

Map the System 2023

# Places We Live: Saving Up Valuable Energy

Julien Otis-Laperrière  
Louise Foglia



**Decarbonization**

**Impacts of development**

**Living conditions**

# 1. Decarbonization

## In Canada

- Net Zero by 2050
- Clean energy
- High energy inefficiency of the building stock

Efficiency Canada:  
if Quebec retrofits its entire  
building stock, 10 Million EVs  
could be put on the road

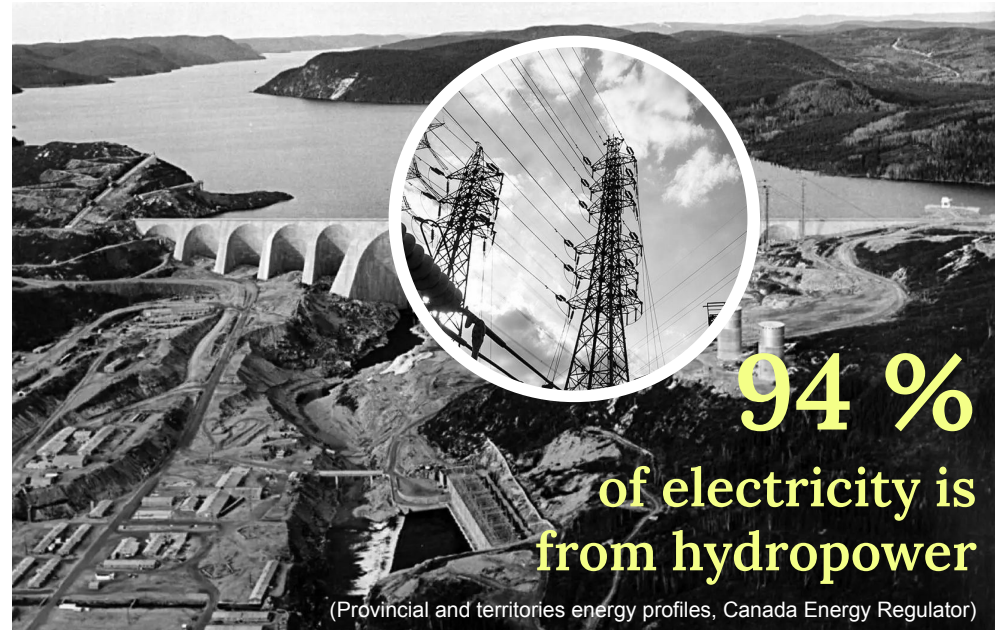


(Planet Decarb; © iStock/iStock/FG Trade)

# 1. Decarbonization

## In Quebec

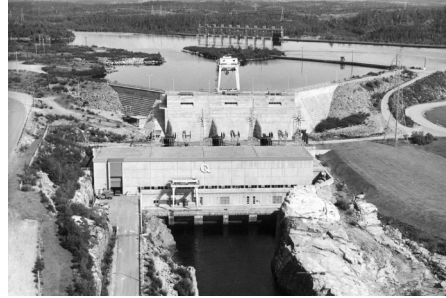
- Myth of abundance
- Winter peak
- Growing demand
- Decarbonization
- Export of clean energy



## 2. Impacts of development

# Local ecosystems and communities

- Disruption of livelihoods
- Settler-colonial development patterns
- Capacity we should not build



(Toronto Star, 2015; Levesque, 2015; Mongabay)

An aerial photograph of a city, likely Montreal, showing a river and surrounding urban areas. A circular inset in the upper right quadrant provides a closer view of a dense urban neighborhood with many buildings.

**35 %**

more energy to heat  
homes in Montreal  
than Finnish  
households

(Official Statistics of Finland, 2020;  
Vanio et al., 2015)

**80 %**  
of dwellings in 2050  
already exist

(Haley & Torrie, 2021)

(NASA, 2007; BANQ, 1949)

## 3. Living conditions

# Montreal's rental market

**4** Million  
people live in  
GMA



**60%**  
renters

(Profil des ménages et des logements,  
Agglomération de Montréal)

