BUILDFORCE CANADA

Building a Greener Future

Estimating the impact on construction labour demands from transitioning buildings in Canada away from fossil fuels

APRIL 2024

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Canadian Home Builders' Association

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BUILDING A GREENER FUTURE

ESTIMATING THE IMPACT ON CONSTRUCTION LABOUR DEMANDS FROM TRANSITIONING BUILDINGS IN CANADA AWAY FROM FOSSIL FUELS

Climate change is a pressing concern worldwide, and Canada is no exception. According to Natural Resources Canada, buildings account for 13% of greenhouse gas (GHG) emissions in Canada, and 78% of those emissions come from space and water heating equipment[1]. Consequently, retrofitting existing buildings to improve their energy efficiency and reduce their carbon footprint has become an important strategy for mitigating climate change. As a result, the Government of Canada is targeting a GHG emissions reduction of 40% from 2005 levels by 2030 and aims to achieve net-zero emissions by 2050[2].

Green retrofits, which involve upgrading buildings to incorporate sustainable technologies and materials, have gained popularity in recent years as an effective means of reducing energy consumption and greenhouse gas emissions.

While retrofitting Canada's buildings is a top priority for achieving a greener future, it will not be without challenges. Achieving the targets set by the Government of Canada will require significant additional effort on the part of the construction industry. This comes at a time when construction labour markets have been operating at or near full capacity in many parts of the country.

In this report, BuildForce Canada estimates the implications for the construction sector as they pertain to meeting the federal emissions reduction goals for homes and commercial and institutional buildings. A **green building scenario** (Scenario) was developed and is contrasted against the BuildForce 2023–2032 **business-as-usual** (Base) forecast scenario to illustrate the benefits and challenges that meeting this ambitious goal may present for the construction sector.

Due to its novelty and to the limited availability of information at the time of preparation, this report does not encompass all green initiatives speculated or underway. For example, it does not estimate the labour impacts from green construction – the processes that make the creation and usage of the built environment as friendly to natural environments as possible (i.e., through such processes as material recycling, alternative material design, use of electric heavy equipment, etc.).

The primary aim of this study is to estimate labour market impacts from converting existing buildings from fossil-fuel or inefficient heating and cooling systems to equipment powered by renewable energy sources. The report also estimates labour market demands from additional investments required to make existing buildings more efficient by reducing energy loss (i.e., replacing old windows and doors, and re-insulating existing homes).

MODEL SET-UP AND ASSUMPTIONS

According to a survey of available studies and industry consultations, achieving significant GHG emissions reductions will require existing buildings to convert from fossil-fuel-powered space and water heaters to systems powered by electricity, such as cold-climate air-source and ground-source heat pumps and building new net-zero or net-zero-ready structures. This scenario does not make assumptions on cost differentials between fossil fuels and electricity; it assumes that policies will be in place that will incentivize this transition. The scenario also assumes all electricity production will be clean (i.e., non-GHG emitting).

While the analysis assumes that the marketplace will move to electric-powered forms of heating, primarily heat pumps, it does not make assumptions about the choices that will be made among air-to-air, air-to-water, water-to-air or water-to-water heat pump systems. These choices will be affected by product availability and innovation, pricing, incentive programs and other factors. In any case the labour market implications will only vary slightly from a trades perspective, with the caveat that some technology-specific (manufacturer) training might also be needed and, to the extent that ground source heat pumps grow in market share, there will be growth in demand for well drillers.

As of 2020, Natural Resources Canada reported 15.9 million homes in existence across Canada. Within those homes, approximately 60% of space heaters and 52% of water heaters were powered by fossil-fuels (i.e., natural gas, heating oil, coal or propane, wood, or non-electric dual systems). This is the latest data made available by Natural Resources Canada that estimates the number of space and water heaters installed by their respective energy sources. The remainder of this report uses the 2020 stock of heating equipment as the starting point for any estimated heat pump or electric water heater installations. Estimates of installations in the intervening years were required to bring the 2020 data inline with the BuildForce base forecast based on available information and industry estimates.

[1] https://natural-resources.canada.ca/energy-efficiency/green-buildings/24572

[2] https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html

Based on these consultations, it is clear that the percentage of homes powered by green systems[3] is steadily increasing, but the current rate of conversions is not sufficient to meet the federal goals. At the current conversion rate of approximately 2.5% per year[4], even if all new homes being constructed were net-zero, it would still take more than 33 years to convert the existing housing stock. This assumes that both the electrical generation and distribution systems across the country can accommodate this additional load (which is beyond the scope of this study but a principal issue to be addressed for this conversion to proceed). This report does not look at the labour requirements for upgrading the electrical grid.

For commercial and institutional buildings, the latest available information is from a 2019 survey commissioned by Natural Resources Canada through Statistics Canada[5]. The survey shows that there were approximately 555,600 commercial and institutional buildings in Canada, excluding universities, other post-secondary institutions, and hospitals. Of these buildings, approximately 21% were not heated or data was unavailable. Among the buildings that reported having space heaters, approximately 55% were heated by natural gas or distillates (i.e., fuel oil, diesel, or kerosene), 4% were heated by other fuels (i.e., propane, steam, hot water, wood, solar, or other), and 41% were heated by electricity.

Data on universities, other post-secondary institutions, and hospitals was available by establishment only – as opposed to the number of buildings. At the time of the data collection, there were close to 1,500 of these establishments in Canada, with only 1% not heated or with heating equipment unknown. Among those that had heating, approximately 74% were heated by natural gas or distillates, while 12% were heated by other fuels, and 14% were heated by electricity.

BuildForce Canada consulted with industry stakeholders to further inform the development of the scenario. Based on this input, a number of assumptions were made related to the percentages of buildings that will convert from fossil-fuel-powered space and water heaters to electrical sources, the percentages of buildings currently using less-efficient electric baseboard heaters that will convert to more-efficient cold-climate air-source heat pumps, as well as the number of new homes required to transition to electric-powered heating equipment over the scenario forecast period.

Based on these consultations, BuildForce Canada estimates that approximately 250,000 heat pumps are installed annually. To reach the federal government's 2030 emissions reduction plan goal, the scenario assumes that heat pump installations will need to increase to approximately 700,000 units installed annually by 2030 in both new-home construction and conversions.

Although converting away from fossil-fuel-powered heating systems to cold-climate air-source heat pumps is likely the path of least resistance, based on currently known technologies, this conversion can present challenges in some instances. For example, replacing a gas furnace with an air handler and a centrally ducted heat pump may create airflow challenges in older homes with inadequate ductwork systems. In these cases, more extensive home renovations will be required to accommodate a move away from fossil-fuel-powered heating systems to cold-climate air-source heat pumps.

Based on industry input, the BuildForce Canada green buildings scenario modelled two types of conversions. The fuel switching component modelled only the minimum labour requirements to execute a simple replacement of an existing heating systems with cold-climate air-source heat pumps. Those more extensive conversions, such as the replacement of ductwork, are modelled under energy-efficiency retrofits. The extent to which more extensive conversions are required is not yet certain.

Investment related to converting space and water heaters from fossil-fuel and less-efficient electric baseboard heaters to heat pumps will vary across provinces and building types. Quebec, New Brunswick, and Newfoundland and Labrador, for example, will see relatively less work relating to reducing residential greenhouse gas emissions compared to Ontario, Saskatchewan, and Alberta where a vast majority of existing space and water heaters are powered by natural gas.

Similarly, apartment buildings will require relatively lower levels of investment compared to single- and semi-detached homes as more than half of apartment buildings across Canada are already powered by electricity. Nevertheless, it is assumed that a proportion of units will upgrade from less-efficient electric baseboard heaters to more-efficient cold-climate air-source heat pumps.

[3] Green systems refers to space heaters that are powered by renewable energy sources such as electricity (includes heat pumps).
[4] The conversion rate is based on the average increase in housing stock powered by green systems from 2010 to 2020.
[5] Survey of Commercial and Institutional Energy Use (SCIEU) - Buildings 2019

The assumed investment requirements are based on the cost differential between the installation of cold-climate air-source heat pumps and traditional furnaces and water heaters. While some of the cost differential is due to relatively more expensive equipment, part also arises from the additional labour required to install these units. This might include upgrading electrical panels, disconnecting fuel lines, re-fitting ducts, and additional plumbing work required to install hydronic systems.

If Canada is to meet its GHG emissions reductions by 2030 and 2050, the path ahead will likely call for the electrification of every building. With the information that is currently available, the systems that exist and are the most cost-efficient alternative are cold-climate air-source heat pumps.

However, this electrification introduces additional draws on Canada's electricity grid and will require that the energy efficiency of existing homes and commercial and institutional buildings – especially older ones – be improved. To minimize the draw on the electrical grid, some homes and commercial and institutional buildings will be required to upgrade older windows and doors, re-insulate walls and attics, and improve air tightness. This work, which is aimed at reducing heat loss, is identified as "energy-efficiency retrofits".

Consultations with industry stakeholders confirmed that while some of this work is underway, further incentives are required to induce homeowners to invest in these types of renovations. The additional challenge, from an economic modelling perspective, is that not all homes will require energy-efficiency retrofits. Project scopes will vary greatly with the age of each home. In consultation with the Canadian Home Builders' Association, these projects were estimated to cost anywhere from $35,000 to $200,000.

The green buildings scenario assumes that a proportion of existing residential buildings will undertake an energy-efficiency retrofit project over the next 10 years. This estimate is based on the fact that over 30% of existing homes in Canada are less than 20 years old and that, unless government incentives are generous and easy to access, most homeowners that are not already planning a major renovation project will not be incentivized to take on such an investment. Should a highly incentivized environment develop over the coming decade, there is the potential that a greater number of energy-efficiency retrofit projects may occur than modelled in this analysis, including deep energy retrofits in which property owners target far greater interventions.

CANADA

IMPACT ON RESIDENTIAL CONSTRUCTION

Achieving the federal government's GHG emissions reduction goal will require Canada's residential sector to simultaneously build new homes equipped with heating equipment powered by green energy sources while retrofitting existing buildings.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

As of 2020, Natural Resources Canada reported 15.9 million homes in existence across the country. Of these, approximately 40% were heated by electricity with a vast majority (35%) heated by electric baseboard heaters. Only 5% were heated by heat pumps. The remaining 60% of existing homes were heated by fossil fuels, including natural gas (45%), dual systems with electric capability (6%), heating oil (4%), dual systems without electric capability (2%), and other heating fuels including coal and propane (2%) and wood (1%).

While most homes across Canada are equipped with space heaters that are powered by fossil fuels, the picture is slightly different for water heaters. Of the 15.9 million water heaters installed in homes across the country, nearly half (48%) were powered by electricity. Natural-gas-powered heaters accounted for close to 49% of units installed across the country, while the remaining water heaters were powered by heating oil, wood, and other fuels.

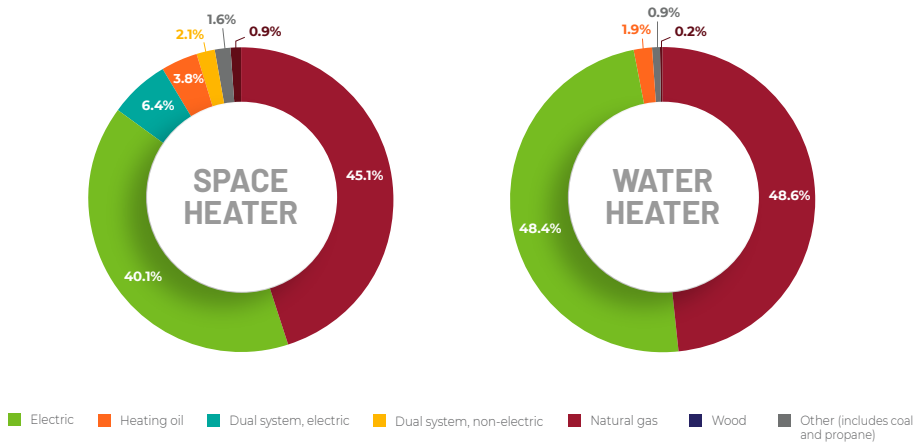
Figure 1 summarizes the breakdown of the stock of space and water heaters by energy source in Canada as of 2020.

To achieve the required GHG emissions reductions from residential buildings by 2030, and reach net-zero emissions by 2050, the number of cold-climate air-source heat pump installations must increase substantially. As recently as 2022, approximately 200,000 heat pumps were being installed annually. The green buildings scenario projects that under an aggressive scenario, heat pump installations must increase to 700,000 units installed annually to reach federal emissions reduction goals.

As shown in Figure 2, this ramp up in heat pump installations is assumed to occur through retrofits and new homes being constructed using cold-climate air-source heat pumps as their main sources of space heating.

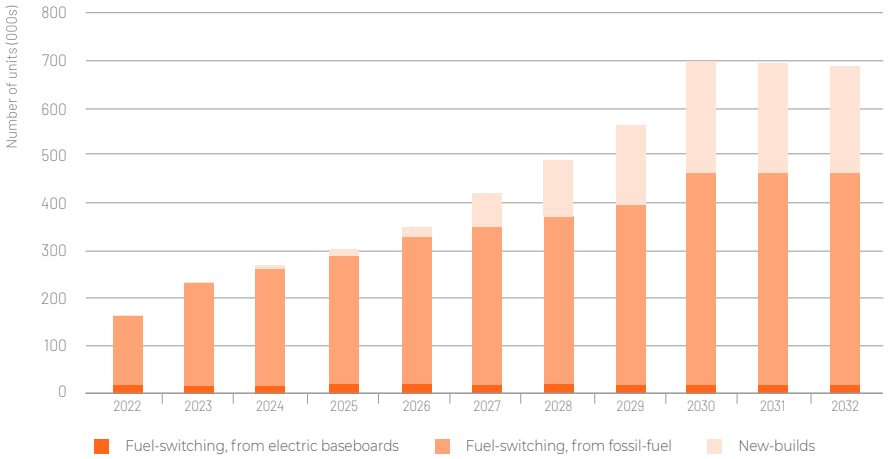
The scenario assumes that a small proportion of homes across the coming decade will replace their less-efficient electric baseboard heaters with more-efficient cold-climate air-source heat pumps. However, the largest increases in heat pump installations are assumed to come through retrofitting existing homes that are powered by fossil fuels, especially in the near term.

FIGURE 1: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY-SOURCE, CANADA, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

FIGURE 2: ESTIMATED NUMBER OF SPACE-HEATING EQUIPMENT INSTALLATIONS, CANADA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

In consultation with the Canadian Home Builders' Association, BuildForce Canada estimated that very few new homes currently being constructed are heated using heat pumps. This is assumed to change over the longer term as changes to the building code could accelerate the introduction of heat pumps in new homes.

Between 2023 and 2032, it is estimated that 181,200 existing homes will replace their less-efficient electric baseboard heaters with cold-climate air-source heat pumps. During the same period, the conversion from fossil-fuel-powered space heating equipment to cold-climate air-source heat pumps is estimated at 3.6 million units. Finally, 1.1 million new homes are estimated to be constructed using cold-climate air-source heat pumps over the 2023 to 2032 scenario period, with the majority of these unit installations occurring after 2026.

The targeted GHG emissions reductions will require homes to also convert water heaters away from fossil fuels to electricity-powered units.

With more than half of all water heaters currently powered by fossil fuels across the country, it is estimated that 3.5 million homes will convert their water heaters across the 2023 to 2032 scenario period. In addition, 1.1 million new homes are estimated to be built using electric water heaters across the decade. As with space heaters, a ramp up for new-home construction will also be required as very few new homes are currently being built using electric water heaters.

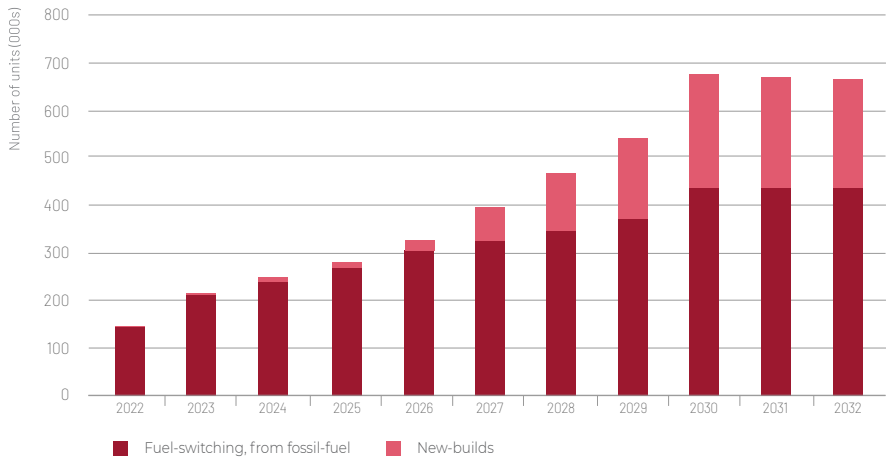
Figure 3 shows the estimated number of electric water heater installations over the scenario forecast period.

The transition to homes heated by electricity is anticipated to increase Canada's draw on the electrical grid. To minimize the additional electricity use across the country, existing homes, especially older buildings, will be required to take on energy efficiency retrofit projects to reduce heat loss.

To estimate the number of these projects, BuildForce Canada consulted with the Canadian Home Builders' Association, whose members are undertaking this work. This consultation revealed that the number of these projects – especially deep energy retrofits that see property owners completely re-insulate walls and attics, replace windows and doors, and improve the overall air-tightness of their homes – is limited to individuals who might already be planning a major renovation project.

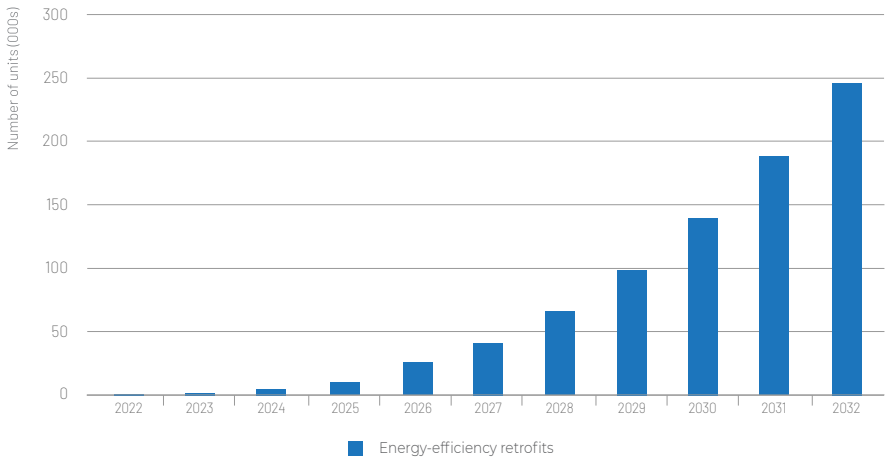
As illustrated in Figure 4, approximately 819,000 existing homes will take on some sort of energy efficiency retrofit project over the 2023 to 2032 scenario period. The scope of these projects ranges from small windows and/or door replacement to deep energy retrofits.

FIGURE 3: ESTIMATED NUMBER OF WATER-HEATING EQUIPMENT INSTALLATIONS, CANADA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

FIGURE 4: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, CANADA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL INVESTMENT

Transitioning Canada's homes from fossil fuels to cold-climate air-source heat pumps is a significant undertaking that will require additional investments. The level of investment required will vary by province depending on the predominant heating source. For all of Canada, converting existing housing units and building new homes with heat pumps, and undertaking energy-efficiency retrofit projects to reduce heat loss, is estimated to increase investment in the residential sector by just over $81.5 billion (in 2012 dollars – adjusted for inflation) over the entire forecast period. While a ramp-up period is anticipated, by 2032 total residential investment under the scenario is anticipated to be 13% higher than was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

Figure 5 shows the estimated investment levels for the residential construction sector across the 2023–2032 scenario period.

Investments associated with building new homes equipped with heat pumps and those related to energy-efficiency retrofit projects are expected to increase over the 2023–2032 scenario period and should account for a relatively smaller share of investments related to this initiative through 2026. Between 2022 and 2026, conversions of existing homes to heat pumps make up the majority of residential investments.

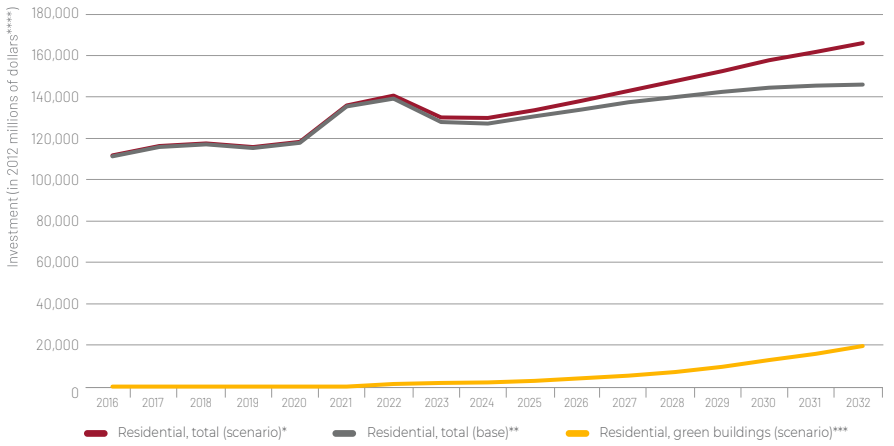
As energy-efficiency retrofits increase across the scenario period, they are estimated to account for a significant part of the activity into the early 2030s. Moreover, the investment requirements for energy-efficiency retrofits are far more substantial than those related to fuel-switching as these projects tend to be labour- and material-intensive. By 2032, investments related to energy-efficiency retrofits account for close to 80% of the investments related to transitioning to green energy sources.

Investment requirements to build new homes equipped with heat pumps is anticipated to start accelerating in the late-2020s. The additional investments required are relatively low when compared to those related to converting existing homes, which typically require more complex installations and, in some cases, require additional construction to adapt the existing homes' mechanical systems to conform to the new heating source.

Across the 2023–2032 scenario period, the additional investments required to build new homes equipped with heat pumps is estimated at $4.4 billion (in 2012 dollars – adjusted for inflation), retrofits of existing homes with heat pumps $25.3 billion, and energy-efficiency retrofits $51.8 billion.

Figure 6 illustrates the investment requirements to transition from fossil-fuel-powered heating equipment to cold-climate air-source heat pumps and energy-efficiency retrofits required to improve home-heating efficiency and minimize future draws on the electrical grid.

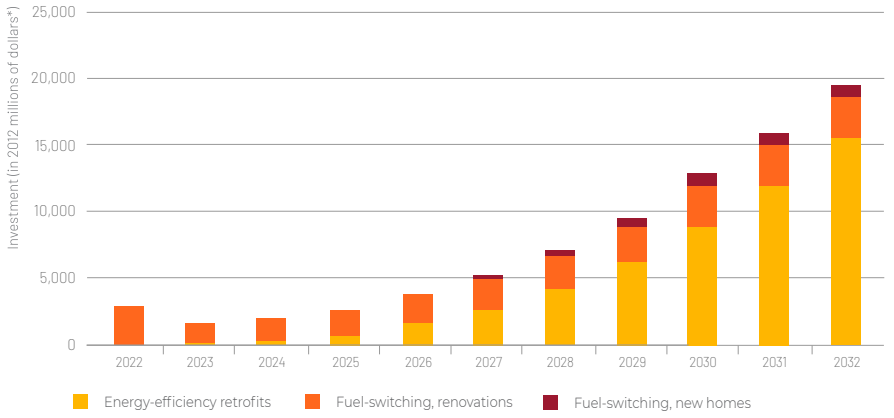
FIGURE 5: RESIDENTIAL INVESTMENT, CANADA, 2023–2032



* Residential, total (scenario) refers to the total residential investment given the assumptions laid out in the scenario.
** Residential, total (base) refers to the total residential investment reported by BuildForce Canada in its 2022-2032 base scenario, released in March 2023.
*** Residential, green buildings (scenario) refers to the residential investment portion attributed to building new homes and retrofitting existing homes equipped with heat pumps and electric water heaters, and renovation investments required to improve the efficiency of existing homes.
**** $2012 millions indicates that the investment values are in year 2012 dollars (base year), that is, adjusted for inflation. This is used to calculate the real physical year-to-year change of the value of construction, factoring out growth due to increases in prices.

Source: BuildForce Canada

FIGURE 6: INVESTMENT REQUIREMENTS RELATED TO GREEN BUILDINGS, CANADA, 2023–2032



* $2012 millions indicates that the investment values are in year 2012 dollars (base year), that is, adjusted for inflation. This is used to calculate the real physical year-to-year change of the value of construction, factoring out growth due to increases in prices.

Source: BuildForce Canada

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green buildings activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

The work outlined in this report will be far-reaching and should drive significant demands for tradespeople and others working in the residential sector. Reducing GHG emissions from residential buildings is estimated to require an additional 56,900 workers who will be directly involved in this work.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

56,900
Total new employment

16,300
Fuel-switching

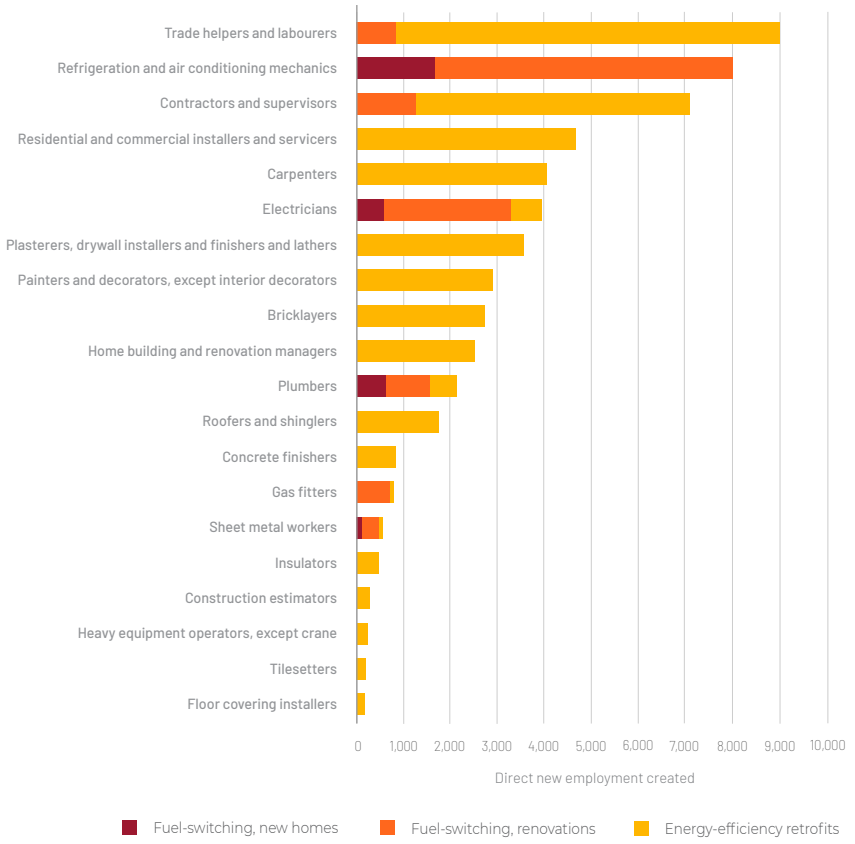
40,600
Energy-efficiency retrofits

Employment requirements across the 2023–2032 scenario will follow the trends in investment, with energy-efficiency retrofits accounting for a significant portion of direct new employment created (71%). Similar to investments, new employment opportunities are anticipated to start ramping up in the late 2020s while work on fuel-switching is already underway.

The direct new employment created is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

Figure 7 shows the direct new employment created for the top 20 trades and occupations across the 2023–2032 scenario forecast and broken out by green building activity.

FIGURE 7: DIRECT NEW EMPLOYMENT CREATED FOR TOP 20 TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, CANADA, 2023–2032



Source: BuildForce Canada

Driven primarily by energy-efficiency retrofits, as many as 9,000 new direct employment opportunities will be created among trade helpers and labourers. This is because the trade is usually involved in most residential construction projects.

As many as 8,100 direct new employment opportunities are also expected to be created among heating, refrigeration and air conditioning mechanics. These demands stem from fuel-switching requirements in new and existing homes. These will create significant labour market challenges as the direct new employment created is nearly four times (387%) the size of the 2022 workforce for this trade.

Labour market challenges may also arise for insulators, gas fitters, and windows and doors installers (all of whom are included under the residential and commercial installers and servicers trade). Although these trades rank lower on the spectrum of direct new employment created, they have a relatively smaller workforce. Therefore, even apparently smaller increases in employment requirements may create recruiting challenges. Direct new employment for insulators accounts for 35% of the base year workforce for the trade, gas fitters 37%, and windows and doors installers 25%.

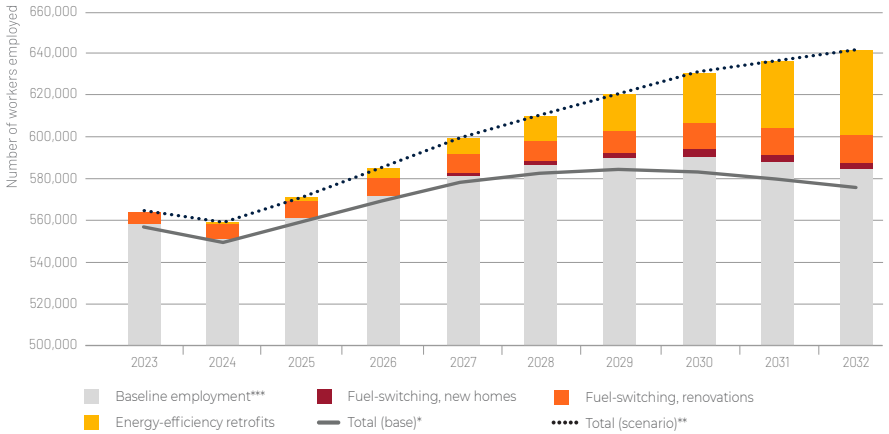
As Canada transitions to heat pumps and improves the energy efficiency of homes, the additional investments are expected to generate overall economic growth that will also increase demand for residential workers indirectly through spinoff investments that will drive additional construction demands related to improved disposable incomes.

