



ONTARIO REAL ESTATE ASSOCIATION

ACCELERATING ONTARIO'S GREEN FUTURE

NEW
APPROACHES
TO HOUSING
AND CLIMATE
CHANGE



** Artist's rendering for illustration purposes*

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EXECUTIVE SUMMARY



If Ontario is to meet its international commitments to reduce emissions, the province must address emissions in the residential building space. Doing so, however, means reducing Ontario's reliance on natural gas, a source of energy that is cost effective, efficient, and highly popular. In addition, reducing emissions without addressing climate adaptation overlooks the catastrophic impact climate change is having on people in Ontario today. Therefore, a unique and careful set of policy solutions are needed for Ontario's political, economic, and environmental circumstances. The 2030 emissions reduction targets are closer than they appear, and a provincial election, rising home prices, and economic recovery from the COVID-19 pandemic are imminent. Given this context, it may be easy to lose sight of the necessary actions required to address climate change in Ontario."

— Stacey Evoy, OREA President

This paper outlines a set of policy options that will help catalyze Ontario's efforts to mitigate climate change impacts broadly, and on homeowners and the housing sector:

1. Create a New Green Home Renovation Tax Credit
2. Energy Audit One Million Ontario Homes by 2035
3. Strengthen Ontario's Building Code for Energy Efficiency
4. Introduce On-Bill Financing for Building Envelope Improvements
5. Support Renewable Natural Gas R&D and Expansion
6. Leverage the Ontario Carbon Trust
7. Supporting Electric Vehicle Infrastructure in Homes
8. New Flood Mapping for Protection of Ontario Homes

The recommendations presented in this paper are beneficial for the environment and are aligned with Ontarians' and Canadians' desire to take climate action and protect the value of their most important asset: their home.

INTRODUCTION

ONTARIO'S GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE CONTEXT

Provincial and National Greenhouse Gas Emissions and Targets

Ontario has committed to meeting its Paris Agreement targets to reduce its greenhouse gas (GHG) emissions by 30% below 2005 levels by 2030—a reduction from 210.6 Megatons (Mt) to 147 Mt.¹ In 2018, Ontario produced 165 Mt in emissions and the province appears on its way to hitting its 2030 target by reducing GHG emissions by an additional 18 Mt in the next eight years.²

That said, there are two important factors to consider when evaluating Ontario's provincial GHG emissions profile. First, when Ontario first

embarked on serious efforts to reduce emissions it took the most meaningful step to date: closing coal-fired power generation plants. In 2005, the electricity grid was responsible for 32.9 Mt of emissions. By 2016, that number had been reduced to just 3.7 Mt, in large part due to the closure of the coal plants.³ As shown in Figure 1, Ontario's progress on emissions reductions to date has been steady. However, without another 'coal-like' policy change, continuing on the path of declining emissions is difficult to fathom. Instead, the government will need to target its highest emitting sectors, instead of solely focusing on electricity generation.

ONTARIO GHG EMISSIONS TRENDS 1990-2018

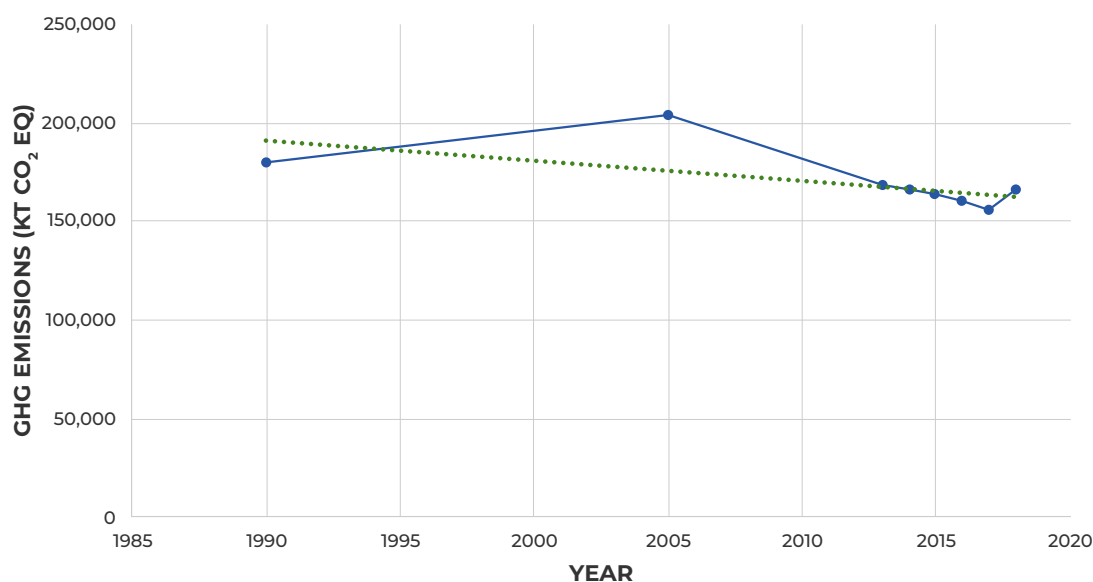


Figure 1 – ECCC, National Inventory Report 1990-2018, Table A11-12

1 Environment and Energy, "Climate Change", Government of Ontario, July 7, 2021, <https://www.ontario.ca/page/climate-change>

2 Environment and Climate Change Canada, "National Inventory Report 1990-2018: Greenhouse Gas Sources and Sinks in Canada", Government of Canada, Table A12-7, https://publications.gc.ca/collections/collection_2020/eccc/En81-4-2018-3-eng.pdf

3 Environment and Energy, "The End of Coal", Government of Ontario, July 7, 2021, <https://www.ontario.ca/page/end-coal#section-5>

Second, the federal government has recently set new targets for the country to reduce Canadian GHG emissions by 40 to 45% below 2005 levels by 2030 instead of the previous 30% target.⁴ Though it is unclear if the Ontario government will endorse this target, it is certain that further action against climate change will be pushed by both the federal government and its international counterparts. To reduce the province's emissions, Ontario will need to target the largest emitting sectors which, in 2018, were transportation (57.4 Mt); buildings (40 Mt); and heavy industry (29.5 Mt) (see Figure 2).⁵

The 40 Mt of emissions from Ontario's building sector constitutes approximately 24% of the province's total emissions.⁶ The building sector emissions are comprised of two sections: residential and commercial buildings. The residential building sector in Ontario alone produced 22.4 Mt of emissions in 2018 and represented 13.5% of Ontario's total emissions.⁷ From a national perspective, Ontario's residential sector emits more than any other province. Of course, Ontario has far more residents than any other province. However, when comparing its residential emissions profile to Quebec, which comprises just over half of Ontario's population, Ontario's residential emissions per capita is much higher (Figure 3).

Without action to address emissions in Ontario's residential building space, it will be difficult for Ontario to meet its existing targets and even harder to meet its future targets. The Ontario Real Estate Association (OREA) commissioned this paper from the StrategyCorp Institute of Public Policy and Economy to help propose constructive policy solutions to address emissions in the residential sector and the climate change impacts those emissions are creating.

Every industry in Ontario must work together to solve the collective climate crisis that we face.

2018 ONTARIO EMISSIONS PROFILE BY ECONOMIC SECTOR

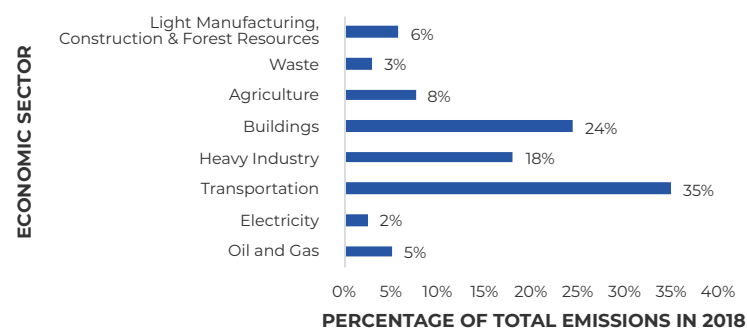


Figure 2 – ECCC, National Inventory Report 1990-2018, Table A12-7

However, when comparing its residential emissions profile to Quebec, which comprises just over half of Ontario's population, Ontario's residential emissions per capita is much higher

RESIDENTIAL BUILDING EMISSIONS BY PROVINCE IN 2018

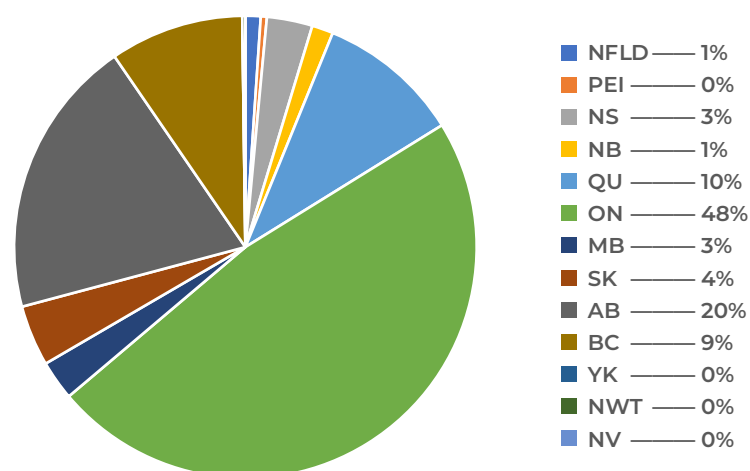


Figure 3 – ECCC, National Inventory Report 1990-2018, Tables A12-2 - 15

4 Tasker, John Paul. Wherry, Aaron, "Trudeau pledges to slash greenhouse gas emissions by at least 40% by 2030, <https://www.cbc.ca/news/politics/trudeau-climate-emissions-40-per-cent-1.5997613>

