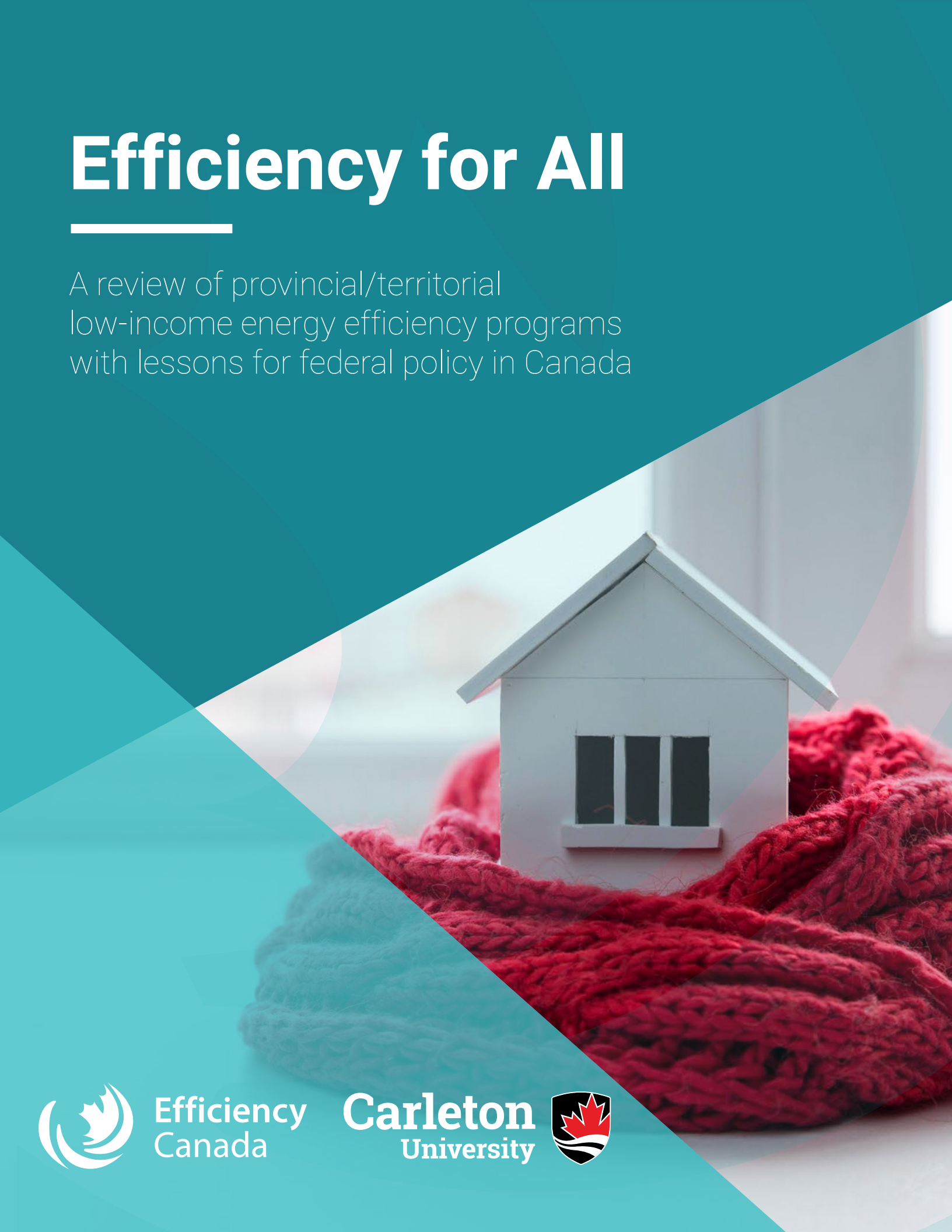
Efficiency for All

A review of provincial/territorial low-income energy efficiency programs with lessons for federal policy in Canada



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Efficiency for All: A review of provincial/territorial low-income energy efficiency programs with lessons for federal policy in Canada

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Table of contents

About the authors

Abhilash Kantamneni has a decade of experience helping communities across the United States and Canada use clean and efficient energy to achieve local priorities, including improved housing, increased 'good jobs' and reduced poverty.

His community-based approach to clean energy, civic engagement and capacity building has rewarded him wide recognition, including being named a '40 Under 40 Energy Leader' by the Midwest Energy News and a Canada Storyteller Award by SSHRC-CRSH. In his earlier life, he optimized power system operations (B.E, Electrical Engineering), tracked transient objects in the night sky (MS Physics), developed AI algorithms for smart microgrids (MS Computer Science), and led a network of social impact organizations in Houghton (MI) into the finals of a national community energy-efficiency competition. Currently, he is completing his Ph.D. in Geography at the University of Guelph, researching the governance of building energy retrofits in Canada.

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Executive summary

Low-income households in Canada are more vulnerable to energy poverty, which is characterized as a situation where a household faces significant barriers to meeting essential home energy needs such as heating and cooling and/or faces challenges paying for their energy costs.

Energy poverty is caused by three main issues: low incomes, high energy prices and/or energy inefficient homes. While there are several ways to combat energy poverty, such as through anti-poverty efforts to increase incomes and/or utility rate design to reduce energy bills, the focus of this report is on measures to improve the energy efficiency of houses. Improving the energy efficiency of housing stock contributes to the long-term goals of reducing greenhouse gas emissions and meeting net-zero goals, while also combating inequality and energy poverty.

Lower-income households experiencing energy poverty can benefit the most from energy efficiency upgrades yet are unlikely to install such upgrades without well-designed policy support. Tailored program approaches are required to reach these households.

In Canada, the need for a specific low-income program approach is recognized by utilities and provincial governments that provide energy efficiency services. However, the federal government has yet to provide specific supports to improve low-income energy efficiency. For Canada to meet net-zero transition goals while also leaving no one behind, expanding the scale and scope of low-income energy efficiency is an urgent national policy priority.

Given this context, the purpose of this paper is to outline the most appropriate and productive role the federal government can play in ensuring energy efficiency helps those most in need.

To achieve this, this paper reviews existing low-income energy efficiency programs at the provincial and territorial levels, discusses general strengths of these programs as well as the common gaps, and identifies strategies the federal government can follow that complements existing programs in the market while achieving specific policy objectives of reducing energy poverty and meeting net-zero goals.

Our review finds that most existing low-income energy efficiency programs are administered by utilities or government departments at the provincial level. Nearly every province reports some existence of an efficiency program targeted at lower-income households providing no-cost or low-cost, turnkey energy saving measures. While program eligibility is typically based on

income, several programs qualify participants based on other proxies, such as participation in other low-income or government programs.

Programs can be categorized in terms of common delivery strategies, energy saving measures and target markets. **Self-install programs** supply easy-to-install energy-saving kits sent directly to qualifying renter or homeowner households. **Direct-install** programs provide professionally installed minor or major upgrade measures at no cost to the participating household based on an initial home energy assessment. Direct-install programs are typically not offered to households living in apartments or condos. Instead, programs with **custom measures for multi-unit buildings** offer energy savings measures ranging from technical assistance to in-suite measures customized for multi-unit buildings' energy needs and built environment. **Product rebate programs** supplement existing product rebates to provide equipment at no cost or at a significantly reduced cost for income-qualified households. **Supplemental programs**, typically found in Northern Canada, are principally focused on enabling homeowners to make health, safety, and mobility upgrades to their existing homes. Improving energy efficiency is one component of such programs.

Using data from annual program reports in prior years and targets for the next few years, we estimate that around 55,000 Canadian households participate in a low-income energy efficiency program in a typical year. The breadth of participation and depth of savings vary by program, and high-level findings by program type are summarized in Table 1. We observe that self-install programs with easy-to-install shallower measures that rely on participant installation reach more households. Direct install programs with walk-through home energy assessments and minor upgrades reach between 0.7% to 1.0% of eligible households in programs surveyed. Provinces such as Nova Scotia and PEI that lead the country in low-income program investment level benchmarks have participation rates closer to 1% and 2%, respectively.

These findings suggest that robust funding can achieve higher participation even for programs providing more comprehensive major retrofit upgrades to help households escape energy poverty.

Program type	Range of participation rates [%]	Range of program cost per participant [$]	Range of energy savings per participant [GJ]
Self-install programs	< 3%	< $100	1.0 GJ – 1.5 GJ
Direct installs with minor upgrades	0.7% – 1%	$400 – $1000	< 5 GJ
Direct installs with major upgrades	1% – 2%	$2,600 – $11,000	17 GJ – 40 GJ

We note that existing programs have two general strengths relevant for delivering energy reduction measures to low-income households. First, several low-income programs successfully engage a relatively large number of low-income Canadians in energy efficiency. Second, this reach is facilitated by deep institutional knowledge program administrators have accrued over many years of program design, outreach, and delivery. Existing providers leverage a wide array of tools, strategies, networks, and relationships to identify and recruit low-income households for participation in energy efficiency programs. Each program's delivery efforts are geared specifically to the provincial context in which they operate, and no two programs are alike. These findings suggest it would be difficult for a federal program to build this delivery capacity from scratch. It would be a missed opportunity to not benefit from the learning over time that has occurred in sub-national programs. It would also create an expensive, inefficient administration duplication and create market confusion by having overlapping program delivery.

We also note that existing programs have several gaps relevant to national policy goals of reducing energy poverty and achieving net-zero emissions.

First, few programs in Canada specifically target energy-poor households experiencing disproportionate energy cost burdens, households living in the least efficient homes, and/or households facing additional challenges such as language barriers or issues navigating systems of support. Second, the depth of investments and savings achieved per household needs to increase substantially above current program levels to be consistent with net-zero emissions and climate change goals. Next, switching to zero-carbon ready highly efficient heating systems (e.g., electric or hybrid heat pumps) is not a widespread standard feature in any program, even though this could significantly reduce overall bills when coordinated with other energy efficiency measures. Finally, low-income families living in homes that require structural or remedial upgrades (such as mold removal) are prevented from participating in energy efficiency programs because program administrators generally do not have mandates to

address non-energy health and safety measures, even if such measures may be necessary to enable energy efficiency upgrades.

We wish to note that the gaps identified are not necessarily a result of deficiencies in program implementation but are principally related to the policy objectives of the provincial governance systems. Program strengths, gaps and outcomes are influenced and, in some instances, constrained by provincial governance and policy objectives.

For instance, several programs, including those in British Columbia or Ontario, are operated by utilities or under utility regulatory institutions. The primary objective of utility demand side management is to achieve portfolio-wide savings goals within a given budget and/or cost-effectiveness constraint. Under these conditions, program design is incentivized towards achieving small energy savings across a number of households rather than on deep measures designed to lift households out of energy poverty or towards achieving net-zero goals. Furthermore, major upgrade programs in provinces such as New Brunswick delivered outside of utility governance systems face challenges with implicit and arbitrary budget caps and policy bottlenecks that prevent additional funding. Next, the lack of fuel switching is also characteristic of governance systems with separate energy efficiency administrators or funding sources by fuel type. Such fuel silos are also present in cases such as in Nova Scotia, where “one stop shop” administration exists, yet funding comes from different sources. Finally, budget limitations prevent energy efficiency programs from providing service in buildings with significant non-energy-related upgrades, even if such upgrades are necessary to install energy-saving measures and improve occupant health and safety.

This understanding of how provincial governance and policy objectives influence program strengths and gaps prepares us to discuss the most productive role the federal government can play in ensuring energy efficiency helps those most in need.

The federal government is responsible for international climate commitments and national climate goals. The national level is also most capable of considering holistic benefits associated with energy poverty reduction, such as adequate and appropriate housing that meets people’s needs along with supporting their physical health and mental well-being.

Energy poverty needs to be prioritized if the transition to net-zero emissions is to be fair and just. With these objectives in mind, we present four policy design considerations for a federal low-income energy efficiency strategy that works best with existing provincial-level programs:

1. **Focus on results**: Federal policy should set targets and prioritize results with respect to achieving net-zero emissions and energy poverty reductions while allowing provincial

and territorial programs to achieve these results in a way that fits their contexts. Net-zero emissions and energy poverty objectives can be further articulated through program indicators related to deeper retrofits, fuel switching to zero-carbon ready fuels and target populations that are 'harder to reach' and those most in need. Many low-income households will likely only be able to access retrofit programs once in a generation. Federal targets must be set to focus efforts towards maximizing long-term benefits – such as through enabling upgrades that allow participants to continue participating in future energy and climate action measures.

2. **Develop and enhance existing programs**: Several provinces have built up outreach infrastructures and have benefitted from learning and relationship building over time that would be difficult for a federal program to build from scratch. A one-size-fits-all federal program could disrupt the existing capabilities of provincial programs. Ideally, the federal government's capabilities should focus on acting as an enabler that increases ambition and monitors the success of the transition to net-zero emissions in an equitable manner, rather than tying up federal resources with program implementation. Developing and enhancing programs at provincial and territorial levels will require a tailored approach. A federal support structure could include a scale-up as well as a program design pathway.

3. **Secure stable long-term funding:** The federal government should make a multi-year funding commitment to avoid boom-bust dynamics that have previously disrupted energy efficiency supply chains and broken participant trust. A federal initiative that encourages and supports provincial-specific program designs will institutionalize these programs within provincial policy systems and thus provide an added layer of political resilience.

4. **Create supportive systems:** The federal government is uniquely positioned to create support systems and provide enabling tools such as detailed data on energy poverty by incidence, prevalence, and geography to help programs target offerings to households that need it the most. This includes enhancing workforce capabilities, welcoming new people into energy efficiency careers to improve program reach and trust among hard-to-reach communities, and developing net-zero standards by building typology and region to guide the goals of each low-income retrofit. Since existing programs are targeted towards achieving provincial policy objectives, the federal government can direct its efforts towards building capacity among provincial programs by encouraging learning across provincial borders and helping provinces explore complementary policy changes to reduce energy poverty and achieve net-zero emissions.

In summary, we outline a productive and appropriate role for the federal government to play in low-income energy efficiency: augmenting and leveraging the delivery capacity of existing programs towards reducing energy poverty and achieving net-zero emissions. Our suggestions for a federal approach to low-income energy efficiency are informed by our findings on the strengths and gaps of existing provincial-level programs and a recognition of the important role multi-level governance has in the Canadian federation.

Energy poverty needs to be prioritized at the national level if the transition to net-zero emissions is to be fair and just, and energy efficiency should benefit all Canadians. Low-income energy efficiency must not be an afterthought. It should be recognized as a sector with significant energy efficiency and GHG reduction potential that will not automatically occur without targeted strategies. A smart strategy to expand the scale and scope of low-income energy efficiency is needed now. We aim to see this report contributing to that project.

Introduction: why low-income efficiency matters now

Improving the energy efficiency of low-income households reduces greenhouse gas emissions and energy costs while also combating inequality and energy poverty. Energy poverty is characterized by a situation where a household faces significant barriers meeting essential home energy needs such as heating and cooling and/or faces challenges paying for their energy costs.

Energy poverty is caused by three main issues; low incomes, high energy prices and energy inefficient homes. There are several ways to combat energy poverty, such as boosting household incomes through social policy or lowering energy prices through utility rate design. However, the focus of this report is reducing energy poverty through improving the energy efficiency of lower-income homes—which also contributes to reducing greenhouse gas emissions and achieving net-zero emission goals.