Figure 8 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce Canada 2023–2032 base forecast, residential employment was estimated to weaken over the near-term due to rapidly rising interest rates which hindered new-home construction. Employment was then expected to recover post-2024 with a housing up-cycle before slowing towards the early 2030s with slowing population growth. Residential construction employment was estimated to rise to a peak of 584,100 workers in 2029. Across the 2023–2032 forecast period, total residential employment was projected to rise by 5%, representing an increase of 28,100 workers above employment levels in the base year.

Under the green buildings scenario, residential employment is anticipated to recede over the near-term with rising interest rates but remain above the base forecast in every year of the outlook. Employment is projected to rise steadily after 2024, driven by significant additional demands from the transition to heat pumps and electric water heaters and

FIGURE 8: RESIDENTIAL CONSTRUCTION EMPLOYMENT, CANADA, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

required energy-efficiency retrofits. By 2032, residential employment is projected at 641,700 workers, which is 11% above the base forecast.

Under normal levels of fuel-switching and energy-efficiency retrofits, Canada's residential employment was projected to rise by 5% across the 2023–2032 period. Accelerating the transition period and building in additional energy-efficiency retrofits raises residential employment by 94,200 workers – or 17% – across the scenario period.

This additional employment reflects demands generated by fuel-switching of new and existing homes, energy-efficiency retrofits, and indirectly through higher overall economic growth.

Table 1 shows the expected change in residential employment for Canada over the 2023–2032 forecast period by trades and occupations under the scenario.

As illustrated in Table 1, demands are expected to increase significantly for heating, refrigeration and air conditioning mechanics. Employment for this trade is anticipated to nearly quadruple over the scenario period. Labour market challenges may also arise for insulators, residential installers, bricklayers, and concrete finishers as these trades will be in high demand from energy-efficiency retrofit projects.

As homes transition to heating equipment powered by electricity, demand for gas fitters is expected to decline. Although retrofitting existing homes will still require these workers to uninstall natural gas lines, demand is projected to be reduced especially in the late 2020s and early 2030s as a significant share of new homes are assumed to be built with electric-powered heating equipment.

The reduced demands for gas fitters may be an opportunity for the industry to support these workers to obtain their heating, refrigeration and air conditioning mechanics certificates. With acute skilled trades shortages already impacting the construction sector, the industry simply cannot afford to lose these valuable workers from the residential workforce. While gas fitters working in commercial and institutional buildings already possess the skills and credentials to undertake this work, residential gas fitters are more likely to require additional training and credentialing. If the industry were able to train gas fitters to install heat pumps, the requirements for heating, refrigeration and air conditioning mechanics would decrease by about 17%.

FUEL-SWITCHING

Fuel-switching is expected to directly generate 16,300 new employment opportunities in Canada's residential sector across the 2023–2032 scenario period. The majority of the new employment is expected to be related to retrofitting existing homes with heat pumps, which is estimated to generate 13,200 new employment opportunities. In new-home construction, an additional 3,100 new employment opportunities are expected to be created.

Employment requirements for tradespeople will be less in new-home construction, as the mechanical and electrical systems are already built to the specifications of the heat pumps that will need to be installed. In fact, the transition away from natural gas should reduce the demands for gas fitters in new-home builds later in the decade.

On the other hand, replacing an existing gas furnace, or other type of space heater powered by fossil fuels, with a heat pump yields additional challenges as in many cases modifications to a home's existing mechanical and electrical systems is required.

Installing a heat pump in an existing home may require upgrading electrical panels and, in some cases, the electrical service – depending on the age of the home's electrical system. Ductwork may also need to be altered based on the new heat pump being installed. In some instances, existing plaster or drywall may need to be opened for duct adjustments. These additions to the scope of the work will increase the need for electricians, sheet metal workers and, to a lesser degree, trade helpers and labourers.

TABLE 1: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, CANADA, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	122,310	18%
34 BuildForce Canada trades and occupations	94,270	17%
Other trades and occupations	28,930	19%
Refrigeration and air conditioning mechanics	8,280	398%
Insulators	610	41%
Residential and commercial installers and servicers	7,340	39%
Bricklayers	3,960	32%
Concrete finishers	1,440	31%
Electricians	6,780	29%
Contractors and supervisors	11,510	28%
Roofers and shinglers	4,110	27%
Painters and decorators (except interior decorators)	7,120	26%
Sheet metal workers	860	25%
Plasterers, drywall installers and finishers, and lathers	5,990	24%
Plumbers	4,380	21%
Drillers and blasters	10	18%
Floor covering installers	1,780	17%
Elevator constructors and mechanics	250	16%
Home building and renovation managers	8,770	16%
Trades helpers and labourers	11,390	14%
Welders and related machine operators	120	14%
Truck drivers	780	13%
Glaziers	190	12%
Steamfitters, pipefitters and sprinkler system installers	20	11%
Tilesetters	870	10%
Heavy equipment operators (except crane)	830	10%
Carpenters	10,200	9%
Crane operators	70	9%
Construction estimators	730	7%
Ironworkers and structural metal fabricators	170	7%
Heavy-duty equipment mechanics	10	2%
Construction managers	-2,280	-5%
Gasfitters	-1,420	-63%

Source: BuildForce Canada

Although the employment impact from fuel-switching is lower than that of energy-efficiency retrofits, the industry will likely be challenged in meeting these demands as these will be concentrated among a small subset of trades and occupations – these include:

- heating, refrigeration and air conditioning mechanics
- electricians
- gas fitters
- plumbers
- sheet metal workers

Lesser demands are also anticipated for contractors and supervisors, as well as other occupations not included among the trades and occupations tracked by BuildForce Canada such as engineers, inspectors, oil burner technicians, sales and administrative staff.

Figure 9 shows the estimated direct new employment created between 2023 and 2032 as a percentage of the base year workforce by trades and occupations.

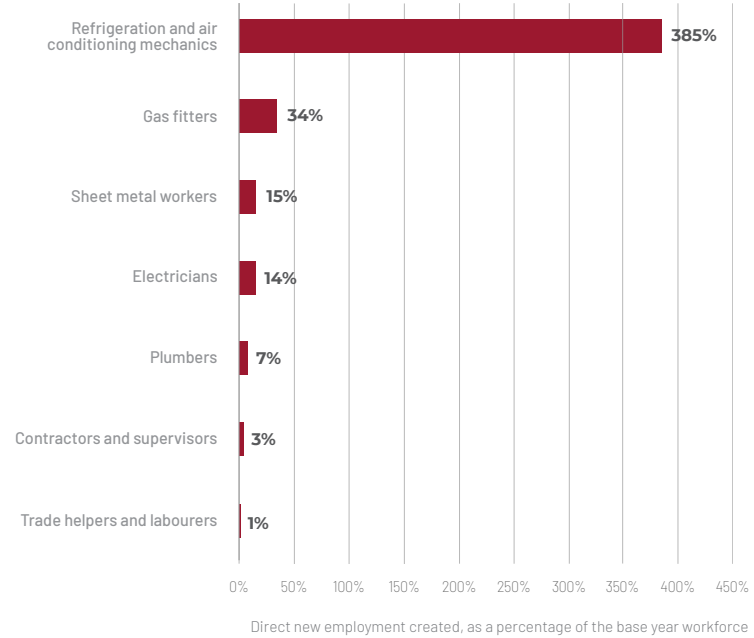
Demand for these trades stems from the scopes of work required to transition from fossil-fuel-powered heaters to heat pumps. Naturally, heating, refrigeration and air conditioning mechanics will see sharp increases in employment demands. As seen in Figure 9, the creation of 8,000 direct new employment opportunities represents a 385% increase over the base year workforce. Nearly quadrupling the workforce within this trade will present significant challenges.

ENERGY-EFFICIENCY RETROFITS

Energy-efficiency retrofits are expected to directly generate 40,600 new employment opportunities in Canada's residential sector across the 2023–2032 scenario period. While new employment creation under these green building activities is significantly higher than fuel-switching, employment requirements are spread across a wider range of trades and occupations due to the nature of the work involved. Nevertheless, some trades and occupations will be in higher demand – these include:

- insulators (home insulation)
- residential and commercial installers and servicers (windows and doors)
- plasterers, drywallers and finishers
- painters and decorators, except interior decorators
- contractors and supervisors
- trade helpers and labourers

FIGURE 9: FUEL-SWITCHING DIRECT NEW EMPLOYMENT CREATED AS A PERCENTAGE OF THE BASE YEAR WORKFORCE BY TRADES AND OCCUPATIONS, CANADA, 2023–2032



Source: BuildForce Canada

Figure 10 shows the estimated direct new employment among the top trades and occupations between 2023 and 2032 as a percentage of the base year workforce by trades and occupations.

The industry is likely to face challenges to meet the rising demands for insulators, residential and commercial installers and services (windows and doors), and bricklayers. As seen in Figure 10, this direct new employment created represents a significant rise from the current workforce.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Canada's residential sector is also tasked with addressing housing affordability across most provinces. With the ratio of home prices to household income rising substantially, the country will need to dramatically increase new-home construction over the next decade.

Canada Mortgage and Housing Corporation estimates the housing supply gap at 3.45 million homes between 2023 and 2030. This figure is the number of additional units required to be built above the business-as-usual levels of activity. Combined, these translate into Canada needing to build close to 5.8 million homes – or raising housing starts from approximately 200,000 units annually to about 700,000 by 2030.

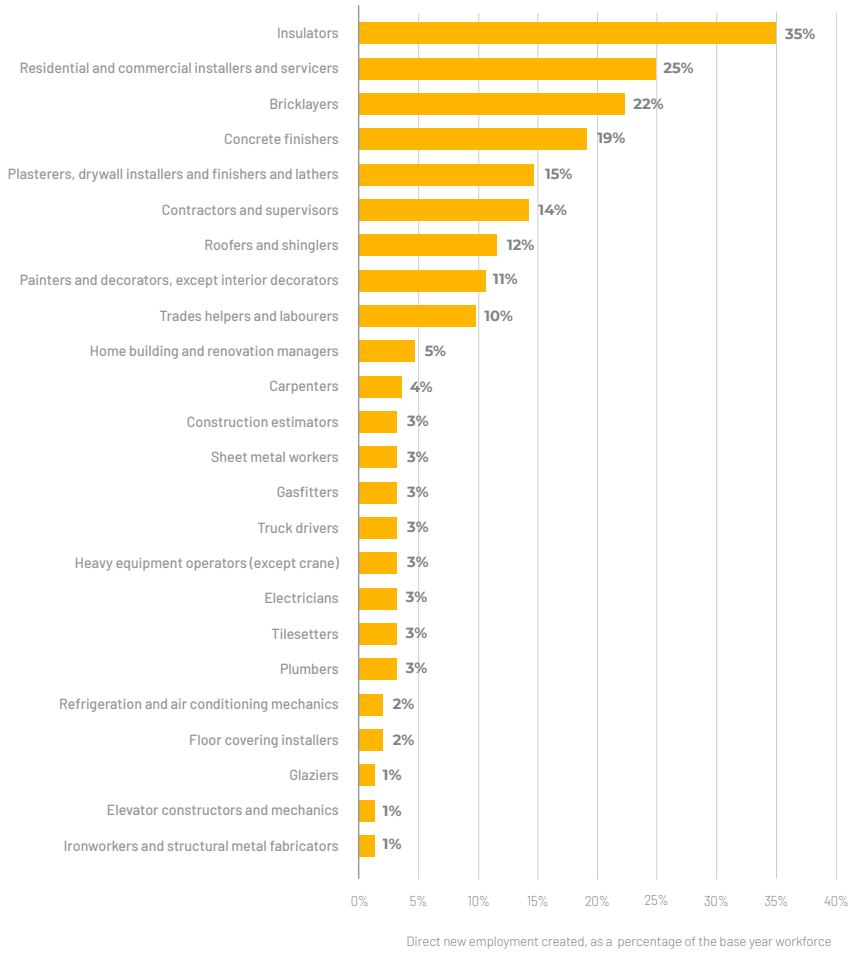
BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building over 5.8 million new homes between 2024 and 2033. Preliminary results from this report estimate that Canada's residential employment could rise by as much as 472,000 workers – or 83% – by 2033 from 2023 levels.

This strong surge in demand to address housing affordability may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition Canada's homes away from fossil fuels may come into competition with sharp increases in new-home construction.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational target of 5.8 million new units built by 2030. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge. This could further hinder the industry's ability to meet GHG emissions reduction goals. On the positive side, if electric sources for heating and hot water generation are incorporated into the construction of these new housing units, a slight acceleration in the electrification transition goals would be achieved.

The following sections of this report consider the implications of fuel-switching and energy-efficiency retrofits on the residential construction sector in each province.

FIGURE 10: ENERGY-EFFICIENCY RETROFITS DIRECT NEW EMPLOYMENT CREATED AS A PERCENTAGE OF THE BASE YEAR WORKFORCE BY TRADES AND OCCUPATIONS, CANADA, 2023–2032



Source: BuildForce Canada

NEWFOUNDLAND AND LABRADOR

IMPACT ON RESIDENTIAL CONSTRUCTION

Homes in Newfoundland and Labrador are primarily heated by electric baseboard heaters. This works in the province's favour as it seeks to meet the federal government's GHG emissions reduction goals. Nevertheless, the province does have some homes that are heated by fossil fuels, and these will need to be converted. Moreover, building new houses equipped with heat pumps and making existing homes more efficient will create additional employment demands.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

Natural Resources Canada estimated that in 2020 there were approximately 251,700 homes in Newfoundland and Labrador. Of these, more than three quarters (76%) were equipped with electric-powered space heaters with a vast majority being electric baseboard heaters; only 1% were equipped with heat pumps. The remaining 24% of homes were heated by fossil fuels, including heating oil (9%), dual systems with electric capability (8%), dual systems without electric capability (4%), natural gas (2%), and wood (1%).

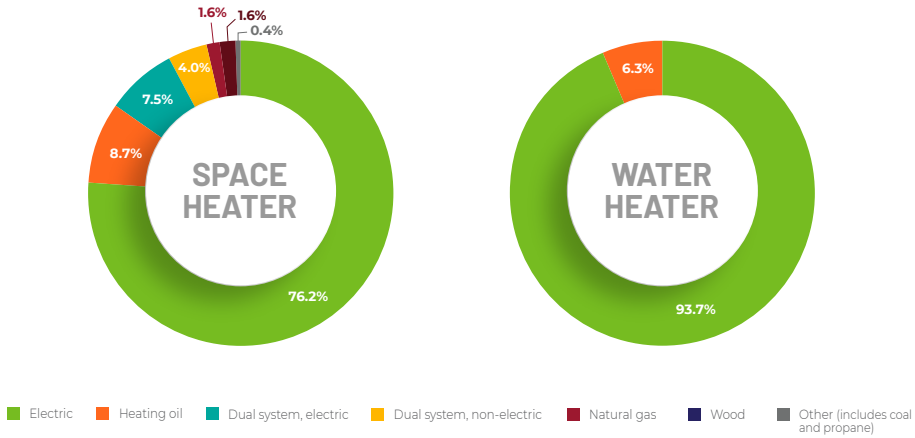
An even more significant proportion of homes were equipped with electric water heaters (94%), while the remaining 6% of water heaters were powered by heating oil.

Figure 11 summarizes the breakdown of the stock of space and water heaters by energy source in Newfoundland and Labrador as of 2020.

The transition away from fossil fuels will create relatively minimal impacts in Newfoundland and Labrador's residential construction sector in comparison to other provinces where most homes are heated by fossil-fuel-powered heating equipment. Nevertheless, a transition is in place that will see some homeowners upgrading their less-efficient electric baseboard heaters while others will replace units powered by heating oil, natural gas, or wood. Additionally, the BuildForce Canada scenario assumes a transition to heat pumps and electric water heaters in new homes constructed.

Under the scenario assumptions, the installation of cold-climate air-source heat pumps in the province is anticipated to increase from about 1,500 units in 2022 to about 4,000 units in 2030. This increase amounts to approximately 30,700 total units installed, of which about half will directly replace fossil-fuel-powered heating equipment and close to one third will be replacing less-efficient baseboard heaters. With a significant portion of homes already heated by electricity, the installation of heat pumps in the province represents about 0.6% of the estimated 4.9 million heat pumps expected to be installed Canada-wide by 2032.

FIGURE 11: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, NEWFOUNDLAND AND LABRADOR, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

Under the scenario, the number of electric water heater installations is also expected to ramp up to 2030 as 6% (16,000 units) of Newfoundland and Labrador's existing homes in 2020 were equipped with water heaters powered by heating oil. Across the 2023–2032 scenario period, this amounts to approximately 12,500 electric water heaters installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 12 shows the estimated number of heat pumps and electric water heaters expected to be installed in Newfoundland and Labrador across the 2023–2032 period.

To mitigate the risks associated with increasing the draw on the electrical grid associated with a full transition to electric-powered homes in Newfoundland and Labrador, the province will require the retrofitting of a number of existing homes to improve overall heating efficiency. This will translate into renovation projects to replace old windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits. These measures are required to reduce heat loss and minimize the draw these housing units make on the electrical grid of the province.

Based on consultations with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small proportion of overall renovation activity in the province. However, under the pressure to make homes more efficient, it is assumed that incentives will be put in place that motivate homeowners to take on these types of retrofit projects.

As illustrated in Figure 13, in this scenario, energy-efficiency retrofits are projected to start ramping up through the late 2020s as incentive programs are assumed to be put in place to mitigate the risks associated with the transition to a fully electric housing stock. For Newfoundland and Labrador, it is assumed that among the 2020 housing stock approximately 12,700 homes will take on some sort of energy-efficiency retrofit project. Many of these projects will likely be concentrated among older and less-efficient homes. Newfoundland and Labrador has one of the older housing stocks in the country, with nearly two thirds (62%) of homes built before the year 2000.

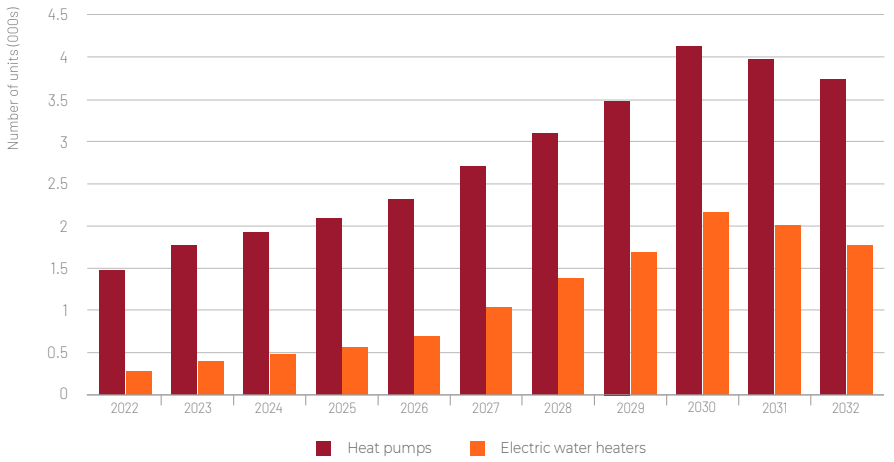
IMPACT ON RESIDENTIAL INVESTMENT

The transition to homes heated by heat pumps and electric water heaters and the associated energy-efficiency retrofits that are required to reduce electricity usage in the province will generate investments beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

For Newfoundland and Labrador, the direct investments related to this work amount to $977 million between 2023 and 2032. With the province already primarily powered by electric heating equipment, the majority of these new investments are associated with energy-efficiency retrofits. In fact, the installation of heat pumps and electric water heaters in both new builds and existing homes is estimated at approximately $174 million, or 18% of the total required investments across the decade.

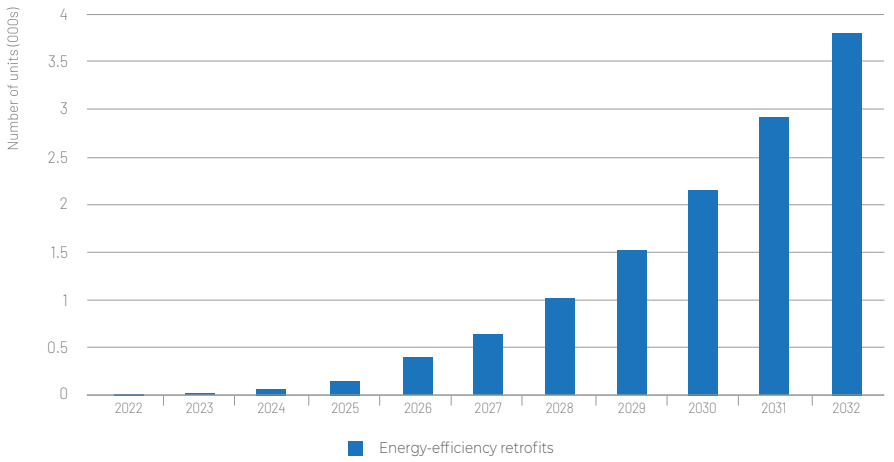
A ramp-up period in these investments is anticipated, which should see investment levels accelerate starting in the late 2020s. By 2032, total residential investment under the scenario is anticipated to be 24% higher than was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

FIGURE 12: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, NEWFOUNDLAND AND LABRADOR, 2023–2032



Source: BuildForce Canada

FIGURE 13: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, NEWFOUNDLAND AND LABRADOR, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green buildings activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes. Indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

In Newfoundland and Labrador, the work outlined in this report is expected to generate 670 direct new employment opportunities, with a significant portion of these related to making existing homes more heat-efficient through renovations. New employment relating to fuel-switching accounts for about 12% of total new employment – due to the fact that the province's existing housing stock is already primarily heated by electricity.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

670
Total new employment

80
Fuel-switching

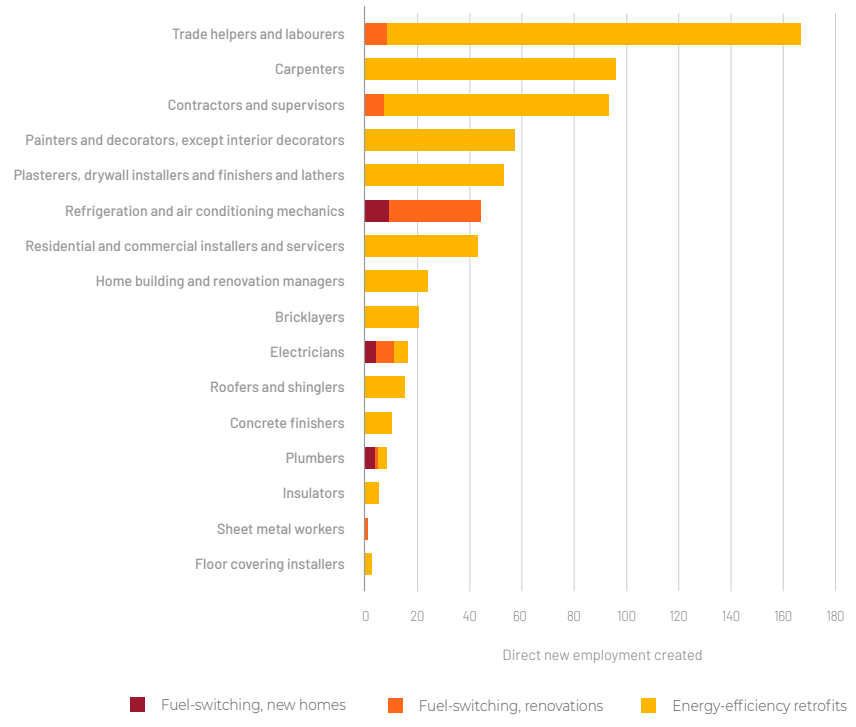
590
Energy-efficiency retrofits

The direct new employment created and presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. However, transitioning the province to even greater use of electricity for heating and hot water generation is expected to span beyond these trades and occupations, and includes engineers, inspectors, oil burner technicians, and sales and other administrative workers.

Direct new employment created in Newfoundland and Labrador will span a variety of trades and occupations working in the residential sector as most new employment relates to energy-efficiency retrofits, which somewhat follows the trade distribution of renovations. However, although fuel-switching accounts for a minor portion of direct new employment, some employment gains will be concentrated among a few specific trades.

Figure 14 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 14: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, NEWFOUNDLAND AND LABRADOR, 2023–2032



Source: BuildForce Canada

Driven primarily by energy-efficiency retrofits, trade helpers will be most impacted by transition activities. This is because the trade is usually involved in most residential construction projects.

The demand for heating, refrigeration and air conditioning mechanics is expected to be significant – accounting for half of the direct new employment created due to fuel-switching. Labour market challenges are likely to arise as the direct new employment created is nearly four times (367%) the size of the base year workforce for the trade.

Labour market challenges may also arise for insulators, contractors and supervisors, and windows and doors installers (covered under the residential and commercial installers and servicers trade). Although these trades rank on the lower end of the spectrum of direct new employment created, they have a relatively smaller workforce which can create labour market challenges even under smaller increases in employment demands. Direct new employment for insulators accounts for 50% of the base year workforce for the trade, contractors and supervisors 26%, and windows and doors installers 25%.

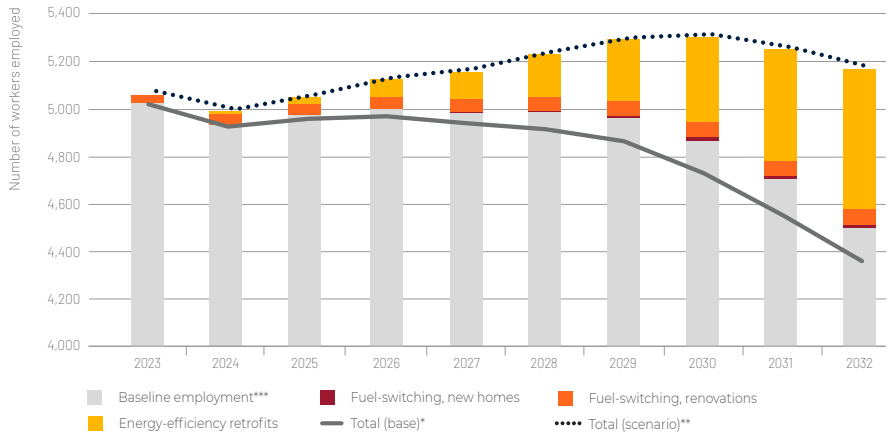
The additional investments in Newfoundland and Labrador are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

Figure 15 presents the residential employment estimates for the 2023–2032 period under the scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce Canada 2023–2032 base forecast, residential employment in Newfoundland and Labrador was estimated to recede over the near term and then hold steady over most of the 2020s before slowing down thereafter with weakening population growth. Across the 2023–2032 period, total residential employment was projected to decline by 6%, representing a decline of 270 workers below employment levels in the base year.

Under the green buildings scenario, residential employment is anticipated to recede over the near term due to the impact of higher interest rates but rise above base forecast levels in 2025 and continue rising thereafter for every subsequent year of the outlook. Employment is projected to peak in 2030, driven by demands generated through energy-efficiency retrofits and fuel-switching. By 2032, residential employment is projected at 5,200 workers, which is 19% above the base forecast.

FIGURE 15: RESIDENTIAL CONSTRUCTION EMPLOYMENT, NEWFOUNDLAND AND LABRADOR, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

In BuildForce Canada's base-case scenario, residential employment in Newfoundland and Labrador was tracked to decline by 6% across the 2023–2032 period. Additional demands from energy-efficiency retrofits and fuel-switching see residential employment in the province rise by 550 workers – or 12% – above base year levels.

Table 2 shows the expected change in residential employment for Newfoundland and Labrador over the 2023–2032 scenario period by trades and occupations under the scenario.

Labour market challenges are likely to arise for heating, refrigeration and air conditioning mechanics. As illustrated in Table 2, demands for this trade are anticipated to rise well above the base year workforce. Challenges may also arise for insulators, bricklayers, trades helpers and labourers, contractors and supervisors, residential installers, and plasterers and drywallers. These trades will be in high demand under energy-efficiency retrofit projects.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Newfoundland and Labrador's residential sector is also tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimates Newfoundland and Labrador's housing supply gap at 60,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built above the business-as-usual levels of activity. Combined, these translate into the province needing to build nearly 73,000 units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building nearly 73,000 new homes between 2024 and 2033. Preliminary results from this report estimate that Newfoundland and Labrador's residential employment could rise by as much as 11,600 workers – or 218% – by 2033 from 2023 levels to meet this housing target.

