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A review and analysis of initiatives addressing energy poverty and vulnerability in Ontario, Canada

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Abstract

This paper examines initiatives that assisted energy poor and energy vulnerable households in Ontario, Canada during 2003 to 2018. Providing a conceptualization for energy poverty and vulnerability, which lack a formal legislative definition in Canadian policy, the paper discusses the history of Ontario’s energy sector and the levels of ‘energy burden’ that brought energy prices to the fore of the public debate. It then reviews 40 initiatives that have assisted energy poor or energy vulnerable households, largely within broader policy areas of energy efficiency and energy savings, housing provision, poverty reduction, healthcare, and climate change mitigation. These initiatives are categorized into three main thematic areas of 1) financial support, 2) energy efficiency and savings, and 3) consumer protection. Further analysis shows that the initiatives largely address short-term needs and focus on the symptoms of energy poverty and vulnerability, rather than on preventative measures. The paper concludes that a more comprehensive approach is needed to address the underlying causes of energy poverty, to develop, target and evaluate effective solutions.

Highlights

- Examines initiatives on energy poor and energy vulnerable households in Canada
- Conceptualizes energy poverty which lacks a legislative definition in Canada
- Reviews 40 initiatives on energy, housing, poverty, health, and climate change
- Initiatives largely address short-term needs and focus on energy poverty symptoms
- A comprehensive approach is needed to target underlying causes of energy poverty

Keywords: energy poverty; fuel poverty; energy vulnerability; energy burden; energy policy; Canada

Word Count: 8265

List of Abbreviations

CELA Canadian Environmental Law Association
CER Canada Energy Regulator
CMHC  Canadian Mortgage and Housing Corporation
CRTC  Canadian Radio-television and Telecommunications Commission
CUSP  Canadian Urban Sustainability Practitioners
EEF   Emergency Energy Fund
EEWG  Energy Efficiency Working Group
ESST  Energy Sector Sustainability Table
ECO   Environmental Commissioner of Ontario
EU    European Union
GHG   greenhouse gas
GDP   gross domestic product
HEC   Home Energy Conservation
HELP  Home Energy Loan Program
IESO  Independent Electricity System Operator
LDC   local distribution company
LIHC  Low Income High-Cost metric
LIHEAP Low Income Home Energy Assistance Program
LILEE  Low Income Low Energy Efficiency metric
LEAP  Low-income Energy Assistance Program
LIEN  Low-income Energy Network
NRCan Natural Resources Canada
OESP  Ontario Electricity Support Program
OEB   Ontario Energy Board
PC    Progressive Conservative Party
PJ    petajoule
RESOP Renewable Energy Standard Offer Program
RDC   Research Data Centre
SHARP Social Housing Apartment Retrofit Program
SHEEP Social Housing Electricity Efficiency Program
SDGs  Sustainable Development Goals
SHAIP The Social Housing Apartment Improvement Program
UGEAP Union Gas Energy Assistance Program
UK    United Kingdom
UN    United Nations
US    United States
WAP   Weatherization Program
1.0 Introduction

Energy poverty, i.e., the inability to access and achieve adequate levels of social and material needs through energy services [1], is widely researched, but has received limited attention in Canada. This is due to a lack of conceptualization, including of the term itself. As a consequence, there is minimal Canadian energy poverty policy agenda or distinction of ‘energy poverty’ from wider definitions of poverty. Yet, it has been estimated that significant differences exist in Canadian ‘energy burdens,’ [2, 3] or what is known as the percentage of household income spent on home energy services [4]. When definitions of energy poverty are distinct, clear, and consistent, challenges faced by those households experiencing energy hardship are more likely to be addressed [5, 6]. In Canada, this absence of proper conceptualization is manifesting in uneven and poor policy implementation.

The term energy poverty was applied to a Canadian context as early as 2008 in documents produced by the now defunct Energy Efficiency Working Group (E EWG), which was established through the former Energy Sector Sustainability Table (ESST). The Government of Canada created the ESST in 2005 as a mechanism comprising industry, government, and civil society experts to advise on improving the environmental and economic sustainability of energy systems, with energy efficiency being a key priority [7]. Similarly, early investigations at Canadian research institutes in 2010-2011 emphasized the prevalence of health issues linked to energy poverty and the benefits of energy efficiency programming for low-income households [8, 9].

There is renewed interest in energy poverty in Canada, as evidenced by increasing media coverage [10, 11, 12], and attention from the Canada Energy Regulator (CER) [13], Natural Resources Canada (NRCan) [14], the Environmental Commissioner of Ontario (ECO) [15, 16], the Canadian Urban Sustainability Practitioners (CUSP) network [17], and Efficiency Canada [18], with the words ‘energy poverty’ weaving in and out of Canadian vocabulary. The timing of this interest should be noted: it coincides with national attention on the 2015 Paris Agreement, the introduction of the Canadian Net-Zero Emissions Accountability Act, the United Nations (UN) Sustainable Development Goals (SDGs), and the development of Canada’s 2021 strategy for their implementation [19], including SDG7, “ensure access to affordable, reliable, sustainable and modern energy for all” (p. n/a) [20]. Although not explicitly stated in SDG7, the concept of ‘right to energy,’ introduced in the 1950s, implies that access to affordable, reliable, sustainable, and modern energy is fundamental for human development and capabilities [21, 22]. Aligning this international policy agenda with the dual challenges of energy poverty and mass societal decarbonization is critical for progressing SDG7 and low-carbon societies in Canada and elsewhere.

Despite the absence of legislation at national or provincial/territorial levels, many provinces have implemented initiatives that could be used to assist with energy poverty or vulnerability to it. The aim of this research is to identify and investigate these, as well as to understand policy responses to energy poverty. Therefore this paper undertook a review and analysis of responses to energy poverty and vulnerability amongst grid-connected households\(^1\) in

\(^1\)The phenomenon of energy poverty extends to those not connected to the grid however it is beyond the scope of this paper to undertake that particular investigation. In Ontario (and Canada) those living in off-grid communities as well as northern and rural communities face several challenges. These include reliance on other fuel types (i.e., wood, oil, kerosene, propane, and diesel); deterrence of new business opportunities due to high energy and energy supply costs;
the Canadian province of Ontario, uncovering 40 initiatives, that were classified into three categories: 1) financial support, 2) energy efficiency and savings, and 3) consumer protection. The Ontario case is noteworthy as there is much contention around the province’s fluctuating electricity prices.

The paper is structured as follows. Section 2 outlines the methodological approach. Section 3 conceptualizes energy poverty and energy vulnerability, and includes a discussion of energy poverty and energy vulnerability relevant policies, Ontario’s energy context and major events that have impacted the relationship households have with their energy use, including exposure to vulnerabilities potentially worsening energy poverty. Section 4 presents findings, which are discussed in Section 5, in particular regarding the adequacy of responses and what might be done to bolster the success of future initiatives. Section 6 concludes.

2.0 Materials and methods

The qualitative review undertaken in this study is based on an extensive search and analysis of relevant policies, initiatives, and materials evaluating them, all of which are explained in detail below (see also Fig. 1).

2.1 Online searches for strategies, measures, and evaluations

The scope of the search focused on initiatives in place between 2003 and 2018. This timeline was selected to control for the influence of government on policymaking as well as the project management of policy (only one political party was in power during this period). The limitations of a changing government are discussed in Section 2.3 and notable developments after 2018 are discussed in Section 5. In Canada, energy regulation largely takes place at the provincial/territorial level (see also Section 3), and so many of the examined initiatives are applicable to all regions of Ontario.

The term initiative is used to refer to any type of policy response, including strategies and measures. Given the interest is in public-facing initiatives, focus was placed on those that were accessible online. In Toronto, approximately 98% of households have home internet access and 42% of those without internet use the public library for access [24]. In Canada, access to the internet is considered to be a “basic service” and it is common for public and private initiatives to be advertised or delivered online [25].

Before beginning the search, a review of relevant academic and grey literature was conducted in order to determine energy poverty and vulnerability criteria (Section 3). Given policies specific to energy poverty do not exist at the national or sub-national level in Canada, the search involved criteria that could, in some capacity, be tied to mitigating risk factors associated with energy poverty and/or vulnerability. Review revealed a variety of risk factors, such as the energy efficiency of housing and appliances (e.g., Boardman, [26]), housing quality such as the presence of leaks, dampness, or rot (e.g., Herrero, [27]), the influence of demographics and health on need for energy services (e.g., [28, 29]), the regressive impacts of climate change mitigation efforts (e.g., [8]), and the influence of wealth or income on energy affordability (e.g., [30, 31]). Based on these findings it was determined the search for strategies and measures should include initiatives falling under the broader policy areas of energy
efficiency and energy savings, housing provision, poverty reduction, healthcare, and climate change mitigation.