Lower-income households experiencing energy poverty can benefit the most from energy efficiency upgrades and are less likely to conduct such upgrades without well-designed programs and policy support. Tailored program approaches are required to reach these households.

Energy-poor households can benefit the most from energy efficiency upgrades and are less likely to conduct such upgrades without policy support. Tailored program approaches are required to reach these households. Standard incentive programs that require up-front capital investments or customer loans are inaccessible to people with considerable financial constraints, and there are additional barriers associated with language and lack of trust in existing institutions that can also inhibit participation.

The need for a specific low-income program approach is recognized by utilities and provincial governments that provide energy efficiency services. Most program portfolios at provincial levels differentiate between residential customers with an “ability to pay” versus low-to-moderate-income communities that cannot afford to invest in efficiency or face other barriers.

The federal government has yet to provide specific support to improve low-income energy efficiency. Yet, new initiatives as a part of the national climate plan include the Greener Homes grant program for the “ability to pay” residential market, an expected loan program, as well as

other initiatives targeted towards public and commercial buildings. Energy efficiency for affordable housing is supported by the National Housing Co-Investment Fund and the Federation of Canadian Municipalities Sustainable Affordable Housing program, yet this leaves out low-income Canadians who are market renters or homeowners.

Canada will need to help low-income Canadians retrofit their homes to meet net-zero transition goals while leaving no one behind. Thus, expanding the scale and scope of low-income energy efficiency is an urgent national policy priority.

Given this context, this paper analyzes the current state of low-income energy efficiency programs in Canada. We examine what programs are available at provincial/territorial levels and what they are achieving. We identify existing program strengths as well as gaps that are most relevant to achieve net-zero emission and energy poverty reduction policy goals. This review of provincial program characteristics will help policymakers learn lessons across provincial borders and share best practices.

We also draw lessons from this provincial level review to suggest where the federal government can play a useful role. We outline how provincial and utility level policy system objectives might differ from those of the federal government and then show how these multiple objectives can complement one another. To achieve this, we sketch a strategy for a federal low-income energy efficiency policy approach based on leveraging the strengths of provincial-level programs and capabilities while using federal resources to significantly expand the scale and scope of low-income energy efficiency to meet net-zero emission and energy poverty reduction objectives.

This research paper starts with defining energy poverty and the net-zero emissions challenge and how these concepts define our research questions and methodology. It then reviews existing low-income energy efficiency programs at the provincial and territorial levels, followed by a discussion of the general strengths and the common gaps of these programs. The paper then discusses why the federal government has a role to play and strategies the federal government can follow that complement existing programs in the market while achieving specific policy objectives. More detailed information on existing programs and methodology is found in the appendices.

What is energy poverty?

While Canada lacks a formal definition of energy poverty, it is often characterized as a condition where households face significant challenges adequately meeting their essential home energy needs, paying for their home energy costs or accessing other life necessities due to disproportionate spending on energy costs, or obtaining energy efficiency upgrades necessary to reduce their energy costs.

These barriers are associated with household incomes. Compared to an average household, lower-income Canadian households are more likely to live in lower-efficiency homes and are more likely to spend a larger portion of their income to meet their home energy needs. After paying for home energy costs, lower-income households might not have enough money left over to access other household essentials.

Conversely, lower-income Canadian households are also statistically *more likely to have already spent*[1] a disproportionate portion of their incomes on other non-energy home essentials like food, clothing, and shelter than the average family. Lower-income households are thus less likely to have money left over to warm or cool their home adequately, afford their home energy costs or invest in energy efficiency upgrades.

Household incomes are a significant determinant of energy poverty, and lower-income Canadian households are more susceptible to energy poverty[2].

However, households with a range of incomes can also experience energy poverty. For instance, some moderate-income households struggle to warm or cool their home adequately or to pay for their energy needs because – quite simply – their energy bills are high. Higher energy bills may be due to higher energy rates, higher-than-average energy use, or both. Factors such as global energy price shocks or utility rate increases contribute to high energy rates. Factors such as the energy performance of the home, the number of occupants relative to the size of the home, the energy efficiency of a home's appliances, and the energy needs and related behaviours of the household contribute significantly to higher energy use. One example of behaviour is the higher energy use required for medical equipment. Higher energy costs – caused by factors beyond income – may push more households into situations where they

[1] Statistics Canada: What are Low Income Cut-Offs? https://www150.statcan.gc.ca/n1/pub/75f0002m/2012002/lico-sfr-eng.htm

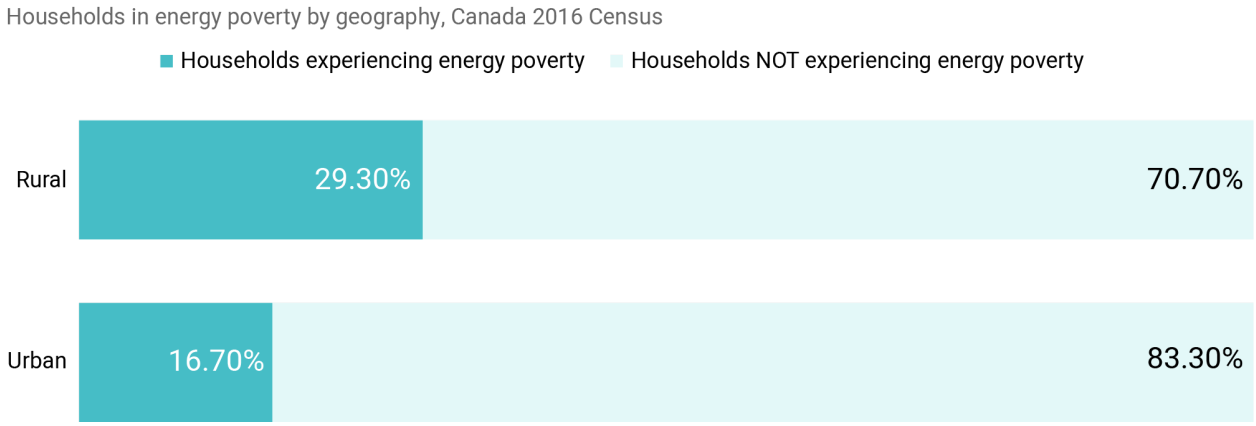
[2] Das, Runa R., Mari Martiskainen, and Grace Li. "Quantifying the Prevalence of Energy Poverty across Canada: Estimating Domestic Energy Burden Using an Expenditures Approach." *The Canadian Geographer / Le Géographe Canadien* n/a, no. n/a https://doi.org/10.1111/cag.12750.

experience energy poverty: an inability to meet energy needs or acquire other essentials adequately.

Therefore, energy poverty is a function of household incomes as well as household spending on energy costs. The ratio of a household's spending on home energy costs to a household's income, known as 'energy cost burden', can serve as a quantitative measure to identify household energy poverty in Canada[3].

In 2015, all Canadian households spent an average of nearly 3% of their total income on home energy needs[4]. Households that spend more than twice the national median – i.e., more than 6% of their incomes – on home energy costs are said[5] to be experiencing energy poverty due to disproportionate energy cost burdens. By this measure, a majority (1.7 million) out of 2.8 million Canadian households experiencing energy poverty are not low-income households[6].

Figure 1: Percentage of Canadian households experiencing energy poverty by geography[7]



[3] Das, Runa R., Mari Martiskainen, and Grace Li. "Quantifying the Prevalence of Energy Poverty across Canada: Estimating Domestic Energy Burden Using an Expenditures Approach." *The Canadian Geographer / Le Géographe Canadien* n/a, no. n/a https://doi.org/10.1111/cag.12750.

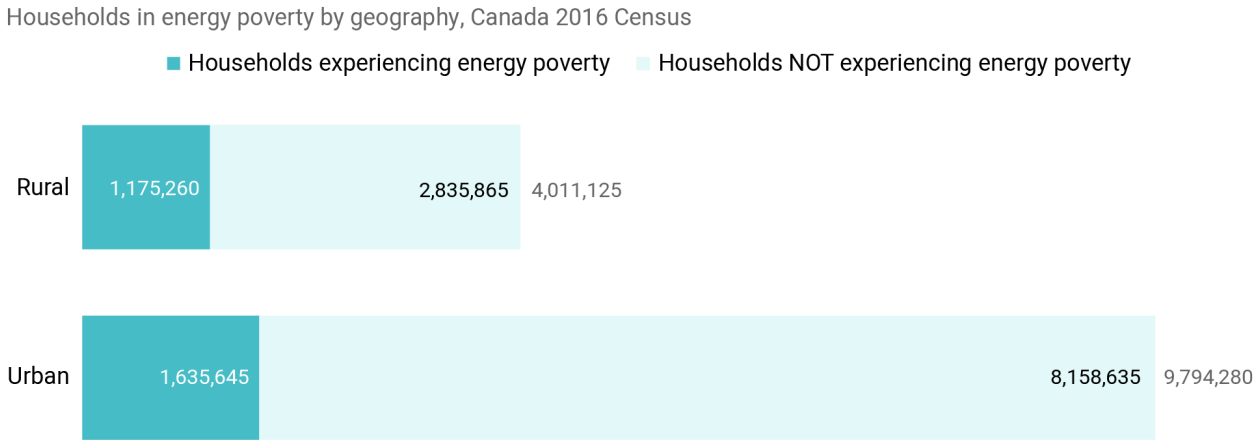
[4] Statistics Canada. Table 11-10-0223-01 Household spending by household income quintile, Canada, regions and provinces. **DOI:** https://doi.org/10.25318/1110022301-eng

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

[6] Energy Poverty in Canada: A Canada Urban Sustainability Practitioners Backgrounder. 2019. https://energypoverty.ca/backgrounder.pdf

[7] Data from Energy Poverty in Canada: A Canada Urban Sustainability Practitioners Backgrounder. 2019. https://energypoverty.ca/backgrounder.pdf (pp. 5)

Figure 2: Number of Canadian households experiencing energy poverty by geography[8]



Data[6] also shows that energy poverty is both an urban and rural problem. The majority (1.6 million) out of 2.8 million Canadian households experiencing energy poverty are located in urban areas and the remaining 1.1 million households experiencing energy poverty are rural. While more urban households experience energy poverty, a disproportionate percentage of rural households – nearly 30%, compared to only 17% of urban households – experience energy poverty.

Similarly, both homeowners and renters in Canada experience energy poverty. A majority (2.1 million) out of 2.8 million Canadian households experiencing energy poverty are homeowners, and the remaining 0.7 million are renters. While most energy-poor households are homeowners, further analysis[5] suggests that renters who pay their own utility bills are more likely to experience energy poverty, followed by homeowners and then renters whose utility bills are included in their rent.

In summary, while household incomes are a contributing factor, energy poverty is not merely another facet of poverty. Energy poverty can be understood in terms of a household's spending on energy costs relative to income. Canadian households with various incomes, homeownership statuses and locations experience disproportionate energy cost burdens. Ultimately, this exacerbates a household's inability to meet energy and household needs or access energy efficiency measures to reduce their cost burdens.

[8] Data from Energy Poverty in Canada: A Canada Urban Sustainability Practitioners Backgrounder. 2019. https://energypoverty.ca/backgrounder.pdf (pp. 5)

Energy poverty and the transition to net-zero emissions

Canada has committed to achieving net-zero emissions by 2050 and 40 – 45% reductions from 2005 levels by 2030. These goals are enshrined in the Canadian Net-Zero Emissions Accountability Act[9], which includes a framework for transparent reporting, sectoral strategies, and independent advice from the Net-Zero Advisory Body.

The December 2021 Minister of Natural Resources Mandate letter includes an objective to "Work with provinces and territories, communities and Indigenous Peoples to develop and implement a National Net-Zero Emissions Building Strategy to achieve net-zero emissions from buildings by 2050, with interim milestones, that include accelerating net-zero emissions new builds and deep retrofits of existing buildings".[10]

Furthermore, the government has stated that no one should be "left behind"[11] in building a net-zero emissions economy. The Net-Zero Advisory Body[12] has established "putting people first" as a foundational value which suggests that "equity and inclusion should be hard-wired in (transition) pathways". Furthermore, "equitable access to the benefits of a net-zero transition" is a component of "seizing the upsides" of GHG reduction futures.[13]

These broad principles and policy directions suggest low-income energy efficiency is a necessary component of Canada's net-zero transition pathways for practical and 'just-transitions' reasons. The practical rationale is simple – bringing all buildings to a "net-zero" compatible standard must include those buildings owned and occupied by lower-income Canadians. Of course, there is also a moral responsibility to ensure the net-zero transition benefits all and does not exacerbate existing inequalities and energy poverty. Indeed, leaving lower-income Canadians with little support in reducing their emissions and avoiding fossil fuel cost increases would likely significantly delegitimize the net-zero emissions transition goal[14].

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[9] Canada, Service. "Canadian Net-Zero Emissions Accountability Act," February 25, 2021. https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/canadian-net-zero-emissions-accountability-act.html.

[10] https://pm.gc.ca/en/mandate-letters/2021/12/16/minister-natural-resources-mandate-letter

[11] Speech from the Throne. https://www.ourcommons.ca/DocumentViewer/en/44-1/house/sitting-2/hansard#Int-11426929

[12] Established in 2021 by the federal Minister of Environment and Climate Change, Net Zero Advisory Body's job is to give advice on how Canada can achieve its goal of net-zero greenhouse gas emissions by 2050. https://nzab2050.ca/

[13] https://nzab2050.ca/publications/news_feed/documents

[14] Haley, Brendan, and Abhilash Kantamneni. "Debunking the Alberta Energy War Room on Energy Poverty." Efficiency Canada (blog), January 11, 2022. https://www.efficiencycanada.org/alberta-energy-poverty/.

We are not the only ones highlighting that an energy poverty strategy is a necessary component of Canada's net-zero emission future. The International Energy Agency's recent *Canada 2022: Energy Policy Review* states that "the question of energy costs and addressing energy poverty will remain of paramount importance in the context of energy efficiency policies throughout Canada", and that "currently, a low-income specific energy efficiency programme is lacking"[15].

Adding net-zero emission goals onto more traditional low-income energy efficiency and energy poverty strategies also has significant implications, speaking to the need for a significant expansion in the scale and scope of deep energy retrofits. This mirrors the general economy, where less than 1% of low-rise residential buildings have received comprehensive retrofits in recent years[16]. The goal of the federal Greener Homes grants and expected loans seeks to increase the number of retrofits; however, these program approaches are unlikely to reach low-income populations. Moreover, aggressive retrofit scenarios need to consider ramping up to retrofitting 5%, or even 12%, of homes per year[17].

Net-zero retrofits must also achieve deeper energy savings. Current practice suggests low-rise residential buildings are achieving 38 GJ of energy savings or 20% from the estimated baseline in savings per home[18]. The deep retrofit savings called for in the called for National Net-Zero Emissions Building Strategy typically achieve energy savings greater than 50% or greater. This would bring typical thermal energy demand intensities of single-family residential dwellings in Canada into the range of 40-70 kWh per square meter[17]. The International Energy Agency calls for retrofitting buildings to "zero-carbon-ready" levels, which requires buildings to be highly energy efficient and directly use or use an energy supply of renewable energy that will be fully decarbonized by 2050[19].

