2020 Canadian Provincial Energy Efficiency Scorecard

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Efficiency Canada

Carleton UNIVERSITY

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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

This report, Efficiency Canada's second Provincial Energy Efficiency Scorecard, assesses energy efficiency policies and outcomes introduced or implemented between January 2019 and June 2020. We are releasing it alongside an updated database of provincial and territorial energy efficiency policies, available at database.efficiencycanada.org. Both the Scorecard and database are helpful reference material for policymakers and energy efficiency sector professionals.

Though it is still too early to assess COVID-19's full impact on energy efficiency, the pandemic did present challenges to our research and writing team. Program administrators and civil servants across the country found themselves stretched thin. This led, in some cases, to delays in our information requests being returned and, in a few instances, 2019-2020 data being unavailable. Nevertheless, all those invited to share information with us did so, barring two requests to the territories. We are deeply grateful to all our respondents.

This past July, the federal government joined the Three Percent Club, a collaboration of governments and supporting organizations that commit to working together to put the world on a path to three percent annual efficiency improvement. Historically, Canada has averaged roughly 1% annual improvement.[1] Our research shows that spending on energy efficiency programs increased by 29% between 2016 and 2018, reaching $1.22 billion. Net incremental savings reached 26.1 petajoules (PJ) in 2017, but dropped to 23.9 PJ in 2018. While the scale of this decrease may be reduced when 2018 programs are fully evaluated, recent disruptions to efficiency frameworks and delivery networks in Ontario and Alberta raise concerns about the institutional stability required to achieve long-term energy efficiency progress.

Readers of this report will find many encouraging signs of progress and more promising developments to come. We note increased provincial action in areas such as building codes, which will need to continue as the federal government publishes updated model national codes intended to put Canada on a path to net-zero energy-ready buildings by 2030. We also see promising signs that the federal government will complement

[1] Canadian energy intensity measured by total primary energy supply divided by constant GDP between 1990 and 2015 saw an average annual decrease of 1.1% using data from International Energy Agency, "World Energy Balances and Statistics – Data Services," International Energy Agency, 2020, https://www.iea.org/subscribe-to-data-services/world-energy-balances-and-statistics.

provincial energy efficiency initiatives. In last year's Scorecard, we recommended the federal government catalyze finance to support provinces. The Canada Infrastructure Bank's new "Growth Plan" includes $2 billion to invest in large-scale building retrofits.[2] Energy efficiency can play an integral role in efforts to respond to the pandemic's significant economic and social impacts.

Below, we briefly outline the methodological changes made for our 2020 Scorecard and highlight the overall results of our analysis.

Methodology

We reorganized this year's Scorecard to create a hierarchy of Policy Area – Topic – Metric. As with our previous report, we focus on five policy areas: Energy Efficiency Programs; Enabling Policies; Buildings; Transportation; and Industry. We weight each according to their respective energy savings potential, as identified in 2018 IEA/NRCan efficiency potential study.[3] These areas comprise 16 topics and 42 policy and outcome-based metrics. Total scores are out of 100 available points, and the top score in each metric represents best-in-class benchmarks and best practice policy. A top score of 100 points should be understood as akin to summitting a mountain all provinces can climb, and scores should not be understood as percentage "grades."

[2] "Prime Minister Announces Infrastructure Plan to Create Jobs and Grow the Economy," *Canada Infrastructure Bank - Banque de l'infrastructure Du Canada* (blog), October 1, 2020, https://cib-bic.ca/en/the-canada-infrastructure-bank-announces-a-plan-to-create-jobs-and-grow-the-economy/.
[3] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050," Insight Series 2018 (Paris: International Energy Agency, 2018).

In some areas, we adjusted weightings and individual metrics. Major changes to topics and weighting this year include the following:

- **Energy Efficiency Programs** (increased in weighting by five points)
    - Program savings decreased in weight by two points
    - Energy savings targets increased in weight by two points, and moved to Energy Efficiency Programs policy area
    - Inclusion of Indigenous Peoples program spending metric (worth two points) and decrease in weighting of program spending to reduce energy poverty (by one point). The energy poverty section scores focus on relative spending, while last year's scores included policy frameworks.
    - Program spending metrics reduced in weighting by two points overall
- **Enabling policies** (decreased in weighting by five points)
    - Energy savings targets metric moved to Programs policy area
    - Grid modernization topic increased in weighting by one point
- **Buildings** (increased in weighting by one point)
    - Building codes and code compliance combined into one topic and increased in weight by one point
    - New points for "code updates plans and activities," tracking provincial statements and activities to adopt new building codes.
- **Transportation** (no overall change in weighting)
    - Commute to work shares metric replaced by Active Transportation metric and reduced in weight by one point
- **Industry** (decreased in weighting by one point)
    - Removal of Cogeneration metric, which was worth one point

In our most significant metric update, we included non-regulated fuels savings and combined them with natural gas savings into a single metric. We did so to better accommodate the Atlantic provinces, which use very little natural gas but do achieve non-regulated fuels savings. We provide all savings figures in petajoules (including electricity savings), though an Appendix is provided with energy savings figures as reported in natural units.

Overall results

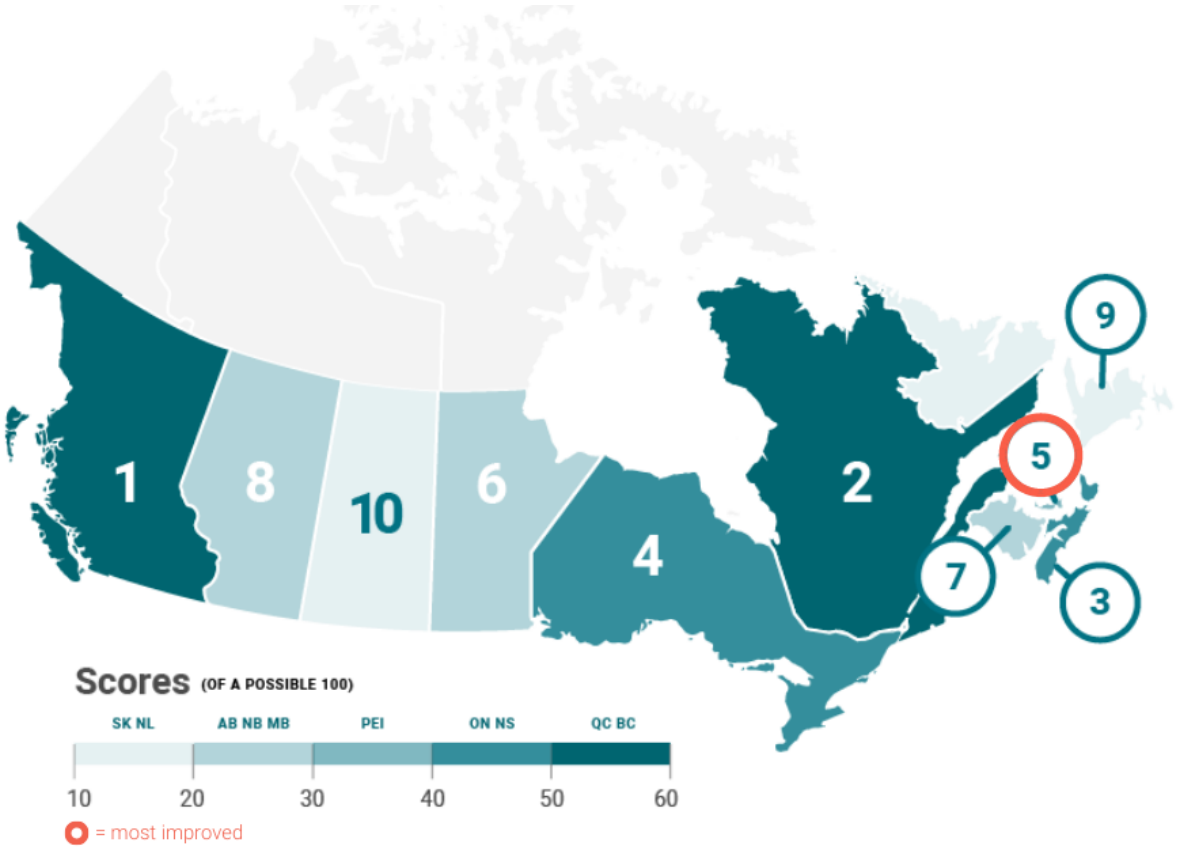

Figure 1. Map of Canada showing provincial scores

British Columbia and Québec retained the top two spots in our overall rankings. British Columbia continues to lead in both Enabling Policies and Buildings, and Québec again places first in Transportation.

Prince Edward Island jumped two spots in the overall ranking, improving its overall score by 11 points and taking first place in the Programs policy area—the result of a strong performance in electricity program savings and spending and investments in low-income and Indigenous Peoples programs.

Meanwhile, Alberta dropped the furthest in rank, mostly as a result of substantially lower electricity and natural gas program savings and spending. Ontario and Manitoba each dropped one spot in overall rankings, while Nova Scotia and New Brunswick each moved up one spot.

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

Table 1. Summary of provincial scores*

Rank	Province	Programs (40 pts)	Enabling (17 pts)	Buildings (19 pts)	Transport (17 pts)	Industry (7 pts)	TOTAL (100 pts)
1 (-)	British Columbia	10	12	16	14	6	**58**
2 (-)	Quebec	11	11	7	17	6	**52**
3 (+1)	Nova Scotia	20	9	10	5	6	**49**
4 (-1)	Ontario	13	11	11	6	5	**45**
5 (+2)	Prince Edward Island	21	4	5	7	1	**37**
6 (-1)	Manitoba	10	4	5	4	6	**29**
7 (+1)	New Brunswick	8	7	2	6	4	**27**
8 (-2)	Alberta	3	6	6	5	6	**24**
9 (+1)	Newfoundland and Labrador	7	4	4	2	1	**17**
10 (-1)	Saskatchewan	2	4	5	2	5	**17**

** Scores rounded to nearest whole numbers. Totals may not sum due to rounding*

Notable developments

Energy efficiency programs

- Only four provinces increased annual electricity savings as a share of domestic sales, though Prince Edward Island improved by 0.88 percentage points (from 0.2% to 1.1%).
- Québec retained top spot in natural gas / non-regulated fuels savings, though Prince Edward Island nearly matches the province (0.93% vs 0.9%, respectively).
- Nova Scotia led capacity savings from efficiency programs as a percentage of peak demand (1.1%), though no province approached top U.S. states on this metric (>2%).
- Prince Edward Island took top spots in all spending metrics and reported an impressive $214.99 spent per capita on low-income programs and $63.59 spent per Indigenous person.
- Nova Scotia and Prince Edward Island scored highest in electricity targets, while targets in New Brunswick and Ontario decreased.
- Only Québec and British Columbia have transportation fuel savings targets

Enabling policies

- More provinces are moving to enable Property Assessed Clean Energy (PACE) financing, which lowers barriers to energy efficiency improvements. Currently only Nova Scotia, Ontario, Alberta, Saskatchewan, Yukon and the Northwest Territories enable PACE programs. Prince Edward Island is working to enable financing programs in two municipalities.
- Saskatchewan's planned Climate Action Centre will provide coordinated support for climate change-related projects in municipalities, including energy efficiency projects. The government announced $181 million to support energy efficiency improvements to public buildings.
- Alberta cancelled its $30/tonne carbon levy, which funded the activities of Energy Efficiency Alberta (among other things) and dissolved the provincial agency in 2020.
- Hydro Québec established a subsidiary, Hilo, with a goal to put smart home technology in the hands of Hydro-Québec customers so that they can understand, control, and adjust their energy use in real-time.

- Québec increased its number of new home energy advisors to 17 certifications per 1,000 new construction permits. This represents an increase of 167 certifications.
- Ontario has gone furthest in formalizing planning procedures for non-wires alternatives to address regional/local grid constraints; numerous other provinces are actively studying the topic and conducting pilot programs.

Buildings

- Prince Edward Island adopted the 2015 versions of the National Building Code (NBC) and the National Energy Code for Buildings (NECB), Québec adopted a modified version of the NECB 2015, and New Brunswick passed legislation to allow cabinet to update its building energy codes (targeting NECB 2015); Nova Scotia upgraded from NECB 2015 to NECB 2017.
- Four provinces reported plans to update their building codes, and three identified activities taken toward adopting the 2020 national codes when available.
- Nova Scotia introduced a pilot energy rating program for commercial and institutional buildings; it does not include mandatory disclosure requirements.

Transport

- British Columbia passed a zero-emissions vehicle mandate in May 2019, and Québec achieved 100% compliance in the first period of its ZEV mandate.
- In July 2019, Québec introduced *Transportez Vert,* which offers up to $10,000 for commercial electric vans and trucks. Since February 2020, the program has also offered up to $100,000 for electric buses. The program also offers free two-day training for fleet managers on energy management and associated incentive programs.
- More than 5% of all new vehicles sold in British Columbia and Québec in 2019 were electric or plug-in hybrid electric vehicles; this adoption rate is over halfway to the federal government's 2025 target.
- Newfoundland and Labrador dedicated $2 million in its 2019 budget to pursue funding opportunities for charging infrastructure with the federal government and the private and not-for-profit sectors.
- Only Québec, Prince Edward Island, and New Brunswick have at least one fast DC charging station per 200 kilometres of public roads

- The Government of Canada set aside ~$3.3 billion for infrastructure improvements under a COVID-19 Resilience funding stream, and those receiving the funding may use it to support active transportation initiatives.

Industry

- No industrial energy management systems programs require certification under international standards, though Alberta's Strategic Energy Management for Large Final Emitters program does allow participants to achieve "ISO-50001 Ready" status.[4]
- British Columbia reported that approximately 7.3% of the province's industrial energy demand has an energy management system in place.

[4] With the closure of Energy Efficiency Alberta, this program is being moved to the Department of Environment and Parks to complete the current cohort. It is unclear if the program will again be offered after this cohort is complete.

Recommendations

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

Table 2. Provincial strengths and areas for improvement

Province	Strengths	Areas for Improvement
Alberta	Municipal financing	Program savings
British Columbia	Building code compliance and support; Transportation electrification; Efficient & low-carbon heating;	Financing; Building energy ratings; Electricity system planning and targets
Manitoba	Long-term targets	Building energy codes; Transportation electrification
New Brunswick	Electric vehicle fast charging; Training and professionalization	Low-to-moderate income programs; Building energy codes
Newfoundland and Labrador	Transportation and heating electrification;	Financing; Energy poverty programs; Industrial energy management
Nova Scotia	Electricity savings; Low-income and Indigenous programs	Net-zero energy-ready building code; Transportation electrification; Leveraging advanced metering infrastructure
Ontario	Appliance and equipment standards; Non-wire and non-pipe solutions	Natural gas conservation programs; Vehicle electrification
Prince Edward Island	Energy efficiency programs; Electric vehicle charging; Cold climate heat pump demonstrations	Energy rating and disclosure; Financing; Industrial energy management programs
Québec	Transportation electrification; Industrial energy management and innovation	Energy poverty; Electricity savings
Saskatchewan	Electricity capacity savings	Energy efficiency programs

Given Canada's national commitment to a three percent annual energy efficiency improvement and the need for a green and just COVID-19 recovery, federal leadership is especially important this year. Accordingly, we have also identified five federal government policy priorities:

1. Federal funding to scale-up provincial program portfolios
2. A federal financing platform to create a market for deep retrofits
3. Introduce a federal Zero Emission Vehicle Mandate
4. Kick-start adoption of net-zero energy-ready building code
5. Measure and promote energy management system certification

Introduction

This report, our second Provincial Energy Efficiency Scorecard, assesses energy efficiency policies and outcomes introduced or implemented between January 2019 and June 2020. We release it alongside an updated database of provincial and territorial energy efficiency policies, available at database.efficiencycanada.org. Both the Scorecard and database are helpful reference material for policymakers and energy efficiency sector professionals.

The Scorecard follows a transparent methodology to evaluate provincial energy efficiency policies and highlights provincial best practices. Users may search the database by jurisdiction and policy area. The database also includes additional topics such as provincial administrative models, cost-effectiveness testing methods, and policy frameworks for appliance and equipment standards.

Energy efficiency and COVID-19

We began collecting data for this Scorecard earlier this year, two weeks after the start of the COVID-19 pandemic. We do not yet know the full impact of the pandemic on energy efficiency, as most of the data in this report is from 2019. That said, the pandemic did slow down energy efficiency program strategies in 2020, which will be reflected in next year's results.

The pandemic also gave rise to new approaches to program administration and education, such as virtual energy audits, online training, retrofits of unoccupied commercial and institutional buildings, and new ways to verify savings. It has also increased awareness of societal resilience, indoor air quality, thermal comfort, social justice, and affordability. These are all challenges that energy efficiency can help solve.

Energy efficiency has also emerged as a core component of plans to recover from 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.[5] The International Energy Agency also highlights the role of energy efficiency in economic stimulus programs.[6]

Energy efficiency can help Canada "build back better" from COVID-19 by:

1. Creating jobs: efficiency program investments create between 16 and 30 jobs per $1 million invested,[7] and 60% of home retrofit investments go towards labour.[8]
2. Increasing consumer spending in the local economy, because energy savings reduce expenditures on imported energy and increase local buying power.
3. Building investor confidence and business expectations, by demonstrating a profitable pipeline of energy savings opportunities for decades to come.
4. Managing pandemic concerns through better indoor air quality,[9] thermal comfort for those staying at home,[10] and improved affordability.
5. Preparing for the future by increasing building resilience to extreme weather from climate change and locking-in GHG reductions through advanced building codes and efficiency standards.

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[5] "Insights & Recommendations," Task Force for a Resilient Recovery, 2020, https://www.recoverytaskforce.ca/.
[6] "Energy Efficiency and Economic Stimulus: IEA Strategic Considerations for Policy Makers," International Energy Agency, April 8, 2020, https://www.iea.org/articles/energy-efficiency-and-economic-stimulus.
[7] 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).
[8] "Energy Efficiency and Economic Stimulus: IEA Strategic Considerations for Policy Makers."
[9] Jensen Zhang, "Integrating IAQ Control Strategies to Reduce the Risk of Asymptomatic SARS CoV-2 Infections in Classrooms and Open Plan Offices," *Science and Technology for the Built Environment* 26, no. 8 (September 13, 2020): 1013–18, https://doi.org/10.1080/23744731.2020.1794499.
[10] "Dump Fuel-Hungry AC Units to Cut Years of Emissions and Save Trillions: UN Report," UN News, July 17, 2020, https://news.un.org/en/story/2020/07/1068641.

Canada needs to triple energy efficiency improvement

This year, the federal government made an important commitment to increase energy efficiency efforts by joining the Three Percent Club, a global alliance of governments and supporting organizations seeking to achieve a three percent global annual efficiency improvement.[11] This is the annual improvement in global energy intensity that the International Energy Agency says is necessary to meet the Paris Agreement's GHG reduction goals.[12]

Canada is currently improving national energy intensity at a rate of around one percent per year.[13] In other words, in order to meet the three percent target, we need to triple current efforts. The provinces will need to play a significant role in doing so because they govern policy areas such as public utility regulation, building codes, and municipal planning. Provincial level utilities and energy efficiency organizations implement many of the on-the-ground programs that save energy.

This year's Scorecard shows an increase in budgets from 2017 to 2018, yet we expect future years to show decreased savings and budgets due to policy changes in large provinces such as Ontario and Alberta. The disruption of energy efficiency delivery capabilities — seen in the shutting down of Energy Efficiency Alberta — raises concerns about the institutional stability required to achieve long-term energy efficiency progress.[14]

Energy efficiency identified as COVID recovery funding opportunity in Saskatchewan

In May 2020, the Government of Saskatchewan committed to invest $7.5 billion in infrastructure over the next two years as a COVID-19 stimulus program.

Of this, the province has bookmarked $181 million for energy efficiency projects through maintenance and cost reduction on provincial and third-party assets, such as education and health buildings, in addition to other government buildings.

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[11] Natural Resources Canada, "Canada Joins Three Percent Club to Improve Global Energy Efficiency," news release, Government of Canada, July 22, 2020, https://www.canada.ca/en/natural-resources-canada/news/2020/07/canada-joins-three-percent-club-to-improve-global-energy-efficiency.html.
[12] "Support Countries' Energy Efficiency Efforts through the Three Percent Club," EE Global Alliance, 2020, https://eeglobalalliance.org/three-percent-club.
[13] International Energy Agency, "Total Primary Energy Supply - Canada," Data and Statistics, 2020, https://www.iea.org/data-and-statistics.
[14] For a discussion on policy resilience, 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). Winfield, Mark et al., "Unpacking

Provinces can accelerate their energy efficiency efforts as an economic recovery response to COVID-19, and the federal government can leverage and activate provincial networks and policy infrastructure to achieve a green and just recovery. Thus, this year's Scorecard includes a chapter on how federal policymakers can complement and support provincial energy efficiency.

Unlike regionally concentrated energy resources like oil and hydroelectricity, energy efficiency is not constrained by geography; it is found throughout the country. In addition, provinces can tailor strategies to their individual circumstances. Our Scorecard reveals where provinces have done so and strengthened energy efficiency capabilities. While there are significant differences in provincial rankings and an urgent need for the lowest ranking provinces to ramp up their efforts, we note that all provinces have existing delivery capabilities through utilities, energy efficiency organizations, and municipalities – which can be ramped up to meet stronger national goals.

Our Canadian Scorecard is modelled after the American Council for an Energy Efficient Economy (ACEEE) state policy scorecard. A comparison of last year's scorecard program savings and spending results with leading American states shows that Canadian provinces have significant room to catch up. For instance, no Canadian province approaches annual electricity savings higher than two percent of sales, which we see in leading states such as Massachusetts and Vermont.[15] Reaching these levels of savings, as well as higher fossil fuel program savings, would create 175,000 annual jobs and increase annual GDP by $42.5 billion over 14 years.[16]

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the Climate Potential of Energy Efficiency: Effective and Resilient Governance for Energy Efficiency in Low-Carbon Sustainable Energy Transitions," (York University Sustainable Energy Initiative, February 24, 2020), https://sei.info.yorku.ca/2020/02/unpacking-the-climate-potential-of-energy-efficiency-effective-and-resilient-governance-for-energy-efficiency-in-low-carbon-sustainable-energy-transitions/.

[15] Brendan Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard" (ACEEE Summer Study on Energy Efficiency in Buildings, American Council for an Energy Efficient Economy, 2020).Brendan Haley, "Energy Efficiency Programs Are 'Shovel-Ready,'" *Efficiency Canada* (blog), May 11, 2020, https://www.efficiencycanada.org/energy-efficiency-programs-are-shovel-ready/.

[16] 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."

Why you should read this year's scorecard

Our Scorecard is a reference document and tool for policymakers, energy efficiency professionals, and advocates. It presents best practices that other provinces can emulate and which we can work together to spread across the country. Top potential scores are based on the benchmarks we need to hit, and likely exceed, to confront the climate emergency and "build back better" from COVID-19. The Scorecard also highlights gaps that the federal government might fill through policy support.

Throughout the report, we provide transparent discussion of the methodology used to benchmark provincial energy efficiency policies and outcomes, tables to summarize both activities and scoring, and call-out boxes to highlight interesting and/or novel approaches to delivering energy efficiency in Canada. In this section, we summarize the overall methodology, approach to data collection and review, and the time period covered in the report. We also provide an overview of the metrics included and scoring, discuss data limitations and areas beyond the scope of this report, and present our overall results.

Methodology

This Scorecard is based upon information attained from three sources: An information request issued to provincial government representatives, utilities and energy efficiency program administrators in April 2020; 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 four sections (energy efficiency programs, enabling policies, buildings, and transportation and industry), comprising 12 parts, covering 48 topics, with a total of 141 questions. 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 between May and July, and Efficiency Canada compiled, analyzed and evaluated them. We circulated a draft report with initial findings to information request respondents and subject-matter-expert advisors in August 2020 for peer review

and a final check on the accuracy of information. We made revisions as required or justified based on this feedback and prepared the final report for release in the fall of 2020.

Time period covered

The Scorecard provides a snapshot of energy efficiency policies and performance in the most recent year (12 months) for which complete data is available. For many indicators in this report, this period occurs within the 18-month window following January 2019 (this is to accommodate calendar and fiscal year reporting bases). However, time periods for some metrics may vary based on the availability of relevant information. For instance, while most provinces were able to provide energy savings and sales data for 2019 (or fiscal year 2019-2020), some could only provide this data for 2018. We seek to use data for the year for which all relevant parties are able to provide information and note this variance in scoring tables, where applicable.

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 energy demand data from Statistics Canada runs only to 2018. 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.

The 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 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 covered time period, we may award no points.

As much as is possible, our Scorecard seeks to evaluate and benchmark the most recent year's activity, with the aim of presenting a dynamic snapshot of energy efficiency progress in Canada. Our 2019 Scorecard took a different approach on some metrics, scoring based on best performance attained over several years. This was to set

a benchmark for future analyses. For applicable metrics, we highlight provincial trends via year-over-year changes in our tables.

Again, we grounded our Scorecard in historical evidence. Our scoring does not account for very recent policy developments. As provinces and territories implement new policies or cancel existing ones, future scorecards will increase or decrease their scoring.

Topics and scoring

This Scorecard tracks 42 separate metrics, representing 16 topics across five broad policy areas (energy efficiency programs, enabling policies, buildings, transportation, and industry). Total scoring is out of 100 points. A jurisdiction scoring 100 points should be understood as achieving the summit of a mountain that all provinces should be striving to ascend. The scores are not percentage grades. We provide an overview of the policy areas, topics and scoring weights in Table 3.

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. 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.

We use the energy savings potential of policy areas— as identified in a 2018 IEA/NRCan efficiency potential study—to inform their relative weighting.[17] 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** (increased in weighting by five points)
    - We decreased program savings weighting by two points;
    - We increased energy savings targets in weight by two points, and moved them to Energy Efficiency Programs policy area;
    - We introduced an Indigenous Peoples program spending metric (worth two points) and decreased the weighting of program spending to reduce energy poverty by one point). Energy poverty scores now focus on relative spending, while last year's Scorecard included policy frameworks; and
    - We reduced the weighting of program spending metrics by two points overall.
- **Enabling policies** (decreased in weighting by five points)
    - We moved the energy savings targets metric to the Programs policy area
    - We increased the weighting of the grid modernization topic by one point

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

- **Buildings** (increased in weighting by one point)
    - We combined building codes and code compliance into one topic and increased its weight by one point.
    - We added new points for "code update and extension activities," to track provincial statements and activities to adopt new building codes.
- **Transportation** (no overall change in weighting)
    - We replaced the commute to work shares metric with an Active Transportation metric and reduced its weight by one point.
- **Industry** (decreased in weighting by one point)
    - We removed the cogeneration metric, which was worth one point.

In addition to the above, we changed the evaluation and scoring methodology and weighting of some metrics within these topic areas. We detail these methodological changes in the relevant metric 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 ACEEE scorecard. Comparison on individual metrics may be instructive, however. An example is a comparison of state and provincial program savings and targets we published earlier this year.[18]

In future years, we envision adjusting the allocation of points to reflect emerging trends in energy efficiency, updates in the policy landscape, and refinements as we develop the capability to track policy areas more closely and learn from previous experience. We therefore ask readers to view the Scorecard as an evolving indicator, and not a standardized index.

[18] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard"; Haley, "Energy Efficiency Programs Are 'Shovel-Ready.'"

Table 3. Policy areas, topics, and score weighting	
Energy efficiency programs	**40**
Program savings	18
Program spending	10
Equity and inclusion programs	4
Energy savings targets	8
Enabling policies	**17**
Financing and market creation	6
Research and development	3
Training and professionalization	4
Grid modernization	4
Buildings	**19**
Building codes and code compliance	12
Energy rating and disclosure	4
Appliance and equipment market transformation	3
Transportation	**17**
Personal vehicle transportation	8
Transport electrification infrastructure	7
Active transportation	2
Industry	**7**
Support for energy management	4
Energy management systems	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 (e.g. financing through local improvement charges/Property Assessed Clean Energy 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,[19] which tracks policy areas such as local transportation and land use planning that complement our provincial focus.

We have not scored territorial policies or outcomes. The territories have a unique energy context, and we were unable to source publicly available information on energy efficiency initiatives. The following section highlights territorial activities, and we include territorial information in our online policy database.

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 the future, we will 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, public transit funding, and

[19] "Smart Energy Communities Benchmark," QUEST, August 30, 2018, https://questcanada.org/project/smart-energy-communities-scorecard/.

urban design. The QUEST Smart Cities Benchmark and the Pembina Institute's work on freight transport provide more information on these policy areas.[20]

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); 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

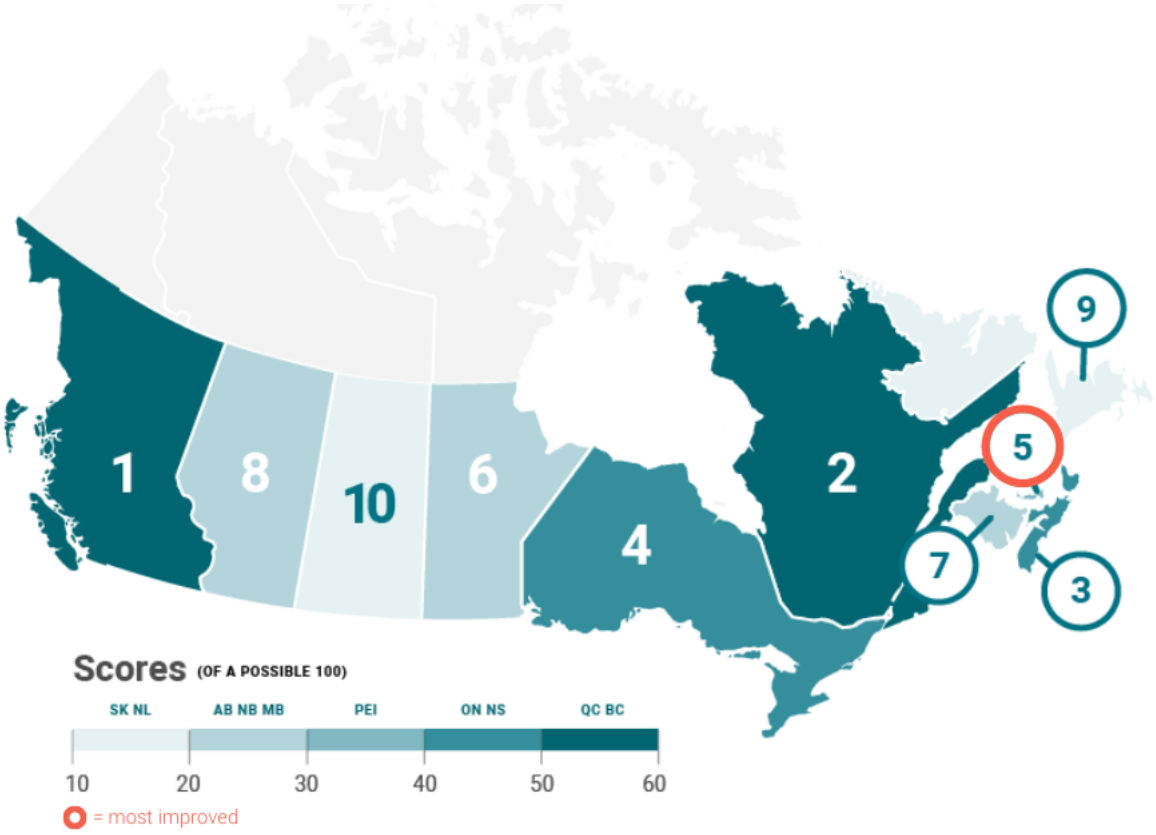

Figure 1. Map of Canada with provincial scores

[20] 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.

*Table 4. Summary of provincial scores**							
Rank	Province	Programs (40 pts)	Enabling (17 pts)	Buildings (19 pts)	Transport (17 pts)	Industry (7 pts)	TOTAL (100 pts)
1 (-)	British Columbia	10	12	16	14	6	58
2 (-)	Quebec	11	11	7	17	6	52
3 (+1)	Nova Scotia	20	9	10	5	6	49
4 (-1)	Ontario	13	11	11	6	5	45
5 (+2)	Prince Edward Island	21	4	5	7	1	37
6 (-1)	Manitoba	10	4	5	4	6	29
7 (+1)	New Brunswick	8	7	2	6	4	27
8 (-2)	Alberta	3	6	6	5	6	24
9 (+1)	Newfoundland and Labrador	7	4	4	2	1	17
10 (-1)	Saskatchewan	2	4	5	2	5	17

** Scores rounded to nearest whole number. Totals might not sum due to rounding.*

British Columbia and Québec retain the top two spots in our overall rankings. British Columbia continues to lead in both Enabling Policies and Buildings, and Québec again places first in Transportation. Prince Edward Island jumped up two spots in the overall ranking, improving its overall score by 11 points and taking first place in the Programs policy area. This notable improvement is the result of the province's strong performance in electricity program savings, and its spending on low-income and Indigenous Peoples programs.

Alberta saw the largest drop, mostly a result of substantially lower electricity and natural gas program savings and spending. Ontario and Manitoba dropped one spot in overall rankings, while Nova Scotia and New Brunswick move up one spot.

Territories

We did not include the territories in our overall scoring due to difficulties accessing information and methodological challenges finding useful comparisons, given the unique context of energy systems in the territories. To reflect scope and resource limitations, we issued a simplified information request to the territories in March 2020. Only government representatives from the Yukon were able to respond to this request. We included information from their response in the relevant section below, but did not incorporate it into our evaluation of provincial activities. We track territorial policies in our Energy Efficiency Policy Database, available at database.efficiencycanada.org.

Given the importance of heating and the high cost of off-grid energy systems, energy efficiency improvements in Canada's north create significant benefits. As discussed below, the northern climate provides opportunities for research and testing to deliver insights about energy efficiency technologies, as well as novel program design strategies to serve local communities.

While this report focuses on subnational policies, we note that the federally funded Northern Responsible Energy Approach for Community Heat and Electricity program (Northern REACHE), covers the territories. The program seeks to increase community-scale adoption of energy efficiency and renewable energy technologies across the north, in order to decrease reliance on diesel for both heating and electricity. Budget 2017 allocated $53.5 million over ten years to this program, starting in 2018-2019.[21]

Below, we discuss the energy efficiency policy context in each of the territories separately and highlight areas of leadership below.

Yukon

The Yukon's energy efficiency programs are operated by the Government Energy Solutions Centre and the Yukon Housing Corporation, as well as utilities (Yukon Energy and Yukon Electrical Company) under the inCharge brand.[22] Back in 1984, the territory pioneered the use of local improvement charges to help residents living in rural areas

[21] Indigenous and Northern Affairs Canada, "Northern REACHE Program," Government of Canada, May 19, 2020, https://www.aadnc-aandc.gc.ca/eng/1481305379258/1481305405115.
[22] Yukon Energy Corporation, "InCharge," InCharge, 2019, https://www.inchargeyukon.ca/.

extend electrical grid and telephone services to their properties. It later used this system to fund on-site renewable energy systems and energy efficiency upgrades.[23]

Though we issued a customized information request to all three territories in March 2020, only government representatives from the Yukon were able to respond. According to their responses, the Yukon government spent $1.39 million on electricity efficiency programs, and another $0.36 million on non-regulated fuels programs in 2019, for a total of $42.79 in efficiency program spending per capita. This level of spending would receive two points in our program spending per capita metric, placing Yukon among the top five jurisdictions on this measure. Government programs achieved gross savings of 3,346 GJ for electricity and 25,394 GJ for non-regulated fuels in 2019 (both of which were not third-party evaluated).

The Yukon released its "Our Clean Future" plan in September 2020.[24] On the energy efficiency front, the territory committed to:

- Investing $30 million, on average, each year, for energy efficiency improvements.
- Replacing fossil fuel heating systems with renewable sources (this includes biomass as well as a target to retrofit 1,500 buildings over 10 years with air-source or ground-source heat pumps.)
- Ensuring all new residential and commercial buildings meet net-zero energy-ready performance by 2032. As part of the plan, the territory has already consulted on adopting the 2020 version of the National Building Code and National Energy Code for Buildings.
- Directing the Yukon Utilities Board to allow Yukon's public utilities to pursue cost-effective capacity demand-side management measures.
- Targeting zero emission vehicles to be 10% of light-duty vehicle sales by 2025 and 30% in 2030, and coordinate with British Columbia, Northwest Territories, and Alaska on charging networks.
- Installing fast-charging stations to make it possible to travel between all road-accessible Yukon communities by 2027.
- Requiring all new residential buildings in the greater Whitehorse area to be built with the electrical infrastructure to support Level 2 electric vehicle charging.

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[23] Roger Peters, Matt Horne, and Nicholas Ian Heap, "Using Local Improvement Charges to Finance Building Energy Efficiency Improvements: A Concept Report" (Calgary, AB: Pembina Institute, May 2004).
[24] 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.

Yukon's Good Energy Program offers rebates to increase energy efficiency for homeowners and commercial business owners. The territory offers homeowners a variety of rebates for upgrades such as installing ENERGY STAR® rated appliances and windows, adding insulation, installing energy-efficient heating systems, and new home builds that are more efficient than the 2015 National Building Code. Commercial business owners can also access rebates for various upgrades, such as LED lighting and smart thermostats.[25]

With support from NRCan, in late 2019 the Yukon government installed three new Level 3 DC fast charging stations in Whitehorse and Carcross—the first such chargers in the territory. This is in addition to the existing three Level 2 charging stations in the territory. Electric vehicle owners can charge at all six stations for free; two more are being added in other communities in 2020.[26]

Northwest Territories

The Northwest Territories' 2030 Energy Strategy, published in April 2018, includes six strategic objectives: Reducing GHGs from electricity generation in diesel communities; reducing emissions from transportation; increasing renewable energy used for heating; increasing commercial, residential and industrial building energy efficiency; working collaboratively with community members; and developing the territory's energy potential/addressing industry emissions.

A key goal of the strategy is to support and increase energy efficiency in residential, commercial, and government buildings by 15%. As noted in the strategy, "energy efficiency…[is] often the least costly solution and the easiest to implement." For the Northwest Territories, this means a 20 Gigajoule reduction of energy use per person, from 133 Gigajoules used in 2016 to a target 113 Gigajoules per person by 2030.[27]

In September 2019, the City of Yellowknife reintroduced energy efficiency standards for residential buildings which the city estimated are roughly 25% higher than the 2015

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[25] Yukon, "Good Energy Rebates," Yukon, 2019, https://yukon.ca/good-energy.
[26] Yukon, "Three New Electric Vehicle Fast-Charging Stations Available in Yukon," Yukon, November 25, 2019, https://yukon.ca/en/news/three-new-electric-vehicle-fast-charging-stations-available-yukon.
[27] Government of Northwest Territories, "2030 Energy Strategy," April 2018, https://www.inf.gov.nt.ca/sites/inf/files/resources/gnwt_inf_7272_energy_strategy_web-eng.pdf.

National Building Code, and announced it would require commercial buildings to conform to the 2017 National Energy Code of Canada.[28]

Nunavut

The Qulliq Energy Corporation (QEC) is responsible for electricity generation, transmission, and distribution in Nunavut; the agency is owned by the Nunavut government. It has undertaken a number of initiatives to increase energy efficiency, such as improving the efficiency of outdated diesel generated power plants while also including the opportunity to incorporate renewable energy in these plants, such as installing solar panels in a number of locations. One of these includes the joint project between the federal government, QEC, and the town of Kugluktuk for a hybrid solar/diesel power plant, which the three parties announced in August 2019.[29] QEC also completed a Smart Grid project in 2016 to better monitor energy use in the capital city, and therefore improve energy efficiency. The QEC also installed LED streetlights in four cities, contributing up to 30% in energy savings.[30]

In August 2020 the Government of Canada and the Government of Nunavut committed to invest $18.3 million through the Low Carbon Economy Leadership Fund for the South Baffin Energy Management Project. This project is working to retrofit a number of government buildings in six communities across the South Baffin region. Upgrades will include solar panels, LED lighting, building airtightness improvements, and solar hot-water systems.[31] Nunavut's Department of Community and Government Services also contributed $8.6 million to the project.

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[28] 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/.
[29] Canada Energy Regulator, "Provincial and Territorial Energy Profiles: Nunavut," Government of Canada, 2020, https://www.cer-rec.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nu-eng.html.
[30] Qulliq Energy Corporation, "QEC Initiatives," Qullic Energy Corporation, accessed July 6, 2020, https://www.qec.nu.ca/power-nunavut/energy-conservation/qec-initiatives.
[31] Environment and Climate Change Canada, "Government of Canada Partners with Nunavut for Renewable and Energy Efficiency Projects.," *Cision*, August 20, 2020, https://www.newswire.ca/news-releases/government-of-canada-partners-with-nunavut-for-renewable-and-energy-efficiency-projects-884577430.html.

Energy efficiency programs

Energy efficiency programs secure energy savings through various strategies such as audits, retrofits, training for building tradespeople, "people-centred"[32] or behavioural efficiency strategies, and customized industrial programs. Programs are administered by natural gas and electric utilities, governments and government agencies, and energy efficiency utilities such as Efficiency Nova Scotia and EfficiencyPEI.[33]

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 much lower cost and at lower risk than new sources of supply,[34] 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 pts)**
    - Net annual incremental savings from electricity efficiency programs (9 points);
    - Net annual incremental savings from natural gas and/or non-regulated fuels efficiency programs (6 points);
    - Electricity capacity savings (3 points)

[32] 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.
[33] For a discussion of this evolution in program administration see Haley et al., "From Utility Demand Side Management to Low-Carbon Transitions: Opportunities and Challenges for Energy Efficiency Governance in a New Era."
[34] 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 **(10 points)**
    - Program spending per capita, all fuels (5 points);
    - Program spending per end-use demand, all fuels (5 points);
- Supporting equity and inclusion **(4 points)**
    - Low income program spending (2 points);
    - Indigenous program spending (2 points)
- Energy efficiency targets **(8 points)**
    - Electricity savings targets (3 points);
    - Natural gas / non-regulated fuels savings targets (2.25 points);
    - Transportation savings targets (2.25 points);
    - Economy-wide targets (0.5 points)

The American Council for an Energy-Efficient Economy (ACEEE) Scorecard informed our analytical methodology and weighting of these metrics, as well as the weighting of the programs section overall. Following the ACEEE methodology, we weight electricity more heavily than natural gas/non-regulated fuel (NRF) savings, because these programs typically have greater potential to achieve energy savings (U.S. figures show electricity programs achieve at least three times the primary energy savings of natural gas programs.[35])

However, our Scorecard places greater weight on natural gas and non-regulated fuel (NRF) savings compared to electricity than the ACEEE version, because Canadian provinces with relatively low-carbon electricity systems place greater emphasis on reducing fossil fuel use to meet their climate goals. This can include the promotion electrification where it contributes to greater efficiency and GHG reductions. We note the continued importance of electricity savings in these jurisdictions to free up clean energy resources to enable strategic electrification.

