Residential Energy Efficiency Initiatives in Quebec: An Energy Justice Crisis?

by

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ABSTRACT

Energy poverty occurs when a household cannot afford a socially and materially needed level of energy services to live a decent and healthy life. Interventions targeting improvements to residential energy efficiency can mitigate energy poverty by increasing energy savings. This study assesses the scope of residential energy efficiency initiatives implemented in Quebec and evaluates whether there are inequalities in their distribution through the lens of energy justice. An online search yielded 56 initiatives. Homeowners, landlords and construction companies benefit the most from initiatives, while lower-income and marginalized groups benefit from them the least. While the former benefit from subsidies, the latter mostly receive advice and small equipment. Their needs are not fully met by currently available initiatives, and they can benefit from an integration into the initiative creation process. For an equitable energy transition in the residential sector, more support must be provided to those who need it the most.

RÉSUMÉ

Un ménage se trouve en précarité énergétique lorsqu'il ne peut pas se permettre le niveau d'énergie socialement et matériellement requis pour une vie saine et convenable. Les interventions en efficacité énergétique résidentielle peuvent atténuer la précarité énergétique en augmentant les économies d'énergie. Cette étude identifie les initiatives mises en place au Québec visant à améliorer l'efficacité énergétique résidentielle et les analyse sous l'angle de la justice énergétique. Une recherche en ligne a produit 56 initiatives. Les propriétaires, locateurs et entrepreneurs bénéficient de la majorité des initiatives, principalement du soutien financier. Les ménages à faible revenu et les groupes marginalisés bénéficient du moins d'initiatives et reçoivent des conseils et petits équipements. Leurs besoins ne sont pas comblés par les initiatives actuellement disponibles, et ils bénéficieraient d'une intégration au sein du processus de création d'initiatives. Pour une transition énergétique équitable, il faut davantage soutenir ceux qui en ont le plus besoin.

CHAPTER 1: INTRODUCTION

Energy poverty, also referred to as energy insecurity or fuel poverty, can be defined as "a condition in which a household is unable to secure a socially and materially needed level of energy services" and as a consequence cannot "live a decent and healthy life" (Bouzarovski et al., 2021, p. 2; Bouzarovski & Petrova, 2015; Hernández, 2016; Middlemiss & Gillard, 2015, p. 147). Energy services refer to the products of energy systems that are necessary to the livelihoods and well-being of individuals (Modi et al., 2005). The emphasis on energy services is important in this context, as it allows to shift the focus of energy systems onto the aspects that directly impact the well-being and livelihoods of individuals, such as "washing, heating, cooking, cooling, and lighting" (Haas et al., 2008, p. 4013).

Energy poverty is influenced by several factors, including lower household income, the energy efficiency and physical conditions of housing, and the price of energy, with lower-income households living in inadequately insulated buildings most at risk of experiencing energy poverty (Bouzarovski et al., 2021; Riva et al., 2021). When evaluating the prevalence of energy poverty, different measures can be used (Tirado Herrero, 2017). In Canada, two measures are often used: a household can be said to experience energy poverty if they spend more than 10% (10% measure) of their income on energy-related expenditures or if their ratio of energy expenditure to household income exceeds twice the national median ratio (2M measure) (Riva et al., 2021). Depending on the measure used, the energy poverty profile of a geographic region can change drastically (Moore, 2012). In Quebec, based on the measure used, between 9% (according to the 10% measure) and 16% (according to the 2M measure) of households experience energy poverty (Riva et al., 2021).

Energy systems in Quebec must be analyzed. In the past decade, while energy expenditures in Quebec demonstrate an oscillating but overall increasing trend, the percentage of total household expenditures allocated to energy has been decreasing, implying that other costs, such as housing or food, take up a much larger share (Figure 1.1) (Transition énergétique Québec, n.d.-b).

Housing cost is an important component of energy poverty. In 2021, 32.5% of new renters in Canada, many of which are located in Quebec's largest urban areas, lived in unaffordable housing (Statistics Canada, 2023). This further exacerbates the burden of energy costs.

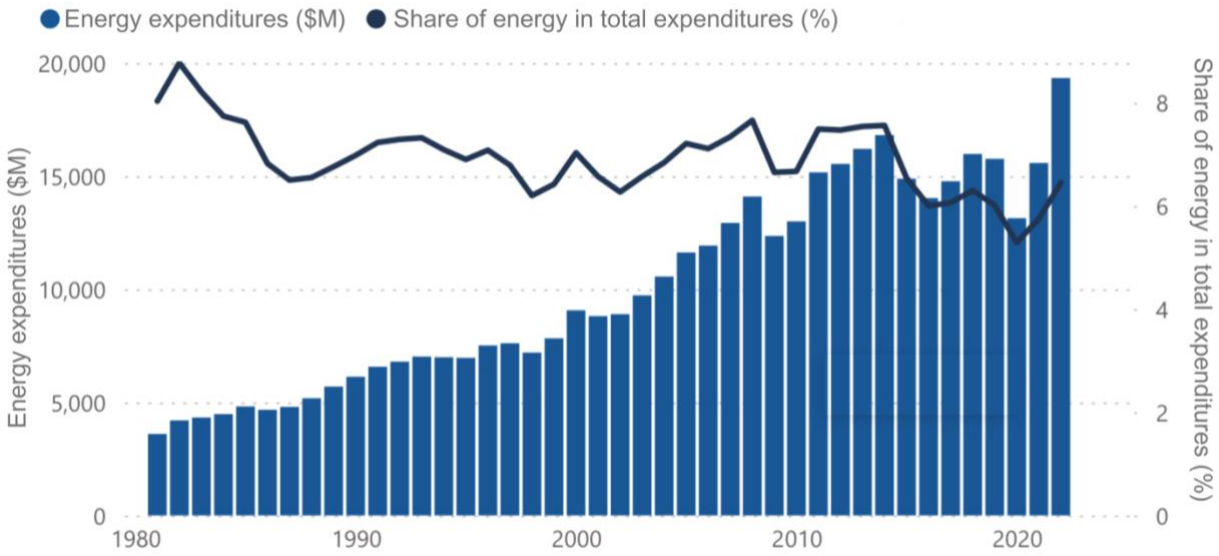

Figure 1.1: Evolution of energy expenditures in Quebec (Reproduced from Transition énergétique Québec, n.d.).

Over the years, the Governments of Quebec have put in place guiding plans for the transition to clean energy, starting in 2006 and currently extending to 2030 with the *2030 Plan for a Green Economy*. It provides guidelines for decarbonation in the transport and industry sectors and highlights the importance of efficiency in energy consumption, promoting electrification under the ultimate goal of mitigating climate change (Gouvernement du Québec, 2020).

Quebec is the largest producer of hydroelectricity in the country, accounting for 94% of the province's total energy profile (Canada Energy Regulator, 2023). This production system has been established since the 1940s, when Hydro-Quebec became a state-owned company, becoming in 1962 the sole actor of hydroelectric production in the province (Hydro-Québec, n.d.). In 1996, the same year as the completion of the second phase of the Baie-James

hydroelectric complex, the *Régie de l'énergie du Québec* was created, fixing energy tariffs and protecting consumers (Hydro-Québec, n.d.; Régie de l'énergie du Québec, n.d.).

Low energy tariffs tend to create the illusion that spending on energy is low. However, in 2021, 44% of the province-wide residential energy consumption originated from housing, including heating, cooling and electricity, with the average household spending 5.7% of their income on energy expenditures– a number higher than that of Ontario, Alberta and BC (Transition énergétique Québec, n.d.-b). Knowing that a high proportion of the Quebec population experiences energy poverty, and that the province is undertaking a transition to clean energy, the support offered to Quebec households to mitigate energy poverty needs to be analyzed. While programs and policies providing support to households in respect to energy efficiency and savings have the potential to mitigate energy poverty, they must be examined with regards to equity and justice, as vulnerable populations are at risk of being left behind during energy transitions (Das, Martiskainen, Bertrand, et al., 2022; Middlemiss, 2022).

The goal of my Honours thesis is to assess the scope of residential energy efficiency initiatives implemented in Quebec and to evaluate whether there are social and spatial inequalities in the distribution of these initiatives. The research questions guiding this study are:

1. Which types of energy efficiency initiatives exist in Quebec?
2. Which audience groups have access to these initiatives?
3. Do these initiatives accurately respond to the needs of different groups?
4. Are the groups in need represented in the process of initiative creation?

For the scope of this study, an initiative includes any program, policy or intervention that provides financial or material support to the residential sector in Quebec with the goal of improving residential energy efficiency.

First, in the Literature Review, I provide a theoretical framework with a highlight on energy poverty, residential energy efficiency, and energy justice, identifying the gaps in literature that my thesis will fill. Chapter 3 outlines the methods that allowed for data collection and analysis.

In Chapters 4 and 5, inventoried residential energy efficiency initiatives are categorized along key variables, providing an overview of the initiatives currently in place in Quebec, with a three-part energy justice analysis determining whether the distribution of support is equal, representative, and comprehensive. In Chapter 6, I conclude that more efforts are needed to ensure that residential energy efficiency initiatives in Quebec are more equally distributed among population groups, to provide adequate support to those who need it the most, and to integrate these groups in the decision-making process. Ultimately, this study provides a critical analysis of support interventions and allows for formulated recommendations to be shared with decision-making actors.

CHAPTER 2: LITERATURE REVIEW

2.1. Energy poverty

2.1.1. Housing as a determinant of energy poverty

Housing and energy poverty are fundamentally interlinked, as the factors that lead to energy poverty are inherent to the conditions of buildings. Socio-economic inequalities lead to inequalities in the availability and distribution of housing, which in turn affect housing quality (Swope & Hernández, 2019). Factors of inadequate building conditions include "poor insulation, drafts and malfunctioning appliances", as well as a lack of air conditioning, which in turn lead to a multitude of physical and mental health problems (Hernández, 2016, p. 9; Alidoust & Huang, 2023). The condition of buildings directly affects the health of their occupants, and the impact of poor residential conditions on energy services creates the burden of energy poverty. Energy poverty is inextricably linked with the housing conditions in which lower-income people live, e.g. those living in social housing, which tends to be underfunded and with inadequate physical conditions (Hernández & Swope, 2019).

An important dimension of residential energy insecurity is associated with energy costs, which is in part used to measure energy poverty. Expenditure-based energy poverty measures rely on the cost of energy services relative to the income of a household. As such, lower-income households are disproportionately affected by energy poverty. Higher energy bills, coupled with lower household incomes, represent a higher share of household spending, pushing people into energy poverty and the associated financial and mental strains (Hernández, 2016; Tardy & Lee, 2019). In Canada, the variation in energy poverty rates between provinces can largely be explained by variations in energy costs, with Atlantic provinces (where houses are larger and often in rural areas and where the main source of energy are oil and biomass) displaying higher rates of energy poverty (Riva et al., 2021).

Poor residential energy efficiency is a direct determinant of energy poverty. Energy efficiency can be affected by an inadequate insulation or thermal regulation, which increase energy

consumption and therefore energy bills (Alidoust & Huang, 2023; Tardy & Lee, 2019). The ability to regulate one's indoor temperature based on variations in outdoor temperature is important to comfort (Andargie et al., 2019). As explained by Hernández (2016), "the inability to regulate temperatures and the consideration of costs [can lead] some [households] to sacrifice comfort and jeopardize health and safety" (p. 6). A systematic literature review of energy efficiency interventions concluded that improvements to isolation are especially beneficial in reducing energy bills for lower-income households (Giandomenico et al., 2022). Therefore, improving housing conditions plays an important role in alleviating energy poverty.

2.1.2. The consequences of energy poverty: poorer health and well-being

It is impossible to separate housing, energy poverty, and health. Occupants of energy inefficient dwellings, who suffer from energy poverty the most, can experience poor thermal comfort, cardiovascular and respiratory illnesses during colder months, and adverse mental health impacts, as well as fear of social stigma and familial/residential instability (Alidoust & Huang, 2023; Hernández, 2016). An inefficient usage of essential energy services, such as lighting, using home appliances, heating and cooling, can give rise to issues related to both mental and physical health, and can impede one's social life (O'Sullivan, 2019). For instance, individuals might not want to invite guests into their home "if they cannot provide a warm home environment in which to socialize" (O'Sullivan, 2019, p. 441).

The subjective experience of living in energy poverty is essential to understanding its health impacts. For example, Middlemiss and Gillard (2015) performed a series of interviews with households living in energy poverty and noted that "if families feel that they're not warm enough, not able to afford energy, they begin to see more extreme coping mechanisms as legitimate, which may lead to other health and social problems" (p. 152). In a similar study, Hernández (2016) revealed that "participants noted key challenges in receiving helpful information on energy savings and available resources in marginalized communities, feeling that nothing could be done to improve the circumstances" (p. 7). Therefore, in analyzing the energy efficiency initiatives available on the market, it is fundamental to look at energy poverty as more than just indicators and measurements. The health impacts of energy poverty represent an issue

of equity and justice, and initiatives must be looked at with the goal of understanding how they might impact the health and well-being of different groups.

2.2. Residential energy efficiency

2.2.1. Energy efficiency and the global energy transition

Countries worldwide have been shifting towards sustainable sources of energy, due to an interlinkage of factors related to decreases in energy supplies, increases in energy costs, a desire to reduce emissions, and the development of new, more cost-effective technologies (for example, as increasingly seen through the electrification of machinery) (Solomon & Krishna, 2011). In the context of the sustainable energy transition, reductions in residential energy emissions must be addressed, as households in the Global North are responsible for 20%-40% of global energy emissions (Pérez-Lombard et al., 2008; Wells et al., 2015).

The need for a transition to green energy has been proven necessary in Canada to limit the global impacts of climate change resulting from its intense production of oil and hydroelectricity (Thompson, 2022). While the federal government aims to reduce greenhouse gas emissions to meet targets set for 2030 (40-45% reduction from 2005 emissions levels), there is concern for the nation's ability to reach these targets due to a lack of concertation and accountability between provinces and energy producers (Dusyk et al., 2021; Haley, 2014). In Quebec, an important hydroelectricity producer, the transition to renewable energy encourages disinvestments in fossil fuels and promotes electrification and a reduction of energy consumption (Transition énergétique Québec, n.d.-a; Viens et al., 2023). In an effort to achieve these goals, the government established an Energy Transition Master Plan, which sets targets such as an improvement of energy efficiency of 15%, a reduction in fossil fuel use of 40%, and an increase of renewable energy production of 25% (Transition énergétique Québec, n.d.-c). The accent placed on energy conservation sets the context for the energy efficiency initiatives implemented in the province.

The global energy transition is an important dimension of energy poverty, as "a transition to net zero is highly risky for energy poor households, who enter into the transition at a disadvantage"

(Middlemiss, 2022, p. 2). It has been long justified that both energy efficiency and energy poverty must be addressed together, as neither issue can be solved independently of the other (Ürge-Vorsatz & Tirado Herrero, 2012). This highlights the importance of looking at the energy transition holistically.