Households owned and occupied by Canadians in energy poverty are likely to be less energy efficient and face the most substantial barriers to making significant energy use improvements or switching to zero-carbon ready fuels. Thus, low-income energy efficiency must not be an afterthought. It should be recognized as a sector with significant energy efficiency and GHG reduction potential that will not automatically occur without targeted strategies.

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[15] IEA. "Canada 2022: Energy Policy Review," pp. 106-107.

[16] Based on 2017-2020 data from EnerGuide / EcoEnergy reports of number of households receiving D/E evaluations where the annual retrofit rate averaged 0.7% of single detached and attached households. See Haley and Torrie "Canada's Climate Retrofit Mission".

[17] Haley, Brendan, and Ralph Torrie. "Canada's Climate Retrofit Mission," June 15, 2021. https://www.efficiencycanada.org/retrofit-mission/.

[18] Ibid. Pp 38.

[19] IEA. "Net Zero by 2050 - A Roadmap for the Global Energy Sector," p. 65.

As outlined in this report, existing low-income energy efficiency programs are unlikely to meet net-zero emissions goals. Yet, when faced with the need for a policy change, we believe it is most prudent to start with an analysis of the present situation to identify ways to build from existing infrastructures and capabilities. This is the thinking that motivates this report.

Research approach

The goals of this research report are to:

1. Review and benchmark provincial low-income energy efficiency programs to inform provincial policymakers to encourage ongoing learning and engagement amongst low-income program professionals.

2. To demonstrate gaps in existing programs that need to be filled, and to clearly outline the most productive role of the federal government in ensuring energy efficiency helps those most in need.

Research questions and definitions

To achieve the above objectives, this report asks and answers the following research questions:

1. What low-income energy efficiency programs are currently offered across Canada, and what are the policy frameworks they operate within?

2. What are existing provincial and territorial low-income energy efficiency programs achieving?

3. What are the strengths and gaps of existing provincial and territorial low-income energy efficiency programs?

4. What role can the federal government play in augmenting the strengths and filling the gaps of existing provincial and territorial low-income energy efficiency programs?

For the purposes of this report, provincial/territorial low-income energy efficiency programs refer to

- Current ongoing programs offered by provinces/territories that offer no-cost or low-cost turnkey measures for reducing residential energy use and increasing energy efficiency in homes, AND

- Targeted towards lower-income populations or households experiencing other energy-related burdens, usually identified through an income-based program eligibility criterion.

The definition above is scoped to identify the programs with a targeted strategy for improving the energy efficiency of low-income households. The definition above will exclude some policy and program strategies that do not have a strategy targeting low-income households but may reach low-income populations or that are part of a larger poverty reduction policy. For example, this report does not consider:

- Bill payment programs, emergency assistance programs, bill forgiveness programs, COVID deferred payment programs, provincial rate subsidies or other low-income assistance programs that do not include energy efficiency measures to reduce long-term energy use for households.
- Energy efficiency programs specifically targeted to Indigenous communities.
- Energy efficiency programs for non-profits, community centers, commercial buildings, even if they may service low-income communities.
- Rebate programs not based on income or explicitly targeted to low-income communities. These can include point of sale rebates programs or residential energy-efficient appliance rebates.

Each of these policy and program areas – particularly indigenous energy poverty – are important, complex, and urgent. We feel they deserve consideration through a separate study and are outside the scope of this report.

Methods

The information for this report was collected in three phases.

First, program information was collected through independent desk research from Efficiency Canada's provincial policy database, which includes a collection of program administrator demand side management reports, evaluation studies, and annual reports. This was supplemented by information collected from relevant websites, brochures, etc.

We then verified and clarified information through an information request to specific energy efficiency program administrators. This was then followed up by interviews with experts and administrators of low-income energy efficiency programs.

Active research began in October 2021, with information being collected, reviewed, and analyzed until February 2022. A draft report was circulated for peer review in early March with subsequent corrections and revisions.

Provincial/territorial low-income energy efficiency programs

Most existing low-income energy efficiency programs are administered at the provincial level by utilities or government departments. A federal low-income energy efficiency program has not existed since the cancellation of the short-lived EnerGuide for Low-Income Households program in 2007[20]. Some energy initiatives targeted to low-income and/or related to energy poverty also exist at the municipal level but are not considered in this paper [21].

Nearly every province in Canada – except for Alberta, which cancelled its programs in 2020 – reports some spending and the existence of a low-income energy efficiency program. In 2020, provinces in Canada spent a total of $115 million on low-income energy efficiency programs.[22]

Thus, the following discussion focuses on the provincial/territorial/utility level energy efficiency programs. The next section outlines existing programs in Canada and presents a taxonomy of program types that will be used throughout the paper. The last section reviews eligibility criteria and relevant policy considerations.

Program types

Low-income energy efficiency programs examined in this section have the characteristics noted in the section above. They provide no cost or low-cost, turnkey measures with eligibility criteria set to target lower-income households. This paper will discuss how each province has developed program strategies tailored to its context. However, it is possible to categorize program types by focusing on common delivery strategies and energy savings measures, as well as the target markets they serve. Table 1 categorizes provincial and territorial level programs in Canada along these dimensions.

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[20] Energy Efficiency Working Group and Energy Sector Sustainability Table. “Energy Efficiency and Energy Affordability for LowIncome Households,” n.d. https://publications.gc.ca/collections/collection_2009/ec/En4-100-6-2008E.pdf.

[21] See, for example, https://www.saltwire.com/nova-scotia/news/energize-bridgewater-receives-950k-in-acoa-funding-for-energy-poverty-reduction-program-475441/

[22] Gaede, Haley, Abboud, Nassar 2021 Canadian Provincial Energy Efficiency Scorecard. Efficiency Canada. Retrieved from https://www.scorecard.efficiencycanada.org/

Below, we provide a description of five program types based on strategies and upgrade measures that we will use throughout the paper.

1) Self-install
2) Direct install with minor upgrades
3) Direct install with major upgrades
4) Custom measures for multi-unit buildings
5) Product rebates
6) Supplemental

Below, each program type is described in turn.

Self-install programs supply easy-to-install energy-saving kits sent directly to qualifying households. The measures are then installed by occupants of the home using the instructions provided. The range of eligible measures includes LED lightbulbs, shower heads, faucet aerators, weather stripping, clotheslines, energy-saving power bars, and wraps for hot water tanks and water pipes. The energy-saving kits are offered at no cost to eligible low-income households. Such programs can be targeted to homeowners as well as tenants and achieve shallow energy savings for each household across a larger number of participants. Examples of these programs in Canada include the Energy Savings Kits Program in British Columbia and the Tier 2 level of support in the Ontario Independent Electricity System Operator's (IESO) Energy Affordability Program.

Picture 1: Energy saving measures offered through Energy Saving Kit from BC Hydro and FortisBC (source:fortisbc.com)

Direct install programs with minor upgrades typically start with a free walk-through home energy assessment by an expert energy advisor who then provides customized energy saving tips and advice to residents. Based on appropriate energy savings measures identified during the assessment, qualifying households receive minor energy efficiency upgrades such as programmable smart thermostats, energy savings kits, and weather stripping customized for their needs. A select few households may receive energy efficiency ENERGY STAR appliance upgrades (fridge, water heater, furnace, air-conditioners) based on the condition of the existing equipment. Some households may also be offered minor health and safety measures, like CO detectors.

While some programs categorized here as offering ‘minor upgrades’ may occasionally offer a few major upgrades to a few select households, this report categorizes them as minor upgrade programs if a majority of the program energy savings can be attributed to minor upgrade measures. For instance, consider IESO’s Home Assistance Program (offered in 2018-2020), where over 75% of the program’s energy savings (2018-2020) came from minor upgrade

measures offered to all participants - like LED lights, clothes racks, and smart power bars while major upgrade measures like air-sealing and insulation offered to a select few participants accounted for less than 6% of energy savings.

Direct install programs with major upgrades are similar to the federal Greener Homes program and provincial programs capable of incentivizing deep retrofits in the ability to pay market. Such programs typically start with a no-cost or subsidized low-cost walk-through home energy assessment by an expert energy advisor who provides customized energy saving tips and advice to residents. Based on the assessment, a range of eligible measures include basement, attic and crawlspace insulation, upgrades to energy-efficient space and water heating equipment, air sealing, window upgrades, heat recovery units and other major energy upgrades measures are prescribed and directly installed by qualified professionals. Major upgrade measures are typically delivered at no cost to participating households[23].

Custom measures for multi-unit buildings offer energy savings measures customized for the energy needs and built environment of multi-unit buildings. Measures can include technical assistance for building managers, and/or direct installs of in-suite measures, and/or rebates on large commercial heating and cooling systems. Technical assistance can be provided for new or existing buildings and include support for integrated design workshops, custom project design, project specification process, project management, identifying and applying for rebates, developing Requests for Proposals (RFP), engaging qualified contractors, project implementation and follow-up project evaluation. Supports can also include funding for hiring technical consultants or providing training for staff of the housing providers. Examples of such programs are BC Housing's Social Housing Incentive Program and Enbridge Gas' Savings by Design Affordable Housing Program.

Installation of energy-efficient equipment can include in-suite measures similar to direct-install programs with minor upgrades. Additional measures can also include commercial building-level major upgrades, such as advanced control systems, building automated systems, variable frequency drives, energy recovery ventilators, advanced ventilation system upgrades, and large boiler system upgrades. In-suite measures are typically free of cost, while building-wide upgrades targeted to housing providers are offered at a highly rebated or significantly reduced cost. Examples of such programs are the Affordable Multi-family Housing Program by Enbridge Gas, the Rental Apartment Efficiency Program by FortisBC and Efficiency Nova Scotia's Affordable Multi-family Housing Program.

[23] The Manitoba Energy Efficiency Assistance Program presents a mix of what we are terming direct install with minor upgrade and product rebate programs, as some measures are installed at no-cost while more efficient furnaces and water boilers are rebated at significantly reduced cost for income-eligible households.

Product rebate programs are similar to general programs that provide rebates for energy-efficient equipment yet adjust the rebate amount to provide equipment at no cost or at a significantly reduced cost for income-qualified households. Timing of participation can occur at the point of retail sale or take a turnkey approach where equipment is installed on-site. A notable example is CleanBC's Income Qualified Rebate program which offers sliding scales of support based on incomes and covers total invoiced upgrade costs, not just a rebate on energy-efficient products.

Supplemental programs are principally focused on enabling homeowners to make health, safety, and mobility upgrades to their existing homes and improvement to energy efficiency one component. Examples in Canada are found in the Northwest Territories and Nunavut. Funding is determined by a sliding scale based on household income, and households are selected for upgrade measures according to the prioritization criterion that is based on a 'level of need' as determined by the program administrator.

Table 1: Provincial/Territorial low-income energy efficiency programs by type and target market

Target Market	Program	Program administrator
Self-install programs		
Homeowners or renters	Specified Income Home Winterization Program	Arctic Energy Alliance
	Energy Affordability Program (EAP) Tier 2	Independent Energy Systems Operator (IESO)
	Energy Savings Kit (ESK) Program	BC Hydro and FortisBC
Multi-lingual households	Empower Me (BC)	Empower Me
Direct install programs with minor upgrades		
Homeowners or renters	Éconologis	Transition énergétique Québec (TEQ)
	Energy Affordability Program (EAP) Tier 1 - Comprehensive Support (Previously Home Assistance Program HAP)	Independent Energy Systems Operator (IESO)
	Energy Conservation Assistance (ECAP) Program	BC Hydro and FortisBC (Electric & Gas)
Homeowners or renters not living in MURBs	Energy Assistance Program	SaskPower
	Energy Efficiency Assistance Program	Efficiency Manitoba
Households with high energy cost burdens	Home Upgrade Program (Cancelled in 2020)	Empower Me, and Government of Alberta
Direct install programs with major upgrades		
Homeowners or renters not living in MURBs	Winter Warming Program	efficiencyPEI
	Home Winterproofing Program	Enbridge Gas
Homeowners	Low Income Energy Savings Program (LIESP)	New Brunswick Power
Homeowners not living in MURBs	Home Energy Savings Program (Electric); Home Energy Savings Program (Oil-Heat)	Newfoundland and Labrador Housing Corporation
	HomeWarming program	Clean Foundation and Efficiency Nova Scotia

Target market	Program	Program administrator
Custom measures for multi-unit buildings programs		
Existing and new affordable housing	Affordable Multi-Family Housing Program	Enbridge Gas
Existing rental multi-unit buildings	Multi-unit Residential Building Efficiency Program	efficiencyPEI
	Rental Apartment Efficiency Program	Fortis BC (Electric & Gas)
Existing affordable housing	Affordable Multi-Family Housing Rebate Program	Efficiency Nova Scotia
Existing affordable housing	Low-Income Support Program	Fortis BC (Gas)
	Social Housing Incentive Program (SHIP)	BC Housing
	Social Housing Retrofit Support Program (SHRSP)	BC Hydro and FortisBC (Electric & Gas)
New affordable housing	Savings by Design Affordable Housing Program	Enbridge Gas
Product rebate programs		
Existing affordable housing	Low-Income Prescriptive Program	Fortis BC (Gas)
	Supplément ménages à faible revenu	Énergir
Homeowners	Energy Efficient Equipment Rebates Home Insulation Rebates	efficiencyPEI
	Free Heat-Pump for Income Qualified Program	PEI Department of Environment, Energy and Climate Action
Homeowners not living in MURBs	Income Qualified Rebate Program	FortisBC (Gas)
	Income Qualified Rebate Program – Heat Pumps	FortisBC (Electric)
Households not living in MURBs	CleanBC Income Qualified Program	CleanBC
Supplemental programs		
Homeowners	PEI Home Renovation Program	PEI Dept of Social Development & Housing
	Home Renovation Program	Nunavut Housing
	Home Repair Program; Preventative Maintenance Program	Northwest Territories Housing Corporation

Target market	Program	Program administrator
Senior homeowners	PEI Seniors Home Repair Programs	PEI Dept of Social Development & Housing
	Seniors Home Repair Program	Nunavut Housing
	Seniors Aging-in-Place Program	Northwest Territories Housing Corporation

Who is eligible?

Eligibility is an important aspect of low-income efficiency program design, given that these programs are targeted towards households with lower incomes.

This section will first discuss income *eligibility*: income-based criteria that define the 'low-income' target market for each provincial and territorial program. Then, we discuss program *qualification*: how programs ensure that eligible households that apply for the program meet the target market criteria.

Income eligibility

Most programs have income-based eligibility requirements, and we can reference them with respect to implicit "poverty lines" or baselines to define low-income. Statistics Canada publishes three different low-income measures[24]: Low-Income Cut-Off (LICO), Low Income Measure (LIM) and Market Based Measure (MBM). In 2019 Canada adopted the MBM as an official measure of poverty[25], however other measures have been widely used before this decision and continue to be used by many programs.