Given that interest is in public-facing initiatives searches were conducted within different online domains. Specifically, organizational, government, energy provider, and consumer group online listings, databases, and websites were reviewed. The search sought to identify strategies—that is, policy, legal, and regulatory frameworks [32] that aimed to impact energy poverty, the energy sector, household energy use, housing, poverty, and/or climate change. The contents of these strategies then informed the search for measures—such as programs, plans, and tools [32]—created in response or about strategy objectives. Search activities included:

- Review of online listings of programs, including those on Ontario Energy Board (OEB) and Independent Electricity System Operator (IESO) websites, NRCan’s Directory of Energy Efficiency and Alternative Energy Programs in Canada, and the Efficiency Canada policy database maintained by Carleton University’s Sustainable Energy Research Centre;
- Review of Canada, Ontario, and Toronto government announcements, press releases, and media coverage (through website searches and Infomart and Google News searches), as well as public relations materials from the OEB and IESO;
- Searches of the websites of electricity and natural gas utilities and other energy service providers, including Hydro One, Toronto Hydro, Enbridge Gas, and Union Gas;
- Searches through the websites of non-profit organizations and consumer associations serving Canada, Ontario, and Toronto (including the Low-income Energy Network (LIEN), the Canadian Environmental Law Association (CELA), GreenSaver, and others);
- Scans of reports and studies relating to energy and economic insecurity in Canada, Ontario, and Toronto (e.g., [33, 8, 34, 35]); and
- Internet-based searches with keywords including ‘energy/hydro/gas affordability,’ ‘low-income energy,’ ‘energy financial support,’ ‘utility bill help,’ and others.

This search resulted in a total of 143 documents. As in Pye et al. [36], inclusion criteria for documents included those that explicitly provided a form of support to energy consumers, and for which there was an identifiable initiating framework or department, jurisdiction, delivery agent. Documents were also to include a target audience of eligibility, and a clear timeline. This approach was iterative and relied on snowball searching. The process of snowball searching included reading information about one initiative or umbrella organization and then tracking down other initiatives or organizations referenced therein, a process that would then be repeated for the next initiative. The process was also iterative insofar as the list of search keywords and keyword combinations were continually revised and expanded as new results that made use of differing sets of terminology were found. Except for jurisdictional limits, this iterative and snowball searching process continued to ensure the inventory of initiatives would be as comprehensive as possible. Comprehensiveness was measured by reaching saturation with sampling [37].

The search for documents (web or other) also included seeking whether an evaluation (of any scope) had taken place of the initiatives, as follows:
• Scan of utilities’ submissions to regulators, including demand-side management reports;
• Review of reports of the OEB and IESO;
• Review of academic papers that mention one or more of the identified initiatives;
• Scan of documents from government, energy service providers, non-profits, and others proposing new initiatives;
• Review of Hansard of the Legislative Assembly of Ontario and Parliament of Canada (where energy affordability is discussed); and
• Web searches with keywords including the names of strategies and measures and/or their delivery agents and the terms ‘evaluation,’ ‘assessment,’ ‘report,’ ‘year-end,’ and others.

2.2 Data organization and analysis

Following the searches, data were organized into a classification scheme, which was grounded in the insights and classification schemes provided by Dobbins et al. [38], Kyprianou et al. [39], and Pye et al. [36]. To understand the scope and reach of the initiatives aimed at responding to energy poverty and energy-related vulnerabilities in Ontario, as well as their approaches to achieving their objectives, data were analysed by coding each initiative in Microsoft Excel software. Coding protocol included each initiative’s associated strategy or measure type (e.g., policy, program, law, regulation, tool), focus (based on the above-described risk factors) and intended effect(s); start and end dates; jurisdictional/geographic focus; target audience(s), eligibility criteria, and application process requirements; initiating body(ies) and delivery agent(s); and other comparable aspects, including whether they had undergone any evaluation. An iterative coding process was used, in which the coding scheme was regularly evaluated and revisited to ensure it was as descriptive and as inclusive as possible of comparable critical elements of initiatives.

Based on the typologies identified by Kyprianou et al. [39], three types of strategies and measures that address energy poverty directly or indirectly were identified (see Table 2): financial support, energy efficiency and savings, and consumer protection.

2.3 Study limitations

This study notably has some limitations. First, the Ontario Government was led by the Liberal Party during 2003-2018 and following the 2018 provincial election (and a change in power) many of the policies that were included in this review have either been reversed or rescinded. Second, while the search for initiatives and the coding exercise revealed important, descriptive details about these initiatives, the study did not include additional details that would allow for a deeper evaluation of the effectiveness of each initiative because such details were rarely shared in documents or websites that were publicly accessible (without having to rely on more resource-intensive access methods such as Access to Information requests or direct outreach to program staff). Third, with most of the initiatives that had undergone some form of evaluation, the evaluations that were included tended to be incomplete: there was little information for example about program uptake, program effects, number of households experiencing service disconnections before and after program implementation, number of
households facing arrears before and after implementation, etc. It is also notable that few of the evaluations were conducted by an independent third party (as opposed to conducted or sponsored by the delivery agent or implementing body), and that most sought to answer only a narrow set of questions, and many were informal or partial. The results shared in Section 4.0 note whether an evaluation had taken place, but it is outside the scope of this study to describe the quality of each evaluation individually. Fourth, although the search for initiatives was comprehensive, there is no claim that it was exhaustive.

Fig. 1. Methodological approach undertaken for investigating responses to energy poverty and energy vulnerability in Ontario.

3.0 Theoretical and conceptual approach

3.1 Energy poverty and energy vulnerability conceptualizations
In this study, the term ‘energy poverty’ is aligned with previous research in this domain, i.e., broadly referring to the challenges households face in attaining necessary energy services to meet their social and material needs [1]. Typically, ‘energy poverty’ has been used to refer to issues of access to electricity and energy services in the developing world [40] whereas, in the developed world, ‘fuel poverty’ is connected to high energy costs, low-income, or inefficient housing [26]. However, increasing energy market globalization and a growing body of research on access to energy services in the developed world challenge the “energy poverty–fuel poverty binary” [1]. The term is also used in relation to energy (in)security [41, 42]—namely, in relation to reliable access to affordable and sustainable energy.

Energy poverty can be conceptualized as a challenge that is temporally dynamic rather than static [43]. That is, the possibility of experiencing energy poverty can change over time and can vary both between and within households, with households experiencing differing degrees of vulnerability at any time. Important is the identification of vulnerabilities—the drivers of energy poverty and the conditions under which energy poverty transforms from a state of being at risk, to a state of being [44]. To conceptualize energy vulnerability, energy poverty researchers Middlemiss and Gillard [45] turned to vulnerability research. Here, the focus is on future harm [46]. This influences a conceptualization wherein energy vulnerability becomes the likelihood of a household being subject to energy poverty, the sensitivity of that household to the impacts of energy poverty, and the capacity of that household to adapt to changes related to energy poverty [45]. Risk factors influencing vulnerability can be broad and macro, such as energy pricing policies or poor energy infrastructure. They can also extend beyond the “affordability–access binary,” and connect to social practices, energy needs, socioeconomics and demographics; for example, income, education, employment, (dis)ability, and/or race/ethnicity (though not exclusively) [1, 47, 48, 49]. “Vulnerability” can be probabilistic and thus changing circumstances can influence the probability of people entering (or exiting) energy poverty [43], with the extent and/or severity of it being exacerbated if those who may be vulnerable are not adequately protected [36]. Critical then are policy responses and initiatives for mitigating energy-related vulnerabilities and for assisting people with exiting out of energy poverty.

3.2 Examples of how energy poverty has been addressed in other countries

Many countries lack a formal definition of energy poverty yet recognize it in some form and respond with specific policies and initiatives [50]. Here a brief overview provides some ‘overarching’ approaches—including that of measurement—from various international examples.