5 ECCC, "National Inventory Report 1990-2018", Table A12-7

6 ECCC, "National Inventory Report 1990-2018", Table A12-7

7 ECCC, "National Inventory Report 1990-2018", Table A12-7

Ontario's Reliance on Natural Gas

Reducing Ontario's residential emissions profile necessitates a decreased reliance on natural gas to heat household spaces and water. Ontario is a leader in operating a very low-carbon intensity electricity grid. The average Ontario household uses about 9,000 kilowatt hours (kWh) of electricity annually, which creates about 0.36 tonnes of CO₂ emission per year per household, or 0.14 tonnes per person.⁸ In other words, the impact of the electricity grid on Ontario's emissions is incredibly small, considering that 96% of electricity in Ontario was produced from zero-carbon emitting sources in 2018.⁹

Individual actions such as switching to energy-efficient lighting and conserving electrically heated water may help reduce the need for natural gas power plants during peak usage times, which create emissions; however, they are unlikely to produce significant GHG reductions in Ontario due to the province's already efficient electricity grid. Although natural gas is the lesser evil in terms of emissions production, compared with other fossil fuels, it still generates approximately 30 Mt of GHG emissions from Ontario buildings annually—which is about 76% of the sector's total emissions.¹⁰ However, Ontario's residential sector consumes the largest amount of natural gas of any province in Canada because it is the primary source of home heating, with roughly 75% of all Ontario homes using natural gas to heat their homes.

It would be nearly impossible to reduce Ontario's residential emissions profile without reducing Ontarians' reliance on natural gas. Other jurisdictions are facing a similar predicament

Politically, Ontario will have to look at ways to reduce household reliance on natural gas without removing homeowner access to this convenient, already installed, and cost-effective source of heating.

in their attempts to reduce GHG emissions. The United Kingdom, for example, will phase out fossil fuel-based heating in new homes by 2025.¹¹ In a jurisdiction with a low-carbon electricity system such as Ontario, electrifying home heating would nearly eliminate residential emissions but it would also result in increased electricity bills for homeowners, which would be extremely unpopular in a province that has long grappled with skyrocketing hydro rates compared with its neighbours.¹²

In fact, when previous provincial administrations openly mused about banning natural gas in Ontario, the backlash was so fierce that the rumours of a natural gas ban were denounced almost instantly, and natural gas expansion plans proceeded instead. Politically, Ontario will have to look at ways to reduce household reliance on natural gas without removing homeowner access to this convenient, already installed, and cost-effective source of heating.

8 Environmental Commissioner of Ontario, "Climate Pollution: Reducing My Footprint", March 2019, Page 18 https://www.auditor.on.ca/en/content/reporttopics/envreports/env19/2019_ClimatePollution_ReducingMyFootprint.pdf

9 Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Ontario", Government of Canada, July 7, 2021, <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-ontario.html>

10 Office of the Auditor General of Ontario, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", November 2020, Page 1 https://www.auditor.on.ca/en/content/annualreports/arreports/en20/ENV_reducinggreenhousegasemissions_en20.pdf

11 Harrabin, Roger, "Gas heating ban for new homes from 2025", BBC News, March 13, 2019, <https://www.bbc.com/news/science-environment-47559920>

12 Chung, Emily, "Goodbye, gas furnaces? Why electrification is the future of home heating", CBC News, January 20, 2020, <https://www.cbc.ca/news/science/greener-heating-1.5429709>



CLIMATE CHANGE ADAPTATION

Reducing GHG emissions is critical to curbing the negative impacts of climate change and ensuring that the effects are not further compounded by inaction. The impacts of climate change are already present in Canada, and around the world. For example, British Columbia witnessed its most severe heat wave in 2021 where a “heat dome” drove temperatures to reach record highs in the mid to high 40 degrees Celcius from late June to early July, resulting in the death of more than 500 people.¹³ Additionally, 2021 was the third worst year for wildfires in British Columbia, resulting in more than 1,600 fires that burned nearly 8,700 square kilometres of land.¹⁴ The tangible impacts of climate change are not limited to Canadas’ western provinces. On the whole, southern Ontario, and Quebec are experiencing warming at twice the rate of the rest of the world.¹⁵ The type of impacts that climate change is yielding, and the rate at which they are impacting Canadians, and Ontarians, means that in addition to actions focused on reducing emissions, the Ontario government will need to consider improving the climate change resiliency of Ontario homes to safeguard them from drastic temperature changes that are already being felt, and which will likely become more prevalent in the future.

This trend has already begun to occur: with annual catastrophic insurance payouts in Canada averaged approximately \$400 million until 2008 but are now approaching \$2 billion each year.¹⁶ With higher insurance payouts inevitably comes rising premiums, making it more costly to own a home in an already expensive market.

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- 13 Rhianna Schmunk, “595 People were Killed by Heat in B.C. this summer, new figures from coroner show”, CBC News, November 1, 2021. <https://www.cbc.ca/news/canada/british-columbia/bc-heat-dome-sudden-deaths-revised-2021-1.6232758#:~:text=The%20majority%20of%20those%20deaths,nearly%2010%20people%20every%20hour>.
- 14 Akshay Kulkarni, “A Look Back at the 2021 B.C. wildfire season”, CBC News, October 4, 2021. <https://www.cbc.ca/news/canada/british-columbia/bc-wildfires-2021-timeline-1.6197751>
- 15 Francois Brissette and Annie Poulin, “What Climate Change means for Southern Ontario and Quebec”, The Conversation. September 7, 2021. <https://theconversation.com/what-climate-change-means-for-southern-ontario-and-quebec-166920#:~:text=On%20the%20whole%2C%20southern%20Ontario,progressive%20loss%20of%20snow%20cover>.
- 16 Radwanski, Adam, “How Ottawa’s program for retrofitting homes showed what’s missing from Canadian climate policy”, The Globe and Mail, April 8, 2021, https://www.theglobeandmail.com/business/commentary/article-how-ottawas-plans-for-retrofitting-homes-showed-whats-been-missing/?cmpid=rss&utm_source=dlvr.it&utm_medium=twitter



Climate change has exposed buildings to stresses and shocks such as rising temperatures, higher water levels, and wildfires revealing new vulnerabilities in Canada's building sector. Advocates for increased spending on climate-change adaptation have posited that flood protection is the most obvious measure, which is increasingly needed in urban areas, and typically costs less than the \$5,000 that the federal government is making available for green retrofits.¹⁷ Akin to GHG reduction improvements, increasing a home's climate change adaptation protection will increase the value of the home as well.

In Ontario, home insurance premiums have grown by 64% over the last decade, from \$782 in 2011 to \$1,284 in 2022, mainly due to climate change related events.¹⁸ With rising home insurance premiums and nearly 87% (approximately 4.35 million homes) of Ontario's housing stock of older vintage that is more susceptible to climate change related events, action is needed to support adaptation of Ontario homes to counter the effects of climate change.¹⁹

The following section of the paper outlines a unique, and carefully considered set of policy recommendations to support Ontario's housing context as it relates to changing political, economic, and environmental circumstances. This section of the report outlines the following eight policy recommendations:

1. Targeted Green Home Renovation Tax Credit
2. 1 Million Homes Energy Audits by 2035
3. Ontario Building Code Amendments
4. On-Bill Financing for Building Envelope Improvements
5. Supporting Renewable Natural Gas R&D and Expansion
6. Leveraging the Ontario Carbon Trust
7. Supporting Electric Vehicle Infrastructure in Homes
8. New Flood Mapping for Protection of Ontario Homes

All of these recommendations are designed to support Canada in meeting its 2030 climate change targets and set the stage for homeowners to contribute to Canada becoming net zero by 2050.

¹⁷ Radwanski, "How Ottawa's program for retrofitting homes showed what's missing from Canadian climate policy"

¹⁸ RATESDOTCA, "Climate Change has caused Ontario and Alberta home insurance rates to increase by 64 per cent and 140 per cent, respectively: RATESDOTCA, CISION, June 2, 2021, <https://www.newswire.ca/news-releases/climate-change-has-caused-ontario-and-alberta-home-insurance-rates-to-increase-by-64-per-cent-and-140-per-cent-respectively-ratesdotca-813234492.html>

¹⁹ Natural Resources Canada, "Residential Sector Ontario", Table 15: Housing Stock by Building Type and Vintage, <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP§or=res&juris=on&rn=15&page=0>

RECOMMENDED POLICY SOLUTION

1. TARGETED GREEN HOME RENOVATION TAX CREDIT



BACKGROUND

In 2007, the Federal government introduced a Home Renovation Tax Credit (HRTC) that provided a 15% tax credit to provide approximately \$3 billion in tax relief for an estimated 4.6 million Canadians.²⁰

The HRTC applied to home renovations for work performed or materials purchased valued between \$1,000, and \$10,000. Eligible renovations included renovations to main living spaces in a home, installing new furnaces or heating systems, and laying new sod.²¹ More recently, the federal government implemented the Canada Greener Homes Grant, which provides rebates of up to \$5000 to help homeowners make energy-efficient renovations to their homes.²²

Most residential emissions in Ontario come from low-rise residential buildings (single-detached and single-attached house types), which account for an estimated 83% of all residential energy use.