LICO is a measure of disproportionate cost burdens. It is an estimate of income under which a family will devote a much larger share of household income to necessities like food, clothing and shelter when compared to an average family[26]. As costs for home essentials vary by household size and geography (urban, rural, etc.), Statistics Canada publishes LICO thresholds separately for seven different household sizes (1 person up to 7 person households) and for five different community sizes (rural areas to large urban areas)[27]. This measure tends to have the most restrictive definition of low-income and captures the lowest number of Canadians.

The Low-Income Measure (LIM) is a relative measure of poverty that seeks to capture households with incomes substantially below the average. It is calculated at 50% of the national household median income. It is adjusted for household size and not adjusted for community

[24] Statistics Canada: Low-income Definitions: https://www150.statcan.gc.ca/n1/pub/75f0011x/2012001/notes/low-faible-eng.htm

[25] Canada, Employment and Social Development. "Opportunity for All – Canada's First Poverty Reduction Strategy." Navigation page, August 21, 2018. https://www.canada.ca/en/employment-social-development/programs/poverty-reduction/reports/strategy.html.

[26] Statistics Canada. Low-Income Cut Offs https://www150.statcan.gc.ca/n1/pub/75f0002m/2012002/lico-sfr-eng.htm

[27] Statistics Canada. Table 11-10-0241-01 Low income cut-offs (LICOs) before and after tax by community size and family size, in current dollars

size[28]. This measure is commonly used for international comparisons and usually captures the greatest number of households within its definition.

The market-based measure defines low-income by using a set of goods and services that represent a basic standard of living. It is adjusted based on costs of living in specific geographies. This measure tends to present a measure of low-income prevalence that is in-between the LICO and LIM.[29]

Table 2 groups low-income programs by their income thresholds. Most programs reference the LICO to determine program eligibility, and these programs use the incomes associated with "urban areas with populations over 500,000" regardless of where the participating household is located. Ontario is unique in recently starting to use the LIM baseline for eligibility. Some programs do not reference a low-income measure and simply present a household income threshold. These programs are noted in *italics,* and we have placed them on a LICO scale by comparing the income level to the 2019 before-tax LICOs in the largest city within the province.[30] The table also includes what we call "context specific baselines" using income thresholds outside of the low-income measures discussed above.

Table 2 clearly shows that several programs have income eligibility well above low-income cut-offs. This includes Ontario programs that have moved to low-income measure (LIM) which will enable those with moderate incomes to participate, as well as two programs that provide major upgrades (the efficiencyPEI Winter Warming program and the Home Energy Savings Program for oil-heated homes in Newfoundland and Labrador). All programs with LICO thresholds also provide a more expansive definition of low-income by using the LICO associated with large urban areas for urban as well as rural households.

These expansions in eligibility above LICO recognize that households with incomes above this standard measure of poverty experience significant barriers to improving energy efficiency. As discussed above, several households with incomes that could be considered "moderate" face significant energy burdens and are considered energy poor.

The table also includes what we labelled "context specific" baselines of income eligibility. These are alternative low-income measures to the ones discussed above and are more tailored to regional contexts. In New Brunswick, the low-income program uses income thresholds from the

[28] Statistics Canada. Table 11-10-0232-01 Low income measure (LIM) thresholds by income source and household size

[29] For more details on the different measures, see 2017 Maytree. How do we measure poverty? Retrieved from https://maytree.com/wp-content/uploads/How_do_we_measure_poverty_May2017.pdf

[30] https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1110024101

Department of Social Development, which are higher in rural communities and homes with a larger number of bedrooms[31]. The higher income limits for rural communities are the inverse of the LICO measures and help New Brunswick recognize that rural communities in the province are more likely to experience additional barriers related to housing above low-income thresholds. Programs in Nunavut and the Northwest Territories used CMHC Core Housing Need Income Threshold, which represents the amount of income a household must have to afford to own and operate a home without government assistance.[32] These are much higher income thresholds, representing the higher cost of living in the north and the policy objectives of these programs focused on housing security.

[31] NB Department of Social Development Housing Income Limits, which are also used to determine income eligibility for public housing and rent supplement programs: https://socialsupportsnb.ca/en/program/public-housing-and-rent-supplement-programs

[32] For more information see https://www.ntassembly.ca/sites/assembly/files/td_90-192.pdf

Table 2: Programs where participants are eligible via income-based thresholds

Income eligibility threshold	Program	Administrator
Low-income cut-off (LICO) or *absolute household income baseline*		
< LICO	Éconologis	Transition énergétique Québec (TEQ)
	Home Energy Savings Program (Electric)[33]	*Newfoundland and Labrador Housing Corporation*
	Energy Efficient Equipment Rebates; Home Insulation Rebates[34]	*efficiencyPEI*
	Free Heat-Pump for Income Qualified Program[36]*;*	*PEI Dept.of Environment, Energy and Climate Action*
< LICO X 115%	HomeWarming program	Clean Foundation and Efficiency Nova Scotia
< LICO X 125%	Energy Efficiency Assistance Program	Efficiency Manitoba
	Supplément ménages à faible revenu	Énergir
< LICO X 130%	Energy Savings Kit (ESK) Program Energy Conservation Assistance (ECAP) Program	BC Hydro and FortisBC (Electric & Gas)
	Income Qualified Rebate Program – Heat Pumps	FortisBC (Electric)
	Income Qualified Rebate Program – Furnace, Boiler, Water Heater	FortisBC (Gas)
	Energy Assistance Program	SaskPower

[33] < $32,500 threshold, which is 93% of 2019 3 person LICO in community size between 100,000 and 499,999. The population of the City of St. John's is 114,000. We assume this is roughly similar to LICO given large number of smaller communities in province.

[34] < $35,000 is absolute income threshold, while 2019 3-person LICO for community size between 30,000 to 99,999 is $34,615. Charlottetown population is 36,000.

< LICO x ~150%	*Winter Warming Program*[35]	*efficiencyPEI*
	Home Energy Savings Program (Oil-Heat)[36]	*Newfoundland and Labrador Housing Corporation*
< LICO x 210%	*CleanBC Income Qualified Program*[37]	*CleanBC*
Income eligibility threshold	**Program**	**Administrator**
Low-income measure (LIM) baseline		
< LIM X 135%	Home Winterproofing Program	Enbridge Gas
	Energy Affordability Program (EAP) – Tier 1 Comprehensive Support	Independent Energy Systems Operator (IESO)
< LIM X 165%	Energy Affordability Program (EAP) – Tier 2 Energy Saving Kits	
Context specific baseline		
Department of Social Development Housing Income Limits	Low Income Energy Savings Program (LIESP)	New Brunswick Power
CMHC Core Housing Need Threshold	Home Repair Program Preventative Maintenance Program Seniors Aging-in-Place Program;	Northwest Territories Housing Corporation
	Seniors Home Repair Program	Nunavut Housing

[35] <$50,000 in absolute income threshold, which is 144% of 2019 3-person LICO for community size between 30,000 and 99,999.

[36] <$52,000 in absolute income threshold, which is 149% of 2019 3-person LICO for community size between 100,000 and 499,999.

[37] Income eligibility threshold of < LICO x 160% for Level 1 support (eligible for up to 95% of upgrade costs) and < LICO x 210% for Level 2 support (eligible for up to 60% of upgrade costs).

Program qualification

This section identifies strategies programs use to determine program qualification – requiring proof of income documents, qualification based on participation in other income support programs that have their own income checks, and programs that have no preliminary income requirements.

Proof of income documents

To demonstrate qualification for the program, most programs require that households submit a copy of their Income Tax Return and/or an Income Tax Notice of Assessment (NOA) for the most recent tax year obtained from the Canada Revenue Agency. Programs then verify that the household net income reported on Line 236 on the most recent NOA is under the maximum income thresholds outlined in Table 2. Every program in Table 2 – with the exception of programs outlined below in Tables 3 & 4 require proof of income documentation.

Participation in other programs

In some jurisdictions, households automatically qualify for energy efficiency upgrades if they have already received some form of social assistance. This ability to "piggyback" on existing programs that serve low-income populations can ease administrative burdens and increase participation. The eligibility is typically already tied to income, but there is no reason for someone to prove low-income more than once.

Table 3 lists programs where participants automatically qualify for energy efficiency services if they participate in another government program. This eligibility method exists in British Columbia, Manitoba, Ontario and Nova Scotia. This form of participation is dependent on the context of larger income and housing support services in each jurisdiction.

The other characteristic of note is how energy efficiency program qualification can be supported by larger energy assistance strategies. This is the case in Ontario, where households that have received a one-time emergency bill-payment assistance through the Low-Income Energy Assistance Program (LEAP) are automatically eligible for low-income energy efficiency programs offered by the province's two program administrators IESO and Enbridge Gas.

In Nova Scotia, households that qualify for Housing Nova Scotia's low-income support program (which has a lower income eligibility threshold) are automatically eligible for the HomeWarming program.

Table 3: Programs where participants are eligible via participation in other government assistance programs

Energy efficiency program	Administrator	Government programs used for energy efficiency program eligibility
Energy Savings Kit (ESK) Program Energy Conservation Assistance (ECAP) Program Income Qualified Rebate Program – Furnace, Boiler, Water Heater Income Qualified Rebates Program – Heat Pumps CleanBC Income Qualified Rebate Program	BC Hydro and Fortis BC Fortis BC (Gas) Fortis BC (Electric) Clean BC	• social or disability assistance • Shelter Aid for Elderly Renters (SAFER) • Rental Assistance Program from BC Housing • National Child Benefit Supplement • Guaranteed Income Supplement • Proof of participation in ECAP or ESK program • 3 recent paystubs (Clean BC program only) • An endorsement form from organization with knowledge of participant's financial situation (Clean BC program only)
Energy Efficiency Assistance Program	Efficiency Manitoba	• Canadian Tire Jumpstart. • City of Winnipeg Recreation Services Fee Subsidy Program. • Community Centre Program Registration Fee Subsidy Grant; • Community Volunteer Income Tax Program. • KidSport Manitoba. • Legal Aid; • Manitoba Camping Association Sunshine Fund; • Manitoba Employment and Income Assistance. • Neighbours Helping Neighbours Program. • No One Left Behind Subsidy • Rent Assist for Manitobans Not Receiving Employment and Income Assistance. • SEED Access to Benefits Program. • SEED Individual Development Account. • SEED Inner City Homebuyer Program. • SEED Saving Circle; and/or • WINNpass.

Energy efficiency program	Administrator	Government programs used for energy efficiency program eligibility
Energy Savings Kit (ESK) Program Energy Conservation Assistance (ECAP) Program Income Qualified Rebate Program – Furnace, Boiler, Water Heater Income Qualified Rebates Program – Heat Pumps CleanBC Income Qualified Rebate Program	BC Hydro and Fortis BC Fortis BC (Gas) Fortis BC (Electric) Clean BC	• social or disability assistance • Shelter Aid for Elderly Renters (SAFER) • Rental Assistance Program from BC Housing • National Child Benefit Supplement • Guaranteed Income Supplement • Proof of participation in ECAP or ESK program • 3 recent paystubs (Clean BC program only) • An endorsement form from organization with knowledge of participant's financial situation (Clean BC program only)
Energy Affordability Program (EAP) –Tier 1 Comprehensive Support	Independent Energy Systems Operator (IESO)	• resident of social housing (IESO program only) • Allowance for Survivors • Guaranteed Income Supplement • Allowance for Seniors • Ontario Works • Ontario Disability Support Program • Healthy Smiles Ontario Child Dental Program
Home Winterproofing Program	Enbridge Gas	• Low-Income Energy Assistance Program grant • Ontario Electricity Support Program • Reciprocal qualification between Enbridge Winterproofing Program & IESO Energy Affordability program
HomeWarming Program	Clean NS and Efficiency Nova Scotia	Referral from Housing Nova Scotia's low-income support program.

Targeted programs with no preliminary income requirements

It is also possible to target low-income populations without a preliminary income requirement. Income qualification requirements might not be required if programs are targeting building types or populations likely to include low-income Canadians.

Table 4 provides examples. These include programs that target affordable housing buildings as well as programs that install energy efficiency measures to rental households.

Noteworthy is Empower Me program in BC and Alberta. In Alberta, the program was unique in prioritizing customer acquisition from historically underserved groups such as newcomers and immigrants and installing energy efficiency measures that optimized affordability on a household level. The program had an open intake and received information from individuals on their energy costs and income. Deeper no-cost energy-saving measures were then prioritized for those households with the highest energy burden and highest opportunities for savings. While

the upgrades portion of the program in Alberta is currently closed, the program continues today offering energy literacy, education, and support for multilingual Albertan households.

The Empower Me program in British Columbia is targeted towards multi-racial and multi-ethnic communities. The program focuses on addressing trust, language, and accessibility barriers, and support for immigrants and newcomers with education and concierge-style support services. The program supports immigrant and newcomer British Columbians in accessing BC Hydro and FortisBC ‘s ESK and ECAP Programs.

Table 4: Targeted programs with no preliminary income qualification requirements

Program	Administrator	Target market
Affordable Multi-Unit Family Housing Rebate Program	Efficiency Nova Scotia	Designated as affordable housing with at least 50% of rents below a specified amount
Affordable Multi-Family Housing Program	Enbridge Gas	
Multi-unit Residential Building Efficiency Program	efficiencyPEI	All rental households in MURBs
Rental Apartment Efficiency Program	Fortis BC	
Home Upgrade Program (Cancelled in 2020)	Empower Me, and Government of Alberta	Households with high energy costs relative to income
Empower Me	Empower Me	Immigrants and newcomers in BC and Alberta
Low-Income Prescriptive Program	FortisBC (Electric & Gas)	Affordable housing providers
Low-Income Support Program		

Eligibility conclusion

This review of program approaches to eligibility demonstrates some commonalities, yet there is no uniform approach used by low-income energy efficiency programs in Canada. Many of the eligibility rules are quite context-specific, based upon different community sizes, fuel types, or costs of living. Others are integrated within larger social assistance programs and energy poverty reduction strategies. Still, others have found ways to target relevant populations without an income-based eligibility criterion. Many programs recognize that energy efficiency barriers exist for people with incomes above standard poverty lines or definitions of low-income.

Further in the report, we will discuss how federal government involvement in low-income energy efficiency will need to take these context-specific factors into account while supporting innovative program designs with different ways of reaching energy-poor Canadians. In addition, federal resources and unique objectives could help more programs expand eligibility to reach more Canadians experiencing other barriers, including high energy cost burdens.

What are existing programs accomplishing?

Program participation

Program participation concerns how many people the program is reaching. In a typical year, a little over 55,000 Canadian households receive energy efficiency upgrades through a provincial low-income energy efficiency program.

It is easiest to understand participation as a percentage of total eligible households. In Table 3, we calculate an annual participation rate to compare across select programs.

The participant data is taken from program reports and interviews with program administrators. Note that the number of participants is closely related to, yet not equivalent to the number of households. Several programs do not distinguish between households and participants in their reporting, and it is possible that one household might participate in a program more than once. It is also possible that a participant may refer to a multi-unit building with many households.

It was not possible to find information on the total eligible participants for several programs. Thus, we estimated this number from census data on income by household and cross-referenced it with the program's stated eligibility criteria. This estimate of total eligible households should be understood as an upper bound because we chose to include more households rather than less, given the way the census data was grouped. More details on this methodology are found in Appendix C.

