savings. The federal government should significantly expand its existing program to support ISO-50001 certification, and work to leverage provincial programs. It should also consider making such certification mandatory to participate in federal economic development and GHG emission reducing programs.

   The federal government should view better energy management systems in industry as an enabler of the comprehensive industrial transformations it is seeking through the Net-Zero Accelerator. Better energy tracking, on-site energy managers and expert consultations, and workforce engagement are all pre-requisites to successfully identify and implement transformative decarbonization projects.

Appendix A: Information Request Respondents

In May 2021, Efficiency Canada circulated an information request to government and utility/program administrator representatives in each province. We contacted each representative beforehand to introduce the scorecard project and confirm their participation. We received a response to all information requests, though in some cases government and utility/program administrators worked together to return a combined response.

Respondents to information request	
Province	Respondents
Alberta	Alberta Ministry of Environment and Parks
	Emissions Reduction Alberta
	Municipal Climate Change Action Centre
British Columbia	British Columbia Ministy of Energy, Mines and Low Carbon Innovation
	BC Hydro
	FortisBC
Manitoba	Manitoba Conservation and Climate
	Efficiency Manitoba
New Brunswick	New Brunswick Ministry of Energy and Resource Development
	New Brunswick Power
Newfoundland and Labrador	Department of Municipal Affairs and Environment, Climate Change Branch
	Newfoundland and Labrador Hydro
	Newfoundland Power
Nova Scotia	Nova Scotia Department of Energy
	Efficiency Nova Scotia
Ontario	Ontario Ministry of Energy, Northern Development and Mines
	Ontario Ministry of Environment, Conservation and Parks
	Ontario Ministry of Transportation
	Ontario Energy Board
	Independent Electricity System Operator (IESO)
	Enbridge Gas

Prince Edward Island	efficiencyPEI
Québec	Ministère de l’Énergie et des Ressources naturelles
	Hydro-Québec
	Énergir
Saskatchewan	Saskatchewan Ministry of Environment
	SaskPower
	SaskEnergy

Appendix B: COVID-19 program administration and delivery impacts

COVID-19 pandemic impacts on program administration and delivery		
Province	Organization	Response
		Due to Covid restrictions some programs that had in-person elements (e.g. On-site Energy Managers program and the Strategic Energy Management programs moved to a more virtual delivery method. This included conducting virtual energy assessments, monthly meetings using Skype/Teams, educational sessions with in--person element removed. While this reduced some of the networking elements, the programs were still successful in achieving significant energy and emissions reductions.
AB	Environment and Parks	Carbon Connect International administers a methane reduction program, and an emissions benchmarking program. They reported that the COVID-19 pandemic had largely impacted jobs as well as production in the industry. Companies are short staffed and do not have capital to spend on retrofit/emission reduction projects. The administration of programs has been challenging to get companies to spend capital even with a financial incentive. Additionally lockdown has made it a challenge to market the program and ensure everyone who is eligible is aware of the program. The projects which are proceeding through the programs have also seen challenges due to limited inventory or availability of equipment and delays in shipping.
AB	MCCAC	While the MCCAC saw an initial slow down in program participation due to the COVID-19 pandemic, the slow down was short-lived. While many public facing facilities such as recreation centres in municipalities were closed, many municipalities determined this downtime was an opportune time to move forward with energy efficiency retrofits because there would be minimal impact/interruptions on recreational activities. Energy construction projects were determined as essential in Alberta during the pandemic which also allowed for solar PV installations to continue uninterrupted.

AB	ERA	In response to the economic impacts associated with COVID-19 and other factors, additional programs were announced and launched in 2020/2021 as part of a broader economic stimulus initiative. Program administration and delivery of programs was largely unaffected with the main changes relating to a reduction of on-site administrating activities, e.g. transition from on-site verification to remote video-conference site inspections.
BC	EMLCI	Due to an anticipated drop in program uptake, the CleanBC Better Homes, along with the Utilities Home Renovation Rebate program, doubled incentives on many measures between Sept 2020 and March 2021. Public consultations for programs where it was required were held virtually and energy inspections or site verifications were either cancelled or performed virtually. The $8 million Building Innovation Fund program was expanded to include scoring applicants for the economic stimulus their projects would create in areas hard hit by COVID-19. Virtually all programs are being executed by Ministry staff working remotely, and can revisit their offices only under strict health guidelines.
BC	BC Hydro	In the initial months of the pandemic, there was a reduction in the number of participants in our traditional DSM programs as a result of a number of factors, including increased difficulty in accessing and implementing projects in customer's homes and businesses, financial hardship for some customers, and an overall reduction in load which reduces the overall conservation potential. However, many customers remained engaged and BC Hydro attempted to mitigate impacts by implementing activities virtually, where possible, developing and implementing safety protocols where site visits remained necessary, and introducing some time-limited changes to offers, such as increased incentives, to encourage participation. As a result, participation returned to close to planned levels for many programs after the initial months.
BC	FortisBC	FortisBC experienced only minor negative impacts to program performance in 2020 other than direct install programs such as the Income Qualified Energy Efficiency Conservation Assistance Program and the Rental Apartment Efficiency Program. FortisBC responded quickly by implementing COVID-19 Recovery offers for all sectors to ensure they met their DSM 2020 approved program targets for expenditures and savings in consideration of pandemic-related slowdown and kept the offers in market for at least end of 2021. The offers were intended to support the BC Restart Plan, customers, and the energy efficiency industry as a whole adding to economic recovery of the province. FortisBC partnered with Home Renovation Program Partners BC Hydro and CleanBC to launch Double Rebates on heating systems campaign which exceeded all expectations of program targets.