The UK was one of the first countries to formally define and recognize energy poverty (or fuel poverty as it has been termed in the UK). Specifically, the 2000 Warm Homes and Energy Conservation Act established a target to end fuel poverty for all households within 15 years of being enacted and a legal commitment to produce a strategy, which initially defined a fuel poor household as one needing to spend 10% of its income to achieve an adequate level of warmth [51]. This resulted in one of England’s largest national programs, the Warm Front Home Energy Efficiency Scheme, which between 2000 and 2013 removed 2.36 million households from energy poverty [52]. Subsequent energy poverty responses in the UK have mostly focused on household energy efficiency improvements on the basis that they best address the negative impacts of inefficient housing on health and well-being [5]. The UK also has a ‘winter fuel payment’ that provides households with financial assistance with their heating bills [53]. Given
its sensitivity to changes in domestic energy costs, which make for tracking the impact of energy efficiency measures difficult [54], the 10% indicator was replaced by the Low-Income High Cost (LIHC) metric in the 2015 updated Fuel Poverty Strategy in England [5]2, identifying a household is in fuel poverty if they have an income lower than average and fuel costs higher than average [5]. More recently, the Low Income Low Energy Efficiency (LILEE) metric has been proposed as an update to the LIHC taking into account energy inefficiency so that all low-income households with high costs living in inefficient homes are considered to be in fuel poverty [5].

Across the European Union (EU), energy poverty responses have been guided by the principle of subsidiarity, with the European Commission focusing on “vulnerable consumers” in regulated markets versus households in the wider energy system [36]. Accordingly, relevant action has been mandated in legislation for those who are vulnerable consumers [6, 39]. While there are several energy poverty indicators used across the EU (see for example the EU Energy Poverty advisory Hub [55]), official definitions of energy poverty and vulnerable consumers differ across the 27 EU member states, and vulnerable households may not be considered as ‘energy vulnerable’ per se. They may however be considered at risk, with individual countries identifying such groups through their social services systems [39]. Half of EU member states provide financial assistance as part of general welfare support, while the remainder target energy or heating payments [38], but there are also countries where overlap exists such as in Denmark and the Netherlands [6]. Social tariffs provide a special pricing, often below the market price, to certain consumers to ensure energy prices are affordable, covering electricity, gas, or both. These are being phased out due to market liberalization, but remain important in Belgium, Cyprus, Greece, Portugal, Romania, and Spain [38]. Although most member states have some type of prohibition in place as per EU legislation, such as not permitting disconnections during the winter, almost a third do not provide specific protection for vulnerable consumers [6].

Closer to Canada, in the United States (US), “pseudo” responses (i.e., recognition short of an official fuel poverty definition) include the Low-Income Home Energy Assistance Program (LIHEAP) and Weatherization Program (WAP), which are funded at the federal level and implemented by the state, as well as other state-level low-income energy assistance and energy efficiency programs [5, p. 433]). LIHEAP provides low-income households assistance with their energy bills whereas WAP is the US’ largest and longest running energy efficiency program [5]. With both, program eligibility requirements are based on statute and directives around income, high energy burdens (paying more than 6% of income on energy bills [56]) and demographic characterizations of vulnerability, such as households with children, elderly members, and/or individuals with (dis)abilities [5].

3.3 The Ontario context

The focus of this study is the province of Ontario, home to the nation’s capital, Ottawa, and its most populated city, Toronto. The province has a population of approximately 14.8 million people. Ontario is English Canada’s largest province geographically, dwarfing many US states and EU member states. In 2020, Ontario had an annual gross domestic product (GDP) of approximately $867,000 million CAD [57], to which the energy sector contributed significantly.

2 Note that the fuel poverty is approached and defined differently in the devolved nations of the UK - e.g. Northern Ireland, Scotland and Wales – see for example: https://www.nea.org.uk/publications/uk-fuel-poverty-monitor-2020-21/
Notably, much of the province experiences cold winters, which include extreme cold with wind chill, and hot, humid summers that influence demand for both heating and cooling.

3.4 Energy sector developments in Ontario

Ontario’s energy sector is complex, especially that of electricity. Until the mid 1990s, Ontario’s electricity sector was a vertically integrated monopoly, built and operated by the provincially owned Ontario Hydro—successor to the Hydro-Electric Power Commission created in 1906 [58]. In 1998, passage of the Energy Competition Act and Electricity Act shifted Ontario to competitive wholesale and retail electricity markets, while Ontario Hydro was broken up into several successor companies [59]. The Electricity Restructuring Act of 2004 later created a “hybrid market,” which is essentially the current structure where energy is bought and sold in a wholesale market while government conducts the supply mix planning and procurement [60].

The evolution of the industry has very much contributed to the relationship the people of Ontario have had with their energy use, and their experience of it. Following the recession of the early 1990s and a financially weakened Ontario Hydro, rates were increased by 30% between 1991 and 1993 [61] and maintained for nearly a decade [62], resulting in reduced electricity demand and less public support for Ontario Hydro [63]. Developments also impacted health: the 1997 review of Ontario Hydro’s nuclear operations and the decision to repair reactors caused a chain of events including increased coal-fired generation (to compensate for the loss of nuclear generated power), which increased smog, greenhouse gas (GHG) emissions, sulphur dioxide, and nitrogen oxide, resulting in pressure to phase out coal-fired plants [58]. Subsequently, between 2003 and 2014, coal’s contribution to electricity supply went from 25% to being phased out [64], changing the configuration of Ontario’s energy sector, its stakeholders, and the ways in which Ontarians and their policymakers imagined the future of energy. With the phase out of coal, Ontario saw the introduction of demand side management programs; encouragement of cleaner electricity through the Renewable Energy Source Request for Proposals, the Renewable Energy Standard Offer Program (RESOP), and the 2009 Green Energy and Green Economy Act; and the beginnings of smart grid development, including meter deployment and time-of-use pricing [63, 65, 66]. From 2006 to 2016, electricity rates (and bills) in Ontario increased by an average of 19% controlling for inflation, an increase not seen in any other Canadian jurisdiction [15], and continuing the rate hike trends seen previously (see Fig. 2). Significantly, Ontario’s rate hikes contributed to the forming of LIEN—a coalition of Ontario legal aid clinics; frontline emergency service providers; and environmental, anti-poverty, and affordable housing advocacy groups [67]. In 2007 LIEN advocated for a rate support program before the OEB, which the OEB dismissed based on the grounds that it did not have jurisdiction to implement rate affordability programs, and that LIEN appealed [67]. The ruling: Ontario’s Divisional Court found that “the Ontario Energy Board has the jurisdiction to establish a rate affordability assistance program for low-income consumers,” [68 p. 13]. This decision, importantly, catalyzed many of the key initiatives presented in Section 4.0.

Compared to electricity, Ontario’s natural gas sector is relatively straightforward. Natural gas is delivered to consumers via transmission and distribution pipelines operated by local distribution companies (LDCs). Consumers have the choice of either buying natural gas from their LDC (default) or through independent retailers; almost 95% of Ontarians choose their LDC [69]. As with electricity, the OEB is responsible for ensuring natural gas market participants comply with the Energy Consumer Protection Act [70]. Here the OEB’s authority relates to the
province’s distribution system, inclusive of delivery charges and responsibility for providing consumer awareness and protection [69]. During Ontario’s coal-fired electricity phase-out, natural gas played a crucial role in meeting the province’s energy demand [71]. Further, the 2018 *Access to Natural Gas Act* was an important development to increase natural gas infrastructure in the province’s underserved areas [72].

Positively, policies eliminated coal, encouraged conservation, and expanded renewables deployment, all contributing to GHG emissions reductions [60], as well as safer and cleaner energy. Electricity costs however continue to be pressing and notorious [60]. Figure 3 presents a timeline highlighting relevant policies and events in Ontario’s energy history which have impacted end-users on several fronts, including affordability of and access to energy in Ontario.

![Historical electricity prices in Ontario 2002-2018](image)

**Fig. 2.** Historical electricity prices in Ontario 2002-2018 [73].
Ontario households use a mix of energy sources for energy services. In 2018, the Ontario residential sector accounted for 626 petajoules (PJ), attributable to space and water heating, space cooling, appliances, and lighting (see Fig. 4) [74]. While Ontarians primarily use electricity for air conditioning, lighting, plug-loads, and refrigeration, natural gas is the dominant energy source for space and water heating [75, 76].