Within the table, the programs are grouped based on their type: self-install or direct install with either minor or major upgrades. We did not include other program types for multi-unit residential, product rebates, or supplemental programs because participants' definitions and collecting data are more complex and difficult to compare.

Table 5 shows that a self-install program has the highest participation rate of 2.5% of eligible households. The shallower saving measures and reliance on participants to install energy efficiency measures enables it to reach more households.

The direct install with minor upgrade program participation rates ranges from 0.7% to 1.0% in the programs below, which is similar to or greater to the participation rates in the overall residential market from 2017-2020.[38] The participation numbers for the major upgrade direct

[38] Based on 2017-2020 data from EnerGuide / EcoEnergy reports of number of households receiving D/E evaluations where the annual retrofit rate averaged 0.7% of single detached and attached households. See Haley and Torrie "Canada's Climate Retrofit Mission".

install programs are interesting. We would expect programs offering more comprehensive retrofit upgrades to have lower participation rates, which is the case for some programs. However, Nova Scotia and PEI have participation rates of about 1% and 2%, respectively. These two provinces have consistently led the country in low-income program investment level benchmarks[39], suggesting that robust funding can increase participation, even with major upgrade programs.

Table 5: Annual program participation rate for select programs

Program name	Estimated annual number of participants	Estimated total number of eligible households	Annual participation rate [%]
			Self-install programs
FortisBC (Electric & Gas) and BC Hydro Energy Saving Kit Program (2016 – 2020)	15,010[40]	608,700	2.5%
			Direct install programs with minor upgrades
IESO Home Assistance Program (2018 – 2020)	11,430	1,582,845	0.7%
TEQ Econologis (2008 – 2020)	8,110	920,635	0.9%
Fortis BC (Electric & Gas) and BC Hydro Conversation Assistance Program (2016 – 2020)	4,160[41]	608,700	0.7%
			Direct Install programs with major upgrades
Nova Scotia HomeWarming Program (2010 – 2019)	1,830	137,880	1.3%
efficiencyPEI Winter Warming Program (2019 – 2021)	610	29,105	2.1%
NL Housing Corporation Home Energy Savings Program (2019 – 2021)	330	53,940	0.6%
NB Power Low-Income Energy Savings Program (2018 – 2021)[42]	330	150,870	0.2%

[39] Gaede, Haley, Abboud, Nassar 2021 Canadian Provincial Energy Efficiency Scorecard. Efficiency Canada. Retrieved from https://www.scorecard.efficiencycanada.org/

[40] Total kits estimated based on average participation numbers reported across program years 2016 – 2020 for BCHydro (approx. 13,510) and FortisBC Electric (approx. 1,500). FortisBC Gas cost shares kits with both BC Hydro and Fortis Electric. As such the kits reported by the electric utilities are unique and do not double count.

[41] Total participation estimated based on average participation numbers reported across program years 2016-2020 for BC Hydro (approx. 3,660) and FortisBC Electric (approx.. 500). FortisBC Gas cost shares with both BC Hydro and Fortis Electric for those customers who have natural gas in their home. As such the participant count reported by the electric utilities are unique and do not double count.

[42] Program participation and investment figured based on targets set by NB Power DSM plan for 2018-2021, reported in https://www.nbpower.com/media/1489275/dsm_plan-2019-2021-en.pdf

Energy savings depth

The comprehensiveness, or depth, of energy savings measures is important for a socially just transition to net-zero emissions, because

- each upgrade should prepare a home for zero-carbon or zero-carbon ready performance, and
- deep energy savings deliver the significant bill savings that help Canadians escape from energy poverty.

Few programs report average GHG savings per household or per participant. An average GHG metric is not necessarily instructive on its own because those savings can be accomplished solely through fuel switching and might not make building envelope upgrades that deliver comfort, health and safety, and bill reduction benefits important for lifting households out of energy poverty. Thus, energy saving metrics are important to consider energy poverty alongside net-zero emission objectives.

Table 6 presents the annual program investment per participant and energy savings per participant for select programs in Canada. As noted above, participants are households in most cases; however, it is possible that they are not synonymous if one household participates in more than one program. Some programs will have different target markets as well, with different energy savings potential. Table 1 showed that renters are frequently targeted by self-install programs, while direct install programs with major upgrades are more likely to be restricted to homeowners living in single-family dwellings. Note that the program costs per household also include non-incentive costs. These may include activities such as participant outreach, program marketing, qualifying households for eligibility, training assessors and installers, measurement and verification, program reporting and other costs associated with administering the program. For instance, major upgrade programs may require at least three in-home visits-one for the home assessment, the second for installing measures, and the third visit for a follow-up measurement and verification for quality assurance. While a detailed breakdown of costs between incentive and non-incentive costs is not available for all programs, it is estimated that programs spend between 20%-30% of their budget on non-incentive costs.[43]

We wish to caution against using Table 6 to directly compare energy saving metrics across programs shown in the table. Instead, Table 6 uses a few programs for which all relevant information was available as examples to highlight the range of energy savings we typically expect to see for each program type. In practice, inputs into modelling methodology, assumptions around self-install rates, rebound rate estimation methods and several other

[43] estimate based on information provided by key informants with direct experience with low-income energy efficiency program administration.

factors impact estimated energy savings reported by programs. Furthermore, measurement and verification protocols and practices vary across provinces and accounting for those differences is outside the context of this report.

Table 6 shows that self-install programs offering basic and low-impact measures have the lowest investment and savings per participant. The programs typically cost less than $100 per program participant and save 1.0-1.5 GJ per participant.

Table 6: Investment and energy savings per participant for select low-income energy efficiency programs

Example program	Annual program investment per participant [$]	Annual energy saved per participant [GJ]
		Self-install programs
FortisBC Electric Energy Savings Kit (ESK) Program (2016 – 2020)	$84	1.0 GJ
FortisBC Gas Energy Savings Kit (ESK) Program (2016 – 2020)	$21[44]	1.5 GJ
		Direct install programs with minor upgrades
TEQ Econologis (2008 – 2020)	$410	1.6 GJ
Fortis BC Gas Energy Conversation Assistance Program (2016 – 2020)	$980	4.9 GJ
		Direct install programs with major upgrades
Enbridge Gas Home Winterproofing Program (2018 – 2020)	$2,620	17.2 GJ
Nova Scotia HomeWarming Program (2010 – 2019)	N/A	39.0 GJ
NB Power Low-Income Energy Savings Program (2018 – 2021)[45]	*$11,170*	N/A

The minor upgrade programs that include home assessments range between $400 - $1,000 per participating household and typically result in a higher level of savings. Major upgrade programs include comprehensive building envelop measures. The table below shows the *average* per participant costs of a wide range between $2,600 to $11,000, and energy savings in the 17 GJ - 40 GJ range are typical for these programs. This would be a reduction of between 15% - 30% from the average energy use of an average single-detached home in Canada[46], and lower for

[44] Note that this captures costs and savings associated with upgrades associated with natural-gas energy savings only. This program is cost-shared with electric utilities, therefore BC Hydro and FortisBC Electric claim a portion of the costs/savings that is attributable to electric energy savings only.

[45] Program participation and investment figured based on targets set by NB Power DSM plan for 2018 - 2021, reported in https://www.nbpower.com/media/1489275/dsm_plan-2019-2021-en.pdf

[46] Calculated from average energy use intensity of 136.7 GJ/household for single detached homes in 2018 reported by Natural Resources Canada, Office of Energy Efficiency, National Energy Use Database, Residential Sector – Energy Use Analysis Tables, Table 3 (a). Retrieved from

less energy-efficient homes. We wish to emphasize that the figures in Table 6 represent *average* values across the program. The range of investments per household and energy savings within each program may vary widely for each participating household.

Existing program strengths

Our review thus far demonstrates that there are a variety of low-income energy efficiency programs across the county at provincial and territorial levels. We have reviewed eligibility policies and program participation metrics, and depth of savings.

In this section, we will highlight two general strengths of provincial-level programs that we see as particularly relevant for reducing energy poverty and achieving net-zero emissions. The first strength relates to participant outreach and engagement. The second concerns program continuity in their markets, the institutional learning and local relationships that correspond with this history.

Participant outreach and engagement

Our review of program participation shows that several low-income programs are successfully engaging a relatively large number of low-income Canadians in energy efficiency. This engagement is achieved through a range of marketing and outreach strategies that can be quite specific to local contexts. These are best illustrated through program-specific case studies, which we present below.

Self-install program example: IESO HAP & EAP

IESO's Home Assistance Program (HAP) offered between 2018 - 2020 in Ontario used a multi-pronged approach to identify and recruit participants. Methods include social media platforms, digital marketing, geotargeted advertising, search engine optimization, and customized landing page. Additionally, HAP created awareness through local community events and outreach through traditional media such as newspaper ads, newspaper inserts, radio, TV spots, and sporting events.

IESO's new Energy Affordability Program offered from 2021 onwards builds on the outreach and engagement infrastructure from the previous HAP. IESO has partnered with social service community agencies that have touchpoints with low-income households. When households access social supports at community agencies, they are also made aware of IESO's energy

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https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=AN&sector=res&juris=00&rn=11&page=0

saving programs they might be eligible for. The most significant source of participant referral for IESO are social housing providers and landlords – accounting for approximately 45% of all referrals (in program year 2021)[47]. Other sources include a brochure in hydro bills, word-of-mouth and coordination with Enbridge Gas on program referral and program eligibility qualification.

IESO also hosts a quarterly roundtable for a panel of experts[48] serving the low-income sector to "create a venue for best practices" and to "better understand the needs and experiences of income-eligible households"[49]. The inputs from the roundtable may inform future program design, participant outreach, and marketing.

Direct-install with minor upgrades example: BC Hydro and FortisBC ECAP

BC Hydro and FortisBC (electric & gas) – work together to offer the Energy Conservation Assistance (ECAP) program to income-qualified households. The partnership between the two utilities helps leverage economies of scale for outreach efforts while also reducing confusion in the marketplace for eligible households.

Digital media marketing and brochure inserts with bills are reportedly the most impactful strategy for the ECAP program.[50] Additionally, the program also has long-standing relationships with community service organizations, food banks and other institutions with regular touchpoints with income-eligible households. To improve outreach to immigrant, newcomer and multi-lingual communities, BC Hydro and Fortis BC partner with Empower Me to train community champions to deliver peer-to-peer educational workshops in their own communities. Both FortisBC and BC Hydro target prior participants of the lower-impact Energy Saving Kit (ESK) programs for recruitment into ECAP direct install program.[51]

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[47] IESO Energy Affordability Program Roundtable Meeting Presentation & Notes Oct 2021: https://saveonenergy.ca/-/media/Files/SaveOnEnergy/residential/eap-roundtable-20210610-presentation.ashx

[48] Disclosure: The lead author of this report Abhilash Kantamneni is a volunteer on the panel of experts providing input to the EAP Roundtable.

[49] EAP Roundtable Kickoff Meeting: Objectives (pg 12) https://saveonenergy.ca/-/media/Files/SaveOnEnergy/residential/EAP-Roundtable-Meeting-June-3-2021-with-questions.ashx

[50] FortisBC Annual Report 2021: https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/210331-fei-2020-dsm-annual-report.pdf?sfvrsn=8824a81d_2

[51] FortisBC Annual Report 2021: https://www.cdn.fortisbc.com/libraries/docs/default-source/about-us-documents/regulatory-affairs-documents/gas-utility/210331-fei-2020-dsm-annual-report.pdf?sfvrsn=8824a81d_2

Direct-install program with major upgrades example: NL Home Energy Savings Program

Newfoundland and Labrador's Home Energy Savings Program is a long-running program that has helped an average of approximately 700 households per year since its inception in 2009.[52] The program is well known in the province, and most outreach happens through word-of-mouth and prospective households calling in directly to sign up for the program.

The low-income program is administered by the Newfoundland and Labrador Housing Corporation. Some referrals come from the provincial utility's take Charge Home Energy Efficiency Loan program, which offers low-interest loans for energy efficiency and heat pumps. Other referrals come from the different points of contact low-income homeowners have with the Newfoundland and Labrador Housing Corporation or the Department of Health and Community Services.

Northern example: Northwest Territories Specified Income Winterization Program

The Specified Income Winterization Program in the Northwest Territories is administered by a third-party contractor that uses a community partnership model to deliver energy saving kits and energy efficiency advice to communities. In 2020, the contractor partnered with five community organizations representing six communities.[53] A liaison worker from each community was hired and provided training on energy saving measures. The liaison worker hosted a workshop for low-income homeowners in their own community to raise awareness, distribute energy saving kits and help ensure the kits were installed correctly.

Each of these examples show that existing programs rely on factors such as local partnerships, stakeholder engagement, utility customer marketing channels, and brand recognition that spreads through word-of-mouth to increase participation. These strategies have grown and improved over time and can be highly context-specific. We believe that the institutional infrastructure already being used to reach low-income households is a key strength of existing programs. In fact, it is important for achieving net-zero emissions and energy poverty reductions.

[52] Previously known as Residential Energy Efficiency Program (REEP) from PY 2009 – PY 2018

[53] Specified Income Home Winterization Program Annual Report 2021: https://aea.nt.ca/document/4762/

Program continuity, institutional learning, and local relationships

Program continuity is closely related to participant outreach and engagement. Many existing low-income energy efficiency programs have been available for low-income homeowners for many years, either in current or slightly different forms (see Appendix A: Program Database for full listing of years in market for each program). Programs such as TEQ's Econologis with long years in the market (2008 – present) benefit from word-of-mouth and name recognition when recruiting households for participation in energy saving measures.

Program continuity also helps program administrators develop deep institutional knowledge about the methods that work for their context. Programs continuously refine outreach strategies and build on the knowledge accrued over many years of program delivery.

Some programs also receive input and learn directly from key stakeholders through advisory boards, such as FortisBC's Energy Efficiency and Conservation Advisory Group. Other programs such as Clean NS's HomeWarming Program use internal processes such as annual reviews, contractor feedback, and participant surveys to segment the market, identify barriers to participation, and improve program delivery.

Programs also benefit significantly from referrals from a network of strong community partnerships and institutional relationships. Programs with long continuity, such as BC Hydro and FortisBC's Energy Savings Kits program, can tap into their internal roster of households that have previously qualified for lower levels of support and recruit them for programs offering additional measures.

Finally, utilities have access to disaggregated energy consumption data that enables them to gain insights from consumption and payment trends to target program offerings towards specific geographies or communities. This insight could promote more active and strategic outreach and avoid barriers associated with application-based intake methods.

Taken together, existing providers leverage a wide array of tools, strategies, networks, and relationships to identify and recruit low-income households for participation in energy efficiency programs. No two programs have the same strategy. Each program's marketing and outreach strategy is geared specifically to the context within which it operates.

Existing program gaps

This section discusses gaps common to existing provincial programs that are most relevant to the joint objectives of achieving net-zero emissions and eliminating energy poverty. In this section, we are generalizing our overall review of existing programs and making note of exceptional examples.

