Beat the Peak - Mitigating Electric Peak Demand in All-Electric New Construction

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ABSTRACT

Amidst efforts to electrify heating, transport, and industry, electric winter demand response is crucial, especially in colder regions. While much focus is on retrofitting existing buildings, all-electric new construction presents an opportunity to implement demand-side management strategies effectively from the outset. These strategies can mitigate electric peak loads more cost-effectively than retrofits. Administrators must identify and promote the most promising technologies to encourage their adoption.

This paper discusses recent findings that energy efficiency measures, especially high-performance building envelopes, offer lasting and cost-effective peak demand reduction potential, comparable or superior to traditional demand response technologies. It also highlights new construction strategies that integrate critical peak-load mitigation technologies like smart electric vehicle chargers and energy storage. Additionally, the paper outlines necessary technical and market transformation strategies for local governments and utilities to foster 'smart' all-electric new constructions, supporting decarbonization goals and reducing peak demand impacts.

Discussions with real estate developers reveal that current incentive programs often miss the unique culture, pace, and workstyle of the sector. Instead of merely increasing financial incentives, administrators should tailor strategies to the industry's realities. This includes influencing early design decisions, addressing split incentives that skew developer priorities towards immediate costs over long-term savings, and valuing personal relationships and trust over formalized processes. These tailored approaches can better align with the industry's operational dynamics and enhance the adoption of energy-efficient practices.

Introduction

A limited number of utilities have developed programs targeting new construction energy efficiency due to the sector's smaller share of the overall building stock and perceived lower potential for savings. As electrification and decarbonization accelerate, meeting peak demand sustainably becomes challenging. In Québec, where electricity is widely used for heating, winter peak demand intensifies rapidly. Given its cost-effectiveness, demand reduction is crucial, particularly in constrained contexts like Québec. This paper explores the significance of demand-side management (DSM) in new construction by highlighting its potential to mitigate peak demand. It also outlines targeted strategies for Hydro-Québec, a crown corporation and electric utility in Québec. These strategies are developed based on insights gathered from industry interviews, aiming to enhance the implementation of DSM in new building projects.

Importance of Demand-Side Management in New Construction

The Context of Québec

The Quebec government has enacted legislation establishing a greenhouse gas (GHG) emissions reduction target of 37.5% by 2030, relative to 1990 levels, and achieving net zero by 2050 (Gouvernement du Québec 2021). The move towards electrification will significantly increase electricity demand thus creating challenges to meet demand sustainably and cost effectively.

Due to factors such as affordable electricity rates and the low capital cost of electric resistance heating systems, electricity is extensively used for heating purposes in Québec, particularly in residential and small commercial sectors. Consequently, the electrical grid encounters its peak demand during winter, particularly in times of severe cold. Also, Québec's unique energy context and heavy reliance on hydroelectric dams place the province at the forefront to successfully achieve the energy transition.

To address the growing peak demand during winter peak periods from decarbonization of the economy, Hydro-Québec, the public utility overseeing electricity generation, transmission, and distribution in Québec (Canada), will need to invest significantly in expanding electricity generation capacity, transmission, and distribution infrastructure, incurring considerable costs. However, reducing demand by improving energy efficiency or managing customer load to shift during specific times has great potential and is recognized as a cost-effective solution to address capacity constraints in winter-peaking regions (Specian, Cohn and York 2021).

Thus, energy efficiency and demand response are growing priorities for Hydro-Québec, which recently tripled its energy efficiency target from 8.2 TWh to 25 TWh by 2029 (Hydro-Québec 2023a). In this context, DSM efforts must be extended, and all cost-effective opportunities to achieve additional savings must be identified.

New Construction: A Growing Importance Sector

While existing buildings represent the biggest share of the building stock, new constructions will represent a significant share over the medium to long term. Indeed, the residential housing stock in Québec will increase by 14% by 2030 and 45% by 2050, representing a 1.25% average compound annual growth between 2020 and 2050 (Canada Mortgage and Housing Corporation 2022). By 2050, if the pace of new residential construction remains the same, buildings newly built will account for at least 31%of Québec's housing stock and at least 12% by 2030 (Dunsky Energy + Climate Advisors 2023). Thus, new construction will represent a non-negligible share of housing stock, translating into a potentially significant impact on electricity and peak demand.