**45** years  
average age of  
Montreal buildings



**3/4**

of renters live in  
homes built before  
1980

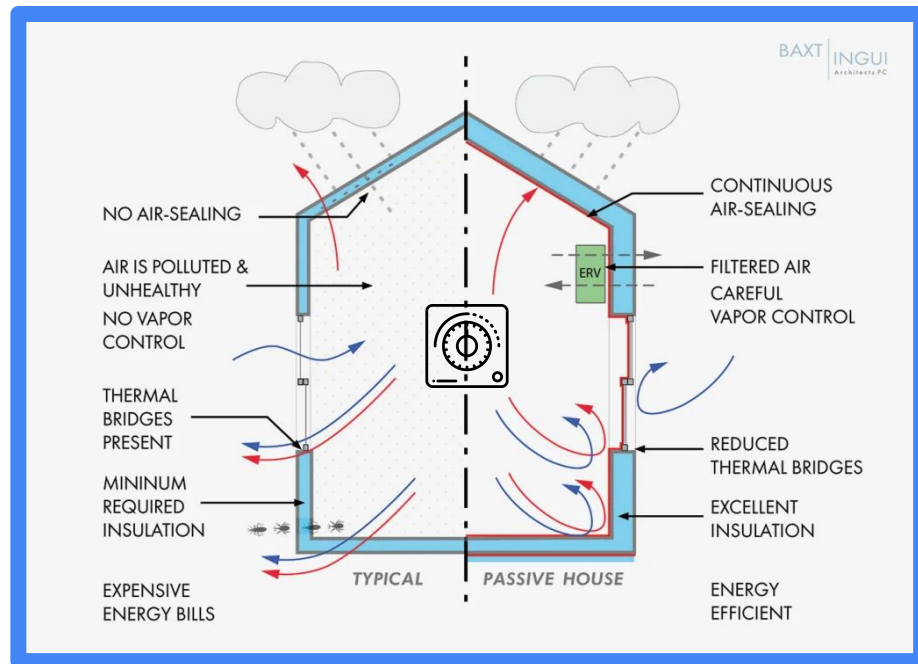
(2016, 2021 Census, Statistics Canada)



(Pointes-à-Callières; Sutton; Proprio)

# Three components of energy consumption

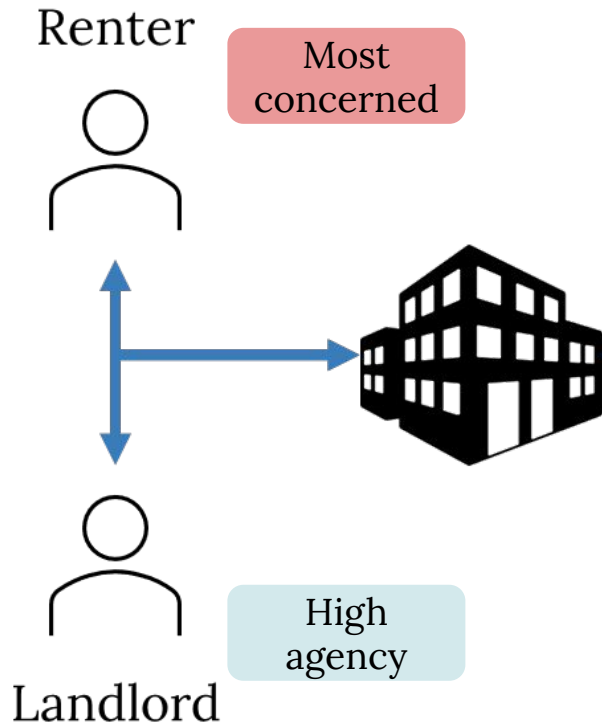
1. Passive systems
2. Active systems
3. Behaviours  
*e.g. to manage stale air in winter*