We wish to note that the gaps identified are not necessarily due to deficiencies in program implementation. In the next section, we will discuss our view that gaps are primarily related to policy objectives of provincial governance systems. This stance leads us to conclude that expanding the scale and scope of low-income energy efficiency programs is primarily a policy systems issue.

The four common gaps in low-income energy efficiency programs we discuss below relate to

1) Deeper energy savings
2) Fuel switching to zero-carbon (ready) fuels
3) Removing non-energy barriers
4) Targeting energy-poor and hard to reach households

Deeper energy savings

Achieving net-zero emissions requires deep retrofits to both significantly reduce emissions from fossil fuel burning within households, and to avoid creating significant constraints on clean electricity supplies. To reduce energy poverty, the magnitude of energy savings per household also needs to be high enough to make a material impact on unaffordable energy bills.

Our program review found that the deepest savings per household were about 40 GJ from direct install with major upgrade programs. This would be a 30% reduction from the average energy use of an average single-detached home in Canada and lower for less energy-efficient homes.[54] Those savings make a significant contribution, yet deeper savings more aligned with net-zero emission emissions should see 50% savings or greater. Ideally, each home should aim to meet thermal energy demand and total energy demand intensity target that makes a home net-zero emission ready.

[54] Based on energy intensity of 136.7 GJ/household in 2018 from Table 39 in Comprehensive Energy Use Database https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=res&juris=ca&rn=39&page=0

Another way to assess the depth of comprehensiveness of retrofits is to consider investment per household (or participant). The direct install with major upgrades program examples demonstrate that these programs invest an average of $8500 – $11,000 per participating household. If we assume that 20% of program costs are associated with administration, marketing, evaluation, and other activities that are not a direct investment in the household, this means $7,000 to $9,000 is invested in direct energy saving measures.

The upper end of these per home investments align with the federal funding available from the US Weatherization Assistance Program[55]. The maximum limit per household is US$7800, which is $9,777 Canadian.[56] However, this is not counting state incentives that can be used as a top-up. For instance, Illinois supplements this funding for a maximum investment per household of US$16,000, which is $20,000 Canadian. In addition, there are proposals to increase this limit. The "Build Back Better" framework proposed increasing the federal per household investment to US$12,000 ($15,000 Canadian).[57] Thus, with expansions of per household investment levels combining state and federal dollars could see retrofit investments of more than $25,000 Canadian, which is roughly triple the amounts invested in Canada.

Scenarios in a recent report on retrofits[58] assumed costs for very deep retrofits (e.g., 60% savings) could be $56,000 – $96,000 for single detached homes and $46,000 – $66,000 for single-family attached homes. These estimates were made from a literature review that did not consider the recent cost increases in construction materials, equipment, and contractor labour.

These factors suggest that the depth of investments and savings achieved per household needs to increase substantially above current program levels to be consistent with net-zero emissions.

[55] See Box 2, page 54 for an overview of US Weatherization Assistance Program.
[56] Based on 2021 Canada/US exchange rate of 1.2535
https://www.bankofcanada.ca/rates/exchange/annual-average-exchange-rates/
[57] https://www.congress.gov/bill/117th-congress/house-bill/5376/text
[58] Haley, Brendan, and Ralph Torrie. "Canada's Climate Retrofit Mission," June 15, 2021.
https://www.efficiencycanada.org/retrofit-mission/.

Fuel switching to zero-carbon ready fuels

Preparing homes for net-zero emissions means transitioning them to zero-carbon or zero-carbon ready heating fuel sources (that will be decarbonized in the future). Enabling low-income households to access lower carbon heating sources reduces GHG emissions. Furthermore, access to zero-carbon fuels will increasingly become both an energy poverty and a just-transitions issue. This is because carbon pricing policies are designed to increase the cost of burning fossil fuels. In addition, if a significant amount of demand begins to exit from fossil fuel distribution systems, low-income households with significant barriers to switching to zero-carbon heating could be stuck with paying the fixed costs of these systems through higher prices.[59]

In the short term, an inefficient fuel switch could increase costs to households because the lower carbon choice (e.g., electricity) is currently still more expensive than fossil fuels in some jurisdictions and under specific design considerations. To avoid increasing energy cost burdens, heating systems must be highly efficient (e.g., electric heat pumps) and any fuel switch should be coordinated with building envelope and other efficiency measures that can reduce overall bills.

In our review, we found only two programs that included the option of switching from fossil fuel to heat pumps as a standard and accepted measure.

In PEI, a low-income household could receive both a no-cost home efficiency through the Winter Warming program and a no or low-cost heat pump - even if the household uses fossil fuel-fired heating systems – through the Free Heat-Pump for Income Qualified Program or the Energy Efficient Equipment Rebate Program. Additionally, heat pumps were installed in fossil fuel heated homes in an earlier Home Comfort Program offered in 2018 – 2020. Efficiency PEI's Home Comfort program is similar to the Nova Scotia Homewarming program and is expected to be relaunched in 2022.

The second program is CleanBC's Income Qualified Rebate program, where a low-income household could receive enhanced rebates that cover 60 – 95% of the cost of switching to an energy-efficient heat pump for water or space heating even if upgrading from a fossil-fuel heating source.

[59] For a discussion see https://www.raponline.org/event/under-pressure-gas-regulation-for-a-time-of-transition/

Removing non-energy barriers

Our interviews and review found the inability of programs to fund non-energy upgrades to be a significant barrier to accomplishing energy efficiency goals in several homes. Households living in buildings not deemed to be 'suitable and safe' conditions do not qualify for most energy efficiency programs. These may include buildings with structural deficiencies or homes requiring major renovation, mold remediation, and/or exterior and interior structural upgrades.

Non-energy saving upgrades such as increasing electrical service to the home are a significant barrier. Non-electrically heated homes often require service upgrades to accommodate a heat pump. When such upgrades are completed, they rarely consider the future electrical infrastructure that will be needed for on-site solar or electric vehicle adoption – creating barriers to low-income Canadians to participating in 'the next' energy efficiency initiatives.

In the "ability to pay" market, energy efficiency programs expect homeowners to finance and manage issues such as mold and structural reinforcements before receiving energy upgrades. However, low-income Canadians experience financing barriers to non-energy upgrades for the same reason they cannot fund energy efficiency upgrades. In addition, these non-energy upgrades contribute alongside energy efficiency to the "non-energy benefits" created by better indoor air quality, physical health and psychological well-being that are important for participants and broader policy objectives.

Some programs offer select health and safety measures like carbon monoxide detectors. In deeper retrofits, heat recovery ventilators are also a standard measure to provide mechanical ventilation in well-air-sealed buildings.

In addition, what we have termed "supplemental programs" that exist in the North are primarily concerned with non-energy upgrades. These programs might only require a stronger energy efficiency component to align with net-zero emission and energy poverty objectives.

Despite these exceptions, most low-income households in Canada with complex structural and health and safety upgrade needs are prevented from participating in energy efficiency programs.

Targeted energy-poor and hard-to-reach households

Our eligibility discussion above notes that several programs recognize that significant barriers to energy efficiency improvements exist above standard definitions of 'low-income'. This makes sense, given that households above these low-income cut-offs can also experience unsustainable energy burdens due to high energy costs.

However, few programs in Canada have developed strategies to specifically target households with the highest energy cost burdens or target households most in need of support due to low income and/or high energy usage and/or other barriers. This targeting is essential to achieve the key two goals. First, reaching households that may otherwise be hard to reach by traditional program outreach strategies. And second, meeting energy poverty reduction objectives of ensuring energy efficiency improvements are comprehensive or "deep" enough to make energy bills affordable.

One exception is Empower Me's now-cancelled Home Upgrades Program in Alberta. It had an open-intake recruitment approach, allowing the program to collect information on energy burdens from direct consultation with participants. The program then prioritized more comprehensive energy efficiency measures that optimized affordability for households with a higher energy burden and greater opportunities to save.

Programs could also target populations within the low-income segment that are deemed "harder to reach". These could include multi-lingual and multicultural communities that may face additional barriers to accessing low-income energy efficiency programs, including language barriers and lack of trust. Other relevant demographics could include senior citizens and other households that lack familiarity with energy-saving technologies or face issues navigating systems of support[60]. Few programs report on progress in reaching hard-to-reach households or have a specific budget allocated to reaching these groups.

The Empower Me program in BC that targets members of multi-lingual, multiethnic and newcomer families is one example of targeting populations with unique barriers.

[60] Comments by Vulnerable Energy Consumers Coalition to Ontario Energy Board on order EB-2015-0029

How governance systems influence program design and objectives

The governance systems that existing low-income energy efficiency programs operate within determine the design and performance of existing programs and subsequently determine the strengths and gaps noted above. This section presents some stylized facts about how energy efficiency programs work, with relevant case examples. We feel this general understanding is critical to developing an effective policy approach that can complement existing programs while directing their delivery capacity towards achieving net-zero emission and energy poverty goals.

Several programs are operated by utilities or are under utility regulatory institutions. The primary objective of utility demand side management is to achieve portfolio-wide savings goals within a given budget and/or under cost-effectiveness constraints. The cost/benefit tests that programs must often pass do not frequently account for societal benefits associated with energy poverty reduction. To support equity and ensure all can participate, some jurisdictions waive formal application of benefit-cost tests for low-income programs (Ontario) or provide a benefit adder to these programs (BC). Others set a minimum budget carve-out (Manitoba).[61]

To our knowledge, no jurisdiction has defined a 'net-zero emissions'-compatible standard for different housing types, and no program has integrated this within its low-income efficiency program. Such a standard could be defined within the planned federal National Net-Zero Emissions Building Strategy.

In general, the public utility governance system will be pulled towards achieving energy savings across a wide number of households to both reduce costs and increase participation. This is the reason why we see more self-install and minor upgrade programs operated by utilities in Canada.

Most direct install with major upgrades programs in the provinces are not operated by utilities and/or receive funding from sources other than utility ratepayers. This includes Nova Scotia, where non-electric measures are supported by government funds (including carbon pricing revenue), and electric measures are supported by a charitable contribution from the utility that exists outside of the regulatory system. Efficiency PEI's programs mix ratepayer funding with significant contributions from the federal low-carbon economy fund, and New Brunswick and Newfoundland and Labrador's programs are supported by government departments. The only utility with a major upgrade program is Enbridge Gas, which has a comparatively lower depth of savings and investments per home.

[61] See Efficiency Canada Provincial Policy database, available at https://database.efficiencycanada.org/

These major upgrade programs outside of utility governance systems face challenges with funding limitations and policy bottlenecks that prevent additional funding. In New Brunswick, the utility regulator has ruled that ratepayer funds cannot be used to expand the low-income program currently funded by the government, despite evidence of a significant waitlist of participants[62]. In Nova Scotia, ratepayer funds are also not used to expand the low-income program with different funding sources. These policies create implicit budget caps.

The lack of fuel switching is also a characteristic of governance systems with separate energy efficiency administrators or funding sources by fuel type. For instance, income-qualified customers of FortisBC electric may be eligible for a heat-pump rebate only if the heat pump replaces an existing hard-wired electric heating system such as baseboard heating[63]. Income qualified customers of FortisBC (gas) that currently use natural gas for space heating are only eligible for an upgrade to an energy-efficient natural gas furnace[64]. The utilities in BC have coordinated the administration of their low-income program, and the Ontario Independent Electricity System Operator and Enbridge Gas are also exploring joint delivery models[65]. However, thus far, these collaborative efforts have not resulted in switching to lower carbon fuels as a program measure.

These fuel-type silos are also present in cases where “one stop shop” administration exists, yet funding comes from different sources. Switching from oil to electric heat pumps is not currently an accepted measure in the Nova Scotia HomeWarming program because electric and non-electric funding comes from different sources.

The other significant silo exists between energy and non-energy upgrades. As discussed above, sometimes the most significant barrier to achieving energy and GHG objectives relates to non-energy issues in a home, such as unstable foundations or moisture issues. What we have termed “supplemental programs” with a core purpose of supporting full-home repair might integrate energy efficiency measures as well. However, most other energy efficiency programs can be prevented from servicing buildings with significant non-energy upgrade needs because

[62] The significant backlog and waiting list of participants was noted in the NB Power’s application for a rate increase that included a budget $2.0 million of its own ratepayer funding to the program in 2018/19, to augment the Province’s funding of $2 million to expand the program to 560 participants, compared to the 220 participants per year in prior years when the program was completely funded by NB Department of Social Development. https://nbeub.ca/uploads/2018%2007%2020%20-%20Decision%20-%20Matter%20375.pdf (p 22)

[63] Fortis BC Income-qualified heat pump eligibility criteria https://www.fortisbc.com/rebates/home/iqheatpump

[64] Fortis BC Income-qualified furnace and boiler rebates eligibility criteria https://www.fortisbc.com/rebates/home/furnace-boiler-rebates-income-qualified

[65] Enbridge Gas 2020 DSM Annual Report : Anticipated Low-Income Program Offering Changes for 2021 https://www.oeb.ca/sites/default/files/Enbridge-Draft-2020-DSM-Annual-Report-20210401.pdf (pp 39)

they do not have an approved budget for such measures. A perspective that recognizes the need to remove all barriers that prevent a building from achieving net-zero emissions would need to develop a strategy for these buildings with non-energy barriers. In addition, a more explicit energy poverty reduction policy would likely see non-energy upgrades as a means to improve the health, safety, and housing security of low-income Canadians.

We have thus far discussed how the nature of provincial governance systems help explain some of the gaps highlighted above. These systems also explain the strengths we have noted. Administration of programs through utilities provides access to customer data and outreach opportunities through strategies like bill inserts that facilitate broader reach.

Another strength discussed is the continuity of low-income programs and the learning and institutional grounding of that history. Having been the principal funding source for energy efficiency over the past decade, utility demand side management governance systems have contributed to this continuity[66].

While every province has its unique policy histories, we present these stylized facts about governance systems within provinces with the hope that it informs more strategic policy development. By understanding how governance and policy objectives at the provincial level influence programs, we can aid in introducing complementary approaches that can leverage their strengths and effectively fill gaps. This understanding prepares us to discuss the most productive role the federal government can play in ensuring energy efficiency helps those most in need.

[66] For a discussion on political resilience and demand side management alongside new governance needs for net-zero emissions, see Haley, B., Gaede, J., Winfield, M., Love, P., 2020. 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.

Suggestions for a federal low-income energy efficiency strategy

The objectives of this report are two-fold. First, to provide a review of the current state of provincial energy efficiency programs and promote cross-border learning. The second objective is related to multi-level governance – considering how the federal government might most productively contribute to low-income energy efficiency given pre-existing provincial and territorial programs.

The lack of federal support to improve low-income energy efficiency remains a policy gap and was recently highlighted in the International Energy Agency's 2022 Energy Policy Review of Canada[67]. The federal Greener Homes program requires up-front payment and offers grants after measures are financed, which is inaccessible tolower-income Canadians. At the time of writing, we also anticipate a federal program to offer low or zero-interest loans for energy efficiency. While such as program could enable greater energy efficiency in multi-unit residential buildings with incentives targeted to landlords and building owners, such a program would require low-income homeowners to take on unsustainable levels of debt and will make the negotiation of conditions to support tenant rights more difficult.