Moreover, new constructions exhibit distinct characteristics compared to existing buildings, influencing their contribution to energy demand. New residential buildings, especially single-family homes, tend to be bigger than existing buildings. To illustrate this, using data from the Comprehensive Energy Use Database of Natural Resources Canada, we estimated that buildings constructed between 2016 and 2020 have a floor space area that is 24% greater than the average floor space area of all existing buildings in Quebec (Natural Resources Canada 2022a). Considering this factor alongside the anticipated 14% rise in the residential building stock by

2030, we estimated that the total surface area will expand by 18% by 2030. Also, new constructions have a greater performance compared to existing buildings. This is primarily due to their integration of more efficient heating technologies, improved building envelopes, and typically superior design to reduce energy usage. Analysis of residential building data reveals that buildings built after 2016 have a 52% lower energy intensity than the average of all existing residential buildings in Québec (Natural Resources Canada 2022b). Consequently, this is anticipated to contribute to an overall 8% increase in residential space heating energy requirements by 2030 which accounts for a large share of energy requirements in Québec (Natural Resources Canada 2022b). According to forecasts from Hydro-Québec, new constructions will increase peak demand from space and water heating by 8.5% and overall residential electricity consumption by 6% by 2030 (Hydro-Québec 2022).

New commercial and institutional (C&I) buildings are expected to have a smaller impact on overall energy and peak demand requirements compared to residential buildings. This is due to the more modest growth anticipated in the C&I buildings sector. Specifically, while the residential building stock is projected to grow by 14% from 2020 to 2030, the total surface area of C&I buildings is forecasted to increase at a much slower rate—only about 3.5% over the same period. This estimate is based on the observed compound annual growth rate of 0.34% from 2015 to 2021. As a result, the expansion in C&I buildings will contribute less significantly to energy demand increases than the residential sector (Gouvernement du Québec 2024).

Thus, although new construction's electricity impact is lower than total building stock growth, it will significantly impact peak demand, emphasizing the need to reduce energy demand in new buildings.

A Least-Costs and Easier Option

Implementing energy efficiency and demand response measures in residential and commercial new construction offers significant advantages in terms of ease and cost-effectiveness. Unlike retrofitting existing buildings, integrating these measures during the initial construction phase allows for seamless integration into the design and construction processes. This eliminates the need for costly retrofitting later. Additionally, incorporating energy efficiency and demand response features from the outset can result in more efficient systems and equipment choices, leading to long-term operational cost savings. Furthermore, in new construction projects, there is often more flexibility to incorporate efficient technologies and design strategies, optimizing energy performance from the start. Other characteristics of the industry also increase cost-effectiveness. Indeed, the new construction industry is relatively concentrated. With a limited number of developers in the industry, a smaller pool of large developers can take on multiple equipment installations simultaneously, leading to economies of scale. For utilities, the limited number of players allows for a more focused marketing strategy, bypassing the need to interact with individual owners, which is often necessary in renovation projects.

Demand-Side Management Potential in New Construction

Methodology

Dunsky Energy + Climate Advisors conducted a study in 2023 for Hydro-Québec to analyze the potential of demand-side solutions in new construction. We identified three types of demand-side potential:

- **Peak demand reductions from demand-response**: provide load flexibility from various sources by managing customer loads to shed or shift load away from peak periods using smart technologies and controls.
- **Peak demand reductions via energy efficiency measures:** achieving permanent reduction of peak demand using more energy-efficient heating equipment and improving the thermal envelope performance of buildings.
- **Energy savings from energy efficiency measures**: secure permanent reductions in electricity consumption by adopting various energy-efficient equipment and improving the thermal envelope performance of buildings.

To assess the energy efficiency potential, Dunsky leveraged results from a technical, economic, and achievable potential study it conducted for Hydro-Québec in 2022 (Dunsky Energy + Climate Advisors 2022). This study focused on residential, commercial, and institutional sectors and assumed three scenarios:

- **Business-as-usual (BAU)** assumes current participation in DSM programs and the same level of financial incentives currently offered.
- **Enhanced incentives (BAU+):** assumes financial incentives are increased to 75% of incremental costs and more important marketing efforts are deployed.
- **Maximum achievable (MAX)**: assumes financial incentives cover 100% of incremental costs, maximal marketing efforts are deployed, and significantly reduced barriers.