In our 2019 Scorecard, we collected spending and savings information from 2016 to 2018 and scored on the highest level of savings/spending achieved in each province during this timeframe. In this year's report, we present and score on savings and spending figures for the most recent year for which respondents to our information request could provide data. The annual tracking provides a more dynamic annual

[35] Weston Berg et al., "The 2019 State Energy Efficiency Scorecard," (Washington, DC: American Council for an Energy-Efficient Economy (ACEEE), October 2019).

benchmarking for this year's Scorecard and future editions. Most provinces produced data from either calendar or fiscal year 2019 (typically, Q2 2019 to Q1 2020), the most recent available.

Other changes this year include a combined non-regulated fuels-natural gas savings metric, an electricity capacity savings metric, and a metric for program spending for Indigenous Peoples or communities. We detail these metrics in the sections below. We have also moved our evaluation of energy efficiency targets from the Enabling Policy section to the Programs section.

Canada-wide savings and spending

The most recent year when national aggregate figures are available for all provinces is 2018. Based on this information, we estimate that energy efficiency program spending across the country totalled more than $1.22 billion in 2018.[36] (In reality, this figure was likely higher, as we were not able to collect complete spending information on the Ontario efficiency programs funded through cap-and-trade revenues, or for all program administrators in the territories.) Total electricity savings from programs across Canada amounted to 9.82 petajoules (PJ), natural gas program savings totalled 8.37 PJ, and non-regulated fuel savings 1.34 PJ, for total net incremental energy efficiency savings of 23.9 PJ in 2018.

Between 2016 and 2018, provinces increased their spending on energy efficiency programs by approximately 29%. This is a promising trajectory, demonstrating growing policy effort. We fear it might not be repeated in future years, however, given recent high-profile budget cuts in large provinces such as Ontario and Alberta.

The 8.3% drop in total savings in 2018 was driven primarily by a decline of nearly 1 terawatt hour (TWh) in electricity program savings in Ontario—though electricity savings also declined in British Columbia, Manitoba, Québec, Saskatchewan, and Alberta (173 GWh combined). Ontario's spending decrease is partially explained by the absence of "true-ups" — savings achieved in 2018 but not yet verified — in the 2018 IESO electricity savings figures.[37]

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[36] This figure includes spending on energy efficiency programs, including low income and Indigenous Peoples programs, and codes and standards. We exclude transportation efficiency spending due to the lack of comparable figures across provinces that reported transportation savings.
[37] Communications with IESO representatives

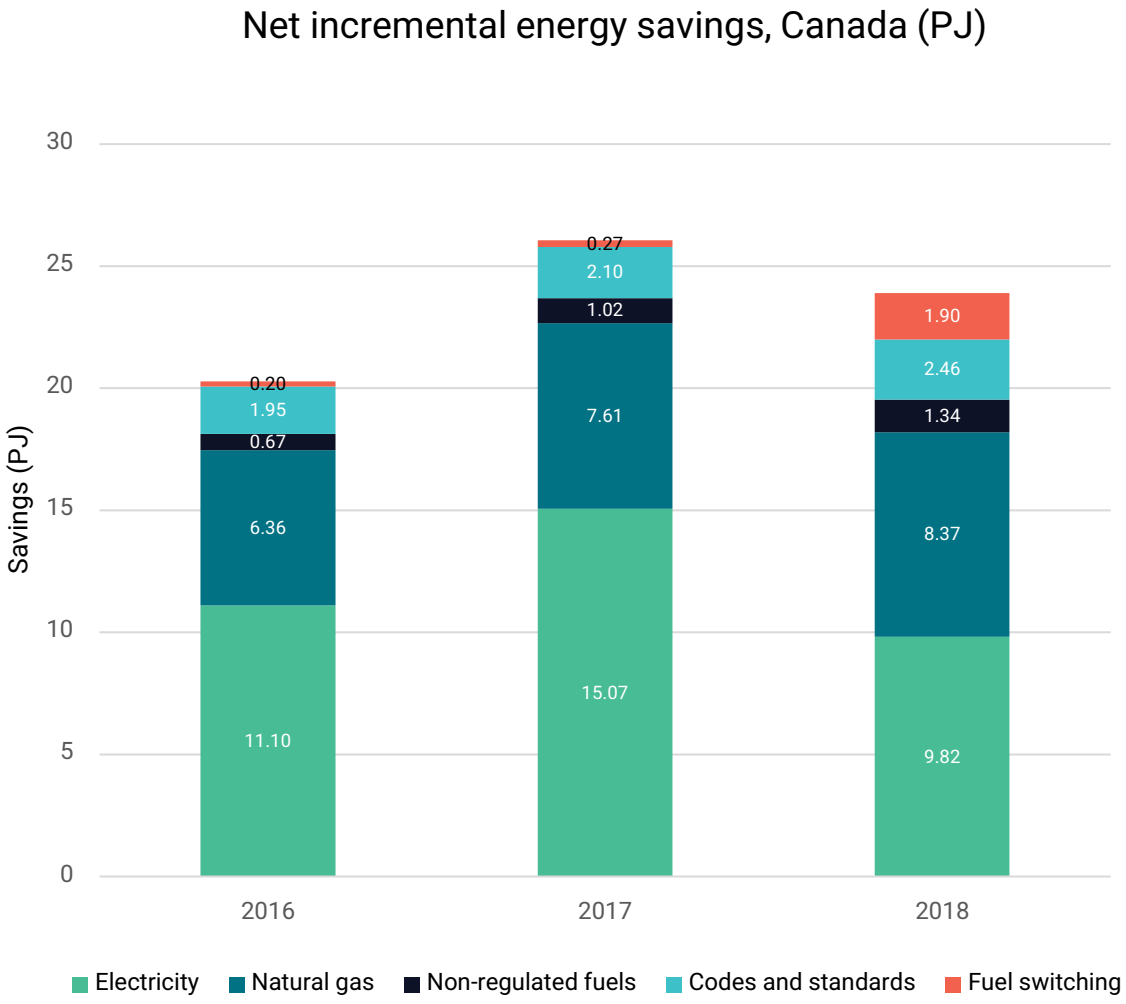

Figure 2. Canada-wide net incremental energy savings and spending[38]

[38] This figure includes 'negative' electricity savings associated with the increased electricity demand associated with fuel switching programs in British Columbia and Quebec. In 2018, this amounted to -0.58 PJ.

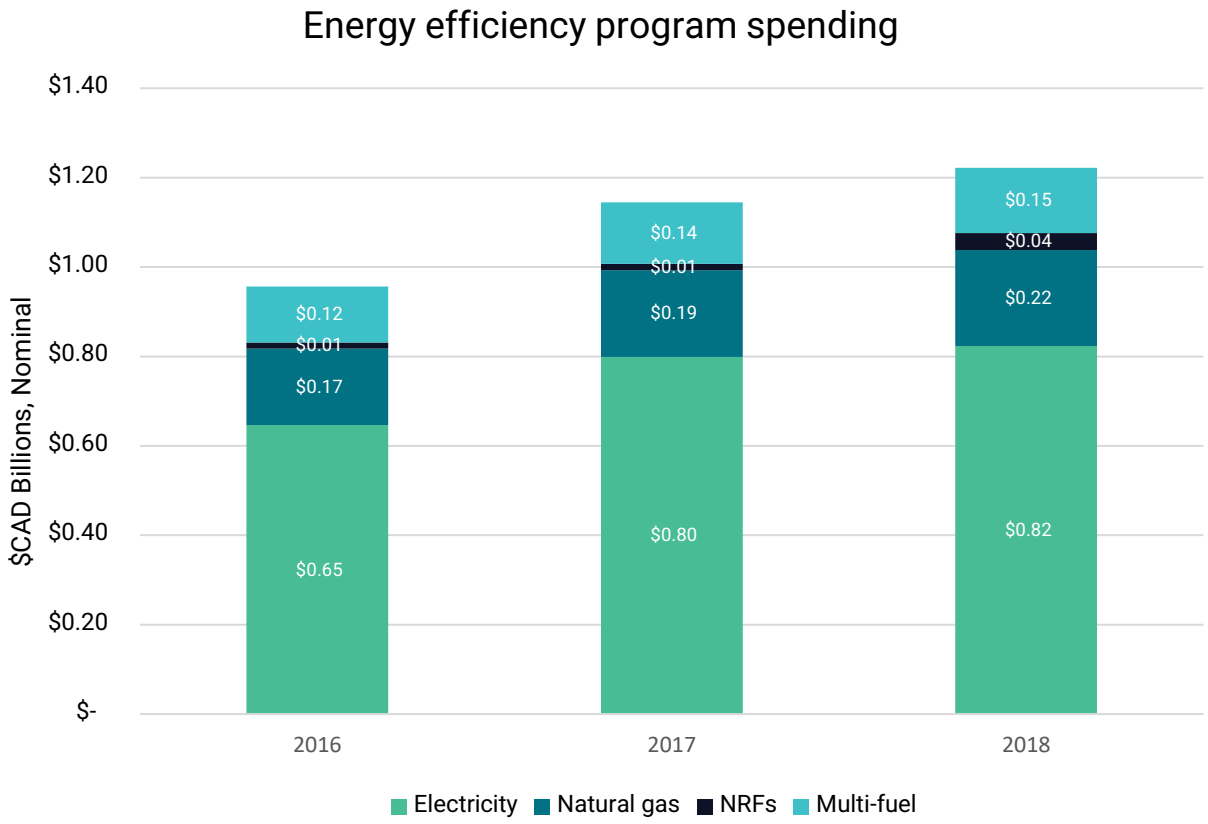

Figure 3. Canada-wide energy efficiency program spending[39]

Savings from natural gas and non-regulated fuels programs, and codes and standards savings, have grown annually since 2016. Natural gas savings have increased by 32% since 2016, driven by large savings growth in Manitoba (1.5x increase) and Québec (>3x increase), but also by stable growth among the program administrators with the highest savings. The principal program administrator in Ontario (Enbridge) alone accounted for 48.2% of natural gas savings in 2018. The vast majority of fuel switching savings reported for 2018 resulted from a single industrial project in British Columbia administered by BC Hydro (1.28 PJ natural gas savings, -0.39 PJ electricity savings).

[39] Spending per fuel is an approximation based on reported spending figures from program administrators listed in Appendix A. Some program administrators do not maintain per-fuel budgets but estimate per-fuel spending based on realized savings (e.g., Energy Efficiency Alberta). TEQ does not differentiate spending by fuel at all and is represented here as 'Multi-fuel'.

The following table provides overall scores for all programs' topics across the provinces.

Table 5. Energy efficiency programs scoring summary

	Program savings (18 points)	Program spending (10 points)	Equity and inclusion (4 points)	Energy savings targets (8 points)	Total (40 points)
Prince Edward Island	7	9	3.5	1.5	21
Nova Scotia	8	6	3.25	2.5	19.75
Ontario	7.5	3.5	0.5	1.25	12.75
Québec	5.75	1.5	0	3.75	11
British Columbia	5	2	0.25	3	10.25
Manitoba	4	3	0.5	2.25	9.75
New Brunswick	4.75	2.5	0.25	0.75	8.25
Newfoundland and Labrador	3.25	2.5	0	0.75	6.5
Alberta	2	0	0.5	0	2.5
Saskatchewan	1.5	0	0	0	1.5

Program savings

Our Scorecard now 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.[40]

Incremental savings are those realized in the year a program was run, and do not include 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.[41]

We asked respondents to indicate whether an independent third party had evaluated their net savings figures and, if so, if that evaluation included consideration of spill-overs, free riders, and interaction effects (which refer to the influence of one measure on the energy savings realized by another measure, and can be mitigating, neutral, or reinforcing). See Table 6 for a summary of savings evaluation protocols.

For this year's Scorecard, we also asked respondents to report savings from fuel-switching measures. Several provinces reported natural gas and non-regulated fuels savings from electrification/fuel switching. One province reported electricity savings from fuel switching (see the sections below for further information). In the tables below, we separate natural gas/NRF savings resulting from electrification from regular program savings. We did not reduce savings from any increase in electricity load (or demand for another fuel) because doing so would fail to present a comparative picture of electricity program savings and the increased load is reflected in the denominator of our savings-as-a-percentage-of-sales metric.

[40] Our 2019 Scorecard did not report on savings from non-regulated fuels programs or electricity capacity savings.

[41] 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.

Table 6. Summary of savings third-party evaluation			
Province	Electricity	Natural gas	Non-regulated fuels
Alberta	●	●	●
British Columbia	●	●	-
Manitoba	●	●	-
New Brunswick	●	●	●
Newfoundland and Labrador*	○	N/A	-
Nova Scotia	●	N/A	●
Ontario	●	●	N/A
Prince Edward Island	●	N/A	-
Québec	●	●	●
Saskatchewan	-	-	N/A

**Provincially funded programs in Newfoundland and Labrador are not third-party evaluated.*

We asked respondents to exclude savings attained from codes and standards work, distributed generation or renewable electricity programs, or rate design from their net incremental figures. 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).[42] We provide further details on scoring methodology in the subsections below.

[42] 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: Energir, SaskEnergy, and Energy Efficiency

Electricity

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 (see Table 7). We awarded provinces an additional point if they had a third party evaluate their savings, or if they subjected their data to an additional layer of scrutiny.

Canadian jurisdictions that reach this level of energy savings will capture significant economic benefits, according to a 2018 economic impact study produced for Clean Energy Canada and Efficiency Canada.[43] In past years, the states of Massachusetts, Vermont, and Rhode Island all achieved higher annual savings, and discussions of aggressive electricity savings suggest a target of 3% a year.[44]

In this year's Scorecard, Nova Scotia replaced Ontario as the top performing province in electricity savings. Last year, we recorded Ontario annual savings at 1.4% in 2017 and Nova Scotia's at 1.3%. Prince Edward Island, Newfoundland and Labrador, Québec and New Brunswick all registered a positive year-over-year change in savings rates. Prince Edward Island saw the largest jump in electricity savings compared to last year, while Ontario saw the largest decrease. Notably, no province scores above the mid-point of our scale, indicating that Canadian provinces have significant room to catch up to leading U.S. states.

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).

[43] 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."

[44] C Neme and J Grevatt, "The Next Quantum Leap in Efficiency: 30 Percent Electric Savings in Ten Years" (Montpelier, VT: Regulatory Assistance Project, 2016). Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard."

Table 7. Electricity savings scoring methodology		
Savings as a % of domestic sales (>=)	Score	Evaluated by a third party
2.50%	8	+1.0
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	
1.09%	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. Electricity savings scoring results						
Province	Annual Incremental Savings as % of Domestic Sales				Score (8 pts.)	Evaluated by a third party (+1 pt.)
	Year	Savings (PJ)	% of Sales	% points change		
Nova Scotia	2019	0.45	1.19%	-0.13%	3.5	1.0
Prince Edward Island~	2019	0.05	1.09%	+0.89%	3.0	1.0
Ontario	2018	5.03	1.02%	-0.39%	3.0	1.0
British Columbia	2018	1.24	0.63%	-0.01%	2.0	1.0
New Brunswick	2019	0.29	0.61%	+0.04%	1.5	1.0
Newfoundland and Labrador	2019	0.16	0.50%	+0.03%	1.5	1.0
Manitoba*~	2019	0.32	0.44%	-0.24%	1.0	1.0
Québec	2019	2.08	0.33%	+0.04%	1.0	1.0
Saskatchewan	2019	0.14	0.17%	-0.04%	0.5	0.0
Albertaŧ	2019	0.11	0.06%	-0.20%	0	1.0

** We estimate 2019 sales data by taking the prior two years average sales growth*
~ We estimate net savings using NTG of 0.872;
ŧ Includes fuel switching.[45]

We derived savings and sales data from information request to utilities and program administrators and supplemented or verified the data with sources such as annual reports or utility regulatory documents. Figures presented may not represent provincial totals, because we excluded some smaller utilities. We based electricity sales for Prince Edward Island on forecasted 2019 sales from Efficiency PEI's 2018-2022 DSM plan.[46] *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 B.*

[45] Alberta reported electricity savings associated with fuel switching, resulting from initiatives to capture fugitive gas emissions during natural gas production to produce onsite electricity, resulting in electricity savings on the grid and net GHG reductions.
[46] Prince Edward Island Energy Corporation, "2018-2021 Demand Side Management ('DSM') Plan," June 29, 2018, 29, http://irac.pe.ca/infocentre/documents/Electric-UE41400-PEI_EEEC-Plan_FINAL-062918-for_filing.pdf.

Natural gas/non-regulated fuels savings

In this year's Scorecard, we combined program savings from natural gas and non-regulated fuels (NRFs) such as heating oil, propane, diesel, and wood into a single metric. This section includes use of these fuels, principally for space heating, as well as their use in industry. (We consider transportation fuels elsewhere in this report.)

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). In these provinces, NRFs comprise ~40% of energy end-use, on average.[47] Our previous Scorecard did not include non-regulated fuel savings because we were uncertain if verified savings data would be available to report. The previous Scorecard included policy-related metrics for NRFs, such as program evaluation, measurement and verification, and a dedicated funding source. We excluded the Atlantic Provinces from natural gas scores and re-allocated points towards NRF savings and policies.

For this year's report, we requested information on NRF savings. All Atlantic provinces, and some others, offer NRF-targeted programming. We combined NRF and natural gas savings to create a composite metric across all provinces. We converted savings for both fuels to petajoules and added them together to calculate annual incremental savings. We divided these savings by final energy demand (excluding transportation and mining, oil and gas) for natural gas, natural gas liquids, and refined petroleum products to normalize annual savings as a percentage of energy demand.[48] The latter two fuels are intended to capture the use of NRFs for non-transport uses, but notably excludes wood (which is not tracked by Statistics Canada).

As noted above, we also asked respondents to provide savings from electrification or fuel-switching programs. Three provinces—British Columbia, Alberta, and Prince Edward Island—reported fuel switching savings for NRFs. British Columbia reported positive fuel savings for the fuel being switched from, and negative savings (i.e., consumption increases) for the fuel being switched to (electricity).

Our benchmarking included only the portion of savings for the fuel being switched from. This enabled us to consistently compare program savings. The associated electricity

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[47] Statistics Canada, "Table 25-10-0029-091: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual," Government of Canada, 2019. Non-energy uses of these fuels are excluded from this denominator.
[48] Statistics Canada.

consumption increases would be captured in the denominator in electricity savings as a percentage of sales metric.[49] (Electricity load increases should provide additional rationale for increasing electricity end-use savings.)

Table 9. Natural gas and non-regulated fuel savings scoring methodology

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

We scored this combined metric on a five-point scale, using the top threshold of savings against sales (1.75%) that we used last year. A recent Canadian economic impact study, produced for Clean Energy Canada and Efficiency Canada, modeled this

[49] We note that U.S. states promoting beneficial electrification have tended to add fuel-neutral goals with savings expressed in Btu (or GJ) units while maintaining electricity- and fossil-fuel specific savings targets. Increased electricity consumption can be a negative benefit in benefit-cost analyses of electrification programs but does not count against the reporting of electricity savings. For further information, see American Council for an Energy Efficient Economy (ACEEE), “State Policies and Rules to Enable Beneficial Electrification in Buildings through Fuel Switching,” April 2020.

level of savings in its "aggressive" efficiency scenario.[50] Provinces receive up to one additional point if reported savings are evaluated by a third party or another layer in addition to internal or third-party evaluation.

Our decision to combine natural gas and non-regulated fuels savings means we cannot make direct comparison to previous years' results. Québec took first place in the natural gas savings metric last year and takes first place in the combined natural gas/non-regulated fuels savings metric this year. By including NRFs this year, we can see that Prince Edward Island nearly matches Québec's savings as a percentage of demand.

To facilitate comparison between this year and last year, and to evaluate the relative performance of natural gas versus non-regulated fuels savings across Canada, the table below shows natural gas savings per program administrator and savings rates (as a percentage of reported domestic sales) for the most recent two years of data. Savings rates for 2018 may not exactly match those presented in our previous Scorecard due to historical data revisions. We offer this information for illustrative purposes only, and did not use it for scoring.

[50] 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 results							
Province	Annual Incremental Savings (PJ)					Score (5 pts.)	Evaluated by a third party (+1 pt.)
	Savings year	Savings, natural gas	Savings, NRFs	Savings, fuel switching	Savings as % of demand		
Québec~	2019	2.62	0.96	-	0.94%	2.5	1.0
Prince Edward Island*~	2019	-	0.01	0.03	0.90%	2.5	0
Nova Scotia	2019	-	0.22	-	0.53%	1.5	1.0
Ontarioŧ	2018	4.04	-	-	0.37%	1.0	1.0
New Brunswick	2019	0.00	0.08	-	0.35%	1.0	1.0
British Columbia	2019	0.84	0.00	0.28	0.33%	0.5	1.0
Manitoba*~	2019	0.25	0.00	-	0.23%	0.5	1.0
Alberta	2019	0.21	0.20	0.00	0.06%	0	1.0
Saskatchewan	2019	0.05	-	-	0.02%	0	0
Newfoundland and Labrador*	2019	-	0.00	-	0.02%	0	0

** NRF savings not third-party evaluated*
~ We estimate net savings using NTG of 0.828 for natural gas and 0.8 for NRF, where applicable;

ŧ. We note that Ontario natural gas programs have a low net-to-gross ratio compared to other jurisdictions. See Table 11 for gross figures.

We derived savings data from information request to utilities and program administrators, and supplemented or verified the data via annual reports, utility regulatory documents, or other documents, and may not reflect true provincial totals (e.g., some smaller utilities are not included). A list of program administrators/utilities reporting savings is provided in Appendix A. We report savings data in gigajoules per program administrator in Appendix C.

Table 11. Natural gas savings, 2018-2019						
Province	Program Administrator	Annual incremental savings (PJ)		Annual incremental savings / Domestic sales (PJ)		
		2018	2019	2018	2019	% points change
Alberta	Energy Efficiency Alberta	0.47	0.21	0.09%	0.04%	-0.05%
British Columbia	FortisBC	0.52	0.83	0.23%	0.35%	0.13%
	CleanBC	0.00	0.00	-	-	-
Manitoba	Efficiency Manitoba	0.22	0.16	0.26%	0.20%	-0.06%
New Brunswick	NB Power	0.00	0.00	0.04%	0.04%	-0.01%
Ontario*	Enbridge	4.24	4.04	0.47%	0.41%	-0.06%
Quebec	Énergir	1.50	1.45	0.65%	0.62%	-0.03%
	Transition énergétique Québec	1.61	1.17	-	-	-
Saskatchewan	SaskEnergy	0.02	0.05	0.03%	0.07%	0.04%

** Ontario (Enbridge) savings figures are for 2017 and 2018, not 2018 and 2019. 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 2018.*

When non-regulated fuels savings and demand are included into the above metric, the overall savings rate in most provinces is reduced. This suggests that, proportional to demand, all provinces could be doing more on non-regulated fuels. In addition, natural gas savings rates decreased in all but two provinces – British Columbia and Saskatchewan.

Capacity savings

Whereas energy savings are the reduction in the actual amount of energy consumed by a measure over a given period of time (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 by generation capacity, e.g., megawatts).

Energy efficiency programs deliver both energy and capacity savings. Like energy savings, capacity savings help to 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%.[51]

We scored this component with the same savings threshold as the ACEEE, but we also awarded half points 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 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 delivery both energy and capacity benefits, as well as customer benefits. In addition, utilities do not face potential throughput disincentives from capacity savings, 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 their utility scorecard.

[51] Grace Relf et al., "2020 Utility Energy Efficiency Scorecard" (Washington, D.C.: American Council for an Energy Efficiency Economy, 2020), 29-30.

The scoring methodology is explained in the following table.

Table 12. 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	

The following results table ranks provinces by highest score.

Table 13. Capacity savings scoring results			
Province	Capacity savings as a % of peak demand		Score (3 pts)
	From efficiency	From demand response	
Ontario	0.98%	3.41%	1.50
Nova Scotia	1.11%	0.00%	1.00
Saskatchewan	0.18%	2.28%	1.00
Newfoundland and Labrador	0.58%	0.71%	0.75
British Columbia*	0.62%	-	0.50
Manitoba	0.63%	-	0.50
Prince Edward Island	1.01%	-	0.50
New Brunswick	0.36%	0.18%	0.25
Québec	0.24%	0.76%	0.25
Alberta**	-	-	-

** Savings and peak demand for BC Hydro only, 2018 data*

The results indicate that the average capacity savings from energy efficiency in Canada falls short of the U.S. average, and no province matches the savings rates of the top utilities in the ACEEE report. The average capacity savings rate in Canada is 0.57% for energy efficiency, and 0.81% for demand response.

Program spending

The Scorecard tracks program spending, as well as savings, to account for efficiency programs that do not directly result in measurable energy savings but support other policy areas, such as codes and standards, market transformation, and innovation. We tracked spending to control for differences that might exist in provincial energy savings evaluation protocols, and in savings levels that occur because of distinct market structures.

We scored based on provincial program spending across all fuels. We used Statistics Canada tables to divide total spending by two denominators: population and a component of end-use energy demand.[52] We opted to score on these criteria rather than fuel-specific metrics because not all program administrators differentiate their budgets by fuel type (though we do provide fuel-specific figures below for illustrative purposes). This method also enabled the use of a consistent denominator to normalize across provinces.

We scored based on both spending by energy demand and spending per capita because each indicator has its advantages and disadvantages, as described below, and produced different rankings across the provinces. We used both indicators to eliminate the biases that might result from using one but not the other. We scored on a five-point scale on both metrics and based top thresholds observed historical maximums.[53]

Spending per end-use demand (all fuels)

Greater energy end use is likely to correspond with more efficiency potential. Thus, an indicator based on spending relative to energy demand controls for provinces that might have small populations relative to energy use. End use energy demand will be relatively higher in jurisdictions with larger industrial demands and larger heating or cooling loads, however these additional energy demands are also likely to create greater potential to save energy.

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[52] End-use demand figures from Statistics Canada, “Table 25-10-0029-01: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual,” Government of Canada, 2020, 25-10-0029–01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510002901. Population figures from Statistics Canada, “Table 17-10-0009-01: Population Estimates, Quarterly,” Government of Canada, 2020, 17-10-0009–01, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901.

[53] This is a minor reduction from our 2019 scorecard, in which these metrics were worth six points each.

The total end use energy demand denominator excluded transportation and the mining, oil and gas sector.[54] Few jurisdictions reported significant spending on transportation efficiency programs, and we consider the major transportation programs that do exist in Canada in the transportation section of the scorecard.

Table 14. Program spending scoring methodology (end-use demand)

Spending per PJ of end use demand ($Millions) (>=)	Score
1.20	5
1.08	4.5
0.96	4
0.84	3.5
0.72	3
0.60	2.5
0.48	2
0.36	1.5
0.24	1
0.12	0.5

[54] We divided 2019 spending figures by 2018 end use demand because this was the most recent data available.

Table 15. Program spending (end-use demand) scoring results				
Province	Year	Spending per PJ ($Millions)	*Annual Change*	Score (5 pts)
Prince Edward Island	2019	$1.21	*+$0.66*	5
Nova Scotia	2019	$0.79	*+$0.14*	3
Ontario	2018	$0.38	*+$0.00*	1.5
Manitoba	2019	$0.34	*-$0.04*	1.0
New Brunswick	2019	$0.34	*+$0.12*	1.0
British Columbia	2018	$0.30	*+$0.03*	1.0
Newfoundland and Labrador	2019	$0.25	*+$0.09*	1.0
Québec	2019	$0.23	*+$0.00*	0.5
Alberta	2019	$0.04	*-$0.07*	0
Saskatchewan	2019	$0.03	*-$0.01*	0

Spending per capita (all fuels)

The per capita spending indicator is intuitive, and controls for differences among provinces based on climatic conditions and/or non-residential energy demands that could be less amenable to annual energy savings. Per capita spending is also more easily compared to U.S. states through the ACEEE Scorecard, where Vermont was the top per capita spender in 2019 at US$99 (C$131), followed by Massachusetts at US$84 (C$111).[55]

[55] Berg et al., “The 2019 State Energy Efficiency Scorecard.” We converted UDS$ to $CAD at 1.3269, the 2019 annual average exchange rate reported by Bank of Canada at https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/

Table 16. Program spending scoring methodology (per capita)	
Spending per capita (>=)	Score
$100	5
$90	4.5
$80	4
$70	3.5
$60	3
$50	2.5
$40	2
$30	1.5
$20	1
$10	0.5

Table 17. Program spending (per capita) scoring results				
Province	Year	Spending per capita	*Annual Change*	Score (5 pts)
Prince Edward Island	2019	$80.49	*+$30.00*	4.0
Nova Scotia	2019	$64.75	*+$12.37*	3.0
Manitoba	2019	$45.74	*-$8.40*	2.0
Ontario	2018	$41.62	*-$1.48*	2.0
New Brunswick	2019	$31.87	*+$8.84*	1.5
Newfoundland and Labrador	2019	$30.73	*+$12.92*	1.5
British Columbia	2018	$29.43	*+$3.78*	1.0
Québec	2019	$29.21	*+$1.88*	1.0
Alberta	2019	$8.10	*-$10.61*	0
Saskatchewan	2019	$5.91	*-$2.34*	0

Spending per utility revenues (by fuel)

Below we present electricity and natural gas efficiency program spending by utilities and third-party program administrators as a percentage of utility revenues from domestic sales.

We based the revenue figures underpinning these calculations on our information request. Though we verified the figures, where possible, based on annual reports, we are not confident that revenue figures are comparable across provinces with vertically integrated versus competitive market structures. A revenue denominator may also be influenced by the availability of low-cost legacy hydroelectric resources in some provinces. We also cannot provide a consistent national comparison across all provinces using this metric because some program administrators do not distinguish budgets for different fuels or do not differentiate spending on natural gas versus NRF

programs (further complicating the denominator in this analysis). We excluded utilities or program administrators that were unable to acquire reliable revenue figures.

This indicator is presented per utility/program administrator, not per province, and therefore not scored. The figures are presented only for informational purposes as this indicator is commonly used to measure the level of energy efficiency effort in utility commission proceedings and public policy processes.

Table 18. Electricity program spending per domestic sales revenues/cost of electricity service

Program administrator	Year	Spending as a % of revenues
Manitoba Hydro	2018	3.8%
FortisBC	2019	2.8%
Ontario Independent Electricity System Operator*	2018	2.7%
Efficiency Nova Scotia / NS Power	2019	2.4%
BC Hydro	2018	2.1%
New Brunswick Power	2019	1.3%
EfficiencyPEI (Maritime Electric and Summerside)	2019	1.2%
Newfoundland and Labrador Hydro & Newfoundland Power	2019	0.9%
Hydro-Québec	2019	0.5%
SaskPower	2019	0.2%

** Denominator based on IESO 'total cost of electricity service', not utility revenues*

*Table 19. Natural gas program spending as a percentage of domestic sales revenues**		
Program administrator	Year	Spending per Revenues
FortisBC	2019	5.3%
Manitoba Hydro	2018	3.5%
Enbridge Gas (Ontario)	2018	3.0%
Énergir (Québec)	2019	1.3%
SaskEnergy	2019	0.5%

** NB Power also reported spending on natural gas and non-regulated fuels combined. As these cannot be reliably separated, it is not reflected in the natural gas spending table below.*

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 of 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 have an obligation to 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 when issuing program delivery calls. These can include putting in place legislated or regulatory requirements to provide efficiency programs targeting certain communities; including provisions in cost-effectiveness testing to allow for lower thresholds for program screening; and 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.[56] 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 suggests a 6% threshold, roughly twice the national median energy burden.[57] 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.[58]

The number of households in energy poverty can differ from the number of households considered to be low-income. Indeed, 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.[59] The number of households

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[56] 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.
[57] 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.
[58] Roger D. Colton, Direct Testimony and Exhibits before the Nova Scotia Utility and Review Board in the Matter of Affordable Energy Coalition et al vs. Nova Scotia Power Inc. et Al, 2007; Roger D. Colton, "A Ratepayer Funded Home Energy Affordability Program for Low-Income Households: A Universal Service Program for Ontario's Energy Utilities" (prepared for Low-Income Energy Network, 2006).
[59] Rezaei, "Power to the People."

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 efficiency upgrades could have the greatest impact.

Statistics on energy poverty are not routinely published. However, Rezaei produced a custom tabulation from the 2016 census, working with the Canadian Urban Sustainability Practitioners (CUSP) network. 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.

Table 20. Households by province spending more than 6% of after-tax income on home energy costs*

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

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

As with our 2019 report, 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.

Table 21. Efficiency program spending: low-income scoring methodology

Spending per Household (>=)	Score
$125	2.00
$109	1.75
$94	1.50
$78	1.25
$63	1.00
$47	0.75
$31	0.50
$16	0.25

Table 22. Efficiency program spending: low-income scoring results					
Province	Year	Program spending ($Millions)	Spending per household in energy poverty	*Annual change*	Score (2 pts)
Prince Edward Island	2018	$5.08	$214.99	*+$96.55*	2.0
Nova Scotia	2019	$17.78	$120.88	*+$35.15*	1.75
Manitoba	2019	$3.26	$43.80	*-$44.16*	0.5
British Columbia	2018	$6.87	$25.24	*+$0.39*	0.25
Ontario	2018	$38.33	$33.68	*+$8.26*	0.5
Alberta	2019	$7.70	$32.43	*+8.83*	0.5
Newfoundland and Labrador*	2019	$1.10	$13.21	*-10.82*	0
New Brunswick	2019	$2.04	$17.77	*+$0.35*	0.25
Québec	2019	$7.94	$12.60	*+$3.78*	0
Saskatchewan	2019	$0.34	$4.12	*+$2.77*	0

** Spending on low-income programs in Newfoundland and Labrador in 2019 is likely to be revised upward in future years, as some invoicing from third-party contractors was delayed due to the COVID-19 pandemic*

Of the 10 provinces, Prince Edward Island has the largest percentage of households in energy poverty, and leads in program spending per household. Prince Edward Island was also the top spender last year, yet it has increased its budgets substantially. Nova Scotia has also increased its budgets and moved from third to second highest position. Manitoba, despite a substantial reduction in low-income spending in 2019, still scored among the top three.

Respondents reported few changes to low-income program policy this year, with the following exceptions:

- SaskPower launched an Energy Assistance Pilot Program in 2019, targeting income-qualified households in Regina and Saskatoon. Participants receive free energy coaching, a home walk-through, tailored energy efficiency advice, and the free installation of several efficiency measures, such as low-flow showerheads, LED lights, power bars, and smart thermostats.
- Under the Interim Framework in Ontario, the IESO continues to operate a province-wide Home Assistance Program which, as under the preceding Conservation First Framework, is not required to pass cost-effectiveness testing.
- Energy Efficiency Alberta's Affordable Housing Energy Solutions program closed in October 2019, while a Home Upgrade pilot program continued throughout the year (the province did not provide spending figures for either program).

Indigenous energy efficiency programs

Indigenous communities are using energy efficiency as a way to achieve objectives such as greater energy sovereignty, local security, and economic well-being.[60] 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.[61]

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.

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[60] 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; Robert D. Stefanelli et al., "Renewable Energy and Energy Autonomy: How Indigenous Peoples in Canada Are Shaping an Energy Future," *Environmental Reviews* 27, no. 1 (September 27, 2018): 95–105, https://doi.org/10.1139/er-2018-0024.

[61] 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.

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.[62] 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.[63] 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.[64]

In this year's Scorecard we tracked Indigenous-specific energy efficiency programs. Any province with such a program, or demonstrated activities, received half a point. We awarded zero points if a government cancelled a program between January 2019 and June 2020 — the time period covered by this report. We share the results of this policy tracking in Table 23.

This year we also introduced a performance indicator to demonstrate the effort provincial-level energy efficiency program portfolios place on improving energy efficiency in Indigenous communities. To develop an initial indicator, we included a question in our information request to provincial governments, utilities, and program administrators on the total annual budget spent on programs tailored toward developing partnership with First Nations, Métis and Inuit. These programs could 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 for 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. The findings from these questions are available in our online policy database.

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[62] 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.
[63] 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/.
[64] 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.

To benchmark spending across provinces, we divided total spending reported in our information request by the number of individuals in each province reporting "Aboriginal identity" in the 2016 census.[65] We awarded points based on the scale in Table 24. We chose $33 per Indigenous individual as the top benchmark. We considered that this year's 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.[66] Energy efficiency program portfolios typically spend a little less than one third of expenditures on residential programs.[67] Thus $33 per individual, in a program area likely to be heavily weighted towards residential buildings, presents a level of spending on Indigenous programs one would expect to see in a comparatively well-funded provincial energy efficiency portfolio. We note that this is a spending metric for the entire provincial Indigenous population, not a spending amount per program participant and thus not a measure of the comprehensiveness of energy retrofits.

As discussed below, several provincial bodies confirmed they had Indigenous energy efficiency programs, but were either unable to provide spending or could only provide incomplete figures.

It is important to note that this metric provides a partial view of Indigenous energy efficiency initiatives in Canada, as it only assesses provincial/program administrator spending. For instance, this approach would not capture Indigenous-led projects taking place without partnerships with provincial government agencies or program administrators.[68] 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.[69] Furthermore, our benchmarking does not include the territories due to the

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[65] 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 previous versions.

[66] No province achieves this level of total per capita spending in this year's scorecard.

[67] The Consortium on Energy Efficiency 2018 Annual Industry Report states that Canadian electric DSM portfolios spent 26% on residential and 3% on low-income in 2017, and natural gas program portfolios spent 19% on residential, 12% low-income, 1% multi-family in 2017.

[68] For a recent review of projects see Indigenous Clean Energy, "Accelerating Transition: Economic Impacts of Indigenous Leadership in Catalyzing the Transition to a Clean Energy Future across Canada," June 2020.

[69] Projects that could be supported by the Northern REACHE program, for example.

data constraints noted for the entire scorecard, which is a significant omission given the large Indigenous population in the north. Thus, the information here should not be interpreted as a complete benchmarking of Indigenous energy efficiency activities. It presents a picture of the level of effort that various provincial policy actors—such as governments, utilities, energy efficiency agencies—devote to programs that should work in partnership with Indigenous communities.

Mi'kmaw Nation Harnesses Energy Efficiency: Nova Scotia's Mi'kmaw Home Energy Efficiency Project

In 2019, the Government of Nova Scotia announced a collaborative initiative with Efficiency Nova Scotia, the Government of Canada, and the Assembly of Nova Scotia Mi'kmaw Chiefs to invest $14 million in a program to expand upon a 2018 pilot initiative to deliver efficiency upgrades to 100 households in 13 Mi'kmaw communities.

The Mi'kmaw Home Energy Efficiency project will run for three years, and is associated with a long-term goal to upgrade 80% of the 2,400 band-owned homes on reserves over 10 years. Eligible upgrades include new insulation, heat pumps, and draftproofing.

Funding for the program is provided by the Province of Nova Scotia ($3.5m) and the Government of Canada ($10.5m).

Wagmatcook elder Francis Pierro, whose home was upgraded as part of the pilot project, emphasized the health benefits in a provincial paper, stating "with the extreme heat last summer, it was difficult to breathe in my home, so I'm looking forward to the air comfort in the summer from my new heat pump."

Table 23. Provincial Indigenous-focused energy efficiency programs		
Province	Provincial-level Indigenous programs	Score (0.5 pt)
Alberta	Between 2017 and 2019, the Government of Alberta administered the Indigenous Energy Efficiency (Retrofit) Program as part of the Indigenous Climate Leadership initiative. The province cancelled the program in its 2019 budget.[70]	0
British Columbia	The Province's CleanBC climate plan includes an Indigenous Community Energy Coach Program, a Remote Community Energy Strategy, and the Indigenous Clean Energy Initiative. Following a series of pilot initiatives, in 2019 BC Hydro launched its Indigenous Communities Conservation Program. FortisBC offers personal support, customer rebates, and free upgrades for Indigenous communities.[71]	0.5
Manitoba	Efficiency Manitoba's website advertises a First Nation Insulation and Direct Install and soon to be launched programs targeted to Métis residents,[72] as well as an Indigenous Small Business Program.[73] Under the previous Manitoba Hydro's Indigenous Energy Efficiency Program an energy efficiency specialist from Manitoba Hydro worked collaboratively with the Band Housing Manager from each Indigenous community to identify qualifying homes in the community for energy efficiency upgrades.	0.5

[70] Kieran Leavitt, "Cuts to Indigenous Relations in Alberta Signal That Communities Aren't Priority, Chief Says," The Toronto Star, October 26, 2019, https://www.thestar.com/edmonton/2019/10/25/cuts-to-indigenous-relations-in-alberta-signal-that-communities-arent-priority-chief-says.html.
[71] FortisBC, "Energy-Efficiency Programs for Indigenous Communities," FortisBC, 2020, https://www.fortisbc.com/in-your-community/indigenous-relations/energy-efficiency-programs-for-indigenous-communities.
[72] Efficiency Manitoba, "Indigenous Offers," Efficiency Manitoba, 2020, https://efficiencymb.ca/my-home/indigenous-offers.
[73] Efficiency Manitoba, "Indigenous Small Business Program," Efficiency Manitoba, 2020, https://efficiencymb.ca/business/indigenous-small-business.