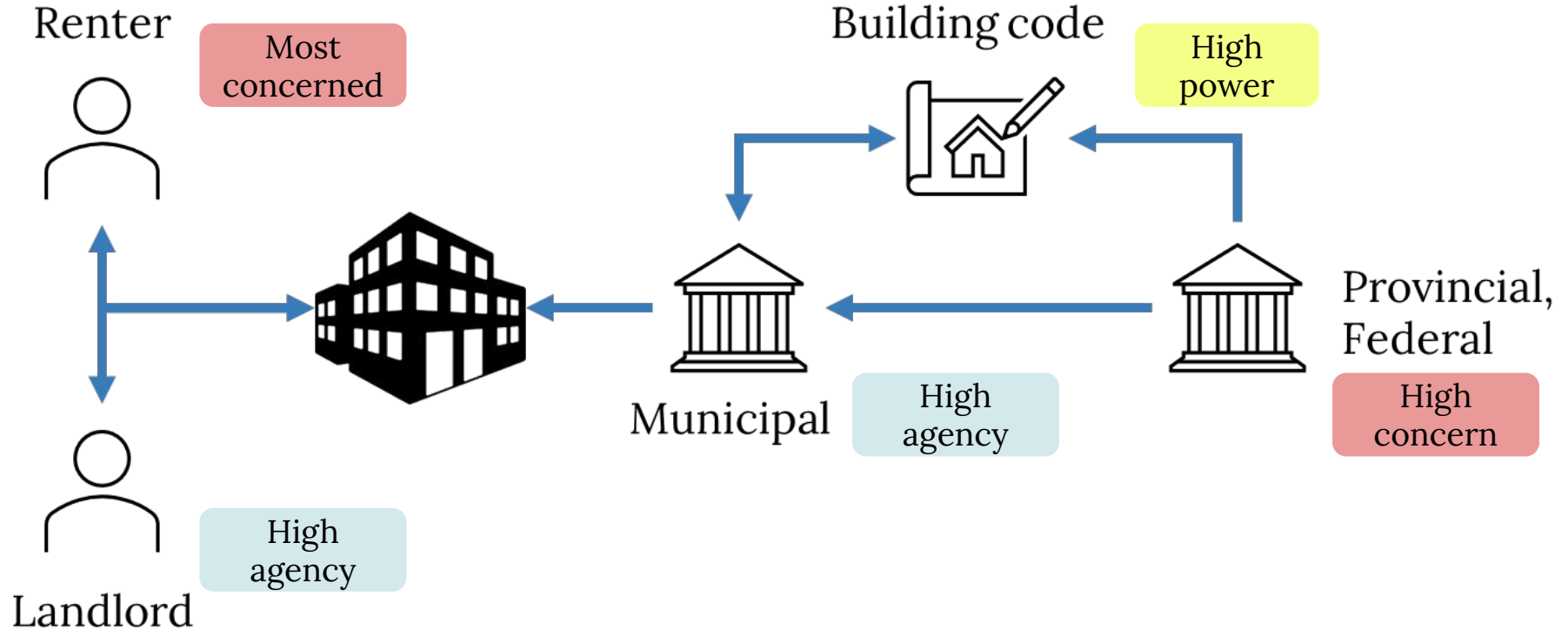
(Anna Bahney, CNN Business 2019)