MB	Efficiency Manitoba	Since the onset of the COVID-19 pandemic in March 2020, Efficiency Manitoba has been actively monitoring and adjusting its COVID-19 safety policies and procedures for in-home and in-business services. Efficiency Manitoba implemented comprehensive safety policies and procedures for in-home and in-business services provided through private sector service providers. At various points in the year, in-home and in-business services were suspended due to public health orders, which significantly impacted delivery models for programs along with reduced resulting energy savings. Some exceptions were made for the following limited scenarios: Programs targeted at First Nation on-reserve customers were impacted by COVID-19, as non-essential northern travel was suspended and continued to be suspended into 2021.
NB	NB Power	With the health and safety of customers, contractors, and staff of utmost priority, NB Power shut down its efficiency initiatives for 3 months. The targets that had been set for the year were revised to reflect the shut down and subsequent increased safety protocols required in a Covid landscape. Protocols and procedures on how to approach site visits throughout the phases issued by GNB were developed and all affected parties were trained on these new standards. There were no major repercussions in the residential sector (an increased number of participants were seen in the opened months of 2020), however the commercial sector did see reduced participation and completion rates as a result of the effects of covid within that sector.
NL	NL Hydro	NL Hydro takeCHARGE rebate programs were administered as per usual. The Isolated Communities Energy Efficiency Program (ICEEP), which requires entry into customer homes/businesses to complete direct installs, was delayed in implementation due to the need to develop procedures to execute the program safely and product supply delays during the COVID-19 pandemic. Program delivery was adapted to include energy saving kits that could be dropped off and modified QA procedures reduced safety risks and allowed the program to run in 2020.
NL	NL Power	COVID-19 caused a significant scaling back of outreach and community activities for Newfoundland Power. We were unable to perform our usual in-person events such as trade shows and retailer days which are big drivers of program participation. We were also forced to stop in-person visits with commercial customers for a period of time, but managed to overcome this through virtual consultations. Despite this, Newfoundland Power was still able to exceed our Energy Savings target in 2020.

NS	Efficiency Nova Scotia	E1 responded to the various challenges and opportunities as related to COVID-19 as follows: • in response to public health and government directives regarding COVID-19, E1 made adjustments to some of E1's programs and services. From March 17 to June 15, 2020, E1 suspended all in-home activities, assessments, and in-business audits. Marketing campaigns were also paused during this time; • modifications to service delivery for some programs (e.g., appliance pick-up outside the residence, virtual audits, etc.); • development of a plan for full business resumption that incorporated the latest public health advice and directives on COVID-19; • development of protocols for Safe Work Practices for delivery partners and staff. This included requirements for physical distancing, enhanced cleaning, non-medical masks, and other safety measures; • exploration of alternative service delivery approaches such as virtual and remote audits;
NS	NS Govt	All Efficiency Nova Scotia programs that involved in-home visits and assessments were suspended from March 17, 2020 until June 15, 2020. This action was taken to protect the health and safety of Efficiency Nova Scotia employees, partners, program participants and to cooperate with public health officials' efforts to stop the spread of COVID-19. Efficiency Nova Scotia also implemented comprehensive safe work practices and protocols before resuming on site visits to protect program participants and workers and reduce the spread of COVID-19. Additionally, Efficiency Nova Scotia examined how they deliver programs and services, and launched a pilot on virtual and remote home audits that uses data analytics to help homeowners identify efficiency opportunities and estimate potential savings.
ON	Enbridge	Residential The Covid-19 pandemic and the associated public health initiatives including lockdowns posed a challenge for Enbridge Gas's DSM programs impacting program delivery as Service Organizations, Energy Advisors and Contractors had to suspend participants' home visits and contract vendors were unable to visit homes and conduct upgrades during the stay-at-home orders. Ongoing impacts, including the willingness of some customers to have auditors in their homes have persisted and impacts will continue to be monitored. The Smart Thermostat program also experienced a slow down due to the closure of non-essential retail. This meant that customers could only purchase devices at eligible online retailers. Program participation during the closures was much lower than forecast as a result. Marketing

		and communications were also suspended for periods of time due to Covid-19. Once the Company was able to return to normal program operations, updates were made to marketing and communication materials including specific language for Covid impacts, as well as outlining language for Delivery agents re: Covid-19. Low Income The COVID-19 pandemic had a major impact on the Home Winterproofing Program and the Stand Alone Smart Thermostat Program. In home assessments and retrofits were cancelled or put on hold for significant time periods. There was hesitancy from some customers to reschedule their appointments once the lockdown restrictions were lifted. In addition, Energy Advisors and Installers were required to complete additional COVID-19 safety protocols including sanitization and PPE. The ongoing program suspensions necessitated additional support from marketing and customer service groups to ensure the most updated and accurate information was being shared. Commercial/Industrial Covid-19 significantly impacted the business market as priorities changed. For example hospitals did not have additional funds for developments as all available discretionary funding was being put towards their Covid-response; universities were not focused on energy efficiency as building usage changed with no students attending in-person. Similarly, other sectors such as long-term care, retail, restaurants, and hospitality also changed priorities given the realities with lock-downs and building restrictions. In many cases, large industrial facilities also changed priorities due to changes in work/production hours which lead to less demand for energy savings. To the extent possible program managers worked to provide more flexible participation, for example allowing businesses to conduct certain parts of the onsite audits themselves and providing relevant information instead of having a program delivery auditor attend the site in-person.
ON	IESO	All in-person interactions between program representatives and participants were temporarily suspended as of March 16, 2020 due to COVID-19; most program activities resumed as restrictions were lifted. Specific direct-install programs such as the Small Business Lighting Program, the low-income Home Assistance Program, and Indigenous Programs were temporarily suspended in certain regions due to the COVID-19 related restrictions. Despite the COVID-19 impacts, the 2019-2020 Interim Framework program portfolio is forecasted to meet energy savings targets as outlined in IESO's CDM plan based on committed projects. Actual savings will be