2.2.2. Energy efficiency retrofits, housing and health

Residential renovations aiming to increase the energy efficiency of a dwelling, or energy efficiency retrofits, are commonly used on the existing housing stock to reduce energy expenditures (Giandomenico et al., 2022). Deep-energy retrofits are a specific type of residential energy efficiency renovations, tackling energy efficiency holistically. They allow for residential energy expenditures to decrease by more than 50%, by improving insulation, air-sealing and ventilation, installing double-glazed windows and doors, and integrating new heating and cooling equipment simultaneously (Amann et al., 2021; Maidment et al., 2014; Tozer et al., 2023; Zhivov et al., 2015). Studies show that occupants of buildings that underwent deep-energy retrofits reported increases in self-reported overall health, with the multiple improvements brought to their buildings representing significant positive changes to their quality of life (Ahrentzen et al., 2016; Breysse et al., 2011, 2015; Frey et al., 2015; Lloyd et al., 2008).

Energy efficiency retrofits play an important role in improving the health of occupants. Residential retrofit interventions targeting energy efficiency improvements, including installing adequate heating sources and properly ventilating the unit, can improve the physical and mental health outcomes of occupants and can reduce hospitalizations associated with energy poverty (Howden-Chapman et al., 2011; Ige et al., 2019). In a study conducted on lower-income households in New-Zealand, Howden-Chapman et al. (2007) highlight the importance of housing insulation, demonstrating that insulated houses consume nearly 20% less energy than non-insulated houses, can maintain higher indoor temperatures, and are less humid, with self-reported health rates reduced. Similarly, as assessed by Jacobs et al. (2014), lower-income retrofitted houses in Washington, D.C., saw increases in adult self-reported general health and a reduction

of 16% in energy consumption. These two examples notably raise the importance of the income dimension within the energy transition.

2.2.3. Energy efficiency interventions and the equitable energy transition

As stated previously, energy poverty and energy efficiency are mutually dependent. In the context of the equitable energy transition, it is notably important to look at the different needs of different groups of individuals. In addition to income, building type and tenancy are two important dimensions of equity. For one, occupants of multi-unit residential buildings face challenges unlike those living in single-family homes, including "compartmentalized interior zones, building height, and control options for occupants, such as operable windows and the level of control over the HVAC system" (Andargie et al., 2019, p. 1). In regards to tenancy, tenants for whom the cost of energy is included in their rent might not intervene in their residential energy efficiency, while tenants who pay for their energy might not be allowed by their landlord to bring about energy efficient interventions (Das, Martiskainen, Bertrand, et al., 2022). Landlords might also not always feel incentivized to improve the quality of rental units, as they bear the cost of renovations without directly receiving their benefits (Das, Martiskainen, Bertrand, et al., 2022; Hernández, 2016).

Residential energy efficiency interventions can help tackle energy poverty. For instance, properly sealed buildings prevent indoor air from leaking out, maintaining indoor temperatures (Middlemiss, 2022). Moreover, based on the previously established measures of energy poverty, a reduction in energy consumption can lead to a reduction in energy spending (Hoicka & Das, 2021). It is important to include occupants in the development and implementation of residential energy interventions and to take their needs into consideration, as it can help address the unpredictable side-effect of interventions arising from human behaviour. For example, improvements in insulation that do not account for the smoking behaviours of participants can result in increases in indoor contaminants (Coombs et al., 2016; Frey et al., 2015). Occupants can also experience thermal discomfort if they are unable to make use of energy efficiency

technologies due to a lack of information and knowledge on the interventions implemented in their dwellings (Baborska-Narozny et al., 2017).

It is important to adapt the type of energy efficiency interventions to the specific needs of population groups. Energy efficiency interventions need to be developed with consideration to factors such as the socio-demographic and cultural characteristics of a household (Šćepanović et al., 2017). For instance, studies on residential energy retrofits that examine interventions on lower-income and social housing highlight the importance of considering marginalized and minority groups living in poorly maintained buildings within the broader energy transition (Ahrentzen et al., 2016; Breysse et al., 2011, 2015; Coombs et al., 2016; Frey et al., 2015; Giancola et al., 2014; Noris et al., 2013; Sharpe & Shearer, 2013; Synnefa et al., 2017). Overall, these groups must benefit from energy efficiency solutions that are equitable and resilient (Lewis et al., 2020). These solutions must notably conform to the principles of energy justice, as outlined below.

2.3. Energy justice as an analytical lens

2.3.1. What is energy justice?

Energy justice is defined as "global energy system that fairly disseminates both the benefits and costs of energy services, and one that has representative and impartial energy decision-making" (Sovacool & Dworkin, 2015, p. 436). Specifically, energy justice can be divided into eight categories that outline areas of focus for holistic policy understanding and development: availability of energy resources, affordability of energy services according to the financial means of each household, due process in ensuring the participation of stakeholders in decision-making, good governance in providing high-quality information on energy systems, consideration of environmental sustainability, intergenerational equity (i.e. between present and future generations), intragenerational equity (i.e. within our current generation), and responsibility towards environmental conservation (Sovacool & Dworkin, 2015).

Building on these contributions, Jenkins et al. (2016) argue that energy justice must be applied along three tenets–distribution, recognition, and procedure–with the reasoning that "if injustice is to be tackled, [one] must (a) identify the concern – distribution, (b) identify who it affects – recognition, and only then (c) identify strategies for remediation – procedure" (p. 175). More precisely, the dimension of distributive justice is concerned with the "spread of [energy-related] burdens" and "whether the energy system is equitable or not" (Jenkins et al., 2016, p. 176; Sovacool & Dworkin, 2015, p. 440). It looks at whether the "distribution of burdens and benefits" related to energy is fair (Jenkins et al., 2021, p. 20). Recognition justice is concerned with the needs of particular groups in policy-making, and whether their needs are represented, absent, or mis-represented (Jenkins et al., 2016, 2021). Procedural justice is used to analyze the equity of the decision-making process, with a focus on "free prior informed consent for energy projects, representation in energy decision-making, and access to high quality information about energy" (Jenkins et al., 2021; Sovacool & Dworkin, 2015, p. 440). It strongly emphasizes that "[unequal] representation in a wide range of institutions including business, local, national and international governmental bodies, as well as non-state actors has had an impact on the decisions made" (Jenkins et al., 2016, p. 178).

National transitions to clean, 'green' energy raise concerns for inequities in the distribution of energy poverty. In some contexts, transitions to clean energy can be associated with increases in energy poverty rates (Karpinska & Śmiech, 2021). In others, lower-income and minority groups can be marginalized by green energy transitions and cannot access energy-saving measures to mitigate energy poverty as much as higher-income groups (Keady et al., 2021). In Quebec, the Government has recognized the need for the province's transition to green energy to be just, with "the social, economic and environmental benefits and costs (…) distributed equitably and fairly between the various societal stakeholders and (…) current and future generations" (Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs, 2023, p. 1). Knowing that socio-political discrepancies can arise during the energy transition, notably through energy efficiency initiatives aimed at facilitating the energy transition at the household

level, an energy justice analysis is needed to bring these issues to the attention of policy makers, like the Quebec government (Healy & Barry, 2017).

2.3.2. Energy justice as a lens for the evaluation of energy efficiency initiatives

Energy justice must serve not only as a philosophical concept but equally as an analytical lens that facilitates decision-making by providing guidelines along which energy systems and processes must be analyzed (Jenkins et al., 2017; Sovacool & Dworkin, 2015). The three tenets of energy justice (distribution, recognition, procedure) must be applied in the context of climate change, which force some to adapt their indoor behavioural habits in response to evolving energy needs (Fuller & Bulkeley, 2013; Williams & Doyon, 2019).

As noted previously, tenants and individuals of lower socio-economic statuses have less agency in the improvement of their dwellings, and as a result generally have lower indoor comfort levels (Andargie et al., 2019). Homeowners, however, can also experience energy poverty, as they have to deal with the high costs of maintaining their homes (Das, Martiskainen, & Li, 2022; Riva et al., 2021), outlining the complex socio-economic dimensions of energy poverty and the need to apply energy justice to understand the variations in experiences among different social groups.

The three tenets of energy justice analyses, as outlined by Jenkins et al. (2016), can provide a holistic view of the different ways in which various groups are affected by energy inequalities, and notably create pathways for policies that address their particular needs. For example, tenants living in rental homes tend to have a limited ability to change the quality of their energy services, and different types of households require varied types of energy services (O'Sullivan, 2019). Here, distribution and recognition justice can help identify the populations needing the most help and target their areas of need. Further, recognition justice can outline the importance of interacting with community actors in developing solutions to energy-related problems by gaining insight on their lived experiences and understanding the type of support they might require (see Howden-Chapman et al. (2011)).

2.4. Energy poverty in Canada

The most research that has been conducted on energy poverty is concentrated in the European Union. Relevant energy poverty-related policies in the European Union date back to 2009, and despite slow efforts from governments at the beginning, the following decade saw "both the EU and constituent Member States [making] significant progress in developing a robust decision-making framework to mitigate energy poverty" (Bouzarovski et al., 2012, 2021, p. 13). The extensive timeline of energy efficiency interventions in the European Union has allowed for a higher amount of and more holistic analyses on energy poverty to emerge in this context (see Herrero, 2017). Despite rapid increases in policy development, there are still spatial discrepancies in energy poverty distribution within the European Union, with higher rates of energy poverty in Central-Eastern and Southern-Eastern Europe (Bouzarovski et al., 2012; Karpinska & Śmiech, 2020, 2021; Papada & Kaliampakos, 2016; Streimikiene et al., 2021).

Research on energy poverty in Canada is emerging. According to Das, Martiskainen, & Li (2022), using the 10% measure, Canadian rates of energy poverty vary greatly among provinces, ranging from 3% in Alberta to 20% in Atlantic provinces, with rates increasing significantly for all provinces when adjusting for housing costs. Another study by Riva et al. (2021) demonstrates that, when using both the 10% and 2M measures, an average of 6% to 19% of Canadian households live in energy poverty, with a significant peak in energy poverty in Atlantic provinces, where, according to the 2M measure, over 30% of households experience energy poverty.

Similarly to results from non-Canadian studies, energy poverty in Canada is associated with adverse mental and physical health effects, and Canadian lower-income households tend to live in dwellings that are energy inefficient (Das, Martiskainen, & Li, 2022; Riva et al., 2021, 2023; Tardy & Lee, 2019). However, the Canadian context is different from others, as energy distribution is managed provincially, which means the energy poverty profile of each province must be studied individually (Tardy & Lee, 2019). Moreover, within provinces, rural and urban

areas are subjected to energy poverty differently, with the prevalence of energy poverty being higher in rural areas compared to urban ones (Das, Martiskainen, & Li, 2022; Riva et al., 2021).

The spatial distribution of energy-related vulnerabilities across Canada highlights the need for policies targeting energy efficiency to be "spatially sensitive and energy justice-based" (Bouzarovski & Simcock, 2017, p. 641). The impacts of energy efficiency initiatives on different population groups must be assessed. To date, such initiatives have only been analyzed for Ontario (Das, Martiskainen, Bertrand, et al., 2022). This study identified 40 initiatives having the potential to reduce energy poverty, many of which target improvements to residential energy efficiency by way of reducing energy consumption. Other initiatives identified provide financial support and consumer protection by making energy services more affordable to users and assisting them with payments to prevent them from being disconnected from the grid. These initiatives not only allow for the energy transition to be affordable for households, but also have the potential of "[reducing] the likelihood of a household ending up in energy poverty as well as their sensitivity to energy poverty" (Das, Martiskainen, Bertrand, et al., 2022, p. 14). In other words, residential energy efficiency initiatives can mitigate energy poverty while creating a level playing field for the energy transition.

The overall findings of the Ontario study reflect a lack of intersectionality in the initiative stock, whereby one initiative often addresses only one of the many issues that overlap in an individual's experience of energy poverty (Das, Martiskainen, Bertrand, et al., 2022). For example, a program addressing the cost of energy might ignore the structural deficits of a housing unit and the low incomes of individuals, providing an insufficient solution to the energy poverty issue. More broadly, the study outlines that there is a misalignment between the actual needs of Ontario households, especially those experiencing energy poverty, and the way Ontario decision-makers approach energy efficiency, which ignores the energy-related challenges faced by the former.

CHAPTER 3: METHODOLOGY

As stated previously, an initiative refers to any program, policy or intervention that provides support, financial or material, to the residential sector in Quebec, and which has the potential of alleviating residential energy poverty by way of improving energy efficiency. All the data pertaining to initiatives was collected between May and November 2023.

The methodological approach employed in this study is divided into two parts. The first part adapts the methods elaborated by Das, Martiskainen, Bertrand, et al. (2022) to the context of Quebec. In their review of initiatives aiming to mitigate residential energy poverty in Ontario, Das, Martiskainen, Bertrand, et al. (2022) searched for strategies and measures online, on the websites of energy providers, consumer groups, online listings, and in the media coverage of government and regulator publications. Identified initiatives were then classified in a table based on certain characteristics. As the study takes place in Ontario, a province whose energy providers and government bodies differ from those in Quebec, data extraction and categorization tables were adapted where needed. These initiatives were then analyzed from the energy justice framework. The broader methodological steps employed are outlined in Figure 3.1.

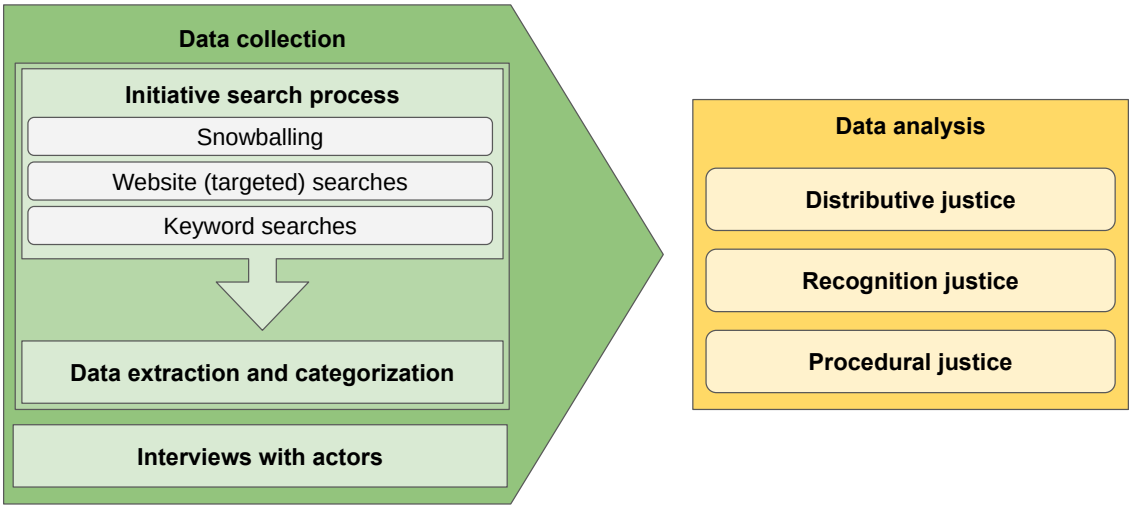

Figure 3.1: Methodological approach employed in the inventorying, categorization and energy justice analysis of data collected on residential energy efficiency initiatives in Quebec.

3.1. Inventorying of initiatives

3.1.1. Search process

The search process was inductive and iterative. It started with the *Éconologis* program, whose existence was already known. From its online information page, other linked programs were identified. This snowballing process was repeated from one program's information page to another, where other programs or collaborative actors were often linked, until all actors found through snowballing were inventoried. Once actors were identified, the residential or program tabs of their websites were searched, and any initiative relevant to the study was inventoried.