According to Canada’s energy regulator, the CER, “a household may be described as experiencing fuel poverty when it spends more than 10% of its income on utilities” [13]. While the CER estimates that 8% of Canadian households live in energy poverty, they do not describe the methods used to arrive at this number, nor do they outline the reasons for using the 10% indicator. Similarly, using the expenditures approach as a proxy measure for energy poverty, Das
et al. [2] estimate 7-9% of Canadian households spend more than 10% of their income on energy expenditures, with low-income, geography, and dwelling conditions being the main predictors of the phenomenon. Even more, Canadian households in energy poverty spend a greater share of their total budget on energy services (almost five times more) than households not in energy poverty [2]. Their estimates are based on energy burden serving as a proxy measure of energy poverty due to unavailable data for more sophisticated measurement. Specific to Ontario, 9% of households experience energy poverty and this figure increases to 11% when taking housing costs into account [2]. For those in energy poverty, median household income in Ontario was approximately $23,000 in 2016 whereas for households not in energy poverty, it was approximately $74,000; annual median spending on energy services by households experiencing energy poverty was $3628, in comparison to $2136 for those not in energy poverty.

In addition to using the 10% indicator, Riva et al. [3] estimated median energy expenditures and then determined those households that exceeded this threshold by two times (i.e., 2M measure). The researchers found approximately 20% of Ontario households to be in energy poverty (their 10% estimates are similar to Das et al.’s estimates). Furthermore, between 2013 and 2016, Ontario residential disconnections increased by 19% while arrears increased by 28% [77]. For those considered eligible low-income customers, disconnections and arrears increased by 74% and 180%, respectively. The number of low-income customer accounts increased from 36,050 to 181,864 between 2013 and 2016 [77]; details are shown in Table 1.

**Fig. 4.** Residential energy use in Ontario by share of end-use based on PJ [74].

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3Descriptive statistics for household income and energy expenditures were determined at the University of Victoria Branch of the British Columbia Interuniversity Research Data Centre (RDC); these are presented for background context and are not considered part of the methods or analyses.
Table 1 Ontario residential energy accounts in arrears or disconnected, 2013 and 2016 [77].

<table>
<thead>
<tr>
<th>Residential customer accounts</th>
<th>2013</th>
<th>2016</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total accounts</td>
<td>4,416,713</td>
<td>4,598,314</td>
<td>4</td>
</tr>
<tr>
<td>Disconnections</td>
<td>49,130</td>
<td>58,286</td>
<td>19</td>
</tr>
<tr>
<td>Arrears</td>
<td>307,822</td>
<td>392,963</td>
<td>28</td>
</tr>
<tr>
<td>Total dollar amount of arrears for customer accounts in arrears at year end</td>
<td>$96,461,640</td>
<td>$134,885,199</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eligible low-income customers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total accounts</td>
<td>36,050</td>
<td>181,864</td>
<td>404</td>
</tr>
<tr>
<td>Disconnections</td>
<td>4,444</td>
<td>7,740</td>
<td>74</td>
</tr>
<tr>
<td>Arrears</td>
<td>10,044</td>
<td>28,077</td>
<td>180</td>
</tr>
<tr>
<td>Total dollar amount of arrears for customer accounts in arrears at year end</td>
<td>$3,883,783</td>
<td>$13,324,615</td>
<td>243</td>
</tr>
</tbody>
</table>

Notes:
1. “Arrears” means an account that is 30 or more days past the minimum payment period as determined according to section 2.6.3 of the Distribution System
2. “Disconnections” means number of customer accounts disconnected for non-payment during the course of the year

4.0 Results

Based on extensive searching, the study identified 40 initiatives that addressed energy poverty and energy-related vulnerabilities amongst grid-connected Ontarians between 2003-2018; some of which were still ongoing in 2022. This inventory of initiatives allowed to draw an understanding about responses to energy poverty and energy-related vulnerabilities in Ontario, Canada. The review shows the term energy poverty has seldom been used by policymakers in Ontario, with the search revealing only a handful of official mentions—such as in an OEB press release [78], a statement by the City of Toronto [79], and a report from the ECO [15]. In analyzing the initiatives, these are inferred to the following classification scheme: financial support (9), energy efficiency and savings (23), and consumer protection (8) (as shown in Table 2).
**Table 2** Responses to energy poverty and energy vulnerability in Ontario, 2003-2018.

<table>
<thead>
<tr>
<th>Framework / initiating dept.</th>
<th>Measure</th>
<th>Stated goal</th>
<th>Date range</th>
<th>Jurisdiction</th>
<th>Delivery agent</th>
<th>Target audience and eligibility</th>
<th>Evidence of evaluation?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial support</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandated by OEB (LEAP customer service rules)</td>
<td>1. Union Gas Energy Assistance Program (UGEAP)</td>
<td>To provide emergency financial assistance to those &quot;who have exhausted all other sources of financial support&quot;</td>
<td>2007 to present (2007–2015 as Winter Warmth Program, which became a year-round program in 2010/11)</td>
<td>Parts of Toronto</td>
<td>Union Gas(^4)</td>
<td>Low-income Union Gas consumers (based on after-tax LIM)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>2. Hydro One Winter Relief Program</td>
<td>To provide “customers suffering acute hardship access to light and heat during the coldest months”</td>
<td>December 2016 to 2018+ (planned)(^5)</td>
<td>Ontario</td>
<td>Hydro One</td>
<td>Disconnected Hydro One customers</td>
<td>None found</td>
</tr>
<tr>
<td>OEB (following a Divisional Court ruling allowing OEB to set special rates for low-income ratepayers)</td>
<td>3. Low-income Energy Assistance Program (LEAP) Emergency Financial Assistance (EFA) grant</td>
<td>&quot;To provide emergency relief to eligible low-income customers who may be experiencing difficulty paying current arrears&quot;</td>
<td>January 2011 to 2018+ (planned)</td>
<td>Ontario</td>
<td>OEB</td>
<td>Low-income households (based on LICO: after-tax income and household size)</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ontario Fair Hydro Plan Act</em></td>
<td>4. Ontario Fair Hydro Plan (bill reduction and rate increase limits)</td>
<td>&quot;To relieve the cost pressures caused by ... system improvements&quot; and &quot;to make the electricity system as affordable as possible&quot;</td>
<td>July 1, 2017 to April 30, 2021 (planned)</td>
<td>Ontario</td>
<td>Electricity vendors</td>
<td>Households, farms, and other ratepayers using less than 50kW / 250,000 kWh</td>
<td>Yes</td>
</tr>
<tr>
<td><em>Ontario Ministry of Energy and Infrastructure [89, 90, 91]</em></td>
<td>5. Ontario Electricity Support Program (OESP)</td>
<td>To &quot;help make electricity more affordable for low-income families&quot;</td>
<td>January 1, 2016 to 2018+ (planned)</td>
<td>Ontario</td>
<td>OEB</td>
<td>Low-income electricity consumers (based on after-tax LIM)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>6. Ontario Electricity Support Program</td>
<td>To &quot;help make electricity more affordable for low-income families&quot;</td>
<td>January 1, 2016 to 2018+ (planned)</td>
<td>Ontario</td>
<td>OEB</td>
<td>Low-income electricity consumers (based on after-tax LIM) with either electric heating or one of the following</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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\(^4\) On January 1, 2019, Enbridge Gas Distribution Inc. and Union Gas Limited merged to become Enbridge Gas Inc. For the sake of precision, and as there are “here are no immediate changes to the services and programs offered by each legacy utility.” \(^84\) we refer to Union and Enbridge separately in this table.