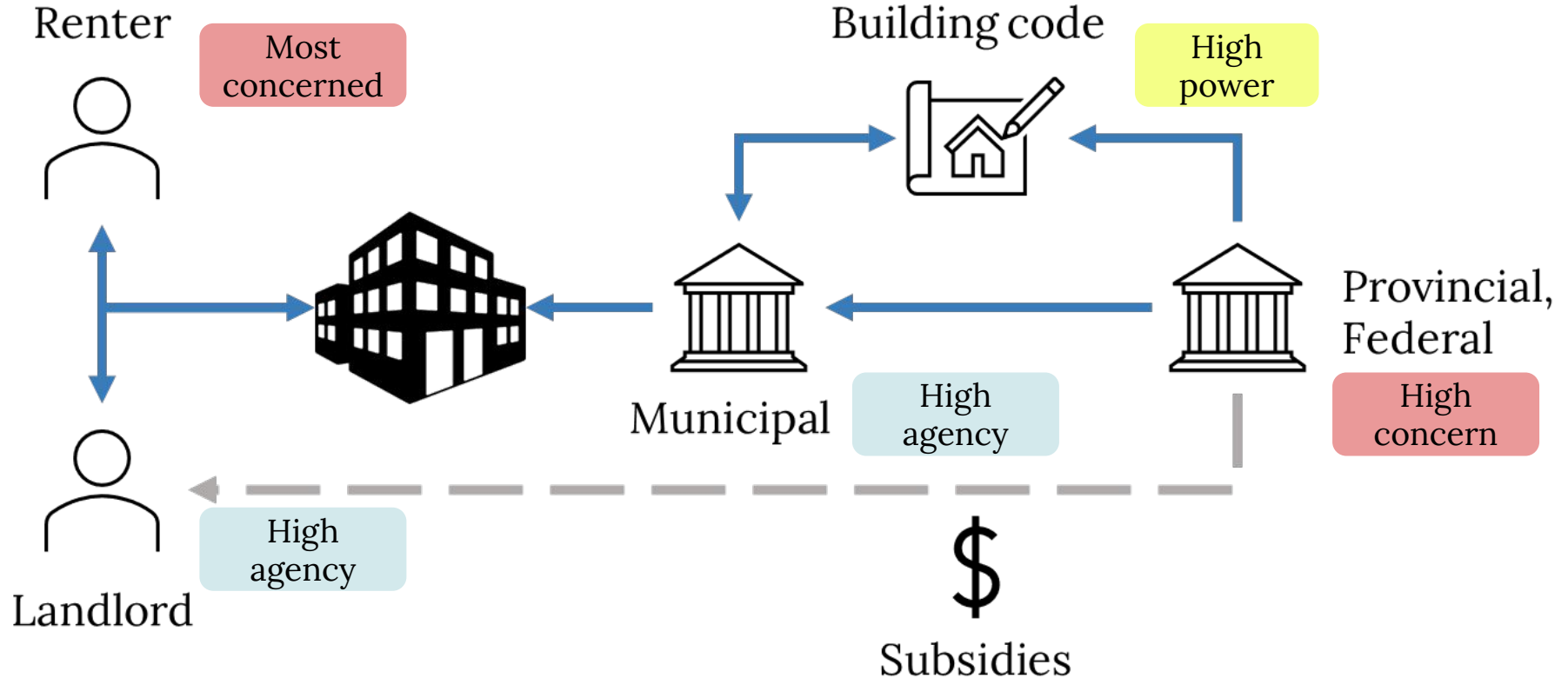
# The frontline: renters and landlords



# The referees: governments



# The referees: governments



# Govts try subsidies, labels and ads

- Subsidies target new and existing buildings
- Labels track energy consumption, such as Canada's EnerGuide
- Ad campaigns from Hydro-Quebec & others

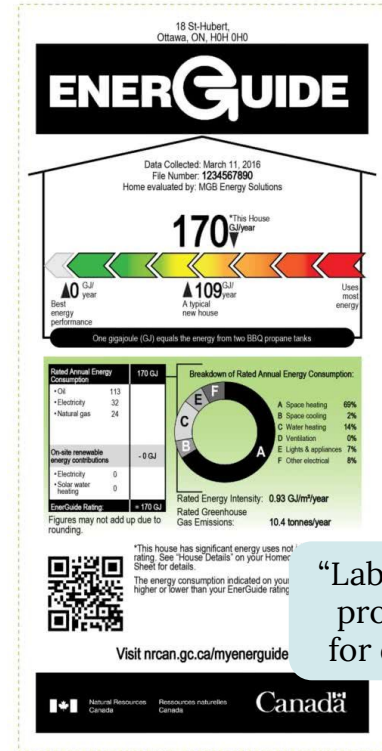


**NOVO  
CLIMAT**

**Hydro Québec**

**BE ENERGY-WISE**  
Discover the Energy Performance Indicator, a brand new tool that will help you track your energy consumption. This easy-to-use tool with tons of features will allow you to understand your household's consumption habits, how that impacts your energy bill and how you compare to similar homes.

Energy indicator  
My consumption profile  
Analysis of promising period  
26%



"Labels as proxies for data"

# Effectiveness is limited by five gaps

1 **Fragmented programs**



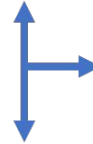
2 **Building code relevance**



1987 → 2015,  
in effect in 2021

3 **Misaligned incentives**

Renter



Owner



# Effectiveness is limited by five gaps

1 Fragmented programs



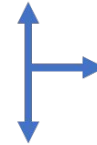
2 Building code relevance



1987 → 2015,  
in effect in 2021

3 Misaligned incentives

Renter



Owner



4 Construction industry readiness



5 Limited data

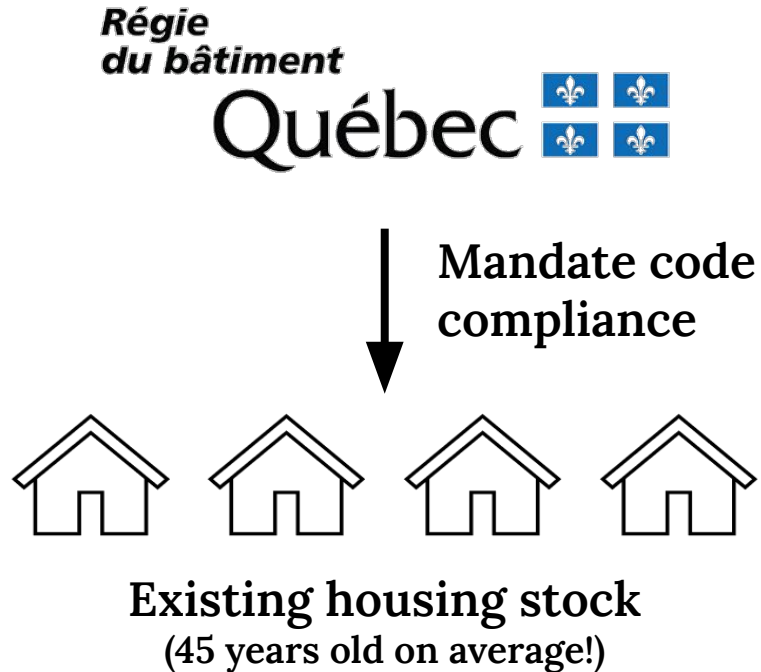
# Proposed intervention: mandating retrofits