We started this paper by arguing that the reconsideration of low-income energy efficiency policy is timely and urgent, given net-zero emission and energy poverty policy objectives. While provinces are responsible for these objectives, the federal government should be expected to play a leadership role. The federal government is responsible for international climate commitments and national climate goals. The national level is also most capable of considering holistic benefits associated with energy poverty reduction, such as improved housing conditions, physical health and psychological well-being for all Canadians. Furthermore, energy poverty needs to be prioritized if the transition to net-zero emissions is to be fair and just. Other national governments have national low-income energy efficiency programs and energy poverty strategies (see box 1 and 2), and so should Canada.

With these motivations in mind, this section discusses policy considerations for a federal low-income energy efficiency strategy that works best with existing provincial-level programs.

[67] International Energy Agency. Canada 2022 Energy Policy Review. IEA Energy Policy Reviews. OECD, 2022. https://doi.org/10.1787/a440d879-en. (pp 7)

We present four policy design principles for consideration:

1) Focus on results
2) Develop and enhance provincial/territorial programs rather than creating a one-size-fits-all approach
3) Secure long-term and stable funding
4) Create supportive platforms

Box 1: UK's national energy poverty reduction strategies

Reducing energy poverty has been a legislated duty of the UK government since 2001 when the first national fuel poverty reduction strategy set non-binding aspirational goals of 'ensuring no person lived in fuel poverty by 2016'.

Subsequent updates in 2015 identified 'improving energy efficiency for low-income homes' as the explicit strategy for reducing energy poverty. This approach was enshrined through statutory targets: ensuring as many energy poor homes as reasonably possible achieve a minimum home energy efficiency rating better than or equal to the top 20% of the most efficient houses in the country. A more recent update in 2021 introduced a new measure of energy poverty - Low Income, Low Energy Efficiency - which helps the UK government better identify and target policies towards low-income households living in the most inefficient homes in the country.

By setting explicit targets for improving home energy efficiency for low-income households, the UK Government sought to "make a real, lasting difference to household bills regardless of future energy prices", to "better link fuel poverty, social justice and climate agenda" and to "ensure fuel poverty remains high on national policy agenda."

Focus on results

Federal policy should set targets and prioritize results with respect to achieving net-zero emissions, and energy poverty reductions, while allowing provincial and territorial programs to achieve these results in a way that fits their contexts.

Net-zero emission and energy poverty objectives can be further articulated through program performance indicators related to

Deeper retrofits. Our review noted that all existing programs have room to increase the investments and energy savings achieved per household. The federal government can publish a net-zero compatible retrofit standard and encourage programs to meet this benchmark.

Fuel switching to zero carbon or zero-carbon ready fuels. Currently, few programs routinely include changing to efficient and zero-carbon ready heating systems as an energy efficiency measure.

Target populations that are most in need because of high energy burdens, low incomes, highest energy usage, or because of additional barriers that make populations hard to reach. Our review found few programs that explicitly target hard to reach or energy-poor households or other demographics that may be regarded as 'hard to reach' through conventional program outreach strategies.

Enabling upgrades. Many low-income households will likely access retrofit programs once in a generation. Federal targets must be set in a way to focus efforts towards maximizing long-term benefits – such as through the installation of enabling upgrades that allow participants to continue participating in future energy and climate action measures. (For instance, upgrading electrical panels to facilitate future installation of heat pumps or electric vehicle charging stations).

An aspect of achieving all four of these benefits should include support for funding non-energy upgrades required to achieve energy and GHG reductions and to promote the health and safety of participants.

These objectives and design principles are complementary to existing program strengths, and each provincial/territorial program is likely to deploy different methods to deliver on these criteria. As noted above, provincial programs have systems that enable them to reach low-income populations and have benefitted from learning and trust-building from several years in their local markets. The reason these measures and strategies are not implemented is due to constrained budgets and the particularities of provincial-level governance systems rather than the lack of administrative capacity to deliver deeper energy and GHG savings to those most in need.

Develop and enhance provincial/territorial programs rather than creating a one-size-fits-all approach

The second principle speaks to the ability of the federal government to encourage provincial/territorial programs to meet performance objectives related to energy poverty reduction and net-zero emissions without creating new administrative infrastructure, as in the case of the federal approach to the federal Greener Homes rebate program.

This report demonstrates that several provinces have built up outreach infrastructures and have benefitted from learning and relationship building over time that would be difficult for a federal program to build from scratch. Provinces and territories deploy diverse strategies that fit their local contexts. This includes who they partner with to reach low-income communities and how local energy contexts might influence eligibility criteria or target populations.

A one-size-fits-all federal program could disrupt the existing capabilities of provincial programs. Ideally, federal government capabilities should be focused on acting as a project manager that monitors the success of the transition to net-zero emissions in an equitable manner, rather than tying up federal resources with program implementation.

Developing and enhancing programs at provincial and territorial levels will require a tailored approach. A federal support structure could include a scale-up as well as a program design pathway.

A scale-up pathway would be used by provinces and territories with existing “major upgrade” or “minor upgrade” low-income efficiency programs. They would show how federal funding could scale up these programs and set new benchmarks for energy-saving depth, GHG reductions, switching to zero-carbon ready fuels, and specific population targeting strategies.

A program design pathway would exist for provinces and territories with no program in market or programs that require substantial changes to meet dual policy goals of net-zero emissions and reducing energy poverty. In these cases, federal funding would be available to contract program design experts, conduct market research, and stakeholder engagement to develop a program that is capable of meeting federal performance requirements.

The U.S. Weatherization Assistance Programme presents an example of how this might work. South of the border, each state submits an annual plan with a simple overview to explain their approach to meeting program goals, energy saving measures included, cost-benefits, and what

improvements are being made compared to last year. This approach finds a balance between federal objectives and local implementation.

Adherence to the *focus on results* principle noted above should avoid the need for lengthy negotiations between provincial and federal levels of government. As seen in the U.S., the administration of low-income programs across government levels can occur between specific departments and have clear expectations and performance criteria. The implementation itself is likely to involve utilities and/or contracted parties. In the case where a provincial or territorial government is disinterested in a partnership, the federal government can contract with a third-party administrator directly.

Finally, a program and policy design consideration should include federal funds delivered in a way that encourages additional provincial or utility level funding contributions. Ensuring this happens requires some knowledge of provincial policy governance systems. The addition of federal funds should create an opportunity to encourage a re-examination of provincial policies that can create perverse bottlenecks or restrict funds. This includes making changes to cost-effectiveness testing rules so that federal funds enhance program benefits rather than administrative costs, and changes to provincial policies that restrict multiple funding sources from contributing to the low-income program.

Secure long-term and stable funding

Long-term funding is required to ground program priorities in net-zero emission and energy poverty objectives as these are long-term and multi-year goals. The federal government should make a multi-year funding commitment to avoid boom-bust dynamics that have previously disrupted energy efficiency supply chains and broken participant trust.

The need for stable funding support is another reason for a multi-level governance approach. A federal program that encourages provincial-specific program designs will institutionalize these programs within provincial policy systems and thus provide an added layer of political resilience.

Box 2: US Weatherization Assistance Program (WAP)

The US Department of Energy's Weatherization Assistance Program (WAP) is widely regarded as the 'Longest Running and Most Successful U.S. Energy Efficiency Program' for its consistent investments in improving the energy performance of homes in need and helping low-income families reduce energy bills by making their homes more energy efficient. In the 45 years since inception, WAP has delivered no-cost energy-savings upgrades to approximately 7 million homes, cutting more than 2 million metric tons of CO_2 every year and supporting more 8,500 jobs in communities across the country.

The US Department of Energy provides core program funding directly to the states, territories and Indigenous governments that then leverage a large network of over 700 local organizations, community action agencies and service agents to deliver weatherization services at no-cost to eligible low-income households in every county in the United States of America. WAP offers grantee states and territories flexibility in low-income energy assistance program design. Grantees leverage WAP funding to supplement ongoing energy assistance programs in line with their own local circumstances and policy priorities.

Create supportive systems

With the federal government acting as an enabler rather than administrator, it can direct its capacities towards providing tools to make programs more effective, encouraging learning across borders, helping provinces explore complementary policy changes to reduce energy poverty, and augmenting capacity.

Common national platforms of value to all low-income energy efficiency programs can include the following:

Detailed data on energy poverty prevalence and location. An intentional approach to targeting programs towards specific geographic areas based on common housing types, past construction practices, and available income data would help scale the uptake of retrofit measures. This can enable innovative outreach approaches by postal code, ethnic community, or building type. It will also help the federal government and program administrators monitor progress and report on successes.

Training. The federal government can champion increases in workforce capabilities and the entry of new people into energy efficiency careers. Low-income programs are particularly relevant to building a high-skilled workforce because contractors work in teams to manage an entire project and are held accountable for results. The US WAP program is well known for producing highly skilled and diligent contractors that are assets to the larger retrofit market. Prioritization should be placed on training and recruitment of Canadians from low-income and racialized communities and other groups traditionally underrepresented at all levels of programs – from skilled tradespeople as installers to program administrators with lived experiences. The attraction of people from these communities to do the work is particularly important because it helps break down language and cultural barriers. National infrastructure such as a database of audit/installer language capabilities can attract more people from these communities to consider jobs in the retrofit economy and facilitate greater participation from diverse communities.

Net-zero standards by building typology and region. These standards should guide the goals of each low-income retrofit. They can also inform the introduction of “retrofit code” or mandatory building performance standard policies, which will require a robust low-income energy efficiency program to be feasibly implemented in low-income communities.

Federal strategy conclusion

These suggestions for a federal approach to low-income energy efficiency are informed by our review of provincial-level programs and a recognition of the critical role multi-level governance plays in the Canadian federation.

Finally, we wish to emphasize all levels of government should consider broader energy poverty reduction strategies, such as direct bill assistance; enhancement of tenant rights to adequate and affordable energy services; arrearage management and emergency supports; and enhanced energy security in northern communities.

Energy efficiency is a fundamental component of any energy poverty strategy that also aims to achieve net-zero emissions. The success of low-income energy efficiency will only be enhanced with complementary strategies at the federal and provincial/territorial levels to reduce energy poverty and income inequality.

Appendix A – Provincial low-income energy efficiency program database

An interactive dashboard of provincial low-income energy efficiency programs categorized by province, program type, target markets, income eligibility criteria and other program characteristics. Dashboard captures existing programs in market as of March 2022.

Link to dashboard: http://efficiencycanada.org/low-income-report

Appendix B: Overview of provincial policy contexts driving program design and implementation

British Columbia

Utilities in British Columbia are required by the 2010 Clean Energy Act[68] to offer Demand Side Measures (DSM) as a part of long-term resource and conservation planning. As a part of their DSM plans, utilities are required to include demand-side measures to help households reduce energy consumption, including specific programs for low-income households. While energy conversation measures are expected to be cost-effective, programs for low-income households receive a 40% adder to account for non-energy benefits.

Electricity low-income programs in BC are offered jointly by the province's electricity utilities BC Hydro and FortisBC Inc and natural gas utility FortisBC Energy Inc and in partnership with CleanBC – British Columbia's climate action plan. BC Utilities Commission reviews and approves the expenditure applications of public utilities, including budgets and spending on low-income efficiency programs.

Alberta

At the time of writing this report, Alberta is the only province in Canada that does not offer a low-income energy efficiency program. Prior to cancelling all its energy efficiency programs in 2020 – including low-income programs – Alberta's Home Energy Upgrade program goals were explicitly focused on reducing energy poverty and alleviating disproportionate household energy cost burdens.[69] The program included targeted outreach towards multi-lingual and multicultural communities that may face additional barriers to accessing low-income energy efficiency programs, including language barriers and lack of trust.

At the time of cancellation, Alberta's energy efficiency program was oversubscribed with over 1700 households on a waiting list.[70]

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[68] BC Clean Energy Act 2010
https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/10022_01

[69] EmpowerMe – program administrator delivering Alberta's Home Upgrade Program Impact Report 2018-2019
https://www.empowermeprogram.com/wp-content/uploads/2019/06/Empower-Me-Impact-Report-1.pdf

[70] Based on information request response from program administrator Alberta's Home Energy Upgrade Program.

Saskatchewan

SaskPower is the principal electric utility in Saskatchewan, established by the provincial government in 1929.[71] In 2019, SaskPower voluntarily developed[72] a small pilot program for low-income energy efficiency called the Energy Assistance Program (EAP), which was subsequently expanded[73] in 2020 to serve a greater number of low-income households across the province.

SaskPower's Energy Assistance Program is not required by legislation or regulation. The province of Saskatchewan does not have a public utilities commission, and utilities in Saskatchewan are not required to publish regular DSM plans.

Manitoba

Efficiency MB is a crown corporation established by the province in 2019 with the mandate[74] to deliver all energy efficiency programs, including low-income programs, across the province of Manitoba.

Efficiency Manitoba offers free home assessments, insulation and home energy saving kits to all eligible households, and rebates on furnace and hot water boiler upgrades for qualifying low-income households using natural gas for heating. Tenants may be eligible for some programs. Efficiency Manitoba is one of the few provincial low-income programs that explicitly requires homeowners to transfer savings from measures to tenants.[75]

Efficiency Manitoba is funded by the province's two major utilities, Manitoba Hydro and Centra Gas (a wholly-owned subsidiary of Manitoba Hydro. Some programs such as natural gas furnace and boiler upgrades programs are funded by the Federal Low Carbon Economy Fund until 2022 [76] Federal funding is only considered additional if the funding supports "new activities" – hence there is a clear pathway for federal funding to support potential program enhancements and expansions.

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[71] SaskPower AboutUs | https://www.saskpower.com/about-us

[72] SaskPower Annual Report 2019-2020 https://www.saskpower.com/-/media/SaskPower/About-Us/Reports/Past-Reports/Report-AnnualReport-2019-20.ashx

[73] SaskPower Annual Report 2020-2021 https://www.saskpower.com/-/media/SaskPower/About-Us/Reports/Report-AnnualReport-2020-21.ashx

[74] Efficiency Manitoba Act https://www.gov.mb.ca/cs/em.html

[75] Efficiency Manitoba Income Qualified Eligibility Application https://efficiencymb.ca/wp-content/uploads/IQP_eligibility-application_P7.pdf

[76] Low Carbon Economy Fund: Supporting Natural Gas Energy Efficiency Programs in Manitoba: https://efficiencymb.ca/articles/low-carbon-economy-fund/

Ontario

In Ontario, low-income energy efficiency programs are offered by the Independent Energy Systems Operator (IESO) and Enbridge Gas.

The electricity low-income program is administered by IESO – a not-for-profit corporate entity established in the Electricity Act, 1998, under the jurisdiction of the Ontario Minister of Energy.[77] IESO operates the electricity market in Ontario. In 2020[78], IESO received a provincial ministerial directive to centralize the delivery of all energy efficiency programs (including low-income programs) across the province of Ontario. Under this directive, low-income programs offered by IESO are not required to meet cost-effectiveness benchmarks, but IESO is nevertheless required to "*ensure that this program is designed and delivered in as cost-effective a manner as is reasonably practicable and in a manner that results in impactful electricity bill savings for those most in need of support*".[79]

The gas low-income programs are administered by Enbridge Gas – Canada's largest gas utility serving more than 15 million people in Ontario and Quebec.[80] Enbridge Gas is required to develop a Demand Side Management (DSM) plan under Ontario Energy Board's (OEB) regulatory framework. OEB's DSM framework sets rules, guidelines for and targets for programs offered by Enbridge, including the low-income programs. Enbridge is eligible to earn shareholder incentives for meeting energy conversation targets for programs, which includes reaching energy savings targets for low-income households.

