

Retrofitting Canada's Homes: Progress Report #1

November 2023



Deep Energy Retrofits
CANADA

Green Communities
CANADA

Green Communities Canada

Green Communities Canada has been leading a community-based climate action movement for more than 25 years, working together with our members and partners from across the country to advance transformative, equitable, and lasting change. As a national organization, our goal is to support and sustain grassroots-led action.

Our work focuses on three key areas of climate impact: sustainable transportation, residential energy efficiency and EnerGuide, and green infrastructure. Green Communities Canada's leadership in community-based energy efficiency programs is unparalleled. We have been designing and delivering retrofit programs for over 25 years, including piloting the Government of Canada's EnerGuide auditing service and designing the Province of Ontario's electric and gas low income retrofit programs. Our member organizations and their energy advisors work with homeowners and contractors every day to implement a broad range of retrofit initiatives and we are intimately connected to the experience of those working on the frontlines of climate action.

In 2022, Green Communities Canada received funding from three philanthropic foundations to launch our Deep Energy Retrofit Program.

The objective of this program is to establish publicly accessible educational resources, supportive training initiatives, and research products that increase momentum for ambitious, widespread, and equitable retrofits, and quickly equip Canadian communities with the tools and capacity required to accelerate change.

Author Kai Millyard has worked in energy and environmental policy for over 40 years. A specialist in residential energy efficiency program design, delivery and evaluation, he designed the first homeowner incentive program using the EnerGuide rating system, which was operated nationally starting in 2003. He has represented environmental organizations at the Ontario Energy Board in the development and oversight of utility demand-side management programs since 1991. Millyard led the design of low income energy efficiency programs in Ontario and managed delivery of those programs for over 10 years. He has been a special consultant to Green Communities Canada and its members since 1993 on a wide variety of projects, including acting as their EnerGuide Service Organization Manager since EnerGuide began in 1998.

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Executive Summary

Canada's 2030 Emissions Reduction Plan includes a target of a 40% reduction in greenhouse gas (GHG) emissions by 2030 and a goal of net-zero by 2050. Buildings emissions increased from 2005 to 2019 but low-rise residential emissions actually decreased 6.1%. We are making progress towards net-zero in housing but not fast enough.

Natural Resources Canada introduced the Canada Greener Homes Grant program in 2021, supported by the well established EnerGuide Rating System. It has been highly successful in stimulating retrofits, which increased nearly four-fold once the program started, with more than 188,000 retrofits completed and documented from 2020 to 2022. Average energy savings, however, increased much more modestly from 17% to 21%. Retrofits resulting in energy savings of over 50% (i.e., deep energy retrofits) are needed to support the elimination of GHG emissions and to minimize the demand for electrical utility expansion. Deep energy retrofits made up only 6.1% of retrofits in 2022.

The Greener Homes program budget will support 700,000 retrofits over seven years.

At this rate it will take more than a century to retrofit the more than 11 million houses in Canada that require upgrades.

The lowest overall societal cost for reducing GHG emissions is for existing residential buildings to follow a retrofit pathway that begins with building envelope efficiency upgrades (e.g. insulation), resulting in the need for smaller mechanical systems (i.e., heating and cooling equipment), and smaller on-site renewable systems.

However, our examination of the EnerGuide data shows that building envelope improvements are being neglected, resulting in the use of more energy than is desirable or necessary. The design and incentive structure of the Greener Homes program is inadvertently moving homeowners away from envelope upgrades, which have declined significantly since the program was introduced, in favour of heat pump and solar installations.

To accelerate and deepen energy retrofits across Canada, this report includes recommendations to improve the Greener Homes incentive program.



Changes to building codes are expected to result in net-zero construction of new houses by the early 2030s. In existing houses, on average, space heating accounts for 63% of energy consumption; lighting and appliances account for 19%; and water heating accounts for 15%. The remaining 3% of energy consumption is for cooling, and that number is forecasted to grow.



Introduction

Wildfires and other extreme weather events this past summer have driven home the urgency of reducing greenhouse gas (GHG) emissions. Canada's 2030 Emissions Reduction Plan includes a target of a 40% reduction in GHG emissions by 2030, and achieving net-zero by 2050. In the buildings sector, emissions increased from 84 megatonnes in 2005 to 91 megatonnes in 2019¹. However, preliminary data just released by the Canadian Climate Centre shows that emissions in the low-rise housing sector have declined by 6.1% since 2005². We are making progress in low-rise housing, but not enough.

In 2021 Natural Resources Canada (NRCan) launched the Canada Greener Homes Grant program (Greener Homes) to help Canadian homeowners retrofit their houses. Greener Homes and other programs across the country use NRCan's EnerGuide Rating System (EnerGuide) to

measure the efficiency of houses, provide homeowners with specific recommendations for improvements, measure improved energy performance after retrofits, and award incentives. The EnerGuide system provides a rich database of energy performance information from before and after retrofits are completed for houses participating in the programs.

This report is focused on the low-rise residential building stock in Canada—buildings up to three storeys above ground, not taller multi-unit buildings. We reviewed the ~188,000 retrofits documented with the EnerGuide system across Canada from 2020, 2021 and 2022 to evaluate Canada's progress towards GHG reduction goals and identify opportunities for acceleration. We also establish a number of benchmarks that we plan to monitor and report on annually.

1. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-planoverview/emissions-reduction-2030/sector-overview.html#sector2>

2. Canadian Climate Centre, *Early Estimate of 2022 GHG emissions 2022*.

<https://440megatonnes.ca/early-estimate-of-national-emissions/#estimate-table-2>. Emissions from commercial buildings on the other hand are continuing to rise

Background

Canada’s existing housing stock & the task ahead

There are about 11,600,000 houses in Canada (see Table 1). Few are highly energy efficient and thus nearly all need to be retrofitted. Newer houses built over the last 30 years (about a third of the total) will need minor building envelope improvements. In older houses more significant building

envelope upgrades are needed to reduce heating and cooling requirements before fuel switching to heat pumps. Heat pumps will be required when heating, cooling and hot water equipment needs to be replaced in order to switch off fossil fuels.