For the demand response potential, Dunsky leveraged the results from the latest technical and economic potential study conducted for Hydro-Québec (Technosim inc 2020). We calculated the achievable share of the economic potential using three scenarios inspired by different levels of achievable participation in demand response programs resulting from marketing efforts as identified by the Lawrence Berkeley National Laboratory (LBNL) (Alstone, et al. 2017). In our analysis, we adopted the unit savings (kW/measure) outlined in the potential study. We then multiplied these savings by the projected market potential for each measure over the 2020-2030 period, as identified in the study. Additionally, we factored in anticipated new construction based on sector-specific growth forecasts. We further adjusted the results by applying different achievable adoption levels from the LBNL. We defined the following three scenarios:

- **Low:** demand response measures have a 7% penetration in the residential and 6% in the commercial and institutional sector, with minimal marketing efforts.

- **Medium**: demand response has a 19% market penetration in the residential sector and 10% in the commercial and institutional sector. Moderate marketing efforts are employed.
- **High**: demand response measures have a 30% penetration rate in the residential sector and 14% in the commercial and institutional sector. Intensive marketing efforts are ongoing to enhance adoption.

Findings

New construction buildings generally show lower energy efficiency potential than existing ones due to stricter construction codes and more efficient heating equipment. Consequently, many prioritize demand response initiatives to reduce peak consumption. However, our analysis reveals that energy efficiency measures in new construction could offer equal or even greater peak demand reductions than demand response strategies. Indeed, in a maximum achievable potential scenario, energy efficiency could yield peak demand reductions of 372 MW, equivalent to 0.86% of Hydro-Québec's projected peak demand for 2030, as shown in Table 1. Conversely, demand response potential could reach 300 MW or 0.70% of the projected peak demand (see

Table 2). Also, unlike demand response initiatives, energy efficiency measures generate energy savings that reach 1,805 GWh or 0.91% of the anticipated energy requirements in a maximum achievable potential scenario.

Table 1. Energy efficiency achievable potential in Québec by 2030, residential and commercial & institutional sectors

Type of Impact	BAU	BAU+	MAX
Energy Efficiency Achievable Potential			
Peak reduction (MW)	70	224	372
Peak reductions as a share of peak demand forecast	0.16%	0.52%	0.86%
Energy Savings (GWh)	423	1,188	1,805
Energy savings as a share of demand forecast	0.21%	0.60%	0.91%

These estimations of energy efficiency potential as a share of Hydro-Québec's demand (%) are calculated based on the total peak demand forecast for 2030. According to Hydro-Québec's latest supply plan, peak demand will reach 43.1 MW, and total energy demand in all sectors combined is forecasted to be 198.7 TWh. For the energy efficiency results, the estimated potential represents the cumulative marginal savings for the study period (2020-2030).
Sources: Dunsky Energy + Climate Advisors, 2023 and Hydro-Québec, 2022.

Table 2: Demand response achievable potential in Québec by 2030, residential and commercial & institutional sectors

Type of Impact	Low	Medium	High
Demand Response Achievable Potential			
Peak reduction (MW)	70	224	372
Peak reductions as a share of peak demand forecast	0.18%	0.44%	0.70%

The estimations of peak reductions as a share of peak demand forecast (%) are derived from Hydro-Québec's forecast for 2030 peak demand. Its latest supply plan shows peak demand will reach 43.1 MW during winter. *Sources*: Dunsky Energy + Climate Advisors, 2023 and Hydro-Québec, 2022.

Our analysis finds that most of this potential will come from the residential sector. However, this does not mean that the potential in each commercial and institutional building is lower and less cost-effective than residential buildings. In this case, residential peak and energy consumption reduction opportunities are more important because this sector accounts for a much larger share of total buildings stock and is also expected to grow more in the next decade based on historical trends (Gouvernement du Québec 2023).

In our results, an important share of the energy efficiency potential comes from envelope measures, geothermal, and heat pumps. For the demand response, most peak reduction comes from load control measures such as smart thermostats, water heaters, and EV chargers.