Websites of actors who were already known to have established initiatives were also searched. These include the Quebec and Canadian governments and the *Société d'habitation du Québec*. To provide a geographic component to the study, a regional search was conducted on the websites of all 101 *Municipalités regionales de comté* (MRCs), including agglomerations with MRC competencies (such as Montreal) and cities with MRC competencies (such as Laval). An MRC is a supralocal administrative unit that oversees the urban planning, environment and regional development of one or more municipalities (Ministère des Affaires municipales et de l'Occupation du territoire, 2016). The MRC was deemed to be the smallest feasible scale of inventory search, as well as the most realistic from the policy perspective.

The snowballing and targeted search approaches were complemented by keyword searches, based on a previous knowledge of existing initiatives or generalized terms allowing for broad search results. Some key words include *politique efficacité énergétique Québec*, *efficacité énergétique faible revenu,* or the name of a previously identified initiative that could lead to an information page with similar initiatives.

The first two approaches were useful for the identification of programs, as these are usually all available on the websites of energy providers or organizations. However, as provincial policies change with the elections of governments, the use of multiple-keyword searches ensured that all past policies were identified.

3.1.2. Inclusion and exclusion criteria

The search for initiatives relied on inclusion and exclusion criteria, as to ensure that the inventoried items address energy efficiency and the residential sector in Quebec. The following specifications allow for the structuring of the search process:

- The main scope of the study being residential energy efficiency, only initiatives applying to the residential sector are considered. While this prioritizes initiatives implemented at the household level, those oriented towards new constructions or corporate buildings are also considered if they apply to large-scale multi-unit residential buildings as well. Similarly, initiatives are considered if the energy provider includes them in the "Residential" section of their website, even if they do not precisely mention targeting residential units.
- Canadian initiatives implemented by the Federal government are taken into account, as they apply to the Quebec population. More broadly, any initiative that applies to households in Quebec, either province-wide or regionally, is considered.
- The initiatives must relate in some capacity to energy efficiency, aiming to "reduce energy demand, making it more affordable to keep homes warm" (Maidment et al., 2014, p. 584). Any initiative aiming to decrease the demand or cost of energy is included. The search excludes initiatives providing energy-related financial support to households without necessarily improving their energy efficiency (e.g. the *Réseau Urgence Énergie Estrie (RUÉE)* program of the Association cooperative d'économie familiale (ACEF) de l'Estrie, which provides a household with $250 to be reconnected to Hydro-Québec after having their electricity cut off).
- Some energy providers offer various pricing options, depending on the energy system used by a household or its financial status. These are considered, but only if their ultimate goal is to encourage efficient energy consumption.

3.1.3. Data extraction and categorization

All identified initiatives were inventoried and categorized in a table (Table 3.1.). The name, category and actor identify the initiative, while the description, initiative type and audience group are used as criteria for evaluation in the energy justice analysis. A similar but separate table is dedicated to the categorization of MRC-level initiatives to outline any geographic discrepancies.

Table 3.1. Criteria along which initiatives are categorized

Criteria (column title)	Description
Name	Full name/title of the initiative
Category	The category of initiative it belongs to (for example, if whether the initiative is a program, a policy, etc.)
Actor	The name of the actor responsible for the implementation of the initiative
Description	Specifies the support provided, for example, which equipment is given to households or the sum of money subsidized by the program
Initiative type	Determined based on the intended effect of the initiative
Audience group	Individuals for whom the initiative was put in place; represents population groups

3.2. Interviews with actors

In complement of the initiative inventory and categorization, interviews were conducted with individuals holding administrative positions at the organizations responsible for the implementation of some of the initiatives inventoried. The goal of the interviews was to obtain an in-depth view of part of the residential energy efficiency initiative creation process by collecting data that is not readily available on the internet. Because the interviews did not seek to uncover personal information or individual values and opinions, no ethics approval was required, as confirmed by the McGill Research Ethics Board.

In total, five participants holding administrative positions at Hydro-Québec, Transition énergétique Québec, the Société d'habitation du Québec and Énergir accepted to be interviewed for this study. Two of the participants were interviewed together. Participants were informed of

the nature of the study and informed consent was obtained. The interviews were recorded, transcribed verbatim, and translated to English for analysis.

The interview was divided in four parts. First, information regarding the role of the interviewee was collected to provide contextual information. Questions regarding the types of services offered by the organization were then asked, including the ways in which the actor supports households in regards to residential energy efficiency. Then, questions regarding the process of creating and developing initiatives aimed to understand the extent to which the needs of different groups are considered during the creation process. Finally, questions regarding the type of households that apply for, and benefit from, different initiatives were asked with the goal of assessing whether some initiatives are more commonly sought after than others, and what characteristics sets them apart.

3.3. Data analysis

Following the inventory and categorization of identified initiatives, the obtained data is analyzed from the energy justice framework based on the definitions provided by Jenkins et al. (2016), Jenkins et al. (2021) and Sovacool and Dworkin (2015), adapted to the context of a residential energy efficiency initiative analysis. The following sections provide an overview of each dimension and the methods for an initiative analysis from its perspective.

3.3.1. Distributive justice

In the context of residential energy efficiency initiatives, distributive justice is concerned with the way such initiatives are distributed throughout the population; more specifically, which audience groups benefit from energy efficiency initiatives the most, and which ones are left out.

To identify trends in socioeconomic group representation within the inventoried initiatives, the *Audience group* criterion is generalized into nine codes for comparison (Table 3.2). Each inventoried initiative is then assigned to one or more of the categories, depending on the number

of groups it targets, as one initiative can benefit more than one group. The number of initiatives per audience group is compared.

Table 3.2. Definition of audience groups.

Audience group	Definition
Homeowners	Households that own the dwelling in which they live
Homeowners (Low income)	Qualified according to the program description or eligibility criteria indicated
Landlords	Owners of a space in which other households live, but do not necessarily live in them themselves
Tenants	Households that rent the space in which they live
Tenants (Low income)	Qualified according to the program description or eligibility criteria indicated
OSBL/HLM	Includes social and community housing or any program aimed at a group of low-income housing units
Tenants (PSR)	Tenants in Private Seniors' Residences
Shelters	Temporary shelters, e.g. for women
Construction companies	Companies that build new residential units

Some distinctions are made. For example, landlords are separated for homeowners. While both own their buildings, landlords do not directly benefit from the energy efficiency interventions implemented in their buildings. Any initiative targeting energy efficiency in multi-unit residential buildings is also classified under "landlords". Another distinction is made for lower-income groups, as they have particular economic needs; from an equity perspective, these must be addressed differently than those of higher-income groups.

3.3.2. Recognition justice

In the context of residential energy efficiency, recognition justice is concerned with whether the needs of audience groups are served by the existing initiatives, and how these needs are addressed in comparison to each other. To assess recognition justice, I created a 'heat map' which

tabulates the relative distribution of initiative type by audience group. The type of initiative is determined according to its intended effect (Table 3.3.).

Table 3.3. Categorization of residential energy efficiency initiative by type and intended effect

Initiative type	Intended effect
Certification	Ensures that building conforms to energy efficiency standards
Advice	Provides occupant with energy efficiency-related information
Equipment	Provides occupant with small energy efficient equipment, such as new shower heads, LED light bulbs, or caulking
Payment plan	Rearranges energy payments in such way that they become more manageable for the tenant according to their income
Reduced rates	Reduces energy tariffs during certain periods to encourage energy efficiency through reduced consumption
Efficiency policy	Government-set policies to increase energy efficiency of a certain type of buildings (e.g. setting a mandatory target for energy consumption reduction by a certain date)
Subsidy	Financial aid; a fixed sum of money that is allocated to a group to support the cost of structural energy-efficiency interventions, such as residential energy retrofits, or the purchase of larger equipment, such as heat pumps

The Excel =COUNTIFS function is used on a table representing audience groups and initiative types to demonstrate which types of initiative each group benefits from. It is possible that one initiative applies to more than one audience group and serves more than one intended effect (i.e. represents more than one initiative type). In this case, the initiative is counted in all the cells corresponding to each audience group it targets and each initiative type it represents.

A heat map is created using a conditional formatting gradient applied to each individual row, ranging from yellow (lower number of initiatives) to green (higher number of initiatives). Applying the conditional formatting to each row (i.e. to each audience group), as opposed to the table as a whole, allows to visually represent the share of each initiative type in proportion to the

total number of initiatives an audience group benefits from. This determines the type of support that each group benefits from the most.

3.3.3. Procedural justice

When applied to residential energy efficiency initiatives, procedural justice is concerned with how, and to what extent, individuals have been consulted during the creation of initiatives. While data from interviews with actors was used in all three energy justice analyses, it was mostly used for the procedural justice analysis. Interviews were analyzed for key themes to determine whether the individuals benefiting from the initiative are represented in its creation, and the extent to which they have a say in the initiative's design. Each interview is analyzed individually and comparatively, to determine how different actors perform both alone and compared to others.

CHAPTER 4: RESULTS

In this chapter, the results of the initiative search and energy justice analysis are presented. Descriptive results outline the major findings of the search, while the energy justice analysis breaks down initiatives along their distribution within the population, the different ways they support various audience groups, and the way audience groups are accounted for within the decision-making process.

A total of 56 initiatives allowing for the improvement of residential energy efficiency were inventoried, issued by eight major actors. Hydro-Québec is the main hydroelectricity provider in Quebec; as a publicly-owned company, the government is its sole shareholder. Énergir and Gazifère are both natural gas providers; the former covers the entire province of Quebec, while the latter is exclusive to the city of Gatineau and the municipality of Chelsea. Transition énergétique Québec is a branch of the ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs created to regulate the province's transition to sustainable energy. The Société d'habitation du Québec (SHQ) is another branch of the Quebec government, responsible for providing housing-related programs and support. The Canadian government and various municipalities are other major actors. While they do not offer any energy efficiency initiatives of their own, the Associations cooperatives d'économie familiale (ACEFs) collaborate with Hydro-Québec and are important in helping Quebec households navigate their energy consumption.

4.1. Descriptive results

The full initiative inventory table can be found in Appendix A and each initiative is referred to by a corresponding number in parentheses in the text. Of 56 residential energy efficiency initiatives, six are national policies guiding the development of energy in the residential sector in Quebec; two are tariff rate options, which encourage efficient energy consumption by increasing rates during peak periods; one is a construction code, guiding the energy goals for new residential constructions; one is a payment plan, which allows for efficient consumption by spreading

Hydro-Québec payments such as they become manageable for the resident; one is a tool for evaluating residential energetic performance and providing solutions for reduced energy consumption.

Of the 45 remaining initiatives, 40 are programs providing subsidies for retrofits as lump sums or loans; five provide small equipment, such as thermostats or LED light bulbs; three provide advice regarding energy consumption; one provides an energy efficient certification to new constructions, and one provides a reduced rate outside of peak consumption periods. Here, the sum of initiatives is superior to 45 as one program can provide multiple types of support, and therefore counts in more than one category.

Of the previously described actors, Énergir has the most initiatives in place, with a total of 15. Hydro-Québec has 11, the SHQ has nine, Transition énergétique Québec has five, the Federal government has five, the Provincial government has four, Gazifère has four, and various municipalities have a total of five: the City of Montreal has two, and the cities of Longueuil, Laval, and Gatineau each have one. These include the programs that actors have in collaboration with each other. In total, four initiatives are issued from a collaboration between two major actors, with the most notable one being between Hydro-Québec and Énergir.

Aside from *RénoRégion* (40), which is exclusive to households in rural areas, and a few initiatives offered at the municipal level, most initiatives apply to the entirety of the Quebec population, regardless of whether they are in urban or rural regions. All the initiatives implemented at the municipal level are offered by large cities. These programs provide subsidies for major renovations, such as improvements to isolation, or for the transition from oil heating systems to electricity. The municipal-scale initiatives exclusively target homeowners and landlords, with the exception of Montreal's *Renoplex* program (25), which also applies to OSBL/HLM.

The guiding plans for the transition to clean energy, such as the current *2030 Plan for a Green Economy* (49), are included in the inventory as they contextualize national energy efficiency goals. While these cannot be applied to the energy justice analysis as they do not target a particular audience group, further sections will discuss initiatives put in place by the SHQ and Transition énergétique Québec, divisions of the Quebec government.

4.2. Distributive justice analysis

4.2.1. Overall results

Figure 4.1 depicts the overall distribution of initiatives by audience group. Homeowners benefit from the most initiatives (38%) with landlords coming in second (15%). Construction companies in the residential sector benefit from 14% of initiatives. A total of 8% of initiatives are allocated to tenants; however, there are no initiatives dedicated exclusively to them. Instead, many of the initiatives that ultimately benefit tenants provide support to landlords. Lower-income tenants or homeowners benefit from 3% and 8% of initiatives respectively. Social and community housing (OSBL/HLM) receives 12% of initiatives, whereas private seniors' residences and temporary shelters receive 1% each.

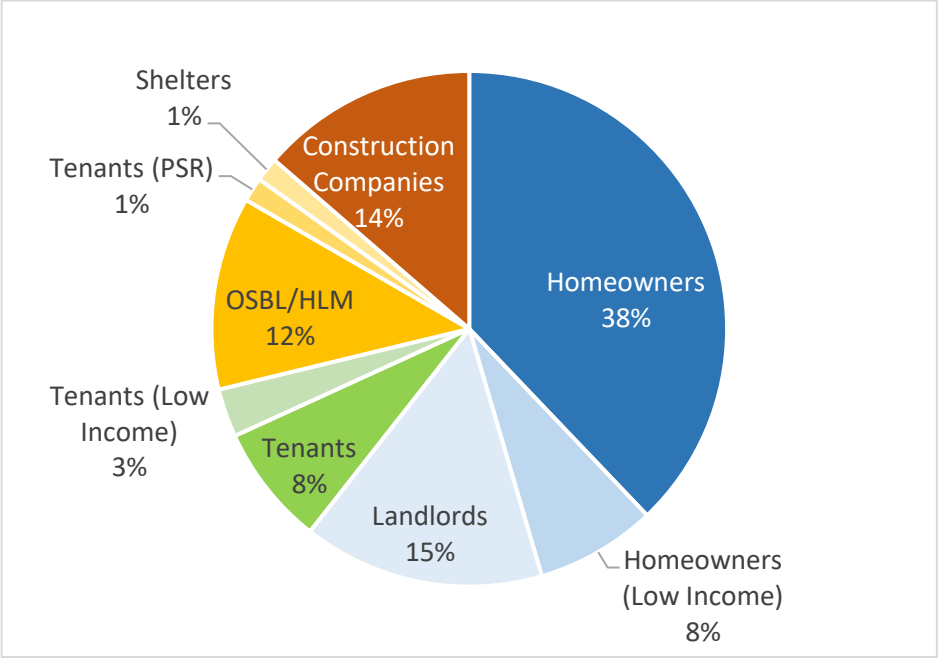

Figure 4.1: Distribution of initiatives by audience group.

Within the broad distribution of initiatives, each actor targets a different proportion of audience groups (Figure 4.2). Homeowners benefit from the most support from all actors, particularly from Hydro-Québec, Énergir, and the municipal sector. Landlords benefit from a high number of initiatives from municipalities as well, while construction companies benefit from a high number of initiatives from Énergir. On the other hand, tenants only benefit from initiatives from energy providers, while occupants of OSBL/HLM mostly benefit from initiatives from the public sector.