Single-detached and single-attached older homes (built before 2010) are the largest sources of residential emissions in Ontario, as gas is the primary fuel used for home heating, compounded by inefficient home heating due to leaking building envelopes and larger square footages. Most older detached homes are located in rural and remote Ontario communities.²³

This section proposes a new government tax credit to support retrofitting older homes in rural and remote communities with building envelope and water heating upgrades to efficiently reduce emissions in Ontario's residential sector.

Most residential emissions in Ontario come from low-rise residential buildings (single-detached and single-attached house types), which account for an estimated 83% of all residential energy use. If Ontario is committed to reducing its emissions footprint in the sector, energy usage must be reduced in low-rise residential buildings. The Environmental Commissioner of Ontario (ECO) noted that the longer these residences remain inefficient, the more difficult it will be for Ontario to meet its current and future climate targets.²⁴

There are approximately 4 million single-detached and single-attached homes in Ontario.²⁵ The ECO estimated previously that 27% of single-detached houses are located in rural and remote communities. As well, 34% of all Ontario homes built before 1960 and almost 60% of Ontario homes with an unknown date of construction, such as century homes, are located in rural and remote communities.²⁶ Improvements to the Ontario Building Code since 2006 have led to dramatic energy-efficiency improvements in newly constructed homes. However, while new homes are becoming more efficient, 86% of existing homes in the province built before 2005 remain in the energy-inefficient past.²⁷

Highly energy-efficient homes have lower utility bills, higher resale values, greater indoor comfort, and more resilience to extreme weather, in addition to lower emissions. A well-insulated and

20 The Government of Canada, "Canada's Economic Action Plan: Building on an Impressive Record of Tax Relief", January 27, 2009. <https://www.budget.gc.ca/2009/pdf/pamphlet-depliant2-eng.pdf>

21 Ibid.

22 Government of Canada, Canada Greener Homes Grant. February 23, 2022. <https://www.nrcan.gc.ca/energy-efficiency/homes/canada-greener-homes-grant/23441>

23 ECO, "Climate Pollution: Reducing My Footprint", Page 25

24 ECO, "2019 Energy Conservation Progress Report", Page 98

25 Natural Resources Canada, "Residential Sector Ontario", Government of Canada, Table 16: Single Detached and Single Attached Housing Stock by Vintage, <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP§or=res&juris=on&rn=16&page=0>

26 ECO, "Climate Pollution: Reducing My Footprint", Page 25

27 ECO, "2019 Energy Conservation Progress Report", Page 98

airtight building envelope would allow homes to be much more energy-efficient. Approximately 72% of all residential natural gas use in Ontario is for space heating.²⁸ Meanwhile, four of the five measures with the highest potential natural gas use reductions improve the building envelope.²⁹

Not only are there environmental and economic benefits, direct and indirect health and property value benefits can also be achieved by improving the energy-efficiency of older homes. Improvements to the building envelope can lead to better air quality and reduced mold buildup, which can help prevent respiratory, cardiovascular, and other chronic diseases.³⁰ In addition, homes with a good building envelope have a more consistent temperature, and adding insulation makes the building quieter. Envelope upgrades can also have an aesthetic appeal, allowing homeowners to refresh the look of their home while improving the building's energy-efficiency. Furthermore, quieter homes and aesthetic appeal are good selling features for a property. In fact, energy-

efficient buildings and homes experience higher resale value and last longer.³¹ Energy efficiency was rated third on the list of the top 10 selling features in a prospective home according to the Canadian Home Builders' Association's 2015 Canadian Home Buyer Preference national study.³² According to a US Green Building Council study, homes with energy-efficiency upgrades (e.g. LEED certification) in a Texas community sell for an average of 8% more than less-efficient homes, which translates to an approximate increase in value of \$24,560 USD.³³

For Canadian residences, the 2021 federal budget proposed to provide \$4.4 billion in multi-year funding to the Canada Mortgage and Housing Corporation to help homeowners complete deep home retrofits through interest-free loans worth up to \$40,000, beginning in summer 2021.³⁴ This program builds on the Greener Homes Initiative, a \$2.6 billion program delivered over seven years and announced in the 2020 Federal Economic Statement. Through this program, Natural Resources Canada will provide 700,000 grants of up to \$5,000 to homeowners for home energy improvements (retroactive to December 1, 2020), up to one million free EnerGuide energy assessments, and support to recruit and train EnerGuide energy auditors.³⁵

Examples of deep home retrofits in this new program include:

- Replacing oil furnaces or low-efficiency systems with a high-efficiency furnace, air source heat pump, or geothermal heat pump
- Better wall or basement insulation and/or wall or roof panels
- Installing a high-efficiency water heater or on-site renewable energy such as solar panels
- Replacing drafty windows and doors



28 ECO, "2019 Energy Conservation Progress Report", Page 100

29 Professional air sealing, super high-performance windows, air leakage sealing and insulation in old homes, and draft proofing.

30 Heerema, Dylan et al, "The many benefits of energy efficient homes and buildings", Pembina Institute, March 2, 2017, <https://www.pembina.org/pub/efficient-buildings-infographic>

31 ECO, "2019 Energy Conservation Progress Report", Page 102

32 Windfall Home Energy, "Home Buyers and Sellers: Know the value of an energy efficient house", <https://windfallcentre.ca/energy/real-estate/>

33 Hallman, Greg, "The Value of LEED Homes in the Austin-Round Rock Real Estate Market", US Green Building Council, 2016, <https://www.usgbc.org/sites/default/files/value-of-leed-homes.pdf>

34 Government of Canada, "Budget 2021: A Recovery Plan for Jobs, Growth, and Resilience", April 19, 2021, <https://www.budget.gc.ca/2021/home-accueil-en.html>

35 Government of Canada, "2020 Fall Economic Statement", November 30, 2020, Page 88, <https://www.budget.gc.ca/fes-eea/2020/report-rapport/toc-tdm-en.html>

Loans would be available to homeowners and landlords who undertake retrofits identified through an authorized EnerGuide energy assessment. This program will also include a dedicated stream of funding to support low-income homeowners and rental properties serving low-income renters, including cooperatives and not-for-profit owned housing. This combination of benefits for homeowners, as well as a newly announced set of federal loans and grants that can be accessed for green retrofits makes it the perfect time for the Government of Ontario to add a complementary Ontario program: a green home renovation tax credit.

ONTARIO GREEN HOME RENOVATION TAX CREDIT

While the new federal Deep Retrofit Program³⁶ is a step in the right direction, experts estimate the actual cost of retrofitting Canada's residential buildings is more than 14 times the amount announced. The Pembina Institute, a Canadian clean energy think tank, calculates that 600,000 dwellings would need to be retrofitted every year from now until 2040 to get all existing housing up to date and energy-efficient, costing \$227 billion over 20 years. In addition, they estimate that in most cases deep home energy retrofits would cost well over \$40,000, which exceeds the federal loan amount.³⁷

Therefore, there is ample room for the Government of Ontario to take this policy a step further and capitalize on the existing federal programs to further incentivize homeowners to make environmentally friendly renovations. To do this, Ontario should pursue a home renovation tax credit that covers renovations and retrofits that are environmentally friendly. The Ontario government currently has a Seniors' Home Safety Tax Credit that has a list of eligible

Further, it can also help increase tax revenue by pulling some of the 38% to 40% of renovation work that is currently done in the underground economy into the legal, tax-collecting world, given the need for receipts to claim the credit.

renovations designed to encourage aging in place.³⁸ In order to create strong alignment between federal and provincial programs, and to render program benefits more accessible to consumers, a similar list could be created for environmentally friendly retrofits that reduce a home's carbon footprint, including replacing oil furnaces or low-efficiency furnaces, improving insulation, replacing drafty windows and doors, draft proofing and professional sealing, and replacing outdated water heaters. The government could also include renovations or product purchases, such as installing broadband or purchasing office equipment, that helps the home into a work-from-home space which would cut down on commutes and thereby reduce emissions as well. A tax credit that reduces the cost of these projects will help families afford environmentally friendly renovations and lifestyles while reducing their personal emissions profile.

Additionally, this type of tax credit has the power to help kickstart the economic recovery from COVID-19. After the 2008 recession, the federal government instituted a broad-based tax credit that helped approximately three million Canadians upgrade their homes and create \$4.3 billion worth of economic activity.³⁹ Though this tax credit would be limited to green projects, it still has the power to generate a large amount of economic activity. Further, it can also help increase tax revenue by pulling some of the 38% to 40% of renovation work that

³⁶ Natural Resources Canada. September 5, 2019 <https://www.nrcan.gc.ca/energy-efficiency/buildings/existing-buildings/retrofitting/20707>

³⁷ Bulowski, Natasha, "Critics throw shade at federal budget cash for home retrofits", National Observer, April 21, 2021, <https://www.nationalobserver.com/2021/04/21/news/critics-federal-budget-2021-home-retrofits>

³⁸ Taxes and Benefits, "Seniors' Home Safety Tax Credit", Government of Ontario, <https://www.ontario.ca/page/seniors-home-safety-tax-credit#section-1>

³⁹ McMahon, Tamsin. "Return of Renovation Tax Credit Unlikely to Match Last Economic Boost." The Globe and Mail, August 4, 2015, <https://www.theglobeandmail.com/report-on-business/economy/conservatives-vow-to-bring-back-popular-home-renovation-tax-credit/article25836672/>

is currently done in the underground economy into the legal, tax-collecting world, given the need for receipts to claim the credit.⁴⁰

However, this type of tax credit, as evidenced by the federal program, could be quite popular and thus expensive. It can also become a way for homeowners to reduce the cost of renovations they were already planning to complete.