New Brunswick	Through its Community Outreach Program, New Brunswick Power works with First Nation communities. Activities include the free installation of low-cost efficiency measures, energy advisor training for First Nations members and mentorship through 20 home evaluation in Tobique First Nation.	0.5
Newfoundland and Labrador	Newfoundland and Labrador reported a collaborative initiative with the Nunatsiavut Government	0.5
Nova Scotia	The Mi'kmaw Home Energy Efficiency project has a goal of providing upgrades to 80% of the 2,400 band-owned homes on reserves over 10 years.	0.5
Ontario	The Independent Electricity System operator operates regionally targeted Indigenous energy efficiency programs, under the Interim Framework from April 2019 to December 2020. Legacy Union Gas (now Enbridge) administered an Indigenous program in 2018.	0.5
Prince Edward Island	As part of its Winter Warming Program, EfficiencyPEI partnered with the Abegweit First Nation, leading to energy audits, upgrades of community buildings and homes, and local training.	0.5
Québec	No Québec organization reported Indigenous-specific energy efficiency programs or spending in the past year.	0
Saskatchewan	SaskPower administered pilot programs to better understand and improve efficiency in northern communities. Activities include community workshops, direct installation targeting five homes, energy monitoring kits, and supporting the development of a Community Energy Plan.	0.5

Table 24. Efficiency program spending - Indigenous peoples/communities, scoring methodology	
Spending per individual (>=)	Score
$33.0	1.50
$27.5	1.25
$22.0	1.00
$16.5	0.75
$11.0	0.50
$5.5	0.25

This year saw one cancellation of an Indigenous Program, in Alberta. The Government of Alberta administered an Indigenous Energy Efficiency (Retrofit) Program as part of the Indigenous Climate Leadership initiative, which operated from 2017 to 2019. This program was cancelled by the province's 2019 budget.[74] We awarded zero points due to the cancellation of this program during the 2019 to June 2020 in which we are tracking policies, and the lack of spending data provided for 2019 or 2018.

Other Indigenous programs are in their infancy and could be ramping up in the future. This includes British Columbia, where the spending figures reported pertain only to pilot programs operated prior to 2019. BC Hydro launched a dedicated DSM offer targeting Indigenous communities in 2019. As well as SaskPower programs that are at a pilot project stage.

[74] Leavitt, "Cuts to Indigenous Relations in Alberta Signal That Communities Aren't Priority, Chief Says."

Table 25. Efficiency program spending - Indigenous peoples/communities scoring results					
Province	Year	Indigenous program exists	Indigenous program spending ($Millions)	Indigenous program spending per individual with Aboriginal identity	Score (2 pts)
Prince Edward Island	2019	Yes	$0.17	$63.59	1.5
Nova Scotia	2019	Yes	$1.72	$33.40	1.5
Newfoundland and Labrador	2019	Yes	$0.21	$4.53	0
New Brunswick	2019	Yes	$0.06	$2.04	0
Ontario*	2018/9	Yes	$0.66	$1.76	0
British Columbia	2018	Yes	$0.29	$1.07	0
Manitoba	2019	Yes	$0.14	$0.63	0
Saskatchewan	2019	Yes	$0.04	$0.23	0
Alberta	-	Yes	-	-	0
Québec	-	No	-	-	0

** Spending year is 2018 for Enbridge and 2019 for IESO, as no common data year was available. Prior to 2019, Indigenous program spending was included in low-income spending by the IESO, and Enbridge did not report 2019 figures.*

Outside of Prince Edward Island and Nova Scotia, the spending per capita figures collected in this year's Scorecard are very far from what could be considered meaningful or equitable. In our view, this suggests that the provinces have yet to embrace Indigenous energy efficiency partnerships as a pathway towards reconciliation.

The low spending figures could be due to a lack of information on Indigenous specific spending and an assumption that Indigenous populations participate in general programming. Given the existence of Indigenous specific programs and marketing materials in several provinces, the lack of specific spending information is surprising. We hope our tracking of this area in this year's scorecard leads to increased spending and better data tracking in future years. We note that Indigenous populations could not be receiving adequate and equal energy efficiency services due to systemic racism, and program approaches that do not consider specific community needs or the importance of negotiation and partnership with independent Indigenous Nations.

Abegweit First Nation and EfficiencyPEI Partnership

Significant energy savings investments in the Abegweit First Nation started with a meeting between the chief and council and Efficiency PEI to examine the needs and goals of the community. These discussions led to an initial energy audit and upgrade of insulation and windows of a chapel building.

The next stage involved upgrading 100 homes through the Winter Warming Program. A member of the First Nation shadowed the program tradesperson, to learn about a career in the trades.

Efficiency initiatives were then increased via free energy audits and 75% funding for relevant upgrades for all residential structures in the community. A construction company started by a band member is leading the upgrades.

EfficiencyPEI and the First Nation continue to discuss future projects through community working groups.

Energy efficiency targets

Energy efficiency targets give clear direction to program administrators and energy system managers. They reinforce the concept of efficiency as a quantifiable energy resource. Evidence from the United States shows that Energy Efficiency Resource Standard (EERS) policies more than triple spending and savings levels.[75] It is also important to track future targets when benchmarking jurisdictions, so relevant comparisons can be made based on where jurisdictions are going and not only where they have been. Targets drive efficiency performance when they push energy efficiency administrators to achieve higher savings than they would otherwise have captured.

The scorecard awards a maximum total of eight points for energy efficiency targets. We score on the level of energy saving targets for electricity, heating fuels (natural gas and non-regulated fuels) by assessing the approximate average annual program savings targeted as a percentage of sales or final energy demand over the 2020 to 2024 period. Electricity savings are weighted higher than heating fuels because of larger savings potential and higher targets. There is significant transportation energy savings potential, however these targets receive lower overall points because they are somewhat novel in the current mix of energy efficiency policies.

We only counted years when targets were present. Some jurisdictions had a target for only one year in advance, while others might have targets over the entire period. The annual targets allowed us to assess the size of the savings ambitions without downgrading provinces at various stages of target negotiation and renewal.

We also awarded points for jurisdictions with clear and accountable transportation savings targets. We expressed these as average annual reductions and awarded points on a scale, as well as a quarter point for having a target given the novelty of explicit transportation savings objectives.

[75] 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.

For both electricity, fuels, and transportation we awarded additional points for the long-term and mandatory nature of the targets.

1. **Long-term.** We awarded an extra quarter point for targets that covered a period of more than three years. A longer target period enables planning for program administrators. A reasonable target period (e.g. three to five years) also enables program administrators to adapt strategies and make mid-course corrections. Finally, a multi-year target provides certainty for contractors, partners, and consumers.
2. **Mandatory**. We awarded an extra quarter point if the province had legislated the target, or if a regulator had mandated, reviewed, and/or approved it. We also considered an "all cost-effective" mandate, or loading order, mandatory. Such orders require energy regulators and managers to prioritize energy efficiency in resource planning. For transportation, we assess if the target was legislated and/or had clear accountability provisions associated with it, given that these targets do not frequently occur under utility regulatory governance frameworks.

Finally, we awarded a quarter point for provinces with targets (across fuel types) that related to structural or economy-wide energy saving, often achieved through codes and standards. We present some illustrative data on percentage of program budgets focused on codes and standards activities for program administrators that provided this information, demonstrating that jurisdictions with these targets place greater emphasis on promoting market transformation.

Electricity savings targets

We awarded provinces a maximum of two and half points based on the annual incremental savings on the scale in Table 25. Information request respondents provided electricity savings targets, and we also accessed relevant public documents, such as demand side management plans or ministerial directives.

To calculate savings as a percentage of sales, we asked respondents to provide projected domestic sales. In cases where this information was not provided, we consulted alternative sources, or took the latest historic sales data available and projected a one percent annual load increase. The savings targets are exclusively from programs and exclude jurisdictions that include codes and standards as part of their

savings targets. This allowed us to provide a consistent comparison across provinces, most of which do not include codes and standards in savings targets, but which have economy-wide savings from those policies. The section below, on economy-wide savings targets, facilitates a further discussion on the role of including codes and standards in targets.

Table 26. Electricity savings targets scoring methodology

Approximate annual incremental electricity program savings as % of sales (>=)	Score	Is the target long-term?	Is the target mandatory?
2.50%	2.50	Score 0.25	Score 0.25
2.25%	2.25		
2.00%	2.00		
1.75%	1.75		
1.50%	1.50		
1.25%	1.25		
1.00%	1.00		
0.75%	0.75		
0.50%	0.50		
0.25%	0.25		

The results are as follows, ranked by highest target (not highest score). British Columbia and Manitoba include codes and standards are part of their targets, and thus we have included a column to show their targets when codes and standards are included.

Table 27. Electricity savings targets scoring results						
Province	Approximate average annual electric program savings target as % of sales (2020-2024)	Score (2.5 pts)	Target including codes and standards	Long-term target (0.25 pts)	Mandatory target (0.25 pts)	Total Score (3 pts)
Nova Scotia	1.2%	1.0	-	Yes	Yes	1.5
Prince Edward Island	1.0%	1.0	-	Yes	Yes	1.5
Manitoba	0.7%	0.5	1.5%	Yes	Yes	1.0
British Columbia	0.6%	0.5	1.3%	Yes	Yes	1.0
New Brunswick	0.6%	0.5	-	-	Yes	0.75
Ontario	0.6%	0.5	-	-	Yes	0.75
Newfoundland and Labrador	0.4%	0.25	-	Yes	Yes	0.75
Québec	0.3%	0.25	-	Yes	Yes	0.75
Alberta	-	-	-	-	-	-
Saskatchewan	-	-	-	-	-	-

British Columbia includes BC Hydro and FortisBC
Ontario target based on 2019-2020 Interim Framework and load from IESO 2020 Annual Planning Outlook tables.

Nova Scotia has the highest electricity savings target, similar to last year. Prince Edward Island has the second highest target. EfficiencyPEI's 2018-2021 demand side management plan has a consistent ramp-up in energy savings targets. If programs continue to increase on a similar schedule the province will move towards annual energy savings of 2% of sales per year, a target noted in the 2016/17 provincial energy strategy.

We observed notable target decreases and/or declining performance in New Brunswick and Ontario. In New Brunswick, last year's Scorecard tracked a target equal to 0.8% of sales; it has since decreased to 0.6%. In Ontario, the 2019-2020 Interim Framework significantly reduced electricity savings program budgets. Ontario achieved annual savings of 1.4% of sales in 2017. However, we expect actual savings in 2020 will likely be higher than the Interim Framework Target (though still lower than those prior to the Interim Framework) due to savings occurring due to legacy funding from programs operating under the previous Conservation First Framework.[76] The IESO's Planning Outlook also notes savings expected from the Green Municipal Fund and federal Climate Action Incentive Fund, which are national initiatives relevant to all provinces.

This year, Saskatchewan did not provide an electricity savings target. The April 2019 Climate Resilience Saskatchewan report includes a measure to save 87 GWh in 2030 from energy efficiency and conservation programs. In its response to our information request, SaskPower stated that it is repositioning its efforts to a broader range of program areas.

Last year we compared Canadian electricity savings targets against the American states.[77] Leading states have targets consistent above 2% of sales, with the top states consistent with 2.7% of sales (Massachusetts), 2.5% (Rhode Island), and 2.4% (Maine and Vermont).

Natural gas and non-regulated fuel savings targets

As with previous sections in this Scorecard, we combined targets for natural gas and non-regulated fuels (e.g. heating oil, propane, diesel, wood). This allowed us to compare targets across provinces where natural gas dominates heating, and also include Atlantic Canadian provinces with high consumption of heating oil and other non-regulated fuels.

Provinces were awarded a maximum of one and three-quarter points based on the scale in Table 28. Information request respondents provided savings targets, and we also took them from relevant public documents such as demand side management plans or

[76] IESO, "Conservation First Timeline Extension," Ministerial Directives, July 23, 2020, http://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives.
[77] Haley et al., "Canada's First Provincial Energy Efficiency Policy Scorecard."

ministerial directives. Information respondents also provided natural gas sales projections. For non-regulated fuels, or in cases where respondents did not project fuel demand, we used Statistics Canada data for final energy demand.[78] We assumed constant final energy demand in future years because we did not find a significant upward trend in demand in the provinces where we applied this denominator. Similar to electricity, we include savings targets for programs only. We provide information on Manitoba which includes codes and standards in savings targets. This column also includes fossil fuel savings targets (natural gas and diesel) from BC Hydro's low-carbon electrification program. We provide the influence of electrification on these targets for illustrative purposes, because at this stage the BC Hydro targets are neither long-term nor mandatory.

Table 28. Natural gas and non-regulated fuels savings targets scoring methodology

Annual Incremental natural gas/NRF savings as % of sales (>=)	Score	Is the target long-term?	Is the target mandatory?
1.75%	1.75	Score 0.25	Score 0.25
1.50%	1.50		
1.25%	1.25		
1.00%	1.00		
0.75%	0.75		
0.50%	0.50		
0.25%	0.25		

[78] Statistics Canada, "Table 25-10-0029-01: Supply and Demand of Primary and Secondary Energy in Terajoules, Annual." Fuel Types (gas plant natural gas liquids, natural gas, total refined petroleum products). Energy use, final demand for the following sectors - agriculture, commercial and other institutional, public administration, residential, industrial minus total mining and oil and gas extraction.

The results are as follows, ranked by highest score (not highest savings targets).

Table 29. Natural gas and non-regulated fuels savings target scoring results

Province	Approximate average annual NG + NRF program savings target as % of demand (2020-2024)	Score (1.75 pts)	Target Including codes and standards or electrification	Long-term target (0.25 pts)	Mandatory target (0.25 pts)	Total Score (2.25 pts)
Québec *	0.75%	0.75	-	Yes	Yes	1.25
Nova Scotia	0.79%	0.75	-	Yes	-	1.00
Manitoba	0.52%	0.50	0.77%	Yes	Yes	1.00
British Columbia [b]	0.46%	0.25	0.81%	Yes	Yes	0.75
Ontario [p]	0.40%	0.25	-	-	Yes	0.50
Saskatchewan	0.06%	0	-	-	-	0.00
Alberta	-	-	-	-	-	0.00
New Brunswick	-	-	-	-	-	0.00
Newfoundland and Labrador	-	-	-	-	-	0.00
Prince Edward Island	-	-	-	-	-	0.00

We used Statistics Canada data to estimate demand for Nova Scotia, Saskatchewan, and British Columbia's target, including electrification.

** Includes savings target and demand projection from Énergir 2019-2023 Plan global en efficacité énergétique. TEQ does not publish a natural gas savings target.*

[b] As the province's major natural gas utility FortisBC has mandatory and long-term targets, listed in the second column. BC Hydro provided internal targets for low-carbon electrification, saving both natural gas and diesel. The company based its annual target equal to 0.81% of energy demand on a two-year internal target, calculated from Statistics Canada energy demand data (see reference in footnote) to include both natural gas and non-regulated fuels in the demand denominator. Given that these electrification targets are neither long-term nor mandatory at this point, we provide the information for illustrative purposes and award full points for FortisBC's long-term and mandatory saving targets.

[p] Savings target for Ontario estimated from approved budgets for 2020 and 2021 and most recent year's yield rate (GJ saved / $). This provides a rough approximation of the Ontario Energy Board's annual target setting process

Nova Scotia has the highest fuel savings target, just ahead of Québec. However, Québec received more points because the Nova Scotia target is not mandatory. Rather, it is based on an agreement with the provincial government, but not required within legislation or as a regulatory order. Nova Scotia savings are primarily focused on "non-regulated fuels" and thus do not fall under regulatory governance structures like natural gas governance systems in Québec, Manitoba, British Columbia, and Ontario. Saskatchewan was not awarded points for a long-term or mandatory target because this is an internal target set by SaskEnergy.

The Ontario Energy Board (OEB) is currently developing a post-2020 natural gas demand side management framework. Enbridge proposed a one-year transition plan, which does not result in a long-term target this year. The OEB has previously developed six-year plans.

There are no formal targets in New Brunswick, Newfoundland and Labrador, or Prince Edward Island, despite active program activities for these fuels. In last year's Scorecard we tracked policy enablers such as dedicated funding sources and third-party evaluation that support these programs with greater certainty and policy durability.

Transportation savings targets

Tracking transportation savings targets is a new feature of the 2020 Scorecard. Provinces can meet these targets via many of the policies we track in the transportation section of the Scorecard, including zero-emission vehicle mandates, electric vehicle purchase incentives, active transportation strategies, and charging infrastructure. A target can encompass freight transportation and many other areas, while program strategies can target specific fleets, promote efficient driving habits, retire inefficient vehicles, as well as other information and education initiatives.

Given that transportation specific targets are still novel, we awarded one point for having a target, and we awarded further points for a target that is long-term, and either mandatory in nature or linked to clear accountability mechanisms.

Responses to our information request confirmed two transportation specific savings targets, in Québec and British Columbia. The following table gives information on each target and provides a rough comparison.

Table 30. Transportation target scoring results					
Province	Transportation savings target (1 pt)	Approximate average annual transportation fuel savings target as % of demand	Long-term target (0.25 pts)	Mandatory target (0.25 pts)	Total Score (2.25 pts)
Québec	Government directive 537-2017 creates a target to reduce the total consumption of petroleum products by at least 5% from a 2013 base year. This short-term target is informed by the 2030 Energy Plan's target to reduce petroleum demand by 40% in 2030. Yet, the TEQ 2018-2023 Master Plan, which is reviewed by the Régie de l'énergie, includes a goal to reduce petroleum use by 12% in 2023 compared to 2013 levels. The latter two targets are consistent with annual savings of 2.9% of demand, if baseline demand holds steady at 2013 levels.	2.9%	Yes	Yes	1.50
British Columbia	The CleanBC climate plan, released in December 2018, includes a target to reduce transportation sector GHG emissions 6.0 Mt by 2030, or 23.4% below 2016 levels. Taking 2016 as a base level of demand, this is roughly consistent with an annual savings target of 2.0% per year, assuming the reductions occur between January 2019 and December 2030. The target is a projection in CleanBC and not yet legislated or regulated. However, a specific transportation target should be clarified through legislation or regulation in the future because the Climate Change Accountability Amendment Act requires the Minister of Environment and Climate Change Strategy to establish GHG emission targets for individual sectors.[79]	2.0%	Yes	No	1.00

[79] Legislative Assembly of British Columbia, "Progress of Bills," Legislative Assembly of British Columbia, 2020, https://www.leg.bc.ca:443/parliamentary-business/legislation-debates-proceedings/41st-parliament/4th-session/bills/progress-of-bills.

Economy-wide targets, and codes and standards

The targets noted above are fuel-specific, and mostly linked to the program savings directly attributable to utility or third-party administrators. Some jurisdictions have also published economy-wide targets, such as goals based on the energy intensity of economic activities. For example, the International Energy Agency estimates that three percent annual improvement in global energy intensity is required to meet Paris GHG emission reduction goals.[80] In July 2020, the Government of Canada joined a global alliance of countries committed to meeting this goal, and the Generation Energy Council report recommended meeting three percent annual energy improvements by 2030.[81]

Several factors come into play in determining economy-wide energy intensity, such as weather, structural changes in the economy, and increased energy services (e.g., increased use of air conditioning).[82] A decomposition of energy intensity analysis by Torrie et al. demonstrated that the sector-specific energy efficiencies and structural effects can move in the same or opposite directions.[83] For example, the Canadian commercial and institutional building sectors experienced drops in both the energy used per floor area, as well as less floor area required to produce a unit of GDP. In contrast, the significant decline in residential energy intensity would have been greater had increased dwelling size and fewer persons per dwelling not offset the total.

Energy efficiency strategies that have traditionally focused on "claimed savings" directly attributable to program activities could be required to consider economy-wide savings. An increased focus on GHG reductions and new policy and program strategies can influence structural change and/or market transformation. In this Scorecard, we award a quarter point if a jurisdiction had a legislated economy-wide standard that corresponded with a specific plan to achieve it.

In Canada, only Québec has published an economy-wide target. Government Directive 537-2017 requires Transition énergétique Québec to create a 2018-2023 Master Plan that improves energy efficiency at least 1% per year on average, and the province's 2030

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[80] "Support Countries' Energy Efficiency Efforts through the Three Percent Club."
[81] The Generation Energy Council, "Canada's Energy Transition: Getting to Our Energy Future, Together" (Ottawa: Natural Resources Canada, June 2018).
[82] See Natural Resources Canada, "Energy Efficiency Trends in Canada: 1990-2015," Government of Canada, 2018, http://oee.nrcan.gc.ca/publications/statistics/trends/2015/index.cfm.
[83] Ralph D. Torrie, Christopher Stone, and David B. Layzell, "Reconciling Energy Efficiency and Energy Intensity Metrics: An Integrated Decomposition Analysis," *Energy Efficiency* 11, no. 8 (December 1, 2018): 1999–2016, https://doi.org/10.1007/s12053-018-9667-z.

Energy Plan calls for a 2030 objective to improve energy efficiency 15% from a 2013 base year.[84] The TEQ 2018-2023 Master Plan aims to improve energy efficiency by 1.2% per year, on average. This target is not based on energy/GDP energy intensity, but a narrower definition of energy efficiency that uses factorization to exclude activity effects, structural effects, weather, and service effects. TEQ states that the initiatives within the plan are expected to improve efficiency by 0.6% per year (9.9 petajoules), higher than the 0.4% or 7.3 petajoules achieved from 2012 to 2017.

Table 31. Economy-wide/codes and standards scoring results

Province	Economy-wide target (0.25 pts)	Targets include codes and standards? (0.25 pts)	Score (0.5 pts)
Québec	Yes		0.25
British Columbia		Yes	0.25
Manitoba		Yes	0.25

Codes and standards targets

To provide a valid comparison, the tables above benchmark provinces on program savings targets exclusively. Program strategies can create larger economic impacts by influencing the development and implementation of stringent codes and standards.

Most jurisdictions do not include codes and standards in their savings targets, though some estimate savings from codes and standards separately. British Columbia and Manitoba are the only two provinces that include codes and standards in targets. BC Hydro includes codes and standards in its savings goals, while FortisBC has a codes and standards support spending target for its electricity and natural gas programs. Manitoba has legislated annual and multi-annual targets for natural gas and electricity, where codes and standards savings can be counted towards meeting the target. These

[84] "Plan directeur en transition énergétique," Transition Énergétique Québec, 2018, 167, https://transitionenergetique.gouv.qc.ca/plan-directeur-en-transition-energetique.

codes and standards savings are estimated to help meet 52% of the electricity target and 33% of the natural gas target from 2020 to 2023.

In this year's information request we asked jurisdictions if they were counting economy-wide savings or if codes and standards savings could be directly attributable to program activity, as is done in some U.S. states (e.g., Massachusetts, California, and Arizona).[85] No Canadian jurisdictions attribute codes and standard savings to program activities in this way.

Economy-wide targets have both benefits and potential drawbacks. On one hand, they can compel program administrators to advocate for and support the development of policies that lead to structural changes, or "lock-in" savings through codes and standards. A policy framework that does not provide some attribution for codes and standards work could create a perverse incentive, whereby program administrators do not support stringent standards because it shifts the baseline in a way that makes it more difficult for them to claim savings from program activities. On the other hand, over-reliance on codes and standards savings could dilute published targets and take away from investments in program

Targets in the Efficiency Manitoba Act

The Efficiency Manitoba Act legislates clear annual targets for electricity and natural gas savings, with flexibility to contribute to cumulative savings targets. Annual savings (including codes and standards) are equal to 1.5% of prior year sales for electricity and 0.75% of prior year sales for natural gas – leading to efficiency contributing to 22.5% of electricity and 11.25% of natural gas savings over 15 years. The legislated targets create the certainty and stability that energy efficiency sector partners need to design and engage stakeholders over the long term.

Between October 2019 and January 2020, the Manitoba Public Utilities Board reviewed Efficiency Manitoba's first three-year plan to meet these targets for fiscal years 2020/21 through 2022/23. The board presented a recommendation report to the provincial government in February of 2020 and the Province of Manitoba approved the plan, with amendments, in advance of Efficiency Manitoba's April 1, 2020 start-up date.

[85] Berg et al., "The 2019 State Energy Efficiency Scorecard." For a description of potential methods to estimate savings, see Glenn Reed, Toben Galvin, and Blair Hamilton, "Savings without Rebates: Moving toward Claiming Savings from Market Transformation" (ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, 2006).

activities. This would create a perverse situation because strong incentive programs are a way to prepare the market for the introduction of more stringent codes and standards.

Specific activities to promote codes and standards that could be enabled by specific targets include energy analysis, development of compliance tools, training, and coupling downstream or upstream financial incentives with specific market transformation goals. It can be difficult to measure specific energy savings from these activities, even though they can contribute to structural changes. A specific target, alongside other policies such as minimum budget requirements, can strengthen market transformation.

One way to illuminate the effect of economy-wide savings goals is to assess the efforts program administrators put into promoting codes and standards in their program portfolios. Table 32 presents the percentage of overall budget specific program administrators spent on codes and standards activities in 2019. We collected this information via our information request.

Table 32. Codes and standards budgets in program portfolios

Province	Program administrator	Spending on codes and standards activities as % of total budget (2019)
British Columbia	BC Hydro *	4.7%
	Fortis BC	1.7%
Québec	Hydro Québec	0.8%
	TEQ	0.3%
Manitoba	Manitoba Hydro	0.4%
Nova Scotia	Efficiency Nova Scotia	0.05%

** 2018-2019 fiscal year*

Jurisdictions with either economy-wide or codes and standards specific targets also provided a budget breakdown (with the exception of Nova Scotia). British Columbia stands out in this regard; the province requires its two utilities to each spend a minimum of 1% of budget on codes and standards activities. BC Hydro has been particularly active in supporting the BC Energy Step Code.

Manitoba utilities have traditionally been active in the development of national model codes and standards. Efficiency Manitoba's first plan covers 2020/21 to 2022/23 and does not have spending targets. The Efficiency Manitoba Act requires the organization to make a "material contribution" to the development of codes and standards in order to count these savings towards its targets. However, the Public Utilities Board panel recommended this be removed because it is too subjective.[86]

With the above discussion in mind, it is evident that there is some benefit to including economy-wide targets, or codes and standards targets, as part of a province's energy efficiency policy mix. Thus, we awarded a quarter point to provinces that have either an economy-wide target or a target that includes codes and standards savings. In future scorecards and related research, we will aim to find new ways to assess the contribution program administrators are making to economy-wide structural changes and market transformation.

Conclusion

No Canadian jurisdiction has a clear and functional mandate to invest in "all cost-effective" energy efficiency, which has spurred higher target setting and savings achievements in leading U.S. states. The rules for resource planning in the BC Utilities Commission Act requires utilities to explain why they are using energy generation or purchases rather than demand-side measures, but the legislation does not require pursuit of "all" cost-effective efficiency to meet demand.[87]

In Ontario, a March 2014 Ministerial Directive instructed the Ontario Energy Board to develop a natural gas DSM framework to "enable the achievement of all cost-effective DSM […] as far as is appropriate and reasonable."[88] However, the Ontario Energy Board capped its maximum achievable energy savings budget, citing its principle of achieving

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[86] Public Utilities Board, "Report on Efficiency Manitoba's 2020/21 to 2022/23 Efficiency Plan Submission" (Winnipeg, MB: Public Utilities Board, February 28, 2020), http://www.pubmanitoba.ca/v1/proceedings-decisions/appl-current/pubs/2020-em-3-yr-plan/em-report-final-feb-2020.pdf.
[87] BC Hydro was at one point excluded from this provision, but Bill 19-2019 amended the BC Utilities Act to remove this exclusion. See Minister Michelle Mungall, "Energy Statutes Amendment Act, 2019," Pub. L. No. 19–2019, accessed October 13, 2020, https://www.leg.bc.ca:443/parliamentary-business/legislation-debates-proceedings/41st-parliament/4th-session/bills/third-reading/gov19-3.
[88] This directive is not changed by the March 21, 2019 Ministerial Directive that instructed a wind down of the Conservation First Framework for electricity.

"all cost-effective DSM that results in a reasonable rate impact."[89] The 2021 program budgets and targets are inconsistent with the maximum achievable potential scenarios for the province, or the GHG reduction objectives in the provincial environment plan.

Many DSM plans and targets are coming up for renewal soon. For instance, the BC Clean Energy Act included an electricity savings objective for BC Hydro that expires at the end of 2020. Ontario's Conservation First Framework for electricity was replaced by an Interim Framework that will expire on December 31, 2020. The province's natural gas framework also ends in 2020. Prince Edward Island's DSM resource plan ends in 2021.

In future scorecards we will continue to explore the benefits of program-specific and economy-wide targets. We will also aim to collect information on future spending commitments because some jurisdictions approve budgets without specific savings targets, and budget information will allow us to assess if budgets are adequate for meeting stated targets.

[89] Ontario Energy Board, "Report of the Board: Demand Side Management Framework for Natural Gas Distributors (2015-2020)" (Toronto, ON: Ontario Energy Board, December 22, 2014), https://www.oeb.ca/oeb/_Documents/EB-2014-0134/Report_Demand_Side_Management_Framework_20141222.pdf.

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) reach maturity.

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 **(6 points);**
    - Financing support programs (2 points);
    - Capital mobilization (1 point);
    - Carbon pricing (3 points);
- Research, development and demonstration and program Innovation **(3 points);**
    - Efficiency research funding (1 point);
    - Enabling strategies and innovation funding (1 point);
    - Research institutes and initiatives (1 point);
- Training and professionalization **(4 points);**
    - Energy advisors, existing homes (1 point);
    - Energy advisors, new homes (1 point);
    - Certified energy managers (2 points);
- Grid modernization **(4 points)**;
    - Advanced metering infrastructure (1 point);
    - Rate designs (1 point);
    - Non-wires alternatives (1 point);
    - Other grid modernization (1 point)

We provide summary scoring results for these topics in Table 33.

Table 33. Enabling policies scoring results					
Province	Financing and market creation (6 points)	RD&D / Innovation (3 points)	Training and professionalization (4 points)	Grid modernization (4 pts)	Total (17 pts)
British Columbia	3.25	2.5	2.75	3.5	12
Ontario	1.75	2.5	2.5	4	10.75
Québec	3	2.75	1.25	3.5	10.5
Nova Scotia	1.5	2	4	1.5	9
New Brunswick	0	2.25	3.25	1.25	6.75
Alberta	1.75	1.25	1.25	1.5	5.75
Manitoba	0.5	2.75	0.75	0.25	4.25
Prince Edward Island	0.5	2	1.25	0.5	4.25
Newfoundland and Labrador	0.5	1.5	0.25	1.25	3.5
Saskatchewan	0.25	1.5	1	0.75	3.5

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.[90] Many programs leverage investment by providing incentives to individuals or businesses that reduce the up-front costs of new and more efficient technologies, but up-front costs are only one of several obstacles to private investment

[90] International Energy Agency, "Market-Based Instruments for Energy Efficiency: Policy Choice and Design," Insight Series 2017 (Paris, France: International Energy Agency, 2017), 20.

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, 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.[91]

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.

In our 2020 Scorecard, we review and score provinces on their financing support programs, actions to mobilize capital (such as issuing green bonds or establishing Green Banks), and on their carbon pricing policies and use of associated revenues to support energy efficiency. We provide scoring results in Table 34.

[91] 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.

Table 34. Funding and financing scoring results				
Province	Financing support programs (2 pts)	Capital mobilization (1 pt)	Carbon pricing (3 pts)	Total (6 pts)
British Columbia	0.75	0.5	2	3.25
Québec	-	1	2	3
Ontario	0.75	1	-	1.75
Nova Scotia	1.5	-	-	1.5
Alberta	0.75	-	1	1.5
Manitoba	0.5	-	-	0.5
Newfoundland and Labrador	0.5	-	-	0.5
Prince Edward Island	0.5	-	-	0.5
Saskatchewan	0.25	-	-	0.25
New Brunswick	-	-	-	0

Support for financing

Provincial governments can enable repayment mechanisms and credit enhancements to remove financing barriers to program participants and attract third-party financiers.[92] 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

[92] Much of this discussion draws directly from a recent report by TAF and Dunsky Energy Consulting. See The Atmospheric Fund (TAF) and Dunsky Energy Consulting, "Energy Efficiency Financing Tools for the Canadian Context," TAF Technical Guidance Note (Toronto, ON, March 2017).

obligations to the party 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 mechanism. They attach repayment to the building receiving the upgrades, thereby enabling a consistent repayment schedule, even if the building changes ownership.

Credit enhancements help de-risk energy efficiency investments to attract more private finance participation. Examples include loan loss reserves (establishing a reserve fund to cover a portion of the losses incurred by lenders due to borrowing defaults); loan guarantees (the government or another public agency acts as a guarantor of loans to consumers, thereby improving borrowing terms); or interest rate buy-downs (government or another public agency reduces the interest rate on private loans).

Our 2019 Scorecard awarded one point for both repayment mechanisms and credit enhancements, for a total of two possible points. However, while the methods of these strategies may differ — mainly by the extent to which they rely on private, third-party financing — their functionality often overlaps. Accordingly, for this year's Scorecard, we asked information respondents to identify financing support programs and indicate which of the above methods they use. We awarded 0.25 points for each financing option available. More options increase the likelihood of supplying financing solutions to market segments with different needs.

We awarded a half point for provinces that enabled PACE initiatives, which allow a building owner to repay energy efficiency improvements over time through the property tax system. Provinces need to enable municipalities to use PACE. It is one financing strategy encouraged by the "Community Efficiency Financing (CEF)" initiative, which the Federation of Canadian Municipalities launched in 2020.

We provide a summary of the results and scoring in Table 35.

Our research indicates that governments and program administrators continue to focus primarily on repayment mechanisms rather than credit enhancements, though this phenomenon is not as pronounced as it was in our previous Scorecard. Last year, we identified only one credit enhancement program, the Green Loan Guarantee Program

offered by Energy Efficiency Alberta, which the agency renamed as the TIER Loan Guarantee Program in 2019. That program guarantees 50% of the principal and accrued interest of loans supporting clean energy projects (including energy efficiency) in event of default.[93]

This year, Efficiency Nova Scotia reported credit enhancement features in its Custom Program On-Bill Financing (loan guarantees), Home Energy Assessment Financing Program, and the Affordable Multi-family Housing On-Bill Financing program (both using interest rate buy-downs). Additionally, the CleanBC Better Homes Low-interest Financing Program, launched in May 2020, offers rates between 0% and 4.99% with financing from FinanceIt Canada Inc. for heat pumps in British Columbia.[94]

[93] Energy Efficiency Alberta, "TIER Loan Guarantee Program," Energy Efficiency Alberta, 2020, https://efficiencyalberta.ca/financing/tier-loan-guarantee-program.
[94] Better Homes BC, "CleanBC Better Homes Low-Interest Financing Program," 2020, https://betterhomesbc.ca/rebates/financing/.

Table 35. Repayment mechanisms/credit enhancements scoring results

Province	Repayment mechanisms				Credit enhancements			Total (2 pts)
	On-bill financing (0.25 pts)	On-bill repayment (0.25 pts)	LIC/PACE financing (0.5 pts)	Soft loans (0.25 pts)	Loan loss reserves (0.25 pts)	Loan guarantees (0.25 pts)	Interest rate buy-downs (0.25 pts)	
Nova Scotia	●	●	●	-	-	●	●	1.5
Alberta	-	-	●	-	-	●	-	0.75
British Columbia	●	-	-	●	-	-	●	0.75
Ontario	-	●	●	-	-	-	-	0.75
Manitoba	●	-	-	●	-	-	-	0.50
Newfoundland and Labrador	●	-	-	●	-	-	-	0.50
Prince Edward Island	-	-	○	●	-	-	-	0.50
Saskatchewan	-	-	○	○	-	-	-	0.25
New Brunswick	-	-	-	-	-	-	-	0
Québec	-	-	-	-	-	-	-	0

● *Full points awarded;* ○ *Partial/no points awarded;*

Most provinces offer some form of repayment mechanism, with on-bill financing of soft loans being the most common. These include lower interest rates and/or longer repayment periods, financed by the utility, the provincial government, or both. Enbridge offers an on-bill repayment service for third-party financed efficiency upgrades, and Efficiency Nova Scotia's Small Business Energy Solutions On-Bill Financing also allows third-party financing. Manitoba, which last year reported five separate programs, administered two programs this past year – the Home Energy Efficiency Loan and the Pay-as-You-Save (PAYS) financing program (though the province has since discontinued the latter of the two. In Newfoundland and Labrador, between 2017 and 2020 the provincial government administered the Energy Efficiency Loans program, which supported soft loans with on-bill financing for both Newfoundland Power and Newfoundland and Labrador Hydro customers. Though the government no longer offers the loan program, both utilities continue to offer on-bill financing for some upgrades.

Saskatchewan ended the Energy Star Loan program noted in our previous report and replaced it (for SaskEnergy customers) with a partnership program with SaskEnergy Network Members (local contractors and retailers) that offers equipment leasing and financing. However, it does not offer the types of rates or terms noted in our description of these initiatives, and thus does not receive any points. Meanwhile, although Québec's Plan Directeur calls for the development of financing support programs, none were in operation at time of writing.

We also asked respondents to provide information about participation in financing support programs identified in our information request, but the results proved inadequate to provide a useful benchmark and scoring. This information does suggest that some program administrator's soft loan and on-bill financing options are seeing very limited uptake. Participation rates on soft loans we received ranged from 3% to 4% of all program participants, and in one case, a respondent reported that fewer than 1% of program participants chose an on-bill financing option. We caution that these rates may not be representative of all loan and financing programs. They might also indicate fluctuating market conditions (given very low interest rates) and highlight the importance of complementing financing with a wider mix of policies. In the future, it would be ideal to conduct more thorough research on the performance of financing programs, considering participation, extent of private sector leverage, efficiency improvements supported, and other indicators.

Local improvement charges/PACE financing

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 transferrable 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.

Alberta's Clean Energy Improvement Program

Alberta's Clean Energy Improvement Program (CEIP) is a province-wide PACE initiative that was initially operated by Energy Efficiency Alberta but will be transitioned to the Municipal Climate Change Action Centre by October 1, 2020. The PACE enabling legislation was passed in January 2019. The program provides property owners with long-term financing for up to 100% of their energy efficiency upgrade or installation project costs.

Energy Efficiency Alberta supported local governments to implement the program in their own communities. About 12 municipalities, representing 90% of Alberta's population, expressed interest in the program. The first pilot program is set to launch in late 2020.

PACE is one of the strategies encouraged by the Federation of Canadian Municipalities "Community Efficiency Financing (CEF)" initiative.[95] 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 are interested to see if more provinces move to enable local government finance leadership.

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

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. In our 2019 Scorecard, we found that only Alberta, Nova Scotia, and Ontario had taken concrete steps towards enabling and implementing LIC/PACE financing within our considered timeperiod.

Alberta's province-wide PACE initiative originated in its Clean Energy Improvement Act, passed in January 2019.[96] More than 10 Nova Scotia municipalities offer residential PACE retrofit financing, with 10-year repayment periods. The Nova Scotia Department of Energy and Mines funds programs that target energy efficiency upgrades. Responses to our information request indicate that hundreds of homeowners have participated in PACE financing programs, but because each municipality holds information on participation and loan amounts, detailed data is unavailable. In Ontario, the Municipal Act, 2001 (O.Reg 586/06) and the City of Toronto Act (O. Reg 596/06, as amended by O. Reg. 323/12), enables local governments to offer financing for energy efficiency and renewable energy retrofits on private property. At time of writing, the City of Toronto was the only Ontario local government to have implemented any LIC-based retrofit programs.

Meanwhile, plans are in motion to potentially enable PACE financing in other provinces. In July 2020 (just outside of our considered time period), Saskatchewan amended its Municipalities Act to enable local governments to implement PACE regimes.[97] In Prince Edward Island, EfficiencyPEI reported that it is working with the PACE Atlantic Community Interest Corporation to implement PACE programming in Charlottetown and Stratford. The utility expects the programs will be active by 2021, following necessary amendments to the province's Municipal Government Act.

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[96] Monica Curtis, "Transition of Energy Efficiency Alberta," Energy Efficiency Alberta, June 11, 2020, https://efficiencyalberta.ca/about/blog/transition-of-energy-efficiency-alberta.
[97] Martin Boucher, "Accelerating the Pace of Local Energy Innovation in Saskatchewan," Centre for the Study of Science and Innovation Policy, May 13, 2020, https://www.schoolofpublicpolicy.sk.ca/csip/publications/making-waves/accelerating-the-pace-of-local-energy-innovation-in-saskatchewan.php; "Amendments To Better Serve Municipalities And Their Citizens," Government of Saskatchewan, November 19, 2019, https://www.saskatchewan.ca/government/news-and-media/2019/november/19/amendments-to-municipal-act.

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.

As we found last year, only three provinces reported use of green bonds to fund energy efficiency measures: Ontario, Québec, and to a more limited extent, British Columbia. The Ontario Financing Authority issues green bonds for energy efficiency and conservation projects, among other types. Since 2015, the authority has issued six bonds, totalling $4.7 billion. It has used the proceeds to support 22 energy efficiency and conservation projects.[98] Québec issued five green bonds since 2017 (up from four reported last year), totalling $2.8 billion. And finally, as we noted is last year's Scorecard, the City of Vancouver issued one green bond in September 2018 for $85 million. CoPower, a private organization, issues green bonds under Vancouver City Savings Community Investment Bank for a variety of projects, including some energy efficiency projects, in Alberta, British Columbia, Ontario, and Québec.[99]

No province presently has a comprehensive green bank performing all the functions described above, which is unchanged from our previous Scorecard. As noted last year, the 2018 Ontario Environment Plan commits to launching an emissions reduction fund to encourage private investment in clean technology, but the province has yet to establish it.

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[98] Ontario Financing Authority, "Green Bond Issues," Government of Ontario, 2020, https://www.ofina.on.ca/greenbonds/issues.htm.
[99] "CoPower Green Bonds," Vancity Community Investment Bank, accessed August 5, 2020, https://copower.me/en/.

Carbon pricing

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.[100]

Governments can also invest carbon-pricing revenue in energy efficiency programs and demonstration projects.[101] 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.[102] According to the Regional Energy Efficiency Database administered by the Northeast Energy Efficiency Partnerships, the Lawrence Berkeley National Lab, and the US 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.[103]

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.[104] It included a federal "backstop" price on carbon that would apply in provinces that did not meet the federal government's minimum standards. The backstop established a minimum charge on fuels consistent with $10 per tonne of GHG emissions in 2018, increasing to $50 per tonne in 2022. The federal government applies increases to fuel charges on April 1 of each year; as of April 1, 2020, the backstop price was $30 per tonne.

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[100] Lisa Ryan et al., "Energy Efficiency Policy and Carbon Pricing," Energy Efficiency Series, International Energy Agency (Paris: IEA/OECD, 2011).
[101] 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.
[102] "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.
[103] Regional Evaluation Measurement & Verification Forum, "Regional Energy Efficiency Database," Northeast Energy Efficiency Partnerships, 2019, https://neep.org/initiatives/emv-forum/regional-energy-efficiency-database.
[104] 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.