Such a surge in demand may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 73,000 homes. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

TABLE 2: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, NEWFOUNDLAND AND LABRADOR, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	570	12%
34 BuildForce Canada trades and occupations	550	12%
Other trades and occupations	30	11%
Refrigeration and air conditioning mechanics	40	358%
Insulators	10	60%
Trades helpers and labourers	170	27%
Bricklayers	20	27%
Residential and commercial installers and servicers	40	24%
Contractors and supervisors	80	23%
Concrete finishers	10	18%
Plasterers, drywall installers and finishers, and lathers	40	18%
Sheet metal workers	<10	18%
Electricians	10	15%
Painters and decorators (except interior decorators)	50	11%
Construction managers	10	9%
Roofers and shinglers	10	9%
Plumbers	10	8%
Construction estimators	<10	5%
Tilesetters	<10	3%
Carpenters	30	2%
Home building and renovation managers	<10	0%
Elevator constructors and mechanics	0	0%
Floor covering installers	0	0%
Heavy equipment operators (except crane)	0	0%
Truck drivers	0	0%
Welders and related machine operators	0	0%
Heavy-duty equipment mechanics	<10	-7%

Source: BuildForce Canada

PRINCE EDWARD ISLAND

IMPACT ON RESIDENTIAL CONSTRUCTION

Unlike other Atlantic provinces, where home heating is primarily powered by electricity, Prince Edward Island's homes have a varied mix of energy sources. Electricity and heating oil are predominant. For this reason, achieving federal GHG emissions reduction goals from residential buildings may prove more challenging in PEI compared to neighbouring provinces. Over the coming decade and through to 2050, Prince Edward Island must contend with replacing space and water heaters powered by fossil fuels with cold-climate air-source heat pumps and electric water heaters, which may put significant pressure on the province's residential workforce.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

According to Natural Resources Canada, in 2020 there were approximately 68,200 homes in existence in Prince Edward Island. Of these homes, an estimated 41% were equipped with electric space heaters, close to 39% were electric baseboard heaters, and the remainder were heat pumps. The remaining 59% of homes in PEI were equipped with space heaters powered by fossil fuels, including heating oil (37%), dual systems without electric capability (16%), wood (3%), other fuels including propane and coal (1.5%), and natural gas (1.5%).

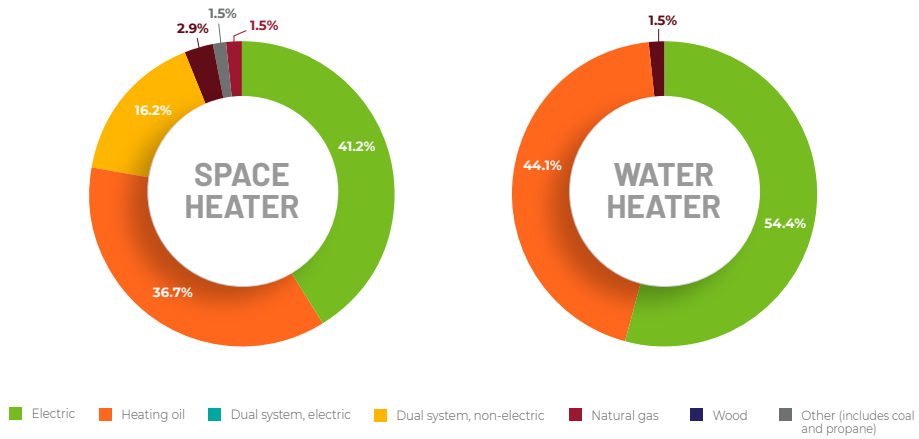
For water heating equipment, slightly over half (54%) of all homes in the province were equipped with electric water heaters. The remaining 46% were powered by fossil fuels with heating oil making up the bulk of those units (44%) and the remainder (2%) being powered by natural gas.

Figure 16 summarizes the breakdown of the stock of space and water heaters by energy source in Prince Edward Island as of 2020.

The transition from fossil fuels to electric-powered heating equipment will have significant implications for Prince Edward Island's residential construction sector as a significant proportion of homes in the province will need to be retrofitted. Additionally, the BuildForce Canada scenario also assumes a transition to heat pumps and electric water heaters in new homes constructed.

To meet GHG emissions reduction goals, the installation of cold-climate air-source heat pumps in PEI must increase from just over 750 units installed in 2022 to about 3,500 units

FIGURE 16: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, PRINCE EDWARD ISLAND, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

in 2030. This increase in heat pump installations amount to approximately 23,700 units installed across the forecast period. About two thirds (66%) of these units will directly replace fossil-fuel-powered heating equipment, while 5% will replace less-efficient baseboard heaters. To put into perspective, the number of heat-pump installations required in PEI is close to the number required in Newfoundland and Labrador (30,700 units), with the latter province having a housing stock that is nearly four times that of PEI.

Under the scenario, the number of electric water heater installations is also expected to ramp up to 2030 to replace existing units powered by heating oil and build new homes equipped with electric water heaters. Across the 2023–2032 scenario period, this amounts to approximately 18,900 electric water heaters installed.

Figure 17 shows the estimated number of heat pumps and electric water heaters expected to be installed in Prince Edward Island across the 2023–2032 period.

The scenario also anticipates a need for energy-efficiency retrofit renovation projects. This will likely be necessary as existing and new home units transition to electric-powered heating equipment to minimize the draw on the provincial electrical grid. While energy-efficiency retrofits range in scope, they can include replacing old windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits.

Based on consultations with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a minor portion of renovation activity in the province. However, under the pressure to make homes more efficient, it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

Under the scenario, it is assumed that between 2023 and 2032, about 3,500 homes within the 2020 housing stock will take on some form of energy-efficiency retrofit project.

Figure 18 illustrates the number of homes taking on energy-efficiency retrofit projects in Prince Edward Island between 2023 and 2032.

Although Prince Edward Island's housing stock is relatively newer than those in other Atlantic provinces, approximately 53% of the province's housing stock was built prior to the year 2000. These units will likely require energy-efficiency retrofits over the coming decade. Moreover, about 18% of the province's housing stock was built before 1946, and may require deep energy retrofit projects.

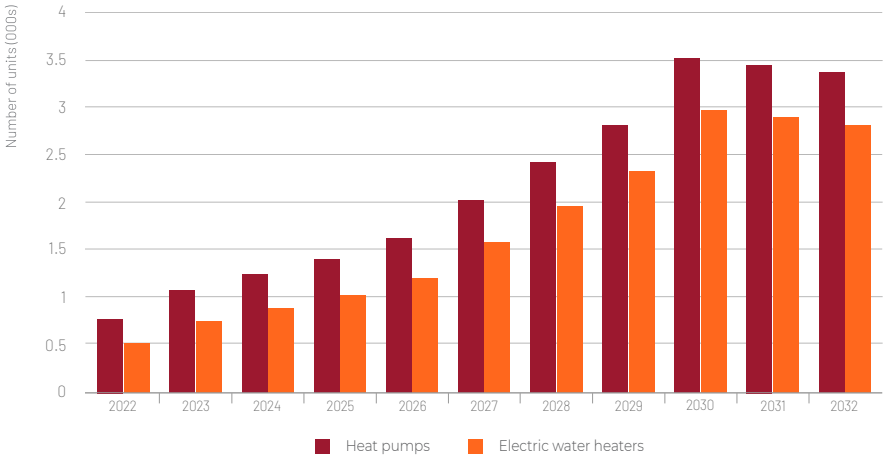
IMPACT ON RESIDENTIAL INVESTMENT

The installation of some 23,700 heat pumps and 18,900 electric water heaters, and additional activity to make homes more efficient, is anticipated to require significant investments in Prince Edward Island. These investments are well beyond levels estimated by BuildForce Canada in the 2023–2032 base forecast, and could result in labour market pressures.

Overall, green building activities in PEI are estimated to require direct investments of $361 million between 2023 and 2032. Fuel-switching – transitioning from fossil fuels to electric heating equipment – is estimated to account for 37% of these additional investments; energy-efficiency retrofits account for the remainder.

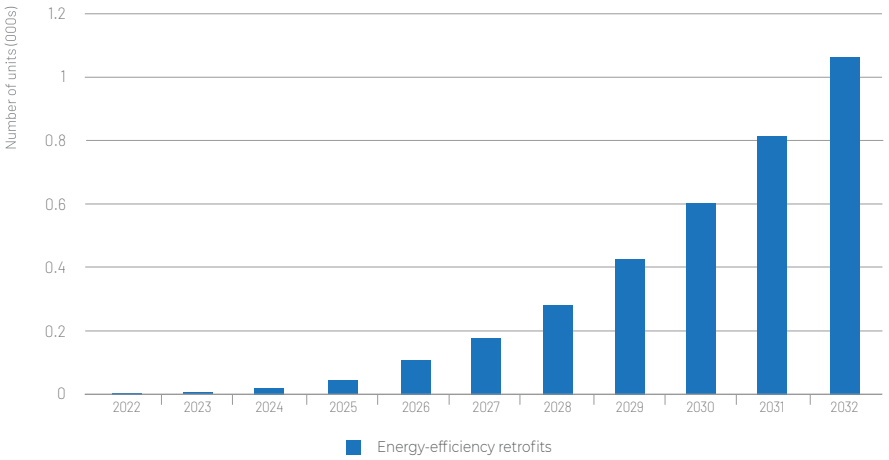
Investment directly related to green buildings activity is anticipated to begin the decade at modest levels and increase toward the early 2030s as assumed government incentive programs and changes to the building code begin to increase the number of energy-efficiency retrofits and new homes equipped with heat pumps.

FIGURE 17: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, PRINCE EDWARD ISLAND, 2023–2032



Source: BuildForce Canada

FIGURE 18: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, PRINCE EDWARD ISLAND, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes; indirect impacts will result from increased economic growth, and should lead to rising disposable incomes.

Additional investments in green building activities are anticipated to generate 250 direct new employment opportunities in Prince Edward Island. Given the need to retrofit existing homes with heat pumps and electric water heaters, approximately 100 of these direct new employment opportunities are related to fuel-switching. Energy-efficiency retrofits are anticipated to create 150 direct new employment opportunities.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

250
Total new employment

100
Fuel-switching

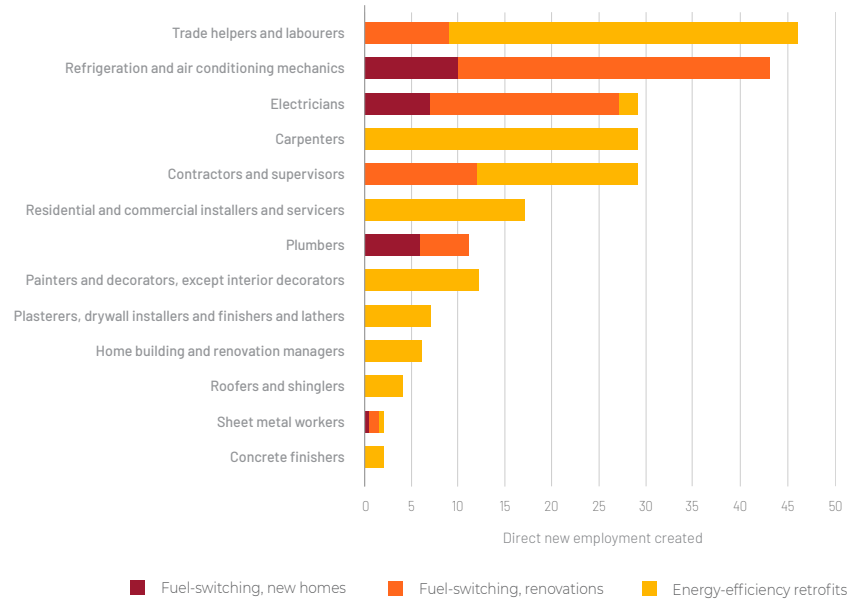
150
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

The direct new employment created in Prince Edward Island will span a variety of trades and occupations, due to the nature of energy-efficiency retrofit projects which tend to require a variety of occupations. However, new employment from fuel-switching will be concentrated among a small number of trades and occupations and could create significant labour market challenges.

Figure 19 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook for Prince Edward Island and broken out by green building activity.

FIGURE 19: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, PRINCE EDWARD ISLAND, 2023–2032



Source: BuildForce Canada

Over the 2023–2032 scenario period, a significant number of the direct new employment created will be among trade helpers and labourers – driven in large part by energy-efficiency retrofits. Although the number of direct new employment opportunities created for this occupation is the largest among the trades illustrated in Figure 19, it represents about 7% of the base year workforce. Over the course of 10 years, this increase is anticipated to be manageable through normal recruitment channels.

On the other hand, the creation of 40 direct new employment opportunities among heating, refrigeration and air conditioning mechanics in PEI is acute and could present significant recruiting challenges as it represents a 700% increase over the base year workforce for this trade.

Labour market challenges may also arise for electricians as the transition toward electric heating equipment requires, in some cases, upgrading electrical panels or service.

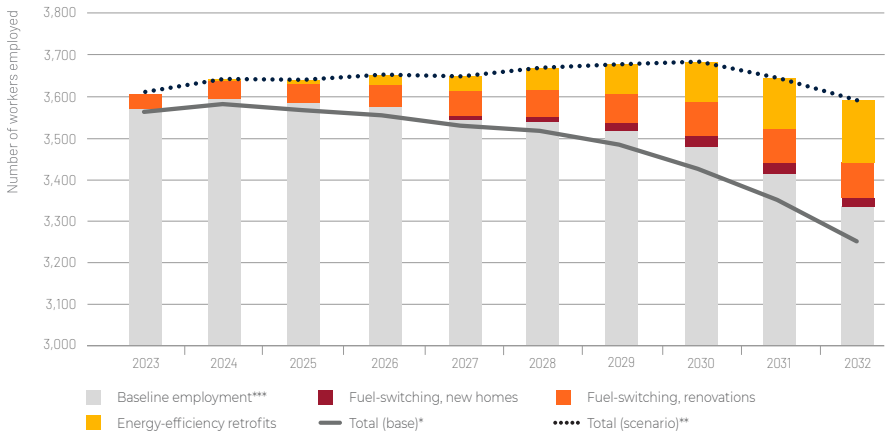
The required work and investments to reduce GHG emissions in Prince Edward Island is anticipated to improve economic activity and generate demands for residential construction workers in the province indirectly through improved disposable incomes.

Figure 20 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023–2032 base forecast, residential employment in Prince Edward Island was anticipated to peak over the mid-2020s before slowing modestly to the end of the decade. By 2032, total residential employment was anticipated to return to levels experienced in 2021.

Under the green buildings scenario, residential employment follows a similar trend to the base forecast over the near-term, although employment levels are projected higher, but

FIGURE 20: RESIDENTIAL CONSTRUCTION EMPLOYMENT, PRINCE EDWARD ISLAND, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employmen**t refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

green buildings activity maintains employment elevated throughout the scenario period. Between 2023 and 2032, residential employment is projected to increase by 11% (+350 workers) over base year levels and approximately 10% above the base case scenario.

Table 3 shows the expected change in residential employment over the 2023–2032 scenario period by trades or occupations under the scenario for Prince Edward Island.

Table 3 indicates that labour market challenges are likely to arise for heating, refrigeration and air conditioning mechanics and residential installers. Over the scenario period, demand for these trades rises significantly above the base year workforce. Specifically, demands for heating, refrigeration and air conditioning mechanics increase by 750%.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Canada's residential sector is tasked with addressing housing affordability.

Canada Mortgage and Housing Corporation estimated no housing supply gap in Prince Edward Island exists, suggesting that new-home construction is proceeding at a rate that can accommodate the growing population without putting excessive upward pressure on housing prices. The same, however, cannot be said of Newfoundland and Labrador and Nova Scotia. Additional housing construction activity in these provinces may create a significant draw on PEI's residential workforce.

TABLE 3: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, PRINCE EDWARD ISLAND, 2023–2032

Trades and occupations, residential sector	Employment change #	Employment change %
Total, all trades and occupations	420	11%
34 BuildForce Canada trades and occupations	350	11%
Other trades and occupations	70	10%
Refrigeration and air conditioning mechanics	50	750%
Residential and commercial installers and servicers	40	33%
Sheet metal workers	<10	30%
Roofers and shinglers	10	27%
Concrete finishers	10	27%
Electricians	40	26%
Painters and decorators (except interior decorators)	50	25%
Contractors and supervisors	40	24%
Plumbers	30	23%
Floor covering installers	10	19%
Plasterers, drywall installers and finishers, and lathers	20	18%
Bricklayers	<10	15%
Insulators	<10	14%
Trades helpers and labourers	50	8%
Heavy equipment operators (except crane)	<10	5%
Truck drivers	<10	5%
Home building and renovation managers	10	4%
Carpenters	20	2%
Construction estimators	<10	2%
Heavy-duty equipment mechanics	0	0%
Tilesetters	0	0%
Construction managers	<10	-2%

Source: BuildForce Canada

NOVA SCOTIA

IMPACT ON RESIDENTIAL CONSTRUCTION

Nova Scotia's residential construction sector is tasked with converting about half of its current housing stock from fossil-fuel-powered heating equipment to cold-climate air-source heat pumps. Compared to other Atlantic provinces, Nova Scotia has the highest proportion of homes heated by fossil fuels. Careful labour force planning will be required to meet the expected rising needs for workers.

In addition to converting existing housing to electric energy sources, the province is expected to start building new homes equipped with heat pumps and undergo additional renovation projects to improve the energy efficiency of existing homes to minimize heat loss and the associated draw on the provincial electrical grid.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

As of 2020, there were approximately 453,500 existing homes in Nova Scotia according to Natural Resources Canada. Approximately half of these were heated with equipment powered by electricity. A significant portion (45%) were heated with electric baseboard heaters; about 5% were heated with heat pumps.

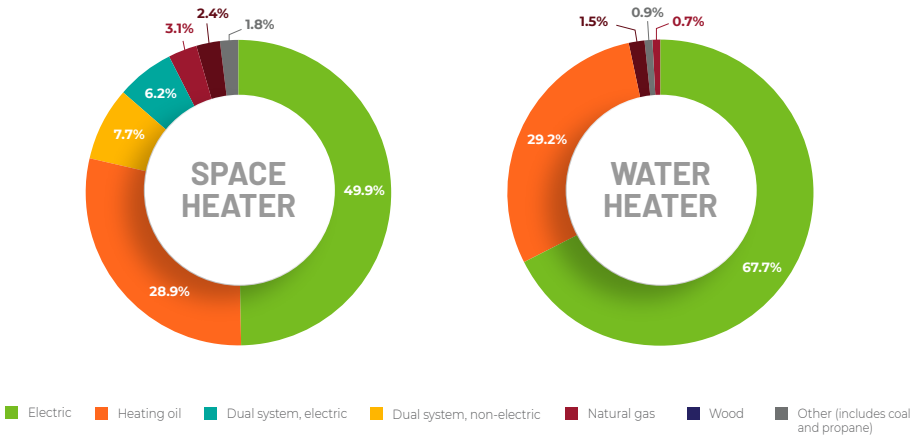
The other half of homes in Nova Scotia were heated by fossil fuels, with heating oil (29%) being a key energy source. The remaining 21% of homes in the province were heated by dual systems without electric capability (8%), dual systems with electric capability (6%), natural gas (3%), wood (2%), and other fuels including coal and propane (2%).

For existing homes in Nova Scotia, electric water heaters were predominant – making up 68% of homes. However, heating oil (29%) also represented a significant share of water heaters in the province. The remainder of homes had water heaters powered by wood, other fuels, and natural gas.

Figure 21 summarizes the breakdown of the stock of space and water heaters by energy source in Nova Scotia as of 2020.

BuildForce Canada's scenario assumes a transition away from fossil-fuel-powered space and water heaters. The work relating to this transition will be comparatively more challenging for Nova Scotia compared to other Atlantic provinces as a significant proportion of the province's homes are heated by heating oil.

FIGURE 21: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, NOVA SCOTIA, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

The scenario also assumes that a proportion of homeowners will take advantage of government incentives to replace less-efficient electric baseboard heaters for more-efficient cold-climate air-source heat pumps.

In addition, if the province is to achieve the federal greenhouse gas emissions reduction goals from residential buildings, a transition to heat pumps and electric water heaters in new homes constructed will be necessary.

Under the green buildings scenario, the installation of cold-climate air-source heat pumps is anticipated to ramp up in Nova Scotia from about 3,900 units in 2022 to about 16,000 units in 2030. Across the 2023–2032 scenario period, this increase in heat pump installations amount to approximately 111,400 units installed, with a significant proportion (68%) directly related to retrofitting existing homes powered by fossil fuels. The heat pump installations across the scenario period represents about 2% of the estimated 4.9 million units expected to be installed Canada-wide by 2032.

With nearly one third of housing units in Nova Scotia equipped with water heaters powered by fossil fuels, the number of electric water heater installations is also expected to ramp up over the scenario period. Approximately 83,300 electric water heaters will need to be installed to replace existing fossil-fuel-powered units and in new-home construction by 2032.

Figure 22 shows the estimated number of heat pumps and electric water heaters expected to be installed in Nova Scotia across the 2023–2032 period.

The transition toward housing that is heated by electricity poses risks associated with increasing the draw on the provincial electrical grid. To mitigate these risks, it is assumed that government incentives will be put in place to incentivize homeowners to undergo energy-efficiency retrofit renovation projects to improve the energy efficiency of older homes. This work could include replacing old windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits. These measures are required to reduce heat loss and minimize the draw these housing units make on the electrical grid of the province.

Based on consultations with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovation activity in the province. However, it is assumed that under a highly incentivized environment this type of activity will rise.

As illustrated in Figure 23, under the scenario, energy-efficiency retrofits are projected to increase through the late 2020s as incentive programs are assumed to be put in place to mitigate the risks associated with the transition to a fully electric housing stock. For Nova Scotia, it is estimated that approximately 23,300 homeowners will take on an energy-efficiency retrofit project over the coming decade.

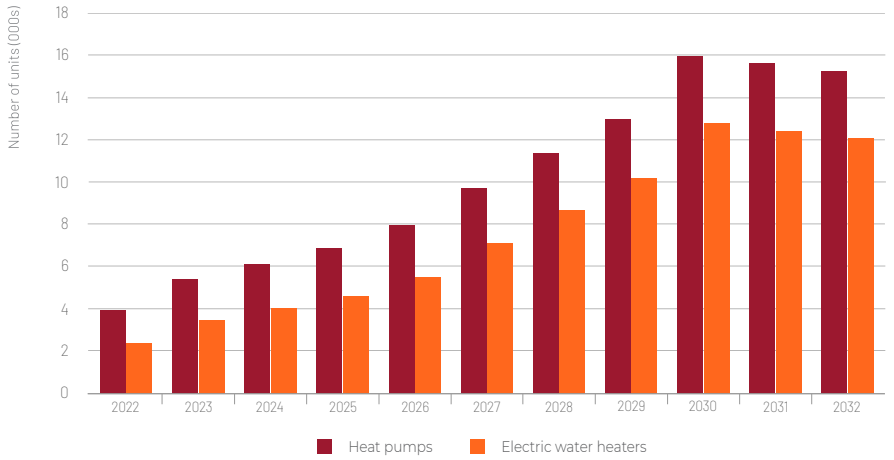
While a proportion of the 2020 housing stock is assumed to undergo an energy-efficiency retrofit, most of these will likely be concentrated among the province's older housing stock. Nova Scotia has one of the oldest housing stocks in the country, with close to 60% of homes built before the year 2000.

IMPACT ON RESIDENTIAL INVESTMENT

Meeting the GHG emissions reduction goal and the associated work related to transitioning existing and new homes to heat pumps, and taking on energy-efficiency retrofits will require significant investments well beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

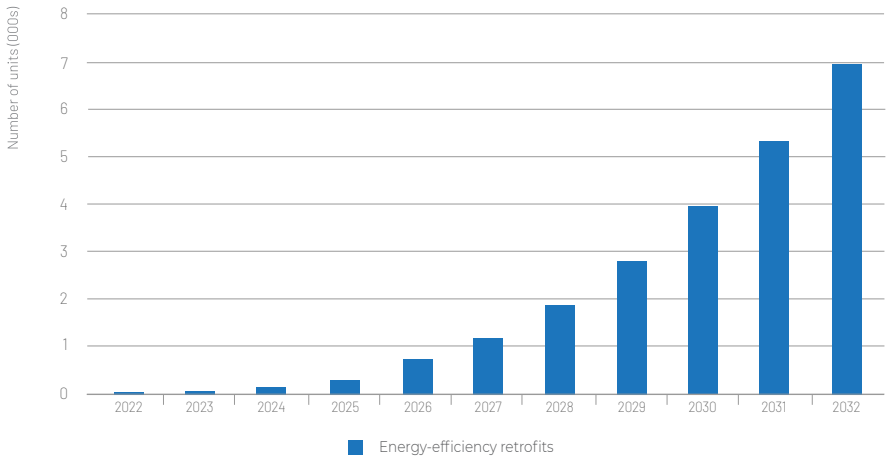
Fuel-switching and energy-efficiency retrofits in Nova Scotia are expected to require investments of approximately $2.1 billion across the 2023 to 2032 scenario period, with

FIGURE 22: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, NOVA SCOTIA, 2023–2032



Source: BuildForce Canada

FIGURE 23: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, NOVA SCOTIA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

a significant portion (69%) associated with energy-efficiency retrofits. Fuel-switching investments are estimated at approximately $651 million.

These investments are expected to start the decade at moderate levels, primarily driven by transitioning existing homes from fossil fuels to heat pumps, but are anticipated to ramp up as the number of new homes powered by heat pumps and electric water heaters increases and a greater number of energy-efficiency retrofits are undertaken.

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the provincial residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes; indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

In Nova Scotia, fuel-switching and energy-efficiency retrofits are expected to generate 1,830 direct new employment opportunities, with a significant portion of the new employment related to making existing homes more heat-efficient through renovations. New employment relating to fuel-switching accounts for about 24% of total new employment.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

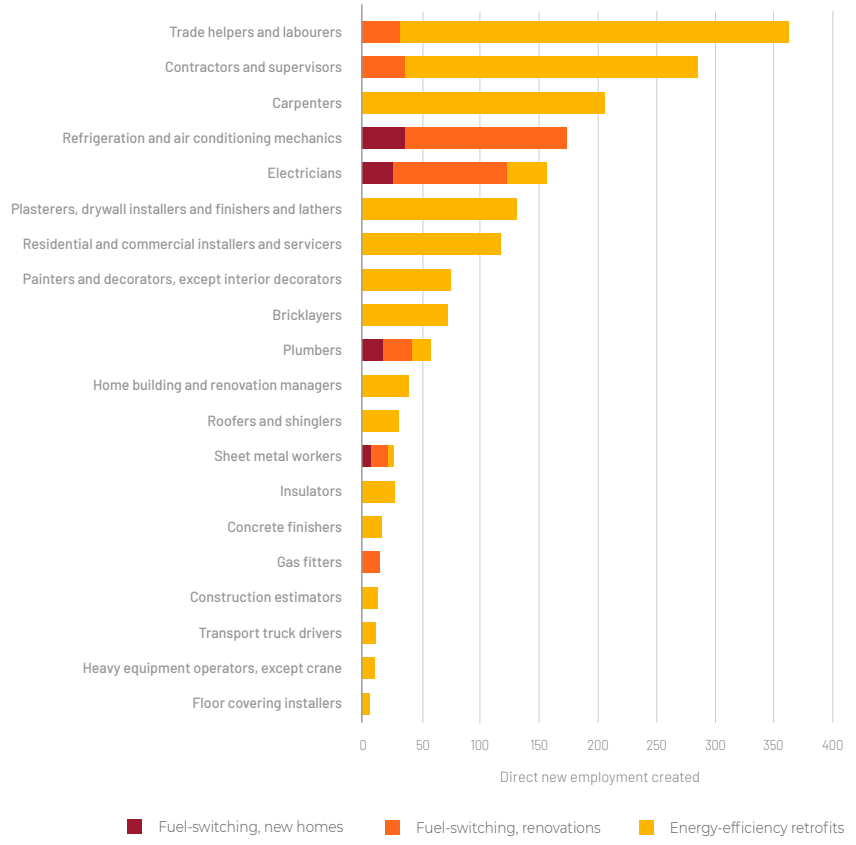
1,830 Total new employment

440 Fuel-switching

1,390 Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

FIGURE 24: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, NOVA SCOTIA, 2023–2032



Source: BuildForce Canada

Direct new employment created through energy-efficiency retrofits spans across many trades and occupations while direct new employment created through fuel-switching is concentrated among a select few trades and occupations.

Figure 24 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

Although a significant number of direct new employment is anticipated to be created for trade helpers and labourers, contractors and supervisors, and carpenters, the comparative impact on their respective labour forces will be small. These are large trades and occupations that are well positioned to acquire necessary workers through traditional channels. These 10-year demands represent at most an increase of 19% above the base year workforce – or growth of about 2% annually.

Labour market challenges will likely arise for heating, refrigeration and air conditioning mechanics, insulators, and gas fitters. The direct new employment created for these trades far exceeds the existing workforce, with demands for heating, refrigeration and air conditioning mechanics quadrupling.

On top of the new employment created, additional demands will be generated indirectly via stronger economic growth and improved household incomes.

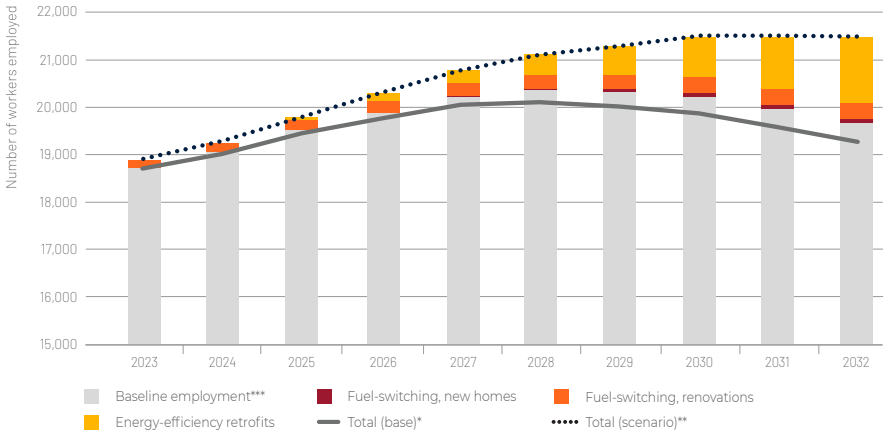
Figure 25 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce Canada 2023–2032 base forecast, residential employment in Nova Scotia was projected to retreat in 2023 due to rising interest rates, which curbed new housing construction, with a recovery anticipated between 2024 and 2028. In the latter years of the outlook, employment was projected to recede as population growth slowed. Across the 2023–2032 period, residential employment was projected to increase by 2,200 workers, representing a 13% increase over base year levels.