Despite these results, some caveats must be noted. First, energy efficiency and demand response potential were not assessed in a joint study, thus not capturing the combined potential of both demand-side options interventions. Second, the potential demand response analysis does not constitute a complete technical, economic, and achievable potential study because we used the economic potential assessed by another study and applied different adoption levels to determine the achievable potential. This does not fully capture the optimization and competition between measures that a formal study would have. Third, Hydro-Québec has enhanced its DSM portfolio since the publication of these studies. The results thus do not include all recent new interventions of the utility that could impact the identified DSM potential (Hydro-Québec 2024b). Lastly, any enhancement to building and energy codes that would impact the potential of new construction identified is not reflected.

Nevertheless, these results suggest that, with additional efforts, the potential to achieve energy and peak demand savings in the new construction industry might be considerable and, thus, must not be neglected in utility demand-side portfolios. Additionally, DSM in new construction allows for more easily combining energy efficiency and demand response interventions, which is likely to improve overall peak demand reduction further.

Barriers

Dunsky Energy + Climate Advisors conducted several interviews with new construction developers in Québec to understand the main barriers to adopting energy efficiency in new construction. These highlighted economic and cultural barriers.

Local Housing Context

The construction sector is particularly sensitive to economic cycles, relying heavily on consumer confidence, business investment, government spending, and interest rate fluctuations, which directly influence its activity. In recent years, the new construction industry has faced significant volatility. Indeed, housing starts have reached record-breaking activity to historically low levels between 2020 and 2023 due to the impacts of the COVID-19 pandemic on the economy, the ensuing period of high inflation, and the following impact on interest rates and economic activity. In Québec, housing starts plummeted by 32% in 2023, marking a historic low (Canada Mortgage & Housing Corporation 2023a). In parallel, Canada experienced massive immigration from 2022 to 2023, with its population increasing by 2.6% in 2023 alone (Statistics Canada 2023).

Consequently, recent low housing starts, coupled with substantial immigration, have resulted in a housing supply that has struggled to keep pace with demand in recent years. This imbalance has exerted significant pressure on housing prices. Since the end of 2020, shelter costs as a share of disposable income have increased steadily in Québec, from 34.9% in the last quarter of 2019 to 39.5% by the end of 2021, as shown in

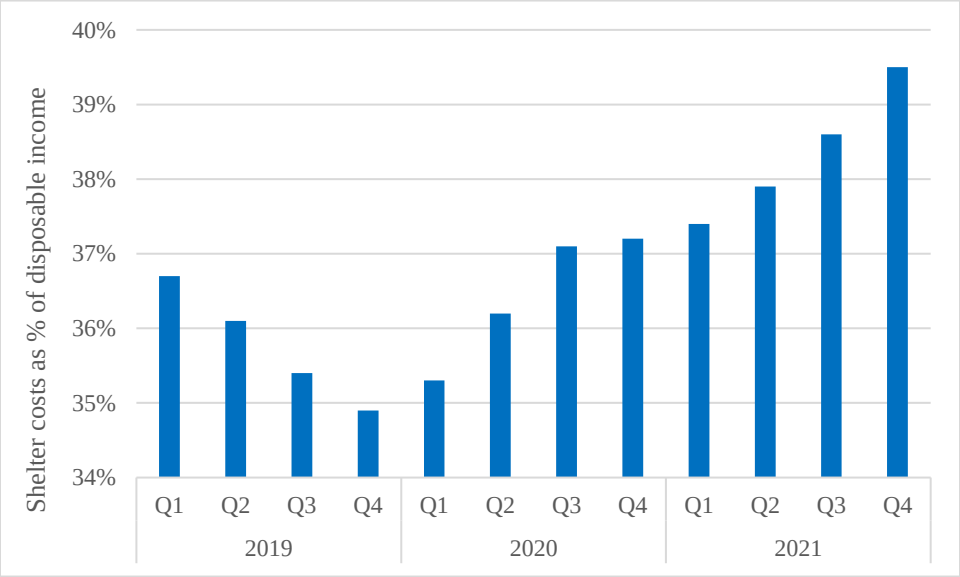

Figure 1. This trend is even more important in Canada, where average shelter costs reached 49% of the average household's disposable income (Canada Mortgage and Housing Corporation 2022).

To fix affordability issues, the Canada Mortgage & Housing Corporation calculated that the pace of new construction would need to double compared to its long-term forecasts (Canada Mortgage & Housing Corporation 2023b). This suggests that affordability issues will remain challenging in the short to medium term unless significant housing policies are implemented. For residential energy initiatives, high housing costs in Québec create additional barriers to energy efficiency as households may increasingly find themselves financially stretched, leading to a potential diversion of capital away from investments in energy-saving measures.