The federal government also developed an output-based pricing system (OBPS) for large industrial facilities in provinces under the federal backstop carbon pricing system. The OBPS sets sector-specific emissions intensity standards that facilities are required to meet. Facilities that fail to meet the standard must either pay the excess emissions charge directly to the federal government, or purchase and remit compliance credits that are granted to facilities that exceed the standard.

We awarded one point to provinces with a carbon price exceeding that of the federal benchmark, and issue up to two points to those that invest a portion of carbon pricing revenue in energy efficiency improvements. Carbon pricing regimes received full points for a clear, formalized procedure to manage proceeds in a way that benefits energy efficiency. Beyond these considerations, our scoring does not consider the form or extent of coverage of non-federal backstop-based pricing regime. The results of our evaluation are shown in Table 36.

Table 36. Carbon pricing summary				
Province	Carbon pricing scheme	Dedicated energy efficiency funding	Description of energy efficiency funding	Score (3 pts)
Québec	Provincial Cap-and-Trade System. Floor price was $22.40 in 2019 and is $23.49 in 2020.	Yes	Québec's regime has the longest-standing formalized procedure for using carbon revenues to support energy efficiency. The province transfers all cap-and-trade revenue to its Fond Verte ("Green Fund"), which it in turn uses to implement the 2013-2020 Climate Change Action Plan. Reducing fossil fuel consumption and improving building energy efficiency is one of the plan's core priorities.[105] As we reported in last year's Scorecard, out of $1.46 billion in revenues collected between 2013 and 2017, Transition énergétique Québec (TEQ) invested $286.5 million in building energy efficiency and $967 million in transportation energy efficiency.[106] The agency reported that the province added $968.01 million to the Fond Verte in 2019.	2
British Columbia	Provincial Carbon Price per tonne - $40. (In September 2020, citing the pandemic, the province indefinitely	Partly	Until mid-2019, British Columbia returned all carbon tax proceeds to residents via tax cuts or rebates. After that point, the province began using a portion of the funds to support its CleanBC Program for Industry.[107] However, in July 2019 it still increased the Climate Action Tax Credit. The CleanBC program includes a CleanBC Industrial Incentive program, which reduces carbon tax costs for companies that meet world-leading emissions benchmarks in their operations, and the CleanBC Industry Fund, which	2

[105] Environnement et Lutte contre les changements climatiques, "2013-2020 Climate Change Action Plan/Green Fund," Government of Quebec, 2019, http://www.environnement.gouv.qc.ca/changementsclimatiques/plan-action-fonds-vert-en.asp.
[106] These figures should be seen as rough approximations. According to TEQ, the diversity and complexity of the programs supported by the Green Fund make it challenging to identify exactly how much supported energy efficiency specifically; "Bilan Mi-Parcours - 2017-2018" (Government of Quebec, 2018), http://www.environnement.gouv.qc.ca/changementsclimatiques/bilan/bilanPACC-mi-parcours.pdf.
[107] The province only directs the share of industry proceeds above $30/tonne to this program.

	suspended scheduled increases to the carbon tax.)		supports emission reduction projects in industry.[108] A provincial listing of sample projects confirms that the fund benefits energy efficiency initiatives.[109]	
Alberta	Federal Carbon Price per tonne - $30 federal fuel charge, Provincial Carbon Price of $30 for industrial emitters under the Technology Innovation and Emissions Reduction (TIER) program.	Partly	Until it cancelled its carbon levy in May 2019, Alberta directed a portion of its proceeds to Energy Efficiency Alberta, and other initiatives that may benefit energy efficiency (for example, Emissions Reductions Alberta, which administers an industrial efficiency RD&D program). Between 2016 and 2018, the province's carbon levy and its industrial emissions intensity charge brought in nearly $1.8 billion, with approximately $169 million budgeted for Energy Efficiency Alberta.[110] In late 2019, as a result of the cancellation of the provincial carbon levy that had funded its work, Energy Efficiency Alberta ended its programs. The province directs funds collected from the TIER program in part towards Emissions Reduction Alberta (ERA), which uses them for a variety of projects including those relating to energy efficiency. Examples include the Industrial Energy Efficiency program (~$49 billion in 2018/2019), which seeks to improving facility efficiency to reduce emissions and increase industry competitiveness.	1
Ontario	Federal Carbon Price per tonne -	No	Proceeds from Ontario's participation in the cap-and-trade market supported a variety of building and transportation efficiency programs, including the	0

[108] Ministry of Environment, "British Columbia's Carbon Tax - Province of British Columbia," Government of British Columbia, 2019, https://www2.gov.bc.ca/gov/content/environment/climate-change/planning-and-action/carbon-tax.
[109] Ministry of Environment, "2019/20 Emissions Performance Projects," Government of British Columbia (Province of British Columbia, 2020), https://www2.gov.bc.ca/gov/content/environment/climate-change/industry/cleanbc-industry-fund/funded-projects.
[110] Rachel Maclean, "Alberta's Carbon Tax Brought in Billions. See Where It Went," CBC News, April 8, 2019, https://www.cbc.ca/news/canada/calgary/carbon-tax-alberta-election-climate-leadership-plan-revenue-generated-1.5050438.

	$30 federal fuel charge, $30 industrial		Green Ontario Fund (GreenON), which provided a range of financial incentives for energy efficiency-related upgrades. By the end of 2019, the province had cancelled all programs administered by GreenON, as well as others also supported by cap-and-trade revenues. In 2019, Ontario implemented an Emissions Performance Standard for its industrial sector, and planned to direct its proceeds towards GHG reductions. However, the province will not implement this until the federal government removes Ontario from the federal output-based pricing system. In September 2020, the federal government approved the Ontario Emissions Performance Standard as an alternative to federal output-based pricing system, even though the federal government deemed the system weaker than the federal alternative.[111]	
Newfoundland and Labrador	Provincial Carbon Price - $20 fuel charge, $30 industrial. (The province delayed adjustments to carbon pricing until October 1, citing the January snowstorm and pandemic.)	Planned	See table below.	0
Manitoba	Federal Carbon Price - $30 federal	No	-	0

[111] Emma McIntosh, “Ottawa Signs off on Doug Ford’s Industrial Carbon Pricing Plan, Even Though It’s ‘Weaker,’” National Observer, September 21, 2020, https://www.nationalobserver.com/2020/09/21/news/ottawa-signs-doug-fords-industrial-carbon-pricing-plan-even-though-its-weaker.

	fuel charge, $30 industrial			
New Brunswick	Provincial Carbon Price - $30 fuel charge, $30 industrial	Planned	See table below.	0
Nova Scotia	Provincial Cap and Trade System - $20 auction floor price in 2020.	Planned	See table below.	0
Prince Edward Island	Provincial Carbon Levy - $30 per tonne, Federal Carbon Price on industry - $30 per tonne	Not directly	All revenue from the provincial carbon price is used for consumer rebates.[112]	0
Saskatchewan	Federal Carbon Price - $30 federal fuel charge, $30 industrial (federal and provincial)	No	The province will direct revenue received from the federal backstop towards projects that reduce GHGs, including energy efficiency projects such as building retrofits and fuel consumption reductions. However, because these funds come from the federal government, we do not award Saskatchewan points for this metric.	0

[112] Prince Edward Island, “Carbon Levy,” Prince Edward Island, March 7, 2019, https://www.princeedwardisland.ca/en/information/finance/carbon-levy.

In our previous Scorecard, we awarded points to "first mover" provinces that had carbon pricing systems in place before the federal government implemented its backstop — namely Alberta, British Columbia, Ontario, and Québec. Both Ontario and Alberta have since cancelled the carbon pricing systems. Ontario passed the Cap and Trade Cancellation Act in October 2018, which provided for the wind-down of that program and subsequent cancellation of many energy efficiency programs. Alberta repealed its $30/tonne carbon levy in May 2019. In January 2020, the province replaced its former Carbon Competitiveness Incentive Regulation with the Technology Innovation and Emissions Reduction (TIER) regulatory initiative. TIER implements a carbon price and emissions trading system targeting large industrial facilities, and the province in part uses the proceeds to fund Emissions Reduction Alberta. British Columbia's carbon tax, set at $40/tonne in 2019, is the only one of the three first movers that exceeds the federal backstop and remains in force (though we note that it has indefinitely suspended further scheduled increases due to COVID-19).

The federal backstop carbon price now applies in Alberta, Manitoba, Saskatchewan, and Ontario, and was set at $30 per tonne in April 2020.[113] Saskatchewan implemented its own OBPS for large industrial emitters in January 2019, though this on its own did not meet the federal benchmark, so the federal government's pricing system applies to electricity generation and natural gas transmission pipelines.

The federal government uses some revenues to support energy efficiency in small business, municipalities, universities, hospitals, schools, and non-profits through the Climate Action Incentive Fund. We did not award points for provinces that might benefit from these programs, because the fund is a federal government initiative.

Nova Scotia, Newfoundland and Labrador, Prince Edward Island, and New Brunswick have each established their own, custom carbon pricing systems—a cap and trade regime in Nova Scotia, and a hybrid performance/carbon tax system in Newfoundland. New Brunswick initially opposed the federal government's pricing system but has since implemented a new fuel charge plan that is applied across the economy. The federal government approved the plan and it came into effect in April 2020. New Brunswick's system for large industrial emitters is still under federal review. Prince Edward Island implemented a provincial carbon levy for consumers in order to achieve the goals of

[113] Carl Meyer, "Carbon Pricing Not Going Anywhere, Trudeau Says," *Canada's National Observer*, March 31, 2020, https://www.nationalobserver.com/2020/03/31/news/carbon-pricing-not-going-anywhere-trudeau-says.

their five-year Climate Change Action Plan, but the federal government administers the output-based system for industrial emitters.[114]

While formal energy efficiency funding arrangements do not yet exist in these provinces, our information request revealed several do plan to support energy efficiency. We outline these plans below. We do not award points for these planned funds but may do so in future scorecards, if they are implemented.

Table 37. Planned energy efficiency programming funding

Province	Description of plans
Newfoundland and Labrador	Newfoundland and Labrador specified that a portion of its carbon price proceeds will be directed to energy efficiency programming, even though no funds have been directly earmarked as such. Newfoundland and Labrador respondents noted that carbon tax revenues are not specifically designated for any projects. However, they indicated that the province directs revenue from industrial sector regulations towards energy reduction projects (but not explicitly energy efficiency programs).
New Brunswick	In its information request response, New Brunswick Power noted that the revenue from the newly introduced carbon price will be directed towards a fund in which energy efficiency projects will be eligible. However, this was only implemented in April 2020, and the respondents noted that it has not yet been determined where and how funds will be distributed.
Nova Scotia	Nova Scotia hosted its first cap-and-trade auction in June 2020. Observers expect a portion of this revenue will support energy efficiency, but the province has not yet allocated the funds to any specific use.

[114] Prince Edward Island, “Carbon Levy.”

Research and development, and program innovation

Continuing research, development, and demonstration (RD&D) of novel energy efficiency technologies and experimenting with innovative program designs and delivery methods is essential to realizing the full potential of energy efficiency. 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, which could incorporate innovations in logistics, marketing, and administration.

According to the International Energy Agency, between 2010 and 2016 energy efficiency RD&D averaged 13.2% of all energy-related RD&D expenditures by Canadian federal, provincial, and territorial governments. The figure increased to 22% in 2017, 25.6% in 2018, and an estimated 26.5% in 2019. This makes energy efficiency second only to fossil fuels in share of total RD&D expenditures.[115] While this share varies considerably over a longer time period, in absolute terms spending on energy efficiency RD&D has increased relatively steadily since 1990 (see Figure 2). Between 2016 and 2019, total government spending on energy efficiency amounted to $874 million, from a total of $3.7 billion on all energy-related RD&D.

[115] International Energy Agency, “Energy Technology RD&D Budgets,” IEA Data Services, 2019, https://www.iea.org/statistics/rdd/.

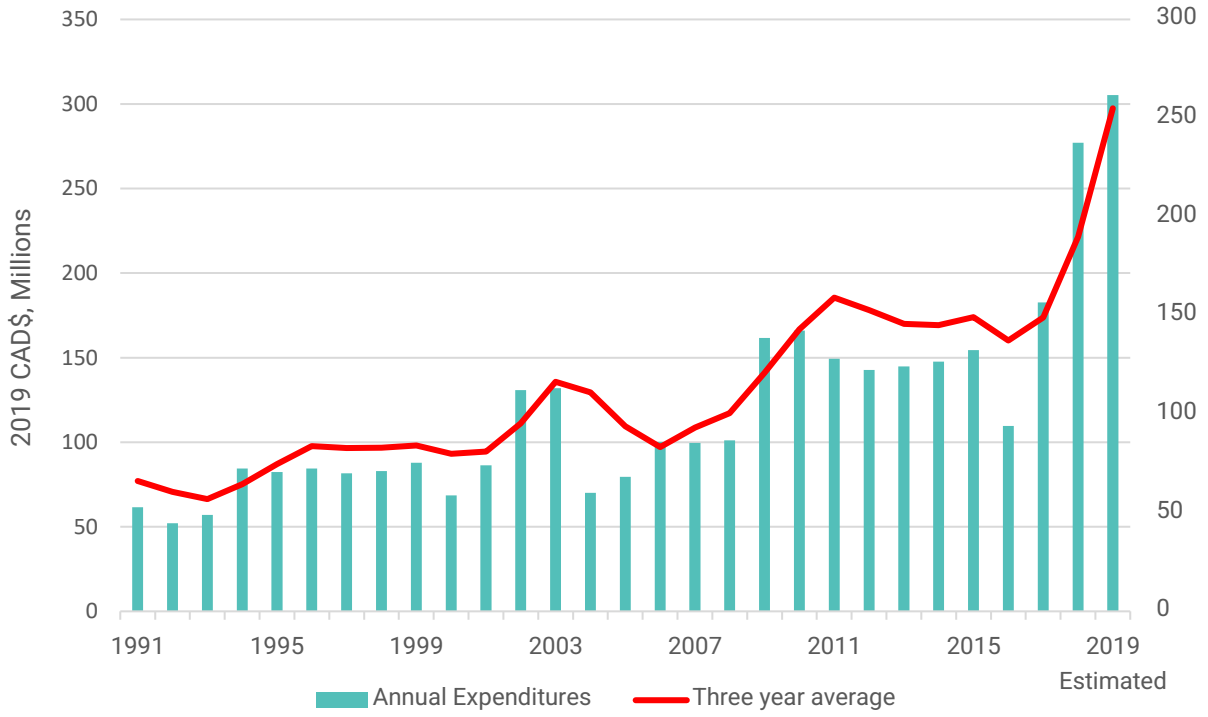

Figure 4. Federal, provincial, and territorial government expenditures on energy efficiency RD&D, 1991-2019 (2019 CAD$)

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.[116] 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

[116] Statistics Canada, "Energy-Related Research and Development Expenditures by Area of Technology, 2017," Government of Canada, 2020, https://www150.statcan.gc.ca/n1/daily-quotidien/190826/dq190826b-eng.htm; 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.

RD&D and program innovation; and the existence of dedicated research institutes, organizations, or provincially-supported energy efficiency research projects. We summarize the scoring for these metrics in Table 37.

Table 37. RD&D and program innovation scoring results

Province	Research funding (1 pt)	Program innovation funds (1 pt)	Institutes and projects (1 pt)	Total (3 pts)
Manitoba	0.75	1	1	2.75
Québec	0.75	1	1	2.75
British Columbia	0.5	1	1	2.5
Ontario	0.5	1	1	2.5
New Brunswick	0.25	1	1	2.25
Nova Scotia	0	1	1	2
Prince Edward Island	0	1	1	2
Newfoundland & Labrador	0.5	0	1	1.5
Saskatchewan	0.5	0.5	0.5	1.5
Alberta	0.25	0	1	1.25

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.[117] 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.

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), 0.75 points for rates between 12% and 16.5%, 0.5 points for 8% to 11.9%, and 0.25 points for 4% to 7.9%. We award zero points to provinces where the share of funding for energy efficiency RD&D falls below 4% of overall funding. We show the results in Table 38.

It is important to note that NSERC funding does not represent all RD&D funding for energy efficiency in each province. There is no publicly available data source for province-wide energy efficiency RD&D expenditure. The next two metrics are intended to capture a fuller picture.

At the time of writing, the NSERC database had not been updated to include 2019/20 funding results, and so we have adjusted the time period to include results from 2016/17-2018/19. Overall, NSERC funding for energy efficiency research totaled $19 million between 2016/17 and 2018/19, out of $177 million for energy resources as a whole. Unsurprisingly, the bulk of that funding went to provinces with more research capacity, and thus more projects overall—41% to Ontario and 26.7% to Québec. The next two provinces, Alberta and British Columbia, receive 13.1% and 9.6% of NSERC funding for energy efficiency projects, respectively.

To benchmark across the provinces, relative to their internal research capabilities, we looked at funding for energy efficiency research as a proportion of funding for all energy resources research. As Table 33 indicates, the share of energy RD&D funding going to energy efficiency does not exceed a theoretically equal amount of 16.6% (since there are six energy resource subcategories) in any of the provinces. Québec leads the other provinces, being the only province to score in the second tier, while Manitoba, Ontario,

[117] Natural Sciences and Engineering Research Council of Canada, “NSERC’s Awards Database,” Government of Canada, 2018, http://www.nserc-crsng.gc.ca/ase-oro/index_eng.asp.

Nova Scotia, British Columbia and New Brunswick all fall into the third tier. Prince Edward Island receives zero points on this metric, as no energy efficiency research was awarded NSERC funding during the covered time period.

Table 38. NSERC funding, all energy resources and energy efficiency 2016/17-2018/19

Province	Energy resources	Energy efficiency	EE research intensity	Score (1 pt)
Québec	$37,410,567	$5,079,989	13.6%	0.75
Manitoba	$2,773,930	$350,500	12.6%	0.75
Ontario	$67,661,007	$7,812,110	11.5%	0.5
British Columbia	$18,483,351	$1,832,146	9.9%	0.5
Newfoundland and Labrador	$2,470,739	$238,000	9.6%	0.5
Saskatchewan	$4,053,079	$372,465	9.2%	0.5
New Brunswick	$2,005,000	$151,000	7.5%	0.25
Alberta	$36,113,626	$2,500,942	6.9%	0.25
Nova Scotia	$5,419,229	$83,000	1.5%	0
Prince Edward Island	$224,123	$0	0.0%	0

Funds for RD&D and program innovation

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. Therefore, we also considered whether efficiency program administrators had dedicated funding to support experimentation, program innovation, and pilot projects. Provinces were awarded half a point for evidence of supported pilot projects and technological demonstration, or a full point for the existence of a dedicated fund or budget line to support experimentation with new program designs and technologies.

Table 39 summarizes provincial funding and programs for energy efficiency RD&D and program innovation, many of which remain the same from last year's Scorecard, with some additions.

Table 39. Program innovation funds scoring results		
Province	Innovation fund	Score (1 pt)
	BC Hydro reported that it did not have a separate fund for RD&D and innovation but provided a list of pilot and demonstration demand-side management programs that it had either led or supported, such as the BC Local Energy Efficiency Partnership Program (LEEP) and capacity-focused DSM activities. These initiatives are supported through other budgets such as the Codes and Standards budget, and the Capacity-focused DSM budget in the utility's DSM plans.	
British Columbia	FortisBC has included funding for its Innovative Technologies program in its 2019-2022 DSM Plan, ranging from $2 million in 2019 to $3.1 million in 2022. The utility also manages its InnoTech program, funding for which totals $550,000 over the same period. In addition, FortisBC received regulatory approval for the Clean Growth Innovation Fund, totaling $4.9 million over four years ($0.40 per client per year). The fund will support the company's plan to reduce customer emissions 30% by 2030 through renewable natural gas, carbon and methane capture, energy efficiency, and fuel cell and remote power technologies.[118]	1

[118] "Clean Growth Innovation Fund," FortisBC, 2020, https://www.fortisbc.com/about-us/clean-growth-innovation-fund.

Manitoba	Efficiency Manitoba's 2020/21 to 2022/23 plan includes an Innovation and Research Fund totaling $2,645,000 in total funding set aside for 2020/21-2022/23. The Efficiency Manitoba Regulation (Sect 11(4)(j) requires that the public utility board consider whether efficiency plans adequately account for new and emerging technologies. The plan also includes an "enabling strategies" budget for activities not specific to a program or measure such as engagement, as well as costs associated with R&D of emerging technologies not yet ready for the Manitoba market. These strategies are across both electric and gas portfolios.	1
New Brunswick	NB Power's DSM plans include "enabling strategies" which can include demonstration projects, support mechanisms (e.g. financing and training), market transformation, and evaluation.	1
Nova Scotia	Efficiency Nova Scotia's DSM plan includes investments in enabling strategies to improve program and services and encourage market transformation.	1
Ontario	The Independent Electricity System Operator (IESO) manages the Grid Innovation Fund, which has supported more than 200 conservation, demand response, energy efficiency and other grid innovation projects since 2005 with an annual budget of $9.5 million. Enbridge maintains a $6-million Collaboration and Innovation Fund ($1 million per year between 2015-2020), and Legacy Union Gas allocated an annual $500,000 toward a pilot and test fund.	1
Prince Edward Island	EfficiencyPEI included an enabling strategies fund in its 2018-2021 DSM Plan, totaling approximately $815,000 over the three years.[119]	1

[119] Prince Edward Island Energy Corporation, "2018-2021 Demand Side Management ('DSM') Plan."

Québec	Hydro-Québec's DSM plan includes specific initiatives for R&D and pilot projects, particularly through its Laboratoire des technologies de l'énergie (LTE), part of its Institut de recherche d'Hydro-Québec (IREQ), as well as its Démonstration technologique et commerciale (DTEC) program. Budgets for these activities are in the range of $8 million per year for 2016-2018. Énergir also has a program which supports innovation in natural gas efficiency by developing and demonstrating new technologies, systems, and processes.[120] TEQ administers the *Technoclimat* program, which offers financial assistance to businesses and organizations that undertake projects to demonstrate or test pre-commercial technologies in the areas of energy efficiency, renewable energy, bioenergy, or GHG reduction[121]	1
Saskatchewan	Neither provincial utility has a dedicated innovation or enabling strategies fund. However, SaskEnergy provides funding for cleantech innovation and research innovation annually, and SaskPower program funding from energy efficiency initiatives can be used for pilot projects.	0.5
Alberta	No dedicated fund reported.	0
Newfoundland and Labrador	No dedicated fund reported	0

[120] Énergir, "Innovations," Énergir, 2019, https://www.energir.com/en/major-industries/energy-efficiency-programs/programs/innovation/.
[121] "Technoclimat Program," Transition Énergétique Québec, 2020, https://transitionenergetique.gouv.qc.ca/en/innovation/program/technoclimat/description.

Research institutes and projects

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 the Canada's energy efficiency innovation system.

We asked survey respondents to identify research institutes and provincially supported research projects for energy efficiency, 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 projects in the past five years that were clearly related. For provinces that had one or more such institutes or projects, we awarded one point.

We attempted to restrict this list to institutes or projects with a clear connection to 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 40. Research institutes and projects scoring results		
Province	R&D institutions/projects	Score (1 pt)
Alberta	Emissions Reductions Alberta has funded RD&D to reduce GHG emissions through a number of funding streams: The Industrial Efficiency Challenge; BEST (Biotechnology, Electricity, and Sustainable Transportation) Challenge; and Partnership Intake Program. These funds totaled $185 million in 2019. Alberta Innovates' Clean Energy program provided $52.9 million in 2019 to various projects.[122]	1
British Columbia	In January 2019, FortisBC supported a five-year smart energy research chair at University of British Columbia Okanagan, along with Mitacs and UBC. In the spring of 2019, the province launched the $1.8 million CleanBC Building Innovation Fund to support research, commercialization, and demonstration.[123] Since 2008, the province's Innovative Clean Energy Fund has supported a number of RD&D projects, including high-performance window certification, field testing of heat pump water heaters and cold climate heat pumps, natural gas heat pump feasibility studies, and modeling of the EnerGuide rating system. It also contributes funding to the BC-NRCan ISO 50001 initiative that we detail in this report's industry chapter.[124]	1

[122] Emissions Reduction Alberta, "Accelerate Technology, Drive Commercialization, Maximize Impact: 2018/2019 Annual Report," May 31, 2019, https://eralberta.ca/wp-content/uploads/2019/12/ERA-2018-19-Annual-Report_FINAL.pdf; Alberta Innovates, "Innovation in Action: 2018/2019 Annual Report," 2019, https://albertainnovates.ca/wp-content/uploads/2019/11/AI_Annual-Report_2018-19_FINAL.pdf.
[123] Ministry of Energy and Mines, "CleanBC Building Innovation Fund - Province of British Columbia," Government of British Columbia, 2019, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/energy-efficiency-conservation/programs/cleanbc-building-innovation-fund.
[124] Ministry of Energy and Mines, "Innovative Clean Energy (ICE) Fund," Government of British Columbia, 2018, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/innovative-clean-energy-solutions/innovative-clean-energy-ice-fund.

Newfoundland & Labrador	Over the past five years the Department of Tourism, Culture, Industry and Innovation has supported several efficiency-related research and development projects, including one on distributed smart thermostats.	1
Nova Scotia	The Government of Nova Scotia has supported several efficiency-related projects in the past five years, including studies of the efficiency sector supply chain, microlending for efficiency upgrades, efficiency opportunities in older homes, and smart grid initiatives led by NS Power.	1
Ontario	The Ontario Energy Board recently launched the OEB Innovation Sandbox to encourage utilities and other actors to get regulatory advice for new ideas, products, and business models. It published its first report in September 2019.[125] The province funds the Ontario Centres of Excellence (OCE), which supports a number of innovative technologies through academia and industry partnerships.	1
Prince Edward Island	The Government of Prince Edward Island has supported several efficiency-related projects in the past five years, including one on cold climate air-source pumps, and another on thermal storage using heat pumps.	1
Québec	Hydro-Québec operates the L'Institut de recerche d'Hydro-Québec (IREQ) research centre, which conducts energy efficiency research at its Laboratoire des technologies de l'énergie (LTE), as noted above. The Centre d'excellence en efficacité énergétique provides funding support for energy efficiency RD&D in the transportation sector, and the Natural Gas Technologies Centre supports energy efficiency research in the natural gas sector.[126] Hydro-Québec supports several other research initiatives, such as the Industrial Research Chair in Optimized Operation and Energy Efficiency: Towards High Performance Buildings, at Concordia University.	1

[125] Ontario Energy Board, "OEB Innovation Sandbox," Ontario Energy Board, 2019, https://www.oeb.ca/_html/sandbox/reporting.php.
[126] "Centre d'excellence en efficacité énergétique," accessed July 31, 2019, https://c3e.ca/.

New Brunswick	The New Brunswick Innovation Foundation has invested in energy-related projects, though energy efficiency is not a core research area. The Smart Grid Innovation Network is a partnership between NB Power, the University of New Brunswick, and Siemens Canada that has supported RD&D in a number of smart grid related areas.	1
Manitoba	Manitoba Hydro has an ongoing research partnership with Red River College, that primarily helped to establish the Building Efficiency Technology Access Centre (BETAC), which focuses primarily on advancing buildings for their durability and energy efficiency. Manitoba Hydro also sponsors the Alternative Village at the University of Manitoba, which conducts research into various energy efficiency technologies and improvements.	1
Saskatchewan	Innovation Saskatchewan manages the Saskatchewan Advantage Innovation Fund to support technological innovations in the province's core economic sectors.[127] Energy is listed as a core sector, though the program does not explicitly specify energy efficiency as an eligible project type.	0.5

[127] "Saskatchewan Advantage Innovation Fund," Innovation Saskatchewan, accessed July 31, 2019, https://innovationsask.ca/research/saskatchewan-advantage-innovation-fund.

Training and professionalization

If they are to meet their energy-savings goals, provinces will need a highly-qualified and professional workforce educated in energy efficiency. Professional credentials encourage ongoing training, which will be important to rapidly evolve toward more efficient buildings and industries. A broader concept of capacity-building involves building a culture of conservation to encourage energy-efficient behaviours in workplaces and homes. We found that all provinces are engaged in some form of capacity-building, such as school education programs, general awareness and education efforts, and training initiatives.

To benchmark the provinces on training and professionalization, we consulted data on residential energy advisors and certified energy managers (CEMs). Natural Resources Canada provided province-specific data on energy advisor certifications, and we consulted the Association of Energy Engineers Certified Professionals Directory for data on its members.

The two certifications cover broad areas of energy efficiency. Energy advisors primarily focus on new and existing residential homes, while CEMs primarily work in commercial, institutional, and industrial buildings and facilities. Our consultations with experts and review of provincial training programs confirmed that these are widely used, nationally recognized certifications that are frequently supported by federal and provincial policy. For instance, new model building codes (Part 9) and the Pan-Canadian Framework goals associated with home energy labeling will likely use Natural Resources Canada's EnerGuide rating system, which is supported by energy advisor certification.[128]

We are using these two certifications as barometers for a much wider system of training and skills development. We note the importance of integrating energy efficiency training within existing educational programs and professional skills development, as well as other energy efficiency certifications. Unfortunately, there is no readily available data source to assess how the broader training, certification, and education system supports energy efficiency.

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[128] David Stonham, "Towards Net-Zero: A Building Code Meeting for the History Books," *Efficiency Canada* (blog), September 12, 2019, https://www.efficiencycanada.org/a-building-code-meeting-for-the-history-books-towards-a-net-zero-building-code/.

We view these two certifications as good indicators because other professionals such as general contractors, electricians, plumbers, and home builders work in partnership with energy advisors and CEMs to identify the most beneficial improvements. Energy advisors and CEMs can also play a role in educating and motivating homeowners and employees to adopt conservation behaviours.

We tracked energy advisors and 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 Maritime 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.

For this topic, provinces could be awarded a total of four points: two for residential energy advisors, and two for Certified Energy Managers. We divided the residential energy advisors score into one point for those certified to evaluate existing homes and one for those who assess new homes. We counted the number of certifications, so one professional with two certifications would be counted twice. The results are summarized in the table below.

Table 41. Training and professionalization scoring results				
Province	Existing home energy advisors (1 pt)	New home energy advisors (1 pt)	Certified Energy Managers (2 pts)	Total (4 pts)
Nova Scotia	1	1	2	4
New Brunswick	0.5	1	1.75	3.25
British Columbia	0.25	0.75	1.75	2.75
Ontario	0.25	0.25	2	2.5
Québec	0.5	0.25	0.5	1.25
Prince Edward Island	0.5	0.25	0.5	1.25
Alberta	0	0	1.25	1.25
Saskatchewan	0	0.25	0.75	1
Manitoba	0	0	0.75	0.75
Newfoundland & Labrador	0	0.25	0	0.25

Existing home energy advisors

For existing houses, we included the number of certifications under the old EnerGuide rating system for new and existing houses, based on the 0-100 scale, as well as certifications under the new (version 15) system that provides a gigajoule-per-year rating.[129] To normalize across the provinces, we divided total certifications over the number of single-detached and single-attached households; we did not update these figures from last year's Scorecard, as new data was not available.[130] This approach

[129] Natural Resources Canada, "Number of Active Energy Advisors by Province - by Program" (Natural Resources Canada, June 1, 2020).
[130] 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.

excludes apartments and mobile homes and other moveable dwellings. Energy advisors have not been as 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 a large number of multi-unit residential dwellings. We awarded points on the following scale:

Table 42. Existing home energy advisor scoring methodology

Existing home energy advisors per 10,000 houses (single detached and attached) (>=)	Score
3.5	1.00
2.6	0.75
1.8	0.50
0.9	0.25

Below are the results of this metric for each province based on the methodology outlined above. Nova Scotia again scored highest for this metric, and many provinces saw increases in the numbers of certifications that they have for existing home energy advisors, especially Prince Edward Island, Québec, and New Brunswick.

Table 43. Existing home energy advisor certifications results				
Province	Existing home energy advisor certifications (June 2020)	Existing home energy advisor certifications per 10,000 houses (single detached and attached)		Score (1 pt)
		2020 results	*Change from 2019 Scorecard*	
Nova Scotia	112	3.7	*-0.1*	1.00
Prince Edward Island	11	2.4	*+0.9*	0.50
New Brunswick	51	2.1	*+0.6*	0.50
Québec	420	2.1	*+0.9*	0.50
Ontario	569	1.5	-	0.25
British Columbia	153	1.3	*+0.1*	0.25
Alberta	71	0.6	-	0.00
Saskatchewan	13	0.4	-	0.00
Newfoundland and Labrador	3	0.2	*+0.1*	0.00
Manitoba	3	0.1	-	0.00

New home energy advisors

We awarded another point for new housing energy advisor certifications. We included certifications for new housing under the older EnerGuide rating system (0-100 scale) for new housing, the new (version 15) system based on a gigajoule-per-year rating which certifies for both new and existing housing, and the ENERGY STAR® and R-2000 certifications.[131] We divided the sum of these different certifications by total new

[131] Natural Resources Canada, "Number of Active Energy Advisors by Province - by Program."

construction building permits for single-dwelling residential structures in 2018.[132] We restricted our denominator to single dwellings for the reasons explained above: This is the market where energy advisors are traditionally more active, and we avoid biasing results against jurisdictions with significant multi-unit residential construction. Points were awarded on the following scale.

Table 44. New home energy advisor scoring methodology

New home energy advisors per 1,000 single dwelling residential new construction permits (2018) (>=)	Score
40	1.00
30	0.75
20	0.50
10	0.25

Table 45 provides the results for each province. Despite a decline in certifications in Nova Scotia, the province remains the leader in this metric. Many provinces saw increases in their certifications. Most notable is Québec, which saw an increase of 17 certifications per 1,000 new construction permits. In raw numbers, this represented an increase of 167 certifications (driven primarily by an increase in ERS v15 certifications). New Brunswick also saw an increase of 11 advisors per 1,000 permits.

[132] Statistics Canada, "Table 34-10-0066-01: Building Permits, by Type of Structure and Type of Work," Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3410006601.

Table 45. New home energy advisor certifications scoring results				
Province	New home energy advisor Certifications (June 2020)	New home energy advisors per 1,000 single dwelling residential new construction permits (2019)		Score (1pt)
		2020 Results	*Change from 2019 Scorecard*	
Nova Scotia	98	45	*-12*	1.00
New Brunswick	48	40	*+11*	1.00
British Columbia	186	30	*+9*	0.75
Québec	186	19	*+17*	0.25
Ontario	397	17	*+1*	0.25
Prince Edward Island	11	16	*+4*	0.25
Newfoundland and Labrador	8	14	*+4*	0.25
Saskatchewan	12	10	-	0.25
Alberta	81	8	-	0.00
Manitoba	3	1	-	0.00

Certified Energy Managers (CEMs)

Finally, we awarded 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.[133] We divided the total certifications listed in a given province by the number of businesses with more than 100 employees.[134] CEMs

[133] "AEE Certified Professionals Directory," Association of Energy Engineers, 2020, https://portal.aeecenter.org/custom/cpdirectory/index.cfm.
[134] Statistics Canada, "Table 33-10-0222-01 Canadian Business Counts, with Employees, December 2019," Government of Canada, 2020, https://doi.org/10.25318/3310022201-eng.

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.[135] 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 awarded points on the following scale:

Table 46. Certified Energy Managers scoring methodology

Certified Energy Managers per 100 large businesses (> 100 employees) (>=)	Score
9.5	2.00
8.3	1.75
7.1	1.50
5.9	1.25
4.8	1.00
3.6	0.75
2.4	0.50
1.2	0.25

[135] 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.

The table below provides the results for the number of CEMs per 100 large businesses with more than 100 employees. Most provinces saw increases in the number of certifications, but Nova Scotia once again remains the leader in this metric.

Table 47. Certified Energy Manager certifications scoring results

Province	Total Certified Energy Manager (CEM) certifications (July 2020)	Certified Energy Managers per 100 large businesses (> 100 Employees)		Score (2 Pts)
		2020 Results	*Change from 2019 Scorecard*	
Nova Scotia	76	12.3	*+2.3*	2.00
Ontario	1053	10.1	*+0.4*	2.00
British Columbia	312	9.4	*+0.7*	1.75
New Brunswick	45	8.8	*+1.5*	1.75
Alberta	212	6.5	*+2.1*	1.25
Saskatchewan	28	3.8	*-0.5*	0.75
Manitoba	35	3.6	*-0.3*	0.75
Québec	146	2.6	*+0.3*	0.50
Prince Edward Island	3	2.6	*+1.6*	0.50
Newfoundland and Labrador	2	0.6	*+0.1*	0.00

Future scorecards could provide more robust tracking of energy training and professionalization. This could include registration data on other certifications, such as LEED® and Passive House, a more exhaustive tracking of how energy efficiency considerations are integrated in existing curricula and professional credentials, and an examination of how regulatory regimes support energy efficiency skills in the trades.

We also hope to track multi-unit residential energy advisor certifications in future editions.

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.[136]

Recognition of the multiple benefits and cost-effectiveness of demand-side management, including both energy efficiency and demand response measures, has given rise to new practices and technologies to manage energy systems. Recognition is growing of the flexibility benefits of demand-side resources—the ability to rapidly change energy demands at certain times, or in particular locations, to make energy networks work more efficiently. For example, demand-side flexibility might be a readily available, and cost-effective way to increase the penetration of renewable energy.[137]

Grid modernization broadly describes the introduction of new technologies and practices to enhance energy grid 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 facilitate two specific components that are particularly relevant to energy efficiency: advanced metering infrastructure, and rate designs that provide incentives for energy efficiency and

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[136] 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.

[137] 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); Cara Goldenberg, Mark Dyson, and Harry Masters, "Demand Flexibility: The Key to Enabling a Low-Cost, Low-Carbon Grid," Insight Brief (Boulder, CO: Rocky Mountain Institute, February 2018).

demand savings. We also consider other grid modernization efforts that could directly or indirectly lead to greater energy efficiency, such as consideration of energy efficiency as a “non-wire” alternative in transmission or distribution grid planning, geo-targeting energy efficiency and demand response, and use of conservation voltage reduction (CVR) or volt-var optimization (VVO).

Table 48. Grid modernization scoring results

Province	Advanced metering infrastructure (1 pt)	Rate designs (1 pt)	Non-wires/pipes alternatives (1pt)	Other grid modernization initiatives (1 pt)	Score (4 pts)
Ontario	●	●	●	●	4.00
Québec	●	●	◑	●	3.50
British Columbia	●	●	◑	●	3.50
Nova Scotia	◑	-	◑	◑	1.50
Alberta	◑	-	◑	◑	1.5
Newfoundland & Labrador	○	-	-	●	1.25
New Brunswick	○	-	◑	◑	1.25
Saskatchewan	◕	-	-	-	0.75
Prince Edward Island	○	-	○	-	0.50
Manitoba	○	-	-	-	0.25

● – 1 point; ◕ - 0.75 pts; ◑ - 0.5 points; ○ – 0.25 points;

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 automatically and remotely record consumption. 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,[138] leading to both cost and energy savings.

A recent ACEEE report emphasized that the benefits of AMI require complementary program strategies to leverage the technology.[139] Leveraging strategies can include:

1. Feedback to customers and use of behavioural insights to help customers reduce energy use;
2. 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.

[138] 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).
[139] 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.

To score this component, we considered the extent to which provinces had taken action to implement advanced metering infrastructure, and evaluated current coverage in different end use market segments (residential, commercial, industrial) in both electricity and natural gas systems. We awarded a half point to provinces that have achieved comprehensive coverage in one or more market segments, in either electricity or natural gas, of two-way communication functionality.

With this year's Scorecard we added another half point for current initiatives to leverage AMI infrastructure to save energy. These could include use of any of the strategies noted above,[140] smart home marketplaces, real-time energy feedback and analysis, etc.

Provinces scoring all available points have comprehensive market coverage and complementary activities to leverage AMI. We gave quarter points to provinces that had undertaken limited pilot or demonstration projects in one or two market segments, where roll-out of AMI infrastructure in progress or planned implementation programs had not yet begun, or for those presently studying the potential of advanced metering infrastructure.

We outline details and scoring of the provinces' actions and progress towards developing advanced metering infrastructure in Table 49.

Hilo Energie: Incentivizing Conservation in Quebec

Hilo is a Hydro-Québec subsidiary that has completed its piloting phase and is preparing to launch a Smart Home Service. The goal is to put smart home technology in the hands of Hydro-Québec customers so that they can understand, control, and adjust their energy use in real-time.

One thousand customers participated in the pilot; the utility gave them free Hilo products and services for the duration of the testing period, with the understanding that they would pay for them after the testing period.

Hilo smart home products include a wireless hub, smart thermostats, light bulbs, receptacles, dimmers, and smoke detectors, and a weather station. Customers control these products with mobile apps. Periodically through the winter, during periods of peak load, Hilo sends "challenges" to customers, inviting them to reduce their consumption. The utility then issues cash rewards to customers who complete the challenges.

The goal in the future is to introduce other smart energy solutions, such as energy services for business, electric mobility, smart storage, and self-produced solar energy, all with the goal of helping all Québecers consume energy better and accelerate the electrification of their economy.

[140] Points for time-of-use rates are recorded in the following grid modernization section.

Table 49. Advanced metering infrastructure			
Province	Extent of AMI coverage	Leveraging AMI activities/policies	Score (1 pt)
British Columbia	BC Hydro launched its smart meter program in 2011; almost all customers now have them installed.[141] FortisBC completed its AMI initiative in 2015, and FortisBC Energy Inc., the natural gas utility, has advanced metering for 100% of its largest commercial and industrial customers, as well as its electric utility residential customers. AMI is in the development stage for natural gas residential customers.	BC Hydro operates a Behaviour Program for residential customers and optimization programs for business customers, as well as the ability for customers to access their energy use data online to be able to compare to trends and other similar buildings. The data also allows BC Hydro to perform load analysis which informs a wide variety of activities internally, such as system planning, customer service, and program and rate design. FortisBC allows customers to install in-home displays so they can observe their real-time energy use data. In 2019 FBC started a Demand Response pilot for C&I customers, that allowed participating customers to see their load profiles and their response to DR events.	1

[141] BC Hydro, "Appendix P - Smart Metering and Infrastructure Program Completion and Evaluation Report," Fiscal 2017 to Fiscal 2019 Revenue Requirements Application (Vancouver, B.C.: BC Utilities Commission, December 21, 2016).