## 1. What?

The Regulator (Régie) mandates current code compliance for existing buildings

## 2. Why?

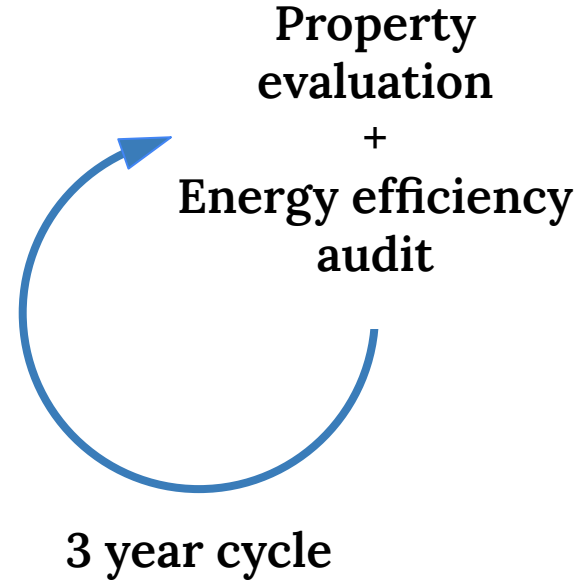
- Constraining codes work elsewhere;
- New rule needed due to low electricity price in QC.



# Proposed intervention: mandating retrofits

## 3. How?

Municipalities can audit as they do property evaluations





# Proposed intervention: mandating retrofits

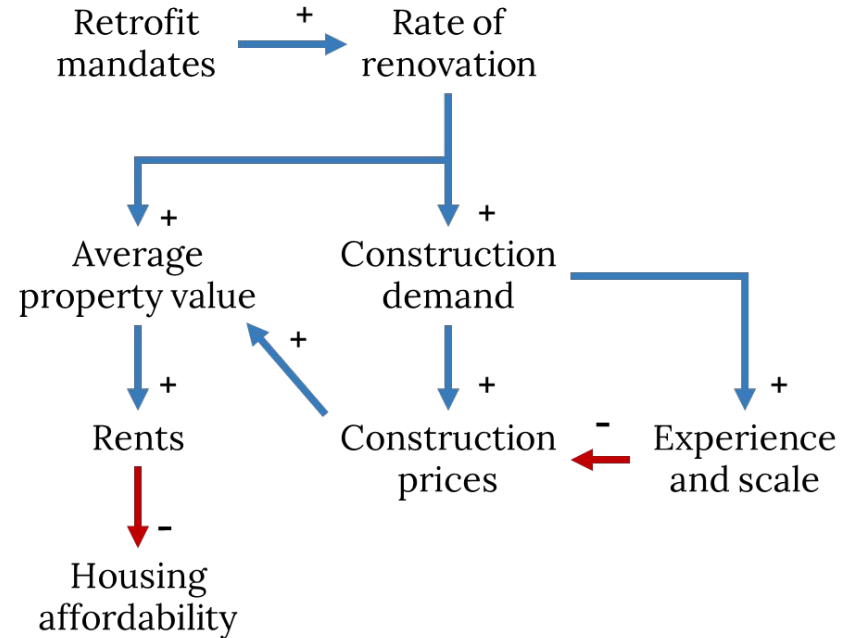
## 3. How?