The scenario projects an even stronger outlook for residential employment. Under the scenario, residential employment is anticipated to stabilize in 2024 as downward pressures from rising interest rates are offset by green buildings activity. It then rises steadily to 2030 and stabilizes near 21,000 workers. By 2032, residential employment rises by 4,400 workers – or 26%.

Table 4 shows the expected change in residential employment in Nova Scotia over the 2023–2032 scenario period by trades or occupations under the scenario.

FIGURE 25: RESIDENTIAL CONSTRUCTION EMPLOYMENT, NOVA SCOTIA, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

Many trades and occupations could see acute labour market challenges across the scenario period as the rise in demands represents a significant increase over the base year workforce. Heating, refrigeration and air conditioning mechanics, in particular, see demands rising by 4.5 times. Insulators, residential installers, and bricklayers also see sharp increases in demand that are likely to result in recruitment challenges.

Employment for gas fitters is anticipated to shrink across the 2023–2032 scenario period due to the transition away from fossil fuels. Although demands for the trade are anticipated to remain while the province replaces natural gas furnaces, it will diminish, especially in the late 2020s and early 2030s as new homes are assumed to be built with electric-powered heating equipment.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Nova Scotia's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase the number of new housing units built over the next decade significantly.

Canada Mortgage and Housing Corporation estimates the housing supply gap for Nova Scotia at 53,200 homes between 2023 and 2030. This number represents the additional units required to be built above the business-as-usual levels of activity. Combined, these translate into the province needing to build nearly 123,200 units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building nearly 123,200 new homes between 2024 and 2033. Preliminary results from this report estimate that the province's residential employment could rise by as much as 12,100 workers – or 60% – by 2033 from 2023 levels.

A strong surge in new housing construction in the province may limit the capacity of the industry to undertake retrofit projects, but may accelerate the transition, if electrical space and water heaters are incorporated into the design of these new housing units.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 123,200 homes. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

TABLE 4: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, NOVA SCOTIA, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	5,440	26%
34 BuildForce Canada trades and occupations	4,410	26%
Other trades and occupations	1,030	28%
Refrigeration and air conditioning mechanics	180	458%
Insulators	40	58%
Residential and commercial installers and servicers	240	47%
Bricklayers	130	42%
Concrete finishers	40	41%
Contractors and supervisors	580	38%
Roofers and shinglers	120	36%
Painters and decorators (except interior decorators)	260	35%
Sheet metal workers	40	34%
Plasterers, drywall installers and finishers, and lathers	280	34%
Electricians	290	32%
Plumbers	160	29%
Home building and renovation managers	170	26%
Floor covering installers	80	25%
Trades helpers and labourers	670	24%
Heavy equipment operators (except crane)	50	21%
Truck drivers	60	21%
Carpenters	970	20%
Construction estimators	60	19%
Welders and related machine operators	10	17%
Heavy-duty equipment mechanics	10	16%
Tilesetters	10	9%
Elevator constructors and mechanics	<10	9%
Construction managers	10	1%
Ironworkers and structural metal fabricators	-10	-19%
Crane operators	-10	-20%
Glaziers	<10	-22%
Gasfitters	-20	-63%

Source: BuildForce Canada

NEW BRUNSWICK

IMPACT ON RESIDENTIAL CONSTRUCTION

New Brunswick holds a favourable position in transitioning away from heating equipment powered by fossil fuels: a substantial portion of the province's homes are already powered by electric heaters. Nevertheless, meeting federal GHG emissions reduction goals will require the province to retrofit existing homes and build new ones equipped electric-powered space and water heaters.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

According to Natural Resources Canada, the province had 355,900 housing units in existence in 2020. Of them, 71% were equipped with electric space heaters – 67% being electric baseboard heaters and 4% being heat pumps. Another 9% of homes in New Brunswick were equipped with dual systems with electric capability. The remaining 20% were heated by equipment solely powered by fossil fuels, including heating oil (9%), dual systems without electric capability (4%), natural gas (3%), wood (3%), and other fuels including coal and propane (1%).

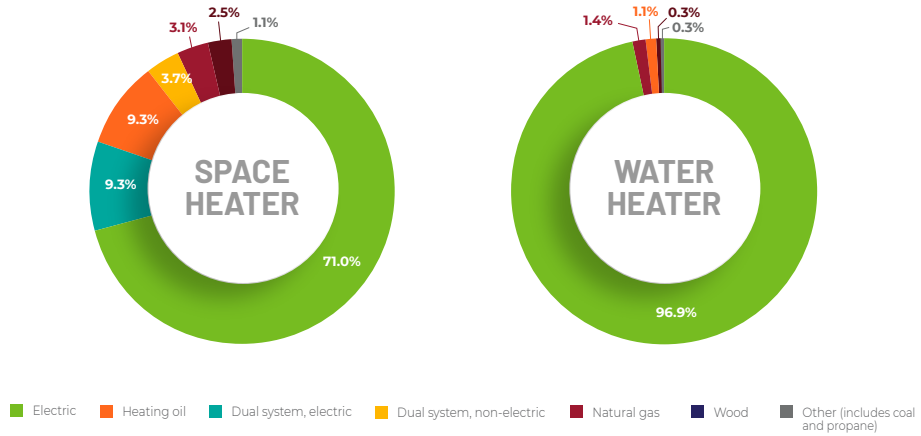
Electricity accounted for 97% of all water heaters in the province in 2020. The remaining 3% were powered by natural gas, heating oil, wood, and other fuels.

Figure 26 summarizes the breakdown of the stock of space and water heaters by energy source in New Brunswick as of 2020.

New Brunswick, like other provinces where the predominant energy source used for home-heating is electricity, will see limited impacts from transitioning away from fossil fuels. Nevertheless, the province is tasked with replacing about 20% of space heaters and 3% of water heaters that are powered by fossil fuels. Moreover, some homeowners will also take advantage of government incentives to replace less-efficient electric baseboard heaters for more-efficient cold-climate air-source heat pumps. The BuildForce Canada scenario also assumes that in future years new homes will be built equipped with heat pumps and electric water heaters.

Heat pump installations are anticipated to ramp up in New Brunswick, from about 1,900 units in 2022 to about 7,000 units by 2030. For the entire scenario period, this amounts to

FIGURE 26: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, NEW BRUNSWICK, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

48,600 units installed in both existing and new homes. Just under half of these units will replace fossil-fuel-powered equipment and just over 20% will replace electric baseboard heaters. The remaining one third are related to installations in new homes constructed between 2023 and 2032.

Electric water heaters are also projected to ramp up in the outlook, although demands are not as significant as for space heaters. Across the 2023–2032 scenario, approximately 19,000 electric water heaters are anticipated to be installed in both existing and new homes in New Brunswick.

Installation of heat pumps and electric water heaters are projected to accelerate starting in the late 2020s as an increasingly greater proportion of new homes are anticipated to adopt these greener energy sources. These demands combine with retrofitting efforts.

Figure 27 shows the estimated number of heat pumps and electric water heaters expected to be installed in New Brunswick across the 2023–2032 period.

As New Brunswick transitions its existing and new residential buildings to electric-powered heaters, the province's electricity demands will increase. To minimize additional demands put on the province's electrical grid, older homes will require retrofitting to improve energy efficiency and reduce heat loss. These energy-efficiency retrofit renovation projects could include replacing old windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits.

Based on consultations with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovation activity in the province. However, under the pressure to make homes more efficient, it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

The scenario assumes that a about 18,200 homes among the 2020 housing stock will take on some level of energy-efficiency retrofits across the scenario period. A ramp-up period is assumed as incentive programs will need to be put in place.

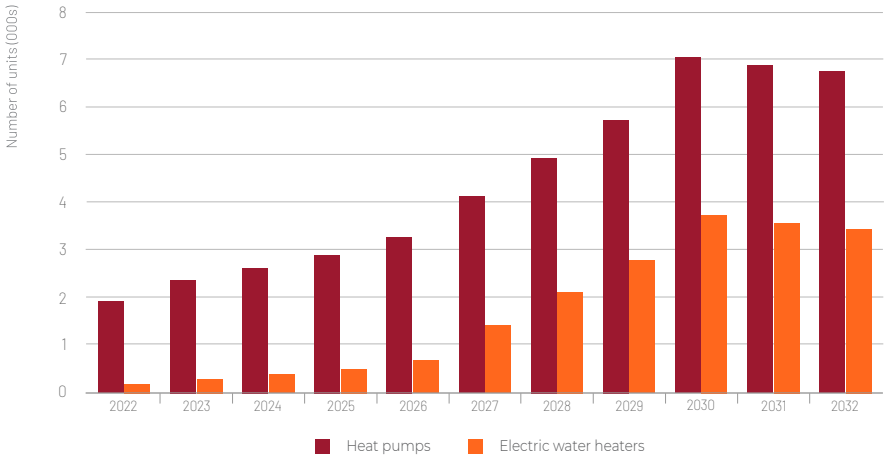
Figure 28 shows the projected number of homes expected to take on energy-efficiency retrofit projects in New Brunswick across the 2023–2032 scenario.

IMPACT ON RESIDENTIAL INVESTMENT

Fuel-switching in new and existing homes, combined with energy-efficiency retrofits, is anticipated to require sizeable investments beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

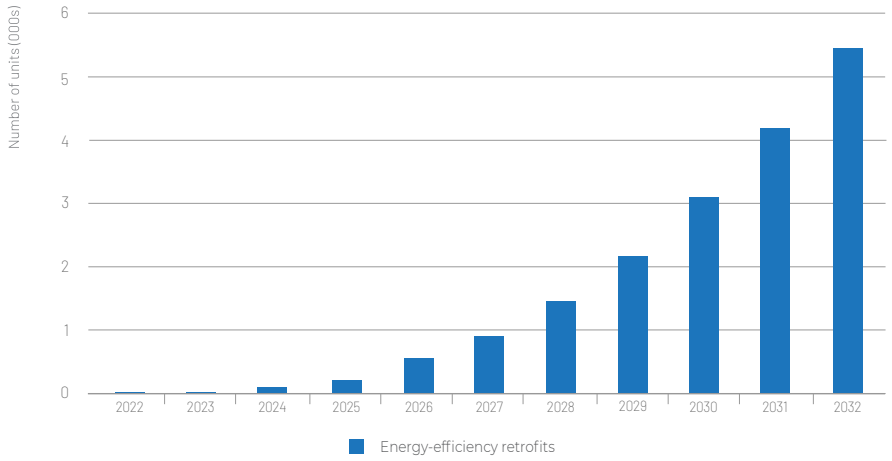
For New Brunswick, direct investments related to this work amount to $1.4 billion between 2023 and 2032. As the province's housing stock is already primarily heated by electricity, investments related to fuel-switching are more modest ($257 million) and account for only about 18% of the total investment requirements. The greatest portion of these investments are related to energy-efficiency retrofits, which amount to $1.1 billion.

FIGURE 27: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, NEW BRUNSWICK, 2023–2032



Source: BuildForce Canada

FIGURE 28: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, NEW BRUNSWICK, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes; indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

Investments relating to fuel-switching and energy-efficiency retrofits are estimated to generate 1,030 direct new employment opportunities in New Brunswick's residential construction sector. Following the trends in investments, a considerable proportion of this new employment is related to making existing homes more efficient through renovations. Direct new employment created relating to fuel-switching accounts for about 17% of all new employment – this is due to the fact that the province's existing housing stock is already primarily heated by electricity.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

1,030
Total new employment

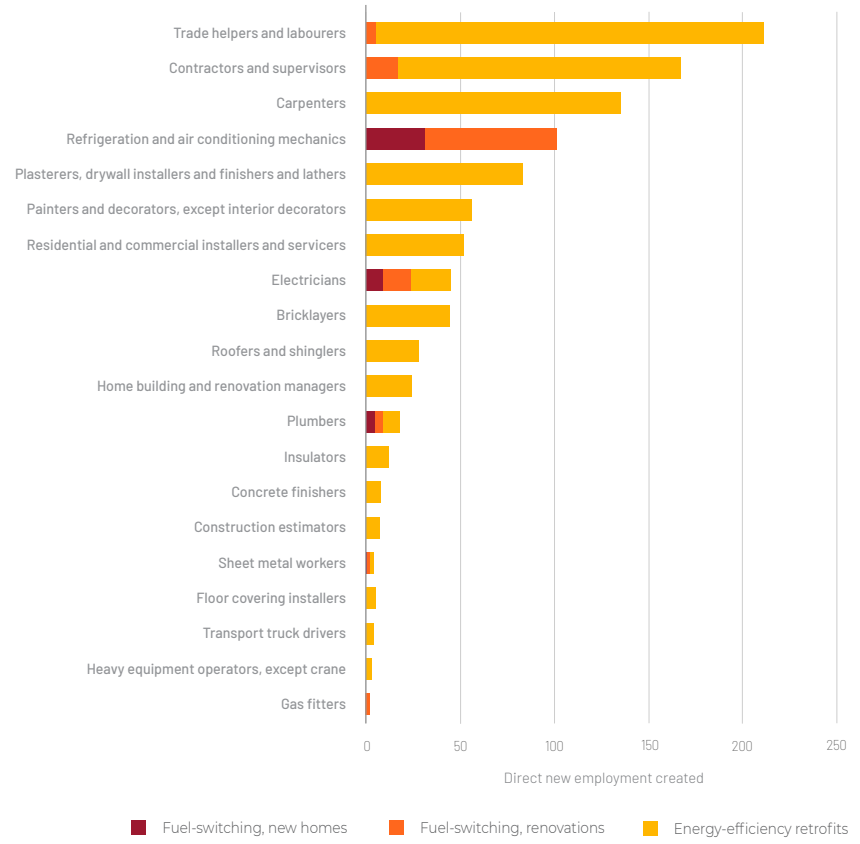
170
Fuel-switching

860
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

The impact on residential employment spans a number of trades and occupations working in New Brunswick's residential sector as energy-efficiency retrofit projects can require a wide variety of trades and occupations. Although direct new employment

FIGURE 29: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, NEW BRUNSWICK, 2023–2032



Source: BuildForce Canada

created related to fuel-switching accounts for a lesser proportion of all new employment created, most of these demands will be concentrated among just a few trades.

Figure 29 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

Driven primarily by energy-efficiency retrofits, trade helpers see the largest employment creation in New Brunswick across the outlook as this occupation is usually involved in most residential construction projects. Energy-efficiency retrofit projects will also create large demands for contractors and supervisors and carpenters.

Fuel-switching is anticipated to generate a significant demand for heating, refrigeration and air conditioning mechanics in New Brunswick. These demands are well beyond the current available workforce, which will likely lead to recruitment challenges over the coming decade. These direct demands amount to close to double (194%) the size of the base year workforce.

In addition to direct new employment creation, green building activity will generate indirect employment requirements through expanded economic growth and improve household incomes.

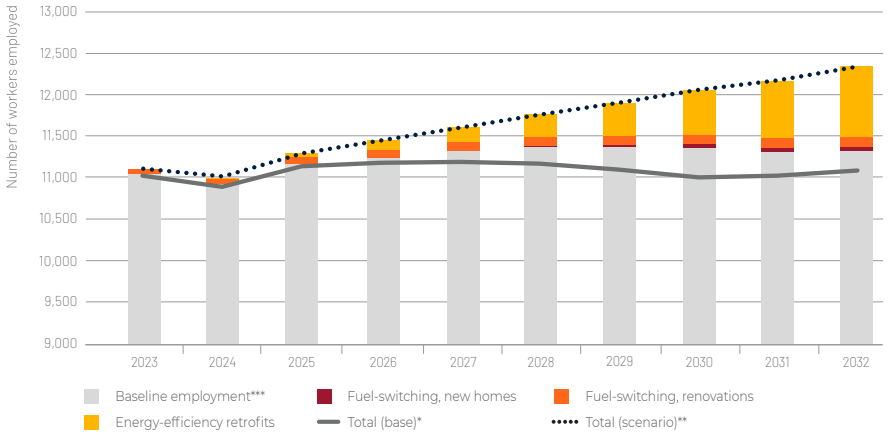
Figure 30 presents the residential employment estimates under the scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce Canada 2023–2032 base forecast, residential employment in New Brunswick was projected to contract moderately over the near term due to rising interest rates. Post-2024, employment was projected to remain relatively stable near 11,000 workers through to 2032. Across the 2023–2032 period, residential employment was projected to increase by 11%, or about 1,100 workers.

Under the green buildings scenario, residential employment is anticipated to recede over the near term with rising interest rates but is projected to be above the base forecast. Employment is then projected to rise steadily across the scenario period, finishing at 12,300 workers by 2032. Across the 2023–2032 period, residential employment is anticipated to increase by 2,300 workers – or 23%.

Table 5 shows the expected change in residential employment for New Brunswick over the 2023–2032 scenario period by trades and occupations under the scenario.

FIGURE 30: RESIDENTIAL CONSTRUCTION EMPLOYMENT, NEW BRUNSWICK, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

Several trades and occupations are likely to face recruitment challenges across the scenario period in New Brunswick. Heating, refrigeration and air conditioning mechanics, in particular, see acute demands which would require the trade's labour force to double from base year levels. Demand for insulators, residential installers (windows and doors), and bricklayers also see sharp increases across the 2023–2032 forecast period.

The transition away from fossil fuels is projected to reduce the demand for gas fitters in the province over the coming decade. Although these workers will still be required to uninstall existing gas lines, employment is projected to decline especially in the late 2020s and early 2030s as an increased proportion of new homes are assumed to be built with heating equipment powered by electricity.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Canada's residential sector is also tasked with addressing housing affordability.

For New Brunswick, Canada Mortgage and Housing Corporation estimated no housing supply gap exists in the province, suggesting that new-home construction is proceeding at a rate that can accommodate the growing population without putting excessive upward pressure on housing prices. Competing pressures from neighbouring provinces, however, may create a pull on the province's residential workforce and potentially limit the availability of the trades required to proceed with the efforts contemplated under the scenario.

TABLE 5: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, NEW BRUNSWICK, 2023–2032

Trades and occupations, residential sector	Employment change #	Employment change %
Total, all trades and occupations	2,740	23%
34 BuildForce Canada trades and occupations	2,320	23%
Other trades and occupations	430	25%
Refrigeration and air conditioning mechanics	110	206%
Insulators	20	59%
Residential and commercial installers and servicers	110	40%
Bricklayers	70	39%
Concrete finishers	20	36%
Contractors and supervisors	320	33%
Roofers and shinglers	70	33%
Plasterers, drywall installers and finishers, and lathers	170	32%
Painters and decorators (except interior decorators)	180	30%
Sheet metal workers	20	26%
Electricians	130	24%
Plumbers	70	23%
Home building and renovation managers	90	22%
Floor covering installers	60	22%
Trades helpers and labourers	320	21%
Heavy equipment operators (except crane)	20	19%
Truck drivers	20	18%
Carpenters	530	18%
Construction estimators	30	18%
Elevator constructors and mechanics	10	17%
Welders and related machine operators	<10	14%
Tilesetters	<10	12%
Heavy-duty equipment mechanics	<10	8%
Construction managers	-10	-2%
Glaziers	<10	-50%
Ironworkers and structural metal fabricators	<10	-50%
Gasfitters	-20	-84%

Source: BuildForce Canada

QUEBEC

IMPACT ON RESIDENTIAL CONSTRUCTION

Quebec has a large share of homes heated by electricity. This is a favourable position for the province as it seeks to meet federal GHG emissions reduction goals. Nevertheless, the province does have some homes heated by fossil fuels which will need to be transitioned. Moreover, the transition to an all-electric housing stock will require older homes to take on energy-efficiency retrofits aimed at reducing heat loss to minimize draws on the province's electrical grid.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

In 2020, Quebec's housing stock was estimated at 4 million units. According to Natural Resources Canada, 71% of these units were equipped with electric-powered space heaters – most (64%) being electric baseboard heaters – while another 15% were equipped with dual systems with electric capability. The remaining 14% were heated by equipment solely powered by fossil fuels, including natural gas (5%), heating oil (5%), dual systems without electric capability (3%), wood (1%), and other fuels including coal and propane (<1%).

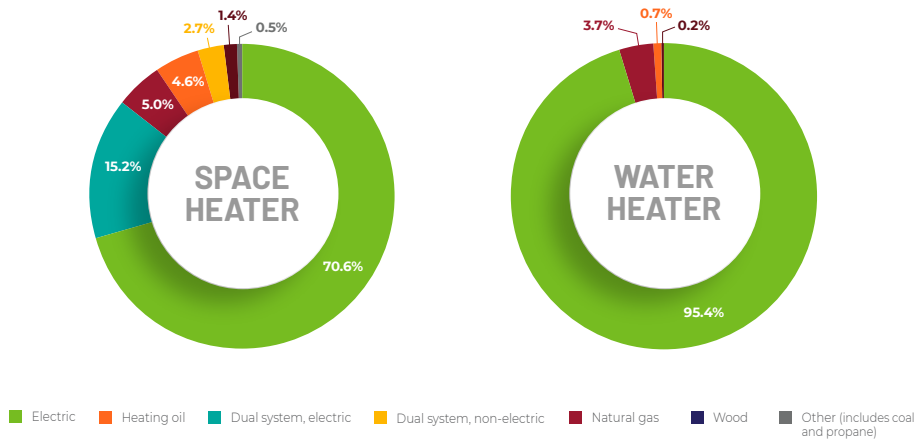
An even-more significant proportion of homes in Quebec were equipped with electric water heaters (95%), while the remaining 5% were powered by natural gas, heating oil, and wood.

Figure 31 summarizes the breakdown of the stock of space and water heaters by energy source in Quebec as of 2020.

Compared to provinces in which homes are predominantly heated by fossil fuels, Quebec's green-building transition will generate more subdued impacts. However, the province is expected to see installation of heat pumps and electric water heaters ramp up to replace existing units powered by fossil fuels and through the construction of new homes equipped with greener heating equipment. Additionally, with government incentives in place, it is expected that some homeowners will take advantage to replace less-efficient electric baseboard heaters with cold-climate air-source heat pumps.

Installation of cold-climate air-source heat pumps in Quebec is anticipated to increase over the coming decade, from about 17,300 units in 2022 to over 76,000 units by 2032.

FIGURE 31: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, QUEBEC, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

For the entire 2023–2032 scenario period, an estimated 511,200 heat pumps are expected to be installed. Just over half of these will be installed to replace existing fossil-fuel powered space heaters. A further 12% will replace electric baseboard heaters. The remaining units will be installed in new homes built in the province.

Although Quebec accounts for over a quarter of Canada's housing stock, heat pump installations over the coming decade account for 10% of the 4.9 million units estimated to be installed Canada-wide. This is reflective of the fact that homes in the province are already primarily heated by electricity.

As a significant portion of Quebec's homes are already equipped with electric water heaters, installation of these units will be relatively low. Across the 2023–2032 scenario period, an estimated 249,400 electric water heaters are anticipated to be installed in new homes and to replace fossil-fuel-powered equipment.

Figure 32 shows the estimated number of heat pumps and electric water heaters expected to be installed in Quebec across the 2023–2032 period.

Quebec is the top producer of electricity in Canada. With approximately 70% of the existing stock of homes already dependent on electricity as their primary heating source, the additional draw on the provincial electrical grid will be less than in other provinces. If existing homeowners can be persuaded to replace their older and less efficient baseboard heating systems with heat pumps, the demands on the grid will be further reduced. Despite this advantage, a sizable proportion of older homes in the province are expected to require retrofits to improve their energy-efficiency.

Based on consultations with the Canadian Home Builders' Association, energy-efficiency retrofits are not dramatically different in the province than elsewhere in the country, accounting for a small portion of annual renovations activity.

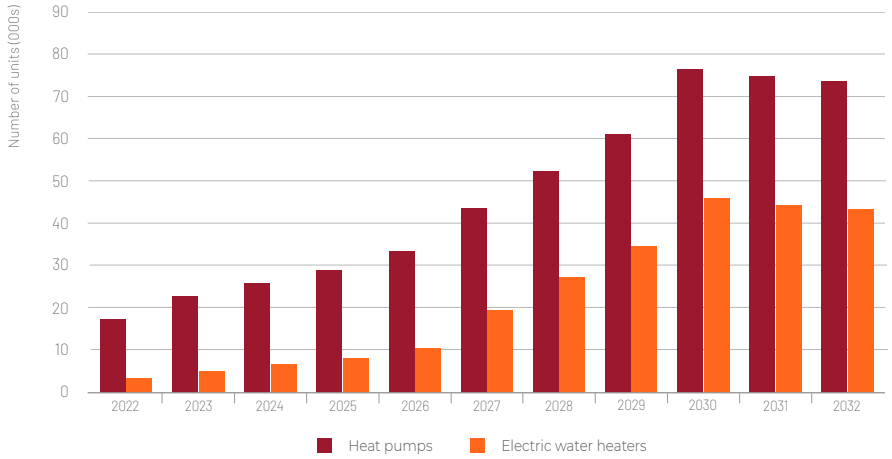
The green buildings scenario assumes that a proportion of Quebec's 2020 housing stock will take on some sort of energy-efficiency retrofit project between 2023 and 2032, with activity assumed to ramp up in the latter half of the 2020s as incentive programs are introduced to motivate homeowners to take on these projects. Across the 2023–2032 period, this amounts to 204,700 home renovations to improve energy efficiency. This is illustrated in Figure 33.

IMPACT ON RESIDENTIAL INVESTMENT

Fuel-switching and energy-efficiency retrofits are expected to require significant investments across the country, which is well beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

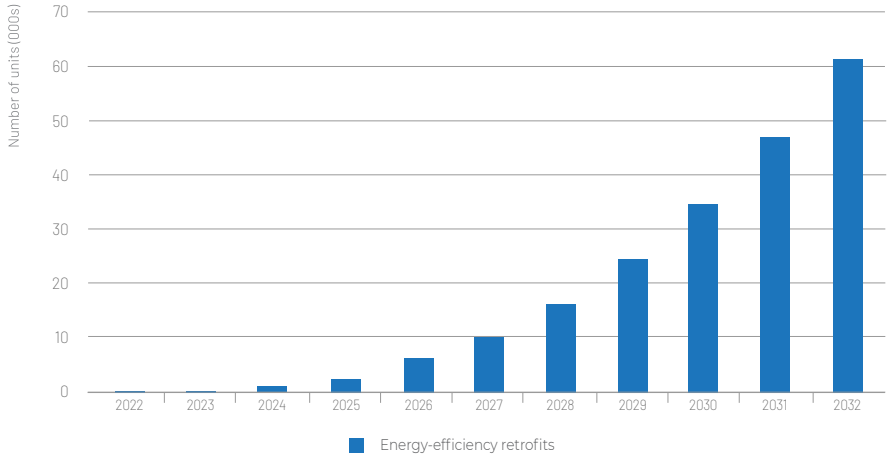
For Quebec, the direct investments amount to $15.7 billion between 2023 and 2032. Most of these investments (83%) are related to energy-efficiency retrofits as homes in the province are already primarily heated by electric equipment. Nevertheless, investments associated with replacing fossil-fuel-powered heating equipment and building new homes equipped with electric-powered heaters is estimated to require investments of $2.7 billion.

FIGURE 32: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, QUEBEC, 2023–2032



Source: BuildForce Canada

FIGURE 33: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, QUEBEC, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

In Quebec, approximately 9,400 direct new employment opportunities are expected to be created in residential construction related to initiatives to transition to a fully electric housing stock. With the province's housing stock already primarily heated by electricity, most of these new employment requirements are related to improving the energy efficiency of existing homes.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

9,400 Total new employment

1,400 Fuel-switching

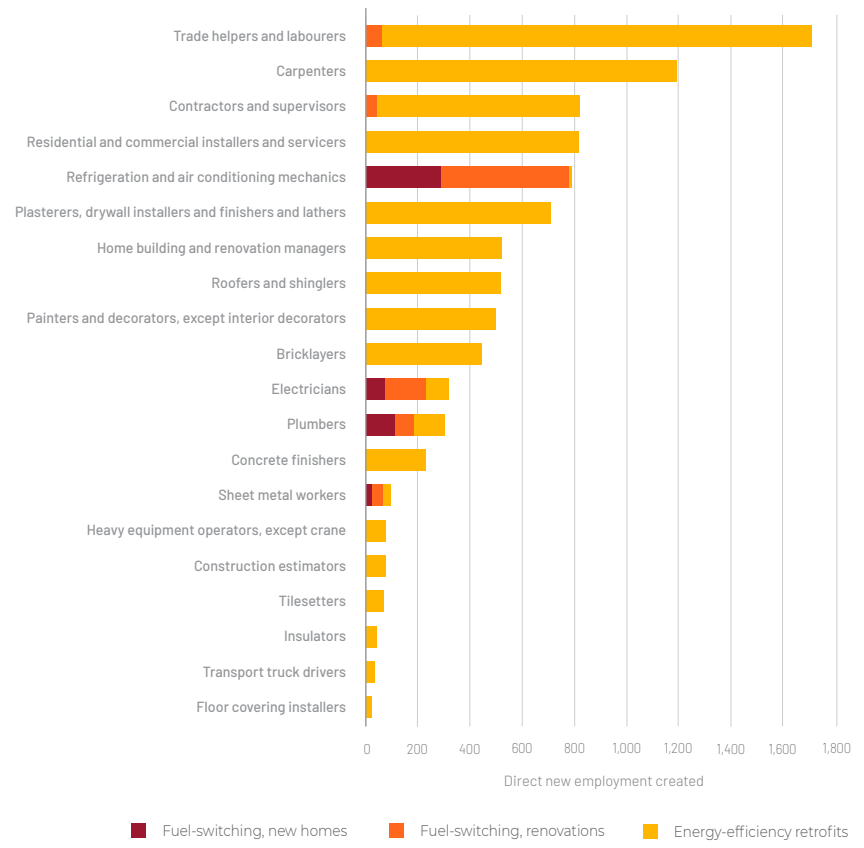
8,000 Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

The creation of these additional new employment opportunities will drive demand across a wide variety of trades and occupations due to the nature of energy-efficiency retrofits. On the other hand, although demands for fuel-switching are relatively smaller, they are concentrated among just a few trades.