To protect against this, the government should only make certain green projects eligible and limit the eligibility to homes built before 2010, before major energy-efficiency requirements were applied to new builds (Figure 4).

The data are clear that older homes have worse carbon footprints and a higher GHG emissions output than those built after 2010 under newer Ontario Building Code requirements.

Financially speaking, the tax credit should be time limited to protect taxpayers in the long run and incentivize renovations and retrofits immediately while the economy attempts to recover from the COVID-19 pandemic. Additionally, the tax credit should have a maximum eligible claim, similar to the \$1,350 maximum claim under the federal post-2008 recession home renovation tax credit.⁴¹ If the Government of Ontario is concerned about funding projects for wealthier Ontarians, an income threshold of \$200,000 per household could also be applied. The combination of financial limits and a pre-approved list of eligible renovations should prevent wealthier Ontarians from taking advantage of the credit to help fund large-scale renovations or projects that should not be taxpayer supported.

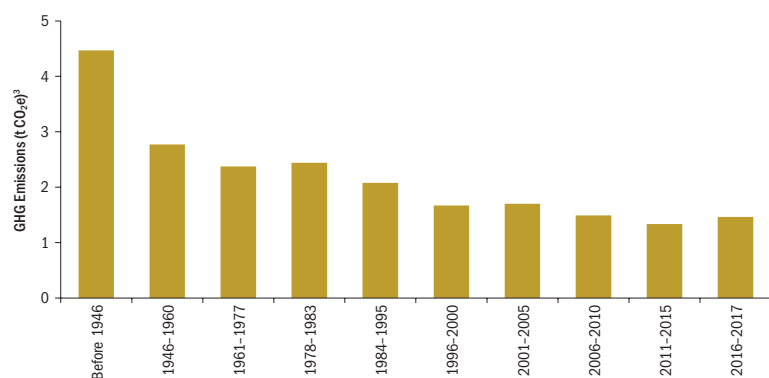


Figure 4 – Residential GHG Emissions in 2017 Per House Based on Period of Construction, Office of the Ontario AG, “Value-for-Money Audit: Reducing GHG Emissions from Energy Use in Buildings”, Page 26

RECOMMENDATION

The Ontario government should create a targeted green home renovation tax credit that applies only to green renovations, including those that enable a work-from-home setup. The green portion of the credit should apply only to homes built before 2010 and feature an income cap to ensure it does not pay for the already-planned renovations of wealthy Ontarians.

40 Jobs and Recovery Committee Submission: Home Renovation Tax Credit,” Ontario Home Builders’ Association, 2020 <https://www.ohba.ca/wp-content/uploads/2020/07/ohba-submission-ontario-jobs-and-recovery-committee-2020.pdf>

41 McMahon, Tamsin, “Return of Renovation Tax Credit Unlikely to Match Last Economic Boost,” The Globe and Mail, August 4, 2015, <https://www.theglobeandmail.com/report-on-business/economy/conservatives-vow-to-bring-back-popular-home-renovation-tax-credit/article25836672/>

RECOMMENDED POLICY SOLUTION

2. 1 MILLION HOME ENERGY AUDITS BY 2035



BACKGROUND

The Ontario residential sector is a significant source of energy emissions, which are attributed to the substantial reliance on natural gas for home heating. Natural gas is the most widely used source of energy in homes, accounting for nearly 90% of energy use emissions from Ontario's residential sector in 2018.⁴² The Office of Energy Efficiency of Resources Canada estimates that in 2015, 62.4% of residential energy consumption was attributable to inefficient room heating (either water or natural gas).

Over the last decade, there has been a reduction in energy consumption that can be attributed to two key initiatives: Natural Resources Canada (NRCAN) incentive programs, and broader, normative framework for energy-efficiency standards and measures (such as the Paris Agreement, or the Pan-Canadian Framework on Clean Growth, and other federal programs).

The federal government's directory of energy-efficiency programs offer 78 initiatives in the residential sector, including financial assistance for retrofitting programs to improve energy-efficiency and energy audit programs to assist homeowners as they plan retrofits and renovations.⁴³ The reductions in energy consumption and improvements in energy-efficiency over the last decade are noteworthy; however, to effectively reduce emissions from homes to a level that aligns with the Government of Ontario's Paris Agreement targets, reductions to energy consumption in households will require a more significant intervention.

Given home energy consumption rates in Ontario, and the significant reliance on natural gas coupled with the proven impacts of past policy and program changes, the implementation of a home energy audit program that complements existing federal programs can assist in climate mitigation efforts in several ways, including:

- Clearly identifying sources of energy inefficiency in Ontario's residential housing sector
- Encouraging and incentivizing home renovations and retrofits to support the reduction in energy consumption, by enabling access to existing renovation-related subsidy programs upon completion of home energy audits
- Reducing energy consumption and emissions from the residential sector, which are significant contributors to GHG emissions in Ontario (along with transportation, and industrial usages).⁴⁴
- Establish consistency in provincial and federal energy-efficiency standards in the housing sector, and encourage a coordinated and balanced effort to support climate change mitigation through emissions curbing across the country.

42 Natural Resources Canada, "Residential Sector Ontario", Table 1: Secondary Energy Use and GHG Emissions by Energy Source, <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP§or=res&juris=on&rn=1&page=0>

43 Natural Resources Canada, Residential Sector. "Single Detached and Single Attached Housing Stock by Vintage", Table 16. <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP§or=res&juris=on&rn=16&page=0>

44 Environmental Commissioner of Ontario (ECO): Annual GHG report, Chapter 2. http://media.assets.eco.on.ca/web/2016/11/2016-Annual-GHG-Report_Chapter-2.pdf



ONTARIO HOME ENERGY AUDIT PROGRAM

To establish a coordinated effort across levels of government in home energy-efficiency and climate mitigation, it is recommended that the Government of Ontario implement a Home Energy Audit program, with a target of completing home energy audits for 10% of households in Ontario. Since the 2007 introduction of the federal home energy audit program, many homeowners across the country have completed audits, and received ENERGYSTAR and EnerGuide labels for their homes. For example, government targets were 22,000 and 85,000 labels issued between 2014 and 2015, and 2016 and 2018, respectively. Actual performance surpassed these targets, reaching 83,000 and 162,000 labels for each period, respectively.⁴⁵

Features and Targets

The home energy audit program should be encouraged by a subsidy program to support Ontario residents. In order to foster uptake of home energy audits, OREA will work closely with the province and industry to encourage the creation of a home energy audit field in MLS® systems. This will create additional ratings and home value information across the province, as they relate to home energy-efficiency.

Given the suite of programs and incentives available at the federal level, as well as the repertoire of energy advisors regulated through NRCAN's database and the energy advisor licensing model available through NRCAN, the implementation of this program should comply with the existing federal rating and certification system to avoid duplication and unnecessary expenditures on advisor certification and program administration.

⁴⁵ Natural Resources Canada (NRCAN), Evaluation of the Energy Efficiency Program. November 5, 2020: <https://www.nrcan.gc.ca/transparency/reporting-and-accountability/plans-and-performance-reports/strategic-evaluation-division/reports-and-plans-year/evaluation-the-energy-efficiency-program/23396>

Supporting the completion of thousands of energy audits will encourage more homeowners to do recommended retrofits and, if their property is put up for sale, share the results of an audit with prospective buyers.

- The target for this proposed program is to reach 1 million home energy audits by 2035 or until at least 20% of the existing Ontario housing stock, particularly older homes, have completed home energy audits.
- Provincial subsidies should be available to residents at the beginning of the voluntary phase of this program, marking an official government endorsement of this program and the 1 million homes goal.
 - Subsidies can be available to anyone who completes an audit.
- Home energy audits should have a ten-year validity period to ensure that home energy emissions and residential construction remain energy-efficient throughout the full lifecycle of a home. This way, an audit is considered valid for several years rather than requiring a renewed audit at every point of sale, thus limiting any negative impact on

a homeowner's ability to sell their property, and mitigating the transactional costs and administrative efforts required prior to selling a home.

- The 10-year validity period should be consistent across new builds and older homes conducting home energy audits.
- New builds will be built to code, which would signify an automatic 10-year audit validity period beginning on the development completion date.
- The program will include the licensing and regulation of home energy auditors. Currently, home energy auditors are certified by NRCAN; however, there is a role for provincial oversight, with similar models implemented for home inspectors and other licensed professionals. A formal licensing regime will help to professionalize the industry and deter any deviation from standards, which is expected to create consumer confidence and increase uptake. Licensing and regulation will form the basis for the sector to mature and become more accepted by Canadian home owners as trusted professionals.

RECOMMENDATION

To establish a coordinated effort across levels of government in home energy-efficiency and climate mitigation, it is recommended that the Government of Ontario implement a home energy audit program, with a target of completing 1 million home energy audits by 2035.