Table 1: Canadian Households by type (2019 data)

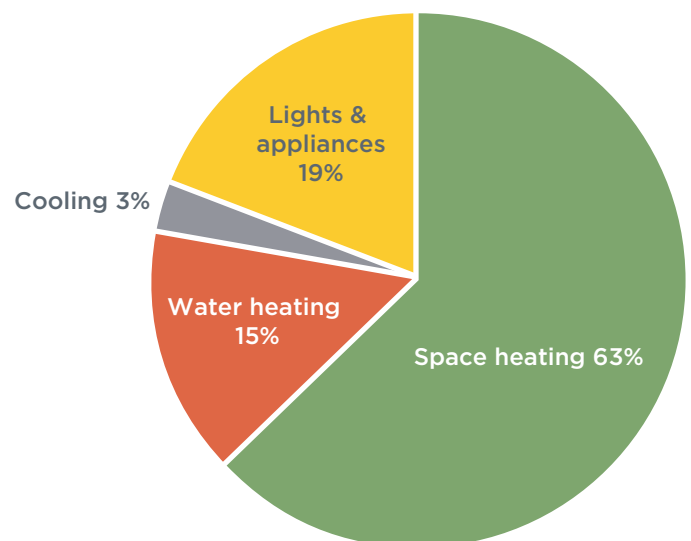
Single-family detached	9,105,014
Semi-detached and row houses	1,987,309
Low-rise apartment units	1,850,538
Estimated total low rise residential building*	11,600,000

* Our estimate for the number of buildings assumes four units per low rise apartment building. High rise apartments account for another ~1.5 million dwellings. However these are treated as commercial buildings and are not discussed in this report. Data from NRCan’s National Energy Use Data Base

Residential Energy Use

In Canada, residential energy use is dominated by space heating. Space and water heating are usually provided by fossil fuels, where the switch to heat pumps can both eliminate fossil fuel use, and significantly increase the efficiency of supplying the energy. Switching to heat pumps typically reduces energy consumption by two-thirds. Even in provinces with abundant hydroelectricity (notably Quebec, Manitoba, and British Columbia) and widespread electric heating, switching to heat pumps which have far higher efficiency is highly cost-effective and frees up large amounts of electricity supply for replacing fossil fuel elsewhere. Heat pump water heaters will be required when hot water equipment in these houses needs to be replaced. Lights, most appliances, and cooling systems already run on electricity.

**Figure 1
Residential energy use**



What is a deep retrofit?

There are three main steps in retrofitting and decarbonizing housing:

Step 1

Improving the thermal efficiency of buildings to reduce the overall amount of energy needed.

Controlling and reducing air leakage, adding insulation, and upgrading windows and doors can reduce the amount of energy needed to heat houses by more than 50%. This essential first step significantly reduces the overall energy demands on the next steps - the need for new electrical generating capacity and on-site renewables.

Step 2

Electrifying the house—to switch off fossil fuel use.

Switching off fossil fuelled equipment may happen in the course of a large comprehensive retrofit. In other cases it can wait until existing equipment comes to the end of its life cycle and needs to be replaced. As long as the heating requirement has been reduced by building envelope improvements, the new heat pumps will be smaller, sized properly, cost less, and will operate more efficiently. At some point, fossil fuelled equipment will be phased out and only heat pumps will be available, and so natural turnover of the equipment can be relied upon to complete the transition³.

Step 3

Adding a renewable energy system, typically solar photovoltaic (PV) panels, to supply some or all of the remaining energy needed.

If steps one and two have been completed well and produced an efficient house, PV systems can supply a significant amount of the remaining energy needed. The option of storage batteries also allows for storing excess PV electricity for later use.

3. Some jurisdictions have started taking this step already. Denmark banned new fossil heating in 2013 and Finland in 2014. New York State passed a law earlier this summer banning fossil fuel heating in new low rise residential buildings starting in 2026. In September the German parliament passed a law to begin phasing out fossil heating not only in new construction but in existing houses, starting in 2026. In Canada, the cities of Victoria and Nanaimo have passed zero-carbon new construction bylaws that will end fossil heating systems in new houses by 2025, and Montreal is in the process of developing a bylaw to do the same.



Canada Greener Homes Grant

In May 2021 the Canada Greener Homes Grant program was launched. The program offers homeowners up to \$5,000 in grants for completing specific upgrades. There was an extraordinary response by homeowners upon the launch of the program, with tens of thousands signing up in the first few days to participate. For the first year, there was a significant waiting list as service providers were training new energy advisors to meet the demand. These delays are largely over

and homeowners can now enroll and get their first energy audit within a week or two.

An initial energy audit provides homeowners with an energy rating of the house and recommendations for improvements. After improvements are made, the energy advisor returns to confirm the upgrades and award incentives.

Figure 2:
Completed Retrofits

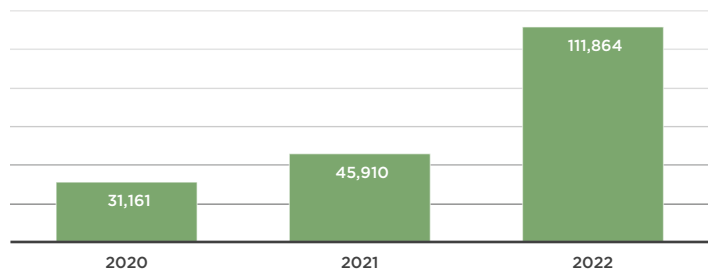


Figure 2 shows the dramatic rise in retrofitting activity over the three year study period. 2020 represents the year before the Greener Homes program was launched. Only some local or provincial programs were operating during that year⁴. 2021 represents a year in which Greener Homes was starting up, and 2022 shows Greener Homes in full operation⁵.