\(^5\) “Planned” end dates indicate the intention of the then-government (and other initiative sponsors/administrators at the time) either to continue the initiative indefinitely or to review or terminate the initiative on a particular date or after a certain period. In some cases it is known that initiatives were terminated earlier than planned after the 2018 change in government, as described in brief in Section 5.0, however this information has been left out here due to being outside the scope of the time period being examined and in an effort to minimize confusion or speculation by providing that information without context.
<table>
<thead>
<tr>
<th>OESP - Energy Intensive [92]</th>
<th>7. Ontario Clean Energy Benefit (OCEB)</th>
<th>&quot;To help mitigate the costs of clean, modern energy for Ontario families&quot; [94]</th>
<th>January 1, 2011 to December 31, 2015</th>
<th>Ontario</th>
<th>Electricity utilities</th>
<th>Residential, farm, small business and other electricity users who consume less than 250,000 kilowatt hours per year</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario Ministry of Finance (as part of &quot;Open Ontario&quot; plan) [95, 91]</td>
<td>8. Ontario Energy and Property Tax Credit [96]</td>
<td>&quot;To help low- to moderate-income Ontario residents with the sales tax on energy and with property taxes&quot; [97]</td>
<td>2011 (2010 tax year) to 2018+ (planned)</td>
<td>Ontario</td>
<td>Canada Revenue Agency (CRA)</td>
<td>Low- to moderate-income Ontarians who own or rent a home</td>
<td>None found</td>
</tr>
<tr>
<td>Originally the Ontario Ministry of Community and Social Services; transferred to the Ontario Ministry of Municipal Affairs and Housing as part of the Community Homelessness Prevention Initiative [98]</td>
<td>9. Emergency Energy Fund (EEF) (part of Toronto implementation of Community Homelessness Prevention Initiative) [99, 100, 101, 102]</td>
<td>&quot;To prevent homelessness by meeting ... emergency housing needs&quot; [100]</td>
<td>2004 to 2018+ (planned)</td>
<td>Toronto</td>
<td>City of Toronto</td>
<td>Residents of Toronto with high housing costs relative to income (total accommodation costs within 85% of total monthly income) who receive assistance from Ontario Works or the Ontario Disability Support Program</td>
<td>Yes (as part of CHPI evaluation)</td>
</tr>
</tbody>
</table>

### Consumer Protection

<table>
<thead>
<tr>
<th>Required by OEB’s service policies for natural gas utilities [103]</th>
<th>10. Arrears Management Programs [83]</th>
<th>To find mutually agreeable payment plans [83]</th>
<th>January 2011 to 2018+ (planned)</th>
<th>Parts of Toronto</th>
<th>Union Gas</th>
<th>Union Gas customers &quot;unable to pay their gas charges&quot; [104]</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. Budget Billing Plan [104, 105]</td>
<td>&quot;Makes budgeting easier by evenly distributing … natural gas charges over the course of 11 months&quot; [106]</td>
<td>Required offer to eligible low-income customers since July 2013, but in place for years prior to that date</td>
<td>Ontario</td>
<td>Enbridge</td>
<td>Available to all Enbridge residential gas heating customers. First-time customers are automatically enrolled.</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>12. Equal billing plan [83]</td>
<td>To offer &quot;residential customers the convenience of equal payments throughout the year&quot; [83]</td>
<td>Parts of Toronto</td>
<td>Union Gas</td>
<td>Available to all Union residential customers</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Waiving security deposits [107]</td>
<td>&quot;To help low-income customers manage their natural gas account&quot; [83]</td>
<td>January 1, 2013 to 2018+ (planned)</td>
<td>Parts of Toronto</td>
<td>Union Gas</td>
<td>Low-income Union Gas customers (based on after-tax income and household size). Or, “in the majority of cases,” if the customer enters into both the Equal Billing Plan and the Automatic Payment Plan or provides a letter of reference from another utility [83]</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>OEB's Low-Income Customer Service Rules (part of LEAP) [80, 108, 109]</td>
<td>14. Arrears payment agreement (for electricity)</td>
<td>To allow low-income customers &quot;more time to pay outstanding balances&quot; to avoid disconnection [108]</td>
<td>October 2010 to 2018+ (planned)</td>
<td>Ontario</td>
<td>Electricity utility or unit sub-metering provider</td>
<td>Low-income customers (based on after-tax income and household size)</td>
<td>Yes</td>
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<tr>
<td>15. Equalized billing (for electricity)</td>
<td>To help consumers budget, as &quot;equalized bills don’t rise or fall suddenly even if [their] electricity usage does&quot; [108]</td>
<td>April 2011 to 2018+ (planned)</td>
<td>Ontario</td>
<td>Electricity utility</td>
<td>Low-income customers (based on after-tax income and household size) may access equalized billing without paying by automatic withdrawal</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>16. Waiving security deposits (for electricity)</td>
<td>To keep &quot;the need to pay a deposit&quot; from becoming &quot;an undue burden for ... low-income consumers&quot; (Walli, Notice of proposal to amend a code: Proposed amendments to the unit sub-metering code board file no. EB-2011-0429. Letter to all licensed unit sub-meter providers and all other interested parties [109].)</td>
<td>October 2011 to 2018+ (planned)</td>
<td>Ontario</td>
<td>Electricity utility or unit sub-metering provider</td>
<td>Low-income customers (based on after-tax income and household size)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>17. Community Homelessness Prevention Initiative (CHPI) [102, 110]</td>
<td>“To address local priorities and better meet the needs of individuals and families who are homeless or at risk of becoming homeless in their local communities” [110]</td>
<td>January 2013 to 2018+ (planned)</td>
<td>Ontario</td>
<td>Municipal Service Managers</td>
<td>Households at risk of homelessness (eligibility varies by municipality)</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

### Energy efficiency and savings

**Enbridge & Union Gas Demand Side Management portfolios (Low Income portfolio) (complies with the OEB’s Demand Side Management Framework for Natural Gas Distributors) [111, 112, 113]**

| 18. Enbridge Home Winterproofing Program [111, 112] | To help lower-income customers "save energy and save money," "enjoy a more comfortable home," “experience better health,” “protect the environment,” and “increase the value of [their] home” [114]. | 2007 to present | Ontario | GreenSaver (for Toronto; others in other areas) | Lower-income Enbridge customers (based on before-tax income or household size, or on enrollment in a designated government assistance program) | Yes |
| 19. Union Gas Home Weatherization Program [113, 115] | "To help the province meet its ambitious energy conservation goals" [115] | 2012 to present | Parts of Toronto | GreenSaver | Lower-income Union Gas customers (based on before-tax income and household size) with a home built before 1975 that requires more insulation, and who heat their homes with a natural gas furnace | Yes |

**Enbridge DSM portfolio (Energy Literacy portfolio) [116]**

| 20. MyEnergyXpert [116, 117] | To provide households with access to energy-saving advice [117] | 2018 to 2018+ (planned) | Ontario | Enbridge (using EnergyX software) | Any household | None found |