Figure 34 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 34: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, QUEBEC, 2023–2032



Source: BuildForce Canada

As energy-efficiency retrofits are the primary driver of direct new employment in Quebec, it raises employment for trade helpers and labourers, carpenters and contractors and supervisors. Although significant in number of workers, these demands represent a small percentage increase above the base year workforce. Conversely, direct new employment created for heating, refrigeration and air conditioning mechanics and insulators represents a substantial increase above the base year workforce, with demands for heating, refrigeration and air conditioning mechanics tripling (+208%) and demand for insulators increasing by 37%.

The additional investments in Quebec are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

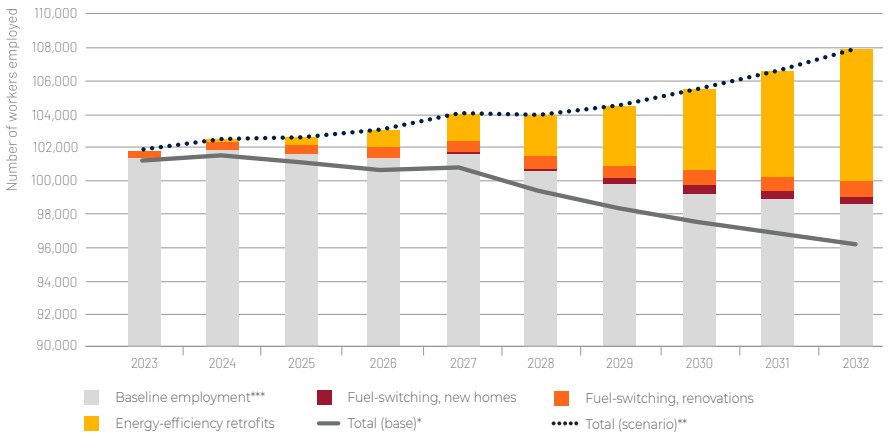
Figure 35 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023–2032 base forecast, residential employment in Quebec was estimated to recede sharply over the near term due to rising interest rates and then stabilize through to 2027. It was anticipated to continue to track lower to 2032 with slowing population growth. Across the 2023–2032 period, employment was expected to recede by 9,200 workers – or 9% compared to base year levels.

Under the scenario, residential employment still faces a reduction over the near term due to rising interest rates but is projected to increase steadily after 2023 with much of this additional employment driven by energy-efficiency retrofits. Across the 2023–2032 period, employment is projected to grow by 2,600 workers – or 2% above base year levels.

Table 6 shows the expected change in residential employment over the 2023–2032 scenario period by trades and occupations under the scenario.

FIGURE 35: RESIDENTIAL CONSTRUCTION EMPLOYMENT, QUEBEC, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

As illustrated in Table 6, employment for heating, refrigeration and air conditioning mechanics working in Quebec's residential sector is projected to double by 2032. Employment for insulators is expected to rise by 31% and residential installers by 28%. The strong increase in the demand for these trades could potentially lead to recruitment challenges across the decade.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Quebec's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimated the housing supply gap for Quebec at 860,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built above the business-as-usual levels of activity. Combined, these translate into the province needing to build over 1.2 million units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building 1.2 million new homes between 2024 and 2033. Preliminary results from this report estimate that Quebec's residential employment could rise by as much as 78,200 workers – or 75% – above 2023 levels by 2033.

This strong surge in demand may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 1.2 million homes. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet GHG emissions reduction goals.

TABLE 6: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, QUEBEC, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	4,210	3%
34 BuildForce Canada trades and occupations	2,600	2%
Other trades and occupations	1,610	4%
Refrigeration and air conditioning mechanics	790	208%
Insulators	40	31%
Residential and commercial installers and servicers	1,140	28%
Concrete finishers	250	22%
Roofers and shinglers	750	22%
Bricklayers	410	21%
Painters and decorators (except interior decorators)	1,010	18%
Contractors and supervisors	770	16%
Plasterers, drywall installers and finishers, and lathers	680	14%
Home building and renovation managers	870	8%
Electricians	190	7%
Plumbers	260	7%
Sheet metal workers	40	5%
Floor covering installers	50	4%
Truck drivers	10	0%
Heavy equipment operators (except crane)	-20	-1%
Carpenters	-510	-2%
Steamfitters, pipefitters and sprinkler system installers	<10	-2%
Elevator constructors and mechanics	<10	-4%
Heavy-duty equipment mechanics	-20	-5%
Trades helpers and labourers	-760	-6%
Tilesetters	-110	-6%
Construction estimators	-150	-6%
Welders and related machine operators	-10	-14%
Ironworkers and structural metal fabricators	-80	-29%
Glaziers	-40	-29%
Construction managers	-2,940	-39%
Crane operators	-20	-52%
Gasfitters	<10	-80%

Source: BuildForce Canada

ONTARIO

IMPACT ON RESIDENTIAL CONSTRUCTION

Ontario is Canada's most populous province. Its housing stock is the largest in the country, accounting for approximately 36% of all homes in Canada. Most existing homes in the province are heated with natural gas and other fossil fuels, which will translate to significant investment and employment requirements over the coming decade and through to 2050 to achieve federal GHG emissions reduction goals.

Besides transforming current residences to utilize electric power sources, the province is also assumed to start constructing new homes fitted with heat pumps, alongside further refurbishment efforts aimed at enhancing the energy efficiency of existing homes. This is to reduce heat dissipation and lower the demand on the provincial electricity network.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

As of 2020, there were approximately 5.8 million existing homes in Ontario. The vast majority of these (77%) were heated by natural gas (66%) and other fossil fuels including heating oil, coal or propane, wood, and other systems. The remaining 23% of homes in Ontario were heated by electric space heaters including electric baseboard heaters (17%) and heat pumps (6%).

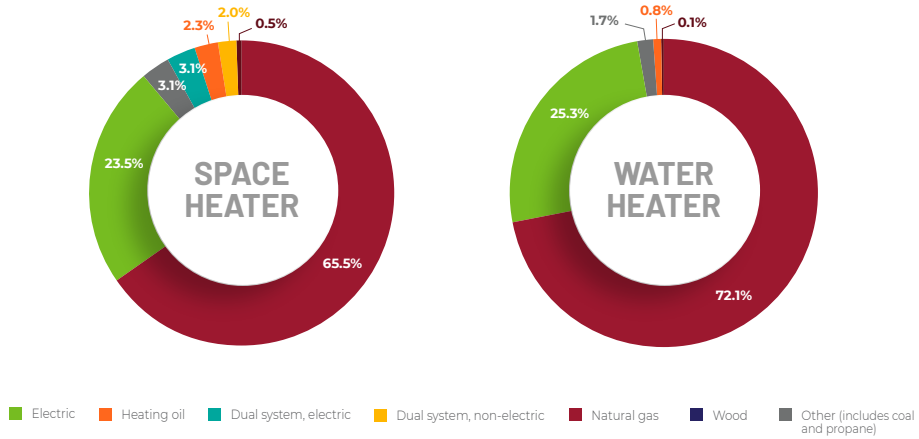
For water heaters, an even-greater proportion were powered by natural gas. In fact, natural-gas-powered water heaters made up about 72% of all water heaters installed in existing homes in Ontario as of 2020. Electric water heaters accounted for 25% of the province's stock.

Figure 36 summarizes the breakdown of the stock of space and water heaters by energy source in Ontario as of 2020.

Achieving the federal government's GHG emissions reduction goals in Ontario will not occur without challenges. The transition away from fossil fuels is expected to have significant impacts in the economy and on the demand for residential construction workers.

Over the coming decade, meeting the interim GHG emissions reduction goals will require Ontario to transition toward electric-powered space and water heaters – namely cold-climate air-source heat pumps for space heating. This transition is expected in both existing and new homes. It is also assumed that some homeowners will take advantage of incentives to replace less-efficient electric baseboard heaters with heat pumps.

FIGURE 36: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, ONTARIO, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

Heat pump installations in Ontario are required to ramp up substantially if the province is to achieve GHG emissions reduction targets, rising from about 78,400 units installed in 2022 to more than 329,000 units by 2030. A ramp-up period is expected as installation of these units should accelerate in the late 2020s as anticipated changes to the building code will accelerate the construction of new homes powered by heat pumps.

For the entire 2023–2032 scenario period, an estimated 2.3 million cold-climate air-source heat pumps are expected to be installed in existing and new homes. The province's heavy dependence on natural gas for space heating suggest that heat pump installations in Ontario will account for nearly half (47%) of the 4.9 million units expected to be installed Canada-wide under the scenario.

With only about 25% of water heaters currently (2020) installed in Ontario being electric, the province is required to dramatically increase installation of these units over the coming decade to reduce GHG emissions. Across the 2023–2032 scenario period, this amounts to approximately 2.3 million electric water heaters installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 37 shows the estimated number of heat pumps and electric water heaters expected to be installed in Ontario across the 2023–2032 period.

Reducing GHG emissions from residential buildings requires transitioning away from fossil fuels and toward electric heating equipment. For Ontario, this means retrofitting more than two-thirds of existing homes currently heated by fossil fuels. This move toward electric heating equipment will create additional demands for electricity, which could be exacerbated by older and less energy-efficient homes.

To mitigate the risks associated with increasing the draw on the electrical grid associated with a full transition to electric-powered homes, Ontario will require retrofitting existing homes to be more heat-efficient. This will translate into renovation projects to replace old windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits.

Based on consultations with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a minor portion of renovation activity in the province. However, under the pressure to make homes more efficient it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

This scenario assumes that just over 301,000 housing units in Ontario will undergo some sort of energy-efficiency retrofit between 2023 and 2032.

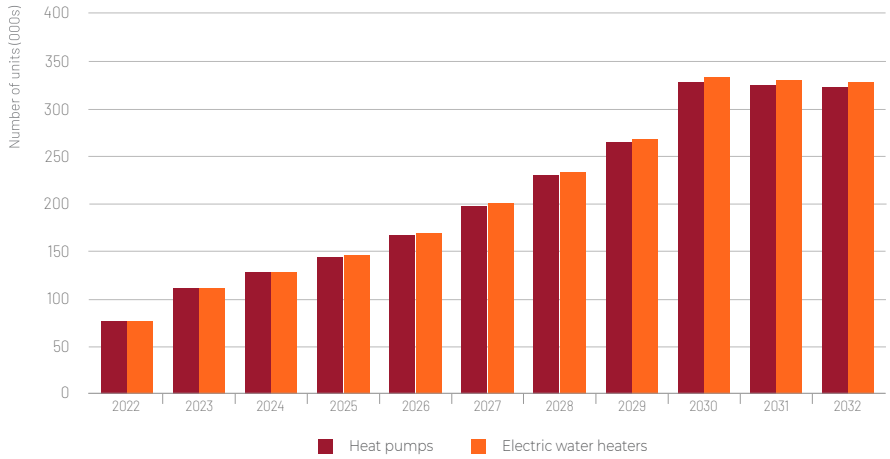
Figure 38 demonstrates the number of housing units in Ontario taking on energy-efficiency retrofit projects across the 2023 to 2032 scenario period.

Ontario has one of the oldest housing stocks in the country, with over 65% of homes built before the year 2000. While the model assumes a proportion of the housing stock will be undergoing energy-efficiency retrofits, under a highly incentivized environment, this estimate could be surpassed.

IMPACT ON RESIDENTIAL INVESTMENT

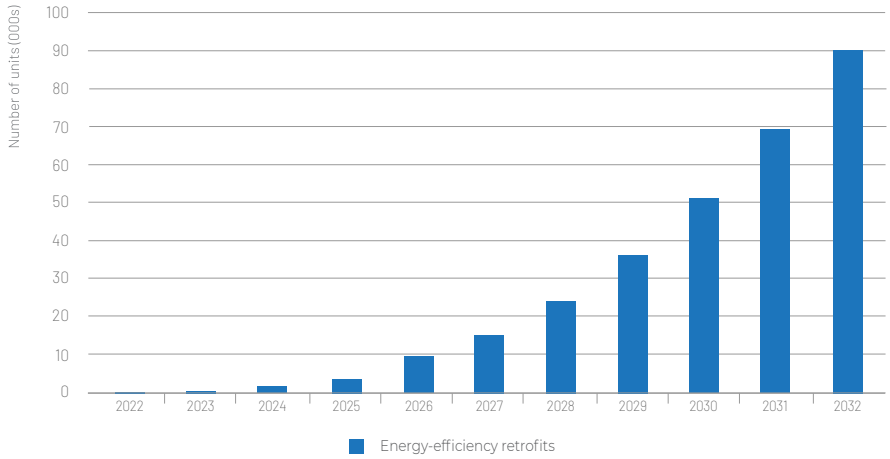
The expected installation of some 2.3 million cold-climate air-source heat pumps and electric water heaters and renovation work aimed at improving the energy efficiency of older homes in Ontario will require significant investments. Under the assumptions laid out in the scenario, the province will require investments of $14.8 billion across the 2023–2032 scenario period. This is well beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

FIGURE 37: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, ONTARIO, 2023–2032



Source: BuildForce Canada

FIGURE 38: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, ONTARIO, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

Due to a substantial need to retrofit existing homes away from fossil-fuel heaters, investments are almost evenly split between fuel-switching and energy-efficiency retrofit renovations in Ontario. Fuel-switching is expected to require $6.5 billion in investments while energy-efficiency retrofits contribute $8.3 billion.

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while the indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

In Ontario, fuel-switching and energy-efficiency retrofits are anticipated to generate 24,600 direct new employment opportunities in the province's residential construction sector. As the nature of the work dictates, most of this new employment creation is related to energy-efficiency retrofits. Nevertheless, fuel-switching is expected to create 8,300 direct employment opportunities, accounting for 34% of all direct new employment created. Moreover, while additional demands related to energy-efficiency retrofits are expected to span several trades and occupations, they are concentrated among a few key trades and occupations involved in fuel-switching.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

24,600 Total new employment

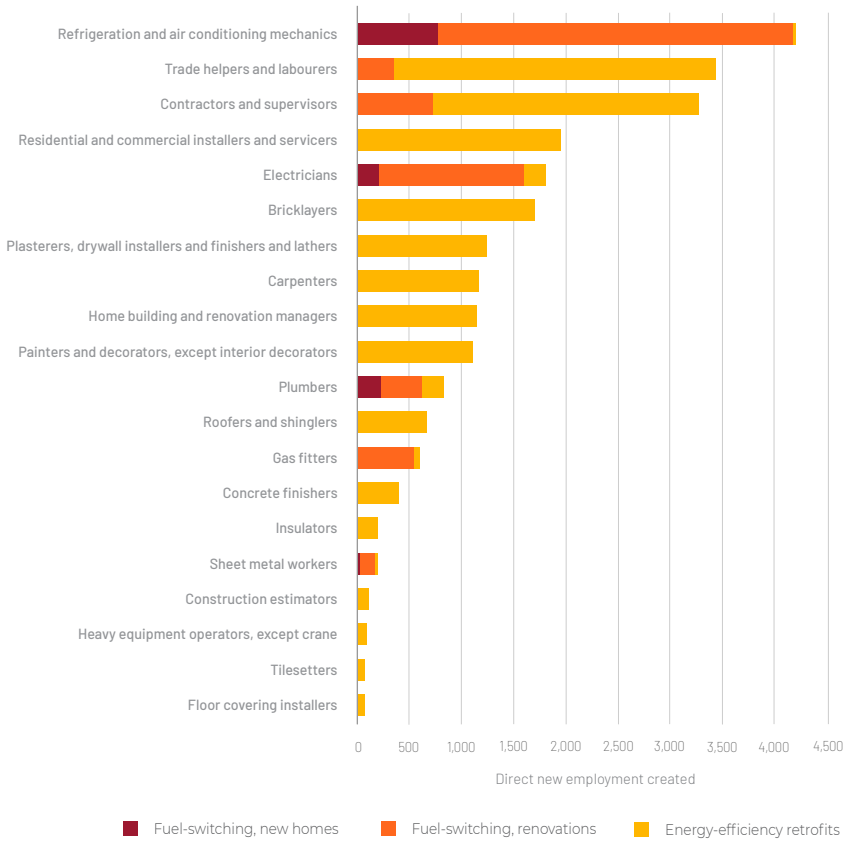
8,300 Fuel-switching

16,300 Energy-efficiency retrofits

Direct new employment created in Ontario will span a variety of trades and occupations working in the residential sector as most new employment relates to energy-efficiency retrofits, which somewhat follows the trade distribution of renovations. However, although fuel-switching accounts for a minor portion of direct new employment, employment growth will be concentrated among a few specific trades.

Figure 39 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 39: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, ONTARIO, 2023–2032



Source: BuildForce Canada

The required installation of 2.3 million heat pumps and electric water heaters in Ontario will create significant demands for heating, refrigeration and air conditioning mechanics – both in total number of new workers needed and as a percentage of the base year workforce. Between 2023 and 2032, the direct new employment created for this trade amounts to 4,200 workers, or nearly four times the size of the trade's workforce in the base year of this forecast.

Despite a transition away from fossil fuels, the scenario estimates direct new employment for gas fitters as each house that converts from a fossil-fuel space or water heater will require a licensed gas fitter to uninstall these units. Nevertheless, overall employment demands for this trade will face downward pressure as new homes are anticipated to be constructed with heat pumps.

Trade helpers and labourers will also see demands increase across the 2023–2032 period. However, these direct new employment opportunities amount to only about 9% of the base year workforce, or less than 1% growth annually, which should be mitigated through traditional hiring practices in the province.

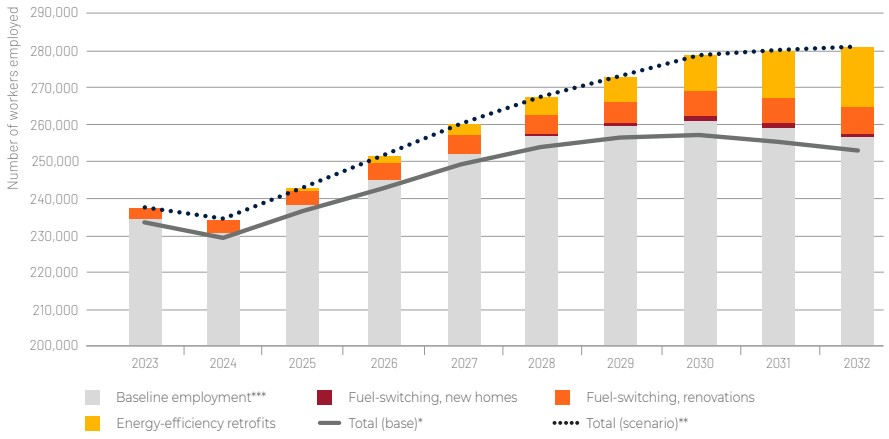
The demands for heating, refrigeration and air conditioning mechanics is expected to be significant – accounting for half of the direct new employment created due to fuel-switching. Labour market challenges are likely to arise as the direct new employment created is nearly four times (367%) the size of the workforce for the trade in the base year.

Labour market challenges are likely for heating, refrigeration and air conditioning mechanics, and gas fitters. Additional recruitment efforts may also be required for insulators, which see strong rises in demand related to energy-efficiency retrofits. The additional investments in Ontario are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

Figure 40 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023–2032 base forecast, residential employment in Ontario was projected to decline over the near term due to rising interest rates which were anticipated to curb new-home construction and renovations. Employment

FIGURE 40: RESIDENTIAL CONSTRUCTION EMPLOYMENT, ONTARIO, 2023–2032



* Total (base) refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** Total (scenario) refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** Baseline employment refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

was projected to rise post-2024 with strong demands from international migration, returning employment levels to close to the 2022 peak of 249,000 workers by 2030. Beyond 2030, employment was projected to begin declining as population growth is expected to slow.

Under the scenario, residential employment in Ontario is still projected to face downward pressures in the near term related to rising interest rates. However, it is projected to remain above the base forecast and rises steadily after 2024.

In BuildForce Canada's base-case scenario, residential employment in Ontario was expected to increase by 9% – or 21,200 workers – above base year levels by 2032. Under the green buildings scenario, residential employment is projected to add 49,200 workers – a 21% increase from base year levels.

Table 7 shows the expected change in residential employment for Ontario over the 2023–2032 scenario period by trades and occupations under the scenario.

The employment changes in relation to the size of the base year workforce, as presented in Table 7, indicate that several trades and occupations in Ontario could face recruitment challenges in the coming decade, including heating, refrigeration and air conditioning mechanics, insulators, residential installers (windows and doors), electricians, concrete finishers, bricklayers, contractors and supervisors, and sheet metal workers.

The availability of heating, refrigeration and air conditioning mechanics, in particular, is likely to be strained as demands relating to fuel-switching causes a quadrupling of employment for this trade over the next 10 years.

The older age profile of homes in Ontario means that fuel-switching, in many cases, requires the upgrade of electrical panels. This is expected to create significant demands for electricians in the province.

As homes transition to heating equipment powered by electricity, demands for gas fitters is expected to decline. Although retrofitting existing homes will still require these workers to uninstall gas lines, demand is projected to be reduced especially in the late 2020s and early 2030s as a significant share of new homes is assumed to be built with electric-powered heating equipment. The anticipated decline in demands for this trade may present an opportunity for retraining these workers to install heat pumps that could alleviate the extreme pressure put on heating, refrigeration and air conditioning mechanics.

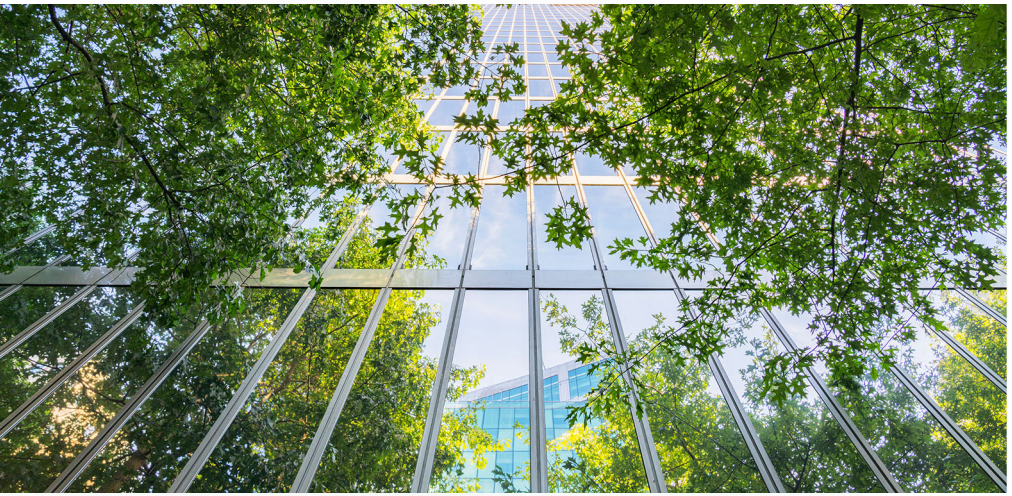


TABLE 7: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, ONTARIO, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	65,490	22%
34 BuildForce Canada trades and occupations	49,210	21%
Other trades and occupations	16,280	26%
Refrigeration and air conditioning mechanics	4,360	401%
Insulators	280	43%
Residential and commercial installers and servicers	3,120	38%
Concrete finishers	690	34%
Electricians	3,070	34%
Bricklayers	2,610	34%
Contractors and supervisors	5,620	31%
Sheet metal workers	360	30%
Plasterers, drywall installers and finishers, and lathers	2,670	28%
Roofers and shinglers	1,650	26%
Painters and decorators (except interior decorators)	2,550	25%
Plumbers	2,030	23%
Home building and renovation managers	5,540	21%
Glaziers	200	20%
Drillers and blasters	<10	18%
Elevator constructors and mechanics	180	18%
Tilesetters	700	18%
Ironworkers and structural metal fabricators	270	17%
Crane operators	70	17%
Welders and related machine operators	90	17%
Floor covering installers	850	16%
Truck drivers	430	16%
Steamfitters, pipefitters and sprinkler system installers	10	16%
Trades helpers and labourers	6,190	15%
Heavy equipment operators (except crane)	480	15%
Carpenters	4,900	14%
Construction estimators	570	14%
Heavy-duty equipment mechanics	20	11%
Construction managers	630	3%
Gasfitters	-960	-61%

Source: BuildForce Canada

REGIONAL INSIGHTS

Demand pressures will vary across Ontario's regions as differences in the size of the local housing stock and availability of workers locally will determine potential demands and whether labour market pressures are likely to arise. The following section provides regional insights for the five Ontario regions covered by BuildForce Canada across the 2023–2032 scenario period:

- **Central Ontario** – Strong demands for workers, stemming from fuel-switching and energy-efficiency retrofits, are anticipated in Central Ontario as this is the second largest residential market in the province. Under the scenario, residential employment in the region is anticipated to increase by 13,900 workers – or 21% – above base year levels by 2032. Several trades and occupations may face recruitment challenges, with specifically sharp rises forecast in demand for heating, refrigeration and air conditioning mechanics, insulators, residential installers (windows and doors), and electricians.

- **Eastern Ontario** – Residential employment in Eastern Ontario was previously projected to decline by close to 10% from peak levels reached in 2021. Accelerating green building activity is projected to add to employment requirements and return employment to 2021 highs by 2032. Tight labour markets are anticipated for heating, refrigeration and air conditioning mechanics across the decade.

- **Greater Toronto Area** – Given the size of the housing stock in the Greater Toronto Area, green building activity is projected to have significant impacts in this region. Under the scenario, the residential sector adds 30,800 workers (+33% from base year levels) across the 2023–2032 period. This increase will likely create labour market challenges for many trades and occupations in the region – especially for heating, refrigeration and air conditioning mechanics, insulators, residential installers, and electricians.

- **Northern Ontario** – The Northern region has the fewest housing units in the province. However, the region's workforce is also relatively smaller, which may translate into recruitment challenges. Across the 2023–2032 outlook, residential employment – supported by growing demands from fuel-switching and energy-efficiency retrofits – is expected to increase by 450 workers, a 5% rise above base year levels. Strong demands created for heating, refrigeration and air conditioning mechanics will exacerbate the availability of workers locally and create recruitment challenges.

- **Southwestern Ontario** – Fuel-switching and energy-efficiency retrofits are expected to raise overall residential employment by 3,700 workers (+11% from the base year) whereas BuildForce Canada's base forecast anticipated employment to end the scenario near 2021 levels of activity after fluctuations. Employment rises substantially for heating, refrigeration and air conditioning mechanics, insulators, and residential installers (windows and doors), which creates potential recruitment challenges.

Table 8 summarizes the expected change in residential employment over the 2023–2032 scenario period by trades and occupations under the scenario for the five Ontario regions.

TABLE 8: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, ONTARIO AND REGIONS, 2023–2032

	Employment change (%, 2023–2032)					
Trades and occupations, residential sector	**Ontario**	**Central**	**Eastern**	**Greater Toronto Area**	**Northern**	**Southwestern**
Total, all trades and occupations	22%	22%	1%	34%	5%	12%
34 BuildForce Canada trades and occupations	21%	21%	1%	33%	5%	11%
Other trades and occupations	26%	25%	3%	36%	6%	14%
Refrigeration and air conditioning mechanics	401%	376%	399%	417%	590%	368%
Insulators	43%	43%	28%	58%	25%	37%
Residential and commercial installers and servicers	38%	36%	21%	49%	13%	31%
Concrete finishers	34%	32%	16%	45%	11%	26%
Electricians	34%	31%	12%	46%	33%	22%
Bricklayers	34%	34%	17%	46%	15%	27%
Contractors and supervisors	31%	30%	12%	42%	11%	23%
Sheet metal workers	30%	27%	10%	44%	23%	19%
Plasterers, drywall installers and finishers, and lathers	28%	26%	7%	37%	7%	17%
Roofers and shinglers	26%	28%	10%	35%	3%	19%
Painters and decorators (except interior decorators)	25%	25%	8%	33%	2%	17%
Plumbers	23%	22%	2%	35%	6%	13%
Home building and renovation managers	21%	23%	3%	28%	-6%	13%
Glaziers	20%	11%	-27%	33%	50%	-5%
Drillers and blasters	18%	0%	0%	25%	0%	50%
Elevator constructors and mechanics	18%	10%	-19%	32%	10%	-7%
Tilesetters	18%	13%	-9%	29%	-2%	2%
Ironworkers and structural metal fabricators	17%	8%	-27%	33%	75%	-15%
Crane operators	17%	-12%	-25%	33%	0%	-14%
Welders and related machine operators	17%	13%	-13%	30%	0%	2%
Floor covering installers	16%	16%	-3%	27%	-2%	8%
Truck drivers	16%	16%	-3%	25%	-4%	8%
Steamfitters, pipefitters and sprinkler system installers	16%	15%	0%	23%	0%	10%
Trades helpers and labourers	15%	15%	-7%	29%	10%	3%
Heavy equipment operators (except crane)	15%	16%	-3%	25%	-5%	8%
Carpenters	14%	16%	-3%	26%	-5%	8%
Construction estimators	14%	16%	-4%	24%	-5%	5%
Heavy-duty equipment mechanics	11%	14%	-5%	21%	-12%	8%
Construction managers	3%	0%	-20%	20%	1%	-8%
Gasfitters	-61%	-74%	-59%	-53%	-34%	-67%

Source: BuildForce Canada

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Ontario's residential sector is also tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimates Ontario's housing supply gap at close to 1.5 million homes between 2023 and 2030. This figure represents the number of additional units required to be built above the business-as-usual levels of activity. Combined, these translate into the province needing to build 2.4 million units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building 2.4 million new homes between 2024 and 2033. Preliminary results from this report estimate that Ontario's residential employment could rise by as much as 227,800 workers – or 100% – by 2033 from 2023 levels.