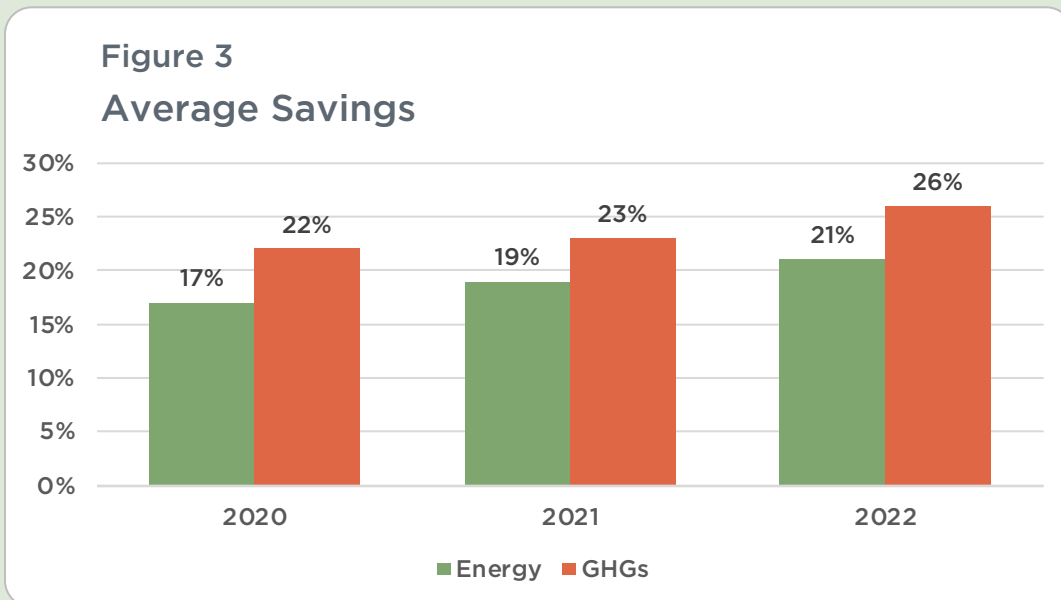
The Canada Greener Homes program has a budget to support 700,000 retrofits over a period of seven years. At this pace, it will take more than a century to retrofit the more than 11 million houses in Canada that require retrofits.

4. Many of these other programs also use the Energuide Rating System to provide recommendations, measure improvements, and award incentives. Nova Scotia, Quebec, Manitoba, and British Columbia have their own programs, layering additional incentives onto federal grants. In Ontario, Enbridge operated a program for their customers during this period. Some municipalities, including Halifax, Kingston, Ontario's Durham Region, Toronto, and Saskatoon, also ran programs. These programs all use Energuide, and the results from all these programs are captured in the database used for this report.

5. In June 2022 Canada Mortgage and Housing Corporation (CMHC) launched a loan offering to supplement the grant program. Up to \$40,000 is available at zero interest to credit-worthy Greener Homes Grants participants over a 10 year term. Unlike the response when the Grant program was launched in 2021, the Loan program did not produce a noticeable increase in program applications.

Moreover, the level of savings per house is not yet at the level needed to reach GHG reduction targets. Figure 3 shows average energy savings from the retrofits and average greenhouse gas (GHG) emission reductions. From 2020, when only local programs were operating, to 2022 with the Greener Homes program in full operation nationally, average energy savings produced by the retrofits increased only modestly from

17% to 21%. Corresponding GHG reductions were somewhat higher. These savings are nowhere near the depth of savings needed to meet GHG goals, even if the pace of retrofitting were dramatically increased. To reach GHG reduction goals, both the depth of savings and the pace of retrofitting need to increase significantly.



The case for deeper retrofits

The combination of highly efficient building envelopes, electrified equipment, and solar PV supply can be combined to build new 'net-zero' houses which need no more energy than is produced on site. However, retrofitting existing houses to net-zero is much more challenging. Nevertheless, applying as many of these strategies as possible in each house can produce deep

energy savings and virtually eliminate GHG emissions. As a result, the concept of deep retrofits is emerging as a practical approach for climate protection. We define 'deep retrofits' as a retrofit that produces total energy savings of 50% or greater, regardless of starting point.

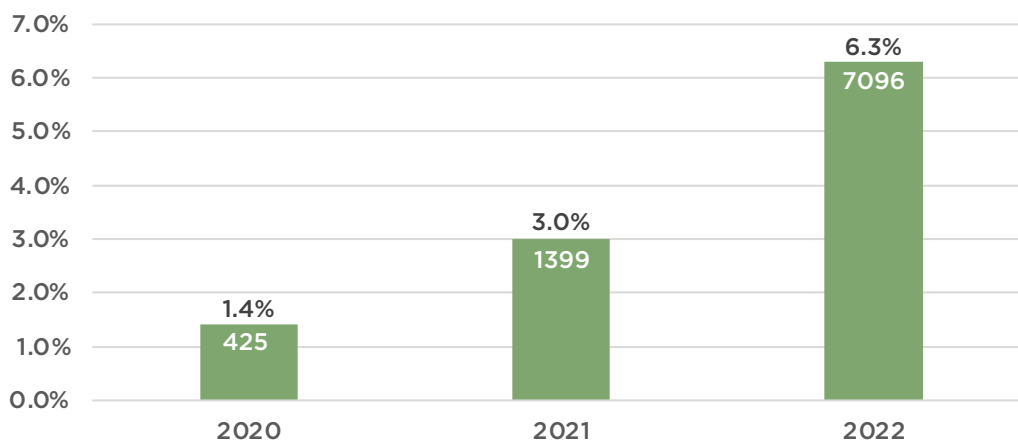


Deep retrofit uptake

In 2020 only 1.4% of homeowners participating in EnerGuide programs were achieving 50% energy savings or greater; see Figure 4 and [Appendix A](#) for a provincial breakdown. With the introduction of Canada Greener Homes incentives, this more than quadrupled to 6.3% in 2022. Two main factors contributed to this increase: the availability of Canada Greener Homes grants, and the introduction of two new upgrades eligible for grants.