**SaveONenergy / Toronto Hydro**

<p>| 21. peaksaver [91, 118, 119] | For &quot;residential and small business electricity demand reduction&quot; [91] | September 2005 to December 31, 2017 | Toronto | Toronto Hydro | Toronto Hydro customer households with their own central air conditioner, electric water heater or pool pump | Yes |</p>
<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Eligibility Criteria</th>
<th>Duration</th>
<th>Administration</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SaveONenergy (under the Ontario Ministry of Energy’s Conservation First Framework)</td>
<td>To &quot;help [Ontarians] keep [their] home comfortable year-round, for less&quot; [123].</td>
<td>Ontario HVAC contractors</td>
<td>2006 to April 1, 2019</td>
<td>Ontario Participating HVAC contractors</td>
<td>Households (eligibility based on equipment)</td>
</tr>
<tr>
<td>Save on Energy Heating and Cooling program</td>
<td>&quot;To help [Ontarians] discover more ways to save and keep [their] home more comfortable&quot; [125]</td>
<td>Ontario</td>
<td>2011 to 2018+ (planned)</td>
<td>Ontario GreenSaver</td>
<td>Lower-income households (based on before-tax income and household size)</td>
</tr>
<tr>
<td>Save on Energy Heating and Cooling Assistance Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada Mortgage and Housing Corporation (CMHC)</td>
<td>&quot;To [increase] comfort and healthier living while improving energy efficiency reduces greenhouse gas emissions and lowers the cost of owning and maintaining your home&quot; [127]</td>
<td>Canada</td>
<td>2004 to 2018+ (planned)</td>
<td>Canada Mortgage and Housing Corporation (CMHC)</td>
<td>Individuals with homeowner or small rental loans who meet minimum equity requirements</td>
</tr>
<tr>
<td>Canada Mortgage and Housing Corporation (CMHC)</td>
<td>&quot;To help protect the environment and support consumers as they make environmentally friendly choices&quot; [128]</td>
<td>Canada</td>
<td>2004 to 2018+ (planned)</td>
<td>Canada Genworth Canada</td>
<td>Consumers of Genworth Canada mortgage insurance products</td>
</tr>
<tr>
<td>Genworth Canada</td>
<td>&quot;To reward... those who purchase energy-efficient homes, or obtain mortgage financing to make energy-efficient home improvements&quot; [130]</td>
<td>May 2013 to 2018+ (planned)</td>
<td>Canada</td>
<td>Canada Guaranty</td>
<td>Homeowners with mortgage financing that is currently insured by Canada Guaranty</td>
</tr>
<tr>
<td>City of Toronto (originally Councillor Mike Layton), enabled by the Municipal Act’s provisions for Local Improvement Charge programs (O. Reg. 322/12)</td>
<td>To make &quot;it easy for homeowners to pay for these home improvements over time, and access rebates offered by the Province of Ontario and utility companies&quot; [131]</td>
<td>March 2014 to 2018+ (planned)</td>
<td>Toronto</td>
<td>City of Toronto</td>
<td>Homeowners with a detached, semi-detached, or row house, in good standing on property tax and utility payments</td>
</tr>
<tr>
<td>Canada Guaranty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Federal Sustainable Development Strategy (part of the ecoENERGY suite)</td>
<td>&quot;To encourage owners of existing low-rise properties to make smart energy retrofit decisions that will result in significant energy savings, more</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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6 Genworth Canada now operates under the brand Sagen MI Canada. The company is also formerly known as GE Capital Mortgage Insurance.
<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>Start Date</th>
<th>Funding Source</th>
<th>Duration</th>
<th>Eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontario Home Energy Conservation Incentive Program</strong> [138, 139, 140]</td>
<td>&quot;To save approximately 1.6 million tonnes of greenhouse gas emissions while strengthening the economy. It's also expected to help an estimated 37,000 homeowners to identify and make energy saving upgrades to their homes&quot; [139].</td>
<td>Early 2016 to 2018+ (planned)</td>
<td>Ontario Union Gas and Enbridge Gas distribution in cooperation with Save On Energy and the provincial government</td>
<td>All Ontario homeowners in single detached homes, town houses or row houses, who heat their home with natural gas, propane, oil, electricity or wood [140].</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>GreenON Installations program</strong> [89, 143]</td>
<td>&quot;To give consumers … greater control over their energy use, and help them find opportunities to lower their energy bills&quot; [89].</td>
<td>August 2017 to 2018+ (planned)</td>
<td>Ontario Independent Electricity System Operator (IESO).</td>
<td>Homeowner and renters living in a single-detached, semi-detached, townhome or row home without an existing smart thermostat</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>GreenON Social Housing program</strong> [144]</td>
<td>To &quot;help improve the energy efficiency of social housing apartment buildings with fewer than 100 units across the province&quot; and to &quot;improve the living conditions for low-income and vulnerable tenants and the long-term sustainability of buildings&quot; [144].</td>
<td>August 2017 to 2018+ (planned)</td>
<td>Ontario Municipal Service Managers</td>
<td>Providers of social housing comprising apartment buildings with fewer than 100 units</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>AffordAbility Fund</strong> [145]</td>
<td>&quot;To help Ontarians who do not qualify for low-income conservation programs to make energy efficiency improvements to their homes, improvements that could not otherwise be done without the support&quot; [89].</td>
<td>June 1, 2017 to 2018+ (planned)</td>
<td>Ontario &quot;An independent trust ... distributes funds to [local distribution companies] that apply&quot; [89]</td>
<td>&quot;Ontarians not eligible for low-income conservation programs and who need support to improve the energy efficiency of their homes&quot; [89]</td>
<td>Yes</td>
</tr>
<tr>
<td>Enbridge Demand Side Management portfolio (Resource Acquisition portfolio) (complies with the OEB’s Demand Side Management Framework for Natural Gas Distributors) [113]</td>
<td>33. Smart Thermostat Program [146, 147]</td>
<td>To allow participants &quot;to save on [their] energy costs&quot; [147]</td>
<td>April 20, 2016 to December 31, 2019 (planned)</td>
<td>Ontario</td>
<td>Enbridge</td>
</tr>
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</tr>
<tr>
<td>Enbridge Demand Side Management portfolio (Resource Acquisition portfolio) [112]; Ontario Home Energy Conservation Incentive Program [133]</td>
<td>34. Home Energy Conservation (HEC) Program [148, 149]</td>
<td>To make “it easy and affordable for homeowners to improve the energy efficiency of their home, lower their energy bills and lessen their home’s impact on the environment” [149]</td>
<td>2012 to December 31, 2019 (planned)</td>
<td>Ontario</td>
<td>Enbridge</td>
</tr>
<tr>
<td>Ontario Home Energy Conservation Incentive Program (via Green Investment Fund) [137,140])</td>
<td>35. Home Reno Rebate program [150, 151]</td>
<td>To allow participants to &quot;save money now,&quot; with cash incentives, &quot;save money later&quot; by using less energy, and &quot;boost [their] home's value&quot; [150]</td>
<td>2012 to 2018+ (planned)</td>
<td>Parts of Toronto</td>
<td>Union Gas</td>
</tr>
<tr>
<td>Ontario’s Five Year Climate Change Action Plan 2016-2020 [141]</td>
<td>36. Social Housing Apartment Improvement Program (SHAIP) [152]</td>
<td>To &quot;help reduce greenhouse gas (GHG) emissions [in large social housing high-rise apartment buildings], improve the quality and sustainability of social housing stock and enhance the quality of life of tenant households” [152]</td>
<td>August 2017 to 2018+ (planned)</td>
<td>Ontario</td>
<td>Ontario Ministry of Housing</td>
</tr>
<tr>
<td></td>
<td>37. Social Housing Apartment Retrofit Program (SHARP) [153]</td>
<td>To fund &quot;retrofit [s to] large social housing apartment buildings (150 or more units) across Ontario”[153]</td>
<td>February 2016 to 2017</td>
<td>Ontario</td>
<td>Municipal service managers</td>
</tr>
<tr>
<td></td>
<td>38. Social Housing Electricity Efficiency Program (SHEEP) [153]</td>
<td>To &quot;help reduce electricity usage, and provide modest GHG emissions reductions” “in low-density social housing buildings where tenants pay their own hydro costs” [153]</td>
<td>February 2016 to mid-2018</td>
<td>Ontario</td>
<td>Municipalities/social housing providers</td>
</tr>
<tr>
<td>Ontario’s Five Year Climate Change Action Plan 2016-2020 (Part of SHAIP)</td>
<td>39. Toronto implementation of Social Housing Apartment Improvement Program (SHAIP) [152]</td>
<td>To &quot;help reduce greenhouse gas (GHG) emissions, improve the quality and sustainability of social housing stock and enhance the quality of life of tenant households” [152]</td>
<td>April 2017 to 2018+ (planned)</td>
<td>Toronto</td>
<td>Toronto Community Housing Corporation (TCHC)</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Ontario’s Five Year Climate Change Action Plan 2016-2020 (part of SHARP)</td>
<td>40. Toronto implementation of Social Housing Apartment Retrofit Program (SHARP) [154, 155]</td>
<td>&quot;To realize timely energy efficiencies and significant reductions in greenhouse gas emissions throughout [Toronto's] ageing social housing portfolio” [154]</td>
<td>2016/17 to 2018+ (planned)</td>
<td>Toronto</td>
<td>Social housing providers</td>
</tr>
</tbody>
</table>
In this category, the review identified two types of initiatives: those that address *affordability* and those that provide *emergency assistance*. Affordability measures primarily support households with their electricity costs, aiming to make electricity more “affordable.” Most originate from electricity legislation frameworks (e.g., *Ontario Fair Hydro Plan Act*) or the Ministry of Energy. For example, the Ontario Clean Energy Benefit (2011-2015) provided households—and other low volume users such as small businesses—with a financial benefit equaling 10% of their electricity bills, including tax, to support the costs of transitioning to clean energy. The benefit was paid through the province’s revenue from Ontario Power Generation (crown corporation responsible for generating electricity) and Hydro One. Through the Ontario Fair Hydro Plan, households and other low volume users had their electricity bills lowered by an average of 25%. The full rebate came into effect in July 2017 and continued until April 2018, after which price increases were held to the rate of inflation in accordance with the *Fair Hydro Plan Act*. Like the Ontario Clean Energy Benefit, the Ontario Fair Hydro Plan aimed to ease the cost of electricity due to system improvements and make electricity “as affordable as possible.”

In contrast to above, certain measures existed for groups consuming higher than average amounts of electricity and having difficulty affording electricity. The Ontario Electricity Support Program (OESP) provided low-income consumers with monthly electricity bill credits. Eligibility criteria included household income and household size. For example, for a household of one with an after-tax household income of $28,000, the monthly OESP credit was $45; for a household of four with a similar household income the monthly OESP credit was $57. The program was also offered via another stream through which intensive electricity users could receive higher levels of assistance. For this latter stream, homes that used more electricity due to electrical heating, or households that relied on approved medical devices (i.e., kidney dialysis machine, mechanical ventilators, or oxygen concentrators) were eligible. Another measure for low- and moderate-income groups, originating from the Ontario Ministry of Finance, came in the form of a credit to offset energy costs and property tax. In 2018, Ontario Energy and Property Tax Credit provided up to $1,042 in tax relief to households with low-to-moderate incomes, with eligible seniors able to claim up to $1,187 in tax relief.