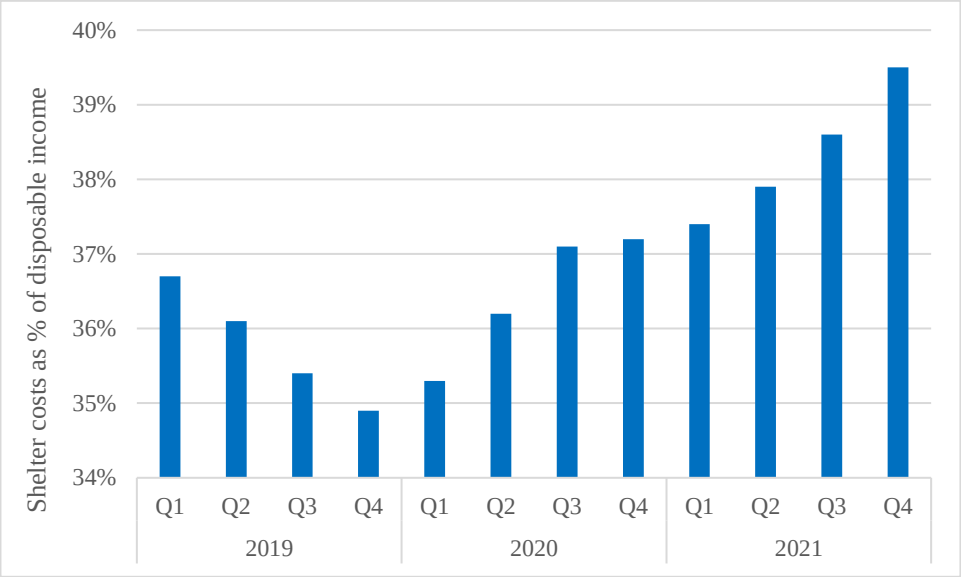

Figure 1. Housing costs as a share of disposable income when the average household buys the average house in Québec. *Source*: Canada Mortgage and Housing Corporation, 2022.

Costs Constraints for Developers

Developers interviewed emphasized costs as one of the main barriers to energy efficiency. They underscored that the new construction industry is fundamentally driven by profitability. For developers, energy efficiency is typically associated with higher incremental costs. It includes more time, effort, and budget to perform energy analysis to identify energy efficiency measures to add to the project. Moreover, in a jurisdiction like Québec, where electricity prices are low, the return on investment tends to be longer, often misaligned with the industry's short-term expectations for payback. For developers, the main preoccupation mentioned was: "How much is it costing me today?" (Dunsky Energy + Climate Advisors 2023).

Business Model and Split Incentive

Business models and culture in the industry are sometimes incompatible with energy efficiency investments and can lead to split incentives issues. Broadly, three types of developers can be identified:

- Operate and pay for energy bills,
- Operate, but tenants pay the energy bill,
- Sell the property after construction.

Developers responsible for operation and energy bill payments have a stronger incentive to invest in energy efficiency, as it reduces operational expenses and offers potential long-term cost recovery. However, industry data indicates that the incentive remains limited even when developers cover energy expenses. This is largely due to energy, water, and waste management costs constituting a small fraction of operating expenses, estimated at 5.9% in the commercial

real estate sector in Québec, primarily driven by the region's low electricity costs (Aviseo Conseil 2017).

When developers are not responsible for energy bills, their motivation for energy efficiency tends to be low. This is because energy costs are passed on to those who will benefit from the savings, leading to split incentive issues, especially if the developers intend to sell the building after its construction. In such cases, their primary incentive lies in energy efficiency enhancing property value, potentially offsetting the costs of developing a more efficient building. In theory, appraisers and buyers may recognize that a more efficient property warrants a higher value. However, in practice, the impact on selling prices remains limited. This could be due to buyers' little knowledge and awareness of energy efficiency and real estate appraisal practices that primarily focus on assessing comparable properties, often overlooking the added value of better designs and energy efficiency (Dunsky Energy + Climate Advisors 2023). Insufficient information regarding higher efficiency equipment and building envelope details within the MLS system may contribute to information asymmetry (Adams 2012). This discrepancy could help explain why energy efficiency benefits are occasionally not reflected in prices.