		determined based on the final number of projects completed and independently verified through the evaluation, measurement and verification (EM&V) process.
PE	efficiencyPEI	As a result of Covid-19, efficiencyPEI halted all site visits on March 16th, 2020. This included energy audits completed by our two Service Organizations. On March 17th, the office was closed to the public. A minimal number of staff worked in the office to ensure phones were answered, while the remainder of staff worked from home. Uptake in programs slowed significantly, and time was used to catch up on any processing backlogs. The office re-opened to the public on May 11th with enhanced cleaning protocols, plexiglass barriers, and new administrative processes. With new inspection protocols, inspections of exterior systems began May 18th, as did residential and commercial energy audits. Interior inspections began on June 22nd. Program participation ramped up in the summer and fall, reaching pre-pandemic levels by the end of the third quarter.
QC	Énergir	We were able to meet our energy savings targets in 2019-2020 (September to October) despite the pandemic. However, we have noticed that some of our clients have postponed their project to 2020-2021.
QC	Hydro-Québec	In order to contribute to the economic recovery, HQD increased its financial support for the Efficient Solutions program aimed at commercial, institutional and industrial clients.
SK	SaskEnergy	The pandemic impacted the supply chain for eligible program equipment, resulting in delays in equipment delivery and limited availability of some equipment. Outreach activities at public events for the commercial sector were put on hold and commercial uptake decreased as customer priorities and shifted.
SK	SaskPower	COVID-19 disrupted the launch of SaskPower's Energy Assistance Program (EAP) and Walk Through Assessment (WTA) Program. The need to increase safety protocols for both programs, in addition to challenges securing contractors due to Covid concerns (the EAP), delayed the full scale launch of both programs. Public Health also restrictions paused program delivery for both programs in the last month of the fiscal year and continued into the new fiscal. SaskPower was able to develop and launch a virtual component for both programmings, providing another option for customers to participate.

Appendix C: Net incremental electricity savings (GWh)

We show electricity savings at the meter level in gigawatt hours (GWh). Where necessary, we converted generation level savings to meter level using provided line-loss values, and gross savings to net using a net-to-gross ratio of 0.872. These are program savings only, excluding savings from codes and standards, rates, demand response, and distributed generation.

	2016	2017	2018	2019	2020
CANADA TOTAL	**2820**	**3937.4**	**3301.3**	**1688.3**	**1739.9**
Alberta		**404.0**	**172.0**	**21.1**	**53.0**
Energy Efficiency Alberta		404.0	172.0	21.1	-
MCCAC					2.1
Provincial government					50.9
British Columbia	**340.8**	**197.8**	**346.4**	**255.9**	**281.3**
BC Hydro	318	170	315	230.1	255.4
FortisBC	22.8	27.8	31.4	25.8	25.9
Manitoba	**157.9**	**187.4**	**154.6**	**103.2**	**53.3**
Manitoba Hydro	157.9	187.4	154.6	103.2	-
Efficiency Manitoba	-	-	-	-	53.3
New Brunswick	**39.2**	**55**	**75.5**	**70.8**	**49.7**
New Brunswick Power	39.2	55	75.5	70.8	49.7
Newfoundland and Labrador	**18.2**	**31.3**	**35.5**	**45.5**	**34.2**
Newfoundland Hydro & NL Power	18.2	31.3	35.5	45.5	34.2
Nova Scotia	**125.9**	**120.3**	**139.3**	**113.8**	**87.3**
Efficiency Nova Scotia	125.9	120.3	139.3	113.8	87.3
Ontario	**1494.4**	**2284.9**	**1824.7**	**446.1**	**343.4**
Independent Electricity System Operator	1494.4	2284.9	1824.7	446.1	343.4
Prince Edward Island			**4.07**	**13.9**	**10.9**
efficiencyPEI			4.07	13.9	10.9

Québec	**576.8**	**606.7**	**504.5**	**577.4**	**826.4**
Hydro-Québec	521.0	523.0	453.1	476.2	442.7
TEQ / Provincial government	55.8	83.7	51.4	101.2	383.7
Saskatchewan	**66.5**	**49.0**	**48.1**	**40.2**	**0**
SaskPower	66.5	49.0	48.1	40.2	0
Yukon	**0.7**	**0.9**	**0.8**	**0.8**	**0.4**
Government of Yukon	0.7	0.9	0.8	0.8	0.4

Appendix D: Net incremental natural gas and non-regulated fuels savings (TJ)

We show natural gas and non-regulated fuels savings in terajoules (TJ). Savings reported as gross were converted to net using a net-to-gross ratio of 0.828 for natural gas, and 0.8 for non-regulated fuels. Savings reported in Mm^3 were converted to TJ using Canadian Energy Regulator conversion factors (1 Mm^3 = 37.30 TJ).

	2016	2017	2018	2019	2020
CANADA TOTAL	**6,912**	**8,624.8**	**9,815.4**	**10,157**	**7,979**
Alberta		**607.0**	**625.6**	**413.2**	**187.0**
All program administrators					
Natural gas		607	465.1	212.5	187
Non-regulated fuels			160.5	200.7	
British Columbia	**432.5**	**528.6**	**626.5**	**839.0**	**1075.4**
FortisBC					
Natural gas	432.5	528.6	626.2	828.6	1016.7
BC Ministry of Energy					
Natural gas			0.3	5.1	32.6
Non-regulated fuels				5.3	26.2
Manitoba	**85.8**	**100.7**	**216.3**	**161.5**	**146.6**
Manitoba Hydro					
Natural gas	85.8	100.7	216.3	161.5	-
Efficiency Manitoba					
Natural gas	-	-	-	-	146.6
New Brunswick			**165.5**	**137.9**	**83.0**
New Brunswick Power					
Natural gas			2.6		
Non-regulated fuels			162.9		
Multi-fuel				137.9	83.0
Newfoundland and Labrador				**4.9**	**-**
Province					
Non-regulated fuels				4.9	-