Québec	Hydro-Québec reported that it had installed more than four million communicating meters, or 99.4% of all meters requiring replacement.[142]	AMI devices help to provide real-time usage updates to customers on the Hydro-Québec website, and also allow for dynamic pricing. Hilo Energie, a new Hydro-Québec subsidiary, introduced smart home devices to help customers measure their energy use. See Box 5 below for more details.[143]	1
Ontario	Ontario's smart metering initiative was completed in 2012. As of December 2019, there were more than five million devices in place, serving almost all residential and small business customers with demand under 50 kilowatts. All customers over 500 kilowatts are on hourly meters. By August 21, 2020, all customers (residential, commercial or business) with peak demand greater than 50 kilowatts will be required to install interval meters. Metering hourly electricity consumption allows local distribution companies to bill customers using time-of-use rates. On the natural gas side, Enbridge has a few pilot areas of one-way AMI, and intends to file a proposal with the OEB for an AMI system, including ultrasonic meters to be deployed across various zones serviced by Enbridge. The goal is to be able to monitor use to be	The IESO provides the Energy Performance Program, which currently has 200 participating commercial and institutional facilities. The whole-building program uses hourly usage data to measure and reward energy savings. The IESO also 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. Many LDCs use hourly data obtained from smart meters to provide energy use feedback to customers to assist them in managing their energy use, according to the OEB.	1

[142] Hydro-Quebec, "Meters and Meter-Reading," Hydro-Quebec, 2019, http://www.hydroquebec.com/residential/customer-space/account-and-billing/meter-reading.html.
[143] Hilo Energie, "Hilo," Hilo Energie, accessed August 19, 2020, https://www.hiloenergie.com/en-ca/.

	able to employ non-pipeline alternatives effectively, as well as to ensure that peak period reduction programs are working.		
Saskatchewan	Since 2015, SaskPower has conducted multiple smart meter projects for the commercial and industrial customer segments. The utility has installed over 22,500 smart meters to date, and anticipates an additional 27,000 over the next year. It is also planning a future project for high-value residential customers. Meanwhile almost every Saskatoon Light and Power customer now has a smart meter. SaskEnergy reported that, as of July 2020, 400,000 advanced natural gas meters had been installed, again reaching almost every customer.	SaskPower's online portal allows commercial and industrial customers to analyze their own data. There are ongoing projects to renew and refresh the external SaskPower website, including the customer portal for all customer segments. For larger customers with demand charges, SaskPower has developed a tool using the high-resolution AMI data to identify energy (kWh), demand (kVA), and other costs ($) savings opportunities (e.g. Power Factor correction) for the customers This tool has been successfully used for load-profile presentations to industrial customers participating in SaskPower's Industrial Energy Optimization Program. AMI data is used to facilitate rate design and provides voltage data to assist with system performance analysis.	0.75
Alberta	In Alberta, a market rule established following deregulation in the early 2000s requires sites with peak demand over two megawatts to have smart meters and allows for distribution utilities to establish their own lower thresholds if desired. In its 2011 final report, the Alberta Utilities Commission's Smart Grid	-	0.5

	Inquiry noted that industrial and commercial customers that accounted for around 70% of consumption were equipped with smart meters, and that select municipalities and distribution utilities had undertaken measures to install smart meters for residential customers.[144] Energy Efficiency Alberta reported in our request for information that EPCOR has 410,000 AMI meters installed on its distribution system. They also noted that EQUS will be replacing approximately 12,000 meters with AMI meters in 2020.		
Nova Scotia	Regulatory actions related to Nova Scotia's AMI initiative began in 2015, though installation of meters only started in 2019. The plan is to complete installation by 2021.	-	0.5
Newfoundland & Labrador	Approximately 58% of Newfoundland and Labrador Hydro's meters are one-way automatic reading meters. Newfoundland Power conducted a pilot program on direct control for hot water tanks which involved installing smart meters on a small scale, though these are no longer installed.	-	0.25
Prince Edward Island	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	-	0.25

[144] "Alberta Smart Grid Inquiry" (Alberta Utilities Commission, January 31, 2011).

	currently installing AMI meters, with 400 installed to date, which supports ETS heating to follow wind.		
New Brunswick	In 2017, New Brunswick's Energy and Utilities Board rejected an advanced metering infrastructure application from NB Power, part of the utility's Energy Smart NB initiative, detailed below. NB Power has since completed and filed a revised AMI business case which includes projected energy savings and has deployed more than 600 smart meters as part of a conservation voltage reduction pilot. NB Power re-applied in late 2019, with a hearing held in 2020. A decision was expected around the time everyone was required to stay home because of COVID-19. As a result, NB Power has asked the Board to delay its decision, and at the time of writing, no decision has been made.	-	0.25
Manitoba	Manitoba Hydro ran an AMI pilot project for natural gas and electricity customers from 2007-2009, but all meters used in the pilot were later removed. The utility is still determining the timeframe for AMI roll-out; in 2019 it analyzed various implementation scenarios, but as of early 2020 it has yet to make an investment decision.	Manitoba Hydro maintains EnerTrend for large industrial and commercial customers to collect usage data through advanced interval metering.	0.25

Rate designs

Whereas conventional rate design was based on a flat, per-kilowatt-hour rate for energy consumption, new rate designs typically incorporate some form of variable pricing, either through inclining (or declining) rates past a certain threshold of consumption, variable but predefined time-of-use rates, or higher peak prices that vary with the severity of the event causing restricted conditions on the grid.[145]

A 2017 study by the American Council for an Energy-Efficient Economy found that time-of-use rates, critical peak pricing, and peak-time rebates for avoided consumption all produced net reductions in energy consumption. Tiered and time-of-use rates tended to reduce payback periods for efficiency upgrades compared to flat rates or relatively higher demand charges as well.[146]

The basic principle behind using rates as an incentive for energy conservation and/or efficiency is that price signals nudge consumers to alter their behaviour. Price signals also create new opportunities for demand-side solutions, such as smart thermostats and thermal storage, that improve efficiency or reduce consumption. Rate designs that offer declining block rates, or regulations that cap rates at a predefined level, should therefore not be expected to lead to energy savings. Utilities have used specialty rate designs for large consumer rate classes for some time, but their implementation in the smaller commercial and residential sectors is a relatively newer development.

We awarded one point to provinces that implemented some form of inclining tiered rates and/or time-of-use rates across all consumer classes, with or without combined customer or demand charges. We may award partial points where such rate designs were partial or incomplete (e.g. demand charges or critical peak pricing without inclined or tiered rates), but still demonstrated considerable progress and participation.

Provincial progress implementing rate design packages to drive energy savings largely mirrors progress on developing comprehensive AMI, with British Columbia, Ontario, and

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[145] Blake Houghton, Jackson Salovaara, and Humayun Tai, “Solving the Rate Puzzle: The Future of Electricity Rate Design,” McKinsey & Company, March 2019, https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/solving-the-rate-puzzle-the-future-of-electricity-rate-design.

[146] Demand charges are based on the total capacity that needs to be in place to support demand requirements from different customer classes. They are more common in large consumer classes. Brendon Baatz, “Rate Design Matters: The Intersection of Residential Rate Design and Energy Efficiency,” (Washington D.C.: American Council for an Energy-Efficient Economy, March 2017), https://aceee.org/sites/default/files/publications/researchreports/u1703.pdf.

Québec all having inclined, tiered, or time-of-use rates in place for multiple end-use customer segments. In Ontario, about 94% of all customers on the Regulated Price Plan (RPP) were billed based on time-of-use pricing, which accounts for 84% of the total electricity consumption on the RPP. Additionally, the Ontario Energy Board and several local distribution companies (LDCs) recently completed testing of alternative dynamic pricing structures, as part of the OEB's Regulated Price Plan Roadmap.[147] The province suspended time-of-use pricing early in the pandemic lockdown, and as of June 2020 introduced a fixed electricity price for all customers previously on time-of-use pricing. As of November 1, 2020, time-of-use pricing resumed, but customers can opt out, choosing instead to pay a tiered electricity price that depends on their level of consumption.

The vast majority of residential Hydro-Québec customers are on inclined tiered rates, while commercial consumers generally have declining tiered rates and large industrial consumers pay a flat rate. In 2019, the utility introduced several flexible rate plans that incorporate peak period pricing for residential and commercial customers. An additional "Winter Credit Option" provides a rebate for curtailed demand. These flex-rate plans are not yet widespread, however, having been rolled out gradually to approximately 20,000 customers at the time of writing. In British Columbia, BC Hydro and FortisBC electricity customers have inclining tiered rates, while dynamic pricing options exist for commercial (FortisBC) and industrial (both utilities) customers. The share of customers participating in dynamic pricing is very low, however.

None of the other provinces have widely implemented variable rates, though more limited plans are in place. For instance, Nova Scotia offers large industrial customers interruptible rates, and approximately 1% of eligible customers participate. There is also a time-of-use option for residential customers using electric thermal storage equipment with a participation rate of approximately 7.5% of residential customers. NB Power has demand charges and an interruptible energy product available for large industrial customers. Manitoba Hydro offers a curtailable rate program for large industrial customers, and SaskPower has demand charges and limited time-of-use rate options for larger customer classes which, the company noted, about 1% of their industrial

[147] Ontario Energy Board, "Regulated Price Plan Roadmap: Report of the Board," (Toronto, ON: Ontario Energy Board, November 16, 2015), https://www.oeb.ca/sites/default/files/uploads/RPP_Roadmap_Report_of_the_Board_20151116.pdf.

customers participate in. Alberta, Manitoba, and Nova Scotia are all studying or developing time-of-use pricing.

Manitoba, New Brunswick, Newfoundland & Labrador, Nova Scotia, and Prince Edward Island have declining tiered rates for general service or smaller industrial customers. Alberta's competitive retail market enables customers to choose from different retailers that may offer custom rate designs, though we were unable to identify any offering time-of-use pricing. As well, an electricity price cap introduced in June 2017 limits energy charges for customers on the regulated rate option to $0.068/kWh.

Non-wires/pipes alternatives

Energy efficiency and demand response can avoid the need to build transmission infrastructure, especially when targeting particular geographic areas 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.[148]

In last year's Scorecard, we combined this section on non-wires/pipes alternatives with the following section and called it *Other Grid Modernization Efforts*. This year, we have split off this component and are awarding a separate point to account for each of various activities. We awarded 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 awarded 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.

Ontario has travelled the furthest in this area. Both non-wires and wires options may be evaluated as part of the IESO's formalized Regional Planning Process to meet regional electricity system needs. The province has conducted several pilot programs to explore the use of geotargeted non-wires solutions, and non-wires projects have been identified as the recommended solution in several instances (see Box 6 for more details). The province is currently reviewing the Regional Planning Process, part of which will include

[148] 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.

consideration of barriers to non-wires alternatives. On the natural gas side, Enbridge reported that they are investigating non-pipe solutions, and are in the process of developing a more informed and comprehensive integrated resource planning process.

Our previous Scorecard noted that Alberta's 2007 Electric Utilities Act outlined circumstances under which the province would consider non-wires solutions. However, based on our information request this year, the Alberta Utilities Commission (AUC) is not currently pursuing non-wires/pipes alternatives beyond those that would be justified under performance-based regulations. The AUC is presently undertaking a Distribution System Inquiry, which includes non-wires/pipes alternatives in scope.

Other provinces reported limited consideration of non-wires alternatives. Both Hydro Québec and BC Hydro consider the impacts of energy efficiency in their DSM planning processes, and factor those impacts into their load projections. Hydro Québec is conducting numerous studies and pilots for decentralized energy resources. BC Hydro is developing a process for consideration of non-wires alternatives and has completed some pilot projects (see below). NB Power is currently evaluating "Local Energy Generation Opportunities" as non-wires alternatives in remote areas, though this does not appear to be a demand-side initiative. Prince Edward Island's 2017 Energy Strategy recommended geotargeted DSM, and Efficiency PEI reported that future DSM plans may consider such initiatives.

Reducing demand in Ontario's indoor agriculture sector

Ontario's Independent Electricity System Operator (IESO) recently issued a call for proposals to reduce the electricity demand from greenhouses during local and bulk system peak periods. It did so because in the coming five years, more than 1,300 MW of greenhouse load is anticipated on Ontario's system.

The IESO hopes to increase the number of demand-side solutions that are adopted by greenhouse growers, as well as demonstrate the need to address infrastructure capacity shortfalls, and the efficacy of demand side solutions. The operator will award up to $2.5 million to the approved projects.

Types of projects can include programs, tools, training, a community of practice, strategic research, emerging technology demonstration, or a strategic opportunity. Projects must address energy efficiency, demand response, conservation behaviour, load reduction, load displacement, or system integration.

SaskPower told us that it is not presently evaluating geotargeted non-wires alternatives, but may do so in the future. In Manitoba, the distribution planning process allows for consideration of non-wires/pipes solutions, though there are no active plans to pursue. Newfoundland and Labrador regards the area as mostly irrelevant to its energy and electricity systems.

While non-wires/pipes alternatives are not widely considered in formalized planning processes, several provinces have studies under way to test the use of energy efficiency in geo-targeted grid planning. BC Hydro is conducting pilot projects at several substations to test demand response and geo-targeted energy efficiency as a means to reduce peak load requirements and avoid potential substation upgrades, as is Hydro-Québec. Efficiency Nova Scotia launched a locational DSM pilot in the fall of 2019.

Pilot studies are also under way in Ontario to test the potential for distributed energy resources, conservation, and demand response to defer other infrastructure upgrades. These include Toronto Hydro's grid performance energy storage system and the IESO's effort to reduce demand from indoor agriculture industry. (See sidebar: "Reducing Demand in Ontario's Indoor Agriculture Sector.") The IESO is also introducing the York Region non-wires alternative demonstration project, which will test Ontario's first local electricity market in order to better manage for peak local demand in an area expected to exceed system capacity over the next 10 years. The draft rules include storage, gas-fired generation, and demand response in the commercial-institutional and residential sectors.[149]

Table 50 provides a listing of reported pilot projects in this area. Listings per province are not intended to be exhaustive.

[149] IESO, "IESO York Region Non-Wires Alternatives Demonstration: Demonstration Project Rules," n.d., http://www.ieso.ca/en/Sector-Participants/Engagement-Initiatives/Engagements/IESO-York-Region-Non-Wires-Alternatives-Demonstration-Project.

Table 50. Non-wires/pipes alternatives pilot projects		
Province	Number of pilot projects	Names of pilot projects
Alberta	1	Jasper Energy Efficiency Project
British Columbia	~6	BC Hydro: Multiple capacity-focused substation pilots; FortisBC: Kelowna C&I Demand and Response pilot project
Québec	4	1.2 MW - 2.4 MW energy storage system at Hemmingford Substation; Quaqtaq Project; Storage system in Lac-Mégantic; Energy Storage solution installed in a Hydro-Québec building in Blainville
Nova Scotia	1	Locational DSM: Klondike Substation Pilot
Ontario	~6	Enbridge Gas: Ingleside Project: Geo-targeted Demand Side Management (DSM) project IESO: Brant Local Demand Response Pilot; Targeted Indoor Agricultural call for proposals; Greenhouse LED Incentive; Alectra Residential Solar Storage Potential; York Region Non-wires Alternatives Demonstration Project

Other grid modernization efforts

The provinces could undertake many other grid modernization efforts that would directly or indirectly lead to greater energy efficiency, though they may not all be universally applicable. Examples include delivering electricity at lower voltages (conservation voltage reduction (CVR) and managing reactive power and voltage levels (VVO, or volt-var optimization).

We awarded up to one point to provinces that have taken action 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. This area has not seen significant changes since last year's Scorecard, and therefore our scores remain unchanged.

Québec, Newfoundland and Labrador, and British Columbia continue to have the most advanced experience with CVR/VVO, and pilot projects are still underway in Alberta, New Brunswick, and Ontario. BC Hydro accounts for VVO in its load forecast development, while Newfoundland Power uses CVR to manage winter peak load. Hydro-Québec conducted its CATVAR project between 2007 and 2016 to install and demonstrate equipment to manage distribution grid voltage and reactive power. The utility cancelled the project in 2016 due to anticipated energy surpluses and energy savings that were lower than expected, though the deployed equipment will be maintained on the network and continue to deliver some energy savings through the end of its operating life. Manitoba, Nova Scotia, Prince Edward Island, and Saskatchewan do not use CVR/VVO, although Saskatchewan is considering the idea and has a number of initiatives that began in the fall of 2019, such as distribution control centres and substation automation.

As noted above, these initiatives are often part of wider smart grid plans or programs that typically involve technologies and processes that may not be directly related to energy efficiency. Other grid modernization efforts may focus on microgrids, distributed energy resources, energy storage, or advanced communication systems. One notable example is NB Power's Energy Smart NB initiative, which targets a range of smart grid technologies and services by including three interrelated elements: Smart Grid, Smart Habits, and Smart Solutions. NS Power is also testing distribution-scale and behind-the-meter storage as part of its Intelligent Feeder Project. Finally, examples of bringing stakeholders together to discuss and plan for increased grid modernization include Alberta's Smart Grid Consortium and Distribution System Inquiry, and the Energy Transformation Network of Ontario, formerly the Smart Grid Forum.

Buildings

The buildings sector is responsible for about 28% of Canada's end use demand and is the largest source of potential energy savings (28%), according to the IEA/NRCan national level energy efficiency potential study.[150] 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:

- Buildings codes **(12 points);**
    - Houses and small buildings (4 points);
    - Commercial, institutional, and multi-unit residential buildings (4 points);
    - Building code update activities (1 point);
    - Building code compliance activities (3 points);
- Energy rating and disclosure **(4 points);**
    - Houses and small buildings (2 points);
    - Commercial, institutional and multi-unit residential buildings (2 points);
- Market transformation **(3 points);**
    - Windows (1 point);
    - Space heating (1 point);
    - Water heating (1 point)

We list overall scores by province and by topic in Table 51.

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

Table 51. Buildings, appliances and equipment scoring results				
Province	Building codes (12 Pts)	Energy rating and disclosure (4 pts)	Market transformation (3 pts)	Total (19 pts)
British Columbia	10.5	2	3	15.5
Ontario	5.5	2	3	10.5
Nova Scotia	4.5	2	3	9.5
Québec	4	1	2.25	7.25
Manitoba	2	1	2.25	5.25
Alberta	4	2	0	6
Newfoundland and Labrador	2.75	0	1.5	4.25
Prince Edward Island	3.25	0	1.25	4.5
Saskatchewan	4.25	0	0.75	5
New Brunswick	1.25	0	0.75	2

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 they can further delegate that responsibility to local governments. The federal government develops model codes that provinces can adopt and revise. Section 9.36 of the National Building Code (NBC), establishes energy efficiency performance

requirements for houses and small buildings.[151] The National Energy Code for Buildings (NECB) prescribes minimum performance levels for all types of buildings, and is the standard for 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.[152]

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 federal government set a goal under the Pan-Canadian Framework on Clean Growth and Climate Change that all provinces will adopt a net-zero energy-ready building code by 2030.[153]

In order to work toward this goal, both the 2020 NCB and 2020 NECB will be tiered codes – consisting of a base

2020 Model National Energy Codes for Buildings

Unlike previous model energy codes which only set a minimum standard, the 2020 versions of the National Building Code and National Energy Code for Buildings will have performance based "tiers" moving towards higher levels of energy efficiency, with the highest tiers reflecting net-zero energy-ready (NZER) performance. These model codes are nearing their final stages of development, yet the full building code is not expected to be published until December 2021.

A NZER building is so energy efficient that it can supply its own energy needs with on-site renewable generation across the course of a year. Like the BC Energy Step Code, tiers enable provinces and municipalities to move towards higher levels of energy efficiency sooner, while ensuring cross-national harmonization and certainty for industry.

The Pan-Canadian Framework on Clean Growth and Climate Change set a goal that all provinces will adopt a net-zero energy-ready standard by 2030.

For more information see: Kevin Lockhart, "What you need to know about the new building codes," *Efficiency Canada*, 2020, www.efficiencycanada.org/what-you-need-to-know-about-the-new-building-codes

[151] 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).
[152] 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, 2018), http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=HB&sector=aaa&juris=ca&rn=2&page=0.
[153] Environment and Climate Change Canada, "Pan-Canadian Framework on Clean Growth and Climate Change."

code but with specified incremental steps that work toward a longer-term performance target.[154] 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.

The expected national tiered codes are similar to British Columbia's BC Energy Step Code, created in 2017. Our 2020 Scorecard tracks existing tiered codes, but also 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.

Houses and small buildings (Part 9)

We awarded provinces one point if they have adopted either the 2012 revision to the National Building Code, or its 2015 version. We awarded similar points for both versions because they contain no significant differences with respect to energy efficiency.[155] We assigned 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 52.

[154] 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/.
[155] Information request to National Research Council.

Table 52. Houses and small buildings code scoring results					
Province	Meets NBC 2012/2015 (1 pt.)	Exceeds NBC 2012/2015 (1 pts.)	Stepped or tiered code (1 pt.)	NZER commitment (1 pt.)	Score (4 pts)
British Columbia	●	-	●	●	3
Ontario	●	●	-	-	2
Alberta	●	-	-	-	1
Manitoba	●	-	-	-	1
Newfoundland and Labrador	●	-	-	-	1
Nova Scotia	●	-	-	-	1
Prince Edward Island	●	-	-	-	1
Québec	●	-	-	-	1
Saskatchewan	●	-	-	-	1
New Brunswick	○	-	-	-	0.5

Since our 2019 Scorecard, Prince Edward Island adopted and implemented NCB 2015 (we listed this as “pending” last year), and in March 2020 New Brunswick introduced legislation giving cabinet the authority to adopt both the NBC 2015 and the NECB 2015 with a goal of having them in force by 2021. We categorized this as “pending.” British Columbia remains the only province to have implemented its own stepped/tiered code at this time, and will require net-zero energy-ready performance in all new construction by 2032.

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

In 1997, Canada created the Model National Energy Code for Buildings, its 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.[156] 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 savings of 7.8% to 11.9% above the 2015 version.[157]

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.

The scorecard awards a half-point to provinces that adopt and enforce NECB 2011, one point for NECB 2015, and two points for NECB 2017 — given the significant jump in efficiency performance it represents. We also looked for evidence that a province's building code was equivalent to one of these standards. We awarded 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.

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[156] 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.
[157] National Research Council information request. This is a broad average over several climate zones and building archetypes.

Table 53. Commercial/institutional and multi-unit residential building code scoring results						
Province	2011 NECB (0.5 pt.)	2015 NECB (1 pt.)	2017 NECB (2 pts.)	Stretch or Step Code (1 pt.)	NZER commitment (1 pt.)	Score (4 pts)
British Columbia	-	●	-	●	●	3
Alberta	-	-	●	-	-	2
Nova Scotia	-	-	●	-	-	2
Ontario*	-	-	●	-	-	2
Saskatchewan	-	-	●	-	-	2
Prince Edward Island	-	●	-	-	-	1
Québec	-	●	-	-	-	1
Manitoba	●	-	-	-	-	0.5
New Brunswick	-	○	-	-	-	0.5
Newfoundland and Labrador	-	-	-	-	-	0

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

One notable development this year was that Quebec adopted and implemented NECB 2015 as of June 27, 2020, while providing industry with an 18-month transition period to adapt its practices. The regulations make some adjustments to the model code, exceeding it in some areas (heat recovery in pools, grocery stores, and arenas), falling short of it in others (minimum thermal resistance of walls and roofs). This is encouraging, as Quebec had not previously updated its energy code since 1983. We also note Prince Edward Island's adoption and implementation of NECB 2015, Nova Scotia's adoption of NECB 2017 in early 2020, and the legislation introduced in New Brunswick that gives cabinet the authority to adopt NECB 2015.

Code update and extension activities

As noted above, the federal government 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. Both updated codes have pre-specified tiers, with gradually improving levels of energy efficiency.[158] In recognition of the upcoming code updates, we asked information respondents to indicate if they had plans to update their existing building codes, and to describe any activities they had taken to work toward this goal. We also asked which tier of the 2020 codes provinces were targeting, though none responded to this question.

We awarded one point to provinces that were able to provide evidence of activities taken in preparation of updating building codes to the 2020 versions and/or a target enforcement date for updated codes. We summarize these plans, activities, and scores in Table 54.

[158] 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.”

Table 54. Code updates plans and activities						
Province	Plans to update	Target update code		Target enforcement date	Update activities	Total (1 pt.)
		NBC	NECB			
British Columbia	Yes	2020	2020	2022	Public consultations have been conducted.	1
Newfoundland and Labrador**	Yes	2020	Other*	-	NECB analysis and consultations have been completed and consultations on amending municipal legislation has also been completed for both NBC/NECB.	1
Nova Scotia	Yes	2020	2020	-	Natural Resources Canada and the province supported an independent assessment of the strengths, assets, barriers, and challenges that currently exist to implementing a building performance path and a potential tiered building energy code, called the Tiered Building Energy Code Readiness Assessment. EfficiencyOne also reviewed and commented on the draft NBC 2020.	1
Ontario	Yes	2020	2020	Within 24 months of publication	-	1
Alberta	Yes**	-	-	Within 12 months of publication	-	1

Saskatchewan	Yes**	-	-	Within 12 months of publication	-		1
Manitoba	Yes	-	-	-	-		-
New Brunswick	Yes	2015	2015	2021	-		-
Prince Edward Island	-	-	-	-	-		-
Québec	No	-	-	-	-		-

** Legislation is under review with objective of amending the Act, but proposals are not publicly available*
** Alberta and Saskatchewan have legislated requirements to adopt the latest building codes within a certain timeframe of their availability. Legislation in Newfoundland and Labrador only requires updating to the latest National Building Code and does not require adopting the National Energy Code for Buildings.*

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. Consultations and collaboration toward the development of a retrofit code (e.g., working with the federal government) do not receive a bonus point.

British Columbia, Nova Scotia, and Ontario reported plans or activities to develop an alteration/retrofit code. British Columbia was the only province able to provide an anticipated date for such a code (2024), though TEQ's Master Plan also specifies a date for the introduction of recommissioning code (between 2023 and 2028). Both provinces received the half bonus point. Ontario and Nova Scotia reported collaboration with the federal government on developing an alteration/retrofit code, but could not provide a timeline for adoption or enforcement.

Nova Scotia learns from the BC Energy Step Code

Nova Scotia has taken steps to explore a more advanced building code by learning from the BC Energy Step Code.

In March 2020, Glave Strategies and Efficiency Canada completed a Tiered Building Energy Code Readiness Assessment for Natural Resources Canada and the Nova Scotia Department of Energy and Mines. The assessment identified strengths and challenges – collecting information via a telephone survey, as well as policy analysis using tools such as the 2019 provincial scorecard. A total of 58 industry, government, and utility stakeholders participated in three workshops in Nova Scotia, where the co-vice chairs of the Energy Step Code Council answered questions on BC's experiences with its tiered code.

As provinces and stakeholders plan to adopt the 2020 tiered energy codes, they can look to experiences in B.C. and other jurisdictions implementing "stretch" codes on how best to smooth the transition towards net-zero energy-ready. buildings.

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. Homeowners would also face significant long-term costs and lower-performing housing, reducing confidence in builders and policymakers.

Consistent with the methodology used by the American Council for an Energy-Efficient Economy, this Scorecard awarded a province one point if it had conducted a compliance study in 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 awarded 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.

Best practices for code compliance

New ways to promote higher compliance with anticipated tiered building codes can be learned from the City of Vancouver and the BC Energy Step Code, and the City of Toronto's green development standard. For instance

- In the City of Toronto, compliance review is assigned to a department with energy and environmental expertise and mandate
- The Province of BC requires building officials to complete an exam on energy codes
- BC Hydro uses building energy managers as coaches for building officials and developers, and provides targeted energy training to building officials
- BC publishes clear housing and technical guidelines to ensure consistent terminology and technical understanding
- The City of Toronto requires compliance reporting as part of funding arrangements

To read more about ideas to promote code compliance and what strategies knock down particular barriers, read the Efficiency Canada Discussion Paper by Andrew Pride "Tiered Energy Codes Best Practices for Code Compliance."

We awarded 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 awarded a quarter point for activities in each of these areas. We summarize these activities and scores in Table 55.

Our 2019 Scorecard found that most provinces did not prioritize building code compliance. Only British Columbia reported that it had conducted a compliance study and had dedicated resources to compliance. The situation has improved somewhat in the past 18 months. Our research found evidence of code compliance studies in Québec, through *L'organisme Garantie Résidentielle* (GCR), which conducts annual inspections of code compliance in a sample of residential construction projects, which could include energy efficiency requirements. A bidder must demonstrate compliance to qualify for a construction guarantee, which then insures buyers against a range of issues associated with poor workmanship or code non-compliance. Québec first implemented this program in 1999, but we did not capture it in our previous Scorecard. EfficiencyPEI reported a budget of $37,000 and two full-time equivalent positions to support code compliance. BC Hydro reported the same level of resources as last year ($400,000), though its total codes and standards budget has increased to $5 million.

More provinces were able to demonstrate provision of code training and technical assistance and stakeholder groups or compliance collaboratives as well (though they are not always focused on energy use). As reported last year, such stakeholder groups exist in both British Columbia, in the form of the Compliance and Energy Advisor subcommittee of the Energy Step Code Council; and Ontario, where the Ontario Home Builders Association and the Ontario Building Officials Association established a compliance technical working group. Newfoundland and Labrador reported that the province's seven largest local governments had formed a working group to share information and build capacity on municipal codes, including energy codes. In Nova Scotia, the Building Code Advisory Committee resolves disputes between owners and building officials, among other issues. In Québec, TEQ reported that the Régie du bâtiment du Québec had established an interpretation committee to deal with the residential sector's energy efficiency requirements.

Lastly, we reported last year that the Ontario government has proposed the creation of an administrative authority to provide code administration and enforcement services. It is unclear if these changes will increase energy code compliance. In September 2019, the government launched a 60-day consultation on this proposal, receiving feedback from key stakeholders and the public. In March 2020, the Ministry of Municipal Affairs and Housing introduced Bill 184, the "Protecting Tenants and Strengthening Community Housing Act, 2020", which included amendments to the

Table 55. Compliance activities scoring results							
Province	Compliance study in last 5 years (1 pt.)	Dedicated resources (1 pt.)	Other compliance activities (1 pt. total, 0.25 pts. each)				Score (3 pts)
			Code training and technical assistance	Utility involvement	Compliance tools	Stakeholder group or compliance collaborative	
British Columbia	●	●	●	●	●	●	3
Québec	●	-	○	-	○	●	1.5
Prince Edward Island	-	●	●	-	-	-	1.25
Newfoundland and Labrador	-	-	●	-	●	●	0.75
Manitoba	-	-	●	-	●	-	0.5
Ontario	-	-	-	-	●	●	0.5
Nova Scotia	-	-	●	-	-	●	0.5
Saskatchewan	-	-	●	-	-	-	0.25
New Brunswick	-	-	●	-	-	-	0.25
Alberta	-	-	-	-	-	-	0

● *Activities in place;* ○ *Activities planned / not yet in place*

Building Code Act that would allow for the future creation of this administrative authority. The province reported that it anticipated further stakeholder consultations, but has yet to decide what services a future administrative authority would deliver.

Energy rating and disclosure

Energy ratings and disclosure make building energy performance visible and can help drive a market for efficiency upgrades and improved building operations. We refer to Home Energy Ratings and Disclosure (HERD) when discussing residential structures and Building Energy Rating and Disclosure (BERD) when discussing commercial, institutional, and multi-unit residential buildings. These initiatives are often referred to as benchmarking programs because they facilitate comparisons with similar building types, which can help make the business case for building upgrades and encourage the investigation of operating procedures that save energy.

Mandatory energy labels enable quicker and deeper savings in Portland

Mandatory energy rating and disclosure policies have stalled in Canada. The Pan-Canadian Framework had an aim to require labelling of building energy use as early as 2019. Ontario previously enabled mandatory disclosure of energy information prior to the sale of a home under the Green Energy Act, 2009 by creating a right to receive the information, however, the provision was never proclaimed into force. The province did not reintroduce the provision when it repealed the Green Energy Act in 2018.

To understand the impact of mandatory labeling and disclosure policies, we need to look south of the border. In 2018, Portland required that sellers of most single-family homes disclose a Home Energy Score at time of sale. The Pacific Northwest National Laboratory is now using the data to explore the benefits of targeting certain clusters for specific energy efficiency upgrades. Neighbourhood scale upgrades promise to reduce the cost of retrofits and improve customer convenience. These examples demonstrate that mandatory labeling policies not only help integrate energy efficiency into markets, they also help streamline retrofits.

See Chrissi Antonopoulos, et al., (2020) "Pushing Green – Leveraging Home Energy Score to Promote Deep-Energy Retrofits in Portland, Oregon," *ACEEE Summer Study on Energy Efficiency in Buildings*. Washington, Dc: American Council for an Energy-Efficient Economy. PNNL-SA-152375.

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."[159] 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.[160]

There are several policy characteristics to consider in the evaluation of this topic:

- Energy rating initiatives (none, voluntary, mandatory)
- Public disclosure options (none, voluntary, mandatory)
- Scope of application (new and/or existing buildings, building size, public buildings, etc.).

For this Scorecard, we awarded provinces up to two points for ratings and disclosure initiatives for both Part 3 (commercial, institutional, and multi-unit residential) and Part 9 (residential and low-rise) buildings, for a potential combined total of four points. To receive full points, the policy or initiative must be province-wide, include mandatory public disclosure, and apply to both new construction and existing buildings. We award partial points to province-wide or regional mandatory or voluntary ratings programs with voluntary public disclosure options. We did not award points for initiatives that do not facilitate voluntary public disclosure (e.g., via a public website, home listing service, or other publication), such as provincial incentive programs that support energy rating labels for new or existing buildings, but only issue provide those ratings in a report to the builder or homeowner.

We provide our scoring summary for these metrics in Table 56.

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[159] Environment and Climate Change Canada, "Pan-Canadian Framework on Clean Growth and Climate Change," 17.
[160] 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.

Table 56. Energy ratings and disclosure scoring summary			
Province	Home energy rating and disclosure	Building energy rating and disclosure	Score (4 pts)
Alberta	1	1	2
British Columbia	1	1	2
Nova Scotia	1	1	2
Ontario	0	2	2
Manitoba	0	1	1
Québec	0	1	1
New Brunswick	0	0	0
Newfoundland and Labrador	0	0	0
Prince Edward Island	0	0	0
Saskatchewan	0	0	0

Home energy rating and disclosure

There have been few changes to this metric since our 2019 Scorecard. We show scoring results in Table 57.

Table 57. Home energy ratings and disclosure programs						
Province	Energy ratings initiative	Energy ratings requirement	Public disclosure requirements	Public disclosure process	Scope of application	Total (2 pts)
British Columbia	Yes	Partially mandatory*	Voluntary	Website	Province-wide	1
Alberta	Yes	Voluntary	Voluntary	Website	Municipal	1
Nova Scotia	Yes	Voluntary	Voluntary	Real estate listings	Province-wide	1

** Not province-wide, and only for new buildings*

In British Columbia, the City of Vancouver requires home energy rating for new homes built to the 2014 and 2019 Vancouver Building By-law,[161] and several other municipalities that have adopted the BC Step Code have mandatory rating requirements for new homes (though there are no associated mandatory disclosure requirements). The City of Vancouver requirement is separate from the voluntary Rateourhome.ca pilot program, which includes voluntary disclosure of EnerGuide ratings on the associated website.

Building energy rating and disclosure

We tracked rating and disclosure policies and programs for larger buildings separately. These programs usually target commercial, institutional, and multi-unit residential buildings. We asked whether programs had reporting requirements (based on a time period, building size, or if a requirement existed separately for public buildings); what reporting tool they used, and what requirements existed around disclosure (e.g., to the public, to buyers, or display of a label). Disclosure is important as it helps inform

[161] City of Vancouver, "Energy Efficiency Requirements for New Single Family and 1-3 Storey Homes," City of Vancouver, 2020, https://vancouver.ca/home-property-development/energy-efficiency-requirements-and-resources-for-homes.aspx.

potential buyers or tenants, enables comparisons with similar buildings, and can improve the business case for building upgrades and improved building operations.

Table 58. Building energy rating and disclosure scoring

Province	Energy ratings initiative	Energy ratings requirement	Public disclosure requirements	Disclosure tool	Scope of application	Total (2 pts)
Ontario	Yes	Mandatory	Mandatory*	Energy Star Portfolio Manager; Open Data;	Province-wide; Annual reporting; Buildings > 100,000 sq ft; Public sector buildings	2
Alberta	Yes	Voluntary	None	Energy Star Portfolio Manager	Municipal	1
British Columbia	Yes	Voluntary**	None	Energy Star Portfolio Manager	Province-wide	1
Nova Scotia	Yes	Voluntary	None	Energy Star Portfolio Manager	Province-wide	1
Manitoba	Yes	Voluntary	None	Energy Star Portfolio Manager	Province-wide	1
Québec	Yes	Voluntary**	None	Unknown	Public sector buildings	1

** Data are disclosed to public in aggregated datasets, but there are no requirements for individual buildings to display or disclose ratings*

*** Both British Columbia and Québec do have some mandatory energy rating requirements, but these are much narrower in scope than in Ontario. In British Columbia, local governments that have adopted the BC Energy Step Code require new large buildings to submit estimated energy use intensity at time of building permit application. In Québec, public sector buildings must report energy consumption on an annual basis.*

Ontario remains the only province with a mandatory energy rating and disclosure policy for large buildings, and this is the first year that these data will be released publicly. The current government made a proposal in the fall of 2019 to stop the roll-out of energy and water reporting for buildings between 50,000 and 100,000 square feet. Though this proposal stalled, the reporting requirement roll-out was nevertheless deferred until July 1, 2023.

One notable development since last year is Efficiency Nova Scotia's new Energy Benchmarking Pilot Program. It facilitates voluntary building rating and benchmarking via ENERGY STAR® Portfolio Manager for Part 3 buildings, though with no public disclosure requirements.

Appliance and equipment market transformation

Appliance and equipment improvements, led either by regulation or industry, are critical energy efficiency drivers. Recent federal regulatory amendments are expected to reduce GHG emissions by 1.07 megatonnes by 2030, with quantified benefits three times higher than technology and administrative costs.[162]

Minimum standards and regulations improve energy efficiency, as does market transformation, which often precedes regulations and makes more efficient products the norm. Product demonstrations, supply chain actor training and education, and

[162] Public Works and Government Services Canada, "Canada Gazette, Part 1, Volume 152, Number 49: Regulations Amending the Energy Efficiency Regulations, 2016," Government of Canada, December 8, 2018, http://gazette.gc.ca/rp-pr/p1/2018/2018-12-08/html/reg3-eng.html; Public Works and Government Services Canada, "Canada Gazette, Part II, Volume 153, Number 12: Regulations Amending the Energy Efficiency Regulations, 2016 (Amendment 15)," Government of Canada, June 3, 2019, http://www.gazette.gc.ca/rp-pr/p2/2019/2019-06-12/html/sor-dors164-eng.html.

customer education via, for example, product labels, all support market transformation.[163]

In Canada, federal standards apply to products that are imported or shipped between provinces, and provinces have jurisdiction over products sold within their borders. British Columbia, Manitoba, Ontario, Québec, New Brunswick, and Nova Scotia have their own appliance and equipment efficiency regulations, including standards for energy use in many federally regulated products. This policy context contrasts with the United States, where federal pre-emption overrides state standards for federally regulated products.[164] Thus, provinces can contribute to appliance and equipment efficiency by setting standards for products not covered by federal regulations, and they can adopt more stringent standards than the federal government.

In 2018, provinces and territories participating in the Energy and Mines Ministers' Conference released a market transformation roadmap for space heating, water heating, and windows.[165] The roadmap aims to set a U-factor of 0.8 for all residential windows sold by 2030, and sets a goal that all space and water heating technologies meet an energy performance of more than 100% by 2035.[166] Interim goals enable provinces to prioritize activities based on their specific contexts, such as carbon intensity of electricity grids and local climates.[167]

This year's scorecard assesses initial progress toward this market transformation roadmap. While not all provinces are involved in developing their own codes and standards (since only some of them manufacture these types of products), there are nevertheless other activities they can pursue. For example, the roadmap identifies many activities provinces can undertake with respect to the three strategic technologies, which are grouped by the following categories:

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[163] Carl Blumstein, Seymour Goldstone, and Loren Lutzenhiser, "A Theory-Based Approach to Market Transformation," *Energy Policy* 28, no. 2 (2000): 137–144.
[164] States may apply for a waiver.
[165] Citing concerns about life-cycle costs and the GHG implications of electrification given the province's carbon-intensive grid, Saskatchewan did not sign on to the final communiqué.
[166] Energy and Mines Ministers' Conference, "Paving the Road to 2030 and Beyond: Market Transformation Road Map for Energy Efficient Equipment in the Building Sector" (Iqaluit, Nunavut, August 2018), https://www.nrcan.gc.ca/energy/regulations/21290.
[167] For instance, there is a 2030 goal for residential natural gas heat pump with a seasonal coefficient of performance greater than 1.2 to be manufactured and installed.

1. Research and development for product development, laboratory and field testing;
2. Demonstrations through pilot / demonstration projects;
3. Information and awareness-raising activities (e.g., labelling);
4. Training on new technologies and equipment installation;
5. Incentives to encourage downstream market demand and/or incentives upstream of customer end-use; and
6. Development of codes and standards, including notices of intent to introduce regulations, consultations, or new regulations.

Even if a given province might not be involved in primary research or developing its own codes and standards, it can still work toward market transformation via the activities in the other categories.

In our information request this year, we asked respondents to indicate whether they had undertaken activities identified by the roadmap in each of these categories. We also asked that provinces identify any regulated products not covered by federal regulations and indicate whether their regulations exceeded the federal standard. Recognizing that provinces may not be active in all areas, we award up to a quarter-point for each activity identified for windows, space heating, and water heating — up to a total of one point for each technology. We award partial points where we interpret reported activities as falling short of the stated aim of the roadmap objectives, or where activities are planned but not yet underway.

We summarize scoring for this component in Table 59.

Table 59. Market transformation scoring summary				
Province	Windows (1 pt)	Space heating (1 pt)	Water heating (1 pt)	Total (3 pts)
British Columbia	1	1	1	3
Nova Scotia	1	1	1	3
Ontario	1	1	1	3
Manitoba	1	1	0.25	2.25
Québec	1	1	0.25	2.25
Newfoundland and Labrador	0.5	0.75	0.25	1.5
Prince Edward Island	0.5	0.5	0.25	1.25
New Brunswick	0.25	0.25	0.25	0.75
Saskatchewan	0	0.5	0.25	0.75
Alberta	0	0	0	0

Windows

The 2018 Energy and Mines Ministers' roadmap outlined a number of concrete activities that provinces can undertake to support market transformation for high-efficiency windows. These include, but are not limited to:

- Supporting research on improved window designs, and to better understand the benefits of high-efficiency windows;
- Developing construction industry market pull, and supporting consistent labelling;
- Conducting education, training and marketing outreach;
- Facilitating installer training and certification;
- Developing and implementing incentives or other financial mechanisms to make high-efficiency windows more affordable;
- Influencing and supporting the development and harmonization of codes and standards and supporting ENERGY STAR® programs for high-efficiency windows.