Quebec

Transition énergétique Québec (TEQ) is a crown corporation created in 2017 with the mandate of supporting Quebec's Energy Transition, Innovation and Efficiency Master Plan.[81] TEQ coordinates programs necessary to achieve energy targets set by the Province of Quebec (improve energy efficiency by at least 1% every year) and monitors their performance. As a part of its mandate and roadmap[82], TEQ delivers a centralized energy efficiency program (Econologis) for all low-income households in Quebec. TEQ is funded by the province of Quebec. An Éconologis low-income program has been offered within the province since 2008.

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[77] https://www.ieso.ca/en/Corporate-IESO

[78] IESO 2021-2024 Conservation and Demand Management Framework Ministerial Directive. https://www.ieso.ca/en/Corporate-IESO/Ministerial-Directives/2021-2024-Conservation-and-Demand-Management-Framework

[79] Ibid, Section C3

[80] About-Us, Enbridge Gas https://www.enbridgegas.com/about-enbridge-gas

[81] https://transitionenergetique.gouv.qc.ca/en/energy-transition-master-plan

[82] https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/plan-directeur/PAP_TEQ_PlanDirecteur_Web_ANG.pdf

All households qualify for home energy assessments, but only households that receive a bill from an energy distributor (electricity, gas, propane, oil) receive additional measures such as Smart Thermostats.

Énergir is the main distributor of natural gas in Quebec and offers additional product rebates to income-qualified households and affordable housing providers. Énergir is regulated by the Régie de l'énergie, which approves investment plans and sets the rates and conditions under which natural gas service is offered in the province of Quebec.

New Brunswick

New Brunswick Power – a crown corporation – is responsible for developing and delivering energy efficiency programs targeting low-income households on behalf of the Province of New Brunswick.

Before 2013, the responsibility for energy efficiency and DSM programs was held by Efficiency New Brunswick, a crown corporation. In 2015, this responsibility was delegated to NB Power through amendments to the Electricity Act of 2015, and Efficiency New Brunswick was dissolved. Sections 117.1 of the Electricity Act give NB Power responsibility for – among other things – "developing and delivering programs and initiatives developing and delivering programs and initiatives in relation to energy efficiency, energy conservation and demand-side management for low-income homeowners on behalf of the Province, provided that these programs and initiatives are paid for by the Province".

In a rate case hearing in 2019[83], NB Power proposed supplementing the existing program with ratepayer funds to get through the backlog of low-income program applicants. However, at that time NB Power's Board affirmed that NB Power is only responsible for delivering programs on behalf of the province, provided the programs and initiatives are fully funded by the Province of NB.[84] Interpreted this way, NB Power is not allowed to use ratepayer funds to deliver low-income programs or to even supplement funding already in place from the province. As such, existing low-income programs in NB are fully funded by the Department of Social Development but delivered by NB Power.

[83] NB Utilities Energy and Utilities Board Hearing Matter No. 375
https://nbeub.ca/uploads/2018%2007%2020%20-%20Decision%20-%20Matter%20375.pdf
[84] Northup 2020, A Comparative Analysis of the Legislated Electricity Regimes in New Brunswick and Nova Sotia
https://www.conservationcouncil.ca/wp-content/uploads/2020/11/ECELNS_NBComparisonsSept2020.pdf

Prince Edward Island

efficiencyPEI is a government agency within the Ministry of Environment, Energy and Climate Action that administers energy efficiency programs, including low-income energy efficiency programs. EfficiencyPEI is funded partly by the Province of PEI and partly by utility ratepayers of PEI and through the Low Carbon Economy Fund.

EfficiencyPEI offers a range of energy efficiency programs for low-income households. WinterWarming – originally known as Home Energy Low Income Program (HELP) from 2008 –2018 – provides comprehensive air sealing and insulation to qualifying households regardless of fuel type. Renters are eligible for the WinterWarming program if they pay their own energy bills. Homeowners may qualify if their household is their primary residence.

Free Heat Pumps for Income Qualified Islanders, launched in 2021 through the Sustainability division of the Department of Energy, Environment and Climate Change, offers free heat pumps to low-income Islanders.

The Energy Efficient Equipment Rebate Program through efficiencyPEI offers rebates on energy-efficient equipment such as Air Source Heat Pumps, Ground Source Heat Pumps, biomass heating systems, efficient water heaters & HRVs for all homeowners with larger rebates for low-income households.

The Home Insulation Rebates Program through efficiencyPEI offers significant rebates on insulation upgrades, air sealing, windows and doors for all homeowners with larger rebates for low-income households.

Additionally, Social Development & Housing offers two programs for low-income households that may contribute to energy efficiency upgrades, the PEI Home Renovation and Seniors Home Repair Programs.

Newfoundland and Labrador

The Home Energy Savings Program (HESP) for low-income households is administered by the NL Housing Corp – a crown corporation – with the mandate to develop and deliver housing assistance policy and programs for low-to-moderate households throughout the province. NL Housing Corp is funded directly through the provincial budget.

NL Housing Corp has offered a version of HESP since 2009[85], offering comprehensive air-sealing and building envelope improvement measures for low-income households heating

[85] From 2009 to 2019, the program was called Residential Energy Efficiency Program (REEP)

with electric heat. In 2018, Federal investment through Low Carbon Economy Fund supplemented HESP to houses with non-electric heating. The expansion is supported[86] by an investment of $6.43 million from the province and $2.14 million from the federal government, to cover a period of 2018 – 2022.

Nova Scotia

HomeWarming program is the low-income energy efficiency program offered by Efficiency Nova Scotia and Clean Foundation.[87] The program is offered separately to homes using electricity and homes using other fuels for space heating.

Starting in 2015, the portion of the program that covers electrically heated homes is funded by a 10-year $37 million charitable donation from Nova Scotia Power. Hence, the program is not covered by ratepayers. This program is administered by the Clean Foundation. The portion of the program that covers non-electrically heated homes is funded directly by the province of Nova Scotia and delivered by Efficiency Nova Scotia.

For rental and affordable housing units Efficiency Nova Scotia has an Affordable Multi-Family Housing Rebate Program.

Yukon

Yukon offers free energy saving kits to all households regardless of income[88]. The government of Yukon also offers a wide range of rebates to all households regardless of income, including rebates for heating systems, renewable energy, appliance upgrades, insulation, home energy assessment, hot water systems and other equipment[89]. These programs are not qualified by income. Thus, this report does not include Yukon's energy efficiency programs in the analysis.

Northwest Territories

Energy efficiency programs and rebates – including for low-income households – in Northwest Territories are delivered by Arctic Energy Alliance (AEA), a non-profit providing energy efficiency and conservations services in that territory. AEA offers energy saving kits and energy advice to income-qualified households in communities across the Northwest Territories.

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[86] 2017 Expansion of Home Energy Savings Program https://www.gov.nl.ca/mpa/low-carbon-economy-programs/homeenergysavings/

[87] HomeWarming Frequently Asked Questions https://www.homewarming.ca/faqs/

[88] Yukon Government, Requsting Energy Saving Kits: https://yukon.ca/en/home-energy-kits

[89] Yukon Government Good Energy Rebates https://yukon.ca/en/housing-and-property/home-energy-rebates

Additionally, Northwest Territories Housing Corporation offers several no-cost home upgrade and renovation programs that also include measures for improving energy efficiency and heating systems for income-qualified households[90].

These include:

- Senior Aging in Place Policy: Up to $10,000 in forgivable loans to subsidize the cost of repairs/modifications related to energy efficiency and independent living to existing homes for qualifying seniors. Households with incomes under $60,000 receive a forgivable loan, and households over that amount have to co-pay 10%.

- Preventative Maintenance Program: Up to $3,000 in forgivable loans for income-qualified households to make minor preventative checks, services, and repairs to the house – including heating and electrical systems.

- Home Repair Program: Up to $50,000 in forgivable loans for existing low-income homeowners to make necessary health and safety-related repairs to existing homes – including heating and electrical systems. Loan amounts are forgiven in increments of $10,000 per year.

Nunavut

Nunavut does not offer energy efficiency measures specifically for low-income households. However, like the Northwest Territories, Nunavut offers several no-cost home upgrade and renovation programs that also include measures for improving energy efficiency and heating systems for income-qualified households[91].

These include:

- Emergency Repair Program: Up to $15,000 in grants for qualifying low-income households to undertake emergency repairs that pose an imminent threat to occupant health and safety[92].
- Home Renovation Program: Up to $65,000 for homeowners to carry out major repairs, renovations and additions to their home provided $15,000 is used for energy efficiency improvements.[93] Funding is offered as a sliding scale based on a threshold by which

[90] Northwest Territories Housing Corporation Policy Manual 2021: https://www.ntassembly.ca/sites/assembly/files/td_343-192.pdf
[91] Nunavut Homeownership Assistance Program: http://www.nunavuthousing.ca/hoap
[92] Nunavut Emergency Repaid Program: http://www.nunavuthousing.ca/erp
[93] Nunavut Home Renovation Program http://www.nunavuthousing.ca/hrp

incomes are below the territorial Homeownership Program Income Eligibility (HPIE) threshold. For instance, households between 0% – 80% of HPIE get 100% of repair costs, while households between 90% to 100% of HPIE are eligible for 20% of repair costs.

- Renewable Energy Homeowner Grant Program: Up to half of project costs or $30,000 for homeowners installing solar renewable energy system to reduce load on the grid.[94]
- Seniors Home Repair Program: Up to $15,000 in grants to eligible seniors for upgrading their homes to a more livable condition, including energy efficiency upgrades. Funding is provided on a sliding scale based on incomes.[95]

[94] Nunavut Renewable Energy Homeowner Grant Program: http://www.nunavuthousing.ca/rehgp

[95] Nunavut Senior Citizens Home Repair Program: http://www.nunavuthousing.ca/schrp

Appendix C: Methodology for estimating number of eligible households and program participation rates for each province.

It was not possible to find information on total eligible participants for several programs. Estimating the 'known universe of opportunity' for low-income energy efficiency programs is a commonly acknowledged to be a challenging problem.

In this report, we estimated this number from 2016 Census data on income by household and cross referenced it with the program's stated eligibility criteria. For instance, consider Table 7. To be eligible for Energy Saving Kit program offered by BC Hydro and FortisBC, the combined annual household income (from all sources) must be below the maximum shown for the household size in Table 7.

Table 7: Income eligibility thresholds for ESK program (FortisBC and BC Hydro)

Household size	Maximum combined household income
1 person	$34,600
2 people	$43,100
3 people	$53,000
4 people	$64,300
5 people	$72,900
6 people	$82,300
7 or more people	$91,600

The total number of households for each income groups for each household size in the province of BC was obtained from the Statistics Canada - 2016 Census Catalogue Number

98-400-X2016097[96] table. This custom table presents household total income groups in constant 2015 dollars for private households of Canada, provinces and territories, census metropolitan areas and census agglomerations. This resulted in the following Table 8

Table 8: Number of private households within each income groups in constant 2015 dollars by household size in the province of BC

Household income range	No. of 1 person households	No. of 2 person households	No. of 3 person households	No. of 4 person households	No. of +5 (and over) person households
Under $5,000	27,380	10,245	3,495	1,570	725
$5,000 to $9,999	16,625	6,235	2,715	1,165	405
$10,000 to $14,999	41,955	8,445	3,195	1,600	550
$15,000 to $19,999	56,655	14,120	4,165	1,850	775
$20,000 to $24,999	52,640	16,825	5,925	2,335	970
$25,000 to $29,999	36,450	24,100	7,320	3,710	1,410
$30,000 to $34,999	34,615	29,425	7,545	4,565	1,930
$35,000 to $39,999	33,150	29,685	8,220	4,845	2,490
$40,000 to $44,999	31,310	29,150	8,440	5,075	2,805
$45,000 to $49,999	28,580	29,600	9,010	5,695	2,975
$50,000 to $59,999	47,480	58,695	18,685	11,855	6,755
$60,000 to $69,999	36,540	56,435	19,125	13,050	7,705
$70,000 to $79,999	27,315	52,690	19,460	14,265	8,625
$80,000 to $89,999	20,190	47,760	19,035	15,175	9,190
$90,000 to $99,999	13,905	41,710	18,475	15,675	9,655
$100,000 and over	37,120	208,635	122,885	140,705	98,515

[96] Source: Statistics Canada - 2016 Census. Catalogue Number 98-400-X2016097. https://www150.statcan.gc.ca/n1/en/catalogue/98-400-X2016097

This table was then converted into Table 9, showing the cumulative number of households per household size with a total household income below each income level. Then, based on the income eligibility criteria in Table 7, the number of households for each household size that fall below the threshold of incomes for eligibility in Table 7 are highlighted. The sum total of these highlighted cells gives the total number of households eligible for income-eligible energy efficiency programs in BC based on income eligibility criteria in Table 7. The sum total of highlighted cells in Table 9 amounts to 608,700 households.

Table 9: Number of private households with total household income under a certain threshold measured in constant 2015 dollars by household size in the province of BC

Total household income	No. of 1 person households	No. of 2 person households	No. of 3 person households	No. of 4 person households	No. of +5 (and over) person households
Under $5,000	27,380	10,245	3,495	1,570	725
Under $9,999	44,005	16,480	6,210	2,735	1,130
Under $14,999	85,960	24,925	9,405	4,335	1,680
Under $19,999	142,615	39,045	13,570	6,185	2,455
Under $24,999	195,255	55,870	19,495	8,520	3,425
Under $29,999	231,705	79,970	26,815	12,230	4,835
Under $34,999	266,320	109,395	34,360	16,795	6,765
Under $39,999	299,470	139,080	42,580	21,640	9,255
Under $44,999	330,780	168,230	51,020	26,715	12,060
Under $49,999	359,360	197,830	60,030	32,410	15,035
Under $59,999	406,840	256,525	78,715	44,265	21,790
Under $69,999	443,380	312,960	97,840	57,315	29,495
Under $79,999	470,695	365,650	117,300	71,580	38,120
Under $89,999	490,885	413,410	136,335	86,755	47,310
Under $99,999	504,790	455,120	154,810	102,430	56,965
Under $100,000	541,910	663,755	277,695	243,135	155,480

This estimate of total eligible households should be understood as an upper bound because we chose to include more households rather than less given the way the census data was grouped.

It is difficult to estimate how many of these households don't pay their own utility bills or live in supportive housing and any other number of reasons that would make them ineligible for low-income energy efficiency programs, even if their incomes were under the qualification threshold.

This methodology was then repeated for every program to estimate the number of income-eligible households in each province that qualify for low-income energy efficiency programs based on the eligibility criteria of the low-income energy efficiency program offered in that province, as shown in Table 6