Nova Scotia	**66.0**	**54.1**	**117.8**	**203.3**	**160.3**
Efficiency Nova Scotia					
Non-regulated fuels	66.0	54.1	117.8	203.3	160.3
Ontario	**3,972.2**	**4,250.4**	**4,043.1**	**4,312.3**	**3,697.2**
Enbridge Gas zone					
Natural gas	1,884.5	1,641.8	1,575.1	1,949.3	1,388.7
Union Gas zone					
Natural gas	2,087.7	2,608.6	2,468.1	2,363.0	2,308.5
Prince Edward Island				**43.4**	**45.2**
EfficiencyPEI					
Non-regulated fuels				43.4	45.2
Québec	**2,321.5**	**3,040.7**	**3,985.7**	**4,004.2**	**2,532.0**
Énergir					
Natural gas	1,469.7	1,460.6	1,497.5	1,469.1	1,618.5
Province					
Natural gas	370.6	617.7	1,606.0	1,575.1	432.4
Non-regulated fuels	481.2	962.4	882.2	960.0	481.2
Saskatchewan	**27.3**	**23.8**	**17.1**	**16.6**	**23.4**
SaskEnergy					
Natural gas	27.3	23.8	17.1	16.6	23.4
Yukon	**7.0**	**19.6**	**18.0**	**20.4**	**28.7**
Yukon government					
Non-regulated fuels	7.0	19.6	18.0	20.4	28.7

Appendix E: Energy efficiency program spending

This appendix lists spending on efficiency programs only. We exclude spending on enabling strategies, innovation or R&D, supporting initiatives, codes and standards, distributed generation, and demand response. Results therefore differ from national level spending presented in Figure 5 above.

	2016	2017	2018	2019	2020
CANADA TOTAL	**888.0**	**1,080.7**	**1,151.9**	**1,004.7**	**998.7**
Alberta	**-**	**89.6**	**80.0**	**35.8**	**38.5**
All program administrators					
Programs	-	89.6	80.0	35.8	38.5
British Columbia	**100.6**	**89.8**	**114.2**	**112.6**	**130.9**
FortisBC					
Programs	31.6	33.9	34.5	54.6	67.5
BC Ministry of Energy					
Programs	0.6	0.6	1.0	3.6	9.8
BC Hydro					
Programs	68.3	55.2	78.6	54.4	53.6
Manitoba	**52.2**	**62.4**	**55.9**	**36.9**	**22.5**
Manitoba Hydro/Efficiency Manitoba					
Programs	52.2	62.4	55.9	36.9	22.5
New Brunswick	**16.2**	**12.5**	**15.8**	**22.4**	**19.6**
New Brunswick Power					
Programs	16.2	12.5	15.8	22.4	19.6
Newfoundland and Labrador	**11.9**	**11.6**	**10.9**	**10.7**	**8.6**
Utilities					
Programs	8.5	8.3	7.6	7.6	5.5
Government					
Programs	3.5	3.3	3.3	3.1	3.1
Nova Scotia	**43.7**	**43.0**	**50.0**	**58.8**	**50.2**
Efficiency Nova Scotia					
Programs	40.4	40.0	46.6	58.8	50.2
Ontario	**459.3**	**564.6**	**608.7**	**489.3**	**361.9**
Enbridge Gas					
Programs	103.2	126.9	133.8	138.4	112.9
Independent Electricity System Operator					
Programs	356.1	435.9	464.3	329.1	216.9
Affordability Fund		1.9	10.6	21.7	32.1

Prince Edward Island	**0**	**0**	**8.7**	**12.7**	**15.0**
Efficiency PEI					
Programs	0	0	8.7	12.7	15.0
Québec	**193.8**	**199.5**	**201.7**	**216.6**	**328.8**
Énergir					
Programs	19.0	18.0	17.8	20.9	21.4
Hydro-Québec					
Programs	50.0	43.7	37.4	39.1	42.0
Transition énergétique Québec					
Programs	124.8	137.8	146.5	156.6	265.4
Saskatchewan	**13.6**	**10.8**	**9.5**	**7.3**	**7.0**
SaskEnergy					
Programs	0.6	0.8	0.5	2.0	2.8
SaskPower					
Programs	13.0	10.0	9.0	5.3	4.2
Yukon				**1.8**	**8.3**
Yukon government				1.8	8.3

Bibliography

Association of Energy Engineers. “AEE Certified Professionals Directory,” 2020. https://portal.aeecenter.org/custom/cpdirectory/index.cfm.

American Council for an Energy Efficient Economy (ACEEE). “Energy Efficiency Resource Standards.” State and Local Policy Database, 2020. https://database.aceee.org/state/energy-efficiency-resource-standards.

BC Hydro. “DRAFT 2021 Integrated Resource Plan.” BC Hydro, 2021. https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/integrated-resource-plans/current-plan/draft-integrated-resource-plan.pdf.

Benoit, Charles. “EV Group Says Zoning Law, Not Building Code Is Best for EV Infrastructure.” Electrek, February 14, 2020. https://electrek.co/2020/02/14/ev-group-says-zoning-law-not-building-code-is-best-for-ev-infrastructure/.

Berg, Weston, Shruti Vaidyanathan, Ben Jennings, Emma Cooper, Chris Perry, Marianne DiMascio, and Jack Singletary. “The 2020 State Energy Efficiency Scorecard.” Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), December 2020.

Binz, Ron, Richard Sedano, Denise Furey, and Dan Mullen. “Practicing Risk-Aware Electricity Regulation.” CERES & Regulatory Assistance Project, 2014. https://www.ceres.org/resources/reports/practicing-risk-aware-electricity-regulation-2014-update?report=view.

Boardman, B. *Fuel Poverty: From Cold Homes to Affordable Warmth*. London: Bellhaven Press, 1991. https://www.energypoverty.eu/publication/fuel-poverty-cold-homes-affordable-warmth.

Building and Safety Standards Board. “Alterations to Existing Buildings Project.” Victoria, BC: Government of British Columbia, Fall 2019. https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/reports/wwh_alterations_to_existing_buildings_web_final_may2020.pdf.

Canada Energy Regulator. “NEB – Market Snapshot: Average Electric Vehicle Range Almost Doubled in the Last Six Years.” Government of Canada, June 25, 2019. https://www.cer-

rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2019/market-snapshot-average-electric-vehicle-range-almost-doubled-in-last-six-years.html.

Canada Green Building Council. “Canada’s Green Building Engine: Market Impact and Opportunities in a Critical Decade.” Vancouver, B.C.: Canada Green Building Council, 2020.

———. “Trading up: Equipping Ontario Trades with the Skills of the Future.” Canada Green Building Council, 2019.