RECOMMENDED POLICY SOLUTION

3. ONTARIO BUILDING CODE AMENDMENTS



BACKGROUND

The Ontario Building Code standards for new residential builds have led to significant improvements in energy-efficiency. However, existing homes are being left behind. The best method of improving an existing home's energy-efficiency is to upgrade the building envelope,⁴⁶ which is more convenient and less costly when done during a renovation. To support existing homes becoming more energy-efficient, the Ministry of Municipal Affairs and Housing (MMAH) should amend the Ontario Building Code to include minimum energy-efficiency requirements related to the building envelope for home renovations. A 2020 report from the Auditor General of Ontario shared that modelling by a third-party vendor retained by the MMAH in 2013 estimated that requiring energy-efficiency upgrades at the time of renovation can reduce GHG emissions by 4.8 to 9.4 Mt over 10 years.⁴⁷

Since 1975, Ontario's Building Code has regulated the use of energy in new buildings and currently has some of the most stringent energy-efficiency standards in North America. However, the Building Code's energy conservation provisions apply only to new buildings or additions; they do not apply to major renovations in older, less efficient buildings. This is problematic considering that most of Ontario's residential building stock predates modern energy-efficiency standards. For example, 82% of houses were built before

2006, when major energy-efficiency updates were made to the Code.⁴⁸ Updates to the energy-efficiency requirements for new builds in the Building Code have been made four times since 1975, meaning that houses built today are designed to use almost 50% less energy—in all forms—than those built prior to 2006.⁴⁹ Unfortunately, many homeowners are unaware of opportunities to make their home more energy-efficient during a renovation, specifically with respect to the building envelope.

Four of the five measures with the highest potential for natural gas savings and positive economic benefits involve improvement of the building envelope, including professional air sealing, installation of super high-performance windows, air leakage sealing and insulation in old homes, and draft proofing.⁵⁰ These residential retrofit measures to the building envelope have an estimated payback period of 5 to 10 years for super high-performance windows, professional air sealing/weather stripping, and air leakage sealing and insulation. However, measures such as wall insulation (attic/ceiling, basement) have a longer payback period of 10 to 19 years.⁵¹

Ontario can look to other jurisdictions such as California and Denmark to understand best practices regarding energy-efficient standards in residential renovations. British Columbia is also currently planning to adopt energy-efficiency requirements for building renovations by 2024.⁵²

46 The term 'building envelope' refers to the building "shell" that separates the indoors from the outdoors, including exterior walls, foundations, roofs, windows and doors.

47 Office of the Auditor General of Ontario, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", November 2020, Page 27 https://www.auditor.on.ca/en/content/annualreports/arreports/en20/ENV_reducinggreenhousegasemissions_en20.pdf

48 AGO, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", Page 26

49 AGO, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", Page 4

50 Environmental Commissioner of Ontario, "2019 Energy Conservation Progress Report", March 2019, Page 100, https://www.auditor.on.ca/en/content/reporttopics/envreports/env19/2019_EnergyConservationProgressReport.pdf

51 AGO, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", Page 46

52 AGO, "Value-for-Money Audit: Reducing Greenhouse Gas Emissions from Energy Use in Buildings", Page 27

The provincial policy on the west coast is looking to the success of the City of Vancouver's energy-efficiency requirements to home renovations introduced in 2019. Vancouver has energy-efficiency requirements on existing buildings when they undergo significant renovations. Projects that cost between \$20,000 and \$74,999 require an EnerGuide Home Evaluation and even larger projects require two additional energy upgrades (Figure 5).⁵³

TOTAL PROJECT COST	ENERGUIDE HOME EVALUATION AND UPGRADES REQUIRED
Less than \$20,000	Not required
\$20,000 - \$74,999	EnerGuide Home Evaluation (pre-renovation)
More than \$75,000	EnerGuide Home Evaluation (pre and post renovation) + select two additional energy upgrades

Figure 5 – Vancouver Building By-Law 11 for Single-Family Home Renovations

In 2017, the Ontario MMAH consulted on potential energy-efficiency requirements for renovations to existing homes more than five years old, which would be triggered by certain types of renovations. The proposals including requiring material alterations or repairs to meet up-to-date energy-efficiency requirements for building envelope related improvements (i.e. insulation, vapour barriers, air barriers, mechanical systems, ventilation, attics, foundation walls, drainage, windows, doors, and skylights). More than 80% of the MMAH consultation respondents supported the potential requirements as is or with modifications; however, no progress has occurred regarding these proposals since 2017, likely due to a change in government priorities and rising home prices.⁵⁴ The government additionally eliminated the Ontario Building Code Advisory Council in the 2019 budget, opting to bring decisions

regarding the code into the Ministry. This move makes it easier for the government to implement emissions reduction renovation changes to the Building Code as they could avoid lengthy advisory panel processes when making these decisions.

In addition, new federal retrofit code requirements for existing buildings are currently under development by the Canadian Commission on Building and Fire Codes and are anticipated to be published in 2022.⁵⁵

Renovations that significantly alter a building are already required to be brought up to code with respect to fire and structural safety, because that cost is justified by their public and private benefits. The same logic should apply to requiring energy upgrades to older, inefficient homes when undergoing a significant renovation, given the pressing demands of climate change.

To provide financial support to homeowners, the program should be aligned with an expansion in on-bill financing for building envelope improvements. With that in mind, exemptions should be considered for heritage properties, disaster caused renovations or situations where home owners have limited financial means.

RECOMMENDATION

The Government of Ontario should build on the 2017 consultation and work with building industry partners to amend the Ontario Building Code to include energy-efficiency requirements for residential renovations in homes built before 2010.

53 City of Vancouver, "Energy requirements for single family and 1-3 storey home renovations", <https://vancouver.ca/home-property-development/energy-requirements-for-single-family-home-renovations.aspx>

54 ECO, "2019 Energy Conservation Progress Report", Page 121

55 Hon. Rosa Galvez, Hon. Michael L. MacDonald, "Reducing Greenhouse Gas Emissions from Canada's Built Environment", Senate of Canada, November 2018, Page 34 https://sencanada.ca/content/sen/committee/421/ENEV/reports/ENEV_Buildings_FINAL_e.pdf

RECOMMENDED POLICY SOLUTION

4. ON-BILL FINANCING FOR BUILDING ENVELOPE IMPROVEMENTS



BACKGROUND

The ECO Energy Conservation 2019 Progress Report noted that upfront costs are one of the three major behavioural barriers that individuals face regarding taking energy-efficient actions and contribute to low participation numbers for residential energy-efficiency improvements. In addition, a significant market barrier to residential energy-efficiency improvement is high borrowing and transaction costs for upfront expenses. Lending institutions may not recognize that energy-efficiency investments should not be treated as other types of personal spending due to income stream production from improvements in the form of lower future energy bills. To reduce these barriers to energy-efficiency improvements at the residential level, on-bill financing is a promising solution to provide financing for projects that removes the burden from homeowners.

On-bill financing (OBF) is a system in which utility companies provide homeowners with the upfront costs of a residential energy-efficiency project and charge their customers said financing costs through their utility bills until recuperated. Following an energy audit, renovation costs are determined for a house and an OBF loan is granted to the homeowner through their utility company to finance the retrofit costs upfront. Then, the homeowner is charged back the capital cost and interest incrementally through their existing utility bills. OBF is an affordable option for homeowners to increase their home's energy-efficiency because the OBF loan servicing charges are repaid using the savings from the reduced energy costs created by the retrofits. Therefore, there is little to no net change in monthly utility bills until the loan is paid. Afterwards, the homeowner will realize a reduction in future utility bills.⁵⁶

OBF programs generally have three main objectives: to expand access to capital by making it relatively easy for building owners to borrow funds for retrofits; to make energy-efficiency improvements affordable; and to drive demand for increased adoption of energy-efficient practices.⁵⁷ OBF can remove two major barriers to improving home energy-efficiency in Ontario by making energy-efficiency retrofits more affordable.

A 2015 study from the Pacific Institute for Climate Solutions examined 30 OBF programs across North America and the UK and found 10 key features of OBF programs that are critical to its success:⁵⁸

1. Attractive interest rates
2. Quick turnaround for approval
3. Ease of use
4. Supplier buy-in
5. Strong brand equity or trust in the provider
6. Effective marketing
7. No bill neutrality requirement
8. Relaxed underwriting criteria
9. Administration of the program by a utility company
10. Post-retrofit audits to ensure effectiveness and prevent fraud

Given that Ontario has an efficient and low-carbon electricity grid, delivering an OBF system through electric utility companies would not result in significant GHG reductions. It would be more effective if the province's natural gas utilities offered OBF financing. An OBF system through Ontario's natural gas utility companies has the potential to increase participation in utility-run conservation programs and reduce residential emissions.

⁵⁶ Efe, Seref. Raheem, Inam ur. Wan, Tingting. Williamson, Carter, "Cheaper Power Bills, More Jobs, Less CO₂ : How On-Bill Financing Done Right can be a Quick Win for British Columbia", Pacific Institute for Climate Solutions, September 2015, Page 6 <https://pics.uvic.ca/sites/default/files/uploads/publications/On-Bill%20Financing%20FINAL.pdf>

⁵⁷ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 6

⁵⁸ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 4

Although the OBF system is already enabled in Ontario, it is not currently offered by any electric or natural gas local distribution company (LDC), possibly because there is no incentive for them to do so.⁵⁹ Enbridge and Union Gas (now the same company and Ontario's primary natural gas LDC) have previously stated that either customers do not need OBF, or that OBF would change the risk profile to their investors.⁶⁰

Case Study: Manitoba

Manitoba Hydro has delivered a successful OBF program which provided \$400 million in total financing with an impressively low default rate of 0.48%, supporting 17% of Manitoba households and improving their home's energy-efficiency.⁶¹ The program has consistently served nearly 5,000 new participants annually with approximately \$29 million in loans.⁶²

Manitoba Hydro found that the most popular home energy-efficiency improvement projects were window retrofits (47%) and furnace replacements (33%). The program supported average annual savings per project of 825 kWh.⁶⁴ Manitoba Hydro's inclusive OBF program underwriting criteria allows for greater market penetration with a loan rejection rate of only 5%.⁶⁵ Impressively, the Manitoba OBF program achieves a 48-hour turnaround time for application approvals.⁶⁶ Manitoba Hydro additionally marketed their OBF program well, as homeowners began asking contractors about the program which contributed to a robust supply of qualified talent to perform the retrofits.