Emergency assistance, however, only focuses on short term relief of the cost of electricity and natural gas in situations such as a job loss, illness, marital breakdown, or emergence of unexpected expenses [78]. A well-known program is the Low-income Energy Assistance Program (LEAP), which provided financial assistance throughout Ontario to households behind on their electricity or natural gas bills and facing utility service disconnection. Delivered via the OEB, a one-time grant was provided to households by LDCs that work with intake agencies such as social services agencies. Similar assistance was available at the local level. For example, the Union Gas Energy Assistance Program (UGEAP), available to low-income households living in the Union Gas service area, provided up to $500 in the form of a one-time grant to households that had exhausted all other forms of financial support.

Another form of assistance focused on poverty and economic inequality, originated from a housing framework: The Emergency Energy Fund (EEF), part of the City of Toronto’s implementation of the Community Homelessness Prevention Initiative, targets low-income households in Toronto already receiving support from Ontario Works or the Ontario Disability Support Program. The fund provides financial assistance to pay arrears, avoid disconnection, or
reconnect to electricity or natural gas. In contrast to the other emergency assistance programs, the overall EEF program goal is to assist households at risk of homelessness.

4.2 Energy efficiency and savings

This review found numerous measures that promoted both **energy efficiency and energy savings**. These primarily addressed climate change mitigation by targeting the building stock as well as a home’s interior (lights, appliances, and other household items). These measures—even if financial—were designed to save energy, therefore they are not classified under financial support. Compared to initiatives belonging to the other classifications, energy efficiency and savings measures were delivered via a wider range of actors such as LDCs, not-for-profit organizations, various levels of government, and private contractors.

While some programs were offered to specific groups such as low-income households, others were offered broadly. For example, the Home Energy Loan Program (HELP), Canadian Mortgage and Housing Corporation (CMHC) Green Home Program, Energy-Efficient Housing Program, and Canada Guaranty Energy-Efficient Advantage Program offered financing to homeowners (or to those with small rental loans in the case of the CMHC program) who had good standing with respect to property tax and utility payments and/or certain mortgage insurance agreements. Goals across programs ranged from making it easier to pay for home improvements to rewarding those obtaining financing to make energy-efficient improvements. Accordingly, Enbridge’s Home Energy Conservation (HEC) Program and Union Gas’ Home Reno Rebate program both offered incentives to residential natural gas customers for first installing recommended energy efficiency upgrades and then submitting to a home energy audit. These programs aimed to make it more affordable for customers (in detached, semi-detached, mobile homes, or in row townhouses) to lower their energy usage. Similarly, programs existed for various households wherein technology-based tools were provided or incentivized.

MyEnergyXpert, delivered through Enbridge, provided software to households so that they could receive tailored feedback to reduce energy consumption. Enbridge also offered the Smart Thermostat Program through which households that purchased a smart thermostat (i.e., a device able to communicate with other technology) could receive a rebate for their purchase.

Compared to the above programs, the eligibility criteria of the AffordAbility Fund were less clear (demand for the program resulted in it being fully subscribed in July 2020, after which it was cancelled). In particular, the fund was provided to “everyone who has an electricity bill that is a burden” [156]. This fund provided levels of support relative to a household’s electricity bill and net income, with further evaluations potentially being required. Support consisted of a Home Energy Kit, including upgrades households could install themselves (e.g., energy saving light bulbs, power-bars, faucet aerators), as well as an in-home visit from an energy advisor. A few programs also specifically targeted low-income households (based on before-tax household income and household size or participation in a government assistance program). The Enbridge Home Winterproofing, Union Gas Home Weatherization, and Save on Energy Home Assistance Programs offered upgrades in the form of new insulation, draft proofing, and smart thermostats. In addition to saving energy, these programs were advertised as benefitting customers by reducing their energy costs, helping them stay warmer during the winter, increasing their home’s value, protecting the environment, and helping the province with its energy conservation goals.

Three notable programs focusing specifically on social housing retrofits emerged as initiatives of Ontario’s 2016–2020 Climate Change Action Plan: The Social Housing Apartment
Improvement Program (SHAIP), the Social Housing Apartment Retrofit Program (SHARP), and the Social Housing Electricity Efficiency Program (SHEEP) [157]. These sought to reduce the energy usage of low-income and “vulnerable” tenants without compromising quality of life, while also contributing to the long-term sustainability of social housing buildings. SHAIP—a five-year program—and SHARP—a program with a fixed budget of $82,000,000—provided funding for retrofits and repairs to social housing apartment buildings, particularly buildings such as high rises and buildings with over 150 units. SHEEP, on the other hand, focused on low-density social housing, funding retrofits for housing units in which tenants were energy ratepayers. Funding for SHARP and SHEEP was awarded by 2017; the former paid for the retrofits of 78 Ontario apartment buildings (approximately 17,954 units), while the latter funded 358 projects (approximately 1,246 units). SHAIP continued to fund retrofit projects and energy audits through 2018.

4.3 Consumer protection

Consumer protection assists households within retail markets with arrears payment assistance, budgeted billing, and waiving of security deposits. These protections were established nearly a decade ago in Ontario. Although some protections are financial, they are more focused on protecting consumers from being financially overburdened and preventing cut-offs. The primary objective with respect to ‘affordability’ is access. Consumer protection is a requirement of the OEB’s service policies for natural gas utilities. For electricity, consumer protection is a requirement of the OEB’s low-income customer service rules.

For natural gas arrears, Union Gas aided households who were unable to pay their charges by forming a mutually agreed upon payment plan. For electricity arrears, LDCs and unit sub-metering providers allowed households more time to pay their outstanding balances with time frames varying according to the amount owed. For example, customers were given at least eight months if they owed an amount less than twice their average bill, at least 12 months if they owed more than twice but less than five times their bill, and 16 months if they owed more than five times their bill. These measures could prevent households from having their energy services abruptly disconnected. As of 2017, winter disconnection for electricity and natural gas had been banned in Ontario [158, 159]. With budgeted or equalized billing, both electricity and natural gas utilities provided households with options to spread electricity or natural gas payments over a set duration to assist with budgeting payments. Last, for low-income households that meet eligibility criteria, Union Gas, Enbridge, and electricity LDCs throughout Ontario waived the security deposits required for connecting to utility services.

5.0 Discussion

The review findings describe policy responses and initiatives that address energy poverty and energy-related vulnerabilities in Ontario. All fall within the broader policy areas of energy efficiency and energy savings, housing provision, poverty reduction, healthcare, and climate change mitigation. These may not have been designed to specifically address energy poverty, but they in some way address risk factors influencing energy vulnerability, i.e., the likelihood of a household being subject to energy poverty, household sensitivity to energy poverty, and a household’s capacity to adapt to energy poverty [45].
The reviewed financial support initiatives, such as bill rebates and benefits, can address the broader risk factors of fluctuating energy prices as well as costs associated with energy systems. This includes infrastructure development, maintenance, and repair. Such initiatives have the potential to be beneficial on three fronts. First, they may reduce the likelihood of a household ending up in energy poverty as well as their sensitivity to energy poverty. Second, these types of initiatives may attract public support for the transition to cleaner sources of energy. Finally, they make the case for affordable energy transitions. However, such wide-reaching policies need to be properly designed. This may not have been the case with the Fair Hydro Plan, for example, due to concerns over fiscal transparency, accountability, and value for money [160]. More, the concept of borrowing from future ratepayers to assist current ratepayers should be questioned in terms of equitability. Also, charging ratepayers for initiatives is regressive, given that income is not considered when setting flat rate fees. This means that low-income households pay more for these initiatives in comparison to higher-income households. It would therefore be more equitable to pay for these initiatives through public subsidies, paid for by taxpayers via a progressive taxation system, rather than keeping payment tied to service-specific billing.