Municipalities can audit as they do property evaluations

## 4. Limitations?

- Effects on rents
- Supply chain constraints
- Timing

→ Portfolio of solutions needed



## Efficiency Canada:

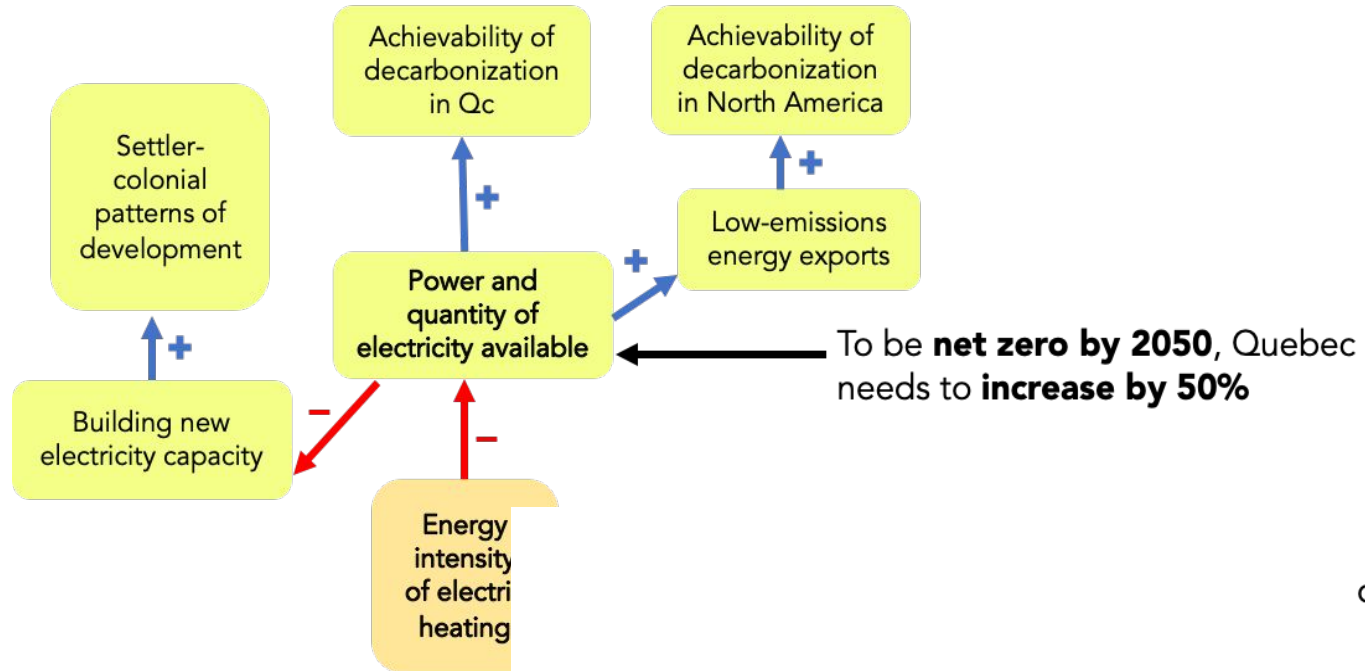
“There is no pathway for Canada to achieve its greenhouse gas emission targets that does not include deep and widespread energy efficiency improvements to the residential and commercial building stock.”

(Haley & Torrie, 2021)



[View the system](#)

# Macro-problem

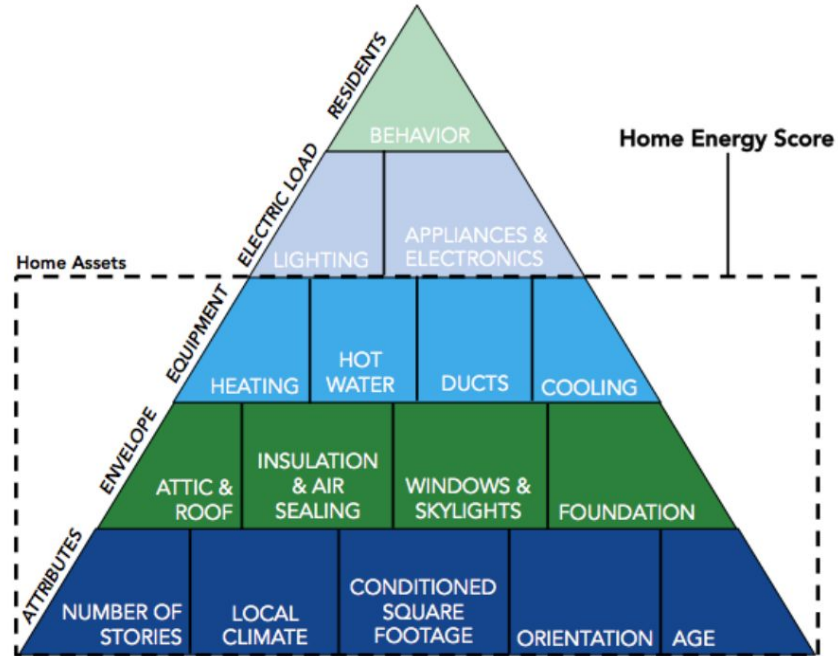


# Households by tenure and building age



# Details on home energy use

Figure 3. Home Energy Use Pyramid



(U.S. Department of Energy, 2021)