Also, project developers emphasized the low interest from buyers for energy performance or the buildings*: "*For the last 300 condo units sold, we didn't get a single question about energy consumption*"* (Dunsky Energy + Climate Advisors 2023). Buyers and occupants of buildings often lack awareness of the energy benefits and are unfamiliar with the usage of installed energy-efficient technologies.

Interviews revealed that industry culture contributes to barriers. The conservative nature of the new construction industry has seen minimal change over the decades. As mentioned by developers, "Real estate is the second least innovative industry after hunting and fishing. Today, we still operate as we did 20 years ago" (Dunsky Energy + Climate Advisors 2023). Market actors highlighted that building more energy-efficient buildings without increasing costs was possible, but it would require changing current practices and the industry's culture.

Unlocking Demand-Side Management Potential in New Construction

Transforming the Market Through Building Codes

In 2021, Québec adopted the National Energy Code of Canada for Buildings 2015 (NECB 2015) to its provincial construction code, which includes over 90 changes improving the energy performance of buildings compared to the previous version of the code (National Research Council of Canada 2021). While this was a beneficial change, much more could be done. In 2022, Canada's National Research Council published the latest version of the National Building Codes for new buildings, which includes five energy performance tiers, with the highest tier consistent with a net-zero-ready construction (National Research Council of Canada 2022). These energy tiers provide a framework for achieving higher levels of energy efficiency and a pathway to make all new buildings consistent with climate policies. This new code, with its tiers, would allow municipalities to choose the tier (potentially higher than the minimum) that meets their community needs and capacity. Also, the significance of tiered codes lies in their ability to establish a transparent and foreseeable trajectory towards a final standard. This, in turn,

offers both the time and guidance necessary to develop market capacity in the forthcoming years (Efficiency Canada 2023).

While it declared that municipalities could adopt energy performance tiers above its provincial code, Québec has not adopted the National Building Codes 2020 yet. A crucial strategy for Québec to enhance savings involves adopting the latest tiered building code, with potential support from Hydro-Québec. Specifically, Hydro-Québec could initiate efforts to advocate before its regulator to invest ratepayers' money to advance the development of building codes and standards and secure a share of the resulting savings. Utility codes and standards programs in the United States have proven highly effective in generating significant energy savings while remaining cost-efficient. (Lee, et al. 2008).

Adapting and Enhancing the User Experience

The new construction industry is characterized by some distinct features, such as the fast-evolving pace of the project, the conservative culture in the industry, and the limited number of developers that undertake most of the large construction projects. Given the fast-evolving pace of the projects, energy-related decisions are made early in the process. Thus, developers benefit from awareness of energy efficiency during the development phase. This means that deploying proactive outreach efforts, such as identifying projects early through the development process and developing strong relationships and communication channels with developers, are critical to influencing the project's energy decisions, as emphasized by (Obert and Dedolph 2006). This can be achieved by collaborating closely with the new construction project team and regularly following up to inquire about upcoming projects. Additionally, dedicated account manager and staff positions should be established for large developers. This team would act as a single point of contact for the project team, ensuring streamlined communication and comprehensive support throughout projects. This would help the energy efficiency team establish a strong relationship with the clients, better understand their needs, and intervene early to influence energy decisions positively.

Additionally, adapting sales language to emphasize financial elements and tailor arguments to fit developers' business models is likely to improve the understanding and perception of developers regarding energy efficiency. Specific tools to demonstrate the financial benefits of efficiency and develop case studies illustrating successful projects to facilitate decision-making will help change conservative practices in the industry. To enhance its support for new construction projects, adapting its sales strategies and support to streamline the user experience and unlock more energy efficiency projects in the sector. Given the limited number of large players in the industry, these efforts must focus on key players that can have an important role in influencing the market.

Incentivize Performance

While financial incentives hold significance, their effectiveness hinges on proper administration and timing. Simply increasing financial support will not yield the desired outcomes, particularly for developers working under tight timelines and shared incentives.