In addition to incentives for upgrading insulation, air leakage control, and high performance windows (building envelope upgrades), the Greener Homes program made electric heat pumps for space heating⁶, and solar photovoltaic systems eligible for grants. These two new upgrades have the potential to greatly increase energy savings over the savings produced by the building envelope upgrades. They also add incentives for the second and third retrofit decarbonization strategies—electrification, and renewable supply.

Figure 4
How many deep retrofits?



6. Incentives for fossil fuelled equipment are not available. <https://naturalresources.canada.ca/energy-efficiency/homes/canada-greener-homes-grant/start-your-energy-efficient-retrofits/plandocument-and-complete-your-home-retrofits/eligible-grants-for-my-home-retrofit/23504>

Figure 5
Average GHG reductions

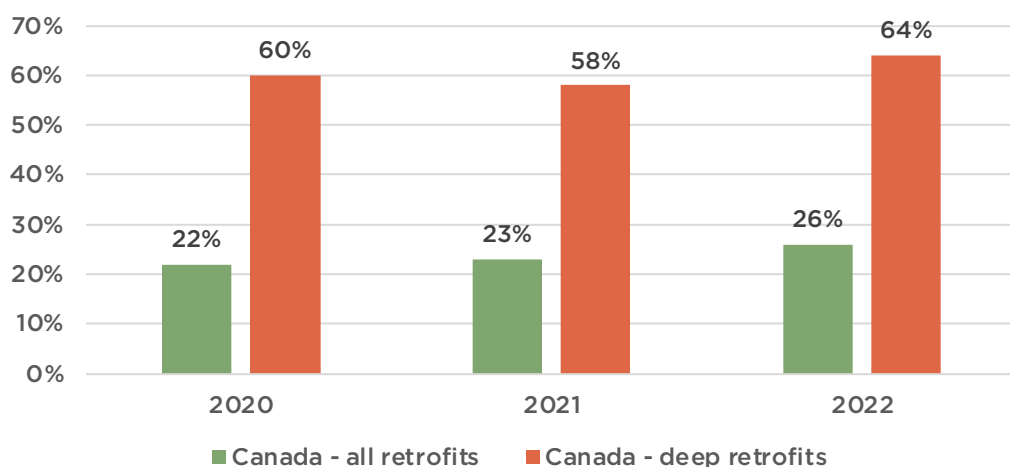


Figure 5 illustrates greenhouse gas reductions from all ~188,000 retrofits, including the reductions realized from the 8,920 deep retrofits. GHG reductions from deep retrofits are more than double the GHG reductions from average retrofits. Deep retrofits have the potential to eventually eliminate emissions, as space and water heating systems are replaced by heat pumps, and provinces phase out generating electricity from fossil fuel.

Deep energy retrofits can provide the depth of energy and GHG savings needed to decarbonize Canada's housing stock, improve the quality of housing, and minimize electrical demand growth. The 8,920 homeowners completing deep retrofits have shown what is possible. Natural Resources Canada and other sponsors of incentive programs should increase the ambition of their programs with the goal of achieving deep retrofits.

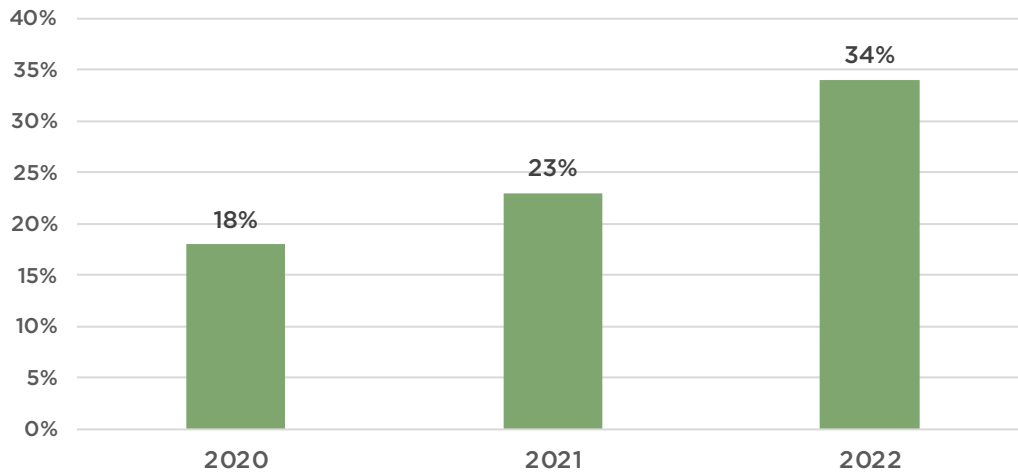
To accompany this shift to a new goal, marketing and education efforts must be

shifted to emphasize the need for, and benefits of, deep retrofits, which extend beyond energy and GHG reductions to include greater comfort, improved indoor air quality, lower operating costs, higher resale value, and greater building durability.

The uptake of deep retrofits is at least partly a result of the recommendations provided to homeowners by their energy advisors. Choosing which upgrades to recommend must take into account the homeowner's plans, available budget, and available incentives. While the ambition of retrofit recommendations has been increasing, most homeowners are not getting recommendations for complete deep retrofits. See Figure 6 (*next page*) and the [Appendix](#) for a provincial breakdown.

EnerGuide Service Organizations and their energy advisors delivering the Greener Homes program should orient their services to promote and support more complete retrofits for homeowners. This may require increased training for energy advisors.