This strong surge in demand to address housing affordability may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction. However, the addition of 1.5 million new homes could help accelerate the transition away from fossil-fuel heating systems – provided electrical heating systems are incorporated into the design of these new homes.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 2.4 million homes. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

MANITOBA

IMPACT ON RESIDENTIAL CONSTRUCTION

In Manitoba, there is a balanced split between space and water heaters powered by electricity versus those powered by fossil fuels, primarily natural gas. The transition away from fossil-fuel-powered heating equipment to cold-climate air-source heat pumps and electric water heaters should generate significant impacts on the provincial economy, particularly affecting investments and demand for workers in residential construction.

While this shift is essential for meeting the federal government's GHG emissions reduction goal, it necessitates the conversion of numerous fossil-fuel-heated homes. In addition to modifying existing homes to run on electric energy sources, it is anticipated that the province will begin building new residences equipped with heat pumps and electric water heaters. This effort will be complemented by additional renovation projects focused on improving the energy efficiency of current homes – especially older homes – with the objective of decreasing heat loss and reducing the load on the provincial electrical grid.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

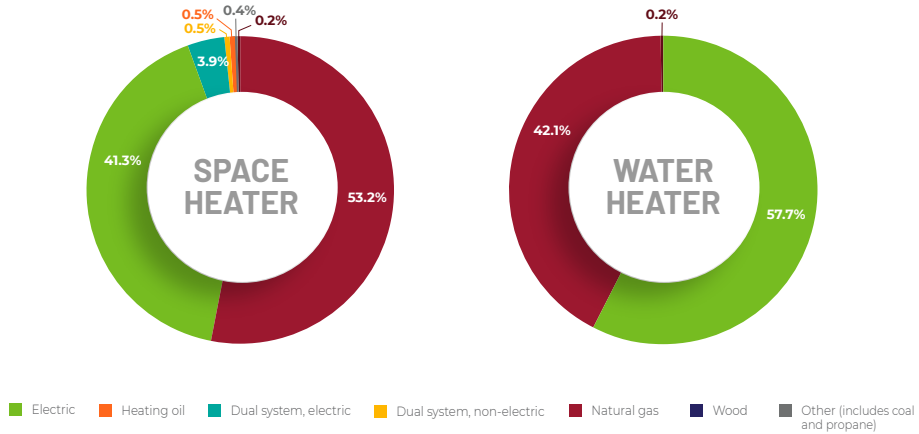
In Manitoba, 59% of the 549,200 existing homes in 2020 were heated by fossil fuels, as estimated by Natural Resources Canada. Natural gas (53%) was the predominant energy source for space heaters. The second-most common heating energy source in the province is electricity (41%), which works to the province's advantage when considering the transition away from fossil fuels. Of these, 38% of homes are equipped with electric baseboard heaters while only 3% have heat pumps.

When considering water heaters, the scale is tipped slightly in favour of electric water heaters (58%) in Manitoba. Nevertheless, a significant proportion of water heaters in the province are powered by natural gas.

Figure 41 summarizes the breakdown of the stock of space and water heaters by energy source in Manitoba as of 2020.

The transition away from fossil-fuel-powered heating equipment will require a significant increase in the installation of heat pumps and electric water heaters in the province. While the bulk of the additional demands stem from replacing equipment powered by fossil fuels,

FIGURE 41: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, MANITOBA, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

it is assumed that some homeowners may take advantage of incentive programs to replace less-efficient electric baseboard heaters with more-efficient heat pumps. The BuildForce Canada scenario also assumes a transition to heat pumps and electric water heaters in new homes constructed.

Installation of cold-climate air-source heat pumps is anticipated to ramp up in Manitoba, up from about 6,100 units in 2022 to about 24,000 units in 2030. Across the 2023–2032 scenario period, this increase in heat pump installations amounts to approximately 172,900 units. Three-quarters of these units will directly replace existing fossil-fuel-powered heating equipment.

Electric water heater installations will also be required to expand across the decade to reduce GHG emissions. Although the requirement is slightly lower than for space heaters, a ramp up is assumed. Across the 2023–2032 scenario period, this amounts to approximately 133,900 electric water heaters installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 42 shows the estimated number of heat pumps and electric water heaters expected to be installed in Manitoba across the 2023–2032 period.

To ensure this transition toward electric-powered heating equipment does not strain the province's electrical grid, it is assumed that energy-efficiency retrofit projects aimed at improving energy efficiency of existing homes will take place – especially among older housing units. These projects can include replacing older windows and doors, re-insulating attics and walls, improving air tightness, and in some cases deep energy retrofits.

Based on discussions with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovation activity in the province. However, under the pressure to make homes more efficient, it is assumed that incentives will be put in place that motivate homeowners to take on these projects.

Under the scenario, as many as 28,200 homes among Manitoba's 2020 housing stock will take on energy-efficiency retrofit projects across the 2023 to 2032 scenario period.

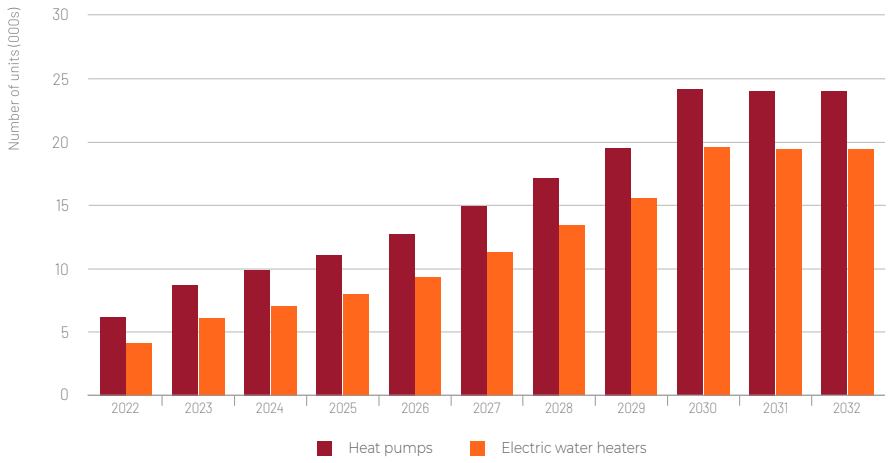
Figure 43 presents the estimated number of homes taking on energy-efficiency retrofit projects in Manitoba across the 2023–2032 scenario period.

IMPACT ON RESIDENTIAL INVESTMENT

The rise in the number of installations of cold-climate air-source heat pumps and electric water heaters, as well as energy-efficiency retrofit renovations, will require significant investments. For Manitoba, under the assumptions laid out in this scenario, investments are estimated at $2.8 billion across the 2023–2032 forecast period. This is well beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

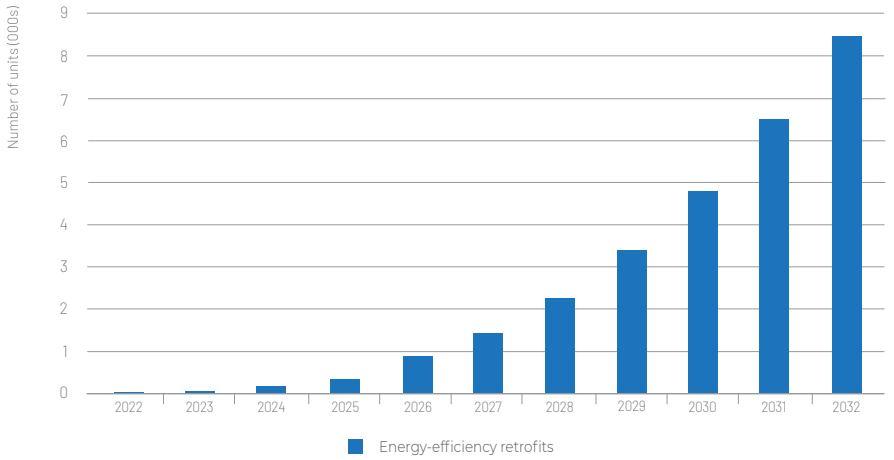
Fuel-switching is estimated to account for 37% ($1 billion) of the total required investments described in the scenario in Manitoba, while a further $1.8 billion, or 63%, is associated with improving the energy efficiency of existing homes.

FIGURE 42: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, MANITOBA, 2023–2032



Source: BuildForce Canada

FIGURE 43: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, MANITOBA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

Work described in this scenario is estimated to generate 2,300 direct new employment opportunities in Manitoba's residential sector. A high proportion of these direct new employment opportunities are related to energy-efficiency retrofits and span a wide range of trades and occupations. Although representing a smaller share, new employment due to fuel-switching is concentrated among a few select trades and occupations.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

2,300
Total new employment

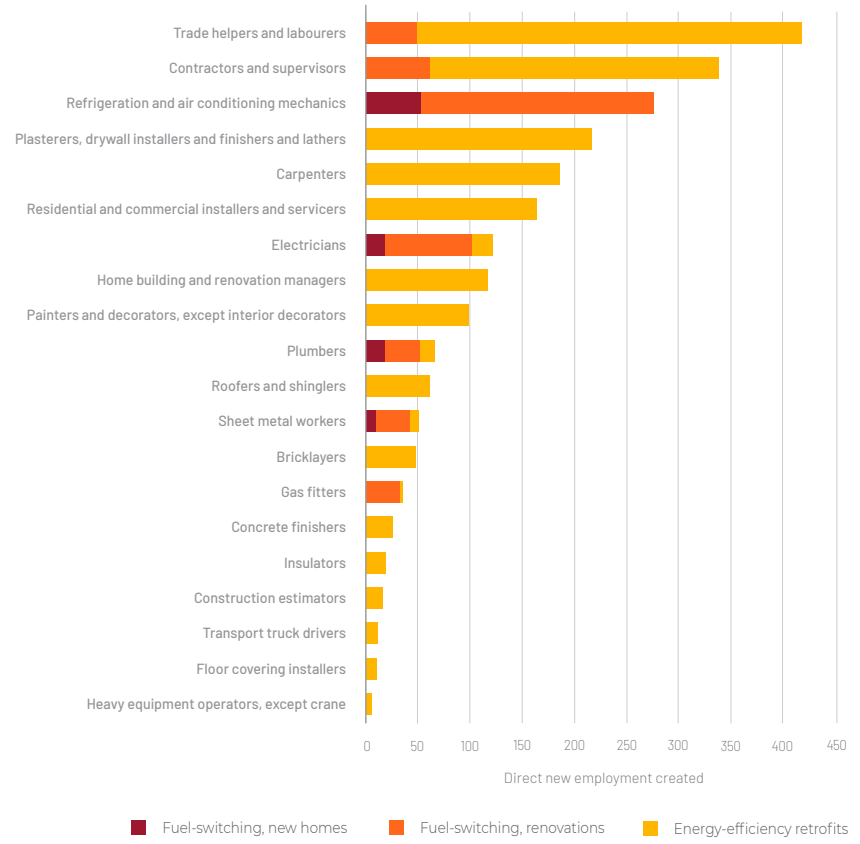
600
Fuel-switching

1,700
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

Figure 44 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 44: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, MANITOBA, 2023–2032



Source: BuildForce Canada

The required installation of 172,900 heat pumps and 133,900 electric water heaters in Manitoba will create significant demands for heating, refrigeration and air conditioning mechanics – both in total number of new workers needed and as a percentage of the base year workforce. Between 2023 and 2032, the direct new employment created for this trade amounts to 280 workers, more than six times the level of the workforce for this trade in the base year. Sheet metal workers also see stronger demands, as these workers may be required to retrofit existing homes.

Despite a transition away from fossil fuels, direct new employment is expected to be created for gas fitters as each house that converts from a fossil-fuel space or water heater will require a licensed gas fitter to uninstall these units. Nevertheless, overall employment demands for this trade will face downward pressure as new homes are anticipated to be constructed with heat pumps.

The additional investments in Manitoba are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

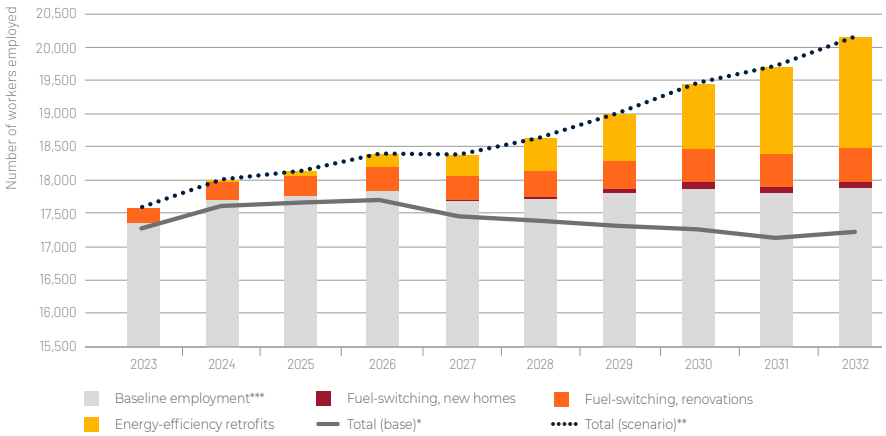
Figure 45 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023-2033 base forecast, residential employment in Manitoba was estimated to recede over the near term with rising interest rates, hold steady through the mid-2020s, and then begin a modest descent related to slowing population growth. Across the 2023–2032 period, total residential employment was projected to decline by 2% from base year levels.

Under the green buildings scenario, residential employment is projected to rebound in 2024 and continues to grow steadily thereafter, exceeding 20,000 workers by 2032. This steady rise in residential employment amounts to the addition of 2,600 workers (+14%) by 2032.

Table 9 shows the expected change in employment over the 2023–2032 period by trades and occupations under the scenario.

FIGURE 45: RESIDENTIAL CONSTRUCTION EMPLOYMENT, MANITOBA, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

The employment changes, as presented in Table 9, indicate that several trades and occupations in Manitoba could face recruitment challenges in the coming decade, including heating, refrigeration and air conditioning mechanics, insulators, residential installers (windows and doors), concrete finishers, and bricklayers.

Manitoba faces the potential for recruitment challenges among heating, refrigeration and air conditioning mechanics as the anticipated increase in demand over the coming decade represents a growth of more than six times above the base year workforce.

As homes transition to heating equipment powered by electricity, demands for gas fitters is expected to decline. Although retrofitting existing homes will still require these workers to uninstall gas lines, demand is projected to be reduced especially in the late 2020s and early 2030s as a significant share of new homes are assumed to be built with electric-powered heating equipment. The anticipated decline in demands for this trade may present an opportunity for retraining these workers to install heat pumps that could alleviate the extreme pressure put on heating, refrigeration and air conditioning mechanics.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Manitoba's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimates Manitoba's housing supply gap to be 170,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built in the province above business-as-usual levels of activity. Combined, this translates into the province needing to build 239,900 housing units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building 239,900 new homes between 2024 and 2033. Preliminary results from this report estimate that Manitoba's residential employment could rise by as much as 27,200 workers – or 141% – above 2023 levels by 2033.

This strong surge in demand to address housing affordability may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction. However, if electrical heating systems are incorporated into the design of these additional homes, the transition away from fossil-fuel heating systems could be accelerated.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 239,900 homes. However, it is important to note that should this work go ahead as planned, a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

TABLE 9: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, MANITOBA, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	3,230	15%
34 BuildForce Canada trades and occupations	2,550	14%
Other trades and occupations	680	19%
Refrigeration and air conditioning mechanics	280	624%
Insulators	20	50%
Residential and commercial installers and servicers	220	40%
Concrete finishers	40	32%
Bricklayers	60	31%
Sheet metal workers	50	29%
Contractors and supervisors	430	29%
Roofers and shinglers	150	27%
Electricians	130	25%
Painters and decorators (except interior decorators)	190	25%
Plasterers, drywall installers and finishers, and lathers	260	25%
Plumbers	90	19%
Home building and renovation managers	240	15%
Floor covering installers	50	13%
Trades helpers and labourers	310	11%
Truck drivers	20	9%
Heavy equipment operators (except crane)	10	8%
Construction estimators	20	8%
Carpenters	270	7%
Crane operators	0	0%
Heavy-duty equipment mechanics	0	0%
Welders and related machine operators	0	0%
Elevator constructors and mechanics	<10	-4%
Tilesetters	-10	-5%
Glaziers	<10	-6%
Construction managers	-240	-13%
Ironworkers and structural metal fabricators	-10	-17%
Gasfitters	-30	-43%

Source: BuildForce Canada

SASKATCHEWAN

IMPACT ON RESIDENTIAL CONSTRUCTION

Saskatchewan has a high proportion of homes heated by fossil fuels. As a result, converting the province's home-heating equipment away from fossil fuels to cold-climate air-source heat pumps and electric water heaters to meet federal GHG emissions reduction goals will have vast in impacts in the province. The transition will mean significant demands for residential construction workers who will lead this transition.

In addition to retrofitting existing homes away from fossil fuels, a rising share of new homes built in the province will be equipped with heat pumps and electric water heaters. Through this transition, it is also assumed that older homes will be required to take on energy-efficiency retrofits to improve the energy efficiency of these units to decrease heat loss and thereby reduce demands on the province's electrical grid.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

According to Natural Resources Canada, as of 2020 there were 493,600 homes in existence in Saskatchewan. Of these, over 84% were equipped with fossil-fuel-powered space heaters with the vast majority (80%) powered by natural gas. Approximately 15% of these homes were heated by electricity with only about 3% heated by heat pumps.

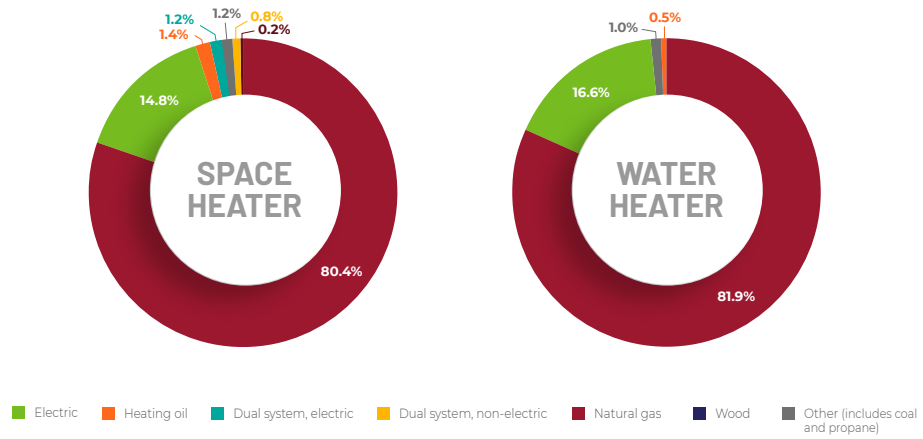
For water heaters, an even-greater share were powered by natural gas (82%) and other fossil fuels (just under 2%) while 17% were already powered by electricity.

Figure 46 summarizes the breakdown of the stock of space and water heaters by energy source in Saskatchewan as of 2020.

As Saskatchewan's homes are predominantly heated by natural gas and other fossil fuels, achieving the federal government's GHG emission reduction goals will require existing homes to transition to electric-powered heating equipment. This transition is expected in both existing and new homes. It is also assumed that some homeowners will take advantage of incentives to replace less-efficient electric baseboard heaters with heat pumps.

The installation of heat pumps in Saskatchewan must accelerate substantially if the province is to achieve GHG emissions reductions from residential buildings. Under the scenario, heat pump installations rise from about 7,500 units in 2022 to about 27,700 units by 2030. A significant number of these installations occur in the late 2020s as anticipated changes to the building code accelerate the construction of new homes powered by heat pumps. For the entire 2023–2032 scenario period, as many as 204,200 units are estimated to be installed.

FIGURE 46: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, SASKATCHEWAN, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

The province's heavy dependence on natural gas for space heating translates to a strong demand for retrofitting activity. Converting existing homes away from fossil fuels accounts for 85% of heat pumps installed over the coming decade.

Electric water heater installations are also required to escalate over the coming decade in Saskatchewan as, currently (2020), most units installed are powered by natural gas. Across the 2023–2032 scenario period, an estimated 201,700 electric water heaters are anticipated to be installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 47 shows the estimated number of heat pumps and electric water heaters expected to be installed in Saskatchewan across the 2023–2032 period.

Reducing GHG emissions from residential buildings requires transitioning away from fossil fuels and toward electric heating equipment. This move will create additional demands for electricity, which could be exacerbated by older and less energy-efficient homes.

To mitigate the risks associated with increasing the draw on the electrical grid associated with a full transition to electric-powered homes, Saskatchewan will require retrofitting existing homes to be more energy efficient. This will translate into renovation projects to replace older windows and doors, re-insulating walls and attics, improving air tightness, and in some cases deep energy retrofits. These measures are required to reduce heat loss and minimize the draw the move to electrical heating sources will have on the electrical grid of the province.

Based on discussions with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovation activity in the province. However, under the pressure to make homes more efficient it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

The scenario presented here assumes that just over 25,000 units among the province's 2020 housing stock will undergo some sort of energy-efficiency retrofit between 2023 and 2032.

Figure 48 presents the estimated number of homes taking on energy-efficiency retrofit projects in Saskatchewan across the 2023–2032 scenario period.

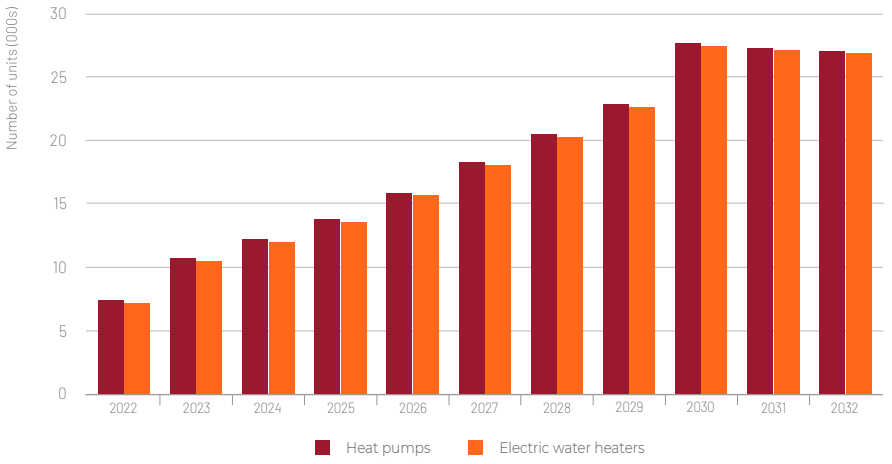
IMPACT ON RESIDENTIAL INVESTMENT

Efforts to transition existing and new homes away from fossil-fuel-powered heating equipment and renovation projects to improve the energy efficiency of older homes will require significant investments in Saskatchewan.

Across the 2023–2032 scenario, these investments amount to $2.9 billion. This is well beyond what was previously estimated by BuildForce Canada in the 2023–2032 base forecast.

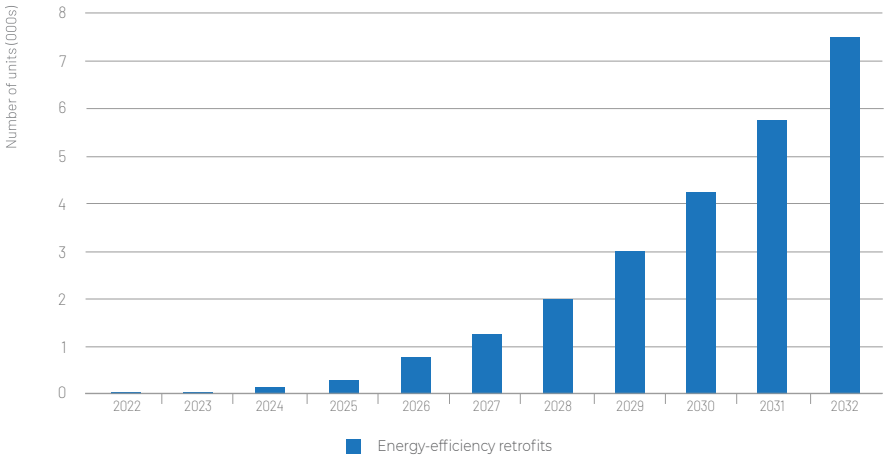
Fuel-switching is anticipated to require investments of $1.3 billion and account for 45% of the total investments required under the scenario. Renovation projects to improve the energy efficiency of older homes is estimated to require $1.6 billion.

FIGURE 47: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, SASKATCHEWAN, 2023–2032



Source: BuildForce Canada

FIGURE 48: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, SASKATCHEWAN, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

The direct impact on Saskatchewan's residential construction sector is estimated at 1,860 direct new employment opportunities due to fuel-switching and energy-efficiency retrofits. New employment due to fuel-switching accounts for 40% of the total and is concentrated among a small number of trades and occupations working in the province's residential construction sector. Job creation from energy-efficiency retrofits span a wider number of trades and occupations.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

1,860
Total new employment

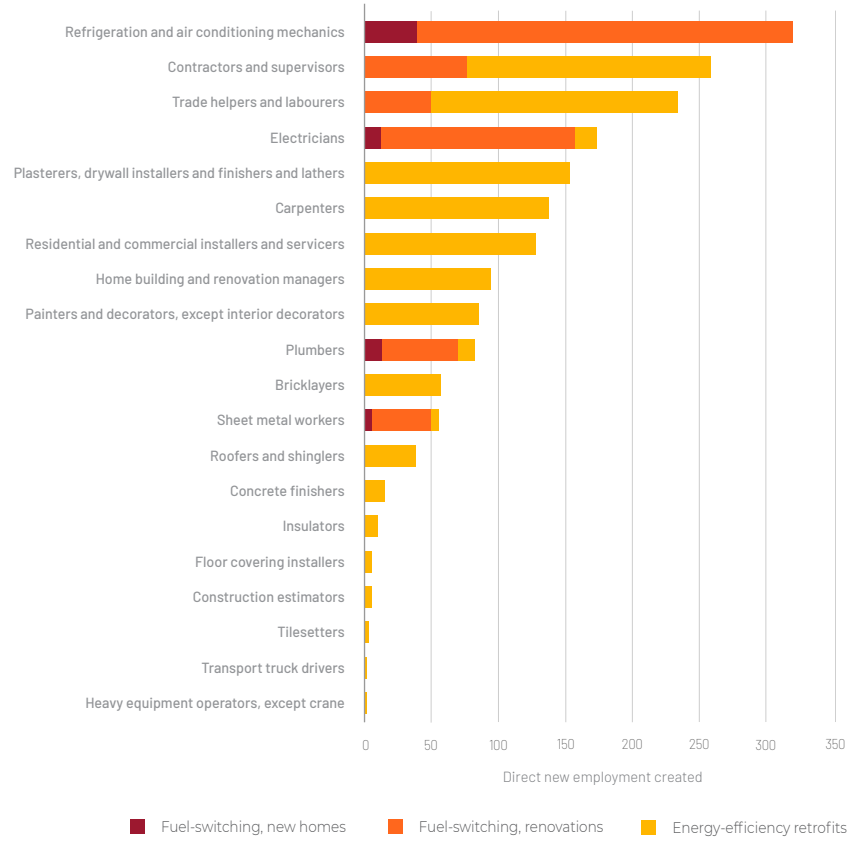
720
Fuel-switching

1,140
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

Figure 49 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 49: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, SASKATCHEWAN, 2023–2032



Source: BuildForce Canada

Because of Saskatchewan's current heavy dependence on natural gas and other fossil fuels for home heating, extreme demands will be generated for heating, refrigeration and air conditioning mechanics. The creation of more than 300 direct new employment opportunities for this trade represents a 10-fold increase from the base year workforce. Fuel-switching activities are also expected to substantially raise the demand for sheet metal workers and electricians.

Energy-efficiency retrofits are estimated to generate strong demands for trades helpers and labourers, contractor and supervisors, insulators, and residential installers (windows and doors).

The additional investments in Saskatchewan are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

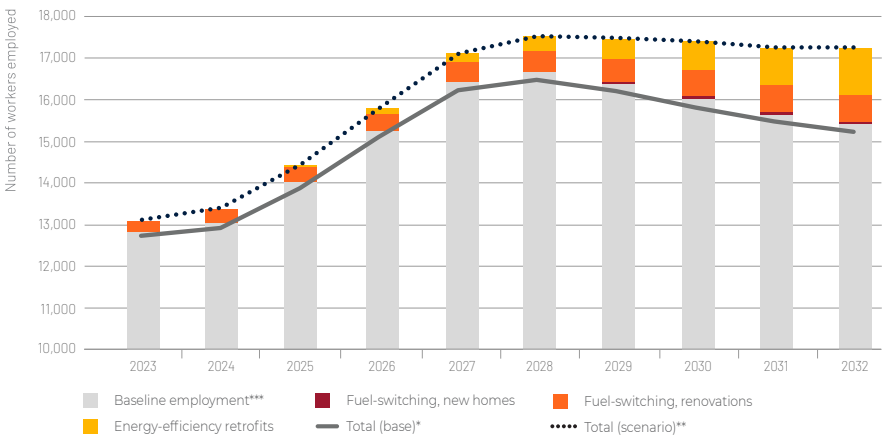
Figure 50 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023–2033 base forecast, residential employment in Saskatchewan was estimated to moderate over the near term as interest rates rose, but then undergo a strong upcycle into the mid- to late-2020s. Although employment was projected to moderate slightly after 2028, with slowing population growth, it was estimated to end the forecast period at 15,200 workers – or 26% above base year levels.