Energy efficiency programs, especially custom programs, often calculate incentives based on equipment specifications and energy studies. Hydro-Québec's DSM portfolio comprises

many programs, including the Efficient Solutions Program (OSE) for commercial, institutional, and industrial customers. OSE is an "umbrella" program that offers customized solutions, custom incentives, prescriptive incentives, and technical support (Hydro-Québec 2024a). This program works with a calculator tool where participants enter their project information and the energy efficiency measures selected and can quickly estimate financial incentives. However, this type of program is associated with two limitations for real estate developers. First, estimating future subsidies at the pre-design stage is difficult in most cases when future equipment is not yet well known. Also, when they can estimate incentives after receiving plans and technical specifications for the project, changing strategies to select more efficient equipment creates additional costs for developers (Dunsky Energy + Climate Advisors 2023). Thus, once construction begins, only prescriptive measures are included in the project, resulting in missed opportunities (Obert and Dedolph 2006). Secondly, while the program estimates available incentives, participants do not receive confirmation. Consequently, developers encounter challenges in incorporating these incentives into their business plans without confirmation. To unlock greater energy efficiency in new constructions, developers should have greater visibility on incentives early in the process and confirmation of available amounts. This would significantly aid in building the business case for energy efficiency.

Another important potential lever that could be used to incentivize energy efficiency is grid connection lead times. Indeed, long lead time costs a lot of money to developers (Michaels and Ornstein 1992). In Québec, obtaining confirmation on available electricity capacity for a project can take several months. For developers, lengthy connection lead times translate to increased costs due to project delays, higher financing expenses, and elevated material costs. Utilities such as Hydro-Québec, facing constraints during peak demand periods, could leverage this situation to their advantage by prioritizing grid connections for more energy-efficient projects. These projects could reduce capacity requirements by incorporating demand response equipment during construction. While this may initially raise equipment costs for developers, the resultant reduction in connection lead times could offset other expenses, potentially balancing the premium associated with energy efficiency measures. This approach presents a mutually beneficial scenario for both developers and utilities. Developers would experience reduced lead times, facilitating quicker project completion while aiding Hydro-Québec in mitigating peak demand impacts.

Financing

Developers are looking for immediate savings and must constantly manage their cash flow. Interviewed actors have identified a financing mechanism that reduces the incremental costs associated with energy efficiency and demand response as a top priority, potentially outweighing incentives in importance. Moreover, when repayment is tied to the bill or building instead of the owner, financing can address some of the challenges related to shared incentives, an important barrier in new construction projects.

Several opportunities exist to support financing. Hydro-Québec could develop an on-bill financing program to attenuate the split incentives issue by assigning the investment to the utility meter. However, given the challenges often associated with on-bill financing, such as administrative burden, low participation, and high development costs, Hydro-Québec could explore supporting other third-party options like green construction loans (Bell, Nadel and Hayes

2011) (The Atmospheric Fund 2024). Also, it could support private financing solutions that tie conditions to energy efficiency or decarbonization performance, such as energy savings performance contracts and energy-as-a-service models. For example, incentivizing and supporting customers to engage in energy-as-a-service contractual agreements to reduce upfront costs for energy efficiency could be considered (ACEEE 2019).

Conclusion

As a winter-peaking jurisdiction, Québec will be facing particularly important peak demand pressures from electrification and decarbonization. Exploiting cost-effective demand-side solutions will be crucial to manage peak demand and offer the opportunity to achieve savings from day one.

Despite existing buildings dominating the stock, new constructions present significant peak savings opportunities, necessitating attention. This paper has emphasized the importance of focusing on new construction, as they will constitute a significant portion of the building stock, estimated at 12% by 2030 and 31% by 2050. Despite their better design and energy performance, new constructions still offer considerable potential for DSM, particularly in energy efficiency, as indicated by our findings.

Indeed, our results showed that energy efficiency could generate higher peak reductions in Québec’s cold climate than demand-response measures mostly from improving building envelope and geothermal. However, many important barriers exist to adopting demand-side solutions in new construction. The project's timeline, the developers' business models, the lack of the full value of energy efficiency recognition during building transactions, and the conservative culture in the industry hinder demand-side measures installation in new construction.

Unlocking the DSM potential in new construction requires advocating for enhanced codes and standards and integrating best practices. Improving customer experience through early support, transparent and more important incentives during the development phase, and developing relationships with the industry is crucial for fostering energy efficiency adoption. Hydro-Québec could further enhance incentives by expediating grid connections for high-energy performance new projects to cut costs associated with connection lead time. Direct financing or third-party green financing for energy-efficient construction projects could be supported.

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