Figure 6
Average Recommended Energy Savings

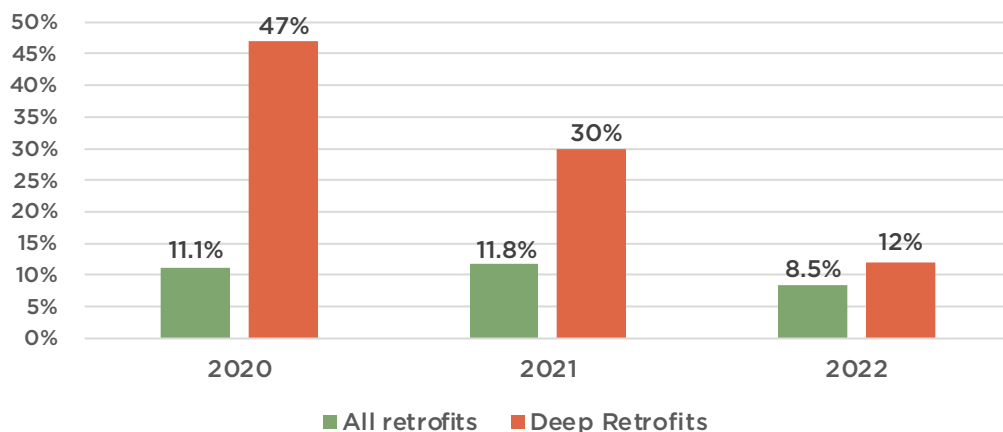


Understanding deep retrofit savings

Deep retrofits are producing larger energy savings than average owing to higher installation rates for heat pumps and solar systems. Forty percent of all households that undertook a retrofit in 2022 installed a heat pump; for those undertaking deep retrofits, 57% installed heat pumps. Solar PV systems were installed in 6% of all retrofits, and in 27% of deep retrofits.

Solar systems offset 14% of total energy use on average, and savings from heat pumps exceed 40%. Therefore a deep retrofit (50% savings or greater) can often be achieved by installation of these two upgrades alone, without improving the efficiency of the building at all.

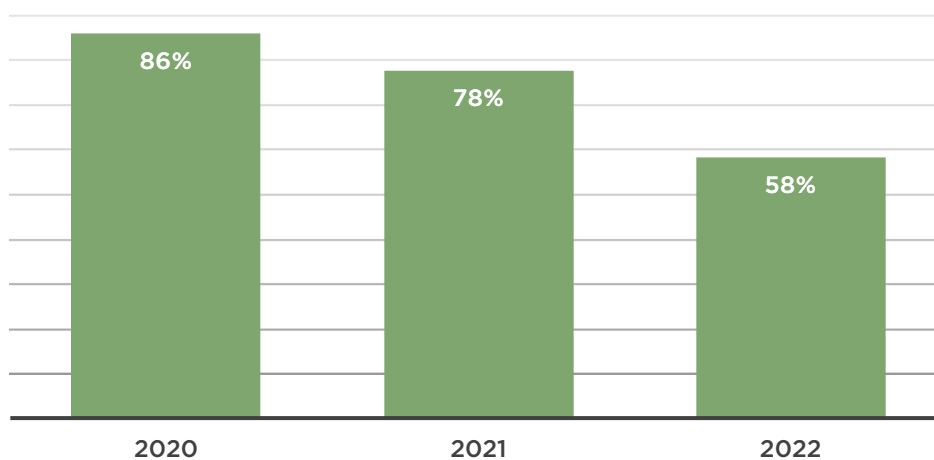
Figure 7
Building envelope improvements
(Avg. heat loss reductions)



In fact, energy savings produced over the three year period from building envelope improvements declined, and are 23% lower under Greener Homes than before the program began. This effect is even more pronounced in deep retrofits. See Figure 7. In 2022, heat loss reductions were 74% lower than for 2020's deep retrofits⁷. This suppression of building envelope improvements is an unintended and problematic consequence of the Canada Greener Homes program design. Why is it happening? Is it something about the advice from energy advisors? Are homeowners running out of funds?

Over the three year period, retrofits recommended to homeowners by energy advisors have been increasingly ambitious. See Figure 6. However, actual energy savings from completed retrofits has grown only modestly from 17% to 21%. (Figure 4) Homeowners have realized lower energy savings than recommended by their energy advisors: 86% of recommended savings in 2020 compared to only 58% of recommended savings in 2022 under Greener Homes. See Figure 8.

Figure 8
Actual savings vs recommended savings

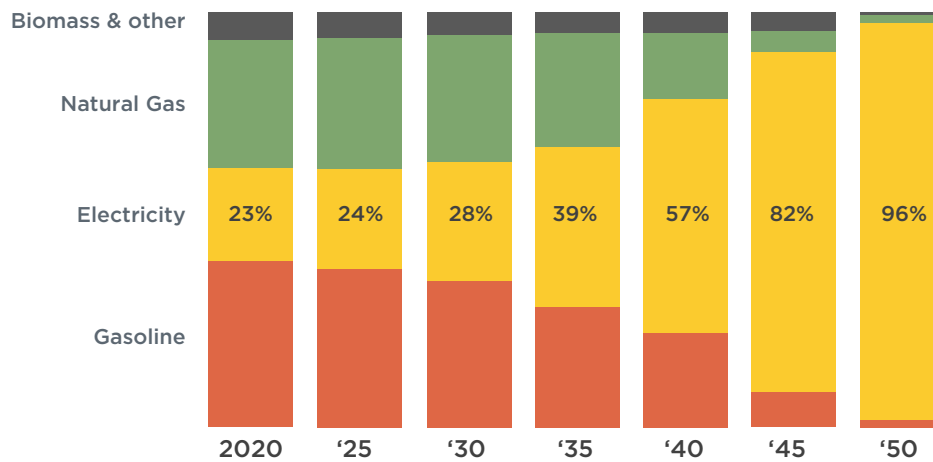


7. For provincial breakdown see [Appendix A](#).

Figure 9

To support net zero, household energy use will shift away from **natural gas** and **gasoline** toward **electricity**

Average household share of energy consumption by type.