Under the green buildings scenario, residential employment is anticipated to follow a similar trend to 2028, with a strong upcycle. However, in this scenario, employment holds steady to 2032 as fuel-switching and energy-efficiency retrofit demands offset downward pressures of slowing population growth. By 2032, residential employment is projected to increase by 5,100 workers (+43%) from base year levels.

A large number of trades and occupations working in Saskatchewan's residential construction sector could face recruitment challenges. Even under the base case scenario, residential employment was projected to increase significantly. This will be exacerbated by the need to retrofit existing homes and build new homes with electric heating equipment.

FIGURE 50: RESIDENTIAL CONSTRUCTION EMPLOYMENT, SASKATCHEWAN, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

Residential employment growth across the 2023–2032 scenario, as a percentage of the base year workforce, is particularly acute for heating, refrigeration and air conditioning mechanics (997%), insulators (79%), sheet metal workers (75%), and electricians (67%), as illustrated in Table 10. This substantial increase in demands is likely to strain the available labour force and lead to recruiting challenges.

In Saskatchewan, fuel-switching, in many cases, requires the upgrade of electrical panels as a high proportion of homes in the province are more than 20 years old. This is expected to create significant demands for electricians in the province.

As homes transition to heating equipment powered by electricity, demand for gas fitters is expected to decline. Although retrofitting existing homes will still require these workers to uninstall gas lines, demand is projected to be reduced especially in the late 2020s and early 2030s as a significant share of new homes are assumed to be built with electric-powered heating equipment. The anticipated decline in demands for this trade may present an opportunity for retraining these workers to install heat pumps that could alleviate the extreme pressure put on heating, refrigeration and air conditioning mechanics.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Saskatchewan's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimates the housing supply gap for Saskatchewan at 60,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built above business-as-usual levels of activity. Combined, these translate into the province needing to build just over 110,600 units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building just over 110,600 new homes between 2024 and 2033. Preliminary results from this report estimate that Saskatchewan's residential employment could rise by as much as 10,400 workers – or 91% – above 2023 levels by 2033.

This strong surge in demand to address housing affordability may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction. However, should the new housing units be equipped with electrical heating systems, efforts to transition away from fossil-fuel heating systems could be accelerated.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 110,600 homes. However, it is important to note that should this work go ahead as planned a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

TABLE 10: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, SASKATCHEWAN, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	6,380	43%
34 BuildForce Canada trades and occupations	5,160	43%
Other trades and occupations	1,220	42%
Refrigeration and air conditioning mechanics	330	997%
Insulators	20	79%
Sheet metal workers	90	75%
Electricians	290	67%
Contractors and supervisors	520	52%
Bricklayers	120	50%
Residential and commercial installers and servicers	250	50%
Trades helpers and labourers	660	49%
Plasterers, drywall installers and finishers, and lathers	360	47%
Plumbers	180	46%
Concrete finishers	40	42%
Construction managers	390	37%
Painters and decorators (except interior decorators)	260	35%
Welders and related machine operators	<10	33%
Carpenters	980	32%
Construction estimators	30	32%
Roofers and shinglers	130	31%
Glaziers	<10	31%
Truck drivers	20	30%
Tilesetters	30	30%
Heavy equipment operators (except crane)	20	30%
Home building and renovation managers	390	29%
Floor covering installers	60	25%
Elevator constructors and mechanics	<10	18%
Ironworkers and structural metal fabricators	0	0%

Source: BuildForce Canada

ALBERTA

IMPACT ON RESIDENTIAL CONSTRUCTION

Alberta is the province with the highest dependency on fossil fuels for home heating in the country. For this reason, meeting the federal government's GHG emissions reduction goals through retrofitting residential heating equipment away from fossil fuels and toward electric-powered ones will have a far-reaching impact. This includes significant demands for residential construction workers.

Meeting these targets will also require that new-home construction move toward heat pumps and electric water heaters. Through this transition, it is also assumed that older homes will be required to take on energy-efficiency retrofit projects to improve the energy efficiency of these units, decrease heat loss, and thereby reduce demands on the province's electrical grid.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

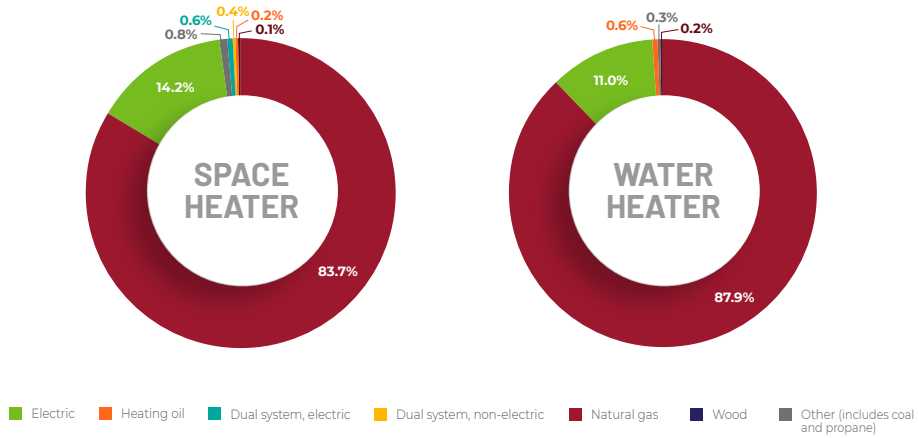
Natural Resources Canada estimated that in 2020 there were an estimated 1.8 million existing homes in Alberta, of which the vast majority (86%) were equipped with fossil-fuel space heaters. Natural gas alone accounted for 84%, while the remaining 2% were powered by heating oil, dual systems with and without electric capability, wood, and other fuels such as coal and propane. Electric space heaters accounted for 14% with most being electric baseboard heaters (11%) and only a small portion (3%) being heat pumps.

These trends carry over into water heaters, where 88% of units in operation in Alberta in 2020 were powered by natural gas. Electric water heaters made up 11%.

Figure 51 summarizes the breakdown of the stock of space and water heaters by energy source in Alberta as of 2020.

Reducing GHG emissions from residential buildings will require transitioning existing and new homes away from fossil-fuel-powered heating equipment and toward cold-climate air-source heat pumps and electric water heaters.

FIGURE 51: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, ALBERTA, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

Heat pump installations in Alberta are anticipated to ramp up across the forecast period, from about 28,200 units in 2022 to over 114,000 units in 2030. This amounts to the installation of 816,800 heat pumps in total in the province over the ten-year period. While most of these units are estimated to be installed in existing homes switching from fossil fuels, a small number of homeowners could take advantage of incentive programs to replace less-efficient electric baseboard heaters with heat pumps. Close to 20% of these units are assumed to be installed in new homes built in the province.

The fact that most water heaters currently installed in Alberta are powered by natural gas dictates that electric water heater installations must also rise substantially. Across the 2023–2032 scenario period, this amounts to approximately 839,700 electric water heaters installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 52 shows installation of heat pumps and electric water heaters in Alberta accelerating through the late-2020s as a higher proportion of new homes are assumed to be built with greener heating equipment.

Transitioning residential buildings away from fossil fuels to electric heating equipment is essential for reducing GHG emissions. Such a shift will inevitably increase electricity demands, particularly from older homes that are less energy efficient. To counter the heightened electricity consumption from a complete shift to electric-powered homes, Alberta must focus on making existing homes more energy efficient through retrofits. These renovations include replacing outdated windows and doors, re-insulating walls and attics, enhancing air tightness, and occasionally undertaking deep energy retrofits. These steps are crucial to decrease heat loss and thereby lessen the impact on the province's electrical grid.

Based on discussions with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovations activity in the province. However, under the pressure to make homes more efficient, it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

The green buildings strategy outlined here envisions that as many as 91,800 units among Alberta's 2020 housing stock will undergo some form of energy-efficiency retrofit between 2023 and 2032.

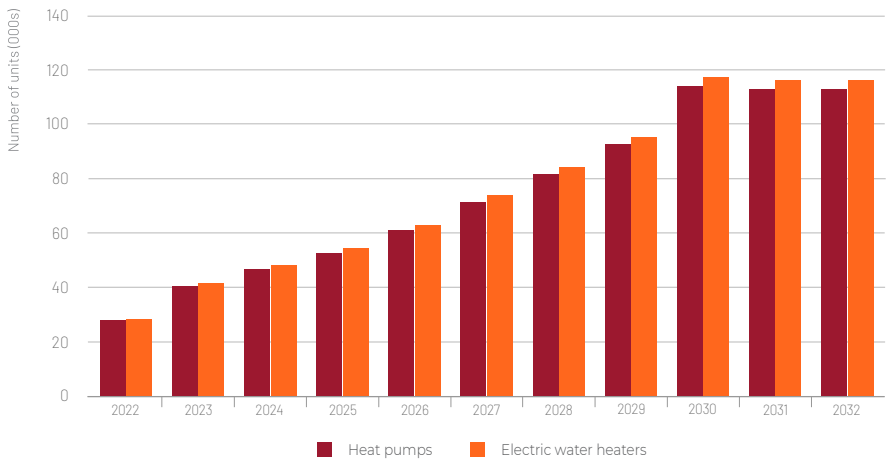
Figure 53 presents the estimated number of homes taking on energy-efficiency retrofit projects in Alberta across the 2023–2032 scenario period.

IMPACT ON RESIDENTIAL INVESTMENT

In Alberta, the move to transition both existing and new homes from fossil-fuel-powered heating systems to electric alternatives, along with renovation projects for older homes, will necessitate substantial investments. The projected investments for these initiatives, spanning from 2023 to 2032, is estimated at $10.9 billion. This figure significantly surpasses BuildForce Canada's 2023–2032 base projections.

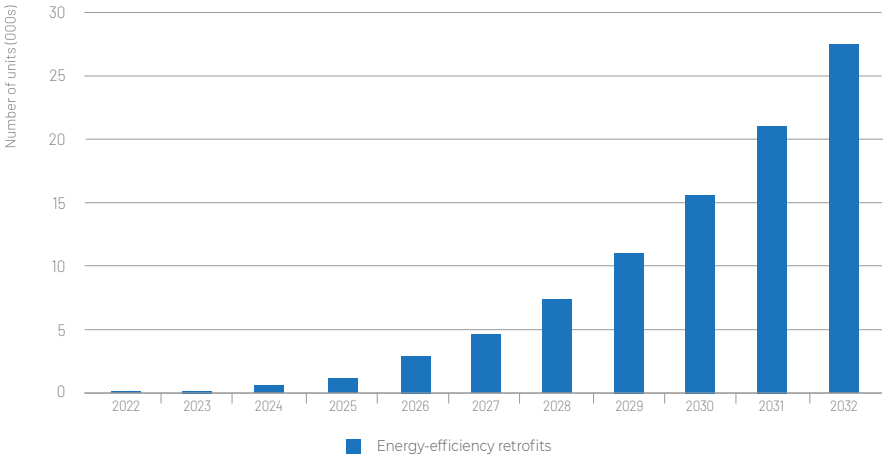
Under the scenario, the shift to greener heating sources is expected to demand about $5.1 billion in investments. Renovation projects aimed at enhancing the energy efficiency of older homes are projected to require around $5.8 billion.

FIGURE 52: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, ALBERTA, 2023–2032



Source: BuildForce Canada

FIGURE 53: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, ALBERTA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

The initiatives detailed in this report are projected to create 7,300 direct new employment opportunities in Alberta's residential construction sector. A considerable number of these employment opportunities will be centered around enhancing the energy efficiency of existing homes through renovation work. Employment related to the process of fuel-switching are expected to constitute around 34% of the total new employment opportunities.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

7,300
Total new employment

2,500
Fuel-switching

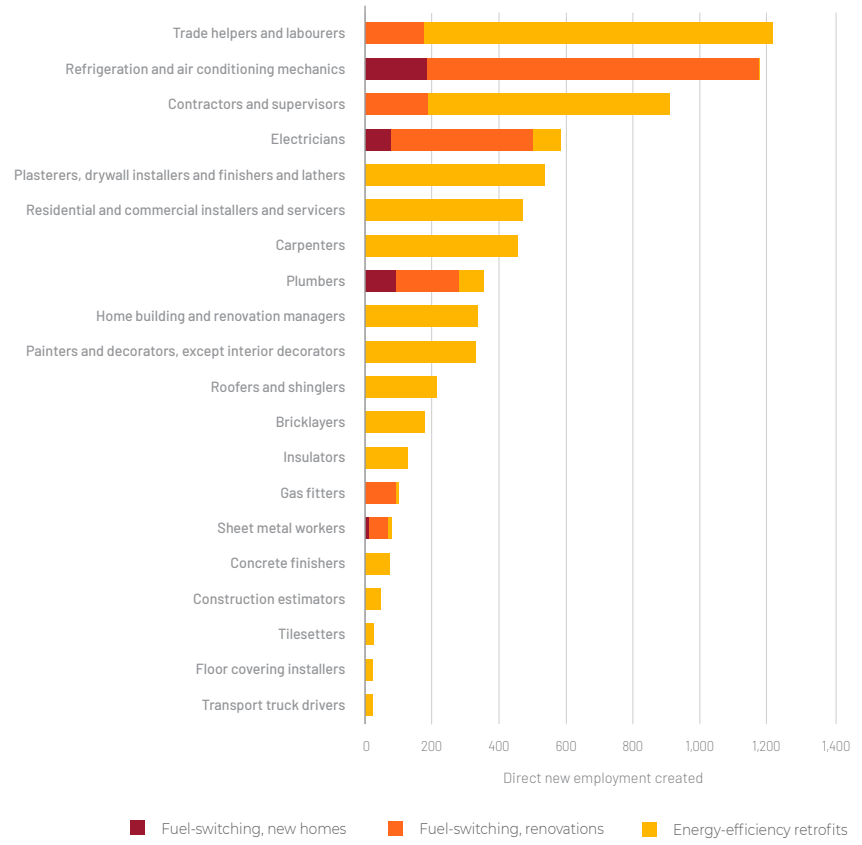
4,800
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

The influx of these direct new employment opportunities related to energy-efficiency retrofits spans a wide variety of trades and occupations due to the nature of the work. On the other hand, direct new employment created for the purpose of fuel-switching are concentrated among a few select trades and occupations and can present significant recruiting challenges.

Figure 54 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 54: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, ALBERTA, 2023–2032



Source: BuildForce Canada

The transition away from fossil-fuel-powered heating equipment will create significant demands for heating, refrigeration and air conditioning mechanics in Alberta. Between 2023 and 2032, the direct new employment created for this trade amount to over 1,100 workers, which is more than seven times the size of the workforce the base year. While the transition away from fossil fuels will reduce overall demands for gas fitters overall, fuel-switching activities will generate direct new employment as each house that converts from a fossil-fuel space or water heater will still require a gas fitter for the uninstall of these units.

Trade helpers and labourers will see strong demands in the total number of workers needed across the 2023–2032 period. However, these direct new employment opportunities amount to only about 14% of the base year workforce, or just over 1% growth annually, which should be mitigated through traditional hiring practices in the province.

The additional investments in Alberta are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

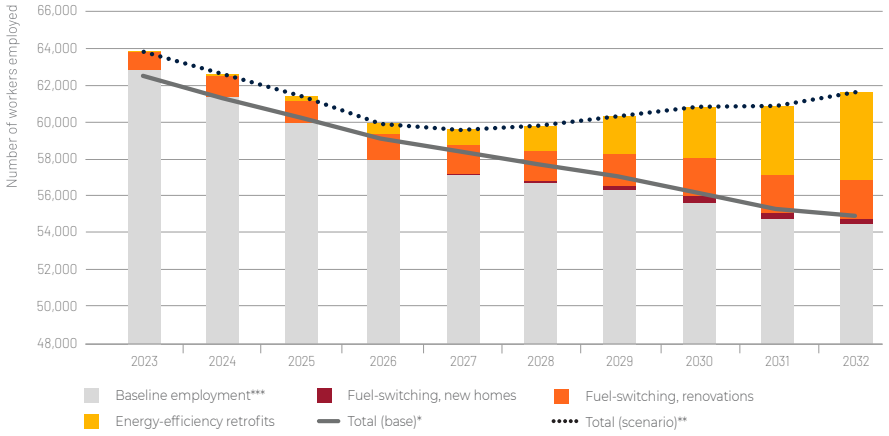
Figure 55 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023-2033 base forecast, residential employment in Alberta was projected to stabilize in 2023, before declining steadily thereafter. Across the 2023–2032 period, residential employment was projected to decline by 4% below employment levels in the base year.

Under the green buildings scenario, residential employment is anticipated to recede over the near term due to the pressures of rising interest rates and its impact on new-home construction which are only partially offset by gains in fuel-switching and energy-efficiency retrofits. By 2027, however, the pace of heat pump and electric water heater installations accelerate and coincide with the ramp up period of energy-efficiency retrofits to return residential employment to a growth trend thereafter. By 2032, residential employment is projected to grow by 4,800 workers (+8%) above base year levels.

When put together, the demands directly and indirectly created from the green building activities highlighted in this scenario may create labour market challenges for several trades and occupations.

FIGURE 55: RESIDENTIAL CONSTRUCTION EMPLOYMENT, ALBERTA, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

Table 11 shows the expected change in residential employment over the 2023–2032 period in Alberta by trades and occupations under the scenario.

As can be seen in Table 11, residential employment for heating, refrigeration and air conditioning mechanics in Alberta is estimated to increase to more than seven times the size of the workforce in the base year. This is a significant increase in demands that will likely lead to labour market pressures across the 2023 to 2032 scenario period.

Other trades and occupations that could also face labour market challenges over the coming decade in Alberta include insulators, residential installers (windows and doors), sheet metal workers, and electricians. The latter two trades see demands rising from retrofitting existing homes away from fossil-fuel driven heating systems, and in some cases, upgrading existing electrical panels and ductworks. The rising demands for insulators and residential installers are driven in large part by energy-efficiency retrofit renovation projects.

With the shift towards heat pumps and electric water heaters in homes, the need for gas fitters is anticipated to decrease. While there will still be a requirement for these professionals to remove gas lines during home retrofits, the demand is expected to diminish, particularly in the late 2020s and early 2030s. This is due to the assumption that a substantial proportion of new homes will be constructed with electric heating systems. The projected decrease in demand for gas fitters could open up opportunities for retraining in the installation of heat pumps. Such a move could help ease the currently high demand on heating, refrigeration, and air conditioning mechanics.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, Alberta's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase new-home construction dramatically over the next decade.

Canada Mortgage and Housing Corporation estimates the housing supply gap for Alberta at 130,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built above the business-as-usual levels of activity. Combined, these translate into the province needing to build over 499,300 units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building over 499,300 new homes between 2024 and 2033. Preliminary results from this report estimate that Alberta's residential employment could rise by as much as 16,300 workers – or 23% – above 2023 levels by 2033.

With Alberta being one of the most affordable housing markets in Canada, the rise in demand is less dramatic than other provinces but may still exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with increases in new-home construction.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the aspirational addition of 499,300 homes. However, it is important to note that should this work go ahead as planned a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet greenhouse gas emissions reduction goals.

TABLE 11: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, ALBERTA, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	6,170	9%
34 BuildForce Canada trades and occupations	4,780	8%
Other trades and occupations	2,260	16%
Refrigeration and air conditioning mechanics	1,170	749%
Insulators	110	35%
Sheet metal workers	80	29%
Residential and commercial installers and servicers	480	28%
Bricklayers	160	20%
Electricians	480	20%
Concrete finishers	70	20%
Contractors and supervisors	800	19%
Roofers and shinglers	310	16%
Plasterers, drywall installers and finishers, and lathers	430	14%
Painters and decorators (except interior decorators)	370	14%
Trades helpers and labourers	1,190	14%
Plumbers	290	12%
Steamfitters, pipefitters and sprinkler system installers	<10	7%
Truck drivers	40	6%
Floor covering installers	40	4%
Tilesetters	20	3%
Home building and renovation managers	100	2%
Drillers and blasters	0	0%
Heavy equipment operators (except crane)	0	0%
Carpenters	-110	-1%
Construction estimators	-20	-1%
Elevator constructors and mechanics	<10	-3%
Heavy-duty equipment mechanics	-10	-5%
Glaziers	-10	-9%
Construction managers	-480	-9%
Welders and related machine operators	<10	-10%
Ironworkers and structural metal fabricators	-10	-19%
Crane operators	<10	-33%
Gasfitters	-80	-44%

Source: BuildForce Canada

BRITISH COLUMBIA

IMPACT ON RESIDENTIAL CONSTRUCTION

In Western Canada, British Columbia is the province with the largest proportion of existing homes heated by electricity – predominantly electric baseboard heaters. This is a comparatively favourable position to be in as the province seeks to adhere to federal GHG emissions reduction goal. Nevertheless, still over half of the province's housing stock is heated with fossil fuels, which will need to be converted across the coming decade. Consequently, the demand for construction workers is set to rise significantly, not only from converting existing homes from fossil-fuel-powered heating equipment, but also from building new homes equipped with electric space and water heaters and from efforts required to make older homes more energy efficient.

CURRENT ENVIRONMENT AND ESTIMATED RETROFITS

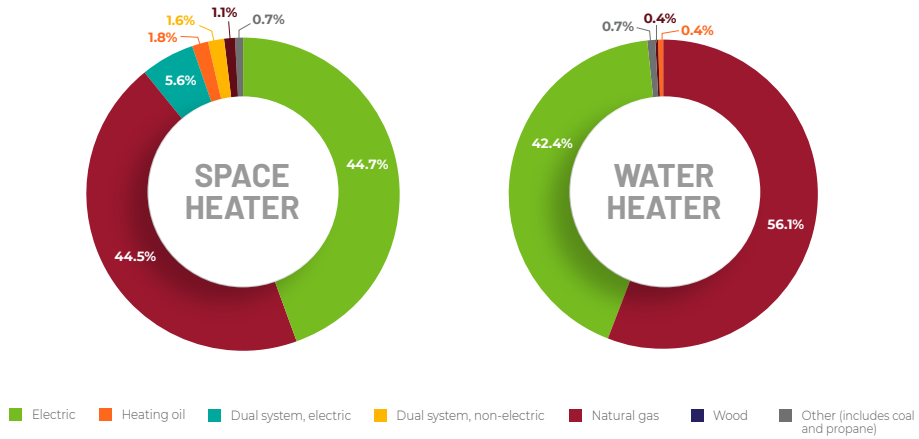
According to Natural Resources Canada, there were approximately 2.1 million homes in British Columbia in 2020. Homes heated with electric energy accounted for 45% of the total housing stock, with most being electric baseboard heaters (41%) while the remaining 4% were heat pumps. The remaining 55% of homes were heated by fossil fuels, including natural gas (44%), dual systems with electric capability (6%), heating oil (2%), dual systems without electric capability (2%), wood (1%), and other fuels including coal and propane (<1%).

For water heaters, the trends are slightly different. In British Columbia, 42% of water heaters in operation as of 2020 were powered by electricity. The remainder were powered by fossil fuels – natural gas in particular accounted for 56% of all water heaters.

Figure 56 summarizes the breakdown of the stock of space and water heaters by energy source in British Columbia as of 2020.

Shifting away from heating equipment powered by fossil fuels in the province will necessitate a marked rise in the installation of heat pumps and electric water heaters. The majority of this increased demand will come from the need to replace fossil fuel-powered equipment. However, it is also expected that some homeowners might leverage incentive programs to swap out less-efficient electric baseboard heaters for more efficient heat pumps. Besides retrofitting existing homes, this scenario also anticipates a move towards integrating heat pumps and electric water heaters in newly built homes.

FIGURE 56: BREAKDOWN OF THE STOCK OF SPACE AND WATER HEATERS BY ENERGY SOURCE, BRITISH COLUMBIA, 2020



Source: Natural Resources Canada, Comprehensive Energy-Use Database

Installation of cold-climate air-source heat pumps is anticipated to ramp up in British Columbia, from about 21,900 units in 2022 to about 103,000 units in 2030. Across the 2023–2032 scenario period, this increase in heat pump installations will amount to approximately 692,200 units installed. About two-thirds of these units will replace fossil-fuel-powered heating equipment, and about 4% will replace less-efficient baseboard heaters. Heat pump installations in British Columbia account for approximately 14% of the estimated 4.9 million heat pumps expected to be installed Canada-wide by 2032.

With a higher proportion of water heaters in British Columbia powered by fossil fuels, the number of electric water heater installations will also be required to increase. Across the 2023–2032 scenario period, an estimated 735,800 electric water heaters are required to be installed to replace existing fossil-fuel-powered units and in new-home construction.

Figure 57 shows the estimated number of heat pumps and electric water heaters expected to be installed in British Columbia across the 2023–2032 period.

To prevent the shift towards electric-powered heating equipment from overburdening the province's electrical grid, it is anticipated that energy-efficiency retrofit projects will be vital to enhance the efficiency of existing homes – and older units in particular. These initiatives could involve updating windows and doors, re-insulating attics and walls, enhancing air tightness, and occasionally, implementing deep energy retrofits.

Based on discussions with the Canadian Home Builders' Association, BuildForce Canada estimates that these types of projects currently represent a small portion of renovation activity in the province. However, under the pressure to make homes more efficient it is assumed that incentives will be put in place that motivate homeowners to take on these energy-efficiency retrofit projects.

Under this scenario, approximately 111,200 homes among British Columbia's 2020 housing stock are projected to engage in energy-efficiency retrofit projects during the 2023 to 2032 period.

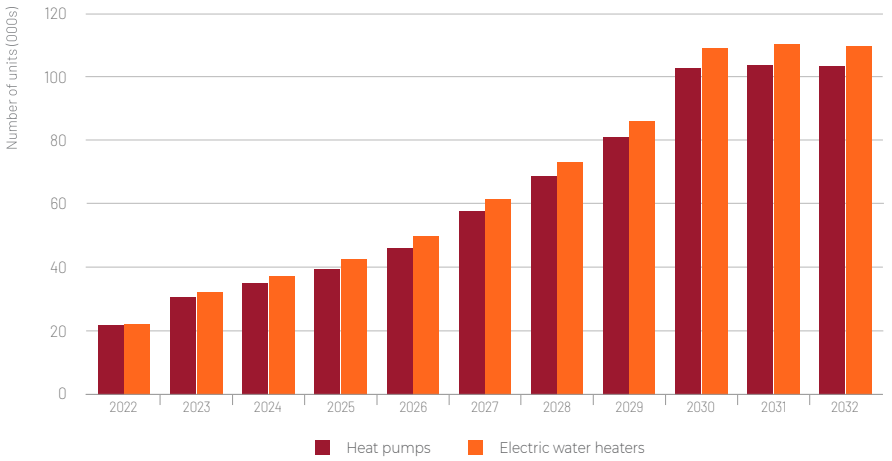
Figure 58 illustrates the estimated number of homes in British Columbia undertaking energy-efficiency retrofit projects over the 2023–2032 period.

IMPACT ON RESIDENTIAL INVESTMENT

The projected increase in the adoption of cold-climate air-source heat pumps, electric water heaters, and energy-efficiency retrofit renovations is expected to demand significant investments. In the context of British Columbia, and based on the assumptions of this scenario, the required investments are estimated to be around $11.2 billion over the period from 2023 to 2032. This figure exceeds the earlier projections made by BuildForce Canada in the 2023–2032 base forecast.

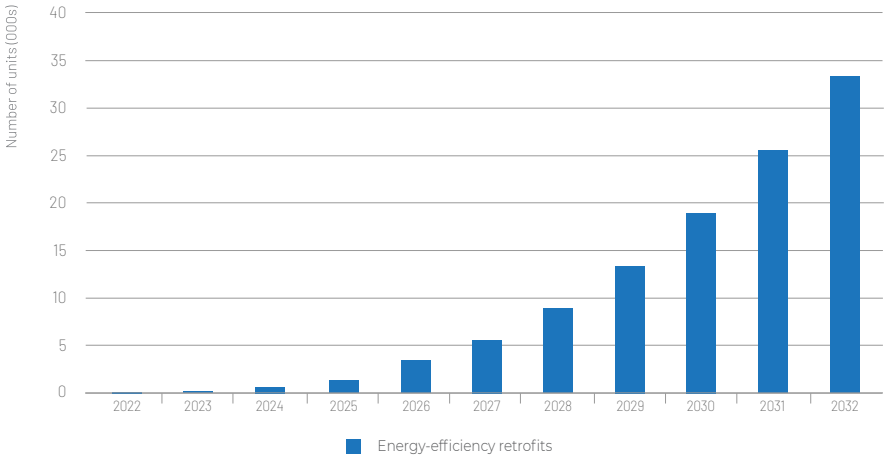
Within this scenario, the process of switching to alternative fuels is anticipated to make up 37% of the required investments, amounting to $4.1 billion. The remaining $7 billion is slated for projects aimed at boosting the energy efficiency of existing homes.

FIGURE 57: ESTIMATED NUMBER OF HEAT PUMP AND ELECTRIC WATER HEATER INSTALLATIONS, BRITISH COLUMBIA, 2023–2032



Source: BuildForce Canada

FIGURE 58: ESTIMATED NUMBER OF HOMES TAKING ON ENERGY-EFFICIENCY RETROFITS, BRITISH COLUMBIA, 2023–2032



Source: BuildForce Canada estimates based on consultations with industry stakeholders

IMPACT ON RESIDENTIAL CONSTRUCTION EMPLOYMENT

Green building activity, including fuel-switching and energy-efficiency retrofits, will produce direct and indirect impacts on the province's residential construction sector. The direct impacts pertain to the new employment created to retrofit and build greener homes, while indirect impacts will result from increased economic growth which should lead to rising disposable incomes.