Canadian Commission on Building and Fire Codes. “Long-Term Strategy for Developing and Implementing More Ambitious Energy Codes: A Position Paper.” National Research Council Canada, 2016.

Canadian Urban Sustainability Practitioners (CUSP). “Energy Poverty in Canada: A CUSP Backgrounder,” October 2019. https://energypoverty.ca/backgrounder.pdf.

CastilloGuerra, Eduardo. “Integrated Dispatchable Resources Control Systems for Peak Load Management in Local Electricity Distribution Networks.” NSERC’s Award Database, 2021. https://www.nserc-crsng.gc.ca/ase-oro/Details-Detailles_eng.asp?id=694836.

District of Central Saanich. “Central Saanich to Launch PACE Financing Program for Homeowners Looking to Get off Oil Heating,” March 2, 2021. https://www.centralsaanich.ca/our-community/news/central-saanich-launch-pace-financing-program-homeowners-looking-get-oil-heating.

Colton, Roger D. *Direct Testimony and Exhibits before the Nova Scotia Utility and Review Board on Behalf of Dalhousie Legal Aid Service in the Matter of: An Application by Nova Scotia Power Inc. for Approval of Certain Revisions, to Its Rates, Charges and Regulations*. Vol. P-881. NSUARB-P-881, 2004.

Federation of Canadian Municipalities. “Community Efficiency Financing,” 2020. https://fcm.ca/en/programs/green-municipal-fund/community-efficiency-financing.

City of Toronto. “Community Energy Planning.” City of Toronto, November 17, 2017. Toronto, Ontario, Canada. https://www.toronto.ca/services-payments/water-environment/environmentally-friendly-city-initiatives/community-energy-planning/.

Dodge, David. “The Most Efficient Transportation on the Planet.” *Huffington Post*, January 29, 2013. https://www.huffingtonpost.ca/david-dodge/bike-lanes-vancouver_b_2567888.html.

Dunsky Energy Consulting. “Prince Edward Island Energy Efficiency Potential Study: A Comprehensive Assessment of Energy Efficiency and Demand Response Opportunities 2021-2030.” Montreal, QC: efficiencyPEI, 2020.

———. “The Economic Impact of Improved Energy Efficiency in Canada: Employment and Other Economic Outcomes from the Pan-Canadian Framework’s Energy Efficiency Measures.” Vancouver, BC: Clean Energy Canada and Efficiency Canada, April 3, 2018.

———. “Trajectoires de Réduction d’émissions de GES Du Québec – Horizons 2030 et 2050.” Préparé pour le ministère de l’Environnement et de la Lutte contre les changements climatiques, June 2019. http://www.environnement.gouv.qc.ca/changementsclimatiques/plan-action-fonds-vert.asp.

ECO Canada. “Assessment of Occupational and Skills Needs and Gaps for the Energy Efficiency Buildings Workforce.” Ottawa, ON: ECO Canada, February 2021.

Egbue, Ona, and Suzanna Long. “Barriers to Widespread Adoption of Electric Vehicles: An Analysis of Consumer Attitudes and Perceptions.” *Energy Policy*, Special Section: Frontiers of Sustainability, 48 (September 1, 2012): 717–29. https://doi.org/10.1016/j.enpol.2012.06.009.

Ehrhardt-Martinez, Karen, and John A. Laitner. “Rebound, Technology and People: Mitigating the Rebound Effect with Energy-Resource Management and People-Centered Initiatives.” In *ACEEE Summer Study on Energy Efficiency in Buildings*, 7–76, 2010.

NS Power. “Electric Vehicle Smart Charging Pilot,” 2021. https://www.nspower.ca/cleanandgreen/innovation/smart-grid-nova-scotia/chargepoint-home-flex-ev-charging-system.

Newfoundland & Labrador Hydro. “Electric Vehicles,” September 2021. https://nlhydro.com/electricvehicles/.

Energy and Mines Ministers’ Conference. “Financing Energy Efficient Retrofits in the Built Environment.” Winnipeg, MB: Energy and Mines Ministers’ Conference, August 2016. http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2016/16-41/publications.gc.ca/collections/collection_2016/rncan-nrcan/M4-122-2016-eng.pdf.

Environment and Climate Change Canada. “Climate Action Incentive Fund.” Government of Canada, September 15, 2020. https://www.canada.ca/en/environment-climate-

change/services/climate-change/carbon-pollution-pricing-proceeds-programming/climate-action-incentive-fund.html.

———. “Pan-Canadian Approach to Pricing Carbon Pollution.” Government of Canada, October 3, 2016. https://www.canada.ca/en/environment-climate-change/news/2016/10/canadian-approach-pricing-carbon-pollution.html.

———. “Pan-Canadian Framework on Clean Growth and Climate Change: Canada’s Plan to Address Climate Change and Grow the Economy.” Ottawa: Government of Canada, 2016. http://www.deslibris.ca/ID/10065393.

Expert Panel on Sustainable Finance and Environment and Climate Change Canada. *Final Report of the Expert Panel on Sustainable Finance: Mobilizing Finance for Sustainable Growth.* Ottawa, ON: Government of Canada, 2019. http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2019/19-24/publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf.

Federal Ministry for Economics Affairs and Energy. “National Action Plan on Energy Efficiency (NAPE): Making More out of Energy,” 2014. https://www.bmwi.de/Redaktion/EN/Artikel/Energy/national-action-plan-on-energy-efficiency.html.

Efficiency Canada. “Financing Energy Savings for New Brunswick Communities through PACE,” May 31, 2021. https://www.efficiencycanada.org/advocating-for-local-financing-options-in-new-brunswick/.

FortisBC. “2021 Green Bond Impact Report.” Vancouver, B.C.: FortisBC, July 2021. https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/green-bond-impact-report.pdf?sfvrsn=6ee23660_0.

———. “We’ve Got Even Bigger Rebates.” FortisBC, 2021. https://www.fortisbc.com/news-events/current-promotions/we-have-got-even-bigger-rebates.