The study found that energy efficiency and savings measures have long-term promise for addressing energy poverty. In the UK for example, where energy poverty is formally recognized, measurement is moving from indicators based solely on expenditures towards the LILEE. This formally captures the energy efficiency aspect of energy poverty [5]. However, many of the initiatives we reviewed target homeowners. This is problematic in the Ontario setting, where renters comprise a large portion of the population. Renters who do not pay for their utilities may not seek out methods to improve the energy efficiency of their homes unless their homes are in poor condition. Even if that is the case, they may not be eligible to receive support. On the other hand, renters who pay for their own utilities may not have permission from their landlords to make changes. Furthermore, incentives may be too small in relation to the time and costs needed for upgrades, and financing may not be available for those who cannot afford to first pay capital costs out-of-pocket. The energy efficiency gap in rental markets and the split incentives of energy efficiency improvements (i.e., where capital costs and utility savings are not shared equally between landlords and renters) are widely recognized issues [161]. Given that energy efficiency measures can help to protect from energy vulnerability and help households adapt to energy poverty, more needs to be done to ensure they are available to those needing them most. Previous research has found that tailoring retrofit incentives to the needs and motivations of specific groups, including renters, is key for increasing the uptake of retrofits [162]. Such research also suggests more needs to be done to realize the unique needs and motivations of various groups, including vulnerable groups, by policymakers. It is noted that energy efficiency measures for addressing housing stock quality, alone, will not address the complexity of energy vulnerability.

The consumer support initiatives that were reviewed address risk factors that extend beyond the “affordability–access binary.” They consider socioeconomic and demographic characterizations of vulnerability, such as household size, households with children, and/or individuals with disabilities. Many of these programs depended on social assistance programs for eligibility considerations—and therefore vulnerability considerations—and the delivery of assistance. As in other countries [6], the notion of vulnerability in Ontario is primarily tied to “consumer vulnerability” rather than energy vulnerability. Problematically, there appears to be varying notions of consumer vulnerability. Our research did not uncover a consistent definition of vulnerability across initiatives or legislation, leaving one to guess or make assumptions as to
its conceptualization. Vague conceptualizations of vulnerability are problematic given that they lead to mitigation strategies that do not address the root cause(s) of energy poverty and energy vulnerability. A one-time grant or support with arrears payments, for example, are likely unsustainable solutions for households experiencing long-term, ongoing difficulties. Emergency assistance, for example, is valuable for households experiencing a sudden or temporary change in circumstances that disrupt routines and practices (see [30]), but falls short of addressing the precarity of their situation. Measures such as bill credits are also unsustainable if a household’s circumstances do not improve. This type of financial assistance is helpful as a transitioning form of support [6] but not as a solution. Even more, for those struggling with costs, reduced rates or credits will not affect their living situation if they are living in inefficient housing and experiencing uncomfortable living temperatures.

Concern remains that Ontario’s decision-makers are leaving households facing energy poverty out of their thinking. They are misunderstanding who they are or what issues they experience or take a technocratic view of the future of energy without addressing the challenges of those who are energy vulnerable or already in energy poverty. After forming government following the Ontario election of 2018, the Progressive Conservative (PC) Party of Ontario took several actions that raised concerns among advocates for vulnerable populations. In cancelling Ontario’s cap-and-trade program, for example, the PC government brought the SHAIP retrofit program to a premature end due to loss of funding [163]. This government also committed to scrap the Green Energy and Green Economy Act [164], terminated the Clean Energy Benefit, and repealed the Ontario Fair Hydro Plan Act with the use of the Fixing the Hydro Mess Act—though a handful of the Plan’s measures, such as electricity bill increases being held to the rate of inflation, remain intact [165]. It should be noted the PC government has been responsible for some positive measures to protect Ontario’s residential energy consumers. As the COVID-19 pandemic began to take its toll in early 2020, increasing unemployment causing residents to spend more time in their homes [166], the government announced a suspension of on-peak and mid-peak electricity pricing for a 45-day period, providing some relief to households billed based on time-of-use [167]. This government also allocated $9 million in new funding for the LEAP program in its March 2020 Economic and Fiscal Update (titled Ontario’s Action Plan: Responding to COVID-19) [168]. The OEB also responded to the pandemic by extending the winter ban on disconnections through July 31, 2020—though, notably, the PC government had revoked the OEB’s authority to apply such a ban (among other consumer protections) to submetering companies one year earlier [169, 170, 171].

While priorities of the province’s political leadership will influence the development of Ontario’s energy system, public attention that is directed on issues may protect some important measures. For instance, it is unlikely that any government will undo the OEB’s order banning electricity distributors from disconnecting homes during the winter, as this would likely generate public scrutiny. Unfortunately, however, such scrutiny cannot be counted on to protect all energy poverty and vulnerability mitigation efforts—particularly those that are complex, costly, or controversial—and it is insufficient to ensure systemic issues are addressed.

Since the end of this study’s timeframe some learning appears to have occurred. Current initiatives, such as the Save on Energy’s Energy Affordability Program, directed to low-income residents, demonstrates understanding of the long term promise of targeted energy efficiency programs [172]. However, issues remain. In 2022, new laws and policies have been enacted and developed, notably the Canadian Net-Zero Emissions Accountability Act to achieve a net-zero economy by 2050. The Act establishes 2030 GHG emissions targets as determined under the
Paris Agreement. It also sets targets for 2035, 2040, and 2045 ten years in advance; each requiring emissions reductions plans [173]. Broadly, decision-makers in Canada appear to understand the future benefits and necessity of policies to help “reduce energy costs for our homes and buildings” [174] as outlined in the federal government’s 2030 Emissions Reductions Plan, released March 29, 2022. Relevant to those in positions of energy vulnerability or in energy poverty, the plan involves $458.5 million to support the low-income stream of the existing federal Greener Homes program starting in 2022-23 through low-interest loans and grants (details have yet to be released) [175]. This investment however falls significantly short of other dedicated funding, such as the larger Canada Greener Homes Grant, which dedicated $2.6 billion over 7 years to help Canadian homeowners across the country improve the energy efficiency of their homes and reduce their bills [176]. Moreover, the Greener Homes program requires up-front payment and only offers grants after measures are financed which makes it inaccessible to lower-income Canadians [177]. Therefore, it is unclear whether decision-makers truly understand the needs of vulnerable consumers, and the implications of this understanding, in Canada’s energy transitions.

6.0 Conclusion

This paper reviews and analyses initiatives from the period of 2003 to 2018 that have the potential of addressing energy poverty and vulnerability in Ontario. It demonstrates that the concept and causes of energy poverty are not well-understood by relevant decision-makers in the province and/or the country. Hence while some important measures were put into place, significant gaps remain.

The status quo of energy poverty in Ontario and Canada is related to energy affordability challenges. Initiatives for addressing affordability have been aligned with the costs of energy, inefficient housing, or low incomes. It is not argued that these factors cannot lead to vulnerable situations, but more needs to be known. So far, these factors are generally being addressed uniquely. Attempts have been made to either address energy costs, inefficient housing, or low incomes. This lacks understanding that those who are in energy poverty could be suffering due to the costs of energy and inefficient housing and low incomes. Indeed, addressing them together is what the UK is looking to move towards with the development of the LILEE, which follows their use of the LIHC, and relies on the use of the 10% indicator. There is also a failure to understand how the above factors interact with other critical vulnerabilities, such as socio-demographics, neighbourhood type, racialization, associated with inequitable energy consumption.

Indicators of energy poverty are problematic if the issue is not defined or studied correctly in the first place [178]. The 10% indicator has been used in Ontario and Canada, but its use has not been justified for use in the Canadian context. Required is systematic and in-depth scholarly study of the complex social, technological, economic, and political underpinnings of energy poverty in Canada. Insights here will contribute to the development of a clear definition of energy poverty in Canadian energy policy that suits the Canadian context. A definition will provide the basis for developing metrics that enable the measurement and monitoring of energy poverty [6]. A common definition would also encourage accountability. This is critically needed given the significant lack of information detailing how initiatives are tracked, which does little for knowing if measures are successful. Ultimately, a definition is needed for developing best practices for policy, regulatory, and legal frameworks and the planning and execution of on-the-
ground solutions. With these, it is clear that interministerial collaboration will also be necessary, as will collaboration between various levels of government, regulators, energy providers, service providers, and organizations such as community groups and advocacy groups.

Canada has positioned itself as meeting SDG7. That is, most Canadians have access to energy. Most also appear to be able to afford energy. However, this does not mean that households do not experience hardships or experience being comprised. To progress SDG7, Canada fundamentally needs to better understand energy poverty and recognise that this issue affects many people and in different situations. Otherwise, Canada risks an increased vulnerability to energy poverty in the coming years.

Data Availability

This paper made use of publicly available policies and initiatives. These are shown in Table 2.

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References


Can We Make Housing More Affordable with Mortgage Loan Insurance?