We summarize provincial activities and scoring in Table 60.

Table 60. Market transformation activities for high-efficiency windows							
	Research and development	Pilots and demonstrations	Information and awareness	Technology and installation training	Upstream or downstream incentives	Regulation, codes and standards	Total (1 pt)
British Columbia	The provincial government "High Performance Window Certification Program" provides funding to manufactures to offset research and development costs.	-	The CleanBC Better Homes Program requires energy performance rating for windows, consistent with CSA and NFRC product standards, and the Energy Star program. All windows sold in the province are subject to labelling requirements.	Members of the Home Performance Stakeholder Council support windows installation quality training and consultation with Fenestration BC	The High Performance Window Certification Program provides funding for manufacturers to certify new ENERGY STAR® "Most Efficient" and "Passive House" product lines.	Higher energy efficiency requirements on windows, doors, skylights are regulated in Amendment 6 and the proposed Amendment 7 to the BC Energy Efficiency Standards Regulation.	1

Manitoba	-	Efficiency Manitoba, Red River College, and industry partners obtained an NSERC grant to study cold climate installation techniques. One goal of this research is to develop practical installation guidelines to reduce thermal bridging at the window/wall junction.	Manitoba Hydro developed and led industry-sponsored presentations to educate industry on the benefits of high-performance windows, including customized presentations for individual companies to assist sales and marketing staff in promoting these products. This work will continue at Efficiency Manitoba.	Fenestration Manitoba provides ongoing training opportunities for all aspects of its business, from sales to installation.	Efficiency Manitoba provides downstream incentives.	Manitoba Hydro and Efficiency Manitoba staff are active participants in the development of the National Energy Code for Buildings at both the sub-committee (SC-EE) and task group (TG-BE) levels.	1

Nova Scotia	-	Efficiency Nova Scotia is running a pilot program to provide additional incentives for new home construction that meets a specified performance level.	Windows and doors must be ENERGY STAR® rated to be eligible for Efficiency Nova Scotia rebates.	Efficiency Nova Scotia has hosted high performance building training sessions, which include information on selection and installation of high-performance windows.	Efficiency Nova Scotia provides downstream incentives for windows and doors.	-	1
Ontario	The IESO has supported National Research Council work on lower-cost production techniques.	EnerQuality, with support from the IESO, administers a “Net Zero Technology Adoption Program,” which works with home builders to design, develop and deliver market-ready technology demonstration projects.	The EnerQuality initiative was developed because of industry expectation of code development, and desired assistance gaining expertise with designing and delivering high performance homes.	EnerQuality offers training to the residential new construction industry on the design and construction of high-performance homes.	Utilities provide downstream incentives.	Ontario amended its Energy and Water Efficiency regulation (O.Reg. 509/18) to increase efficiency standards for residential windows and align with building code requirements.	1

Québec	-	-	Hydro Québec has promoted ENERGY STAR® windows and patio doors since 2007, and developed awareness campaigns for both customers and industry.	Hydro-Québec and the Association de vitrerie et fenestration du Québec launched a specialized training course in 2019 for window installers, leading to Fenestration Installation Technician (FIT) certification.	Hydro-Québec provides training and awareness, and TEQ offers a downstream incentive for ENERGY STAR® certified windows and doors.	Hydro Québec participated on the standards development committees, and the government is planning to amend energy efficiency standards to apply to devices or equipment that do not directly consume energy.	1
Newfoundland and Labrador	-	-	TakeCharge incentive programs and LEED® Silver requirements for public buildings create market pull.	Industry-led training includes windows.	-	-	0.5

Prince Edward Island	-	-	-	EfficiencyPEI arranged for window installation training to be provided by Summerhill to members of its Network of Excellence.	EfficiencyPEI's Home Insulation Rebate program provides rebates for ENERGY STAR® rated windows and doors.	-	0.5
New Brunswick	-	-	-	-	NB Power provides downstream incentives for retrofits that include windows	-	0.25
Alberta	-	-	-	-	-	-	0
Saskatchewan	-	-	-	-	-	-	0

Space heating

The 2018 roadmap sets out a number of concrete activities that provinces can undertake to support market transformation for space heating via electric or gas heat pumps. These include, but are not limited to:

- Supporting research to develop high efficiency and lower cost cold climate heat pumps;
- Conducting demonstration of cold climate heat pumps and/or gas heat pumps;
- Developing Canadian performance ratings and qualified product listings;
- Developing heat pump training and contractor certification programs;
- Expanding access to and uptake of existing and future heat pump incentive programs; and
- Developing high performance specifications for cold climate heat pumps.

Table 61 below provides a summary of provincial activities and scoring in these areas.

Table 61. Market transformation activities for space heating							
	Research and development	Pilots and demonstrations	Information and awareness	Technology and installation training	Upstream or downstream incentives	Regulation, codes and standards	Total (1 pt)
British Columbia	FortisBC, BC Hydro, NRCan and the provincial government collaborated on a field study of sizing, specification, and installation practices for cold-climate heat pumps.	The Esk'etemc First Nation partnered with The Government of Canada, First Nations Health Authority, Interior Health Authority, and BC Housing to fund and construct the Alkali Lake Health and Wellness centre, meeting Net-Zero Energy Ready labelling requirements. BC Hydro also provided support.	BC Hydro has been engaged in the development of EXP-07, the CSA standard for heat pumps. Finalization of this standard precedes product listing, sizing, and selection tools.	FortisBC, BC Hydro, the Province of British Columbia (CleanBC), and the Home performance Stakeholder Council support contractor training on quality installation and are developing a Program Registered contractor directory that will be mandatory for rebate program participation	BC Hydro, FortisBC, and the Province of British Columbia offer downstream incentives. Through CleanBC, the province provides installer incentives for heat pumps.	Energy efficiency requirements for heat pumps are regulated in Amendment 6 to the BC Energy Efficiency Standards Regulation.	1

Manitoba	Field performance monitoring of central ducted cold climate heat pumps in three Winnipeg homes in 2016 and 2017.	-		Manitoba Hydro and Efficiency Manitoba Earth Energy/Ground Source Heat Pump incentive programs require participating contractors and installers be members of the Manitoba Geothermal Energy Alliance (MGEA).	Manitoba Hydro has provided downstream incentives for ground source heat pumps for several years. Efficiency Manitoba plans to switch to upstream incentives paid directly to distributors.	Manitoba Hydro has participated in the CSA technical committee developing the EXP-07 and EXP-10 standards.	1

Nova Scotia	-	Efficiency Nova Scotia partnered with Housing Nova Scotia and Nova Scotia Community College to pilot four hybrid thermal heat pump systems.	Efficiency Nova Scotia's programs require heat pumps to be Cold Climate certified, measured with internal criteria based on the North East Energy Partnership's cold-climate heat pump list.	Efficiency Nova Scotia has hosted high performance building training sessions, which include information on selecting and installing space heating equipment.	Efficiency Nova Scotia offers downstream incentives for heat pumps to both residential and commercial customers.	Efficiency Nova Scotia supports the development of CSA heat pump standards.	1

Ontario	The IESO Grid Innovation Fund has supported research into geothermal systems and heat pumps, and Enbridge has supported research into heat pumps.	The IESO Grid Innovation Fund has supported multiple heat pump pilot projects, including one in which the City of Toronto installed a commercial-scale, lake-based geothermal system as part of a deep energy retrofit of a neighborhood centre.	Enbridge offers a “Savings by Design” program to improve new-building energy performance, and has participated in updating the ANSI Z21.40.2 and .4 standards for gas heat pumps. The IESO participated in the development of CSA EXP07 standards.	-	Heat pumps may be eligible under Enbridge’s Custom Retrofit commercial program. Save on Energy incentives for residential electricity customers were cancelled in 2019, but remain in place for institutional, commercial and industrial buildings.	Amended O.Reg. 509/18 to increase efficiency standards for commercial and residential gas-fired boilers; commercial oil-fired boilers; residential gas-fired furnaces; and gas fireplaces.	1

Québec	Québec Hydro has conducted research into power management, large capacity heat pumps, and geothermal systems.	-	-	Hydro-Québec provides training for HILO technicians on space heating, but not specifically heat pumps.	TEQ offers downstream incentives for ENERGY STAR® rated heat pumps through its Rénoclimat and Chauffez vert programs.	Hydro-Québec participated in the development of the CSA performance standard for split-system and single-package central air conditioners and heat pumps.	1
Newfoundland and Labrador	-	Newfoundland Power is studying ductless mini-split heat pumps.	takeCharge incentive programs and LEED® Silver requirements for public buildings create market pull.	For provincial programs, heat pump installers must be journey refrigeration mechanics.	The province offers downstream incentives for heat pumps.	-	0.75
Prince Edward Island	-	PEI partnered with Natural Resources Canada to conduct 16 field studies of cold-climate heat pumps between 2018 and 2020.	-	-	Efficiency PEI provides downstream incentives to residential and commercial clients.	-	0.5

Saskatchewan	SaskEnergy co-funded lab and field testing for a natural gas cold climate heat pump in 2019 and 2020.	-	-	SaskEnergy provided training on high efficiency space heating (above code) for SaskEnergy Network Members.	-	-	0.5
New Brunswick	-	-	-	-	NB Power provides downstream incentives for heat pumps	New Brunswick regulates heat pumps under the Energy Efficiency Act, and is working to harmonize the legislation with federal standards.	0.25
Alberta	-	-	-	-	-	-	0

Water Heating

The roadmap sets out a number of concrete activities provinces can undertake to support market transformation for heat pump water heaters. These include:

- Developing Canadian performance ratings for electric and/or gas heat pump water heaters;
- Developing labelling and marketing programs for commercial water heaters;
- Improving building designer and contractor awareness and training; and
- Influencing and supporting the development and harmonization of codes and standards for water heating technologies.

We summarize of provincial activities and scoring in these areas in Table 62.

Table 62. Market transformation activities for water heating							
	Research and development	Pilots and demonstrations	Information and awareness	Technology and installation training	Upstream or downstream incentives	Regulation, codes and standards	Total (1 pt)
British Columbia	-	FortisBC, BC Hydro, NRCan and the province conducted a field study of in-situ heat pump water heaters in 2019.	BC Hydro, CleanBC, and FortisBC use qualified product lists developed by the Northwest Energy Efficiency Alliance.	FortisBC works with water heater equipment manufactures to demonstrate new products but relies on them for installation guidelines.	Utilities and the province provide downstream incentives.	The province has proposed an amendment to the Energy Efficiency Standards Regulation that would introduce residential and commercial gas boiler standards, including combination boilers serving domestic and service hot water.	1

Nova Scotia	-	Efficiency Nova Scotia partnered with NRCan, Nova Scotia Power, and the province to install and monitor performance of CO_2-refrigerant split heat pump water heaters and conventional integrated heat pump water heaters.	Efficiency Nova Scotia's 2020-2022 DSM plan includes a focus on increasing uptake of domestic hot water measures.	Efficiency Nova Scotia has hosted high performance building training sessions, which include information on selecting and installing water heating equipment.	Efficiency Nova Scotia provides downstream rebates for integrated heat pump water heaters.	Efficiency Nova Scotia has provided support for CSA standards development.	1

Ontario	-	Enbridge has conducted residential pilots of smart water heater controllers and gas heat pump water heaters.	Enbridge's Savings by Design program (noted above) hosts a workshop that focuses on space and water heating improvements.	-	Enbridge provides midstream incentives for commercial natural gas water heaters with a minimum efficiency of 94.5%.[168]	The province amended O.Reg 509/18 to set a standard for commercial oil-fired storage water heaters, and to update standards for commercial gas-fired storage water heaters and instantaneous water heaters (residential and commercial).	1

[168] The Market Transformation Roadmap specifies a target for fuel-burning water heaters to meet or exceed a performance rating of 90% (condensing technology) by 2025. By 2030, electric water heaters will need to meet or exceed 100% efficiency, and residential gas heat pump water heaters should have an efficiency factor of 1.4 or greater.

Manitoba	Field performance monitoring of heat pump water heaters installed in two customer homes in 2016	-	-	-	Manitoba Hydro has promoted high efficiency condensing water heaters and provided downstream incentives to commercial customers. Efficiency Manitoba will continue promoting them, but will be switching to upstream incentives direct to distributors.	-	0.25
New Brunswick	-	-	-	-	NB Power provides downstream incentives for water heaters.	New Brunswick regulates water heaters under the Energy Efficiency Act, and is updating legislation to harmonize with federal standards.	0.25

Newfoundland and Labrador	-	-	-	Industry-led training includes water heaters.	-	-	0.25
Québec	-	-	-	-	Hydro Québec provides downstream incentives for three-element water heaters.	-	0.25
Saskatchewan	-	-	-	-	SaskEnergy provides downstream incentives for commercial space and water heating.		0.25
Alberta	-	-	-	-	-	-	0
Prince Edward Island	-	-	-	-	EfficiencyPEI provides downstream incentives for hybrid hot water heaters.	-	0.25

Transportation

Transportation accounts for 29.8% of total energy consumption in Canada and stands to deliver 26% of the country's potential energy savings by 2050.[169] Achieving these savings would avert the release of 1.5 gigatons of CO_2 emissions through 2050, or one-third of the total potential emissions reductions.[170]

Light-duty passenger vehicles account for almost half of Canada's transport energy demand. While a number of 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.[171] Electrification could lead to large total energy savings as well: under the IEA's Energy Efficiency scenario, two out of three light-duty passenger vehicles sold will be electric by 2050, cutting fuel consumption from this subsector in half.[172]

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. In this year's Scorecard, we introduce an assessment of active transportation policies. We collected information on the following policy areas or metrics:

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[169] Natural Resources Canada, "Canada's Secondary Energy Use (Final Demand) by Sector, End Use and Subsector."; International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."
[170] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."
[171] Office of Energy Efficiency & Renewable Energy, "All-Electric Vehicles," U.S Department of Energy, 2019, http://www.fueleconomy.gov/feg/evtech.shtml.
[172] International Energy Agency and Natural Resources Canada, "Energy Efficiency Potential in Canada to 2050."

- Personal vehicle transportation **(8 points)**
    - The existence of a zero-emissions vehicle mandate (2 points);
    - High-efficiency vehicle consumer incentives (2 points);
    - BEV/PHEV registrations per total vehicle registrations (4 points);
- Transport electrification infrastructure **(7 points)**
    - Policies to support public charging stations (2 points);
    - Availability of public charging (including fast DC charging) stations (4 points);
    - Support for battery electric (BEV) and plug-in hybrid electric vehicles (PHEV) in building codes and/or municipal bylaws (2 points);
- Active transportation **(2 points)**
    - Active transportation policy (2 points).

The scorecard does not include measures related to commercial and freight transportation, nor urban form issues that would make cities more amenable to energy-efficient personal transportation. The QUEST Smart Energy Communities Benchmark includes more information on personal transportation and urban design issues.[173]

We present summary scoring results for these topics in Table 63.

[173] "Smart Energy Communities Benchmark."

Table 63. Transportation Scoring Results				
Province	Personal vehicles (8 pts)	Transportation electrification (7 pts)	Active transportation (2 pts)	Total (17 pts)
Québec	8	6.75	2	16.75
British Columbia	8	4	2	14
Prince Edward Island	1	3.75	2	6.75
New Brunswick	1	3.25	2	6.25
Ontario	2	2.75	1	5.75
Nova Scotia	1	1.5	2	4.5
Alberta	2	2	0.5	4.5
Manitoba	1	0.5	2	3.5
Newfoundland and Labrador	0	1.5	0.5	2
Saskatchewan	0	1	0.5	1.5

Personal vehicle transportation

Zero-emission vehicle mandates

Governments can promote energy efficiency in personal vehicle transportation by adopting mandates requiring that zero-emission vehicles comprise a certain share of all vehicles sold by manufacturers in a given jurisdiction. In April 2019, Canada announced a nation-wide ZEV target of 10% of light-duty vehicles sold by 2025, 30% by 2030, and 100% by 2040.[174] This target encompasses battery electric, hydrogen fuel cell electric, and plug-in hybrid electric vehicles. The Interim report of the Task Force for a Resilient Recovery recommended that the federal government introduce a ZEV mandate that requires manufacturers to phase in a growing share of zero-emission vehicles, across all vehicle classes.[175]

Provincial and state governments have taken the lead by introducing ZEV mandates. We awarded two points to a province with a legislated ZEV mandate, with requirements that meet or exceed the federal targets. In Canada, British Columbia and Québec have ZEV mandates in place.

Québec ZEV Mandate Achieves 100% Compliance

During the first compliance period of Québec's ZEV Act, from 2017 to 2019, the province achieved 100% compliance from manufacturers. Any manufacturer that sells or leases 4,500 or more new vehicles every year is subject to the Act and must accumulate credits to meet a target that the province sets each compliance period. Early adopter manufacturers were awarded credits for new vehicles sold from 2014-2017. All manufacturers subject to the Act met their obligations through their own sales, or by acquiring credits from other manufacturers.

[174] Transport Canada, "Government of Canada Invests in Zero-Emission Vehicles," Government of Canada, March 23, 2020, https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/zero-emission-vehicle-infrastructure-program/21876.
[175] "Insights & Recommendations."

Table 64. ZEV Mandates description and scoring		
Province	Description	Score (2 pts)
British Columbia	British Columbia announced its intention to pass a ZEV mandate by 2020 in its Fall 2018 CleanBC climate strategy.[176] The Zero-Emission Vehicles Act, passed in May 2019, implements a credit/debit system for auto manufacturers, requiring them to meet an escalating annual percentage of new light-duty ZEV sales and leases, reaching: 10% by 2025, 30% by 2030, and 100% by 2040.[177] Regulations following this Act were implemented in July 2020, which introduced phased targets to be met each year, as well as compliance requirements.[178]	2
Québec	Québec introduced its Zero-Emission Vehicle Standard in October 2016 and it came into force in January 2018. The standard establishes a credit/debit system, requiring manufacturers to earn ZEV credits equivalent to 3.5% of light-duty vehicle sales and leases by 2018 and 22% by 2025.[179] Québec achieved 100% compliance in the 2018 model year (see Box 6).[180]	2

[176] Government of British Columbia, "CleanBC: Our Nature, Our Power, Our Future," (Victoria, BC: Government of British Columbia, December 2018), https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_2018-bc-climate-strategy.pdf.
[177] British Columbia Minister of Energy, Mines & Petroleum Resources, "Zero-Emission Vehicles Act," Pub. L. No. Bill 28 (2019), https://www.leg.bc.ca/parliamentary-business/legislation-debates-proceedings/41st-parliament/4th-session/bills/first-reading/gov28-1.
[178] BC Gov News, "Province Puts in Place Rules for 100% Electric-Vehicles Sales by 2040.," British Columbia, July 30, 2020, https://news.gov.bc.ca/releases/2020EMPR0031-001416.
[179] Government of Quebec, "ZEV Standard - Explanatory Leaflet," 2019, http://www.environnement.gouv.qc.ca/changementsclimatiques/vze/feuillet-vze-reglement-en.pdf.
[180] Government of Quebec, "Zero Emission Vehicle (ZEV) Standard: Report on the Results of the First Compliance Period," April 15, 2020, http://www.environnement.gouv.qc.ca/changementsclimatiques/vze/index-en.htm.

Vehicle consumer 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.[181] 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.[182] We awarded two points to provinces with financial incentives that supplement the federal incentives for individual consumers, or that provide incentives for organizations to electrify their fleets. We awarded partial points for policies or programs that target either consumers or organizations, or for policies or programs that ended during the period under review. This is a different approach from last year's Scorecard, in which we only awarded points for consumer incentives.

[181] See Natural Resources Canada, "2019 Fuel Consumption Guide" (Ottawa, ON: Government of Canada, 2019). for estimates of annual fuel costs for all passenger vehicles sold in Canada.
[182] Transport Canada, "Zero-Emission Vehicles," Government of Canada, January 31, 2020, http://www.tc.gc.ca/en/services/road/innovative-technologies/zero-emission-vehicles.html.

Table 65. Consumer vehicle incentives			
Province	Direct to consumer incentives	Incentives for fleet electrification	Score (2pts)
British Columbia	Yes, Clean Energy Vehicles Program, BC SCRAP-IT program	Yes, Specialty-Use Vehicle Incentive	2
Québec	Yes, *Roulez Vert* Program	Yes, Transportez Vert Program	2
Alberta	No	Yes, the Municipal Climate Change Action Centre's program	1
New Brunswick	Yes, Drive Electric NB Fund	No	1
Nova Scotia	No	Yes, Connect 2 Fund	1
Manitoba	No	No	0
Newfoundland & Labrador	No	No	0
Ontario	No	No	0
Prince Edward Island	No	No	0
Saskatchewan	No	No	0

British Columbia's Clean Energy Vehicles Program offers point-of-sale incentives of up to $3,000 for BEV/PHEVs with a suggested retail price of less than $55,000. This represents a change from 2019, where the incentive was up to $5,000 and the suggested retail price was a maximum of $77,000.[183] The province also funds a Specialty-Use Vehicle Incentive (SUVI), available to individuals and public or private fleets as an incentive for electric motorcycles and scooters, forklifts, and other commercial vehicles, and the non-profit BC SCRAP-IT Program Society offers financial

[183] Government of British Columbia and New Car Dealers Association of BC, "Clean Energy Vehicles for British Columbia | New Car Dealers of BC," 2020, https://www.cevforbc.ca/.

incentives for new ($6,000) and used ($3,000) electric vehicles, but not PHEVs.[184] These incentives (with the exception of the SUVI) can be combined with the federal incentive.[185]

Québec launched its *Roulez Vert* ("Drive Green") program in January 2012, and the province continues to offer rebates of up to $8,000 for purchase of a new BEV/PHEV with a retail price below $60,000. This is a reduced amount from 2019, when the retail price was required to be less than $75,000. A pilot project between April 2017 and March 2019 that offered rebates of up to $4,000 for the purchase of used BEV/PHEVs is now an official part of *Roulez Vert*.[186]

Québec Introduces Transportez Vert

Québec's Transportez Vert program helps fleet-owning organizations, such as municipalities, improve energy efficiency. It has four different components: Support for energy management to reduce vehicle fuel consumption; acquisition of technologies and equipment that reduces GHG emissions; eco-driving training for how and why to adopt more energy-efficient and safe driving; and DC fast charging stations.

The province launched Transportez Vert in July 2019. In February and May 2020, it introduced temporary incentives to help organizations purchase commercial electric vans and trucks (May) and electric buses (February) for their fleets. These incentives will be offered until December 31, 2020.

This is a part of the Drive to Zero Pledge, which aims to eventually eliminate emissions from the commercial transportation sector. Canada, British Columbia, and the City of Vancouver have also signed the pledge.

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[184] Province of British Columbia, "Go-Electric Vehicle Incentive Program," Province of British Columbia, 2020, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program/passenger-vehicles?keyword=electric&keyword=vehicle&keyword=incentive; "Program Policies," The BC SCRAP-IT Program, 2020, https://scrapit.ca/faqsinfo/programpolicies/.
[185] Plug In BC, "Vehicle Incentives," Plug In BC, accessed June 9, 2020, https://pluginbc.ca/incentives/vehicle-incentives/#:~:text=Clean%20Energy%20Vehicle%20Program,-The%20province%20of&text=The%20CEVforBC%20point%20of%20sale,a%20hydrogen%20fuel%20cell%20vehicle.
[186] Transition energetique Quebec, "Government Rebates," Government of Quebec, 2020, https://vehiculeselectriques.gouv.qc.ca/english/rabais/rabais-offert-gouvernement-du-quebec.asp.

In February 2020, *Transportez Vert* began offering up to $100,000 for electric buses, and in May it introduced offers up to $10,000 for commercial electric vans and trucks.[187] We awarded Québec and British Columbia full points for this metric.

New Brunswick again offered a limited consumer incentive program. With support from federal and provincial grants, under the *Drive Electric NB* program, the New Brunswick Lung Association offered $1,000 rebates between April 2018 and March 2019 — when the program's funding was exhausted.[188] An additional 10 rebates of $1,000 were again offered between September 2019 and February 2020.

Alberta's Municipal Climate Change Action Centre provides local governments with funding to purchase or lease electric vehicles for their fleets. This program provides funding for passenger vehicles of up to $14,000 and can be combined with the federal incentive. The program also covers 30% of the cost of medium- to heavy-duty vehicles, such as electric garbage trucks, up to a maximum $300,000 per vehicle. Depending on the length of the lease, the program can also cover a portion of lease costs, on a sliding scale basis.[189]

Nova Scotia does not offer a direct-to-consumer incentive, but since 2012 has operated a sustainable transportation funding program called Connect 2. The program in part funds zero-emission fleet projects, with grants up to $75,000. It supported several fleet projects between 2019 and 2020.[190] We awarded one point each to New Brunswick, Alberta, and Nova Scotia for providing consumer or corporate fleet incentives, but not both.

None of the other provinces offered incentives for the purchase of BEV/PHEVs for either consumers or corporate fleets.

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[187] Transition Énergétique Québec, "Improvements in the Business, Innovation, and Transport Sectors," Transition Énergétique Québec, 2020, https://transitionenergetique.gouv.qc.ca/en/relance/bonifications-dans-les-secteurs-des-affaires-et-de-linnovation.
[188] Hannah Moore, "Happy Problem: Drive Electric NB's Rebate Program Was So Popular It Had to End Early," Conservation Council of New Brunswick, February 29, 2019, https://www.conservationcouncil.ca/en/happy-problem-drive-electric-nbs-rebate-program-was-so-popular-it-had-to-end-early/.
[189] Municipal Climate Change Action Centre, "Electric Vehicles for Municipalities Program," Municipal Climate Change Action Centre, 2020, https://mccac.ca/programs/electric-vehicles-for-municipalities-program/.
[190] 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/.

Electric vehicle registrations

Battery electric and plug-in electric hybrid vehicles registrations provide a quantitative indicator of personal transportation electrification. Last year, we scored cumulative BEV/PHEV registrations between 2010 to 2018, divided by the total by all light-duty vehicle registrations in 2018 using data from Statistics Canada.

This year, we scored BEV/PHEV registrations as a share of all passenger vehicle registrations, using only the most recent year (2019).[191] This provided a more dynamic annual accounting, and is also consistent with federal and provincial goals expressed as percentage of sales in a given year. We used the federal ZEV targets as a scoring benchmark. If a province is more than halfway towards the 2025 goal of 10% of new vehicles sold being BEV/PHEV, it received full points. As detailed in Table 66, we awarded full points if 5% of sales were BEV/PHEV, with decreasing points for reduced percentages.

Table 66. BEV/PHEV registrations scoring methodology

% of all passenger vehicle registrations that are BEV/PHEVs (>=)	Points
5%	4
2.5%	3
1%	2
0.5%	1

[191] Statistics Canada, “Vehicle Registrations, by Type of Vehicle,” Government of Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2010002101&pickMembers%5B0%5D=1.1&pickMembers%5B1%5D=3.1; Statistics Canada, “New Motor Vehicle Sales,” Statistics Canada, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=2010000101#timeframe.

Table 67. BEV/PHEV registrations scoring results				
Provinces	% of all passenger vehicle registrations that are BEV/PHEVs			Scoring (4 pts)
	2018	2019	*% points change*	
British Columbia	3.3	7.4	*+4.1*	4
Québec	2.7	5.6	*+1.9*	4
Ontario	2.0	1.0	*-1.0*	2
Prince Edward Island	0.3	0.8	*+0.5*	1
Alberta*	0.2	0.6	*+0.4*	1
Manitoba	0.3	0.5	*+0.2*	1
New Brunswick	0.3	0.4	*+0.1*	0
Saskatchewan	0.1	0.3	*+0.2*	0
Nova Scotia*	0.2	0.3	*+0.01*	0
Newfoundland and Labrador*	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.[192] We calculated the percentage of BEV/PHEVs using 2018 Q4 – 2019 Q3 sale numbers from the same Statistics Canada table as the other provinces.*

[192] Electric Mobility Canada, "Electric Vehicle Sales in Canada in 2018," February 2019, https://emc-mec.ca/wp-content/uploads/EMC-Sales-Report-Rapport-de-ventes-M%C3%89C-2018.pdf.

Canada-wide, in 2019 registrations of BEVs/PHEVs represented only 2.5% of total vehicle registrations. British Columbia and Québec are both more than halfway towards a trajectory that will meet the federal ZEV target. None of the other provinces are currently achieving half of the 2025 annual sales target. Most provinces increased their proportion of registrations, with the exception of Ontario and Newfoundland and Labrador.

Transport electrification infrastructure

Support for public 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 to potential buyers, second only to cost concerns.[193] Studies have shown that greater availability of public charging stations can reduce range anxiety, even though most owners prefer to charge their vehicles at home and that average daily driving habits suggest that range limitations are not an issue.[194] 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.[195]

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

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[193] 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.
[194] Jing Dong, Changzheng Liu, and Zhenhong Lin, "Charging Infrastructure Planning for Promoting Battery Electric Vehicles: An Activity-Based Approach Using Multiday Travel Data," *Transportation Research Part C: Emerging Technologies* 38 (January 1, 2014): 44–55, https://doi.org/10.1016/j.trc.2013.11.001.
[195] 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.

centres. According to Natural Resources Canada, the initiative supported deployment of 102 electric vehicle charging stations in Phase 1, and Phase 2 will target 900 more. The most recent (March 2020) information from Natural Resources Canada indicates that the federal government has selected 837 electric vehicle fast chargers for funding.[196]

We awarded half a point to provinces that support private charging stations in homes or workplaces, another 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 may have awarded 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 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.

[196] Natural Resources Canada, "Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative," Government of Canada, April 15, 2020, https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352.

Table 68. Support for public/private electric vehicle charging infrastructure				
Province	Support for private charging (0.5 pts)	Support for public charging (0.5 pts)	Prioritize level 3 charging (1pt)	Score (2 pts)
Québec	●	●	●	2
British Columbia	●	●	●	2
Newfoundland & Labrador		●	●	1.5
Ontario		●	●	1.5
Alberta		●	●	1.5
New Brunswick		●	●	1.5
Nova Scotia		◑	●	1.25
Prince Edward Island		◑	●	1.25
Manitoba	●			0.5
Saskatchewan				0

British Columbia supports both private and public charging infrastructure.[197] As noted in our 2019 scorecard, the province supported a separate program aimed at fleet

[197] Government of British Columbia, “DC Fast Charger Program,” 2018, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program/charging-infrastructure/dcfc-program; Government of British Columbia, “Clean Energy Vehicle Program,” 2017, https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/clean-transportation-policies-programs/clean-energy-vehicle-program.

managers, administered by the Fraser Basin Council, which offered up to $2,000 per Level 2 charging station.[198] Québec also supports both private and public charging installation, with a $600 rebate for residential charging installation and *Transportez Vert* financial assistance for the installation of DC fast charging to promote the electrification of fleets.[199]

BC Expands Charging Infrastructure to Include Trucks and Buses

A new addition this year, British Columbia has dedicated $12 million to continue the support for fuelling stations, home chargers, and incentives for larger, non-personal vehicles such as buses and trucks in the 2020 Budget.[183]

As we noted in last year's Scorecard, in 2018 the Province of New Brunswick partnered with NB Power to build a dozen Level 2 charging stations at provincial parks. In an effort to target range anxiety, the province also partnered with Natural Resources Canada in 2019 on a campaign to increase public awareness and knowledge about the availability of charging stations.[200]

Manitoba' Hydro's Home Energy Efficiency Loan program includes residential electric vehicle chargers; participants can finance up to $3,000 for a home charger through the program.[201] In its 2019 budget, Newfoundland and Labrador dedicated $2 million to pursue funding opportunities for charging infrastructure with the federal government and the private and not-for-profit sectors. The province opened bids for tender that same year, and the charging network is being installed in 2020.[202] Another new

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[198] "Fleet Infrastructure Incentive," Plug In BC, 2019, https://pluginbc.ca/incentives/fleet-infrastructure-incentive/.; British Columbia Ministry of Finance, "Budget and Fiscal Plan 2020/2021-2022/2023," February 18, 2020, https://www.bcbudget.gov.bc.ca/2020/pdf/2020_budget_and_fiscal_plan.pdf.
[199] Transition energetique Quebec, "Home Charging Station Rebate," Government of Quebec, 2020, https://vehiculeselectriques.gouv.qc.ca/english/rabais/domicile/programme-remboursement-borne-recharge-domicile.asp; Transition Énergétique Québec, "Transportez Vert," Transition Énergétique Québec, 2020, https://transitionenergetique.gouv.qc.ca/transport/programmes/transportez-vert.
[200] NB Power and Tourism, Heritage and Culture, "Electric Vehicle Charging Stations to Be Added to Provincial Parks," Government of New Brunswick, May 22, 2018, https://www2.gnb.ca/content/gnb/en/news/news_release.2018.05.0598.html.; NB Power, "E-Charge Network for Electric Vehicles Continues to Grow in New Brunswick," Government of New Brunswick, March 5, 2019, https://www2.gnb.ca/content/gnb/en/news/news_release.2019.03.0150.html.
[201] Manitoba Hydro, "Qualifying Upgrades," Manitoba Hydro, June 3, 2020, https://www.hydro.mb.ca/your_home/residential_loan/qualifying_upgrades/#top.
[202] Hon. Tom Osborne, Minister of Finance, "Budget 2019 – Working towards a Brighter Future," Government of Newfoundland and Labrador, April 16, 2019, https://www.releases.gov.nl.ca/releases/2019/fin/0416n07.aspx; Lindsay Bird, "Electric-Vehicle Charging Network Planned for N.L. in 2020," *CBC News*, October 26, 2019,

development in 2020 is the Ivy Network in Ontario, which will install 160 fast chargers across Ontario through a partnership between Ontario Power Generation and Hydro One.[203] Meanwhile, Alberta's Municipal Climate Change Action Centre will fund up to half of the cost of charging stations for municipalities, when applicants also apply for electric-vehicle purchase funding (as noted in the following Consumer Incentives section).[204]

As per our previous Scorecard, utility-run initiatives underway in other provinces have received some provincial or municipal support. These generally pertain to the building and/or management of a provincial charging network with industry or municipal partners. Examples include ATCO's Peaks to Prairies program in Alberta,[205] NB Power's eCharge Network,[206] and Hydro-Québec's charging network, *Le Circuit Électrique.*[207] In Nova Scotia[208] and Prince Edward Island, utility or government construction of public electric charging stations has largely proceeded with support from the federal government, with case-by-case provincial funding.[209] These two provinces therefore received partial points for their participation in federal programs.

At the time of writing, Saskatchewan did not have any active government or utility-run programs to support construction of either private or public charging stations.

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https://www.cbc.ca/news/canada/newfoundland-labrador/electric-vehicle-charging-network-newfoundland-1.5334972.

[203] Luke Sarabia, "Ivy Charging Network Officially Launches with Commitment to Roll out 160 Fast Chargers across Ontario by End of 2021," Electric Autonomy Canada, February 14, 2020, https://electricautonomy.ca/2020/02/14/ivy-charging-network-officially-launches-with-commitment-to-roll-out-160-fast-chargers-across-ontario-by-end-of-2021/.

[204] Municipal Climate Change Action Centre, "Electric Vehicles for Municipalities Program."

[205] "Peaks to Prairies Electric Vehicle Charging Station," accessed June 3, 2020, https://www.atco.com/en-ca/projects/peaks-to-prairies-electric-vehicle-charging-station.html.

[206] "Welcome - ECharge Network," NB Power, 2019, https://echargenetwork.com/.

[207] Hydro-Québec, "Le Circuit Électrique," Le Circuit électrique, 2019, https://lecircuitelectrique.com/.

[208] CBC News, "NS Power Says $1M for Electric Vehicle Chargers a 'Benefit to Nova Scotians,'" CBC News, March 6, 2018, https://www.cbc.ca/news/canada/nova-scotia/ns-power-says-1m-for-electric-vehicle-chargers-a-benefit-to-nova-scotians-1.4564164.

[209] Government of Prince Edward Island, "Canada Invests in PEI's First Level 3 Electric Vehicle Fast Chargers," Government of Prince Edward Island, March 11, 2019, https://www.princeedwardisland.ca/en/news/canada-invests-peis-first-level-3-electric-vehicle-fast-chargers.

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 stations with the extent of the provincial road network.[210] 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 in order 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.

We awarded a quarter point for each station per two hundred kilometres of publicly owned roads, up to a total of three points. This reflects the average range of most electric vehicles on the road in Canada, and an average desired number of chargers on major roads to give drivers range confidence.[211] (An analysis of U.S. charging corridors found that stations spaced about 70 miles, or 112 kilometres, apart was enough to give drivers confidence needed for long-range trips.[212]) The presence of DC fast-chargers is also important, particularly on roadside charging stations, because they can restore about an 80% charge on a vehicle in about thirty minutes.[213] We also awarded up to one point for any province with at least one fast charger per 200 kilometers of public road.

We obtained data on public charging stations from the Natural Resource Canada (NRCan) Electric Charging and Alternative Fuelling Stations Locator. The online database reveals all publicly accessible and currently available public charging stations across Canada.[214] Listings include both networked charging stations (those part of one

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[210] 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, 2020, https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410017601.
[211] The average electric vehicle has a range of 200 to 250 kms on a full charge, with some models able to drive more than 400 kms on one charge. CAA, "Electric Vehicles," CAA, 2020, https://www.caa.ca/electric-vehicles/faq-electric-vehicles/#:~:text=While%20range%20is%20affected%20by,driving%20on%20a%20single%20charge.
[212] Eric Wood et al., "National Plug-in Electric Vehicle Infrastructure Analysis." (U.S. Department of Energy, September 2017), https://www.nrel.gov/docs/fy17osti/69031.pdf.
[213] 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/.
[214] Natural Resources Canada, "Electric Charging and Alternative Fuelling Stations Locator," Government of Canada, 2019, https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation-and-alternative-fuels/electric-charging-alternative-fuelling-stationslocator-

of ten different charging networks),[215] 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.

The NRCan database is verified by an independent third-party, 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-reported, non-networked stations. We are nevertheless confident that the NRCan database provides a fair basis for comparison across the provinces.

map/20487#/analyze?country=CA&fuel=ELEC&ev_levels=1&ev_levels=2&ev_levels=dc_fast&status=E&status=P.

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

Table 69. Electric vehicle charging stations per 200 kilometres of public-owned roads				
Province	Charging stations	Stations / 200 kilometres	*Year-over-year change*	Score (3 pts)
Québec	2,367	11	*+ 1.4*	2.75
Prince Edward Island	34	6.5	*+ 1.7*	1.5
British Columbia	902	4.4	*+ 0.2*	1
Ontario	1,293	3.5	*+ 0.3*	0.75
New Brunswick	126	3	*+ 0.3*	0.75
Nova Scotia	85	1.8	*+ 0.2*	0.25
Newfoundland and Labrador	24	0.8	--	0
Alberta	210	0.6	--	0
Manitoba	43	0.4	--	0
Saskatchewan	44	0.3	*+0.1*	0

Table 70. Fast DC charging availability				
Province	Stations with DC fast charging	DC fast chargers per 200 kilometres of road	*Year-over-year change*	Score (1 pt)
Québec	284	1.3	*+ 0.4*	1
Prince Edward Island	7	1.3	-	1
New Brunswick	43	1	*+ 0.2*	1
Ontario	275	0.7	*+ 0.1*	0
British Columbia	145	0.7	*+ 0.2*	0
Nova Scotia	25	0.5	*+ 0.2*	0
Alberta	44	0.1	*+ 0.1*	0
Manitoba	13	0.1	*+ 0.1*	0
Saskatchewan	10	0.1	-	0
Newfoundland and Labrador	0	0	-	0

At 11 and 6.5 stations per two hundred kilometres of road, respectively, Québec and Prince Edward Island ranked highest on this metric. Ontario (3.5), British Columbia (4.4), New Brunswick (3), and Nova Scotia (1.8) followed. The remaining provinces had fewer than one station per two hundred kilometres of road.

In last year's scorecard, we scored provinces based on the share of stations that had DC fast chargers, awarding one point if the share exceeded 20%. Only New Brunswick and Nova Scotia exceeded that threshold. To improve consistency and comparability, this year we scored DC charging availability in-line with our method for evaluating all charging stations. All provinces reported increases in their number of DC fast chargers, except for Newfoundland and Labrador and Saskatchewan. These improvements are largely due to policy commitments by provincial and municipal governments that

recognize the importance of DC fast chargers along roadways and prioritize their development, as noted in the charging policies section above.[216]

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.

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 included in building codes, as well as different types of use at these parking lots (short term at a restaurant, longer at an office building, etc.).[217]

Municipalities in every province technically have the ability to include EV charging infrastructure requirements in their bylaws, unless the province explicitly forbids it (thought, 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, the provide municipalities with the certainty and support they need to make changes.[218]

Consequently, this year our information requests asked about the existence of explicit provisions for municipalities to make their own decisions. We awarded one point to

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[216] Luke Sarabia, "Canada's EV Networks Are Growing at Pace, but More Is Needed," Electric Autonomy Canada, March 2, 2020, https://electricautonomy.ca/2020/03/02/canadas-ev-charging-networks-2020/#/analyze?country=CA&fuel=ELEC&ev_levels=all&show_map=true.
[217] 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/.
[218] 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.

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 are able to write such bylaws, even if none have yet elected to do so.