OBF is a relatively simple win-win scenario for government, as it supports the reduction of GHG emissions, creates high-skill construction jobs, upgrades homes to make them more energy-efficient and climate resilient, lowers household energy bills, and does not require a new spending line in government budgets.

⁵⁹ ECO, "2019 Energy Conservation Progress Report", Page 116

⁶⁰ ECO, "2019 Energy Conservation Progress Report", Page 116

⁶¹ ECO, "2019 Energy Conservation Progress Report", Page 117

⁶² Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 8

⁶³ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 8

⁶⁴ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 8

⁶⁵ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 8

⁶⁶ Efe et al, "Cheaper Power Bills, More Jobs, Less CO₂", Page 9



RECOMMENDATION

The Government of Ontario should take the key lessons from other jurisdictions' implementation of OBF and work with their energy sector stakeholders to offer OBF residential energy-efficiency programs for their customers. These programs should also include advertising campaigns to increase public awareness once the programs have launched.

RECOMMENDED POLICY SOLUTION

5. SUPPORTING RENEWABLE NATURAL GAS R&D AND EXPANSION



BACKGROUND

As noted in the introduction to this paper, Ontario relies on natural gas to heat most homes, which produced 19.8 Mt alone in 2018. Renewable natural gas (RNG) is a carbon-neutral fuel created by capturing methane emissions from organic waste, landfills, and farms. RNG can be blended into natural gas applications and used to heat homes, which is an effective solution to reduce GHG emissions.⁶⁷ The primary environmental benefits of RNG are emission reductions and cleaner fuel substitution, including the potential reduction of 18.9 Mt per year of Ontario's GHG emissions if RNG was applied province-wide.⁶⁸ As long as all quality standards are met, RNG can connect to existing natural gas pipelines, making it a seamless change for consumers to adopt. Supporting further research and development in the RNG space, including supporting its expansion, will support greening the natural gas grid in Ontario and help heat homes with a clean energy source that reduces their GHG emissions.

RNG is particularly attractive in Ontario because it is a carbon-neutral fuel that can be seamlessly adopted into the province's natural gas system and is a more consistent fuel source as it is not hindered by extreme weather. Notably, RNG is more cost-effective than electrification in Ontario as RNG is equivalent to approximately \$0.09/kWh, while electricity in Ontario is priced at \$0.128/kWh. However, RNG is nearly five times more expensive than regular natural gas at \$24/GJ–1 GJ is equal to 277.8 kWh.⁶⁹ In 2016, the average annual expenditure on natural gas per household in Ontario was \$718, and \$3.7 billion across Ontario.⁷⁰ For the customer, switching household heating from natural gas to RNG will be more expensive, but not as costly as adopting electric heating. An April 2021 study from the

Canadian Biogas Association highlighted the importance of ensuring the economic sustainability of RNG cluster development by focusing on two main factors: RNG sale price and feedstock composition ratios.⁷¹ With greater research and development in RNG, efficiencies could be found to reduce its cost and make it a more accessible green option for Ontario homeowners (Figure 6).

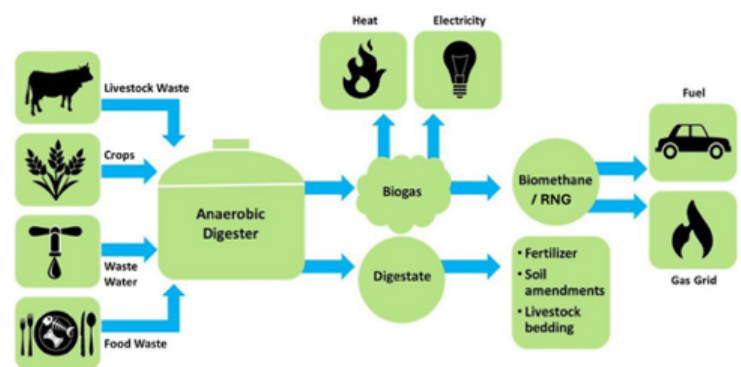


Figure 6 – Anaerobic Digestion Process, Environmental and Energy Study Institute, <https://www.eesi.org/papers/view/fact-sheet-biogasconverting-waste-to-energy>

RNG has the potential to significantly reduce home emissions in Ontario, considering that most of Ontario's residential energy emissions (22.4 Mt per year) come from natural gas-fired space and water heating.⁷² An average Ontario house heated by a natural gas furnace emits close to five tonnes of emissions per year. Individual houses emit more than condominiums and apartments, as the units are smaller and share common walls.

A 2012 QUEST study noted that Ontario's potential access to RNG is large, with 32 large landfill sites, 1.7 million head of cattle, 4.5 million head of hog, and other large potential agricultural and forestry waste sources.⁷³

⁶⁷ Enbridge Gas, "Renewable Natural Gas", <https://www.enbridgegas.com/Natural-Gas-and-the-Environment/Enbridge-A-Green-Future/Renewable-Natural-Gas>

⁶⁸ Fremeth, Adam, "Renewable Natural Gas The Ontario Opportunity", QUEST Canada, July 2012, Page 11, https://questcanada.org/wp-content/uploads/2018/08/2012_Renewable-Natural-Gas-The-Ontario-Opportunity_Full_Report.pdf

⁶⁹ Enbridge Gas, "Renewable Natural Gas"

⁷⁰ ECO, "2019 Energy Conservation Progress Report", Page 101

⁷¹ Canadian Biogas Association, "Agricultural Renewable Natural Gas (RNG) Resource Clustering Study", April 2021, https://biogasassociation.ca/images/uploads/documents/2021/reports/Agricultural_RNG_Resource_Clustering_Study_April_2021.pdf

⁷² ECO, "2019 Energy Conservation Progress Report", Page 98

⁷³ Fremeth, "Renewable Natural Gas The Ontario Opportunity", Page 5

Considering Ontario's reliance on the natural gas system, supporting the production of RNG will in turn support the province in reducing emissions while providing Ontario farmers with a new source of income. The Government of Ontario is already supporting RNG development in the province with regulation changes that enable new and expanded on-farm biogas⁷⁴ systems, and the announcement of the largest RNG facility in the province. The government also announced regulatory changes to enable new and expanded biogas systems in the province in July 2021, which include increased maximum allowable limits on and new types of off-farm anaerobic digestion materials (such as food processing waste and source separated organics), and encouragement of RNG production.⁷⁵ Enbridge Gas partnered with Walker Industries and Comcor Environmental on an innovative \$42 million RNG project in Niagara. The plant is expected to be operational by 2022 and will generate enough RNG to heat

8,750 homes per year, while reducing GHG emissions by 48,000 tonnes per year.⁷⁶ With this new facility, the Ontario Energy Board approved Enbridge Gas to pilot a voluntary RNG program, which gives customers the option to pay \$2 per month for RNG as of January 2021. Though paying more may not seem attractive today, an increasing carbon price on traditional natural gas in Ontario may make this the more affordable option in the near future.

In addition, a low carbon hydrogen-blending pilot with Enbridge Gas and Cummins Inc. was announced in November 2020. With the support of Sustainable Development Technology Canada, the \$5.2M project is piloting the blending of renewable hydrogen produced at the Power-to-Gas Facility in Markham, Ontario. The blended content will make up to 2% of the natural gas supplied to 3,600 Markham customers, reduce up to 117 tonnes of CO₂ from the atmosphere, and will not affect customers' bills.⁷⁷



- ⁷⁴ Biogas is produced after organic materials are broken down through anaerobic digestion. Biogas can be upgraded into biomethane, also known as renewable natural gas.
- ⁷⁵ Government of Ontario, "Ontario Increasing Opportunity for On-Farm Renewable Natural Gas Production", July 5, 2021, <https://news.ontario.ca/en/release/1000461/ontario-increasing-opportunity-for-on-farm-renewable-natural-gas-production>
- ⁷⁶ Enbridge Gas, "Renewable Natural Gas"
- ⁷⁷ Enbridge Gas, "Enbridge Gas announces a \$5.2M Hydrogen Blending Pilot Project to further explore greening of the natural gas grid", November 18, 2020, <http://enbridgegas.mediaroom.com/2020-11-18-Enbridge-Gas-announces-a-5-2M-Hydrogen-Blending-Pilot-Project-to-further-explore-greening-of-the-natural-gas-grid>

The Ontario Energy Board has also approved an application from Enbridge to implement a pilot Voluntary Renewable Natural Gas Program in Ontario which started in 2021, where customers can choose to support the transition to clean energy through a small monthly contribution to purchase carbon neutral RNG. During the first five years of the program, Enbridge Gas anticipates up to 28,000 customers could participate, reducing CO₂ emissions by 8,000 tonnes, the equivalent of taking 1,600 cars off the road for one year.⁷⁸

While RNG production technology is an emerging sector in Ontario, there is work to be done to support its mass commercialization by making it an affordable and energy-efficient alternative for consumers. The RNG facility in Niagara cost \$42 million and is expected to produce enough energy to heat 8,750 households. Given that Ontario has approximately 5 million homes, of which the majority are heated using natural gas, the province would require more than 500 more Niagara-like facilities to supply enough RNG, which would translate to more than \$20 billion at the current rate. For a government looking to recover financially from the COVID-19 pandemic, this number will need to decrease through innovation and testing to meaningfully scale the technology.