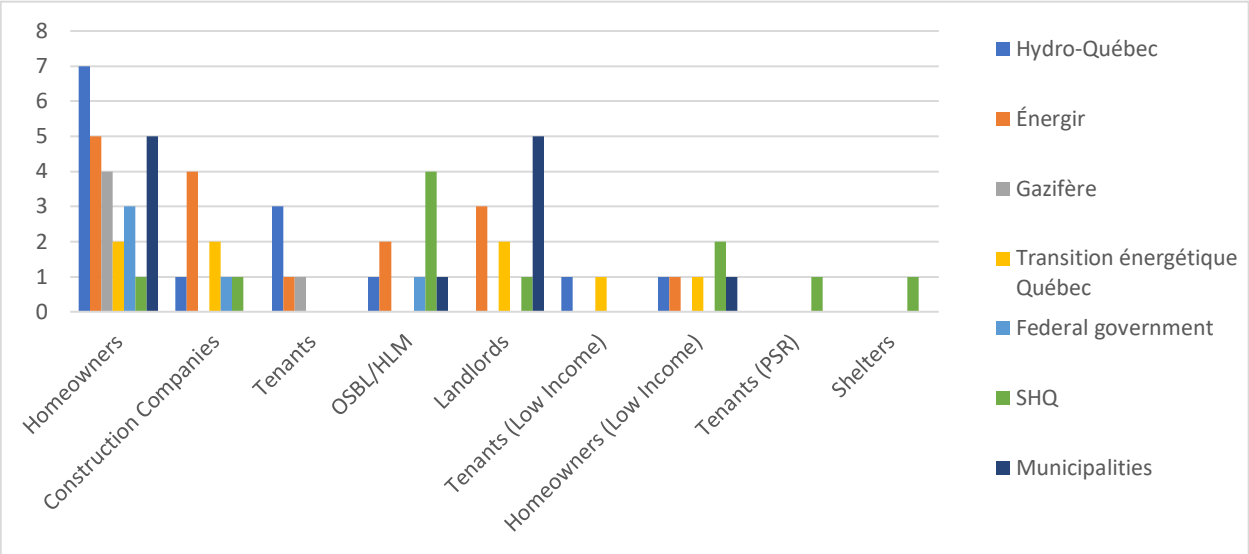

Figure 4.2: Distribution of initiatives by actor

4.2.2. Énergir

The distribution of initiatives by audience groups varies between actors. First, of the 15 initiatives that Énergir offers, five go towards homeowners, four apply to residential construction companies, three apply to landlords, two apply to OSBL/HLM, one applies to lower-income homeowners, and one applies to tenants. Of the initiatives benefiting landlords, one applies to landlords of lower-income tenants. When discussing the distribution of initiatives throughout different residential sectors, one participant observed that due to a decline in residential households that rely on natural gas, "Énergir mostly serves the commercial, industrial, institutional sectors," which can explain why a majority of their initiatives apply to new and existing large-surface buildings, including multi-unit residential buildings.

4.2.3. Hydro-Québec

Of the 11 initiatives offered by Hydro-Québec, a majority (n = 7) apply to homeowners, three to tenants and one to OSBL/HLM. Construction companies and lower-income tenants and homeowners benefit from one initiative each. Despite homeowners benefiting from the most support from Hydro-Québec, one participant explains that the company works to increase the number of programs available to renters, but also more generally by reaching more marginalized groups by "trying to consider the rental clientele more, because in the past, [Hydro-Québec] didn't have any offers aimed at tenants."

4.2.4. The SHQ

Of the nine initiatives provided by the SHQ, four go towards HLM/OSBL, two are dedicated to lower-income homeowners, while one applies to all homeowners. Construction companies, landlords, tenants in PSRs and shelters each receive one initiative. The SHQ provides many initiatives towards social and community housing. One participant explains that the energy consumption in these buildings is paid for "by housing associations and other organizations, [the SHQ's] direct partners, and above that the SHQ pays for what we call the building operating deficit." In other words, a reduction in energy consumption is ultimately a reduction in the amount paid by the State.

4.2.5. Transition énergétique Québec

Transition énergétique Québec has a total of five initiatives, of which homeowners, landlords and construction companies benefit from a majority (two each). Lower-income tenants and homeowners both benefit from one program, *Éconologis* (1). When asked about the applicability of other programs to various ranges of household types, one participant states: "[this needs] to be confirmed, but I'm pretty sure that they aren't for low-income households. (…) And it's mainly single-family homes that are targeted." Also in relation to *Éconologis*, through which households can benefit from personalized consultations from energy efficiency counsellors, one participant states that "it's much harder to reach Northern Quebec," highlighting spatial issues related to the

application of existing programs. It is also important to note that while most of their programs are available throughout the year, *Éconologis* is only active from October to March.

4.2.6. Other actors

The Federal government plays a role in guiding residential energy efficiency in Quebec, providing three initiatives to homeowners, such as the *Canada Greener Homes Grant* (41) and the *Canada Greener Homes Loan* (42), one initiative to OSBL/HLM for the renovation of their dwellings (*Canada Greener Affordable Housing*, 44), and one to construction companies for the construction and renovation of energy efficient housing on a larger scale.

Some municipalities offer their own programs from which their residents can benefit. The City of Montreal in particular has two programs, *RénoPlex* (25) and *Réno logement abordable* (26), both of which apply to landlords, the former also applying to homeowners and OSBL/HLM. Other municipalities, such as Longueuil, Rouyn-Noranda, Sherbrooke, Shawinigan, Trois-Rivières, Gatineau and Saguenay, partake in the SHQ's *Programme Rénovation Québec* (51), a subdivision of the affordable housing program *AccèsLogis*. In addition, the City of Longueuil provides a program to support homeowners in improving isolation. The cities of Laval and Gatineau also have their own initiatives supporting homeowners and landlords in the conversion from fuel heating systems to electric ones. There are no initiatives specifically for tenants provided by municipalities. Residents of the municipalities of Gatineau and Chelsea benefit from initiatives offered by Gazifère. Of the four initiatives it provides, all apply to homeowners and one also applies to tenants.

4.3. Recognition justice analysis

4.3.1. Overall results

Figure 4.3 represents the ways in which the needs of different audience groups are met by the initiatives that are available, as to determine the extent to which initiatives respond to the needs of each group. The heat map represents the share of the number of initiative types in proportion to the total number of initiatives available to each audience group. Therefore, for groups such as

lower-income tenants, advice, equipment and payment plans are highlighted in darker green because they are the only types they benefit from. However, the same amount of the same initiatives for landlords are represented in pale yellow, as they represent a smaller proportion of the total number of initiatives that landlords benefit from. (See Appendix B. for a descriptive heat map with the name of each initiative in the cell(s) it belongs to.)

		Initiative type							
		Subsidy	Equipment	Advice	Efficiency Policy	Payment Plan	Reduced Rates	Certification	Total (audience group)
Audience groups	Homeowners	21	3	2	0	0	1	0	27
	Homeowners (Low Income)	3	1	1	0	1	0	0	6
	Landlords	9	1	1	0	0	0	0	11
	Tenants	1	3	1	0	0	1	0	6
	Tenants (Low Income)	0	1	1	0	1	0	0	3
	OSBL/HLM	6	1	0	2	0	0	0	9
	Tenants (PSR)	1	0	0	0	0	0	0	1
	Shelters	1	0	0	0	0	0	0	1
	Construction Companies	8	0	0	1	0	0	1	10
		50	10	6	3	2	2	1	

Figure 4.3: Types of initiatives that each audience group benefits from.

The majority of initiatives (n = 50) provide subsidies, most of which benefit homeowners (n = 21), landlords (n = 9), and residential construction companies (n = 8); the audience groups benefiting the least from subsidies are tenants (n = 1) and lower-income tenants (n = 0). It is important to note that while tenants in PSRs and shelters only benefit from one initiative, this initiative provides those who manage their housing buildings with financial aid for renovations, including residential energy efficiency retrofits. Initiatives providing energy efficiency advice and small equipment, such as LED lightbulbs, also serve many audience groups, mostly tenants and lower-income tenants. While homeowners and landlords also benefit from advice and equipment, these initiatives are lower in number compared to the others they benefit from; these groups benefit from multiple types of initiatives, which include advice, equipment, reduced rates, and largely subsidies.

4.3.2. Énergir

As seen previously, different audience groups receive varied amounts of support from different actors. Similarly, each actor provides various *types* of support to different audience groups. First, Énergir provides high amounts of subsidies to construction companies and homeowners. For homeowners, programs such as *Subvention pour un système combo à très haute efficacité énergétique* (9) provide up to $850 in subsidies for upgrades to residential heating systems; for construction companies, programs such as *Programme d'efficacité énergétique - Volet Préchauffage solaire* (16) can provide subsidies of up to $200,000 for solar heating systems that save on natural gas consumption. Other initiatives, such as the *Subvention pour un thermostat intelligent* program (11), provide new equipment, a smart thermostat, to homeowners, tenants, and landlords of buildings of more than four units.

Lower-income groups, such as lower-income homeowners, lower-income tenants, and OSBL/HLM benefit from financial aid through programs such as *Supplément ménages à faible revenu* (10). For buildings of four units or more, this financial aid goes to the landlord. This program acts as an enhancer to all the programs that apply to homeowners: as Participant 5 explains, "in regards to all the programs [Énergir offers], lower-income households can double their subsidies via the program for lower-income households." As such, lower-income groups receive an additional support from Énergir.

4.3.3. Hydro-Québec

Hydro-Québec offers many types of initiatives, which are divided into three categories of support: as one participant explains, these categories represent tools for the diagnosis of residential energy efficiency, energy efficiency advice, and financial support for the purchase of energy efficient equipment, such as heat pumps. Examples within these groups include the *Outil de performance énergétique* (28), which provides personalized guidelines to reduce their residential energy consumption, and is a tool for both evaluating energy consumption and providing advice. Subsidies constitute the bulk of the initiatives offered by Hydro-Québec. Initiatives such as *Thermopompes efficaces* (29) provide up to $2,800 in subsidies to

homeowners for the installation of an energy efficient heat pump; similarly, *Offre biénergie* (35), which is offered in collaboration with Énergir, provides between $5,500 and $5,800 to homeowners for the installation of a dual energy heating system, allowing to reduce consumption in both natural gas and electricity during peak hours.

Hydro-Quebec supports tenants mostly with equipment, advice, and reduced rates, through programs such as the aforementioned evaluative tool and *Hilo* (27), which provides smart thermostats and consumption reduction challenges during peak hours. Similar initiatives encouraging energy efficiency through consumption reduction are tariffication options, such as *Option de credit hivernal* (33) and *Tarif flex D* (34). Tenants also benefit from one financial aid program, *LogisVert* (30), which provides them with subsidies for deep energy retrofits, for example by installing a new heat pump, renovating the isolation and changing the heating system. This is the only program of its kind available to tenants.

Similarly, other marginalized groups, such as OSBL/HLM, also benefit from financial support for holistic interventions in energy efficiency. The program *Rénovation énergétique pour les ménages à faible revenu* (6), administered in collaboration with the SHQ, provides these groups with subsidies for the purchase of small and large equipment, such as LED lights and ENERGYSTAR appliances, and for major renovations, including the replacement of windows and isolation. This initiative exists because, as explained by one participant, Hydro-Québec is "heavily involved in social housing, with coops, housing societies, or with non-profit organizations that manage social housing, where we [Hydro-Québec] provide support by subsidizing equipment or energy efficiency measures for efficient housing."

Marginalized groups, such as tenants, lower-income groups and OSBL/HLM do not benefit from the same type of support as homeowners, with the latter receiving more financial aid subsidies. However, according to an interview participant, this is a gap that Hydro-Quebec is aware of: "Of course, a person with more financial means may be more inclined to make major equipment purchases. That's why we try to be careful by offering [initiatives] specifically for low-income

households." One such initiative is the *Entente de paiement* (36), established between Hydro-Québec and ACEFs, by which lower-income tenants or lower-income homeowners can obtain personalized payment plans that divide their hydroelectricity bills in an affordable way based on their income, allowing them to regulate their energy consumption in a financially manageable way.

When discussing the needs of different audience groups according to the initiatives that are established, one participant states that "we [Hydro-Québec] have to make sure that an initiative we want to put into the market will ultimately reduce the customer's consumption over a period of time that makes sense for them," but also that "the measure must ultimately make sense for Hydro-Québec," showing that the need of both audience groups and the company are met through each initiative.

4.3.4. The SHQ

Most of the initiatives put in place by the SHQ offer subsidies to various audience groups, including marginalized groups such as OSBL/HLM and lower-income homeowners. Such programs include *Programme de rénovation des habitations à loyer modique* (54), by which OSBL/HLM receive a subsidy covering 100% of renovation costs, including energy efficient renovations. Similarly, lower-income homeowners benefit from the *Programme Rénovation Québec* and *RénoRégion* programs (51, 40), which offer subsidies of up to $20,000 for major renovations, with the caveat that the former can only be administered in partnership with participating municipalities, thus excluding residents of non-participating towns.

OSBL/HLM and construction companies are subjected to mandatory efficiency policies, such as the *Cible organisationnelle de la transition énergétique* (39), setting energy consumption reduction targets for HLMs, and the *Règlement sur l'efficacité énergétique du bâtiment - Code de construction du Québec* (38), which guides the energy efficiency goals for all new residential constructions. Once implemented, efficiency policies must be respected and followed.

Initiatives are put in place by the SHQ only if they make financial sense for the government. Because the SHQ is responsible for the energy costs in social housing, initiatives such as efficiency policies provide support for both occupants of social housing and the government by reducing energy consumption and bills. This utilitarian approach further explains how subsidies for renovations are granted. As one interview participant explains, energy efficiency interventions funded by programs that include broader renovations (e.g. *Programme de rénovation des habitations à loyer modique* (54) for OSBL/HLM, *Programme d'aide à la modernisation des installations de certaines résidences privées pour aînés* (55) for tenants in RPAs, or *Programme d'amélioration des maisons d'hébergement* (56) for shelters) usually only occur if other major renovations are required, "because it's often not profitable to only intervene in energy efficiency." Therefore, while marginalized groups have access to financial aid programs on paper, it is unclear the extent to which they actually benefit from it.

4.3.5. Transition énergétique Québec

Transition énergétique Québec mainly offers subsidies, equipment and advice to homeowners, landlords and construction companies. Programs such as *Rénoclimat* (2) and *Chauffez vert* (3) provide homeowners and landlords with subsidies for major renovations, including isolation, window replacement, the installation of new heating systems, and for the conversion from fuel oil to electricity. Similarly, programs such as *Novoclimat* (4) and *ÉcoPerformance* (5) provide construction companies with subsidies towards the construction of energy efficient housing.

The *Éconologis* program (1) provides energy efficiency advice and small equipment, such as LED light bulbs and electronic thermostats, to lower-income homeowners or lower-income tenants. Under this program, targeted audience groups can also receive a new refrigerator and have their windows and doors caulked and weather-stripped. When asked about the implementation of their programs, an interview participant explained that "they're all programs that have been available for over 20 years." The age of these programs must be considered in the context of recognition justice, as societal needs in terms of housing and energy are evolving.

Further, a participant explains that the reason behind the implementation of energy efficiency programs is not entirely oriented towards the needs of the individual: “it’s increasingly about reducing the demand for energy. (…) Until recently, we didn’t pay much attention to [energy efficiency], but [the energy transition] isn’t just about greenhouse gases, it’s also about reducing the number of kilowatts during peak demand periods.” As such, initiatives implemented by Transition énergétique Québec share the common goal of reducing the pressure on the hydroelectricity grid.