Table 71. Electric vehicles in building codes and/or municipal bylaws		
Province	Explanation	Score (1pts)
British Columbia	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 as well.[198]	1
Québec	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.[219] It was also indicated that municipalities have the power to include BEV/PHEVs in their bylaws, and that two municipalities have done so for high-rise residential buildings – the City of Sainte-Rose and the City of Laval.	1
Ontario	In 2018 Ontario amended its building code to require new single- and multi-family homes to include supporting infrastructure for BEV/PHEV charging, effective January 1, 2018 — but the requirement was revoked in another amendment passed May 2, 2019.[220] Ontario government representatives indicated in our information request that municipalities have the power to include BEV/PHEVs in their bylaws, but are unaware of any that have done so.	0.5
Saskatchewan	Indicated that municipalities have the power to include BEV/PHEVs in their bylaws but are unaware of any that have done so.	0.5
Alberta	Indicated the City of Calgary has included BEV/PHEVs in its bylaws but did not explicitly state that all municipalities had this power, or if any others had acted this way.	0.5

[219] Government of Québec, "Building Act," B-1.1, r.2 Construction Code and Safety Code § 5.05 (2018), http://legisquebec.gouv.qc.ca/en/ShowDoc/cr/B-1.1,%20r.%202.
[220] Government of Ontario, "O. Reg. 88/19: BUILDING CODE," Amending O. Reg. 332/12 BUILDING CODE ACT, 1992 § (2019), 88, https://www.ontario.ca/laws/regulation/R19088.

Active transportation

In last year's Scorecard, we scored provinces based on the share of people who commuted to work using sustainable modes of transportation, based on a Statistics Canada analysis of 2016 Census of Canada data. As this information has not changed, we have chosen this year to score provinces on active transportation policies instead. Active transportation refers to forms of transportation where people physically power their own mobility through walking, biking, skateboarding, and other modes.[221] Such active transportation modes were one of several other forms of sustainable transportation we looked at in our 2019 scorecard. Cycling is one of the most efficient forms of transportation,[222] 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. [223]

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.[224] This helps to set 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 aimed at promoting active transportation. We awarded provinces a full two points for explicit active transportation policies/legislation and partial points for related policies that are not as explicit or all-encompassing. We awarded partial points to provinces that did not have provincial policies, but major municipalities had their own.

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[221] Public Health Agency of Canada, "Mobilizing Knowledge on Active Transportation," 2014, https://www.canada.ca/en/public-health/services/health-promotion/healthy-living/physical-activity/mobilizing-knowledge-on-active-transportation.html#legislation.
[222] 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.
[223] Billie Giles-Corti et al., "The Co-Benefits of Health for Investing in Active Transportation," *NSW Public Health Bulletin* 21, no. 5–6 (July 16, 2010): 122–27, https://doi.org/10.1071/NB10027.
[224] Public Health Agency of Canada, "Mobilizing Knowledge on Active Transportation."

Table 72. Active transportation policy		
Province	Policy description	Score (2pts)
British Columbia	British Columbia introduced an active transportation strategy in June 2019 that identifies priorities to fund infrastructure, promote active transportation, and make it safer and more accessible.[225]	2
Manitoba	Manitoba has an active transportation policy, which it works to achieve through other policies, such as education, active living, safety, environment, and infrastructure/community planning.[226]	2
New Brunswick	New Brunswick's From Surfaces to Services policy includes consideration for increasing active transportation, particularly through increased infrastructure for "walking, biking and wheeling," as well as awareness campaigns.[227]	2
Nova Scotia	Nova Scotia's Choose How You Move: Sustainable Transportation Strategy includes actions intended to increase active transportation, such as ensuring those commuting less than 2 km can do so using active modes through the *Connect2* funding program, a new funding program noted above in the Vehicle Consumer Incentives section. The strategy also includes an action to complete an active transportation policy and plan, but it has yet to be completed.[228]	2

[225] Province of British Columbia, "Move Commute Connect: BC's Active Transportation Strategy," June 2019, https://www2.gov.bc.ca/assets/gov/driving-and-transportation/funding-engagement-permits/grants-funding/cycling-infrastructure-funding/activetransportationstrategy_report_web.pdf.
[226] Manitoba, "Manitoba's Active Transportation Policy," Manitoba Indigenous and Municipal Relations, accessed June 10, 2020, https://www.gov.mb.ca/mr/at/policy.html.
[227] New Brunswick Economic and Social Inclusion Corporation, "From Surfaces to Services," December 2017, https://www2.gnb.ca/content/dam/gnb/Departments/esic/pdf/Transportation-Transport/FromSurfacesToServices.pdf.
[228] Government of Nova Scotia, "Choose How You Move: Sustainable Transportation Strategy," (Halifax, NS: Government of Nova Scotia, April 2013), https://novascotia.ca/sustainabletransportation/docs/Sustainable-Transportation-Strategy.pdf.

Prince Edward Island	Prince Edward Island is introducing an active transportation fund of $25 million over five years to support infrastructure for active transportation across the province, as a part of its Sustainable Transportation Action Plan.[229]	2
Québec	Québec introduced a Sustainable Mobility Policy in 2018 that will be in effect until 2030, and active transportation is an integral component. It outlines the government's role in increasing active transportation across the province through legislation that makes choosing these modes more accessible, such as increased safety and increased networks.[230]	2
Ontario	Ontario does not have an encompassing active transportation policy. However, it implemented the #CycleON Action Plan 2.0 in 2018 to increase cycling as a valid transportation alternative through community and infrastructure design and funding. The plan also involves working with municipalities to ensure they include active transportation in their official community plans.[231]	1
Alberta	No provincial policy. Edmonton, Calgary have active transportation policies/plans that are either standalone or incorporated into larger transportation plans.	0.5
Newfoundland & Labrador	No provincial policy. St John's has a master plan for cycling in the city.	0.5
Saskatchewan	No provincial policy; Regina and Saskatoon have active transportation policies/plans that are either standalone or incorporated into larger transportation plans.	0.5

[229] Province of Prince Edward Island, "Active Transportation Fund," June 15, 2020, https://www.princeedwardisland.ca/en/information/transportation-infrastructure-and-energy/active-transportation-fund.
[230] Québec Ministry of Transportation, "Transporting Québec Towards Modernity: Active Transportation Intervention Framework," 2018, https://www.transports.gouv.qc.ca/en/Documents/active-transportation-intervention-framework.pdf.
[231] Ontario Ministry of Transportation, "#CycleON Action Plan 2.0," 2018, http://www.mto.gov.on.ca/english/publications/ontario-cycling-strategy.shtml.

Provinces can also encourage active transportation through legislation, such as exempting bicycles from the provincial sales tax (British Columbia) or by mandating minimum distances between vehicles and bicycles (Nova Scotia).[232]

In most provinces, including those where there is no provincial active transportation policy, local governments have their own goals and policies for increasing active transportation. For example, Edmonton, Calgary, Saskatoon, and Regina all have active transportation policies/plans that standalone or are incorporated into larger transportation plans, and St John's has a master plan for cycling in the city.[233] These are just some of the municipalities that have implemented their own policies where the province has none, but many municipalities with existing provincial policies have their own municipal plans and policies as well.

Active Transportation and COVID-19

Active transportation is especially important to consider in light of public health measures implemented to combat the spread of COVID-19. With people being asked to stay home from work if they're able, many people are walking and biking as ways to get around, and to get out of their homes.

However, in many cities in Canada, the infrastructure is not in place for people to safely do this - whether it is safe bike paths, or space on sidewalks for people to physically distance the recommended two metres. Many municipalities have opted to expand sidewalks into roads to allow for physically distanced walking and shopping on main streets, and many cycling proponents have advocated for increased bike lanes and related infrastructure.

In August 2020, the Government of Canada adjusted its Investing in Canada Infrastructure Program to support a range of pandemic-resilient infrastructure projects – including active transportation initiatives. About $3.3 billion has been set aside for this purpose. Projects are eligible for up to 80% federal cost share for provinces, municipalities and not-for-profit organizations, or up to 100% for territorial or Indigenous projects.

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[232] Public Health Agency of Canada, "Mobilizing Knowledge on Active Transportation."
[233] City of Edmonton, "Active Transportation Policy," 2009, http://sirepub.edmonton.ca/sirepub/cache/2/ohb2bwcntdbaag4i5dryy0us/57519061120200239116 59.PDF ; City of Edmonton, "The Way We Move: Transportation Master Plan," 2009, https://www.edmonton.ca/city_government/documents/land_sales/TransportationMasterPlan.pdf; City of Calgary, "Calgary Transportation Plan," 2009, https://www.calgary.ca/transportation/tp/planning/calgary-transportation-plan/calgary-transportation-plan-(ctp).html; City of Saskatoon, "Active Transportation Plan Final Report," June 2018, https://www.saskatoon.ca/sites/default/files/documents/2016-06_atp_summary_report_final_08-26_submission_-_combined_rfs.pdf; City of Regina, "Transportation Master Plan," 2017, https://www.regina.ca/export/sites/Regina.ca/transportation-roads-parking/driving/.galleries/pdfs/Transportation-Master-Plan.pdf; City of St John's, "Bike St John's Master Plan," June 2019, https://www.engagestjohns.ca/bike-st-johns-master-plan.

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 as a whole since 1990.[234] While this sector (excluding oil and gas) has 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%.[235]

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,[236] forestry, and construction.

Potential efficiency savings vary across these subsectors. The greatest potential is in less energy-intensive manufacturing industries as well as pulp and paper (together these account for around two-thirds of cumulative savings by 2050), while the least is in cement, accounting for 2% of total savings.[237] 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 takes place in Québec.[238]

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[234] Natural Resources Canada, “Canada’s Secondary Energy Use (Final Demand) by Sector, End Use and Subsector.”
[235] International Energy Agency and Natural Resources Canada, “Energy Efficiency Potential in Canada to 2050.”
[236] Includes oil and gas production
[237] International Energy Agency and Natural Resources Canada, “Energy Efficiency Potential in Canada to 2050.”
[238] 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, which are broadly applicable across industry subsectors and provinces. For our 2020 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 73.

Table 73. Industry scoring summary

Province	Components of energy management (4 pts)	Energy management systems (3 pts)	Total (7 pts)
British Columbia	4	2	6
Québec	4	2	6
Manitoba	4	2	6
Nova Scotia	3.5	2.25	5.75
Alberta	3.5	2	5.5
Saskatchewan	3	2	5
Ontario	3.5	1.5	5
New Brunswick	3	0.5	3.5
Newfoundland and Labrador	1	0	1
Prince Edward Island	0.5	0	0.5

Components of energy management

All industrial sectors can implement facility and/or organization energy management. The approach consists of a number of 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 provide further description of 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. Provinces with programs to support the installation and use of an energy management information system (EMIS) receive one point.

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.[239] 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

[239] Office of Energy Efficiency, "Energy Management Information Systems," Natural Resources Canada, December 12, 2017, https://www.nrcan.gc.ca/energy/efficiency/energy-efficiency-industry/energy-management-industry/energy-management-information-systems/20403; James H. Hooke, David Hart, and Byron J. Landry, *Energy Management Information Systems: Achieving Improved Energy Efficiency: A Handbook for Managers, Engineers and Operational Staff* (Ottawa: Office of Energy Efficiency of Natural Resources Canada, 2004).

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.[240]

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.[241] We awarded provinces with support programs for energy audits a half point.

While a company typically conducts an energy audit for an entire facility, an energy efficiency feasibility study is another form of assessment that is carried out for a single system within the facility. A feasibility study ascertains the costs and benefits of making efficiency improvements to that system, and helps the business inform investment decisions.[242] 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 initiative. Having a dedicated, professional energy manager embedded in the organization is therefore an integral part of overall organizational energy management. An alternative

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[240] 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.
[241] 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.
[242] BC Hydro, "Energy Efficiency Feasibility Study," BC Hydro - Power Smart, 2019, https://www.bchydro.com/powersmart/business/programs/studies-audits/eefs.html.

strategy is to provide access to expert energy management consultants to program participants as needed. This could be a less comprehensive approach in large industry, or a relevant adaptation in small-medium industry.[243] We award a half point each for either strategy.

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, to ensure they have the knowledge and resources to support management's plans. We awarded a half point to provinces with industrial efficiency programs that supported such training and education initiatives within an organization, whether or not they were tied to a larger energy management incentive program.

[243] 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.

Table 74. Support for energy management								
Province	Tracking, monitoring, and benchmarking		Assessment		Management		Capacity-building	Total (4 pts)
	Benchmarking (0.5pts)	EMIS (1 pt)	Energy audits (0.5pts)	Feasibility studies (0.5pts)	Embedded energy managers (0.5pts)	Provision of expert consultation (0.5pts)	Workforce training and awareness (0.5pts)	
British Columbia	●	●	●	●	●	●	●	4
Manitoba	●	●	●	●	●	●	●	4
Québec	●	●	●	●	●	●	●	4
Alberta	-	●	●	●	●	●	●	3.5
Nova Scotia	-	●	●	●	●	●	●	3.5
Ontario	-	●	●	●	●	●	●	3.5
New Brunswick	-	●	●	●	-	●	●	3
Saskatchewan	-	●	●	●	-	●	●	3
Newfoundland and Labrador	-	-	●	●	-	-	-	1
Prince Edward Island*	○	○	○	○	○	○	-	0.5

** Partial points awarded for planned program activities*

Energy management systems (EnMS)

An energy management system (EnMS) combines assessment, management, measurement and verification, and capacity-building into a comprehensive plan or strategy for energy management. 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.[244]

An EnMS requires an organization to:[245]

- 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; and
- 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 with this explicit aim, 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

[244] Office of Energy Efficiency, "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.
[245] Office of Energy Efficiency.

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 management.[246] 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.[247] Under SEP 50001, three optional tiers — Silver, Gold, and Platinum—recognize elevated savings performance above the requirements of the ISO standard.[248]

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

We based this approach upon the results of our internal research of industrial energy efficiency programs that we undertook for our 2019 Scorecard. We included outcome-oriented metrics to develop an indicator of progress toward the Generation Energy Council's target that 75% of industrial energy should be under an EnMS by 2030.

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[246] Office of Energy Efficiency, 50001; "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.
[247] U.S. Department of Energy, "ISO 50001," Better Buildings Initiative, 2019, 50001, https://betterbuildingssolutioncenter.energy.gov/iso-50001.
[248] U.S. Department of Energy, "SEP 50001 Silver, Gold & Platinum," Better Buildings Initiative, 2019, https://betterbuildingssolutioncenter.energy.gov/iso-50001/sep-50001/silver-gold-platinum.

We scored EnMS 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 toward a comprehensive EnMS, including all of 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);[249]
    - 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 (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 75 and offer a discussion of our findings including program outcomes. 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. Due to data limitations, we provide both for illustrative purposes only.

[249] 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 75. EnMS program results						
Province	Program(s) description	EnMS Support (1 pt)	Informed by standard (0.5 pts)	Certification		Total (3 pts)
				Required (1.5 pts)	Additional support (0.5 pts)	
Nova Scotia	Efficiency Nova Scotia reported two industrial energy management programs: The Strategic Energy Management (SEM) program. and the Energy Management Information Systems (EMIS) program. The SEM program is designed to work with industrial customers to build an EnMS in their facilities and 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 pts for SEP-50001)	-	•	2.25

Alberta	Energy Efficiency Alberta reported four industrial programs associated with energy management, all part of the broader Custom Energy Solutions portfolio: Industrial, On-site Energy Manager, Strategic Energy Management (SEM) for general industrial and for large-final emitters (SEM-LFE), and the Methane Emissions Reduction program. 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

British Columbia	BC Hydro reported two energy management-related programs under its broader Strategic Energy Management - Industrial portfolio: an Energy Manager program (with a subcomponent for Energy Monitoring and Targeting), and the Strategic Energy Management (SEM) cohort program, which provides a performance incentive based on verified savings. BC Hydro aligns guidance to ISO 50001 where appropriate, and other national modelling / M&V protocols for the SEM cohort program. Customers are encouraged to also utilize government funding/co-funding, where available, and are permitted to use other BC Hydro offers to compliment SEM incentives and support. FortisBC offers SEM program offers for both large- and medium-sized customers. The SEM program has two streams: A cohort stream focusing on medium industrial customers that do not have a dedicated energy manager, and an industrial energy manager stream focusing on larger industrial customers that do have that capacity in-house. Outside the FortisBC electric service territory, the program is offered in parallel to the existing BC Hydro SEM program, as an additive offer. The Province of British Columbia offers an ISO 50001 Implementation Incentive by stacking its incentives with those provided by with Natural Resources Canada. As a	•	•	-	•	2

	result, support is provided for 75% of project costs to develop an EnMS according to ISO-50001 principles.					
Manitoba	Efficiency Manitoba reported a portfolio of five existing programs offered either by, or jointly with, Manitoba Hydro, including support for ENERGY STAR® Portfolio Manager; provision of EnerTrend (an energy profiling/benchmarking tool); support for energy efficiency screening studies; an Energy Management Engineering Service program to help participants compare their own facilities with other industrial facilities and develop an energy management plan; and an Industrial Energy Management program, which also helped participants to develop an energy management plan. Efficiency Manitoba's 2020-2023 DSM plan indicates a new Strategic Energy Management cohort program and Energy Manager Initiative are planned, though these did not appear to be operating prior to June 2020.	●	●	-	●	2

Québec	Énegir reported that it has the Energy Management System (*Système de gestion de l'énergie*). 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, and funding for different stages of the process, such as developing an EMIS. Both Énegir and Hydro Québec's programs are similar in that they provide funding to allow companies to deploy an energy management system for natural gas and electricity. Transition énergétique Québec (TEQ) offers the *Ecoperformance* energy Management program, which again provides funding for different stages of an EnMS, such as conducting an energy audit, hiring an energy manager, and providing training on ISO-50001. The TEQ Master Plan includes an objective to provide additional financial incentives to program participants that have 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.	•	•	-	•	2

Saskatchewan	SaskPower provides the Industrial Energy Optimization Program with separate tracks for capital investment and energy management. The energy management track supports projects that will lead to an EMIS and an EnMS, including the planning and implementation of ISO-50001. The energy management track consists of three phases: Identification, development, and implementation, with the company able to move onto the next phase only when the previous is complete.	●	●	-	●	2
Ontario	Enbridge Gas offers a Comprehensive Energy Management (CEM) program, and a Strategic Energy Management (SEM) program. These programs are intended to influence industrial and commercial customers to develop a culture of conservation and continuous improvement. Enbridge Gas works with participants to examine energy use, establish an energy model, and to guide customers to undertake actions suitable to their operation. The IESO offers the Save on Energy - Energy Manager Program, which provides annual funding for hiring an energy manager at an industrial, commercial or institutional facility (pay based on performance), with the goal of encouraging energy managers to embrace the principles of energy management, including EnMS, or at least components of an EnMS. The Custom track for the Retrofit program provides incentives for building automation systems (including EMIS), based on baseline electricity demand of the program participant.	●	-	-	●	1.5

	NB Power reported an Industrial Energy Efficiency Program – EMIS track, which aligns with the SEP-50001 certification, for measurement and verification purposes, but is not based specifically on this certification, and is not a comprehensive EnMS program.					
New Brunswick	There are a number of phases, including audit, design, implementation, and optimization of an EMIS that participants can receive incentives for completing, NB Power noted that the participant does not have to complete every phase to receive an incentive. Subsidized capacity building is also offered for industrial participants.	-	○	-	-	0.5
Newfoundland and Labrador	Newfoundland and Labrador does not have a comprehensive industrial energy management program, but reported that they have the takeCHARGE program, which offers rebates for energy audits and feasibility studies to commercial facilities.	-	-	-	-	0
Prince Edward Island	EfficiencyPEI launched a Small Businesses Energy Solutions program and a Custom Energy Solutions program in August 2020, just outside of the time period considered in this report.	-	-	-	-	0

Findings and outcomes

Provincial governments and utilities have yet to create comprehensive and effective energy management systems. Support for energy management is often piece-meal, comprising multiple separate programs under a larger portfolio, with few efforts to leverage participation toward the development and implementation of comprehensive energy management systems. In fact, we struggled to clearly distinguish support for energy management (i.e., the components reviewed in the preceding section) from support for energy management systems. We noted this same challenge in our 2019 Scorecard.

As in our previous Scorecard, only Alberta, British Columbia, Nova Scotia, Québec, and Saskatchewan reported programs that would ultimately yield a full-fledged EnMS. None of these programs require certification, though all five provinces reported that they would provide additional support to a participant choosing to pursue certification. Notably, Energy Efficiency Alberta's SEM-LFE program enabled participants to achieve "ISO-50001 Ready" status, which is a detail we did not capture in last year's report. SaskPower's Industrial Energy Optimization program – which we highlighted last year for its effective design, reduction of program complexity, and features to leverage greater participation – retains these features. However, unlike BC Hydro's SEM Cohort program, the energy management track of SaskPower's program does not base incentives on verified savings.

Yet, even with these programs, it is not always clear if the result is intended to be the implementation of a comprehensive EnMS in a program participant's organization or facility, or the development of the knowledge, monitoring abilities, and personnel capacity to implement one. Responses to our request for certifications achieved through program activities suggests that provinces and utilities could be doing considerably more to track and verify the results of such initiatives. As noted above, 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 and total potential participants. The results were not consistent enough to merit scoring, though we present a summary of this information in Table 76 for illustrative purposes.

Table 76. EnMS program participation and certification				
Program administrator	Program name	Participant level	Total participants (cumulative)	Total potential participants
Energy Efficiency Alberta	SEM	Facilities (of same organization)	14	-
	SEM-LFE	Facility	58	-
	On-site Energy Manager	Facilities (of same organization)	20	-
BC Hydro	Industrial energy manager	Customer	50	72
	SEM Cohort	Customer	53	276
Province of British Columbia	BC-NRCAN ISO-50001 Implementation Initiative	Premise	9	-
Manitoba Hydro	Energy Management Engineering Service	Customer	60	-
	Industrial energy management	Customer	1188	-
NB Power	EMIS	Customer	2	40
Efficiency Nova Scotia	Strategic Energy Management	Customer	19	40-50
	EMIS	Customer	5	40-50

Enbridge Gas	Comprehensive Energy Management Program	Account	17	976
	Strategic Energy Management	Account	6	-
IESO	Energy Manager Program	Customer	260	-
Hydro-Québec		Premise	25	385
TEQ	Management de l'énergie	Premise	66	59
SaskPower	Industrial Energy Optimization Program	Customer	52	150

These figures are not directly comparable across provinces. Most administrators used customer numbers to detail participation, though Energy Efficiency Alberta, Hydro Québec and TEQ offered programs at the premise/facility level, and Enbridge offered its at the account level. SaskPower noted that, though participation is by customers, participants can apply for incentives within the program for various projects. Energy Efficiency Alberta noted that none of its programs had been operating for long enough to have resulted in any certifications. Manitoba Hydro's participation numbers reflect the longest standing programs, as well as the broadest applicability (the ENERGY STAR® Portfolio Manager program had 3,500 participants alone, including commercial and institutional participants). Of the five programs listed, the utility has offered the one most closely associated with an EnMS (the Industrial Energy Management program) since 1993; it has had 1,188 participants.

As indicated by these findings, most program participants do not pursue EnMS certification, provincial program administrators do not thoroughly track them, or

inadequate time has elapsed to have resulted in certification, as is the case in Alberta. We note that Natural Resources Canada provides an alphabetical list of ISO-50001 certified organizations, containing 16 organizations with 161 facilities/buildings combined, so EnMS are being deployed across the country (this includes commercial/institutional facilities such as Hilton Hotels and Resorts, however, which alone accounts for 125 facilities).[250] Also, Natural Resources Canada provides cost-shared financial assistance organizations to develop and implement ISO-50001 energy management systems in their facilities, as noted in the box above.

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). At the same time, considering the challenges in distinguishing between support for the components of energy management and the implementation of a full EnMS, and without further certification, it is also difficult to ascertain how representative it is of industrial facilities with an EnMS in place that are a result of program activities. At the very least, the data should be considered as representing industrial facilities and/or organizations that are generally familiar with the principles of energy management and that have some components of an EnMS in place, but which may or may not have a full, comprehensive system up and running.

British Columbia – Natural Resources Canada ISO-50001 Implementation Incentive

In partnership with Natural Resources Canada, the British Columbia Ministry of Energy, Mines, and Petroleum Resources funds up to 75% of the costs associated with developing a facility-based energy management system. Offers top out at $80,000 and are a part of BC's Innovative Clean Energy Fund.

Funding can cover several components that align with the ISO-50001 Energy Management System Standards, such as development of an energy baseline, energy use assessment, professional training, employee salaries for work related to energy management, and more.

British Columbia is the only province with a formal agreement with Natural Resources Canada to stack federal energy management funding with provincial programs. Applicants from British Columbia need only apply once (through either the B.C. or the federal website), and the joint funding is managed by Natural Resources Canada.

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

This is likely true of both certification rates among program participants and reported energy consumption of program participants with an operating EnMS. Neither Manitoba nor Saskatchewan provided figures here, and Alberta and the IESO in Ontario were only able to report energy savings as a result of their respective industrial programs. As with participation numbers, there may also be double counting across separate programs. Consequently, we present this data for illustrative purposes only and do not use it for scoring.

Table 77. Industry energy consumption with EnMS

	Reported energy consumption under EnMS	Total industrial demand, all fuels (excl. oil and gas sector)	Share of industrial demand with an EnMS in place
Alberta	-	502.2	-
British Columbia	28.82	396.4	7.3%
Manitoba	-	120.8	-
New Brunswick	0.01	65.4	0.2%
Newfoundland and Labrador	-	50.5	-
Nova Scotia	0.89	38.7	2.3%
Ontario	0.08 (Enbridge only)	1216.7	0.0%
Prince Edward Island	-	3.6	-
Québec	9.04	1003.5	0.9%
Saskatchewan	-	118.1	-

The overall picture this section presents is that most provinces have many of the components to support industrial energy management, however few actually require certification. This is perhaps not surprising, given that measurable energy savings (consistent with “resource acquisition”) is the primary performance objective of ratepayer funded programs. Evidently no utility regulator, nor provincial government, has made EnMS certification a performance objective of program administrators.

Energy Management System certification is an explicit objective of the Generation Energy Council Report (75% of industrial energy use benefiting from energy management systems by 2030), which the federal Natural Resources Minister has a mandate to implement.[251] EnMS certification is associated with longer term market transformation objectives because it supports continuous improvement and quality assessment over the long-term.

While provincial utilities and program administrators may have the means to encourage EnMS certification, the drive to do so rests at the federal level. While we now see some provincial-federal programs, and the federal government covering 50% of the cost of certification, the federal government likely needs to provide greater emphasis on certification to leverage provincial program administrators and industry themselves to help meet the 75% coverage goal. It is also important for the federal government to establish a baseline and measure progress towards this goal. Our experience in attempting to collect data from this year’s scorecard suggests a facility-specific data collection method is needed.

[251] “Mandate Letters,” Prime Minister of Canada, 2020, https://pm.gc.ca/en/mandate-letters.

Conclusions

Provincial highlights

With this Scorecard, we aim to reveal each province's energy efficiency strengths and opportunities for improvement. Opportunities for improvement are not always areas in which a province received a low score – they may also be areas in which the province is poised to take advantage of existing strengths to further improve energy efficiency. In this concluding chapter, we provide a brief discuss each province's energy efficiency policy context and changes since our previous report and highlight province-specific strengths and opportunities for improvement. Reading these highlights across all provinces will also help to foster best practice sharing and learning across provincial borders.

Alberta

Alberta ranked 6th in last year's Scorecard, supported by impressive savings achieved by Energy Efficiency Alberta's initial programs. This year, however, Alberta's energy efficiency sector experienced significant disruption, leading the province to drop two spots in our rankings (from 6th to 8th place) and receive the largest point reduction (from 30 to 24).

A new government significantly reduced Energy Efficiency Alberta's programs in October 2019 and announced the shutdown of the agency in June 2020. The ramp-down in programs that create jobs and save Albertans money is apparent in this year's results. For instance, Alberta went from electricity programs saving 0.8% of sales in 2017 to 0.06% in 2019 (the lowest in the country). The province cancelled its carbon levy that funded these programs, which placed the province under the federal carbon pricing backstop for non-industrial emissions. Albertans still pay for carbon pollution – but now they lack the benefit of provincial programs that help them save energy. The results of these program disruptions are likely to be reflected in future scorecards.

Local governments such as Edmonton continue to take action to improve energy efficiency and reduce emissions. Emissions Reduction Alberta and the Municipal Climate Change Action Centre are province-wide organizations that will administer what is left of the province's energy efficiency programs, albeit with different overall

objectives. In the future, Alberta can expand energy efficiency efforts through these organizations. Alberta could also follow other provinces and states by recognizing energy efficiency as a resource in the province's electricity and natural gas systems.

Strengths

- **Municipal financing**: Alberta is one of four provinces with legislation that enables improvement charges or Property Assessed Clean Energy (PACE) financing programs, which enable energy efficiency upgrades through the property tax system. This gives Alberta's local governments an advantage in developing their climate and efficiency plans, and allows them to apply for federal support through the Federation of Canadian Municipalities "Community Efficiency Financing (CEF)" initiative.[252] The Municipal Climate Change Action Centre will take over the administration of Energy Efficiency Alberta's Clean Energy Improvement Program that administers PACE financing on behalf of municipalities.

Areas for improvement

- **Program savings**: Despite the significant early achievements of Energy Efficiency Alberta, the current government scrapped the provincial agency. The disruption to programs began before the formal dissolution of the organization; in 2019, Alberta had the second-lowest per capita spending on efficiency programs, ranked the lowest in electricity savings benchmarks, and third lowest in natural gas and other fuel savings benchmarks. The province also has no energy efficiency targets.

  Yet, our indicators show that the province maintains delivery capacity. Numbers of residential energy advisors remained unchanged, and the province's complement of Certified Energy Managers increased. However, without a new energy efficiency strategy, this expertise could be lost quickly.

British Columbia

For the second year, British Columbia receives the top rank in the Scorecard. The BC Energy Step Code, which provides a clear pathway to net-zero energy-ready new buildings, remains a Canadian best practice and provides the template for the

[252] "Community Efficiency Financing."

anticipated tiered model national building codes that will soon be available for all provinces to adopt. The province is also supporting market transformation and lower emissions through code compliance initiatives, utility support for codes and standards development, and plans to adopt an energy standard for existing building retrofits by 2024. The province is leading in provincial electric vehicle registrations and encouraging low-carbon electrification.

The recent delays and cost overruns of the Site C hydroelectric project signals that increased investments in electricity savings could be a lower risk alternative to large megaprojects. Long-term electricity systems resource needs will be considered in 2021 through an updated Integrated Resource Plan. Recent changes to the Utilities Commission Act require BC Hydro to file a long-term Integrated Resource Plan with the B.C. Utilities Commission. Luckily, the Integrated Resource Plan is required to include a long-term plan for demand-side management, and to explain why any new infrastructure or energy purchases are not being replaced by cost-effective demand-side management.[253] The CleanBC plan noted increased electricity demands required to electrify heating, transportation, and industry, which presents an opportunity to demonstrate the strategic role energy efficiency can play in freeing up the province's existing supply of renewable electricity to reduce GHG emissions.

British Columbia can solidify its leading position in future scorecards by following the policy-development model exemplified by the BC Energy Step Code.[254] This includes setting ambitious long-term goals; inviting shared leadership between government, utilities, and industry to promote market transformation; and enabling municipalities to implement PACE financing. The processes and skills already developed prepare British Columbia to move forward in areas such as municipal financing and building energy rating and disclosure.

Strengths

- **Building code compliance and support**: Through the BC Energy Step Code process, the province developed strategies and policy tools to ensure compliance with more advanced building codes – including training, building energy manager coaches, and

[253] BC Hydro was originally exempt from Sect 44.1(2)(f) of the Utilities Commission Act, but Bill 19-2019 removed this exemption. See Mungall, Energy Statutes Amendment Act, 2019.
[254] James Glave and Robyn Wark, "Lessons from the BC Energy Step Code," June 2019, https://energystepcode.ca/publications/.

stakeholder peer learning networks.[255] British Columbia utilities have the highest concentration of spending on supporting codes and standards in their program portfolios, enabled by minimum spending requirements.

- **Transportation electrification:** British Columbia is one of two provinces with a zero-emission vehicle mandate and in 2019 led the country in electric vehicle registrations. The City of Vancouver is also one of the few Canadian local governments to incorporate BEV/PHEV charging requirements into its building bylaws.
- **Efficient & low-carbon heating**: British Columbia is one of the few provinces to report significant fossil fuel savings from heating electrification. These savings result from government-funded low-carbon electrification programs that couple high-efficiency heating equipment with building-envelope improvements. BC Hydro, FortisBC, and the BC Ministry of Municipal Affairs and Housing administer these programs and support research and enabling standards. The province is also one of the most active supporters of a federal roadmap for heating system market transformation.

  In addition, Fortis BC has committed to reducing emissions by 30% by 2030, and received regulatory approval for a Clean Growth Innovation Fund that will explore innovations in renewable natural gas, carbon and methane capture, coupled with energy efficiency. The utility also leads the country in spending on natural gas efficiency programs as a percentage of domestic sales revenues.

  At the local government level, the City of Vancouver introduced carbon pollution caps for new larger residential buildings taking effect in 2021, and zero emission space and water heating requirements for new low-rise residential buildings, starting in 2022.[256]

Areas for improvement

- **Financing**: Given British Columbia's history of local-government climate leadership, it makes sense for the province to enable financing energy efficiency upgrades through the property tax system via Property Assessed Clean Energy (PACE) programs.[257] The

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[255] Andrew Pride, *Tiered Energy Codes Best Practices for Code Compliance*, DiscoverEE (Efficiency Canada, 2020), https://www.efficiencycanada.org/discoveree-tiered-energy-codes-best-practices-for-code-compliance/.
[256] City of Vancouver, Report from General Manager of Planning, Urban Design and Sustainability to Standing Committee on Policy and Strategic Priorities re: Climate Emergency Requirements for New Housing 3-Storeys and Under, March 10, 2020, available at https://council.vancouver.ca/20200429/documents/pspc3.pdf
[257] PACECanada, "PACE: A Transformational Climate Solution," PACE BC, 2020, https://www.pacebc.ca/.

provinces of Alberta, Ontario, Nova Scotia, and Saskatchewan have already implemented enabling legislation, and the Federation of Canadian Municipalities supports it via its "Community Efficiency Financing (CEF)" initiative. The Union of BC Municipalities also called on the provincial government to develop PACE enabling legislation.[258] The BC Economic Recovery Plan, released in September, includes $2 million for a PACE Roadmap and Pilot Program — a promising sign.

- **Building energy ratings**: The province can leverage the energy modeling and workforce capabilities developed through the BC Energy Step Code to implement a mandatory building energy rating program. Energy ratings will inform consumers, help create a market for energy retrofits, and show the true value of properties.
- **Long-term resource planning and targets:** In 2021, BC Hydro will complete its first Integrated Resource Plan (IRP) since 2013. The province's existing legislated electricity energy efficiency savings target also expires in 2020. An IRP is a long-term plan that considers how to meet future energy demands through a combination of energy efficiency/demand side strategies and electricity generation.

  The province can ensure the IRP contributes to CleanBC objectives by requiring BC Hydro to invest in all energy demand reductions that are lower cost and lower risk than electricity generation. It should consider the implications of increased electrification of transportation, building heat and hot water, and industry to lower economy-wide emissions, and recognize how electricity savings free up resources to electrify these sectors while avoiding high cost and high-risk generation projects. Long-term planning for a low-carbon economy could justify a ramp-up of electricity savings and an end to the current "moderation approach", which places BC electricity savings below Nova Scotia, PEI, and Ontario – and far below leading American states.

Manitoba

In April 2020, the province formally transferred administration of energy efficiency programs from Manitoba Hydro to Efficiency Manitoba, a new crown corporation. Following a Public Utilities Board review, the province approved the new organization's

[258] Union of BC Municipalities, "Resolution B140: Support for Property Assessed Clean Energy Legislation in BC" (Union of BC Municipalities, 2019), 140, https://www.ubcm.ca/assets/Resolutions~and~Policy/Resolutions/2019%20UBCM%20Resolutions%20Disposition.pdf.

first three-year plan prior to its legislated commencement date. Efficiency Manitoba builds on a 30-year history of energy efficiency programs in the province.

Since our previous Scorecard, Manitoba Hydro has introduced a program to support residential electric-vehicle charger installations.[259] We also noted a slight increase in the overall number of public charging stations. That said, the province has significant room to catch up to other hydro-rich provinces in more efficient and low-carbon transportation.

Strengths

- **Long-term targets**: The Efficiency Manitoba Act mandates annual savings equal to 1.5% of prior year sales for electricity, and 0.75% of prior year sales for natural gas – leading to efficiency contributing to 22.5% of electricity and 11.25% of natural gas savings over 15 years. Efficiency Manitoba's three-year plan provides the stability needed to meet these targets by adjusting strategies and maintaining relationships with delivery partners.

  However, other provinces have higher annual targets for programs savings (Nova Scotia and Prince Edward Island for electricity, and Nova Scotia and Québec for natural gas and other fuels). Leading American states are achieving annual electricity savings in the 2-3% range. Thus, we view Manitoba's long-term targets as minimums, and underscore the importance of strong program savings that use codes and standards to enable longer-term market transformation.

Areas for improvement

- **Building energy codes:** Manitoba has a long history of supporting codes and standards, and was one of the first jurisdictions to adopt efficiency requirements for large buildings (in 2013) and low-rise housing (in 2015).[260] But despite this early leadership, all other provinces that have adopted an energy code for large buildings have since moved to more advanced versions of the National Energy Code for Buildings (NECB). Manitoba can regain its leadership position by adopting the 2020 version of the model building codes — now in their final stages of development — and commit to moving up the tiers towards net-zero energy-ready buildings. Efficiency Manitoba is well placed to facilitate

[259] Manitoba Hydro, "Qualifying Upgrades."
[260] Conservation and Climate, "Energy Efficiency," Government of Manitoba, 2020, https://www.gov.mb.ca/sd/environment_and_biodiversity/energy/green_bldg.html.

code adoption and enforcement, given its mandate to make a "material contribution" to codes and standards development.

- **Transportation electrification:** Manitoba's potential hydroelectric surplus highlights its opportunity to use renewable energy in the service of a more efficient and lower emission transportation system. Other hydro-rich provinces, namely British Columbia and Québec, lead in transportation electrification, yet Manitoba lags in BEV/PHEV registrations and has the second-lowest number of charging stations per road kilometer.

New Brunswick

Since our previous Scorecard, New Brunswick has grown its energy savings and energy efficiency industry capacity. Its 2019 per capita spending and electricity savings both increased when compared with 2018. The province also has 15 new existing and new home energy advisors, and eight new Certified Energy Managers.

Despite this increase in program-delivery capability, New Brunswick is reducing its energy savings targets. It has moved annual electricity savings targets of 0.8% of sales to 0.6%, and the target only exists for one year. Further, the province has reduced its electricity savings plans to a level below that recommended by its 2017 Integrated Resource Plan.[261] New Brunswick completed an efficiency potential study at the end of 2019. An updated IRP, expected in 2020, will likely to demonstrate the benefit of electricity savings in the province's energy future.

New Brunswick has also made progress on the adoption of a building energy code, a key recommendation in last year's scorecard. In March 2020, government passed the *Building Code Administration Act*, which gives cabinet the authority to adopt the national energy code for buildings. The government aims to have a new building code in place across the province for the 2021 construction season.[262]

Strengths

- **Electric vehicle fast charging:** New Brunswick has one DC fast charging outlet for every 200 kilometers of road in the province (slightly behind Québec and Prince Edward

[261] NB Power, "NB Power's 10-Year Plan: Fiscal Years 2021-2030," September 2019, 11, https://www.nbpower.com/media/1489656/10-year-plan-2021-to-2030.pdf.
[262] Government of New Brunswick, "Act Introduced to Standardize Building Codes," Government of New Brunswick, March 11, 2020, https://www2.gnb.ca/content/gnb/en/departments/public-safety/news/news_release.2020.03.0106.html.

Island). The province's charging network supports an increase in the number of electric vehicles through complementary policies, such as an incentive for fleet electrification and a zero-emission vehicle mandate.

- **Training and professionalization:** The province's increases in energy advisor and manager certifications placed it second behind Nova Scotia in training and professionalization benchmarking and demonstrates strong capacity for the delivery of energy efficiency improvements.

Areas for improvement

- **Low-to-moderate income programs**: New Brunswick currently provides about $2 million a year to support a low-income energy efficiency program through the provincial government and the federal low-carbon economy fund. This level of spending is equal to $18 per household in energy poverty, while Nova Scotia is spending $121 and PEI spends $215.
- **Building energy code:** New Brunswick has created enabling legislation and made plans to adopt a province-wide building energy code. A response to our information request revealed an intention to adopt the 2015 versions of the model codes. Yet, a 2020 version will be released soon that will provide a path towards net-zero energy-ready buildings by 2030. By adopting the most advanced building code available, New Brunswick can increase economic and environmental benefits, while fostering greater harmonization with neighbouring provinces.

Newfoundland and Labrador

Newfoundland and Labrador faces significant energy system challenges with cost overruns from the Muskrat Falls project and low oil prices affecting a significant export sector. Strategic demand-side strategies can help the province create jobs, manage energy costs, and lower GHG emissions. A detailed analysis for the province's Board of Commissioners of Public Utilities showed electrification of heat and transportation to be the "highest value (bill) mitigation opportunity" because it reduces energy bills across all fuels by reducing oil expenditures, and takes advantage of technological improvements in electric vehicles and cold-climate heat pumps.[263] As the province

[263] Synapse Energy Economics, "Phase 2 Report on Muskrat Falls Project Rate Mitigation," (Cambridge, MA: Board of Public Commissioners of Public Utilities, Province of Newfoundland and Labrador, September 3, 2019), http://www.pub.nf.ca/2018ratemitigation/report/Synapse%20Energy%20Economics%20Inc.%20-%20Phase%20Two%20Report%20-%20September%203,%202019.pdf.

increases electrification, energy efficiency can reduce bills for those most in need and avoid high-cost peak demand periods.

This year's Scorecard records modest increases in program savings, program spending, savings targets, research funding, and new-home energy advisors. The province is pursuing a partnership with the Nunatsiavut Inuit regional government and has demonstrated plans to adopt an updated building code, its utilities are researching heat pumps, and St. John's has adopted a new cycling master plan. These activities have moved the province up one spot in our rankings, earning just enough points to place the province ahead of Saskatchewan.

Strengths

- **Transportation and heating electrification:** Newfoundland and Labrador has moved forward with plans to promote electrification to manage the Muskrat Falls hydroelectric surplus and cost overruns. This includes a roll-out of an electric vehicle charging network in 2020, supported in the province's 2019 budget and by the federal government.[264] It is directing monies from the federal low-carbon economy fund towards fuel switching in public buildings.[265] Federal government financial assistance to manage Muskrat Falls also mentioned that Ottawa would continue to work with the province on "electrification and decarbonization." [266] Unfortunately, the latest data we could gather on fuel savings and electric vehicle charging does not yet reflect the outcomes of these efforts, but we anticipate future scorecards will pick up their influence as data becomes available.