# Proposed intervention: mandating retrofits

## Increasing rate of renovation by:

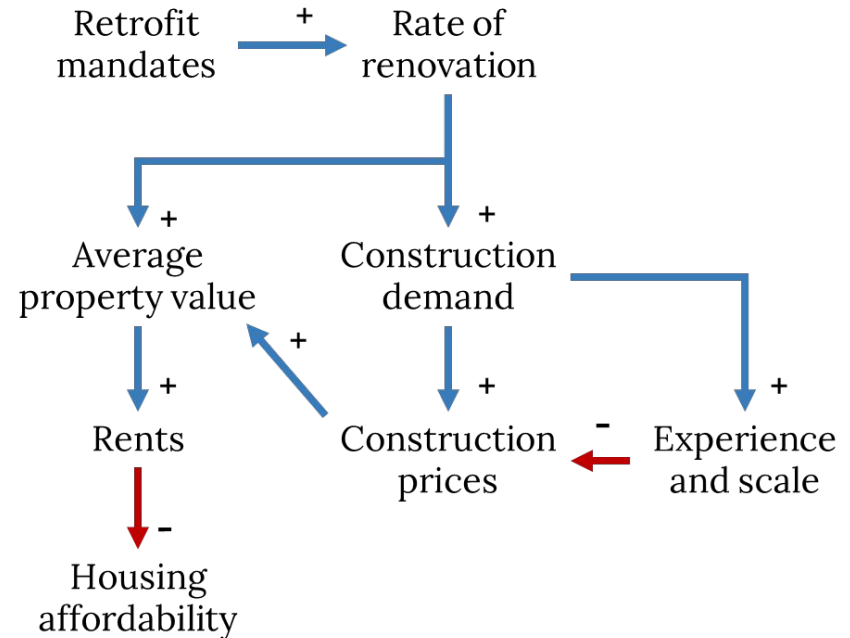
### 1. Reducing costs

- Streamline subsidies to increase access
- Pressure banks to provide green loans

### 2. Increasing knowledge

- Comprehensive reports after evaluations
- Familiarizing landlords

“82% Quebecers feel it is important to reduce energy consumption in their homes, 66% say they don't know much about green building and renovation.” (Léger, 2021)



# Retrofits on the ground



## A. Duplex

Retrofits: **YES**

- Knowledgeable
- Skilled
- Eco concerns
- Money saved up
- Rénoclimat
- EnerGuide audit
- Renovations costs = \$40K
- Subsidies = up to \$2.5K
- 2 heat pumps = \$5K
- Subsidies = up to \$700

Rénoclimat: "Your cheque for Rénoclimat financial assistance will be mailed to you generally 10 to 12 weeks after the post-work evaluation of your home."

(Rénoclimat, Government of Quebec)

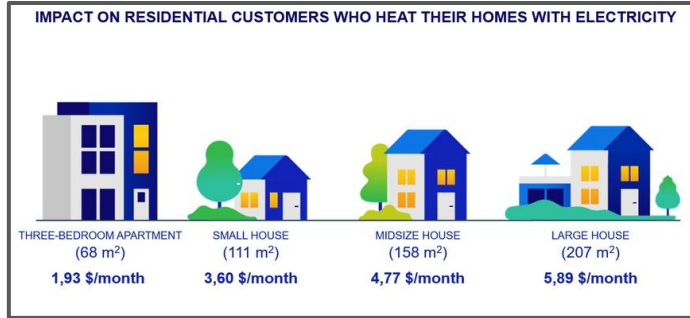
## B. Fiveplex

Retrofits: **NO**

- Uninformed
- Inexperienced
- Renters complain
- More dwellings
- Tight budget
- Unclear programs
- No incentives due to cheap electricity bills



# Electricity Rates



(Hydro-Québec, 2021)

**Heritage pool:** Block of energy with low rate for Quebecers.

**Rate D:** Low price for the first 40 kWh (6.509¢ /kWh).



## Average energy bills in North America

(Hydro-Québec, 2022)

## REFERENCES (order of appearance)

Planet Decarb [picture]. <https://planetdecarb.com/about/>

iStock/iStock/FG Trade [picture]. <https://www.innovationnewsnetwork.com/are-electric-cars-tackling-climate-change/26749/>