4.3.6. Other actors

All of the initiatives put in place by the Federal government provide subsidies, either as lump sums or loans, to homeowners, residential construction companies, or OSBL/HLM. Programs such as the *Canada Greener Home Grant* (41) or the *Oil to Heat Pump Affordability Program* (43) provide homeowners with subsidies of up to $5,000 and $10,000 respectively for residential energy retrofits, while the *Canada Greener Homes Loan* (42) provides them with a subsidy of up to $40,000 for residential energy retrofits. The *Canada Greener Affordable Housing* program (44) provides OSBL/HLM groups with up to $170,000 per housing unit in subsidies for deep-energy retrofits. Construction and development companies equally benefit from financial support from the *Greener Neighbourhoods Pilot Program* (45), which aims to encourage more large-scale energy-efficient housing developments.

Most of the initiatives put in place by Gazifère provide homeowners with various subsidies for renovations, ranging from $350 to $1,000. In addition, the company offers a subsidy for the purchase of a smart thermostat for tenants and homeowners under the *Thermostat intelligent* (21) program.

The types of initiatives offered by the municipal sector vary between municipalities. The City of Montreal provides two financial aid programs for major residential renovations, including those related to heating systems. The *RénoPlex* (25) program offers a subsidy to homeowners, landlords, or OSBL/HLM if renovations of at least $3,000 have already been undertaken.

Similarly, *Programme Réno logement abordable* (26) offers subsidies to landlords of affordable housing units for major renovations in their buildings. With the exception of the *Programme Rénovation Québec* (51), which is offered in collaboration with the SHQ, no programs offered at the municipal level provide financial aid to lower-income homeowners specifically; instead, they all apply to homeowners or landlords broadly. Two programs provided by the cities of Laval and Gatineau, in particular, offer subsidies to homeowners or landlords for the replacement of a fuel heating system by an electric one, the former being offered as an addition to the *Chauffez vert* (3) program.

4.4. Procedural justice analysis

The interviews conducted with actors in housing and energy revealed information about the extent to which audience group voices are considered in the process of developing initiatives. Three key themes emerged, outlining steps in the decision-making process and the different ways they consider audience group perceptions.

4.4.1. Financial analyses and organizational structures

As stated previously, many actors consider their own financial needs when implementing energy efficiency initiatives, for example by creating special tariffs or imposing mandatory energy efficiency standards to reduce energy demand during peak hours or to reduce the cost of energy for providers. During the decision-making process, cost-benefit analyses are a key factor in creating the terms and structures of initiatives by considering both the benefit to the provider and the client. One participant explains that "we [the company] evaluate the potential that they [energy efficiency programs] can provide in terms of savings (…) because we need to make sure that they are still suitable for the market, and that they still apply to our customers." Another participant similarly stated that the first step of program creation is "asking questions about (…) which measures have the most potential [for saving]. (…) Often, external firms conduct analyses [on the savings potential of energy efficiency initiatives]."

The cost-benefit analysis allows actors to determine whether the program makes financial sense to be put in place, accounting for the needs of audience groups only if they also make sense for the company. Interestingly, participants from private and state-owned companies and from government organizations all mentioned considering their own financial needs, with one participant from the public sector stating that retrofit programs are often created with the goal of "asset maintenance." Overall, cost-benefit analyses seem to be the starting point for the creation of many energy efficiency initiatives.

Similarly, the government's budget determines the financial feasibility of new initiatives created by government organizations. As one participant explains,

> if we want to make more significant changes [to a program], we have to review the normative framework, which is much, much more tedious and time-consuming, and then it needs to be approved (...). Then we determine the target clientele, the eligibility criteria. After that, we draft the normative framework, which we submit to the Treasury Board, which then decides whether or not the program can be implemented following recommendations.

As such, the Treasury Board plays an important role in guiding the creation of new initiatives, demonstrating that both private and public actors undertake cost-benefit analyses when creating initiatives.

However, one participant mentioned that programs targeting lower-income groups do not go through the same cost-benefit analysis, stating that "when we develop programs for lower-income households, we bypass these financial analyses (…) we're much less concerned with profitability; it's more of a social mission." The needs of lower-income groups surpassing the financial profitability of the company is not a theme that emerged in other interviews, despite other actors also offering initiatives for lower-income households. When asked if audience group perspectives are taken into consideration in the creation of programs, another participant answered that "when conducting studies on the technical and financial feasibility [of a program], it's something that is taken into account, indeed." While the weight participant's needs are given

during the decision-making process compared to that of financial feasibility is unclear, some actors consider lower-income audience groups during the decision-making process.

4.4.2. Evaluations by external firms

Another key component of the initiative creation process are evaluations by external firms. As mentioned previously, external firms are sometimes used by actors to evaluate the financial feasibility of an initiative. However, most often, they are used to evaluate programs. Depending on the actor, some external firms take into account audience group opinions to a greater extent than others.

For instance, one interview participant from the public sphere explained that programs are evaluated every two years. When discussing the evaluation process for one of their initiatives, which targets lower-income individuals, the participant shared a description of the process: “This evaluation was based on a review of internal documents, a literature review, 3 interviews with members of the program management team, 7 interviews with the organization's coordinators and advisors, and a telephone survey of 200 [program] participants.” The types of questions asked during phone interviews with program participants are not specified, nor are the structures of interviews with the program’s internal coordinators and advisors. Despite the number of surveyed program participants being high, the socioeconomic variables considered during sampling, such as ownership of occupied units, are unclear.

On the other hand, an interview participant representing another major actor explained that third party firms take a much more holistic approach to program evaluations. According to the participant, during the interview process used to determine customer satisfaction, external firms “will survey our clients, installers, construction workers, and technology distributors to find out how our programs are perceived across the market and across our clientele.” Here, while the structure of surveys is unclear, the types of audiences considered outside of the organization’s management body is much more diverse and integrates the opinions of various people involved in the initiative implementation process.

4.4.3. The role of community organizations and ACEFs

Within the initiative creation and implementation process, one participant stated that their organization experienced difficulties in reaching groups with language barriers. While they attempted to bridge these gaps by trying to work "with organizations that welcome newcomers," they acknowledged that "we're not there yet." Similarly, another interviewee explained that when creating initiatives for lower-income groups, the organization establishes "partnerships with organizations that work directly with this clientele," showing that community organizations are important in reflecting the voices and needs of marginalized groups during the initiative creation process.

Similarly, these two participants highlighted the role played by the ACEFs in mediating between marginalized groups and actors in energy and housing. ACEFs provide individuals with financial advice and support them in energy-related difficulties, and the collaboration between ACEFs and major actors emerges through their collective involvement in the *Comité pour la transition énergétique des ménages à faible revenu*. As one participant states, "it's a committee that was set up with various organizations that are in direct contact with the lower-income population. Often, these [organizations] are the ACEFs (...)." The participant further explains that the committee seeks to understand what energy-related difficulties low-income households face and what their energy-related needs are, while identifying weaknesses in the kinds of initiatives that currently exist.

As another participant also explains, "we work in collaboration with the ACEFs, because it's the ACEFs who come into contact [with lower-income groups] in the field, who also know who the lower-income households are." It is clear that the involvement of these two actors with ACEFs, who work with lower-income groups, is essential in allowing them to connect with the needs of these groups. In this way, community organizations and ACEFs allow for lower-income and other marginalized groups to be involved in the decision-making process.

4.4.4. Other considerations

In some cases, such as those related to social housing, individuals must interact with the administration of their building regarding their energy needs. Therefore, procedural justice also applies to the extent to which the opinions of tenants are considered in the implementation of the initiatives in their building. According to one participant, depending on the building and on "the nature of the renovation, the tenant's opinion isn't important." Therefore, tenants are not always integrated in the decision-making process behind the retrofits of the units they occupy.

However, as one participant explained, when voicing their concerns, tenants can reach out to the administrative board of their building, with offices open 5 days a week and dedicated phone lines in case of an emergency: "if tenants want to pass on a message, that's not a problem. (...) Tenants can make complaints to their [housing] office or even to the SHQ." Therefore, tenants can voice their opinions on the way energy efficiency initiatives are implemented in their buildings. However, the extent to which this system is successful in allowing tenants to voice their complaints is not specified.

This section presented the results of the online initiative search, organized by tenet of energy justice and by actor, and complemented by interviews with employees holding administrative capacities within key organizations in the energy transition, which allowed to understand the mechanisms behind initiatives. Patterns of discrepancies in justice emerged, which will be discussed in the following section.

CHAPTER 5: DISCUSSION

The goal of this thesis is to identify the types of initiatives allowing for the improvement of residential energy efficiency in Quebec and to analyze them along distributive, recognition and procedural justice. Results show that more can be done in regards to energy efficiency initiatives for a just energy transition in the residential sector in Quebec. This chapter discusses the results of the analyses and identifies paths for future development while considering the limitations of the study.

5.1. An inequitable distribution

Based on the results of the study, there is a lack of equity in the distribution of initiatives throughout the Quebec population. Homeowners, landlords and residential construction companies are overly targeted by the initiatives in place. On the other hand, tenants and lower-income groups, including lower-income tenants and lower-income homeowners, are the least targeted by existing initiatives. Moreover, the lack of initiatives available specifically for tenants demonstrates a lack of recognition of their particular needs. As explained by Keady et al. (2021), the distribution of energy efficiency initiatives is not just if those who benefit from them are "already better off than those excluded" (p. 2). Here, tenants and lower-income groups are disadvantaged compared to groups who generally have more financial resources. The disproportionate amount of initiatives serving homeowners and construction companies has the potential of exacerbating existing housing inequalities. Knowing that funding for initiatives is not unlimited, homeowners have more options for support compared to marginalized groups.

Tenants in Ontario also face a disadvantage in the distribution of initiatives, as Ontarian homeowners also benefit from a majority of initiatives (Das, Martiskainen, Bertrand, et al., 2022). Individuals who do not own their homes are burdened by the inability to intervene in the energy efficiency of their dwellings, regardless of whether they pay for their energy or not (Das, Martiskainen, Bertrand, et al., 2022). This similarity between provinces in unequal initiative distribution raises issues in regards to the ability of Canadian tenants to enter the energy

transition alongside homeowners. More interventions from both the provincial and federal level are required to ensure that these patterns in inequality are not exacerbated as the energy transition progresses.

These patterns of disadvantage are also observable in the distribution of initiatives offered by each actor. For instance, energy providers like Hydro-Québec and Énergir cater primarily to homeowners, landlords and construction companies, while the social and communal housing is more supported by the SHQ. These patterns can possibly be explained by the fact that each actor seeks to target the audience groups that can most benefit them. For example, as will be discussed in further sections, homeowners have more agency in renovating their dwellings, so providing them with different initiatives can help decrease demand from energy providers. Similarly, knowing that the SHQ pays the energy deficits in social and community housing, imposing mandatory efficiency policies on these groups can ensure a reduction in government expenses.

Residents of urban areas, especially homeowners, appear to benefit from additional programs implemented in some larger cities. The only exception is the *RénoRégion* program (40), which applies province-wide to rural areas. These patterns are also observable in Ontario, where residents of Toronto benefit from additional support from various actors at the municipal scale, such as housing providers and the City itself (Das, Martiskainen, Bertrand, et al., 2022). Residents of small municipalities, which perhaps do not have the budget to allocate to residential energy interventions, could be disadvantaged by the current geographical reach of available initiatives. Knowing that energy poverty affects a large proportion of households in rural areas compared to urban settings (Riva et al., 2021), households in rural areas could benefit from additional initiatives in the same way households in large cities do. Moreover, in Quebec, the initiatives in place at the municipal level are mostly accessible to homeowners, further exacerbating inequalities between audience groups. More initiatives in urban areas should target tenants, which tend to make up a large share of the population in cities.

5.2. An insufficient recognition of needs

5.2.1. The disproportional targeting of homeowners

The recognition justice analysis reveals that the energy efficiency initiatives that are currently in place do not entirely respond to the needs of marginalized groups, which raises issues of equity. The inequitable distribution of initiatives among audience groups is further exacerbated by the fact that those who benefit from the most initiatives also benefit from support that allows for stronger improvements in energy efficiency. For instance, homeowners benefit the most from financial support, with some initiatives providing thousands of dollars in subsidies. While they might not cover the full costs of an energy retrofit, subsidies remain an important form of support and can incentivize the undertaking of residential energy efficiency interventions.

Similarly, homeowners benefit from different *kinds* of initiatives, such as lump sum financial aid or loans, and equipment, with which they can diversify the types of energy efficiency improvements they bring about in their homes. While some programs, such as *Rénoclimat* (2) or *LogisVert* (40), provide subsidies for deep-energy retrofits, combining different programs offering financial support for different types of interventions, e.g. the replacement of heating systems and improving isolation, can allow to attain deep energy retrofits. Knowing that deep-energy retrofits are more effective in increasing residential energy efficiency compared to renovations that tackle a single aspect of the dwelling (Ürge-Vorsatz & Tirado Herrero, 2012), homeowners are well equipped in strengthening their residential energy efficiency. This is further facilitated by the fact that homeowners have agency over the buildings they own, which means they can do more with the financial support they are provided (Hernández, 2016). As such, homeowners have control over the residential energy efficiency of the dwellings they live in.

Lower-income homeowners can technically benefit from initiatives targeting all homeowners. However, initiatives such as the *Canada Greener Homes Loan* (42) assume that the homeowner qualifies for a loan, which individuals with unstable incomes tend to have difficulty receiving (Wainer & Zabel, 2020). Moreover, some financial aid programs such as *RénoPlex* (25) require a renovation of at least $3,000 to have already been undertaken, which is inaccessible to those who

cannot afford to begin the renovation without the financial support. Lower-income homeowners are thus burdened by both the unavailability of initiatives that provide them with concrete help, such as financial support, and by their inability to benefit from those open to all homeowners. Moving forward, more initiatives like *Supplément pour ménages à faible revenu* (10), which adapt programs to fit the needs of lower-income homeowners, should be implemented by other actors in the energy sector.

5.2.2. A further disadvantage for lesser-represented groups

Unlike homeowners, tenants and lower-income tenants mostly benefit from advice and equipment, which limits the extent to which they can intervene in the energy efficiency of their dwellings, particularly when compared to homeowners. Initiatives like *Éconologis* (1), which provide small equipment (e.g. efficient shower heads and LED lights) and advice on efficient energy consumption, are not as beneficial in the long term as initiatives allowing for deep energy retrofits. Moreover, this initiative in particular is limited in that it only operates seasonally, from October to March, reducing the time frame in which tenants can improve their residential energy efficiency. Further, initiatives such as *Hilo* (27), which allow tenants to reduce their energy consumption and energy bills, require a connection to a computer or smartphone to receive alerts at the beginning of the consumption reduction challenge, limiting the availability of the program for those who do not have a connection to the internet. There is also a misalignment in the recognition of low-income group's needs: individuals who cannot afford to adequately provide themselves with energy services already consume the least amount of energy and are more efficient with their consumptions (Middlemiss & Gillard, 2015). Therefore, there is only so much that advice-providing initiatives can do to support them.