Gerdes, Justin. “Can Non-Pipeline Alternatives Curb New York’s Rising Natural Gas Demand?,” October 17, 2018. https://www.greentechmedia.com/articles/read/can-non-pipeline-alternatives-curb-new-yorks-rising-natural-gas-demand.

Gilleo, Annie. “New Data, Same Results – Saving Energy Is Still Cheaper than Making Energy.” American Council for an Energy Efficient Economy, December 1, 2017. https://www.aceee.org/blog/2017/12/new-data-same-results-saving-energy.

Gold, Rachel, Annie Gilleo, and Weston Berg. “Next Generation Energy Efficiency Resource Standards.” Washington, D.C.: American Council for an Energy Efficiency Economy, July 30, 2019. https://www.aceee.org/research-report/u1905.

Government of Canada. “Building a Green Economy: Government of Canada to Require 100% of Car and Passenger Truck Sales Be Zero-Emission by 2035 in Canada,” June 29, 2021. https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html.

———. “Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative,” March 2021. https://www.nrcan.gc.ca/energy-efficiency/transportation-alternative-fuels/electric-and-alternative-fuel-infrastructure/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352.

———. “Mobilizing Knowledge on Active Transportation.” Accessed July 14, 2021. https://www.canada.ca/en/public-health/services/health-promotion/healthy-living/physical-activity/mobilizing-knowledge-on-active-transportation.html.

Government of Quebec. “2030 Plan for a Green Economy.” Government of Quebec, 2020. https://www.quebec.ca/en/government/policies-orientations/plan-green-economy/.

Government of Yukon. “Our Clean Future: A Yukon Strategy for Climate Change, Energy and a Green Economy.” Whitehorse, YK: Government of Yukon, September 14, 2020. https://yukon.ca/sites/yukon.ca/files/env/env-our-clean-future.pdf.

Haley, Brendan. “Energy Efficiency Programs Are ‘Shovel-Ready.’” *Efficiency Canada* (blog), May 11, 2020. https://www.efficiencycanada.org/energy-efficiency-programs-are-shovel-ready/.

Haley, Brendan, James Gaede, Mark Winfield, and Peter Love. “From Utility Demand Side Management to Low-Carbon Transitions: Opportunities and Challenges for Energy Efficiency Governance in a New Era.” *Energy Research & Social Science* 59 (January 2020).

Haley, Brendan, and Ralph Torrie. “Canada’s Climate Retrofit Mission: Why the Climate Emergency Demands an Innovation-Oriented Policy for Building Retrofits.” Ottawa, ON: Efficiency Canada, 2021.

“Help Cities Lead.” Help Cities Lead, 2021. https://www.helpcitieslead.ca/.

Hyslop, Katie. “BC First Nation Gets Active about Passive Housing.” The Tyee. The Tyee, January 9, 2017. https://thetyee.ca/News/2017/01/09/First-Nation-Active-Passive-Housing/.

IESO. “2019 Conservation Achievable Potential Study.” Toronto, ON: IESO & OEB, 2019. https://www.ieso.ca/2019-conservation-achievable-potential-study.

———. “Barriers to Implementing Non-Wires Alternatives in Regional Planning.” November 2018. http://www.ieso.ca/-/media/Files/IESO/Document-Library/engage/rpr/rprag-20181101-barriers.pdf?la=en.

Indigenous Clean Energy. “Accelerating Transition: Economic Impacts of Indigenous Leadership in Catalyzing the Transition to a Clean Energy Future across Canada,” June 2020.

Infrastructure Canada. “Inventory of Publicly Owned Road Assets.” Government of Canada, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410017601.

Innovation, Science and Economic Development Canada. “Gasoline Stations - 4471 - Businesses - Canadian Industry Statistics.” Government of Canada, 2021. https://www.ic.gc.ca/app/scr/app/cis/businesses-entreprises/4471.

Task Force For Resilient Recovery. “Insights & Recommendations,” 2020. https://www.recoverytaskforce.ca/.

International Energy Agency. “Energy Technology RD&D Budgets.” IEA Data Services, 2021. https://www.iea.org/statistics/rdd/.

———. “Market-Based Instruments for Energy Efficiency: Policy Choice and Design.” Insight Series 2017. Paris, France: International Energy Agency, 2017.

International Energy Agency and Natural Resources Canada. “Energy Efficiency Potential in Canada to 2050.” Insight Series 2018. Paris: International Energy Agency, 2018.

“ISO 50001 - Energy Management Systems.” International Organization for Standardization (ISO), 2018. https://www.iso.org/files/live/sites/isoorg/files/store/en/PUB100400.pdf.

Joint CCBFC/PTPACC Task Group on Alterations to Existing Buildings. “Final Report - Alterations to Existing Buildings Joint CCBFC/PTPACC Task Group on Alterations to Existing Buildings.” Ottawa, ON: National Research Council Canada, April 2020.

Lampert, Allison. “Quebec to Ban Sale of New Gasoline-Powered Cars from 2035.” *Reuters*, November 16, 2020, sec. Environment. https://www.reuters.com/article/us-autos-canada-emissions-idUSKBN27W289.

Lane, Courtney, and Kenji Takahashi. “Rate and Bill Impact Analysis of Rhode Island Natural Gas Energy Efficiency Programs.” Synapse Energy Economics, Inc., October 2, 2020. https://www.synapse-energy.com/sites/default/files/Synapse%20RI%20Gas%20RBI%20Report-20-037.pdf.

Lawrynuik, Sarah. “Federal Funds to Cut Hydro’s Own Bill for Efficiency Programs.” *The Toronto Star*, April 15, 2021, sec. Canada. https://www.thestar.com/news/canada/2021/04/15/federal-funds-to-cut-hydros-own-bill-for-efficiency-programs.html.

Lockhart, Kevin. “What You Need to Know about the New Building Codes.” *Efficiency Canada* (blog), February 4, 2020. https://www.efficiencycanada.org/what-you-need-to-know-about-the-new-building-codes/.

Long, Christine. “Post-2020 Natural Gas Demand Side Management Framework, Board File Number EB-2019-0003,” December 1, 2020. https://www.oeb.ca/sites/default/files/OEBLtr-Post-2020-DSM-Framework-20201201.pdf.