Source: The Big Switch, 2022

Electrification & the importance of building envelope savings

Far less of Canada's energy use is supplied as electricity (20%) than is supplied as fossil fuels (70%)⁸. The transition to electric vehicles is underway. In addition to transportation, the prospect of shifting space and water heating from fossil fuels to electric heat pumps means electric grids across Canada will need to expand rapidly to meet demand. Canada's Energy Future 2023, the June 2023 report from Canada's Energy Regulator, forecasts that electricity use will more than double by 2050 to meet the demand for heat pumps and electrified

transportation⁹. In its report, The Big Switch, the Canadian Climate Institute estimates that electric generation capacity needs to grow by 2.2 to 3.4 times to meet the new demand¹⁰. In July, the Ontario Government announced plans to expand Ontario's electricity system with up to 20 new nuclear reactors, new transmission lines, pumped storage, and other options¹¹. Other electrical generation expansion plans have been launched by British Columbia and Quebec.

8. Energy Fact Book 2022-2023, Natural Resources Canada, Secondary Energy Use by fuel type.

9. <https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/index.html>

10. <https://climateinstitute.ca/reports/big-switch/>

11. Powering Ontario's Growth, Ontario Ministry of Energy, <https://www.ontario.ca/page/poweringontarios-growth#section-6>

This scale of expansion amounts to building more electrical generation capacity in under 30 years than was built over the last century. The benefit of reducing space heating needs before fuel switching is clear: if heating requirements are halved, only half the generating capacity will need to be built. The Big Switch observed that “Aggressive improvements in energy efficiency are needed so Canada’s electricity

systems meet electricity demand that is right sized.” A recent study completed for the US Department of Energy’s Lawrence Berkeley Laboratory concluded that efficient, grid-responsive buildings would make a clean electricity grid more than \$100 billion cheaper every year¹². Yet under Greener Homes, building envelope efficiency improvements are declining.

Retrofit costs & incentives

The maximum grant from Canada Greener Homes is \$5,000, the same amount as was offered 20 years ago under the “EnerGuide for Houses” retrofit program. Taking inflation into account, \$5,000 has the buying power of only ~\$3,250 now. Conversely, if the offer had kept up with inflation the maximum grant now would be ~\$7,900.

During the same period, labour and materials costs have increased. New heat pumps cost between \$5,000 and \$25,000. A solar PV system can easily be \$25,000, and comprehensive building envelope work on older houses can cost as much as \$100,000. In the Greener Homes grants list, there are four different upgrades alone that can earn the full \$5,000: window replacements, solar PV systems, heat pumps, and wall insulation. Installing a heat pump uses up the full \$5,000, leaving nothing to support any other upgrades. Why are savings from building envelope improvements declining? Homeowners who have significant work to do on their houses are limited by a small total grant. They have to pick and choose what they will do, and they are choosing heat pumps and solar panels over building envelope improvements. The cap of \$5,000 is constraining the program’s success.

A revised Greener Homes program must significantly increase the maximum grant amount available to Canadian homeowners to recognize the higher costs of renovations, provide an adequate incentive to enable homeowners to pursue all the upgrades needed in their homes, and realize deep retrofit levels of savings. Once the program is delivering deep savings, budgets must be increased to accelerate retrofitting to meet GHG goals.

Many Canadians live in ‘energy poverty’—where energy bills take up a disproportionate fraction of household income¹³. The Greener Homes type of retrofit incentive program does not work for low-income households or First Nations communities. A different type of program is required—one that provides a 100% incentive, where there is no cost to the participant. While some provinces or utilities have programs dedicated to low-income or Indigenous housing, availability across Canada is limited, budgets are low, and programs are generally not focussed on deep savings. Good work is being done by others on this topic, and will be reviewed in future Progress Reports.

12. <https://www.canarymedia.com/articles/energy-efficiency/why-efficient-buildings-are-key-to-decarbonizing-the-power-grid>

13. <https://www.energy-poverty.ca/>



Professional help

Financial incentives are a powerful tool for helping homeowners overcome barriers to upgrading their houses, but they do not address all barriers.

For many homeowners the ‘hassle cost’ of doing the required research, collecting quotes from multiple contractors, evaluating quotes, hiring contractors, obtaining permits, and overseeing work is a cost that is too large. As a result, recommended retrofits simply don’t get done.

For large projects, which have a greater prospect of deeper savings, professional help is critical; both to relieve the workload and to provide needed expertise. In some cases, general contractors or architects will provide this service and manage a complete renovation/retrofit. However, they do not always have the expertise to ensure the energy performance aspects of the project are completed successfully.

Finally, many homeowners undertake renovations as do-it-yourself projects. Unfortunately, this sometimes produces poor results. EnerGuide advisors completing

post-retrofit audits regularly find that homeowners or their contractors have not completed retrofits effectively, won’t realize the desired energy savings, and won’t earn incentives as a result. High quality results are much harder to realize with piecemeal efforts carried out in the absence of expert help and a long term retrofit plan¹⁴.

For these reasons, various parties delivering the Canada Greener Homes program have created a range of services to help fill the gap. Sometimes called Energy Coach, Navigator, or Concierge services, these efforts include additional information, design assistance, on-site training and consultations with architects and contractors to help achieve the energy performance goals, and more¹⁵.

While a number of local programs have started funding services for homeowners, these services should be available across the country, and be recognized, endorsed, and funded by the Canada Greener Homes program to help ensure more successful retrofits.

14. While top quality results are easier to achieve in comprehensive retrofits, not all homeowners are able to do large renovations. Good results can still be obtained if a number of ‘piecemeal’ retrofits are completed over time, if they are carried out with a proper plan and expert advice in place.

15. Examples include Ottawa’s Home Retrofit Planner service, Vancouver’s Home Energy Navigator program, and Durham Region’s Home Energy Coach service.

Examples of stronger programs

Germany has offered incentives to homeowners for retrofits through its KfW Bank¹⁶ since at least 2006. Adopting some features of the German program would represent significant improvements to Greener Homes. The current German program has some similarities to Greener Homes.