As in Ontario, there is a lack of initiatives in Quebec providing integral and substantial support to groups vulnerable to energy poverty (Das, Martiskainen, Bertrand et al., 2022). Lower-income tenants might be able to benefit from financial support through payment plans or to reduce their energy tariffs in off-peak hours, but they have no agency over improving the quality of their dwelling. Energy poverty is a multifaceted issue that cannot be addressed by initiatives that

improve the physical quality of a dwelling without providing reduced rates for lower-income individuals, and vice-versa (Das, Martiskainen, Bertrand et al., 2022). In Ontario and Quebec, homeowners are at an advantage as they benefit from initiatives of various types. The type of support given to tenants and marginalized groups can only reflect their needs if it holistically addresses all the facets of energy poverty, i.e. income, housing conditions, and energy costs. More such initiatives, which do not offer reduced energy consumption as the only solution, must be implemented for an equitable energy transition.

The lack of initiatives providing adequate support to tenants can be explained by the fact that most of the support for energy efficiency interventions that ultimately benefit tenants is allocated to landlords. Initiatives like *Rénoclimat* (2) allow occupants to regulate their thermal comfort by subsidizing improvements to insulation, windows, and heating systems by providing financial support for renovations to the owner of the building (i.e. the landlord). However, landlords are often not incentivized to undertake renovations as they pay for interventions that they do not benefit directly from (Hernández, 2016). Under initiatives like *RénoPlex* (25), the landlord must begin the renovation before receiving a subsidy, which incurs out-of-pocket expenses that the landlord might not be incentivized to pay for. As such, the types of support directly available to tenants are limited, leaving them with little opportunities to improve the energy efficiency of their dwelling. The shift in support for tenants towards landlords further revokes tenants' agency in improving their dwellings and increasing their indoor comfort levels (Andargie et al., 2019).

A similar issue was also identified in Ontario, where renters do not receive enough support despite making up a large share of the population (Das, Martiskainen, Bertrand et al., 2022). This study also recognized the "split incentive" landlords face when paying for renovations that do not benefit them (Das, Martiskainen, Bertrand et al., 2022, p. 14). More incentives are needed to encourage landlords to implement energy retrofits at no cost (i.e. rent increase) to tenants, as landlords are ultimately the ones that ensure tenants live in adequate conditions.

Tenants in social and community housing are also disadvantaged in the support they receive. While there exist initiatives providing subsidies for the renovations of social housing, albeit small in number, these sums are not always available for residential energy improvements. As seen through interviews with actors in housing and energy, energy efficiency interventions are often only accessible within the context of other major renovations to the building, meaning that tenants in social housing must wait until the condition of their dwelling deteriorates sufficiently to benefit from improvements in residential energy efficiency. The lack of access to support for energy efficiency interventions is further burdened by the fact that state-owned buildings, such as HLMs, are subjected to mandatory efficiency policies requiring a reduction in energy consumption. Considering that individuals in social housing already face barriers in regulating the energy efficiency of their dwelling when the control over energy services is exerted by housing authorities (Palm et al., 2020), mandatory energy efficiency policies further limit the ability of tenants in social and community housing to regulate their well-being.

The support provided for social and community housing tenants is different in Ontario, where two initiatives specifically aiming to retrofit social housing buildings (the *Social Housing Apartment Retrofit Program* and the *Social Housing Electricity Efficiency Program*) allowed for the retrofit of 17,954 and 1,246 units respectively (Das, Martiskainen, Bertrand, et al., 2022). Social housing authorities in Quebec must allocate more funds to energy efficient interventions, knowing they are just as important to occupant health and well-being as other structural renovations. Implementing programs that dedicate funds to energy efficiency renovations in particular could ensure that occupants in social and communal housing actually benefit from the sums that are put aside for the renovation of their buildings.

5.2.3. Ulterior motives to initiative creation

In seeking to understand whether the needs of different groups are met by the initiatives that are available to them, the analysis revealed that some initiatives equally serve the goals of the actors behind their creation. In initiatives such as *Offre biénergie* (35), created in collaboration by Hydro-Québec and Énergir, homeowners contribute to the desaturation of the hydroelectric grid

during peak demand hours by shifting their energy use to natural gas, while reducing natural gas consumption during normal hours, thus reducing demand for both energy providers. It is important to note that encouraging the use of natural gas, which is a fossil fuel, goes against the principles of a green energy transition and leads to believe that energy providers might prioritize financial benefit at the expense of sustainability. On the other hand, initiatives implemented by the public sector that aim to convert heating sources from fuel to electricity contribute to the Government's broader goals of reducing fossil fuel consumption. Knowing that homeowners benefit from initiatives subsidizing energy system conversions the most, they have the upper hand in the energy transition.

Programs that provide lower-income groups with energy-efficient equipment, such as thermostats or LED lights, allow them to reduce their energy consumption and lower their energy bills, which also reduces demand for the energy supplier. However, such initiatives do not necessarily improve thermal comfort, but rather address the financial aspect of energy poverty. Homeowners, who benefit from support towards improving insulation or installing new energy efficient heating and cooling equipment, can reduce their consumption while regulating indoor temperatures. For recognition justice to be met, tenants must be able to derive the same benefits (i.e. thermal comfort) from energy efficiency initiatives as homeowners.

In creating energy efficiency initiatives to serve their goals, major actors in energy and housing pose a barrier to ensuring that the energy transition is equitable. Findings in Ontario raise the concern that "decision-makers are leaving households facing energy poverty out of their thinking. They (…) take a technocratic view of the future of energy without addressing the challenges of those who are energy vulnerable or already in energy poverty." (Das, Martiskainen, Bertrand et al., 2022, p. 14). To avoid exacerbating energy poverty, and for energy justice to be met, actors engaging in the energy transition must consider the needs of all population groups as much as their own.

5.3. An insufficient consideration of audience groups

The analysis of interviews with major actors in the energy and housing sectors demonstrated that the process of initiative creation, including evaluation and modification, can be improved to include targeted audience groups, particularly marginalized groups. Previous studies of residential energy efficiency interventions demonstrate that undesirable results following deep energy retrofits, such as increases in indoor air pollutants due to smoking, could have been avoided if the actors responsible for the intervention's implementation had acknowledged the behaviors of occupants (Coombs et al., 2016; Frey et al., 2015). Understanding the lived experiences of energy insecure individuals can highlight ways in which the provision of energy services and energy efficiency initiatives should be improved (see Middlemiss & Gillard, 2015; Hernández, 2016). The lack of procedural justice in designing initiatives for the energy transition in the residential sector can have negative consequences on occupant well-being.

All the actors interviewed explained that their initiatives are created using a cost-benefit analysis. This raises issues in the imbalance between financial feasibility and equity and reflects an ethical problem, whereby some argue that "equity, dignity, or fair distribution (…) cannot be monetized, but that they nonetheless matter" (Sunstein, 2017, p. 27). Only one actor explained that the needs of lower-income groups trump the cost-benefit analysis. Such a practice should be adopted across actors in energy transition to ensure that marginalized groups are adequately represented and that their needs are met.

Following their creation, initiatives are evaluated to detect areas of improvement. Depending on the actor, audience groups are considered during the evaluation process, mostly though external firms. However, even here, opinions from within the internal organization seem to be considered just as much. Even though audience groups are taken into account during the evaluation process, the extent to which their experiences are given weight or importance is unclear. More needs to be done in integrating marginalized groups into the decision-making process, by considering their perspectives before the initiative is put on the market and by giving them more space during

evaluations. This ensures that they are active participants in the development of initiatives that benefit them.

The collaboration between actors and community organizations, including ACEFs, is essential in providing an opportunity for lower-income and marginalized communities to have their voices heard. As Howden-Chapman et al. (2011) demonstrate, forming partnerships with organizations active in the community can allow for the creation of housing solutions adapted to local needs. The *Comité pour la transition énergétique des ménages à faible revenu* is a strong starting point in sensibilizing them to the needs of marginalized groups, and efforts to collaborate with community organizations and ACEFs must continue for the development of equitable energy efficiency initiatives.

5.4. Limitations

The results of this study must be appreciated in light of some limitations. First, the analysis is extensive but not exhaustive, due to the snowball method of data collection. Data collection relied on information that was available to the public on the internet between May and November 2023, the data collection period, and on information provided directly by interview participants who work for major actors. It is possible that some initiatives were not included. Also, some inventoried initiatives could not be integrated in the energy justice analysis because there was no audience group specified in their description. More research is required, and future studies should attempt to establish a systematic search method. Future studies should also span over a larger period of time as to detect potential changes in the scope of initiatives following developments in provincial energy efficiency goals.

Interviews with actors are limited in the knowledge of the interviewee, and the low number of participants limits the generalizability of data. More research is needed to better understand the processes and structures behind residential energy efficiency initiatives. Future studies could explore the energy and housing sectors in depth to obtain a portrait of the systems governing residential energy efficiency in Quebec.

To date, studies of initiatives having the potential to mitigate residential energy poverty have only been conducted in Ontario and Quebec. Knowing that Canada as a whole is undergoing an energy transition, and that provinces like Alberta show little sign of reducing emissions originating from the oil industry (Dreis, 2024), this study must be replicated for all provinces as to obtain a portrait of how different individuals across the country are supported throughout the energy transition.

CHAPTER 6: CONCLUSION

This thesis is inscribed in a larger study seeking to prevent and reduce energy poverty in Quebec. It explored the different initiatives available in Quebec for residential energy efficiency improvements, with the ultimate goal of understanding how they support different population groups with respect to energy poverty. The energy justice analysis was used to assess whether there are equity discrepancies in the distribution of initiatives throughout the Quebec population, whether they adequately represent the needs of individuals, and the extent to which these individuals are considered in the creation of initiatives.

Based on this analysis, it is clear that more efforts need to be implemented in the province for an equitable and just distribution of initiatives. Homeowners benefit the most from initiatives, which allow them to bring about more holistic residential energy efficiency interventions, such as deep energy retrofits. On the other hand, tenants and lower-income households benefit from the least amount of initiatives, with those available only partially addressing their needs. Going forward, more effort must be put into ensuring that marginalized groups are represented in the decision-making process and that they are provided with more initiatives tailored to their needs.

The housing and energy sectors in Quebec are intersecting in ways that exacerbate difficulties on lower-income groups. With the cost of housing increasing, the portion of income that can be allocated to energy services, along with other necessities such as food, decreases. Knowing that energy inefficient dwellings can subject their occupants to energy poverty, the lack of adequate support targeting lower-income groups can have a detrimental impact on their well-being. This is to be considered in the context of changes in weather and climate patterns, which are bound to increase summer temperatures, and consequently will increase vulnerabilities to extreme weather events. Overall, this analysis has outlined shortcomings in the distribution of energy efficiency initiatives and has provided guidelines to mediate them. If Quebec is to transition to a green energy economy, it must not leave anyone behind.

REFERENCE LIST

Ahrentzen, S., Erickson, J., & Fonseca, E. (2016). Thermal and health outcomes of energy efficiency retrofits of homes of older adults. *Indoor Air*, *26*(4), 582–593. https://doi.org/10.1111/ina.12239

Alidoust, S., & Huang, W. (2023). A decade of research on housing and health: A systematic literature review. *Reviews on Environmental Health*, *38*(1), 45–64. https://doi.org/10.1515/reveh-2021-0121

Amann, J., Srivastava, R., & Henner, N. (2021). *Pathways for Deep Energy Use Reductions and Decarbonization in Homes* (pp. 1–67). American Council for an Energy-Efficient Economy.

Andargie, M. S., Touchie, M., & O'Brien, W. (2019). A review of factors affecting occupant comfort in multi-unit residential buildings. *Building and Environment*, *160*, 106182. https://doi.org/10.1016/j.buildenv.2019.106182

Baborska-Narozny, M., Stevenson, F., & Grudzinska, M. (2017). Overheating in retrofitted flats: Occupant practices, learning and interventions. *Building Research And Information*, *45*(1–2), 40–59. https://doi.org/10.1080/09613218.2016.1226671

Bouzarovski, S., & Petrova, S. (2015). A global perspective on domestic energy deprivation: Overcoming the energy poverty–fuel poverty binary. *Energy Research & Social Science*, *10*, 31–40. https://doi.org/10.1016/j.erss.2015.06.007

Bouzarovski, S., Petrova, S., & Sarlamanov, R. (2012). Energy poverty policies in the EU: A critical perspective. *Energy Policy*, *49*, 76–82. https://doi.org/10.1016/j.enpol.2012.01.033

Bouzarovski, S., & Simcock, N. (2017). Spatializing energy justice. *Energy Policy*, *107*, 640–648. https://doi.org/10.1016/j.enpol.2017.03.064

Bouzarovski, S., Thomson, H., & Cornelis, M. (2021). Confronting energy poverty in Europe: A research and policy agenda. *Energies*, *14*(4), 858. https://doi.org/10.3390/en14040858

Breysse, J., Dixon, S. L., Jacobs, D. E., Lopez, J., & Weber, W. (2015). Self-reported health outcomes associated with green-renovated public housing among primarily elderly

residents. *Journal of Public Health Management and Practice : JPHMP*, *21*(4), 355–367. https://doi.org/10.1097/PHH.0000000000000199

Breysse, J., Jacobs, D. E., Weber, W., Dixon, S., Kawecki, C., Aceti, S., & Lopez, J. (2011). Health outcomes and green renovation of affordable housing. *Public Health Reports*, *126*(1), 64–75. https://doi.org/10.1177/00333549111260S110

Canada Energy Regulator. (2023, August 24). *Provincial and Territorial Energy Profiles – Quebec*. https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-quebec.html

Coombs, K., Chew, G., Schaffer, C., Ryan, P., Brokamp, C., Grinshpun, S., Adamkiewicz, G., Chillrud, S., Hedman, C., Colton, M., Ross, J., & Reponen, T. (2016). Indoor air quality in green-renovated vs. non-green low-income homes of children living in a temperate region of US (Ohio). *Science Of The Total Environment*, *554*, 178–185. https://doi.org/10.1016/j.scitotenv.2016.02.136

Das, R. R., Martiskainen, M., Bertrand, L. M., & MacArthur, J. L. (2022). A review and analysis of initiatives addressing energy poverty and vulnerability in Ontario, Canada. *Renewable and Sustainable Energy Reviews*, *165*, 112617. https://doi.org/10.1016/j.rser.2022.112617

Das, R. R., Martiskainen, M., & Li, G. (2022). Quantifying the prevalence of energy poverty across Canada: Estimating domestic energy burden using an expenditures approach. *The Canadian Geographer / Le Géographe Canadien*, *66*(3), 416–433. https://doi.org/10.1111/cag.12750

Dreis, M. (2024, January 22). Alberta oil and gas emissions reduction progress report. *Pembina Institute*. //www.pembina.org/blog/alberta-oil-and-gas-emissions-reduction-progress-report

Dusyk, N., Turcotte, I., Gunton, T., MacNab, J., McBain, S., Penney, N., Pickrell-Barr, J., & Pope, M. (2021). *All Hands on Deck: An assessment of provincial, territorial and federal readiness to deliver a safe climate*. Pembina Institute.

Frey, S., Destaillats, H., Cohn, S., Ahrentzen, S., & Fraser, M. (2015). The effects of an energy efficiency retrofit on indoor air quality. *Indoor Air*, *25*(2), 210–219. https://doi.org/10.1111/ina.12134

Fuller, S., & Bulkeley, H. (2013). Changing countries, changing climates: Achieving thermal comfort through adaptation in everyday activities. *Area*, *45*(1), 63–69. https://doi.org/10.1111/j.1475-4762.2012.01105.x

Giancola, E., Soutullo, S., Olmedo, R., & Heras, M. (2014). Evaluating rehabilitation of the social housing envelope: Experimental assessment of thermal indoor improvements during actual operating conditions in dry hot climate, a case study. *Energy and Buildings*, *75*, 264–271. https://doi.org/10.1016/j.enbuild.2014.02.010

Giandomenico, L., Papineau, M., & Rivers, N. (2022). A systematic review of energy efficiency home retrofit evaluation studies. *Annual Review of Resource Economics*, *14*(1), 689–708. https://doi.org/10.1146/annurev-resource-111920-124353

Gouvernement du Québec. (2020). *Plan pour une économie verte 2030: Politique-cadre d'électrification et de lutte contre les changements climatiques*.