McEwen, Brendan. “‘EV Readiness’ Requirements Framework,” April 11, 2019. https://cleanairpartnership.org/cac/wp-content/uploads/2019/10/NRCan-EV-Readiness-Requirements-Framework-Final-Report-4-11-2019-McEwen-Climate-and-Energy.pdf.

Mercer, Nicholas, Amy Hudson, Debbie Martin, and Paul Parker. “‘That’s Our Traditional Way as Indigenous Peoples’: Towards a Conceptual Framework for Understanding Community Support of Sustainable Energies in NunatuKavut, Labrador.” *Sustainability* 12, no. 15 (January 2020): 6050. https://doi.org/10.3390/su12156050.

Minister of Energy, Northern Development and Mines. “Ministerial Directive: 2021-2024 Conservation and Demand Management Framework.” Government of Ontario, September 30, 2020. https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework.

Molina, Maggie, and Marty Kushler. “Policies Matter: Creating a Foundation for an Energy-Efficient Utility of the Future.” Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), June 9, 2015. https://aceee.org/policies-matter-creating-foundation-energy.

Nadel, Steven, James Gaede, and Brendan Haley. “State and Provincial Efforts to Put a Price on Greenhouse Gas Emission.” Washington, D.C.: American Council for an Energy Efficiency Economy (ACEEE); Efficiency Canada, March 2, 2021. https://www.aceee.org/research-report/i2101.

Nadel, Steven, and Adam Hinge. “Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals.” An ACEEE White Paper. Washington, D.C.: American Council for an Energy Efficiency Economy, June 2020.

Natural Resources Canada. “2019 Fuel Consumption Guide.” Ottawa, ON: Government of Canada, 2019.

———. “Canada’s National Energy Code.” Government of Canada, March 6, 2018. https://www.nrcan.gc.ca/buildings/canadas-national-energy-code/20675.

———. “Canada’s Secondary Energy Use (Final Demand) by Sector, End Use and Subsector.” In *National Energy Use Database*. Ottawa, ON: Government of Canada, 2019. http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=aaa&juris=ca&rn=2&page=0.

———. “Comprehensive Energy Use Database.” Government of Canada, 2016. https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm.

———. “Conducting an Energy Audit.” Government of Canada, December 12, 2017. https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/conducting-energy-audit/20401.

———. “Electric Charging and Alternative Fueling Stations Locator.” Government of Canada, 2021. https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-and-alternative-fuels/electric-charging-alternative-fuelling-stationslocator-map/20487#/analyze?country=CA&fuel=ELEC&ev_levels=dc_fast&status=E.

———. *Energy Management Training Primer*. Ottawa, ON: Government of Canada, 2016. http://epe.lac-bac.gc.ca/100/201/301/weekly_acquisitions_list-ef/2016/16-31/publications.gc.ca/collections/collection_2016/rncan-nrcan/M144-262-2015-eng.pdf.

———. “Number of Active Energy Advisors by Province - by Program.” Natural Resources Canada, June 1, 2021.

———. “Residential Sector, Total Households by Building Type and Energy Source.” In *National Energy Use Database*. Ottawa, ON: Government of Canada, 2018. http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/data_e/databases.cfm.

Natural Sciences and Engineering Research Council of Canada. “NSERC’s Awards Database.” Government of Canada, 2020. http://www.nserc-crsng.gc.ca/ase-oro/index_eng.asp.

Neal Elloitt. “Energy Efficiency Programs for Small and Medium-Sized Industry.” Washington D.C.: American Council for an Energy-Efficient Economy (ACEEE), February 10, 2000. https://www.aceee.org/research-report/ie002.

Neme, C, and J Grevatt. “The Next Quantum Leap in Efficiency: 30 Percent Electric Savings in Ten Years.” Montpelier, VT: Regulatory Assistance Project, 2016.

Northeast Energy Efficiency Parternships, Lawrence Berkeley National Lab, and US Department of Energy. “Regional Energy Efficiency Database,” 2017. https://neep.org/advanced-emv-forecasting-and-planning-solutions/regional-energy-efficiency-database.

Nova Scotia Department of Energy and Mines. “Low Carbon Communities and Connect 2.” Nova Scotia. Accessed June 5, 2020. https://novascotia.ca/low-carbon-communities/.

Nowak, Seth. “Big Opportunities for Small Business: Successful Practices of Utility Small Commercial Energy Efficiency Programs.” Washington, DC: American Council for an Energy Efficiency Economy, 2016. aceee. org/researchreport/u1607.

Office of Electricity Delivery and Energy Reliability. “Advanced Metering Infrastructure and Customer Systems: Results from the Smart Grid Investment Grant Program.” U.S. Department of Energy, September 2016.

Office of Energy Efficiency. “ENERGY STAR for Industry Certification.” Natural Resources Canada, August 1, 2017. https://www.nrcan.gc.ca/energy-efficiency/energy-star-canada/energy-star-industry/19858.

———. “ISO 50001 Energy Management Systems Standard.” Natural Resources Canada, December 12, 2017. https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/iso-50001-energy-management-systems-standard/20405.

Office of Energy Efficiency & Renewable Energy. “All-Electric Vehicles.” U.S Department of Energy, 2019. http://www.fueleconomy.gov/feg/evtech.shtml.

Office of the Auditor General of Ontario. “Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings, 2020,” November 2020. https://www.auditor.on.ca/en/content/annualreports/arreports/en20/ENV_reducinggreenhousegasemissions_en20.pdf.

Ontario Financing Authority. “Green Bond Issues.” Government of Ontario, 2020. https://www.ofina.on.ca/greenbonds/issues.htm.

Potter, Jennifer, Elizabeth Stuart, and Peter Cappers. “Barriers and Opportunities to Broader Adoption of Integrated Demand Side Management at Electric Utilities: A Scoping Study.” Berkeley, CA: Electricity Markets and Policy Group, Berkeley Lab, February 2018.