Archives Le Devoir. Manic 5 [picture]. Le Devoir. <https://www.ledevoir.com/environnement/759751/hydroelectricite-bras-de-fer-federal-provincial-en-vue-quant-aux-barrages>

Levesque, F. (2015). Les Innus bloquent toujours La Romaine [picture]. Le Nord-Cotier. <https://lenord-cotier.com/2015/07/15/les-innus-bloquent-toujours-la-romaine/>

n.d. Cree Nations on the Quebec side of James Bay are thriving thanks to a landmark deal signed over 40 years ago [picture]. The Toronto Star. <https://www.thestar.com/news/canada/2016/05/02/cree-nation-on-quebec-side-of-james-bay-thriving-while-first-nations-on-ontario-side-linguish.html>

n.d. [picture]. Mongabay. <https://news.mongabay.com/2019/02/financiers-to-discuss-hydropower-as-climate-change-mitigation-but-dams-are-not-clean-energy-commentary/>

Canada Energy Regulator. (2023). Energy profiles of provinces and territories. Canada Energy Regulator. <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-quebec.html>

Statistics Finland. (2021). Appendix table 1. Energy consumption in households 2012-2020, GWh. Statistics Finland. [http://www.stat.fi/til/asen/2020/asen\\_2020\\_2021-12-16\\_tau\\_001\\_en.html](http://www.stat.fi/til/asen/2020/asen_2020_2021-12-16_tau_001_en.html)

Vainio et al. (2015). High-efficiency CHP, district heating and district cooling in Finland. [https://energy.ec.europa.eu/system/files/2016-03/Art%252014%2520report%2520ENFinland\\_0.pdf](https://energy.ec.europa.eu/system/files/2016-03/Art%252014%2520report%2520ENFinland_0.pdf)

n.d. (1949). Vue satellite Montréal 1949 [picture]. Banque des archives nationales, Montréal. [https://histograd.com/old\\_map.php?map=98&lang=en](https://histograd.com/old_map.php?map=98&lang=en)

NASA (2007). ISS014-E-15408 [picture]. The Gateway to Astronaut Photography of Earth. <https://eol.jsc.nasa.gov/SearchPhotos/photo.pl?mission=ISS014&roll=E&frame=15408>

Sutton. Propriété à revenus [picture]. Sutton. <https://www.suttonquebec.com/fr/inscription/propriete-a-revenus-a-vendre-11501-boul-langelier-montreal-montreal-nord-.html?noInscription=9449822&typeInscription=1>

Du Proprio. Vue avant, Devant du bâtiment [picture]. Du Proprio. <https://duproprio.com/fr/montreal/montreal-nord/multiplex-a-vendre/hab-11978-avenue-matte-850307#description>

Statistics Canada (2021). Census 2016. Statistics Canada. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/dt-td/Lp-eng.cfm?LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=0&GK=0&GRP=1&PID=0&PRID=10&PTYPE=109445&S=0&SHOWALL=0&SUB=0&Temporal=2017&THEME=121&VID=0&VNAMEE=&VNAMEF=>

Baxt Ingui Architects. Passive house [figure]. CNN Business. <https://www.cnn.com/2019/06/18/success/passive-house/index.html>

Transition Énergétique. NovoClimat [screenshot]. Gouvernement du Québec. <https://transitionenergetique.gouv.qc.ca/residentiel/programmes/novoclimat>

Natural Resources Canada. EnerGuide [screenshot]. <https://natural-resources.canada.ca/energy-efficiency/energuide/12523>

US Department of Energy. (2021). Figure 3. Home Energy Use Pyramid [figure]. Home Energy Score Scoring Methodology, US Department of Energy. [https://betterbuildingsolutioncenter.energy.gov/sites/default/files/attachments/Home\\_Energy\\_Score\\_Methodology\\_Paper.pdf](https://betterbuildingsolutioncenter.energy.gov/sites/default/files/attachments/Home_Energy_Score_Methodology_Paper.pdf)

Léger (2021). Transition énergétique – Sondage auprès des Québécois (es). Gouvernement of Quebec. [/https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/plan-directeur/MERN-Mise-niveau-2026-plan-directeur-transition-energetique.pdf](https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/plan-directeur/MERN-Mise-niveau-2026-plan-directeur-transition-energetique.pdf)

Hydro-Québec (2021). Rates in north america [graphic]. Hydro-Québec. <https://www.hydroquebec.com/residential/customer-space/rates/comparison-electricity-prices.html>