Haas, R., Nakicenovic, N., Ajanovic, A., Faber, T., Kranzl, L., Müller, A., & Resch, G. (2008). Towards sustainability of energy systems: A primer on how to apply the concept of energy services to identify necessary trends and policies. *Energy Policy*, *36*(11), 4012–4021. https://doi.org/10.1016/j.enpol.2008.06.028

Haley, B. (2014). Promoting low-carbon transitions from a two-world regime: Hydro and wind in Québec, Canada. *Energy Policy*, *73*, 777–788. https://doi.org/10.1016/j.enpol.2014.05.015

Healy, N., & Barry, J. (2017). Politicizing energy justice and energy system transitions: Fossil fuel divestment and a "just transition." *Energy Policy*, *108*, 451–459. https://doi.org/10.1016/j.enpol.2017.06.014

Hernández, D. (2016). Understanding 'energy insecurity' and why it matters to health. *Social Science & Medicine*, *167*, 1–10. https://doi.org/10.1016/j.socscimed.2016.08.029

Hernández, D., & Swope, C. B. (2019). Housing as a platform for health and equity: Evidence and future directions. *American Journal of Public Health*, *109*(10), 1363–1366. https://doi.org/10.2105/AJPH.2019.305210

Hoicka, C. E., & Das, R. (2021). Ambitious deep energy retrofits of buildings to accelerate the 1.5°C energy transition in Canada. *Canadian Geographies / Géographies Canadiennes*, *65*(1), 116–127. https://doi.org/10.1111/cag.12637

Howden-Chapman, P., Crane, J., Chapman, R., & Fougere, G. (2011). Improving health and energy efficiency through community-based housing interventions. *International Journal of Public Health*, *56*(6), 583–588. https://doi.org/10.1007/s00038-011-0287-z

Howden-Chapman, P., Matheson, A., Crane, J., Viggers, H., Cunningham, M., Blakely, T., Cunningham, C., Woodward, A., Saville-Smith, K., O'Dea, D., Kennedy, M., Baker, M., Waipara, N., Chapman, R., & Davie, G. (2007). Effect of insulating existing houses on health inequality: Cluster randomised study in the community. *BMJ (Clinical Research Ed.)*, *334*(7591), 460.

Hydro-Québec. (n.d.). *Chronologie | Histoire de l'électricité au Québec*. Retrieved October 5, 2023, from http://www.hydroquebec.com/histoire-electricite-au-quebec/chronologie/

Ige, J., Pilkington, P., Orme, J., Williams, B., Prestwood, E., Black, D., Carmichael, L., & Scally, G. (2019). The relationship between buildings and health: A systematic review. *Journal of Public Health (Oxford, England)*, *41*(2), e121–e132. https://doi.org/10.1093/pubmed/fdy138

Jacobs, D. E., Breysse, J., Dixon, S. L., Aceti, S., Kawecki, C., James, M., & Wilson, J. (2014). Health and housing outcomes from green renovation of low-income housing in Washington, DC. *Journal of Environmental Health*, *76*(7), 8–60.

Jenkins, K., McCauley, D., & Forman, A. (2017). Energy justice: A policy approach. *Energy Policy*, *105*, 631–634. https://doi.org/10.1016/j.enpol.2017.01.052

Jenkins, K., McCauley, D., Heffron, R., Stephan, H., & Rehner, R. (2016). Energy justice: A conceptual review. *Energy Research & Social Science*, *11*, 174–182. https://doi.org/10.1016/j.erss.2015.10.004

Jenkins, K., Sovacool, B., Mouter, N., Hacking, N., Burns, M.-K., & McCauley, D. (2021). The methodologies, geographies, and technologies of energy justice: A systematic and comprehensive review. *Environmental Research Letters*, *16*(4), 043009. https://doi.org/10.1088/1748-9326/abd78c

Karpinska, L., & Śmiech, S. (2020). Invisible energy poverty? Analysing housing costs in Central and Eastern Europe. *Energy Research & Social Science*, *70*, 101670. https://doi.org/10.1016/j.erss.2020.101670

Karpinska, L., & Śmiech, S. (2021). Will energy transition in Poland increase the extent and depth of energy poverty? *Journal of Cleaner Production*, *328*, 129480. https://doi.org/10.1016/j.jclepro.2021.129480

Keady, W., Panikkar, B., Nelson, I. L., & Zia, A. (2021). Energy justice gaps in renewable energy transition policy initiatives in Vermont. *Energy Policy*, *159*, 112608. https://doi.org/10.1016/j.enpol.2021.112608

Lewis, J., Hernández, D., & Geronimus, A. T. (2020). Energy efficiency as energy justice: Addressing racial inequities through investments in people and places. *Energy Efficiency*, *13*(3), 419–432. https://doi.org/10.1007/s12053-019-09820-z

Lloyd, E. L., McCormack, C., McKeever, M., & Syme, M. (2008). The effect of improving the thermal quality of cold housing on blood pressure and general health: A research note. *Journal of Epidemiology & Community Health*, *62*(9), 793–797. https://doi.org/10.1136/jech.2007.067835

Maidment, C. D., Jones, C. R., Webb, T. L., Hathway, E. A., & Gilbertson, J. M. (2014). The impact of household energy efficiency measures on health: A meta-analysis. *Energy Policy*, *65*, 583–593. https://doi.org/10.1016/j.enpol.2013.10.054

Middlemiss, L. (2022). Who is vulnerable to energy poverty in the Global North, and what is their experience? *WIREs Energy and Environment*, *11*(6), e455. https://doi.org/10.1002/wene.455

Middlemiss, L., & Gillard, R. (2015). Fuel poverty from the bottom-up: Characterising household energy vulnerability through the lived experience of the fuel poor. *Energy Research & Social Science*, *6*, 146–154. https://doi.org/10.1016/j.erss.2015.02.001

Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs. (2023). *A Just transition: The core principle of Québec's fight against climate change*.

Ministère des Affaires municipales et de l'Occupation du territoire. (2016). *L'organisation municipale au Québec en 2016* (p. 22). Gouvernement du Québec.

Modi, V., McDade, S., Lallement, D., & Saghir, J. (2005). Energy services for the Millennium Development Goals. In *Energy services for the Millennium Development Goals.* World Bank. https://www.cabdirect.org/cabdirect/abstract/20083156488

Moore, R. (2012). Definitions of fuel poverty: Implications for policy. *Energy Policy*, *49*, 19–26. https://doi.org/10.1016/j.enpol.2012.01.057

Noris, F., Adamkiewicz, G., Delp, W. W., Hotchi, T., Russell, M., Singer, B. C., Spears, M., Vermeer, K., & Fisk, W. J. (2013). Indoor environmental quality benefits of apartment energy retrofits. *Building and Environment*, *68*, 170–178. https://doi.org/10.1016/j.buildenv.2013.07.003

O'Sullivan, K. C. (2019). Health impacts of energy poverty and cold indoor temperature. In *Encyclopedia of Environmental Health* (pp. 436–443). Elsevier. https://doi.org/10.1016/B978-0-12-409548-9.11566-0

Palm, J., Reindl, K., & Ambrose, A. (2020). Understanding tenants' responses to energy efficiency renovations in public housing in Sweden: From the resigned to the demanding. *Energy Reports*, *6*, 2619–2626. https://doi.org/10.1016/j.egyr.2020.09.020

Papada, L., & Kaliampakos, D. (2016). Measuring energy poverty in Greece. *Energy Policy*, *94*, 157–165. https://doi.org/10.1016/j.enpol.2016.04.004

Pérez-Lombard, L., Ortiz, J., & Pout, C. (2008). A review on buildings energy consumption information. *Energy and Buildings*, *40*(3), 394–398. https://doi.org/10.1016/j.enbuild.2007.03.007

Régie de l'énergie du Québec. (n.d.). *Mission, vision, valeurs*. Retrieved November 9, 2023, from https://www.regie-energie.qc.ca/fr/la-regie/qui-sommes-nous/mission-vision-valeurs

Riva, M., Kingunza Makasi, S., Dufresne, P., O'Sullivan, K., & Toth, M. (2021). Energy poverty in Canada: Prevalence, social and spatial distribution, and implications for research and policy. *Energy Research & Social Science*, *81*, 102237. https://doi.org/10.1016/j.erss.2021.102237

Riva, M., Kingunza Makasi, S., O'Sullivan, K. C., Das, R. R., Dufresne, P., Kaiser, D., & Breau, S. (2023). Energy poverty: An overlooked determinant of health and climate resilience in Canada. *Canadian Journal of Public Health*. Scopus. https://doi.org/10.17269/s41997-023-00741-0

Šćepanović, S., Warnier, M., & Nurminen, J. K. (2017). The role of context in residential energy interventions: A meta review. *Renewable and Sustainable Energy Reviews*, *77*, 1146–1168. https://doi.org/10.1016/j.rser.2016.11.044

Sharpe, T., & Shearer, D. (2013). Adapting the Scottish tenement to twenty-first century standards: An evaluation of the performance enhancement of a nineteenth century "Category B" listed tenement block in Edinburgh. *Journal of Cultural Heritage Management and Sustainable Development*, *3*(1), 55–67. https://doi.org/10.1108/20441261311317400

Solomon, B. D., & Krishna, K. (2011). The coming sustainable energy transition: History, strategies, and outlook. *Energy Policy*, *39*(11), 7422–7431. https://doi.org/10.1016/j.enpol.2011.09.009

Sovacool, B., & Dworkin, M. (2015). Energy justice: Conceptual insights and practical applications. *Applied Energy*, *142*, 435–444. https://doi.org/10.1016/j.apenergy.2015.01.002

Statistics Canada. (2023, October 4). *L'histoire de deux locataires: L'abordabilité du logement chez les locataires récents et les locataires existants, au Canada*. https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-X/2021016/98-200-X2021016-fra.cfm

Streimikiene, D., Kyriakopoulos, G. L., Lekavicius, V., & Siksnelyte-Butkiene, I. (2021). Energy poverty and low carbon just energy transition: Comparative study in Lithuania and Greece. *Social Indicators Research*, *158*(1), 319–371. https://doi.org/10.1007/s11205-021-02685-9

Sunstein, C. R. (2017). Cost-benefit analysis and arbitrariness review. *Harvard Environmental Law Review*, *41*(1). https://doi.org/10.2139/ssrn.2752068

Swope, C. B., & Hernández, D. (2019). Housing as a determinant of health equity: A conceptual model. *Social Science & Medicine*, *243*, 112571. https://doi.org/10.1016/j.socscimed.2019.112571

Synnefa, A., Vasilakopoulou, K., De Masi, R., Kyriakodis, G., Londorfos, V., Mastrapostoli, E., Karlessi, T., & Santamouris, M. (2017). Transformation through renovation: An energy efficient retrofit of an apartment building in Athens. *Procedia Engineering*, *180*, 1003–1014. https://doi.org/10.1016/j.proeng.2017.04.260

Tardy, F., & Lee, B. (2019). Building related energy poverty in developed countries – Past, present, and future from a Canadian perspective. *Energy and Buildings*, *194*, 46–61. Scopus. https://doi.org/10.1016/j.enbuild.2019.04.013

Thompson, S. (2022). Green renewable power and policy in Canada: A just energy transition to net-zero. *Journal of Geoscience and Environment Protection*, *10*(3), Article 3. https://doi.org/10.4236/gep.2022.103001

Tirado Herrero, S. (2017). Energy poverty indicators: A critical review of methods. *Indoor and Built Environment*, *26*(7), 1018–1031. https://doi.org/10.1177/1420326X17718054

Tozer, L., MacRae, H., & Smit, E. (2023). Achieving deep-energy retrofits for households in energy poverty. *Buildings and Cities*, *4*. https://doi.org/10.5334/bc.304

Transition énergétique Québec. (n.d.-a). *À propos*. transitionenergetique.gouv.qc.ca/a-propos

Transition énergétique Québec. (n.d.-b). *Dépenses des particuliers consacrées à l'énergie—Statistiques énergétiques du Québec*. Retrieved November 9, 2023, from https://transitionenergetique.gouv.qc.ca/expertises/statistiques-energetiques/depenses-des-particuliers

Transition énergétique Québec. (n.d.-c). *Energy Transition Master Plan*. transitionenergetique.gouv.qc.ca/en/energy-transition-master-plan

Ürge-Vorsatz, D., & Tirado Herrero, S. (2012). Building synergies between climate change mitigation and energy poverty alleviation. *Energy Policy*, *49*, 83–90. https://doi.org/10.1016/j.enpol.2011.11.093

Viens, N., Sapinski, J. P., Laurin-Lamothe, A., & Pineault, É. (2023). *Decarbonization, hegemonic projects, and the green growth policy-planning network: The case of Québec*. https://doi.org/10.31235/osf.io/mqj4a

Wainer, A., & Zabel, J. (2020). Homeownership and wealth accumulation for low-income households. *Journal of Housing Economics*, *47*, 101624. https://doi.org/10.1016/j.jhe.2019.03.002

Wells, E., Berges, M., Metcalf, M., Kinsella, A., Foreman, K., Dearborn, D., & Greenberg, S. (2015). Indoor air quality and occupant comfort in homes with deep versus conventional energy efficiency renovations. *Building and Environment*, *93*, 331–338. https://doi.org/10.1016/j.buildenv.2015.06.021

Williams, S., & Doyon, A. (2019). Justice in energy transitions. *Environmental Innovation and Societal Transitions*, *31*, 144–153. https://doi.org/10.1016/j.eist.2018.12.001

Zhivov, A., Lohse, R., Shonder, J., Nasseri, C., Staller, H., Moerck, O., & Nokkala, M. (2015). Business and technical concepts for deep energy retrofit of public buildings. *ASHRAE Transactions*, *121*.