[264] Katie Ingram, "Federal NRCan Funding Paves the Way for Newfoundland EV Fast-Charging Network," *Electric Autonomy Canada* (blog), July 15, 2020, https://electricautonomy.ca/2020/07/15/newfoundland-ev-charging-network/.
[265] Municipal Affairs and Environment, Climate Change Branch, "Premier Ball Announces $40 Million for Low Carbon Economy Programs," Government of Newfoundland and Labrador, March 15, 2019, https://www.gov.nl.ca/releases/2019/exec/0315n01/.
[266] Finance Minister Bill Monreau to Premier Dwight Ball, February 10, 2020.

Areas for improvement

Financing: Newfoundland and Labrador's Energy Efficiency Loan Program ends in 2020. The province can follow Nova Scotia, Ontario, Alberta and Saskatchewan by enabling Property Assessed Clean Energy (PACE) programs, which allow local governments to finance energy upgrades through the property tax system. This method ties repayment to the property itself, rather than an individual homeowner. This strategy offers a solution to concerns by the provincial Consumer Advocate that repayment periods for heat pumps are too long for seniors.[267] Enabling PACE also gives provincial municipalities a new tool to apply for funding from the Federation of Canadian Municipalities Community Efficiency Financing (CEF) initiative.[268] For example, the St. John's retrofit plan.[269]

- **Energy poverty programs**: Census data shows that 38% of households in Newfoundland and Labrador spent more than 6% of their income on energy. Muskrat Falls hydroelectric project cost overruns will add pressure on electricity bills, potentially exacerbating this challenge. Prince Edward Island is spending $215 per energy poor household, Nova Scotia is spending $120, while the latest data suggest Newfoundland and Labrador spent just $13 per energy poor household.
- **Industrial Energy Management:** A recent study estimates that nearly half of Newfoundland and Labrador's long-term energy efficiency potential is in the industrial sector,[270] and we award points in this policy area because of the significant energy saving opportunities. Newfoundland and Labrador's industrial energy management programs are not as comprehensive as other provinces, neglecting areas such as benchmarking, information systems, support for embedded energy managers, and promotion of energy management system certification (e.g. ISO 15001). Comprehensive energy management systems can help both large and small industrial customers become more competitive and continuously improve performance.

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[267] Mark Quinn, "Can You Guess What Products Are Selling like Hotcakes as Muskrat Falls Looms? Heat Pumps," CBC News, October 15, 2019, https://www.cbc.ca/news/canada/newfoundland-labrador/heat-pump-sales-newfoundland-labrador-1.5321181. Other strategies include linking repayment to energy bills or third parties instead of individual consumers.
[268] "Community Efficiency Financing."
[269] Juanita Mercer, "St. John's City Council to Consider Funding for Green Home Energy Upgrades," The Telegram, August 16, 2020, http://www.thetelegram.com/news/local/st-johns-city-council-to-consider-funding-for-green-home-energy-upgrades-485862/.
[270] Dunsky Energy Consulting. 2020-2034 Conservation Potential Study. Final Report (Volume 1 – Results). Accessed via Information Request, PUB-NP-104, Rate Mitigation Options and Impacts Reference.

Nova Scotia

Nova Scotia moves up a spot in this year's overall ranking, from fourth to third place, and narrowly loses the top score in the Programs policy area to Prince Edward Island. Scorecard benchmarking shows that Nova Scotia has the highest electricity program savings and significant increases in low-income program spending. Nova Scotia placed second in spending on programs in partnership with Indigenous peoples, primarily through the Mi'kmaw Home Energy Efficiency Project. The province has the highest targets in the country for both electricity and non-electric fuel savings, though they lag behind leading U.S. states.

Nova Scotia is one of three provinces to enable Property Assessed Clean Energy (PACE) financing through property tax bills for energy efficiency upgrades, which gives municipalities an extra tool when applying for new federal policy supports.[271] The province also maintains its lead in the number of home energy advisors and Certified Energy Managers. Many of these professionals service the larger Atlantic region, indicating that the province has developed a vibrant energy efficiency industry.

The province recently announced a new energy benchmarking pilot project for large buildings,[272] which complements a voluntary program to provide energy labels on residential real estate listings. Both programs could evolve into mandatory energy rating and disclosure policies to embed energy savings into real estate markets and building operations.

In the fall of 2019, the province passed the *Sustainable Development Goals Act*, which commits to achieving net-zero greenhouse gas emissions by 2050. In June 2020, the Halifax Regional Municipality released its HalifACT 2050 climate plan. The province can enable several of the plan's objectives, including making all new buildings net-zero emissions by 2030, retrofitting all existing buildings by 2040, improving industrial process efficiency 75% by 2040, and requiring 100% of new-vehicle sales to be zero-emissions by 2030.[273] Province-specific low-carbon scenarios show that significant energy savings are part of a strategy to phase-out coal, electrify transport, and reach

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[271] "Community Efficiency Financing."
[272] "Benchmarking Pilot," Efficiency Nova Scotia, 2020, https://www.efficiencyns.ca/business/business-types/benchmarking-pilot/.
[273] "HalifACT: Acting on Climate Together," City of Halifax, 2020, https://www.halifax.ca/about-halifax/energy-environment/halifact-2050-acting-climate-together.

90% renewable electricity.[274] The provincial electricity system Integrated Resource Plan for 2020 considers net zero emissions in 2050 and 2045, as well as high electrification scenarios.[275]

Strengths

- **Electricity savings**: Nova Scotia has the highest electricity savings in this year's Scorecard (equal to 1.2% of sales). Efficiency Nova Scotia, the province's efficiency utility, has consistently produced savings at this level or higher. An efficiency potential study shows that savings of 2% of sales are achievable in future years,[276] which means Nova Scotia could join leading U.S. states in energy efficiency performance.
- **Low-income and Indigenous programs:** Nova Scotia not only achieves relatively high annual energy savings, it also includes support for low-to-moderate income households and Indigenous populations in its program portfolio. With respect to low-income and Indigenous program benchmarks, the province is the second-highest spender; just behind Prince Edward Island.

Areas for improvement

- **Net-zero energy-ready building code:** Nova Scotia has already engaged stakeholders on a prospective British Columbia–style tiered building energy code, and has a high number of energy advisors and building professionals. It should continue preparations to rapidly adopt the new national model energy codes to support provincial and municipal climate plans. When compared with British Columbia, Manitoba, and Québec, Efficiency Nova Scotia spends a comparatively low amount promoting codes and standards in its program portfolio. Nova Scotia could access auction revenues from its provincial cap-and-trade carbon pricing system to promote quicker building code adoption and high levels of compliance.
- **Transportation electrification:** Nova Scotia's success in renewable energy development and anticipated hydroelectric imports will help clean up its currently coal-reliant grid. This will make electrification a key component of a low-carbon strategy. The federal government established a target that 10% of light-duty vehicle sales be zero-emission by

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[274] Ralph Torrie, "Accelerating the Coal Phase Out: Nova Scotia and the Climate Emergency" (Ecology Action Centre, November 2019), https://ecologyaction.ca/sites/default/files/images-documents/EAC%20Coal%20Phaseout%20Report%20-%20April%202020.pdf.
[275] Nova Scotia Power, "Integrated Resource Plan," Nova Scotia Power, 2019, https://irp.nspower.ca/.
[276] Navigant, "Nova Scotia Energy Efficiency and Demand Response Potential Study for 2021-2045" (EfficiencyOne, August 14, 2019).

2025, but as of 2018, such vehicles constituted just 0.2% of Nova Scotia registrations. Recent analysis suggests the province should add consumer rebates and a zero-emission vehicle mandate to its policy mix.[277]

- **Leveraging advanced metering infrastructure:** Nova Scotia plans to install advanced meters across the province by 2021. Nova Scotia Power should work with Efficiency Nova Scotia and other partners to make the best use of this infrastructure. The utility can use real-time customer feedback to achieve energy savings and demand-side responsiveness, and leverage the data to improve program design, targeting, and evaluation and encourage grid-interactive and efficient buildings.[278]

Ontario

Ontario slipped from third to fourth place in this year's rankings. This Scorecard shows reductions in electricity savings, per capita spending, and electric vehicle registrations. If these reductions in savings and budgets continue in Canada's largest province, the whole country will feel the impact on energy efficiency improvement.

Ontario remains the only province with a mandatory energy rating and disclosure policy for large buildings, and the data will be released publicly for the first time this year. In the fall of 2019, the current government proposed a halt to the roll-out of mandatory energy and water reporting for buildings between 50,000 and 100,000 square feet. Though that proposal stalled, the government still deferred the roll-out of those reporting requirements until July 1, 2023.

The province's Conservation First Framework (CFF) was scheduled to operate from 2015 to 2020 for both electricity and natural gas conservation programs. It cancelled the electricity framework and replaced it with an Interim Framework between April 2019 and December 2020. A September 2020 ministerial directive defined a 2021-2024 framework. Program delivery organizations and consumers need certainty in a long-term framework, with no disruption in timelines. Unfortunately, the framework will significantly reduce spending from historical levels.

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[277] "Fuelling Change with Electric Vehicles: Ecology Action Centre Calls for Provincial Action," Ecology Action Centre, July 23, 2020, https://ecologyaction.ca/press-release/fuelling-change-electric-vehicles-ecology-action-centre-calls-provincial-action.
[278] Dan York, "Smart Meters Gain Popularity, but Most Utilities Don't Optimize Their Potential to Save Energy," American Council for an Energy-Efficient Economy (ACEEE), January 9, 2020, https://www.aceee.org/blog-post/2020/01/smart-meters-gain-popularity-most-utilities-dont-optimize-their-potential-save.

While Ontario program spending equalled 2.7% of the total cost of electricity service in 2018, we estimate that annual average spending under the new framework will be 0.8% of the total cost of electricity service.[279] The benchmarking in this year's Scorecard (Table 18) shows that only Hydro-Québec and SaskPower spend less. At its 2018 spending level, Ontario would have placed 12th among U.S. states, just behind New York. At its new planned spending level, it would tie with Florida, ranked 35th.

Ontario's natural gas demand side management framework is also up for renewal, and it currently being considered by the Ontario Energy Board (OEB). The province's 2018 Environment Plan calls for a significant increase in natural gas conservation starting in 2021, but the government has yet to direct the OEB to meet the targets in the province's plan. The 2021 transition plan approved by the OEB included the same budgets and target mechanisms as had been approved for 2020.

That said, we do see provincial organizations and local governments making some forward progress on energy efficiency. For instance, Ontario Power Generation and Hydro One are installing more fast chargers for electric vehicles through the Ivy Network,[280] the Town of Whitby has proposed a green development standard for new building developments,[281] and the City of Windsor aims to retrofit 80% of its homes by 2041.[282]

Strengths

- **Appliance and equipment standards:** Ontario's leadership informs national benchmarks for energy efficient appliances and equipment. The province regulates 25 products not already subject to federal rules, and already regulates space and water heating products that the federal government will start regulating in the next five years. The province's regulations in technologies such as liquid-to-air heat pumps and internal water loop heat pumps are more stringent than the federal government's. The latest amendments

[279] Annual average budget of $173 million divided by total cost of electricity service estimate from Flat Demand Outlook in IESO August 2016 Electricity System Cost Outlook, compared with $464 million in 2018 program spending.
[280] Ontario Power Generation, "New Ivy Charging Network Set to Give Electric Vehicle Drivers Peace of Mind," Ontario Power Generation, February 14, 2020, https://www.opg.com/story/new-ivy-charging-network-set-to-give-electric-vehicle-drivers-peace-of-mind/.
[281] City of Whitby, "Whitby Green Standard," City of Whitby, September 28, 2020, https://whitby.ca/en/townhall/whitby-green-standards.asp.
[282] CBC News, "Strategy Aims to Have 80 per Cent of Windsor Homes Retrofitted for Energy-Efficiency by 2041 | CBC News," CBC News, February 20, 2020, https://www.cbc.ca/news/canada/windsor/deep-energy-retrofit-program-standing-committee-1.5469070.

proposed in November 2019 harmonize with federal standards and increase efficiency requirements for residential windows to align with the provincial building code.

- **Non-wire and non-pipe solutions**: The Independent Electricity System Operator is piloting geographically targeted energy efficiency and demand response projects in a bid to alleviate local grid constraints and avoid costly transmission and distribution infrastructure upgrades. These initiatives include creating markets for grid services. The province's 2021-2024 electricity demand management framework further encourages regionally targeted initiatives.

  Enbridge Gas also is also running a geo-targeted demand side management project, in Ingleside, in an effort to better understand the role of energy conservation in deferring and avoiding future capital projects. In 2020, the Ontario Energy Board launched an Integrated Resource Planning process, and its scope includes consideration of how demand side solutions such as efficiency and electrification provide alternatives to new natural gas pipelines.[283]

Areas for improvement

Natural gas conservation programs: Ontario has consistently achieved relatively high natural gas savings. However, the province has strong potential to do even more on this front because its 2018 Environment Plan called for a significant increase in natural gas investments starting in 2021. The Ontario government can implement its Environment Plan by directing the OEB to increase natural gas efficiency programs to meet its target as a minimum.

Vehicle electrification: This year's Scorecard shows a drop in electric vehicle registrations, and notes that other provinces have more comprehensive EV charging networks. The province has recently directly invested in promoting electric vehicle manufacturing.[284] To reinforce these investments in EV supply, the province should encourage greater EV demand. In particular, Ontario can join British Columbia and Québec by requiring a certain percentage of EV sales through a zero-emissions-vehicle mandate. The province can also help EV owners by offering incentives for private charging, and encourage EV charging in building codes and municipal bylaws.

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[283] For a history see Environmental Commissioner of Ontario, "A Healthy, Happy, Prosperous Ontario: Why We Need More Energy Conservation," 2019 Energy Conservation Progress Report (Toronto, ON: Government of Ontario, March 2019).
[284] Office of the Premier, "Historic Ford Canada Investment Transforming Ontario into Global Electric Vehicle Manufacturing Hub," Ontario Newsroom, October 8, 2020, https://news.ontario.ca/en/release/58736/historic-ford-canada-investment-transforming-ontario-into-global-electric-vehicle-manufacturing-hub.

Prince Edward Island

Prince Edward Island moved up two spots in the overall ranking and took the lead in the Programs policy area, earning it "most improved province" status. The province saw the largest increase in benchmarks for per capita spending and electric vehicle chargers per road kilometer. Prince Edward Island also tied Québec for the biggest proportional increase in existing home energy advisors.

The province also for the first time introduced a building energy code, the National Energy Code of Canada for Buildings (2015) for large buildings and the National Building Code of Canada (2015) for low-rise buildings.

In December 2017 the province converted EfficiencyPEI into a service agency of the PEI Energy Corporation; it now acts as a public utility to pursue electric and non-electric fuels. A 2018-2021 demand side management plan included a consistent ramp-up in savings and required evaluation of program savings by a third party (which was not previously the case). A 2016/17 energy strategy called for ramping up to annual savings equal to 2% of sales for electric and non-electric savings. The province can continue on a trajectory towards those levels, which would put Prince Edward Island on par with leading American states.

Strengths

- **Energy efficiency programs:** A 2018 demand side management strategy planned a steady ramp-up in program savings and budgets, which is reflected in this year's scorecard. Prince Edward Island leads in 2019 benchmarks for per capita spending, and in program spending targeted to low-income households and Indigenous peoples. The province placed second in electricity and non-electric fuel savings benchmarks.
- **Electric vehicle charging:** Driving an electric vehicle around the Island should be easier with significant increases in EV charging. Since last year's Scorecard, the province has added nine new charging stations and seven new DC fast charging outlets. This means Prince Edward Island is now second only to Québec in number of available chargers per road kilometer.
- **Cold climate heat pump demonstrations**: Between 2018 and 2020 Prince Edward Island partnered with Natural Resources Canada to conduct 16 field studies of cold climate heap pumps. These studies are important to understanding how to promote efficient and low-carbon heating in "very cold" climate zones and make a significant contribution

to achieving the objectives of the federal "Market Transformation Roadmap for Energy Efficient Equipment in the Building Sector."

Areas for improvement

- **Energy rating and disclosure:** Transparent building energy labels and benchmarking remain missing pieces of the evolving PEI energy efficiency policy toolkit. The province can complement compliance with its new building code and enable even more program savings by requiring energy labels when homes are sold, and by requiring owners of large buildings to benchmark their property's energy use against others.
- **Financing:** The municipalities of Charlottetown and Stratford are applying for Federation of Canadian Municipalities funding that will allow building owners to finance energy upgrades through the property tax system. The province can strengthen these municipal initiatives by amending the Municipal Government Act in a manner similar to changes made in Nova Scotia.
- **Industrial energy management programs:** Prince Edward Island lost points in this year's Scorecard because industrial energy efficiency programs were not operating during the period of analysis. In August 2020 the province launched a custom energy solutions program targeted at larger businesses, as proposed in the 2018-2021 DSM plan. With these programs in place, Efficiency PEI should achieve even more energy savings and improve scores in this assessment's industrial section. Prince Edward Island can promote continuous improvement in energy productivity and help meet national level goals by encouraging Energy Management System certification.

Québec

Québec hangs onto its second-place overall position in this year's Scorecard and again takes the first place in transportation. Major changes from last year include the adoption of an energy code for large buildings; the previous update was in 1983. Québec also claimed the largest increase in the number of new and existing home energy advisor certifications. The province has the largest percentage of demand met via savings in natural gas and other fuels.

In the fall of 2019, Hydro-Québec launched Hilo, a new subsidiary focused on smart energy services. The subsidiary will incentivize customers to reduce peak demand, give them access to real-time energy consumption data, and create a smart-home product marketplace—benefitting both customers and the grid.

Bill 44, tabled in October 2019, proposes to change the name of the Green Fund to the "Electrification and Climate Change Fund," abolishing the Green Fund management council and transferring responsibilities to the Minister of the Environment and the fight against climate change. It also abolishes the Transition Énergétique Québec (TEQ) state corporation and places the "master plan" under the responsibility of the Ministry of Energy and Natural Resources. During the legislative hearings several witnesses noted the professionalism and collaborative nature of TEQ as an organization, emphasizing the importance of predictability of program structures and budgets.[285] The state corporation also received a high ranking for governance practices in a study by the *Institut sur la gourvernance de'organisations privées et publiques.*[286]

Québec's policy framework includes diverse sources of funding (e.g. ratepayer and carbon pricing revenues) and coordination of government agency (TEQ) and public utility demand side programs. It will need to maintain this framework to achieve its energy efficiency, GHG reduction, and electrification goals.

Strengths

- **Transportation electrification**: Québec was the first province to adopt a zero-emission vehicle mandate, requiring manufacturers to sell a certain proportion of electric vehicles in the province. It achieved 100% compliance between 2017 and 2019.

  The province's extensive electric vehicle charging network continues to grow. Québec also saw the largest growth rate in EV registrations between 2018 and 2019, though placed second to British Columbia in annual BEV/PHEV registrations as a percentage of all sales.

- **Industrial energy management and innovation:** Industrial programs operated by TEQ, Énergir, and Hydro-Québec support all of the components for comprehensive energy management. TEQ's *Écoperformance* and Énergir's industrial programs are largely responsible for Québec's leading position in natural gas savings as a percentage of fuel demand. Hydro-Québec's Laboratoire des technologies de l'énergie (LTE) also supports industrial energy efficiency R&D.

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[285] Assemblée nationale du Québec, *Séances des commissions*, vol. 42e législature | 1re session, 2020, http://m.assnat.qc.ca/fr/video-audio/archives-parlementaires/travaux-commissions/AudioVideo-84247.html.
[286] Yvan Allaire, Caroline Cambourieu, and Mantote Sambiani, "La gouvernance des sociétés d'État québécoises en 2019," (Institut sur la gourvernance de'organisations privées et publiques, September 2019), https://igopp.org/la-gouvernance-des-societes-detat-quebecoises-en-2019/.

The TEQ Master Plan includes an objective to provide additional financial incentives for program participants that have 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.

Areas for improvement

- **Energy poverty**: While Québec is renowned for its low electricity prices, 18% of households spend more than 6% of their income on energy. COVID-19 has also put more stress on lower income tenants and homeowners who work from home, yet do not live in indoor environments with adequate cooling, heating, and ventilation. Québec is the third lowest spender on low-income efficiency programs per energy-poor household.
- **Electricity savings**: A surplus of contracted electricity has meant that Québec has not placed significant emphasis on achieving electricity savings in recent years, though Hydro-Québec has a long history of efficiency program implementation. Québec has placed increased emphasis on electrification, and is now exploring hydrogen,[287] to use the province's large renewable energy resources to reduce emissions. An analysis to inform the government's electrification strategy projects the need for an additional 125 to 185 TWh by 2050, above the 206 TWh produced in 2015.[288] If Québec is to meet its climate and economic goals associated with electrification, it can reduce electricity system costs and avoid the controversies and risks associated with new energy generation projects by ramping up electric energy efficiency to achieve energy and peak capacity savings.

[287] François Desjardins, "L'hydrogène dans le viseur de la présidente d'Hydro-Québec," Le Devoir, August 19, 2020, https://www.ledevoir.com/economie/584374/energie-l-hydrogene-dans-le-viseur-de-la-presidente-d-hydro-quebec.
[288] 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.P. xv

Saskatchewan

Saskatchewan ranks last in this year's Scorecard. The province received the lowest marks in the programs and transportation policy areas. It previously had a modest electricity energy efficiency target in the Prairie Resilience climate plan, yet the province does not currently have any mandatory energy savings targets.

Saskatchewan adopted the relatively advanced National Energy Code of Canada for Buildings (2017) last year. The province has a legislated requirement to adopt the latest codes within 12 months of publication, which means it will be adopting the 2020 versions of the national model codes in the coming years. The new codes include multiple performance tiers, with the highest performance buildings meeting a net-zero energy-ready standard. By adopting this code, the province will empower local governments to move faster with climate and energy plans and set the province on a trajectory towards making all new buildings perform at the high level of the Saskatchewan Research Council's *Conserver House*, built back in 1977.[289]

Fortunately, it looks like energy efficiency progress is on the horizon. Saskatchewan has embedded energy efficiency at the core of its COVID-19 pandemic response. In May 2020, the government dedicated $181 million to achieving cost reductions through energy efficiency in provincial government buildings, as well as public education and health services buildings.[290] In addition, the province introduced changes to the Municipal Act in July 2020 that enable Property Assessed Clean Energy (PACE) financing, allowing local governments to establish programs for financing energy-efficiency investments through property tax bills. This will enable local governments such as Regina to move towards 100% renewable energy by 2050.[291]

Strengths

- **Electricity capacity savings**: In 2019 Saskatchewan saved 2.3% of its electricity via peak demand response, just behind Ontario's level of 3.4% savings. These peak demand

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[289] Nicole Huck, "'Passive Home' Movement a Success in Germany, but Not in Saskatchewan Where It Started," CBC News, August 5, 2015, https://www.cbc.ca/news/canada/saskatchewan/passive-home-movement-a-success-in-germany-but-not-in-saskatchewan-where-it-started-1.3179851.
[290] "Building a Strong Saskatchewan."
[291] Brett Dolter and Ann Dale, "Municipal Energy Futures Project: A Case Study of Regina, Saskatchewan," Mitacs, December 18, 2019, https://www.mitacs.ca/en/projects/municipal-energy-futures-project-case-study-regina-saskatchewan.

savings can also be achieved through energy efficiency programs that have the added advantage of reducing overall energy demand, which will in turn reduce both consumer bills and pollution.

Areas for improvement

- **Energy efficiency programs:** Saskatchewan has the lowest per capita spending and SaskPower and SaskEnergy spend the lowest amount on energy efficiency as a percentage of their utility revenues. Now that the government has recognized energy efficiency as a way to save money in public buildings and create jobs, it could also consider the significant long-term cost savings available when energy efficiency is treated as a more cost-effective alternative to energy generation expenditures in electricity and natural gas systems.

Federal policy implications

This Scorecard offers insights into federal government policy priorities by identifying gaps across all provinces, and areas where federal and provincial policy frameworks can interact. The national commitment to a three percent annual energy efficiency improvement, and the need for Canadian leadership on a green and just COVID-19 recovery make federal leadership even more important this year.

Based on the patterns unveiled in this year's Scorecard, we identify the following five areas for federal government action:

1. Federal funding to expand provincial program portfolios

To kick-start economic recovery, the federal government will be looking for ways to create jobs and increase local spending rapidly. Our Scorecard and database show that every province and territory has existing organizational structures that administer energy efficiency portfolios. All provinces also have room to ramp up energy savings as no province is meeting our top benchmarks, which are based on savings levels seen in leading U.S. states.

The Scorecard also demonstrates that nearly every province has systems for the third-party evaluation of energy efficiency programs. The federal government can leverage these measurement, evaluation, and verification systems to ensure accountability and effectiveness.

We already see the impact of recent federal initiatives. Several provinces have achieved higher savings with support from the Low Carbon Economy Fund, such as Prince Edward Island and Nova Scotia, this year's program policy leaders. We also note that several local governments are planning to engage in the Federation of Canadian Municipalities Community Efficiency Financing initiative, which has launched because of funds allocated in the 2019 federal budget. These federal funding avenues could be quickly ramped up.

Enabling provinces to support a portfolio of programs means administrators can tailor strategies to regional priorities and flexibly adjust programs to make sure the money is actually spent and jobs are created, while adapting to different COVID-19 re-opening policies. However, the federal government should take steps to ensure this support helpfully augments the efficiency portfolios typically supported by provinces. We suggest emphasizing achieving deeper building retrofit savings, expanding programs to combat energy poverty, building partnerships with Indigenous communities, and transitioning to zero-carbon heating systems.

A three-year funding increase of $10.4 billion would put the provinces on a trajectory towards catching up to leading U.S. states, creating 175,000 annual jobs and increasing annual GDP by $42.5 billion in the near-term.[292]

2. A federal financing platform to create a market for deep retrofits

This Scorecard illustrates the capacity of efficiency program administrators and energy efficiency professionals to develop and implement energy efficiency projects. However, commercial lenders and investors are not investing in deep energy efficiency upgrades to the extent required to meet climate goals. Barriers to private investment include perceived high transaction costs for each retrofit project and uncertainty regarding the potential cash flows from energy savings and related benefits.

Our Scorecard reveals low participation rates in several program administrator-run financing support programs. In addition, few provinces are implementing financing strategies, such as loan loss reserves or loan guarantees, that attract private sector

[292] 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."

capital. There are many possible reasons for this, such as lack of program promotion or consumer awareness, unattractive loan terms, or an inability to transfer financing if a property is sold. The current piecemeal approach, where each project arrangement exists independently and only involves the program participant and program administrator, does little to mitigate these issues. The federal government could lower overall costs of accessing capital and leverage more private dollars from public energy efficiency investments by enabling proponents to aggregate projects. Doing so would achieve economies of scale, reduce performance risks, and create awareness of financing opportunities.

The federal government took an initial step towards supporting efficiency finance by funding the Federation of Canadian Municipalities, which launched the Community Efficiency Financing initiative in summer 2020. Our Scorecard tracking indicates that several municipalities intend to take advantage of this program, and that provinces are taking complementary actions by enabling Property Assessed Clean Energy (PACE) financing. The federal government could further support these residential financing initiatives by directing a federal entity, such as the Canada Mortgage and Housing Corporation (CMHC), to co-finance and underwrite loans.

More recently, the Canada Infrastructure Bank's (CIB) new Growth Plan includes a $2 billion investment in large-scale building retrofits. The CIB can activate provincial on-the-ground program delivery capabilities to originate projects by establishing clear market standard and financing-access requirements. It can also support pre-development activities such as community outreach, energy audits, and regional project aggregation.

Federal institutions such as the CIB and CMHC can embrace a mission to create a functioning national market for deep energy retrofits. The federal government should take the lead on this agenda via initial investments that demonstrate the investment opportunity and take advantage of the its ability to absorb risk. Several strategies are ideally administered nationally. These include aggregating regional efficiency projects into large-scale investments that can attract institutional investors, promoting common energy saving measurement, and introducing evaluation standards across the country to build investor confidence and enable trade.

By providing "patient" capital focused on social returns, and creating new market institutions, the federal government would create a platform that allows provinces to achieve much higher energy savings than those currently achieved in this Scorecard.

3. Introduce a federal Zero Emission Vehicle Mandate

While the federal government has introduced nation-wide targets for zero-emission vehicles to comprise a certain portion of total vehicle sales by specified target years, only Québec and British Columbia have implemented mandates requiring manufacturers meet similar targets. Both provinces lead in annual BEV/PHEV vehicle registrations and are on track to meeting 2025 federal target of 10% of light-duty vehicles sales by 2025. Québec achieved 100% compliance with its first ZEV target date.

Provinces without ZEV mandates lag significantly, with electric vehicles comprising 1% or less of annual registrations. A national ZEV mandate would achieve the federal targets, create demand for a zero-emission vehicle industrial ecosystem, and harmonize efforts across all provinces.

4. Kick-start adoption of net-zero energy-ready building code

The National Research Council and the broader building community have developed new 2020 national model building codes that are expected to be finalized soon, yet not released until December 2021. Unlike previous codes that only provide a minimum guideline, the new building codes outline performance “tiers” that increase towards net-zero energy ready (NZER) performance. The Pan-Canadian Framework on Clean Growth and Climate Change set an objective that all provinces will adopt net-zero energy-ready building codes by 2030.

Thus far, only British Columbia has a clear commitment to implement a NZER standard. In this year’s Scorecard, we asked provinces for plans to update towards the 2020 codes, and activities undertaken to facilitate building code adoption, such as stakeholder outreach and capacity building. Only three provinces provided evidence of preparatory activities.

There is an urgent need for the federal government to encourage provinces to adopt the 2020 model codes. Federal support in the next year is important to not let the delayed release of the full model building code hold back adoption of the energy-efficiency standards, which are largely already developed. To encourage provincial and territorial adoption of the new codes, the federal government can support training, enforcement, compliance tools, research, and public engagement.

Most utility program portfolios do not promote codes and standards adoption because they are more focused on measurable energy savings in lieu of structural changes in the building sector. Thus, federal funding to encourage the types of activities that led to the BC Energy Step Code would fill a policy gap. The federal government can also set the expectation that provinces will move towards net-zero energy-ready codes by 2030 and make funding conditional on adopting the new codes and establishing a plan to achieve a 90% compliance rate.

5. Measure and promote energy management system certification

The Generation Energy Council introduced an objective to see 75% of industrial energy use benefiting from energy management systems by 2030.[293] Energy management systems promote continual improvement in performance, and certification presents a standard that demonstrates environmental responsibility to customers and trade partners.

Yet the progress we are making towards this goal is unknown because data is not collected or made publicly available. The provinces and the federal government have programs in place to make energy management systems a normal part of industrial operations; they need coordination and further support.

This year's Scorecard shows that most provinces have industrial programs that support components for energy management – tracking, assessment, management, and capacity-building. Some have dedicated, comprehensive energy management systems programs. However, few of these programs lead to, or require, certification through recognized standards such as ISO-50001. Such certifications would verify the existence and performance of an energy management system. The disconnect is understandable, because provincial and utility program administrators are mostly focused on achieving energy savings objectives, while the federal government has a greater interest in formal certification because it supports continuous improvement and quality assessment over the long-term.

The federal government currently supports energy management in industry, which includes financial assistance of up to 50% of eligible projects costs, up to a maximum

[293] The Generation Energy Council, "Canada's Energy Transition: Getting to Our Energy Future, Together."

of $40,000 per facility to implement the ISO 50001 standard, an energy management information system, or to conduct heat and fluid industrial process studies.[294] The federal energy management program has an annual funding envelope of $600,000, and it is typically over-subscribed.

Countries with a high uptake of energy management systems have required mandatory audits, with certification as an alternative compliance option. The list includes Germany, which has the largest number of ISO 50001 certifications.[295] After the United Kingdom required energy audits as part of its Energy Savings Obligation Scheme, ISO 50001 certifications jumped four-fold in one-year (2014-2015) and eight-fold between 2014 and 2017.[296]

The federal government needs to increase its focus on industrial energy management to meet the Generation Energy Council's industrial energy efficiency target. An agenda to increase the use of energy management systems in Canadian industry can include:

[294] Natural Resources Canada, "Financial Assistance for Industrial Energy Management Projects," Government of Canada (Natural Resources Canada, December 12, 2017), https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-industry/financial-assistance-energy-efficiency-projects/20413.
[295] Federal Ministry for Economic Affairs and Energy, "Energy Efficiency," 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; ISO/CASCO "Committee on conformity assessment," "ISO Survey of Certifications to Management System Standards," International Organization for Standardization, 2019, https://isotc.iso.org/livelink/livelink?func=ll&objId=18808772&objAction=browse&sort=name&viewType=1.
[296] ISO/CASCO "Committee on conformity assessment," "ISO Survey of Certifications to Management System Standards."

1. Collecting and publishing data on the extent of energy management systems and certification in Canada, by province and type of certification level achieved.
2. Scaling up and out existing federal action on industrial energy management. This could be achieved via the following:
    a. Increasing funding for federal industrial energy management programs;
    b. Coordinating with provincial program administrators to formally combine and streamline program support for energy management system certification (e.g., as is achieved through the BC-NRCAN ISO 50001 initiative); and
    c. Making energy management system certification mandatory for program participants receiving incentives, as included in the Transition Énergétique Québec Master Plan.
3. Identifying and evaluating the feasibility of international best practices for industrial energy management in Canada, such as mandatory energy audits for large industrial facilities, but with energy management system certification as an alternative compliance option.

Future Scorecards

Our approach to future scorecards will evolve alongside emerging trends in energy efficiency policy, and our ability to track different policy areas. The scorecard will be an evolving indicator and tool for learning and sharing best practices, rather than a standardized index.

The decision-making framework for future revisions or expansions of the scorecard will consider our capacity to analyze, as well as the comparability and availability of data, consensus on policy importance, and ability of provincial policymakers to take action.

We welcome advice on the development of future scorecards. To ensure future scorecards are accurate, we encourage readers to send updates to our database as energy efficiency policy changes are made.

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Appendices

Appendix A: Respondents to information requests

Efficiency Canada circulated an information request to government and utility/program administrator representatives in April 2020, in each province. Each representative was contacted beforehand to anticipate the request and to introduce the scorecard project. We received a response to all information requests sent in all cases, though in some cases government and utility/program administrators worked together to return a combined response. Individual respondents are listed below.

Province	Government	Utility/Program Administrator
Alberta	Environment and Parks	Energy Efficiency Alberta
British Columbia	BC Ministry of Energy, Mines and Petroleum Resources	FortisBC BC Hydro
Manitoba	Energy Division, Ministry of Growth, Enterprise and Trade	Manitoba Hydro / Efficiency Manitoba (post April 1, 2020)
New Brunswick	Ministry of Natural Resources and Energy Development	New Brunswick Power
Newfoundland and Labrador	Department of Municipal Affairs and Environment, Climate Change Branch	Newfoundland and Labrador Hydro Newfoundland Power
Nova Scotia	Energy Efficiency and Renewable Energy, Nova Scotia Department of Energy	Efficiency Nova Scotia
Ontario	Ministry of Energy, Northern Development and Mines Ministry of Environment, Conservation and Parks Ministry of Municipal Affairs and Housing Ontario Energy Board Affordability Fund Trust	Independent Electricity System Operator Enbridge Gas

Prince Edward Island		Efficiency PEI
Québec	Transition énergétique Québec (TEQ)	Hydro-Québec Énergir
Saskatchewan	Climate Change Branch, Ministry of Environment	SaskPower SaskEnergy

Appendix B: Net incremental electricity savings

Electricity savings are shown in gigawatt hours (GWh), at the meter level. 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. Totals for 2019 are not shown due to incomplete data.

	2016	2017	2018	2019
CANADA TOTAL	**3,098.98**	**4,205.72**	**2,888.53**	
Alberta		**404.00**	**172.00**	**31.48**
Energy Efficiency Alberta		404.00	172.00	21.08
British Columbia	**492.95**	**390.61**	**344.89**	**23.74**
BC Hydro	472.00	365.00	316.00	
FortisBC	20.95	25.61	28.89	23.74
Manitoba	**158.26**	**193.03**	**171.40**	**103.66**
Manitoba Hydro	158.26	193.03	171.40	103.66
New Brunswick	**35.79**	**50.69**	**69.00**	**80.96**
New Brunswick Power	35.79	50.69	69.00	80.96
Newfoundland and Labrador	**18.17**	**31.31**	**35.46**	**45.48**
Newfoundland Hydro & NL Power	18.17	31.31	35.46	45.48
Nova Scotia	**125.91**	**120.29**	**139.28**	**126.03**
Efficiency Nova Scotia	125.91	120.29	139.28	126.03
Ontario	**1,598.98**	**2,358.08**	**1,397.58**	
Independent Electricity System Operator	1,598.98	2,358.08	1,397.58	
Prince Edward Island			**4.07**	**17.21**
Efficiency PEI			4.07	17.21
Québec	**589.81**	**607.71**	**506.45**	**579.15**
Hydro-Québec	534.00	524.00	455.00	478.00
TEQ	55.81	83.71	51.45	101.15
Saskatchewan	**66.48**	**48.99**	**48.11**	**40.24**
SaskPower	66.48	48.99	48.11	40.24

Appendix C: Net incremental natural gas and non-regulated fuels savings

Natural gas and non-regulated fuels savings are shown in gigajoules (GJ). 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 Mm3 were converted to GJ using Canadian Energy Regulator conversion factors (1 Mm3 = 37300 GJ). Totals for 2019 are not shown due to incomplete data.

	2016	2017	2018	2019
CANADA TOTAL	**7,228,453**	**8,892,229**	**11,609,161**	
Alberta		**607,009**	**628,621**	**413,208**
Energy Efficiency Alberta				
Natural gas, Net		607,009	468,104	212,489
Non-regulated fuels, Net			160,517	200,719
Fuel switching, net				1,447
British Columbia	**438,827**	**553,538**	**1,910,463**	**870,597**
FortisBC				
Natural gas, Net	438,827	553,538	626,226	831,959
BC Ministry of Energy				
Natural gas, Net			291	5,089
Non-regulated fuels, net				5,326
Fuel switching, net			1,418	28,223
BC Hydro				
Fuel switching			1,283,946	
Manitoba	**83,925**	**100,710**	**220,070**	**161,217**
Manitoba Hydro				
Natural gas, Net	83,925	100,710	220,070	161,217
New Brunswick			**165,535**	**79,897**
New Brunswick Power				
Natural gas, Net			2,620	2,290
Non-regulated fuels, Net			162,915	77,607
Newfoundland and Labrador				**4,926**
Province of Newfoundland and Labrador				
Non-regulated fuels, Gross				4,926

Nova Scotia	**65,967**	**54,070**	**117,809**	**220,318**
Efficiency Nova Scotia				
Non-regulated fuels, Net	65,967	54,070	117,809	220,318
Ontario	**3,965,810**	**4,243,559**	**4,036,620**	
Enbridge Gas				
Natural gas, Net	*3,965,810*	*4,243,559*	*4,036,620*	
Prince Edward Island				**54,108**
EfficiencyPEI				
Non-regulated fuels, net				13,068
Fuel-switching, net				41,040
Québec	**2,320,233**	**3,038,356**	**3,983,584**	**3,579,616**
Énergir				
Natural gas, Net	1,469,620	1,460,668	1,497,595	1,446,009
Transition énergétique Québec				
Natural gas, Net	370,613	617,688	1,605,989	1,173,607
Non-regulated fuels, Net	480,000	960,000	880,000	960,000
Saskatchewan	**27,274**	**23,783**	**17,105**	**50,947**
SaskEnergy				
Natural gas, Net	27,274	23,783	17,105	50,947

Appendix D: Energy efficiency program spending

Energy efficiency program spending excludes transportation programs. Data is presented in CAD $1M nominal dollars. Codes and standards spending are presented separately where available, some program administrators might include this under program totals. Totals for 2019 are not shown due to incomplete data.

	2016	2017	2018	2019
CANADA TOTAL	**947.3**	**1,137.8**	**1,222.0**	-
Programs	941.2	1,130.9	1,215.6	820.6
Codes and standards	6.2	6.9	6.4	2.5
Alberta	**-**	**89.6**	**80.0**	**35.8**
Energy Efficiency Alberta				
Programs	-	89.6	80.0	35.8
British Columbia	**128.4**	**115.4**	**144.7**	**-**
FortisBC				
Programs	38.6	39.2	42.5	73.0
Codes and standards	0.1	0.2	0.2	1.3
BC Ministry of Energy				
Programs	0.6	0.6	1.0	3.6
BC Hydro				
Programs	84.0	70.6	96.1	-
Codes and standards	5.1	4.8	4.9	-
Manitoba	**64.7**	**77.9**	**78.5**	**62.8**
Manitoba Hydro/Efficiency Manitoba				
Programs	64.3	77.6	78.3	62.6
Codes and standards	0.4	0.3	0.2	0.2
New Brunswick	**13.5**	**13.4**	**17.1**	**24.7**
New Brunswick Power				
Programs	13.5	13.4	17.1	24.7
Newfoundland and Labrador	**12.4**	**12.3**	**11.7**	**16.1**
Utilities				
Programs	12.4	12.3	11.7	16.1
Nova Scotia	**43.7**	**43.0**	**50.3**	**63.5**

Efficiency Nova Scotia				
Programs	43.4	42.7	50.0	63.2
Codes and standards	0.03	0.03	0.03	0.03
Ontario	**462.4**	**563.4**	**599.6**	**-**
Enbridge Gas				
Programs	106.3	127.5	135.3	-
Independent Electricity System Operator				
Programs	356.1	435.9	464.3	274.0
Prince Edward Island	**0**	**0**	**8.7**	**12.7**
Efficiency PEI				
Programs	0	0	8.7	12.7
Québec	**208.9**	**212.1**	**220.2**	**249.0**
Énergir				
Programs	19.1	18.1	18.4	21.7
Hydro-Quebec				
Programs	65.0	55.3	54.4	56.5
Codes and standards	-	0.9	0.9	0.5
Transition énergétique Québec				
Programs	124.2	137.1	146.3	169.8
Codes and standards	0.6	0.7	0.2	0.5
Saskatchewan	**13.9**	**11.1**	**9.8**	**7.0**
SaskEnergy				
Programs	0.9	1.1	0.8	1.7
SaskPower				
Programs	13.0	10.0	9.0	5.3