RECOMMENDATION

To further support and scale RNG production and adoption in the province, the Government of Ontario should continue to invest in research and development of RNG and fund additional projects like the one in Niagara to broaden Ontario's RNG network.

⁷⁸ Government of Ontario, "Ontario Welcomes Construction of Largest Renewable Natural Gas Plant in the Province and New Program for Enbridge Customers", October 7, 2020, <https://news.ontario.ca/en/release/58714/ontario-welcomes-construction-of-largest-renewable-natural-gas-plant-in-the-province-and-new-program>

RECOMMENDED POLICY SOLUTION

6. LEVERAGING THE ONTARIO CARBON TRUST



“...\$41 billion over 10 years, with half being spent in the first three years. That’s ... money spent on things that the rising carbon tax will do anyway.”



BACKGROUND

When the Progressive Conservative Party, led by Premier Doug Ford was elected in Ontario in 2018, they ran on a platform to cancel the cap-and-trade system and fight the federal government in court over the imposition of a carbon tax. As part of this effort, they announced their own climate initiatives to replace the carbon tax should they be successful in their court challenge. One of the main initiatives was a \$400 million fund called the Ontario Carbon Trust, which would be used to invest in climate friendly ideas and technologies to reduce Ontario's GHG output.

Since then, the Government of Ontario lost the court fight, with the Supreme Court of Canada ruling that the federal carbon price backstop is constitutional and thus can remain in place. Now, the Ontario government is faced with a decision: Should it follow through with its commitments that were designed to replace the carbon tax in Ontario, or not?

The reason a carbon tax is so effective is because of its simplicity. By raising the price of emitting through higher fuel prices, consumers and businesses alike are incentivized to change their behaviour to non-emitting habits. The demand for eco-friendly alternatives rises as the price of the carbon tax rises and, therefore, the market is driven towards more environmentally friendly alternatives in order to stay competitive. Prior to this shift in policy, electric vehicles (EVs) were not in demand. Now, the Ford Motor Company of Canada is expecting 40% of its fleet to be fully electric by 2030, including such popular offerings as the F-150 pickup truck.⁷⁹

The carbon tax will reduce emissions over time through both direct taxation and market influence. Despite this, some governments have grown impatient, demanding greater results immediately, leading them to layer on less cost-effective programs that do not reduce emissions

⁷⁹ Colias, Mike, "Ford Expects 40% of Global Vehicle Volume to Be Fully Electric By 2030", May 26, 2021, <https://www.wsj.com/articles/ford-expects-40-of-global-vehicle-volume-to-be-fully-electric-by-2030-11622033457>

nearly as well. For example, when analyzing the most recent federal government environmental plan, authors Ken Boessenkool and Chris Ragan found that 26 of the 104 funded initiatives were policies that would have been achieved by the carbon tax. Those 26 policies are slated to cost “...\$41 billion over 10 years, with half being spent in the first three years. That’s ... money spent on things that the rising carbon tax will do anyway.”⁸⁰ As the provincial government adjusts its environmental plans in wake of the Supreme Court decision, it should not make the same mistakes.

The Ontario Carbon Trust would have funded businesses and groups with environmentally friendly products aimed at reducing emissions. Instead, with the certainty of the carbon price backstop firmly in place, these groups will be able to use that certainty to find seed funding on the private market instead of from taxpayers. Moreover, unless these initiatives have a lower price per tonne than the current carbon tax, they are not worth an individual’s money at this time. Eventually, the rising tax rate will surpass the cost of these technologies and make them viable on the everyday market. Until that point, investment by the Government of Ontario would essentially be subsidizing their performance, thereby wasting taxpayer dollars to achieve worse results.

Given this, the Government of Ontario should cancel the Ontario Carbon Trust and use the \$400 million budgeted for other initiatives. These initiatives should not be aimed solely at reducing emissions, but rather have greater social and economic benefits to complement environmental benefits. For example, the money could be used to help fund a green home renovation tax credit to help stimulate the economy, or to fund research projects such as expanding RNG initiatives.



RECOMMENDATION

The Ontario government should repurpose the \$400 million Ontario Carbon Trust that is no longer necessary due to the introduction of the carbon tax, and use the money to fund initiatives that help Ontario’s economy recover from the COVID-19 pandemic. Measures introduced under the Ontario Carbon Trust should be environmentally friendly policies or drive further environmental benefits that would not be achieved by a rising carbon tax alone.

⁸⁰ Boessenkool, Ken. Ragan, Christopher, “Boessenkool and Ragan: The Liberals need have faith that their carbon tax will do its job.”, January 5, 2021, <https://theline.substack.com/p/boessenkool-and-ragan-the-liberals>

RECOMMENDED POLICY SOLUTION

7. SUPPORTING ELECTRIC VEHICLE INFRASTRUCTURE IN HOMES



BACKGROUND

EVs may not have a direct impact on the value of homes currently; however, research suggests that municipal and provincial policies, building codes, and bylaws across the country are trending towards mandatory or encouraged EV charging port installations in new builds.⁸¹ ⁸² This includes Ontario where, as of 2018, condominiums are expected to be at least “partially” EV-ready; i.e. 20% of all parking spaces must be EV dedicated.⁸³

The significant impacts of the transportation sector on GHG emissions, particularly among passenger vehicles, place an additional emphasis and urgency on the opportunity to support the adoption of EVs. Figure 7 below highlights the distinction between 4.6 metric tons of CO₂ emissions from combustion engines, compared with zero emissions from electric vehicles. Notably, the federal context is shifting towards an emphasis on zero-emissions cars and passenger trucks by 2035 as a means of curbing GHG emissions related to the transportation sector.⁸⁴

From the consumer perspective, there are three key barriers to adopting EVs:

1. The cost of charging station installations is generally inaccessible to the average consumer, particularly as they relate to travel range.
2. There are significant limitations for EVs related to the maximum travel range experienced at lower-level charging ports that render low-cost options the least feasible for residents and consumers who use their cars to drive to work. The average commute to and from work in Ontario is 8.7 kilometres, meaning that a single charge at the lowest cost and most accessible charging port level is only sufficient only for a one-way commute to work.⁸⁵
3. With respect to the consumer installation burden, many pre-existing residential builds in Ontario are not equipped with EV charging stations. This means that homeowners looking to purchase an EV are expected to bear the costs of materials and installation for charging stations.

EMISSIONS PER CONVENTIONAL / AVERAGE PASSENGER CAR	
Total GHG Emissions for Passenger Transport	32.6 Mt CO ₂ e*
No. of registered cars in Ontario	6.7 million
Emissions per year (avg)	4.6 metric tons of CO ₂
Emissions per lifecycle of a car	66 tonnes of CO ₂
Average lifespan of a car	320,000 km
Emissions per km per car (avg)	206 gCO ₂ per km on an average car

EMISSIONS BY ELECTRIC VEHICLES	
Emissions per year (avg)	No emissions
Emissions per lifecycle of a car	No emissions
Manufacturing Emissions	17.5 tonnes of GHG per car

Figure 7 – Statistics Canada Vehicle Registration Database, 2017 *Transportation is the largest and fastest growing share of Ontario's greenhouse gas emissions.

81 <https://pluginbc.ca/policy/>
82 <https://www.cantechletter.com/2016/04/every-new-house-built-quebec-mandatory-240v-electric-vehicle-charging-station/#:~:text=Stock%3A%20electric%20vehicles-,Every%20new%20house%20built%20in%20Quebec%20to%20have%20mandatory%20240v,to%20the%20Journal%20de%20Montr%C3%A9al.>
83 <https://medcapassets.com/ev-charging-stations-in-condominiums/#:~:text=Newly%20built%20condos%20in%20Ontario,relevant%20electrical%20codes%20and%20legislation.>
84 <https://www.canada.ca/en/transport-canada/news/2021/06/building-a-green-economy-government-of-canada-to-require-100-of-car-and-passenger-truck-sales-be-zero-emission-by-2035-in-canada.html>
85 <https://www150.statcan.gc.ca/n1/daily-quotidien/190225/dq190225a-eng.htm>

There are three levels of charging for an EV and an associated range of costs, with the lowest costs for Level 1 and the highest costs for Level 3 (Figure 8).^{86, 87, 88}

Supporting the adoption of EVs and the installation of EV charging ports in homes can ensure that housing trends are aligned with automotive projections and would help maintain or increase home values in the future. Having the right ports is key to supporting the adoption of EVs and the transformation of the automotive industry.