- The program uses the German home energy rating system for awarding incentives.
- There is both a loan and a grant component to the incentives.
- Loans are available for up to €150,000 (roughly CAD\$210,000) in contrast to the Greener Homes loan of \$40,000. CMHC's loan comes interest free for up to 10 years. KfW loans have a 20 year term, and interest rates are low.
- The grant portion is treated as forgiving repayment on a portion of the loan and is for up to 25% of the loan amount, or over CAD\$50,000. The amount available depends on how high the retrofit climbs on the home energy rating scale.
- The much larger grant maximum provides a significant incentive for homeowners to install the full range of upgrades needed to complete an energy efficient renovation.
- The incentive is performance-based—it rewards large energy savings, not the installation of individual upgrades. This supports the development of a whole project that will maximize savings, which the piecemeal approach in Canada does not.
- The program requires participating homeowners to retain an energy expert to support them through the renovation, by providing assistance with design, advice, contractor management, and to ensure energy targets are met. The cost of this support can be included in the incentives. A list of qualified experts is provided.

16. <https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilie/>

In Ireland the One Stop Shop program¹⁷ is specifically aimed at deep retrofits:

- Grants for a wide variety of energy savings upgrades are offered up to a maximum of ~\$50,000. The average grant paid out to date for single detached homes is ~\$34,000.
- Grant eligibility requires reaching a high efficiency rating on their home energy rating scale.
- Incentives cover project management/advice.
- Offers the homeowner a one stop shop service including before and after energy audits, managing the retrofit, general contracting, and grant application.

Performance-based incentives are being added to some local Canadian programs as well, including the Arctic Energy Alliance program, Efficiency Manitoba's Home Energy Retrofits program, and Kingston Ontario's Better Homes Kingston program¹⁸.

Greener Homes incentives should be updated with a much higher incentive maximum to incent deep retrofits, a performance-based bonus component, and a grant for expert help for homeowner's projects.

New construction

This report is focused on the retrofitting of existing houses. However, new home construction will contribute new greenhouse gas emissions. Fortunately, building codes across the country require these houses to have relatively well insulated building envelopes. And, there are plans for further progress with building codes to require net-zero energy use in the future. As a next step, provincial governments should prohibit fossil fuel heating in new houses as soon as possible. This will hasten the transition to efficient heat pumps and avoid new GHG emissions. With the Canada Mortgage & Housing Corporation (CMHC) projecting a 'supply gap' of 3.5 million dwellings by 2030¹⁹, and with plans to accelerate housing construction to meet these needs, taking steps to minimize the GHG emissions is all the more urgent.

17. <https://www.seai.ie/grants/home-energy-grants/one-stop-shop/>

18. <https://aea.nt.ca/program/home-improvements/>

<https://efficiencymb.ca/my-home/home-energy-retrofit-program/>

<https://www.cityofkingston.ca/resident/better-homes-kingston/about-the-program>

19. *If two thirds of these dwellings are low rise houses, then over 2 million more houses would be built over the next seven years further driving up Canada's GHG emissions. Housing shortages in Canada, Updating how much housing we need in 2030, Canada Mortgage & Housing Corporation, September 2023.*

Conclusion & recommendations

The Greener Homes program is a strong base for supporting homeowners in residential retrofitting, and has shown early success. However, the pace of retrofitting and the resulting savings are not deep enough to realize Canada's GHG reduction goals. In fact, the limited grants available have inadvertently led to declining building efficiency improvements.

1

Recommendation 1: To ensure Greener Homes is aligned with the goal of net-zero by 2050, *adopt deep retrofits as the program's objective*, and redesign incentives accordingly.

2

Recommendation 2: To ensure Greener Homes enables the market to achieve net-zero by 2050, *revise program messaging to emphasize deep retrofits*, and a complete retrofit plan (envelope, mechanicals, renewables) rather than piecemeal measures.

3

Recommendation 3a: To ensure Canada can achieve net-zero by 2050, *significantly increase the maximum Greener Homes grant* amount available to homeowners in recognition of the higher costs of renovations, and to provide an adequate incentive to undertake the necessary upgrades to realize deep retrofit levels of savings. Similar programs in Ireland and Germany offer homeowners grants of more than \$50,000.

Recommendation 3b: To encourage deeper energy savings, *include a performance-pay grant* scaled to the level of energy savings produced.

Recommendation 3c: To increase the success of achieving deep energy retrofits, *cover the cost of homeowners accessing expert help* to complete their retrofits.

4

Recommendation 4: To increase the support for homeowners ultimately achieving deep energy retrofits, we recommend EnerGuide Service Organizations provide their energy advisors with *increased training*.

5

Recommendation 5: To avoid increasing fossil fuel use in new construction and accelerate the transition to heat pumps, *provincial governments must phase out fossil fuel equipment in new construction* as soon as possible.