Pruys, Sarah. “Yellowknife Introduces New Energy Efficiency Rules.” Cabin Radio, September 18, 2019. https://cabinradio.ca/21662/news/yellowknife/yellowknife-introduces-new-energy-efficiency-rules/.

Rachel Gold and Dan York. “Leveraging Advanced Metering Infrastructure to Save Energy.” Washington D.C.: American Council for an Energy-Efficient Economy (ACEEE), January 9, 2020. https://www.aceee.org/research-report/u2001.

Relf, Grace, Emma Cooper, Rachel Gold, Akanksha Goyal, and Corri Waters. “2020 Utility Energy Efficiency Scorecard.” Washington, D.C.: American Council for an Energy Efficiency Economy, 2020.

Rezaei, Maryam. “Power to the People : Thinking (and Rethinking) Energy Poverty in British Columbia, Canada.” University of British Columbia, 2017. https://doi.org/10.14288/1.0351974.

Ryan, Lisa, Sara Moarif, Ellina Levina, and Richard Baron. “Energy Efficiency Policy and Carbon Pricing.” Energy Efficiency Series. Paris: IEA/OECD, 2011.

Sarabia, Luke. “Canada Mandates 100 per Cent of New Cars, Passenger Trucks Be Zero-Emission by 2035.” *Electric Autonomy Canada* (blog), June 30, 2021. https://electricautonomy.ca/2021/06/29/federal-zev-mandate-2035/.

———. “Newfoundland and Labrador Joins the Ranks of EV Rebate Provinces and Territories.” Electric Autonomy Canada, June 8, 2021. https://electricautonomy.ca/2021/06/08/newfoundland-and-labrador-ev-rebate/.

Saskatchewanians for Sidewalk Sustenance. “Delay the EV Tax,” 2021. https://sidewalktax.ca/.

QUEST. “Smart Energy Communities Benchmark,” 2020. https://smartenergycommunities.ca/.

Statistics Canada. “Aboriginal Peoples Highlight Tables, 2016 Census.” Government of Canada, 2016. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/abo-aut/Table.cfm?Lang=Eng&S=99&O=A&RPP=25.

———. “Census in Brief: The Housing Conditions of Aboriginal People in Canada.” Ottawa, ON: Government of Canada, October 25, 2017. https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016021/98-200-x2016021-eng.cfm.

———. “Residential Use of Wood and Wood Pellets.” Government of Canada, 2020. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510008301.

———. “Table 17-10-0009-01: Population Estimates, Quarterly.” Government of Canada, 2020. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901.

———. “Table 25-10-0029-01: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual.” Government of Canada, 2020. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510002901.

———. “Table 25-10-0059-01: Canadian Monthly Natural Gas Distribution, Canada and Provinces.” Government of Canada, 2019. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510005901.

———. “Table 27-10-0347-01 Industrial Energy Research and Development Expenditures by Area of Technology, by Industry Group Based on the North American Industry Classification System (NAICS) and Country of Control.” Government of Canada, 2020. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2710034701&pickMembers%5B0%5D=2.1&pickMembers%5B1%5D=3.1&pickMembers%5B2%5D=4.42.

———. “Table 33-10-0222-01 Canadian Business Counts, with Employees.” Government of Canada, 2021. https://doi.org/10.25318/3310022201-eng.

———. “Vehicle Registrations, by Type of Vehicle.” Government of Canada, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2010002101&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=3.1.

Steven Nadel. “More States and Provinces Adopt Carbon Pricing to Cut Emissions.” American Council for an Energy-Efficient Economy (ACEEE), January 3, 2019. https://aceee.org/blog/2019/01/more-states-and-provinces-adopt.

The Atmospheric Fund (TAF) and Dunsky Energy Consulting. “Energy Efficiency Financing Tools for the Canadian Context.” TAF Technical Guidance Note. Toronto, ON, March 2017.

"The Investment of RGGI Proceeds in 2016." The Regional Greenhouse Gas Initiative, September 2018. https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2016.pdf.

Transport Canada. "Incentives for Purchasing Zero-Emission Vehicles." Government of Canada, 2021. https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles/incentives-purchasing-zero-emission-vehicles.

Truth and Reconciliation Commission of Canada. "Honouring the Truth, Reconciling the Future: Summary of the Final Report of the Truth and Reconciliation Commission of Canada." Truth and Reconciliation Commission of Canada, 2015. http://www.trc.ca/assets/pdf/Executive_Summary_English_Web.pdf.

Turner, Jeff. "EV Fast-Charger Expansion: Making the Economics Work for Utilities.," May 21, 2020. https://electricautonomy.ca/2020/05/21/ev-charging-economics-for-utilities/.

U.S Department of Energy. "50001 Ready." Accessed August 23, 2021. https://www.energy.gov/eere/amo/50001-ready-program.

———. "About the 50001 Ready Program." Better Buildings. Accessed August 20, 2021. https://betterbuildingssolutioncenter.energy.gov/iso-50001/50001Ready/about.

US Department of Energy. "ISO 50001." Better Buildings Initiative, 2019. https://betterbuildingssolutioncenter.energy.gov/iso-50001.

Voegtlin, Adrien. "Quantification du potentiel d'efficacité énergétique du parc de logements québécois : des térawattheures à portée de main !" Rapport d'étude de la Chaire de gestion du secteur de l'énergie. HEC Montreal, 2021. https://energie.hec.ca/cgse-hec-re052021/.

Wiginton, Lindsay, Cedric Smith, Maddy Ewing, and Geoffrey Battista. "Fuel Savings and Emissions Reductions in Heavy-Duty Trucking: A Blueprint for Further Action in Canada." Calgary, AB: Pembina Institute, April 2019. https://www.pembina.org/reports/freightclimateblueprints.pdf.

Wood, Eric, Clement Rames, Matteo Muratori, Sesha Raghavan, and Marc Melaina. "National Plug-in Electric Vehicle Infrastructure Analysis." US Department of Energy, September 2017. https://www.nrel.gov/docs/fy17osti/69031.pdf.

Yukon. “Good Energy Rebates.” Yukon, June 17, 2021. https://yukon.ca/en/good-energy-rebates.