CHARGING LEVELS & ASSOCIATED COSTS		
LEVEL	CHARGING IMPACT	COSTS
Level 1	Charging adds about 8 km of range per hour	Costs range from \$300 to \$2,500, with no installation costs.
Level 2	Charging, common in both private households and in public places, use a 240-volt system (like a clothes dryer plug) and adds 30 to 50 km of range per hour	The costs range from \$6,000 to \$20,000; and requires installation
Level 3	Charging stations, also known as direct current fast chargers (DCFC), use a 480-volt system and can add more than 100 km of range per hour. These stations make longer trips feasible for EV drivers.	The costs are approximately \$50,000 due to equipment purchasing, and specialized installation costs.

Figure 8 – Charging Levels and Associated Costs

RECOMMENDATION

To support the adoption of EVs in Ontario, the government could amend the Building Code to make electric vehicle charging port stations mandatory in new builds and remove HST on charging infrastructure sales to lower costs for consumers to support adoption among residents living in older builds.

86 <http://www.metrovancouver.org/services/air-quality/climate-action/transportation-programs/ev-strata-condo/key-info/chargers-installation-costs/Pages/default.aspx#:~:text=Installation%20costs%20can%20vary%20from,1%20charging%20also%20require%2020Amps>
87 <https://www.propertymanagerinsider.com/how-much-do-ev-charging-stations-cost/>
88 <http://www.mto.gov.on.ca/english/vehicles/electric/charging-electric-vehicle.shtml>

RECOMMENDED POLICY SOLUTION

8. NEW FLOOD MAPPING FOR PROTECTION OF ONTARIO HOMES



BACKGROUND

As temperatures across North America continue to rise because of climate change, property-level residential flooding is occurring more frequently and is posing a pronounced challenge for Canadian homebuyers. In fact, with respect to insurable losses, flooding is cited as the most costly climate event in Canada in terms of damage and impact.⁸⁹ Homebuyers are becoming more wary of purchasing a home in a flood plain, as insurance premiums and cap rates (i.e. the maximum level of flood insurance available) for residential basement flooding have lowered. As homeowner protections continue to trend downward, the number of homes being deemed ineligible for flooding insurance is increasing. Considering that the approximate cost of renovating a basement following a flooding event is \$43,000, flood risk is a major factor that will continue to be considered for future homebuyers.⁹⁰

A recent study conducted as part of *Treading Water* aimed to illustrate the effect that flooding events had on real estate variables, such as sold price and number of days on the market. As expected, the average sold prices of homes in three Ontario cities (Burlington, Toronto, and Ottawa) over a six-month period pre- vs. post-flooding was approximately 7.7% lower in flooded vs. non-flooded communities. Similarly, homes spent 30% more time on the market in flooded vs. non-flooded communities.⁹¹ To put this into perspective, the average sale price of a home in Ontario in 2021 was just over \$871,000, meaning that a “flood discount” would cost sellers more than \$67,000. For many homeowners, their home is their largest asset and retirement fund, making any effect on home devaluation detrimental to people across Ontario.



The consequences of natural disasters such as flooding will continue to have an impact on the housing market, even beyond residential areas that are in flood plains. Precipitation events known as “rain/weather bombs,” like those experienced in British Columbia in November 2021, can release the equivalent of a month of rainfall (200 to 300 mm) over the span of a few days.⁹² Properties that are not located near bodies of water can become affected through storm sewer overflow, leading to flooding of low-lying areas. Until now, adaptation to flood risk has been mostly reactive, but governments can create tools that will inform buyers and sellers about risks associated with the communities in which they live and help them plan for future climate events.

89 Bakos, K., Feltmate, B., Chopik, C. & Evans, C., “Treading Water: Impact of Flooding on Canada’s Residential Housing Market,” Prepared by the Intact Centre on Climate Adaptation, University of Waterloo, February 2022.

90 Bakos, Feltmate, Chopik and Evans, “Treading Water.”

91 Bakos, Feltmate, Chopik and Evans, “Treading Water.”

92 Environment and Climate Change, “Canada’s top 10 weather stories of 2021,” Government of Canada, December 2021, <https://www.canada.ca/en/environment-climate-change/services/top-ten-weather-stories/2021.html>.

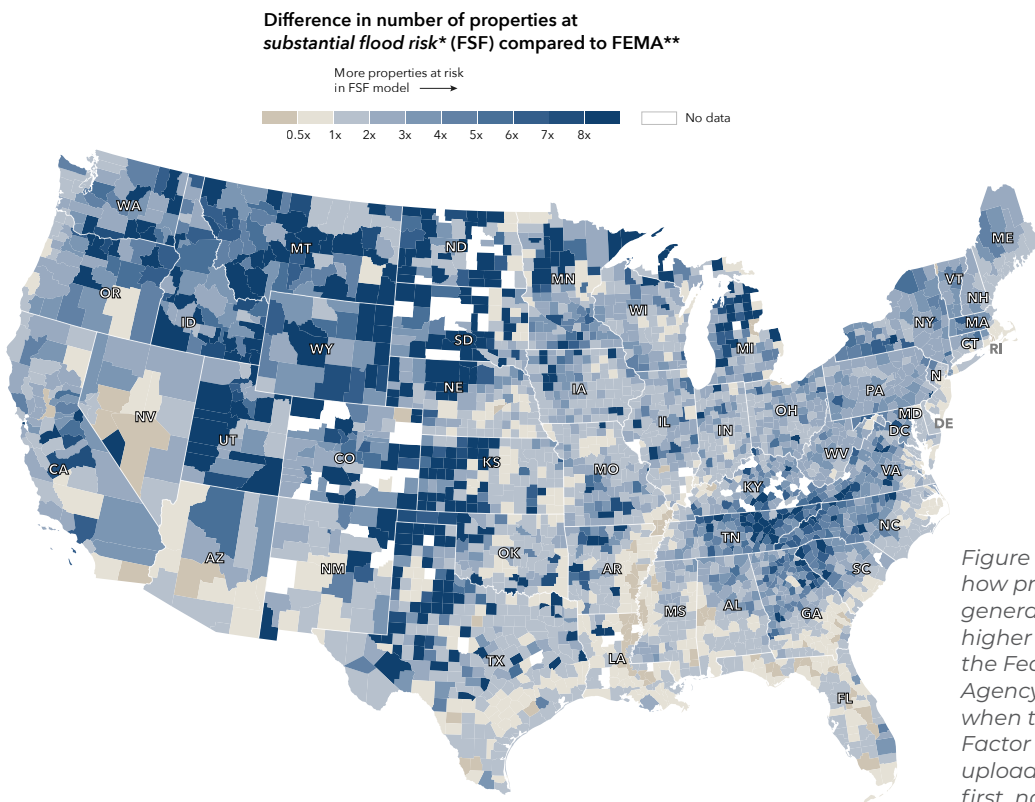


Figure 10 – Map of United States depicting how properties at risk for flooding are generally captured at rate that is 1.7 times higher than those captured as part of the Federal Emergency Management Agency's flood-risk identification system when they are assessed using the Flood Factor Model, https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf

Such tools already exist and are being used by American REALTORS® and consumers. In 2020, The National Association of REALTORS® (NAR) partnered with a non-profit research firm, the First Street Foundation, to develop Flood Factor™—a searchable website that allows users across the United States to employ residential information, such as an address or postal code, to assess flood risk in residential areas. The firm used existing Federal Emergency Management Agency (FEMA) data and images obtained from airplanes and satellites to create a national flood mapping model that identifies flood zones not only near streams and rivers, but also in areas that may be at risk of flooding due to heavy rainfall. Flood Factor™ provides a flood risk score for more than 142 million homes.⁹³ The score is determined by the likelihood of flooding and the potential depth of a flood over the next 30 years.⁹⁴ By working with federal and municipal governments, Ontario could develop a system

like Flood Factor™ to make flood preparedness more accessible and motivate homeowners to protect their property from flooding. Increasing transparency and providing greater context for homebuyers can help reduce surprises and increase confidence in real estate markets where flooding poses a potential risk of depreciation.

RECOMMENDATION

To allow Ontarians to make better-informed decisions when buying or selling a home, it is recommended that the Government of Ontario develop a user-friendly system that establishes the flood risk of residential properties across the province, to fill in gaps in existing flood mapping.

⁹³ Bakos, Feltmate, Chopik and Evans, "Treading Water."

⁹⁴ National Association of REALTORS®, "Flood Factor™ FAQ," October 2020, <https://www.nar.realtor/national-flood-insurance-program/flood-factor-faq>.

CONCLUSION

The residential building sector in Ontario is one of the leading drivers of GHG emissions in the province. This paper has outlined a set of policy solutions that create the conditions for Ontario to reduce emissions, mitigate the impacts of climate change on the housing sector, and support societal uptake of measures that will encourage the overall “greening” of the housing sector.



Recent environmental and climate change events in Canada, such as heat waves in British Columbia, have highlighted the significant challenges and issues that arise when housing is not prepared for rapidly changing environmental conditions. Impacts range from social well-being to economic and financial considerations, which require proactive government intervention to ensure that Ontarians are safeguarded, and that homeowners are prepared for the future.

The policy options outlined in this paper will help catalyze Ontario's already existing climate mitigation efforts, and will bring the province closer to meeting its GHG emissions reductions targets and commitments.

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The StrategyCorp Institute of Public Policy and Economy provides thought leadership on important public policy issues facing Canadians and their governments across the country by combining policy expertise with key political insights.

The Ontario Real Estate Association commissioned the StrategyCorp Institute of Public Policy and Economy to produce an independent white paper on constructive policy solutions to address emissions in the residential real estate sector and the climate change impacts those emissions are creating.

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