APPENDIX A: INITIATIVE INVENTORY AND CATEGORIZATION TABLE

nº	Name	Type	Actor	Description	Initiative type	Audience group
1	**Éconologis**	Program	Transition énergétique Québec	Provides energy efficiency advice and window caulking, weather-stripping, electrical outlet insulation, refrigerator replacement, low-flow showerheads, and electronic thermostats; seasonal program	Advice; equipment	Homeowners (low income) or tenants (low income)
2	**Rénoclimat**	Program	Transition énergétique Québec	Provides energy efficiency advice and financial aid of up to $5,365 depending on the renovation, including insulation, waterproofing, door/window and ventilation system replacement, and changing heating systems	Advice; subsidy	Homeowners or landlords
3	**Chauffez vert**	Program	Transition énergétique Québec	Provides a financial aid of up to $1,250 or a flexible amount per unit for the conversion of fuel heating systems to electric systems	Subsidy	Homeowners or landlords

4	**Novoclimat**	Program	Transition énergétique Québec	Provides a varying amount of financial aid for the construction of new energy efficient-homes that comply with the efficiency standards established by the program	Certification; subsidy	Construction companies
5	**Écoperformance**	Program	Transition énergétique Québec	Provides a varying amount of financial aid for the construction of new energy-efficient buildings, including residential ones	Subsidy	Construction companies
6	**Rénovation énergétique pour les ménages à faible revenu**	Program	Société d'habitation du Québec & Hydro-Québec	Provides a varying amount of financial aid for the energy-efficient renovation of social and communal housing, such as the replacement of doors/windows, isolation, and heat recuperator units	Subsidy	OSBL/HLM
7	**Subvention pour une chaudière à condensation**	Program	Énergir	Financial aid of up to $100 for the installation of a condensing boiler	Subsidy	Homeowners

8	**Subvention pour un système combo à condensation**	Program	Énergir	Financial aid of up to $150 for the installation of a combo system with a condensing tankless water heater	Subsidy	Homeowners
9	**Subvention pour un système combo à très haute efficacité énergétique**	Program	Énergir	Financial aid of up to $850 for the installation of a "warm air" combo systems with a condensing tankless water heater and an eligible fan coil with certified superior energy efficiency	Subsidy	Homeowners
10	**Supplément pour ménages à faible revenu**	Program	Énergir	Provides up to double of the financial support offered by other programs for low-income homeowners or a landlord with low-income tenants; for buildings of 4 units or less	Subsidy	Homeowners (low-income), landlords or OSBL/HLM
11	**Subvention pour un thermostat intelligent**	Program	Énergir	Reimburses up to $100, but not more than 75% of the cost, for a new smart thermostat	Equipment	Homeowners or tenants

12	**Supplément ménages à faible revenu - Affaires**	Program	Énergir	Provides up to double of the financial support offered by other programs for landlords with low-income tenants or OSBL/HLM; for buildings of 4 units or more	Subsidy	Landlords (low income tenants); OSBL/HLM
13	**Programme d'efficacité énergétique - Innovation efficace**	Program	Énergir	Provides up to $250,000, but no more than 75% of the cost, for energy efficient innovative projects	Subsidy	Construction companies
14	**Programme d'efficacité énergétique - Construction et rénovation efficaces, volet Nouvelle construction efficace**	Program	Énergir	Financial aid of up to $325,000 for the construction of new energy efficient constructions, including housing, that reduce natural gas consumption	Subsidy	Construction companies
15	**Subvention pour un thermostat intelligent (Affaires)**	Program	Énergir	Reimburses up to $100, but not more than 75% of the cost, for a new smart thermostat; for residential buildings of 4+ units	Equipment	Landlords

16	**Programme d'efficacité énergétique - Volet Préchauffage solaire**	Program	Énergir	Financial aid of up to $200,000 for the purchase and installation of a solar energy collector linked to a functioning natural gas system	Subsidy	Construction companies
17	**Programme d'efficacité énergétique - Volet remise au point**	Program	Énergir	Financial aid of up to $100,000 for the recommissioning of existing mechanical systems in buildings to reduce energy consumption	Subsidy	N/A
18	**Subventions pour un aérotherme**	Program	Énergir	Financial aid of up to $2,900 per condensing unit heater for its purchase and installation	Subsidy	N/A
19	**Subventions pour un chauffe-eau**	Program	Énergir	Financial aid of up to $20,000 for the purchase and installation of a condensing water heater	Subsidy	N/A
20	**Subventions pour une chaudière**	Program	Énergir	Financial aid of up to $25,000 for the installation of a condensing tank in new constructions	Subsidy	Construction companies
21	**Thermostat intelligent**	Program	Gazifère	Reimbursement of $100 for the installation of a smart thermostat	Equipment	Homeowners or tenants

22	**Échangeur d'air avec récupérateur de chaleur**	Program	Gazifère	Financial aid of $350 for the installation of an air exchanger with heat recovery	Subsidy	Homeowners
23	**Chauffe-eau sans réservoir à condensation**	Program	Gazifère	Financial aid of $500 for the installation of a condensing tankless water heater	Subsidy	Homeowners
24	**Conversion - Mazout au gaz naturel**	Program	Gazifère	Financial aid of up to $2,000 for the purchase/rental of heating equipment, converting from fuel to natural gas heating	Subsidy	Homeowners
25	**Rénoplex: subventions à la rénovation des immeubles de 1 à 5 logements**	Program	Ville de Montréal	Financial aid of varying amounts for the renovation of buildings of 1-5 units; requires a renovation of at least $3,000 to have been undertaken prior to financial aid request	Subsidy	Homeowners, landlords or OSBL/HLM
26	**Programme Réno logement abordable**	Program	Ville de Montréal	Financial aid of varying amounts for the renovation of buildings of 6+ affordable units; requires a renovation of at least $3,000 to have been undertaken prior to financial aid request	Subsidy	Landlords

27	**Hilo**	Program	Hydro-Québec	Provides a smart thermostat for the participation in challenges to reduce energy consumption in peak hours	Equipment; reduced rates	Homeowners or tenants
28	**Outil de performance énergétique**	Tool/strategy	Hydro-Québec	Tool that allows clients to view their consumption profile, compare themselves to other households, and receive personalized energy efficiency advice	Advice	Homeowners or tenants
29	**Thermopompes efficaces**	Program	Hydro-Québec	Financial aid of up to $2,800 for the installation of an energy efficient heat pump	Subsidy	Homeowners
30	**Logisvert**	Program	Hydro-Québec	Financial aid of up to $22,000 for the installation of new energy efficient equipment, including heat pumps, heat storage units and insulation	Subsidy	Homeowners, tenants or construction companies
31	**Offre visant les accumulateurs de chaleur**	Program	Hydro-Québec	Financial aid of $22,000 for the installation of a heat storage unit	Subsidy	Homeowners
32	**"Chauffe-eau ECOPEAK"**	Program	Hydro-Québec	Financial aid of $100 for the purchase of a ECOPEAK water heater	Subsidy	Homeowners

33	**Option de crédit hivernal**	Rates	Hydro-Québec	Allows clients to save 53 cents per kwh not consumed during peak hours	Reduced rates	N/A
34	**Tarif Flex D**	Rates	Hydro-Québec	Allows clients to have a lower rate during the winter, which increases during peak hours	Reduced rates	N/A
35	**Offre biénergie**	Program	Hydro-Québec & Énergir	Financial aid of up to $5,800 for the installation of a bi-energy heating system	Subsidy	Homeowners
36	**Entente de paiement**	Payment plan	Hydro-Québec & ACEFs	Allows low-income households to better regulate their energy consumption through personalized and affordable monthly payment amounts	Payment plan	Homeowners (low income) or tenants (low income)
37	**Mesures d'exemplarité de l'État pour la lutte aux changements climatiques**	Policy	Société d'habitation du Québec	Measure put in place to make state-owned buildings 10% more efficient than the norms established by the Construction Code; existing buildings must be converted to a renewable source of heating	Efficiency policy	OSBL/HLM

38	**Règlement sur l'efficacité énergétique du bâtiment - Code de construction du Québec**	Construction code	Société d'habitation du Québec	New rule in the Construction Code aiming to improve the energy efficiency of new residential constructions of < 3 floors or 3+ floors with a commercial space	Efficiency policy	Construction companies
39	**Cible organisationnelle de la transition énergétique**	Policy	Société d'habitation du Québec	Measure put in place to force HLMs to reduce their energy consumption by 12% by 2029	Efficiency policy	OSBL/HLM
40	**Rénorégion**	Program	Société d'habitation du Québec	Provides a financial aid of up to $20,000 for major renovations in rural areas, including improvements to heating and isolation	Subsidy	Homeowners (low income)
41	**Canada Greener Homes Grant**	Program	Government of Canada	Financial aid of up to $5,000 for admissible green renovations	Subsidy	Homeowners
42	**Canada Greener Homes Loan**	Program	Government of Canada	Loans of up to $40,000 for energy-efficient renovations	Subsidy (loan)	Homeowners
43	**Oil to Heat Pump Affordability Program**	Program	Government of Canada	Financial aid of up to $10,000 for the conversion of fuel heating systems to heat pumps	Subsidy	Homeowners

44	**Canada Greener Affordable Housing**	Program	Government of Canada	Various financial aid of up to $170,000 in lump sums or loans for the energy efficient renovation of OSBL/HLM	Subsidy (loan)	OSBL/HLM
45	**Greener Neighbourhoods Pilot Program**	Program	Government of Canada	Various financial aid for the development of large-scale residential energy efficiency projects	Subsidy	Construction companies (for low-income/communal housing)
46	**L'Énergie pour construire le Québec de demain: La stratégie énergétique du Québec 2006-2015**	Policy	Government of Quebec	The first energy-related policy to be implemented in Quebec	Efficiency policy	N/A
47	**Politique énergétique 2030; Énergie des Québecois: source de croissance**	Policy	Government of Quebec	The subsequent energy-related policy, establishing energy-efficiency targets	Efficiency policy	N/A

48	**Plan directeur en transition énergétique**	Policy	Government of Quebec	The last of three energy-related policies, establishing goals in the reduction of fossil fuel consumption and energy consumption reduction	Efficiency policy	N/A
49	**Plan pour une économie verte 2030: politique-cadre d'électrification et de lutte contre les changements climatiques**	Policy	Government of Quebec	The environmental program of the Legault government, following that of the Couillard government, prioritizing the electrification of Quebec's economy	Efficiency policy	N/A
50	**Programme d'amélioration de l'isolation**	Program	City of Longueuil	Financial aid of up to $3,000 for the improvement of isolation	Subsidy	Homeowners
51	**Programme Rénovation Québec**	Program	Société d'habitation du Québec & Municipalities	Financial aid of various amounts for the major renovations of residential buildings, including those related to energy efficiency	Subsidy	Homeowners or homeowners (low income) or landlords
52	**Remplacement d'un système de chauffage au mazout**	Program	City of Laval	Financial aid of up to $2,000 for the replacement of a fuel heating system to an electric one	Subsidy	Homeowners or landlords

53	**Programme de remplacement de systèmes de chauffage au mazout**	Program	City of Gatineau	Financial aid of up to $3,500, but not more than 75% of the total cost, for the replacement of a fuel heating system to an electric one	Subsidy	Homeowners or landlords
54	**Programme de rénovation des habitations à loyer modique**	Program	Société d'habitation du Québec	Program that provides a subsidy of 100% of the cost of major renovations in HLMs, including energy efficiency improvements	Subsidy	OSBL/HLM
55	**Programme d'aide à la modernisation des installations de certaines résidences privées pour aînés**	Program	Société d'habitation du Québec	Financial aid of varying amounts for the renovation of PSRs, including energy infrastructures	Subsidy	Tenants (PSR)
56	**Programme d'amélioration des maisons d'hébergement**	Program	Société d'habitation du Québec	Financial aid of up to $21,000 per unit for the renovation of women's shelters, including those related to energy efficiency	Subsidy	Shelters

APPENDIX B: RECOGNITION JUSTICE HEAT MAP, WITH INITIATIVES

	Subsidy	Equipement	Advice	Efficiency policy	Payment plan	Reduced rates	Certification
Homeowners	21	**EN** : Subvention pour un thermostat intelligent; **GZ** : Thermostat intelligent; **HQ** : Hilo	**TEQ** : Rénoclimat; **HQ** : Outil de performance énergétique	0	0	**HQ** : Hilo	0
Homeowners (Low income)	3	**TEQ** : Éconologis	**TEQ** : Éconologis	0	**HQ & ACEF** : Entente de paiement	0	0
Landlords	9	**EN** : Subvention pour un thermostat intelligent (Affaires)	**EN** : Supplément ménages à faible revenu - Affaires	0	0	0	0
Tenants	1	**EN** : Subvention pour un thermostat intelligent; **GZ** : Thermostat intelligent; **HQ** : Hilo	**HQ** : Outil de performance énergétique	0	0	**HQ** : Hilo	0
Tenants (Low income)	0	**TEQ** : Éconologis	**TEQ** : Éconologis	0	**HQ & ACEF** : Entente de paiement	0	0
OSBL/HLM	6	**HQ** : Programme Rénovation énergétique pour les ménages à faible revenu	0	**SHQ** : Mesures d'exemplarité de l'État pour la lutte aux changements climatiques; Cible organisationnelle de la transition énergétique	0	0	0
Tenants (PSR)	1	0	0	0	0	0	0
Shelters	1	0	0	0	0	0	0
Construction companies	8	0	0	**SHQ** : règlement sur l'efficacité énergétique du bâtiment - Code de construction du Québec	0	0	**TEQ** : Novoclimat

* see p. 73 for explanation of acronyms

APPENDIX B: RECOGNITION JUSTICE HEAT MAP, WITH INITIATIVES, CONTINUED

	Subsidy
Homeowners	**TEQ** : Rénoclimat, Chauffez vert; **EN** : Subvention pour une chaudière à condensation, Subvention pour un système combo à condensation, Subvention pour un système combo à très haute efficacité énergétique; **GZ** : Échangeur d'air avec récupérateur de chaleur, Chauffe-eau sans réservoir à condensation, Conversion - Mazout au gaz naturel; **MTL** : RénoPlex; **HQ** : Thermopompes efficaces, LogisVert, Offre visant les accumulateurs de chaleur, "Chauffe-eau ECOPEAK"; **HQ & EN** : Offre biénergie; **GC** : Subvention canadienne pour des maisons plus vertes, Prêt canadien pour des maisons plus vertes, Programme pour la conversion abordable du mazout à la thermopompe; **Longueuil** : Programme d'amélioration de l'isolation; **SHQ** : Programme Rénovation Québec; **Laval** : Remplacement d'un système de chauffage au mazout; **Gatineau** : Programme de remplacement de systèmes de chauffage au mazout
Homeowners (Low income)	**EN** : Supplément pour ménages à faible revenu; **SHQ** : RénoRégion, Programme Rénovation Québec
Landlords	**TEQ** : Rénoclimat, Chauffez-vert; **EN** : Supplément pour ménages à faible revenu, Supplément ménages à faible revenu – Affaires; **MTL** : RénoPlex, Programme Réno logement abordable; **SHQ** : Programme Rénovation Québec; **Laval** : Remplacement d'un système de chauffage au mazout; **Gatineau** : Programme de remplacement de systèmes de chauffage au mazout
Tenants	**HQ** : LogisVert
Tenants (Low income)	
OSBL/HLM	**SHQ & HQ** : Rénovation énergétique pour les ménages à faible revenu; **EN** : Supplément pour ménages à faible revenu, Supplément pour ménages à faible revenu – Affaires; **GC** : Programme Canadien pour des logements abordables plus verts; **MTL** : RénoPlex; **SHQ** : Programme de rénovation des habitations à loyer modique
Tenants (PSR)	**SHQ** : Programme d'aide à la modernisation des installations de certaines résidences privées pour aînés
Shelters	**SHQ** : Programme d'amélioration des maisons d'hébergement
Construction companies	**TEQ** : Novoclimat, ÉcoPerformance; **EN** : Programme d'efficacité énergétique - Innovation efficace, Programme d'efficacité énergétique - Construction et rénovation efficaces - volet Nouvelle construction efficace, Programme d'efficacité énergétique - Volet Préchauffage solaire, Subventions pour une chaudière; **HQ** : LogisVert; **GC** : Programme pilote pour des quartiers plus verts

* Acronyms: TEQ = Transition énergétique Québec; HQ = Hydro-Québec; EN = Énergir; GZ = Gazifère; SHQ = Société d'habitation du Québec; GC = Federal government; MTL = City of Montreal