Appendix A

Figure A1
Average energy savings per retrofit by province

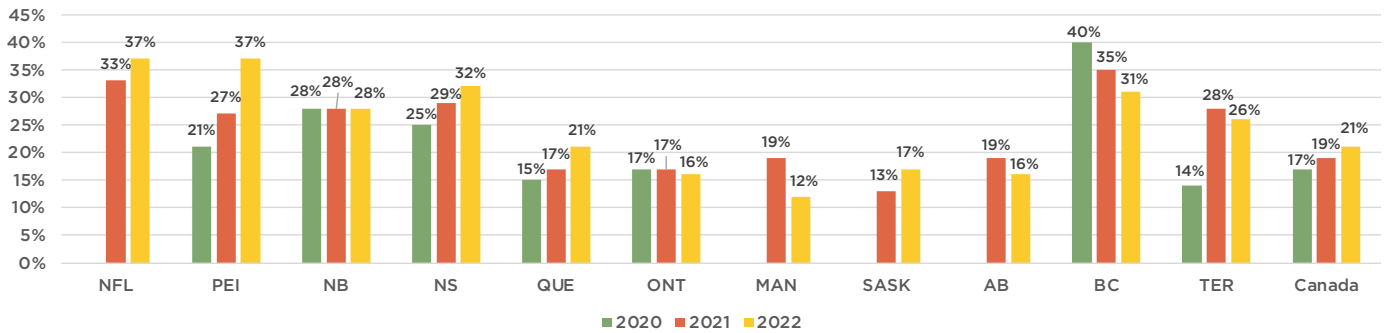
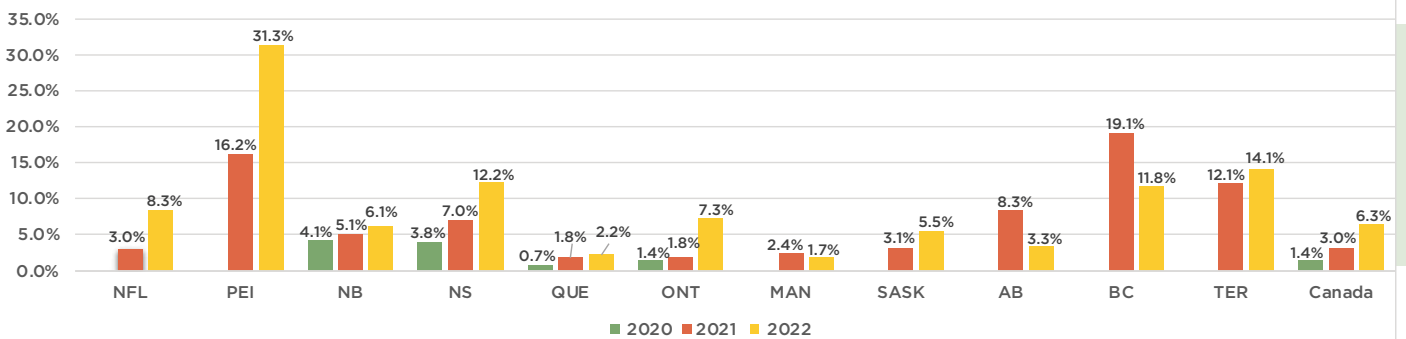


Figure A2
Deep retrofits as a percentage of all retrofits



Appendix A

Figure A3
Average recommended savings by province

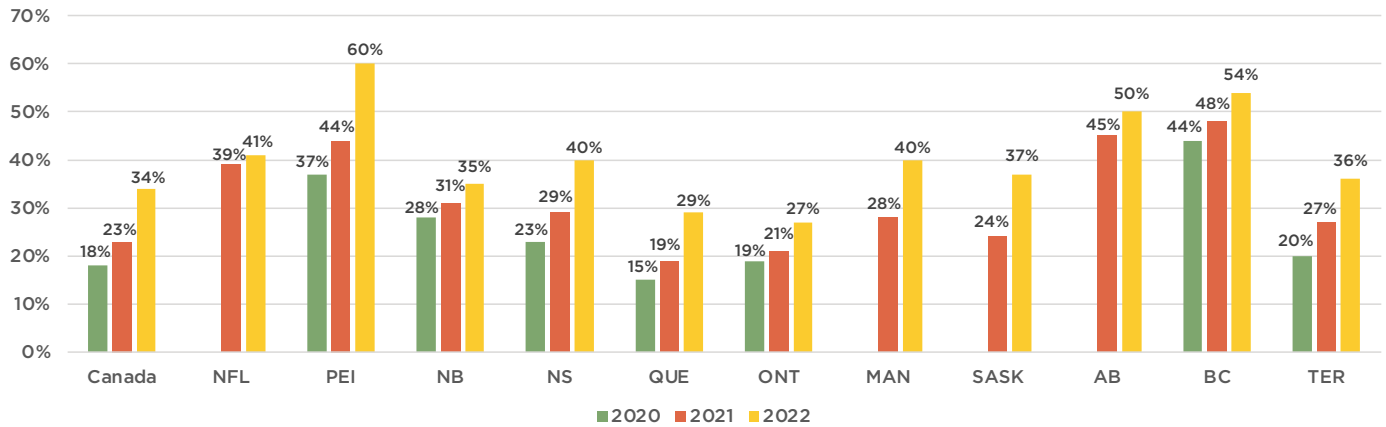
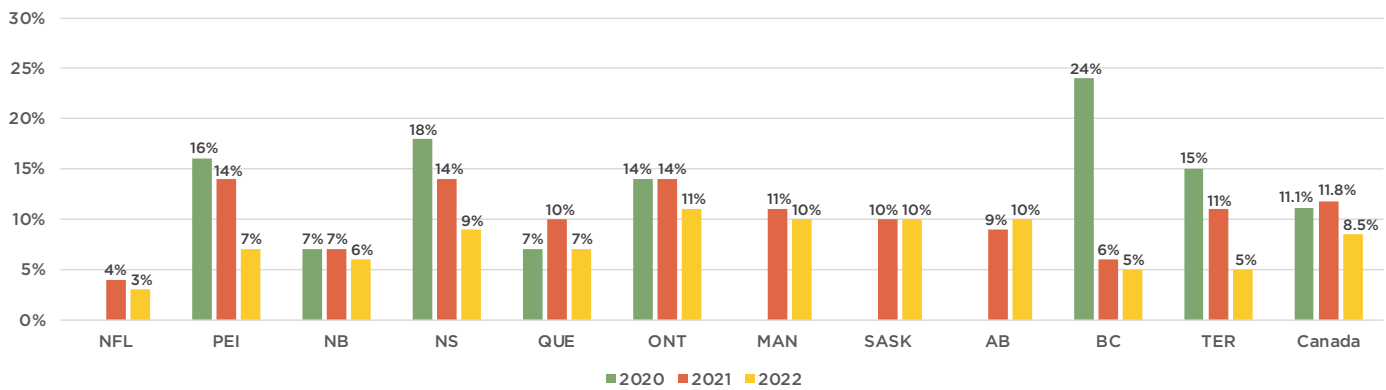


Figure A4
Heat loss reduction over time (building envelope work)



Learn more about deep energy retrofitting at:

deepenergyretrofits.ca

This is a program of Green Communities Canada
greencommunitiescanada.org