When considering only the direct impact of the green building activities set out in this report, an estimated 7,900 direct new employment opportunities are anticipated to be generated in British Columbia's residential sector. Close to three-quarters (73%) of direct new employment created is anticipated to relate to energy-efficiency retrofits and span a wide variety of trades and occupations. Meanwhile, fuel-switching accounts for a relatively smaller share of total new direct employment created but it is concentrated among a few key trades and occupations that will take on this work.

Employment created in residential construction

New employment directly related to green buildings, 2023–2032

7,900
Total new employment

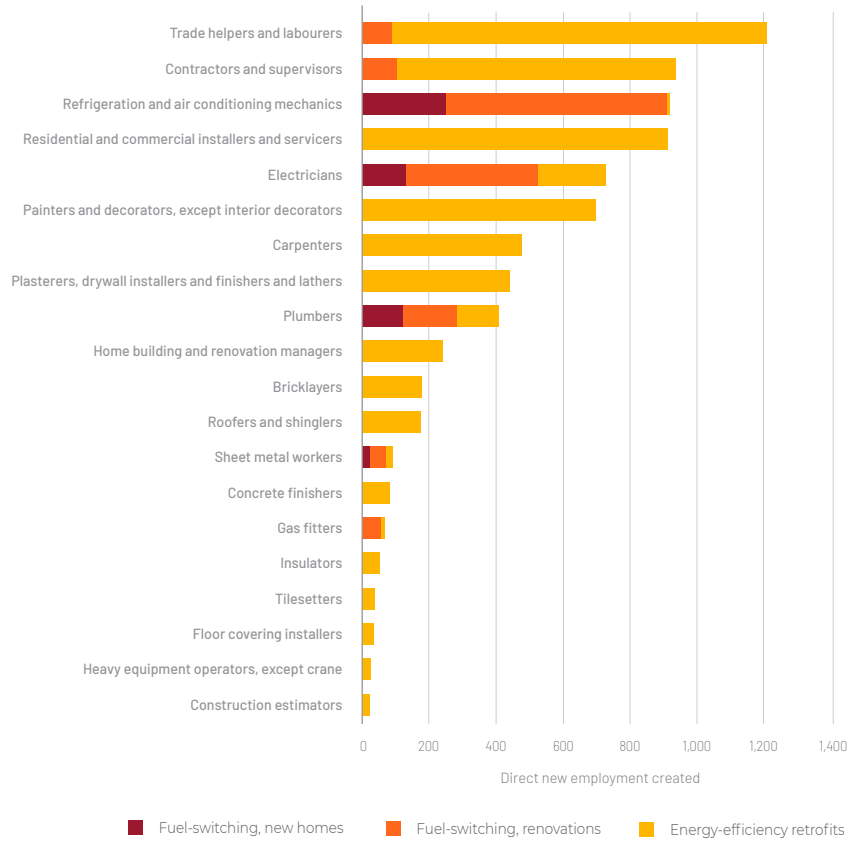
2,100
Fuel-switching

5,800
Energy-efficiency retrofits

The direct new employment created presented here is specific to the 34 trades and occupations tracked by BuildForce Canada, which are the predominant on-site occupations. This work is expected to span several occupations outside these trades and occupations, including engineers, inspectors, oil burner technicians, and sales and other administrative workers.

Figure 59 shows the direct new employment created for the top trades and occupations across the 2023–2032 outlook and broken out by green building activity.

FIGURE 59: DIRECT NEW EMPLOYMENT CREATED FOR TOP TRADES AND OCCUPATIONS, BY GREEN BUILDING ACTIVITY, BRITISH COLUMBIA, 2023–2032



Source: BuildForce Canada

British Columbia's need to install 692,200 heat pumps and 735,800 electric water heaters will significantly increase the demand for heating, refrigeration, and air conditioning mechanics. This surge will be notable both in terms of the total number of new workers required and relative to the workforce size of this trade in the base year. From 2023 to 2032, the creation of direct new employment in this field is expected to exceed 900 workers, which is more than three times the workforce level of the base year. Electricians, plumbers, and sheet metal workers could also see increases in demand relating to fuel-switching activities.

Even as the province transitions away from fossil fuels, there will still be new employment opportunities for gas fitters. Every home that switches from a fossil-fuel space or water heater will need a licensed gas fitter for the removal of these units. However, the overall employment requirements for this trade are expected to decline as more new homes are built with heat pumps later in the decade.

The additional investments in British Columbia are anticipated to boost economic activity in the province that will also increase demands for residential construction indirectly through improved disposable incomes.

Figure 60 presents the residential employment estimates for the 2023–2032 scenario contrasted against the BuildForce Canada 2023–2032 base forecast.

In the BuildForce 2023–2033 base forecast, residential employment in British Columbia was estimated to retreat from peak levels of activity in 2022 due to rising interest rates. Post-2024, as interest rates were assumed lower and incomes adjusted to higher interest rates, residential employment was projected to make positive gains each year to 2032. Across the 2023–2032 period, residential employment was projected to increase by 14% above employment levels the base year.

Under the green buildings scenario, British Columbia's residential employment is still expected to trend lower over the near term as modest gains from green buildings activities only partially offset downward pressures from lowered new-home construction. After 2024, employment trends higher in every year, but levels are estimated higher than under the base forecast. By 2032, employment is projected to have grown 25% and is estimated at 110,900 workers, which is 10% above the levels that were previously estimated by BuildForce Canada.

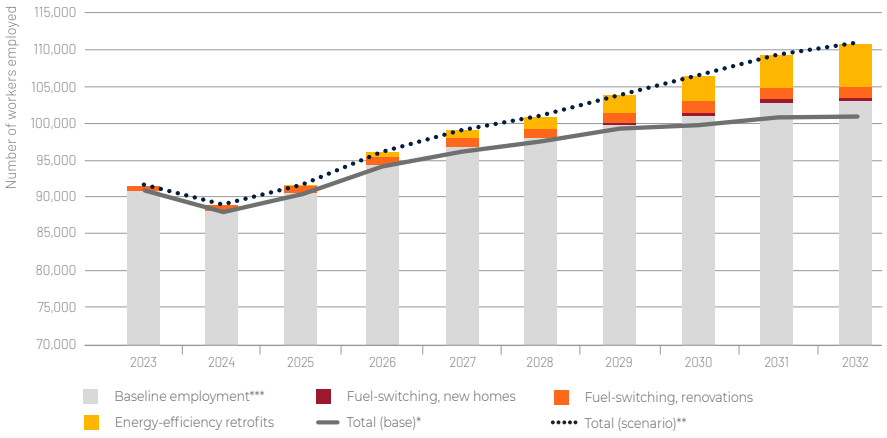
The assumptions laid out in this scenario, which are the requirements to meet federal GHG emissions reduction goals, will likely create labour market challenges for many trades and occupations working in British Columbia's residential construction sector. Demand for several trades and occupations is expected to rise by 30% or more between 2022 and 2032.

Recruitment challenges are likely to arise for heating, refrigeration and air conditioning mechanics, as demand for this trade increases more than three times (359%) the size of the base year workforce. Fuel-switching activities may also create challenges for electricians (+32%) and plumbers (+31%).

Efforts to improve the energy efficiency of older homes is likely to be challenged by the availability of workers to meet acute increases in demand. In British Columbia, the demand for residential installers (windows and doors) rises by 60% above the base year workforce. Roofers and shinglers, painters, concrete finishers, insulators, and bricklayers are also projected to experience significant rises in employment.

As homes increasingly adopt heat pumps and electric water heaters, the demand for gas fitters is expected to decline. These professionals will still be needed to dismantle gas lines during home renovations, but their services are likely to be less sought after, especially into the late 2020s and early 2030s. This trend is attributed to the likelihood that a large number of new homes will be equipped with electric heating systems. The anticipated reduction in the need for gas fitters presents a potential for these workers to be retrained in installing heat pumps, which could alleviate the current heavy demand for heating, refrigeration, and air conditioning mechanics.

FIGURE 60: RESIDENTIAL CONSTRUCTION EMPLOYMENT, BRITISH COLUMBIA, 2023–2032



* **Total (base)** refers to the total residential employment reported by BuildForce Canada in its latest LMI forecast, released in March 2023
** **Total (scenario)** refers to the total residential employment requirements given the assumptions of the green building scenario, which starts in 2023 and runs through to 2032
*** **Baseline employment** refers to the residential employment from activities outside of retrofitting homes with cold-climate air-source heat pumps or energy-efficiency retrofit activities (i.e., windows and doors, insulation, air sealing, etc.). The baseline residential employment includes indirect and induced impacts from green retrofitting activities

Source: BuildForce Canada

Table 12 shows the expected change in employment over the 2023–2032 period by trades and occupations under the scenario.

COMPETING PRESSURES

In addition to transitioning away from fossil-fuel-powered heating equipment, British Columbia's residential sector is tasked with addressing housing affordability. As the ratio of home prices to household income has risen substantially, the province will need to increase dramatically new-home construction over the next decade.

Canada Mortgage and Housing Corporation estimates British Columbia's housing supply gap at 610,000 homes between 2023 and 2030. This figure represents the number of additional units required to be built above the business-as-usual levels of activity to meet affordability targets. Combined, these translate into the province needing to build just over one million units.

BuildForce Canada is releasing a separate report that estimates the additional employment requirements from building one million new homes between 2024 and 2033. Preliminary results from this report estimate that British Columbia's residential employment could rise by as much as 87,100 workers – or 95% – above 2023 levels by 2033.

This strong surge in demand to address housing affordability may exacerbate the challenges faced by the industry to transition away from fossil-fuels. The availability of key tradespeople to transition the province's homes away from fossil fuels may come into competition with sharp increases in new-home construction.

New-home construction assumptions in this report follow business-as-usual levels of activity and do not include the addition of one million homes. However, it is important to note that should this work go ahead as planned a much sharper labour market challenge will emerge, which could hinder the industry's ability to meet GHG emissions reduction goals.

TABLE 12: RESIDENTIAL EMPLOYMENT CHANGE BY TRADES AND OCCUPATIONS, BRITISH COLUMBIA, 2023–2032

	Employment change	
Trades and occupations, residential sector	**#**	**%**
Total, all trades and occupations	27,680	26%
34 BuildForce Canada trades and occupations	22,340	25%
Other trades and occupations	5,340	28%
Refrigeration and air conditioning mechanics	970	359%
Residential and commercial installers and servicers	1,700	60%
Roofers and shinglers	900	46%
Painters and decorators (except interior decorators)	2,200	41%
Concrete finishers	280	39%
Insulators	90	39%
Bricklayers	390	35%
Electricians	2,150	32%
Plumbers	1,280	31%
Plasterers, drywall installers and finishers, and lathers	1,090	30%
Contractors and supervisors	2,360	30%
Floor covering installers	570	29%
Sheet metal workers	190	27%
Trades helpers and labourers	2,590	22%
Drillers and blasters	10	21%
Elevator constructors and mechanics	60	20%
Truck drivers	190	19%
Home building and renovation managers	1,360	19%
Heavy equipment operators (except crane)	260	18%
Carpenters	3,110	16%
Steamfitters, pipefitters and sprinkler system installers	10	16%
Construction estimators	180	16%
Tilesetters	220	15%
Welders and related machine operators	40	15%
Glaziers	50	15%
Crane operators	30	9%
Construction managers	360	6%
Ironworkers and structural metal fabricators	10	4%
Heavy-duty equipment mechanics	<10	4%
Gasfitters	-310	-81%

Source: BuildForce Canada

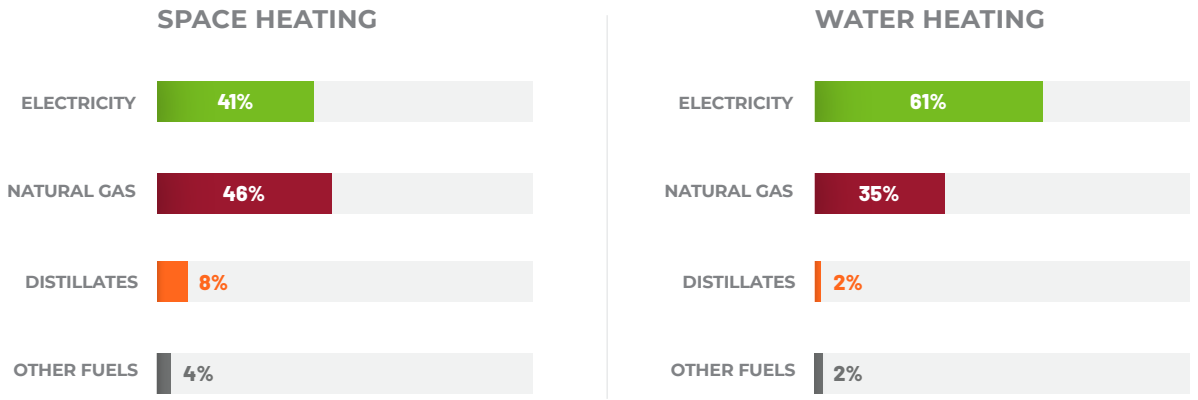
IMPACT ON COMMERCIAL AND INSTITUTIONAL BUILDINGS

Canada's interim greenhouse gas (GHG) emissions reduction targets of a 40% reduction from 2005 levels by 2030, and net-zero target by 2050, are ambitious and will require commercial and institutional buildings to undergo similar green building activities as presented for residential buildings. This could include retrofitting existing buildings away from heating and cooling equipment powered by fossil fuels, stipulating that new buildings be equipped with equipment run on electricity, and performing renovation projects to improve energy efficiency.

CANADA

CURRENT ENVIRONMENT

According to a 2019 survey[6] commissioned by Natural Resources Canada through Statistics Canada, there were 437,800 commercial and institutional buildings equipped with space heating in existence across Canada during the year of the data collection. That figure excludes universities, other post-secondary education institutions, and hospitals. Of these buildings, retail (non-food), office space (excluding medical), and mixed-use[7] buildings accounted for close to half of all commercial and institutional buildings. This is important to understand as the energy source used in these buildings will skew the overall demands for retrofits as the country aims to meet the federal GHG emissions reduction goals. With more than half of these types of buildings heated by fossil fuels, the transition away from fossil fuels will likely have significant impacts.



[6] Survey of Commercial and Institutional Energy Use (SCIEU): https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/scieu/2019/tables.cfm
[7] Mixed-use buildings typically contain commercial or retail space on the ground and first floors and residential land uses above.

SPACE HEATING

Among these existing commercial and institutional buildings, natural gas was the primary energy source for space heating. It accounted for 46% of all buildings in Canada with space heaters installed. Electricity was the second-most common energy source for space heaters across the country. The remainder of commercial and institutional buildings were heated with equipment running on distillates – which include fuel oil, diesel and kerosene – or other fuels, including propane, steam, hot water, wood, solar, and all other energy sources.

Based on the 2019 data, on average, most commercial and institutional buildings were heated by natural gas, though differences existed across regions of the country and across building types. For example, in Quebec 70% of commercial and institutional buildings were heated by electricity while in Ontario and the Prairies, three-quarters were heated by natural gas.

Canada-wide, most hotels, motels, hostels, or lodges, libraries or archives, police and fire stations, bank branches, and restaurants were already heated with electricity. Meanwhile, a higher proportion of primary and secondary schools, warehouses, assisted living facilities, and vehicle dealership, repair and storage facilities tended to use natural gas for space heating.

Table 13 illustrates the proportion of commercial and institutional buildings across Canada by building type and primary fuel types used for space heating.

TABLE 13: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, CANADA, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**41%**	**46%**	**8%**	**4%**
Bank branch	53%	42%	4%	2%
Public safety - police and fire station	56%	37%	3%	4%
Assisted living facility	37%	55%	5%	4%
Hotel, motel, hostel, or lodge	66%	21%	6%	7%
Preschool or daycare	59%	33%	6%	2%
Primary or secondary school	18%	74%	6%	2%
Restaurant	53%	38%	2%	6%
Food or beverage store	43%	52%	2%	4%
Retail - non-food	45%	49%	4%	2%
Office space - medical	40%	53%	6%	1%
Office space - excluding medical	43%	46%	5%	7%
Recreation centre	29%	49%	19%	3%
Ice rink	16%	29%	54%	2%
Place of worship	35%	51%	11%	3%
Museum or gallery	42%	44%	2%	13%
Library or archives	58%	38%	2%	3%
Warehouse	30%	60%	4%	6%
Vehicle dealership, repair, or storage	28%	50%	15%	7%
Mixed use	45%	48%	3%	4%
Others in scope	33%	57%	4%	6%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

For water heating, the trends were more favourable. Canada-wide, approximately 61% of existing commercial and institutional buildings were already equipped with electric units.

As was the case for space heaters, there were differences across provinces and across building types. Similar to trends in space heating, water heaters Ontario and the Prairie provinces tended to depend more on natural gas while the Atlantic provinces and Quebec were heavily dependent on electricity.

Table 14 illustrates the proportion of commercial and institutional buildings across Canada by building type and primary fuel types used for water heating.

Meeting federal GHG emissions reduction goals will require commercial and institutional buildings across the country to switch away from fossil-fuel-powered heating and cooling equipment to ones powered by greener energy sources. These can, and are likely to include, cold-climate air-source heat pumps and electric water heaters.

"Canada-wide, approximately 61% of existing commercial and institutional buildings were already equipped with electric units."

TABLE 14: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, CANADA, 2019

Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**61%**	**35%**	**2%**	**2%**
Bank branch	79%	18%	3%	0%
Public safety - police and fire station	60%	38%	1%	1%
Assisted living facility	28%	67%	3%	3%
Hotel, motel, hostel, or lodge	39%	51%	2%	8%
Preschool or daycare	67%	31%	1%	1%
Primary or secondary school	43%	53%	3%	2%
Restaurant	65%	33%	0%	2%
Food or beverage store	63%	32%	1%	4%
Retail - non-food	67%	31%	1%	1%
Office space - medical	57%	32%	2%	9%
Office space - excluding medical	64%	33%	3%	1%
Recreation centre	61%	38%	0%	1%
Ice rink	63%	31%	3%	3%
Place of worship	72%	25%	2%	1%
Museum or gallery	59%	39%	1%	2%
Library or archives	88%	11%	0%	1%
Warehouse	64%	31%	2%	3%
Vehicle dealership, repair, or storage	72%	26%	1%	1%
Mixed use	60%	38%	1%	1%
Others in scope	55%	41%	2%	2%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

ANALYSIS LIMITATION

Although this report sets out to analyze the full impact on construction labour demands from transitioning all building types in Canada away from fossil fuels, the novelty of the topic presented substantial data and knowledge gaps that limit the extent to which BuildForce Canada can estimate labour market impacts.

While data made available through Natural Resources Canada gave BuildForce Canada a very good understanding of the current environment surrounding residential buildings, their heating and cooling equipment, and the cost differential from upgrading to a heat pump or electric water heater, the same information was not readily available for commercial and institutional buildings.

Moreover, in consultation with key industry stakeholders who are experts in this transition, BuildForce Canada learned that these retrofit projects are seldom taking place. Nevertheless, this is work that will be required as the country aims to meet its GHG emissions reduction targets and detailed impacts should be analyzed as more data and information becomes available.

LABOUR MARKET IMPLICATIONS

Although an exact measure of rising demands is not present in this report, it is reasonable to assume that the demand for trades and occupations working in Canada's non-residential sector will rise as this work begins to take place.

Due to the nature of fuel-switching and energy-efficiency retrofit work, the trades and occupations that are likely to be in highest demand will coincide with the analysis laid out for residential buildings. This will likely mean escalating demands for heating, refrigeration and air conditioning mechanics, electricians, sheet metal workers, insulators, commercial installers, and trade helpers and labourers. Similarly, demands for gas fitters will decline in later years.

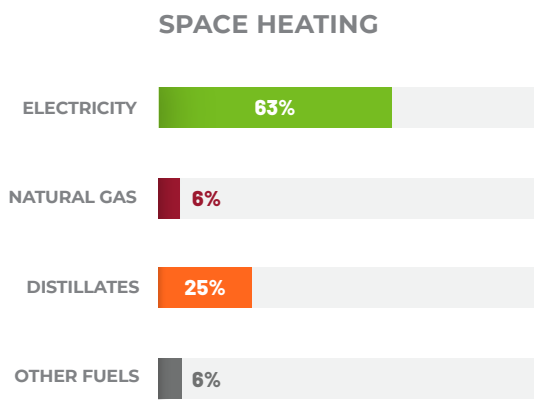
However, the commercial and institutional buildings segment of non-residential construction is well positioned to utilize gas fitters for the transition away from fossil fuels. Unlike in the residential sector, most gas fitters working in the commercial and institutional buildings segment are already equipped with the knowledge and certificates to take on this work. Therefore, since the required workforce is already adequately equipped to proceed, transitioning these buildings should be less impacted by additional labour force requirements, thereby permitting the transition to proceed in a more accelerated fashion.

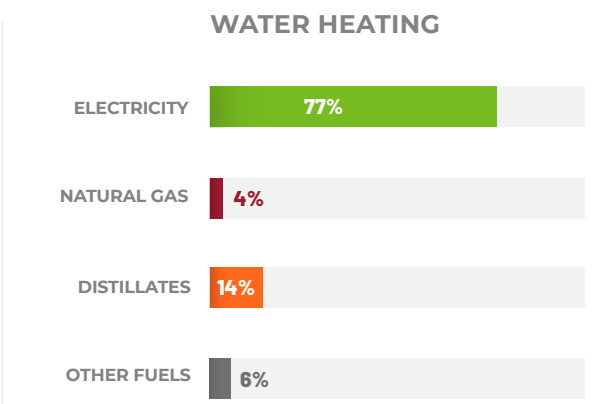
The following section of this report provides a snapshot of the heating equipment currently (as of 2019) installed in commercial and institutional buildings for each of the following regions within Canada: Atlantic, Quebec, Ontario, Prairies, and British Columbia.

ATLANTIC CANADA

CURRENT ENVIRONMENT

In 2019, there were an estimated 28,200 commercial and institutional buildings in Atlantic Canada, excluding universities, other post-secondary institutions, and hospitals. As is the case with residential buildings, most commercial and institutional buildings in the region were heated with electricity – both space and water heating.





SPACE HEATING

In Atlantic Canada's commercial and institutional buildings, electricity emerged as the leading energy source for space heating, constituting 63% of the mix. The remaining fuel sources were primarily distillates, including fuel oil, diesel, and kerosene, which accounted for 25%. The balance was made up of various other fuels, such as natural gas, propane, steam, hot water, wood, solar, and additional energy forms.

Most existing types of commercial and institutional buildings in Atlantic Canada were predominantly heated by electricity (more than 50%), except for primary and secondary schools, places of worship, and vehicle dealership, repair, or storage facilities which were heavily dependent on distillates.

Table 15 illustrates the proportion of commercial and institutional buildings across Atlantic Canada by building type and primary fuel types used for space heating.

"In Atlantic Canada's commercial and institutional buildings, electricity emerged as the leading energy source for space heating, constituting 63% of the mix."

TABLE 15: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, ATLANTIC CANADA, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**63%**	**6%**	**25%**	**6%**
Bank branch	76%	12%	8%	5%
Public safety - police and fire station	53%	5%	39%	4%
Assisted living facility	59%	8%	26%	7%
Hotel, motel, hostel, or lodge	67%	2%	17%	15%
Preschool or daycare	67%	4%	21%	9%
Primary or secondary school	36%	16%	43%	5%
Restaurant	85%	2%	4%	9%
Food or beverage store	84%	5%	6%	5%
Retail - non-food	78%	8%	11%	2%
Office space - medical	73%	3%	21%	2%
Office space - excluding medical	57%	9%	32%	2%
Recreation centre	87%	1%	8%	4%
Ice rink	59%	12%	28%	2%
Place of worship	19%	0%	72%	9%
Museum or gallery	74%	3%	21%	2%
Library or archives	62%	0%	20%	18%
Warehouse	54%	8%	36%	1%
Vehicle dealership, repair, or storage	30%	8%	57%	6%
Mixed use	71%	3%	18%	9%
Others in scope	62%	11%	16%	12%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

For water heating, an even-greater proportion of commercial and institutional buildings in Atlantic Canada were powered by electricity – on average 77% of all buildings. As is the case for space heating, distillates emerged as the secondary energy of choice for powering water heaters.

Table 16 illustrates the proportion of commercial and institutional buildings across Canada by building type and primary fuel types used for water heating.

"For water heating, an even-greater proportion of commercial and institutional buildings in Atlantic Canada were powered by electricity – on average 77% of all buildings."

TABLE 16: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, ATLANTIC CANADA, 2019

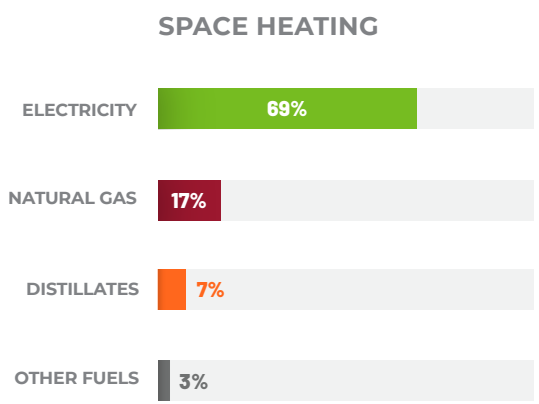
Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**77%**	**4%**	**14%**	**6%**
Bank branch	89%	0%	12%	0%
Public safety - police and fire station	83%	6%	10%	1%
Assisted living facility	68%	7%	19%	6%
Hotel, motel, hostel, or lodge	63%	5%	7%	26%
Preschool or daycare	82%	0%	15%	4%
Primary or secondary school	63%	6%	27%	4%
Restaurant	88%	3%	2%	8%
Food or beverage store	56%	1%	3%	40%
Retail - non-food	94%	1%	4%	1%
Office space - medical	75%	1%	23%	2%
Office space - excluding medical	72%	2%	26%	1%
Recreation centre	98%	1%	1%	0%
Ice rink	45%	16%	38%	2%
Place of worship	53%	1%	35%	11%
Museum or gallery	83%	8%	8%	2%
Library or archives	89%	0%	11%	0%
Warehouse	75%	1%	24%	1%
Vehicle dealership, repair, or storage	95%	0%	5%	0%
Mixed use	91%	2%	5%	2%
Others in scope	78%	11%	10%	1%

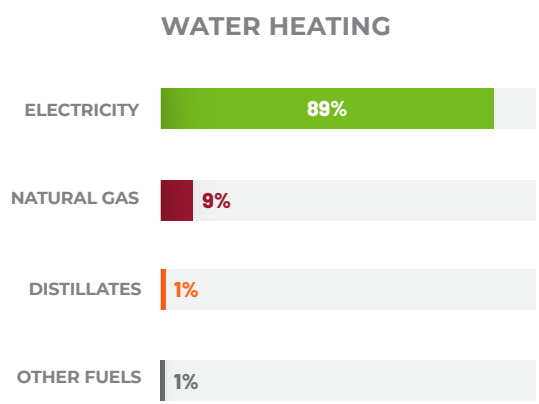
Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

QUEBEC

CURRENT ENVIRONMENT

An estimated 134,000 commercial and institutional buildings, excluding universities, other post-secondary institutions, and hospitals, existed in Quebec as of 2019. The predominant types of buildings were restaurants, retail (non-food), and vehicle dealership, repair, or storage facilities. Understanding the energy utilization in these structures is pivotal as it affects the extent of retrofitting needed for Quebec to achieve federal GHG emissions reduction goals. The extensive use of electricity for heating restaurants and retail buildings is favourable for the province, however a significant proportion of vehicle dealerships are heated with natural gas.





SPACE HEATING

In Quebec, on average, close to 70% of commercial and institutional buildings were heated with electricity. Natural gas was the second most-used energy source for space heating, accounting for 17%, on average. The balance was made up of distillates and other fuels. Although electricity was predominant in most building types, natural gas and other fossil fuels emerged as key energy sources across primary and secondary schools, police and fire stations, and vehicle dealerships.

Table 17 illustrates the proportion of commercial and institutional buildings in Quebec by building type and primary fuel types used for space heating.

"In Quebec, on average, close to 70% of commercial and institutional buildings were heated with electricity. Natural gas was the second most-used energy source for space heating, accounting for 17%, on average."

TABLE 17: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, QUEBEC, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**69%**	**17%**	**7%**	**3%**
Bank branch	77%	17%	6%	0%
Public safety - police and fire station	47%	40%	4%	9%
Assisted living facility	86%	12%	2%	0%
Hotel, motel, hostel, or lodge	82%	6%	11%	1%
Preschool or daycare	96%	3%	1%	1%
Primary or secondary school	35%	60%	3%	2%
Restaurant	87%	9%	1%	2%
Food or beverage store	89%	9%	1%	1%
Retail - non-food	82%	11%	4%	3%
Office space - medical	97%	1%	2%	1%
Office space - excluding medical	74%	7%	3%	16%
Recreation centre	50%	3%	46%	1%
Ice rink	12%	5%	-	2%
Place of worship	65%	28%	7%	0%
Museum or gallery	58%	19%	23%	0%
Library or archives	98%	2%	0%	0%
Warehouse	55%	35%	5%	5%
Vehicle dealership, repair, or storage	43%	32%	15%	11%
Mixed use	84%	13%	2%	1%
Others in scope	62%	28%	1%	9%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

Close to 90% of water heaters in operation in commercial and institutional buildings across Quebec were powered by electricity. This was evident across all building types, but a significant share of police and fire stations, museums or galleries, and hotels, motels, hostels, or lodges were equipped with natural-gas-powered water heaters.

Table 18 illustrates the proportion of commercial and institutional buildings in Quebec by building type and primary fuel types used for water heating.

"Close to 90% of water heaters in operation in commercial and institutional buildings across Quebec were powered by electricity."

TABLE 18: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, QUEBEC, 2019

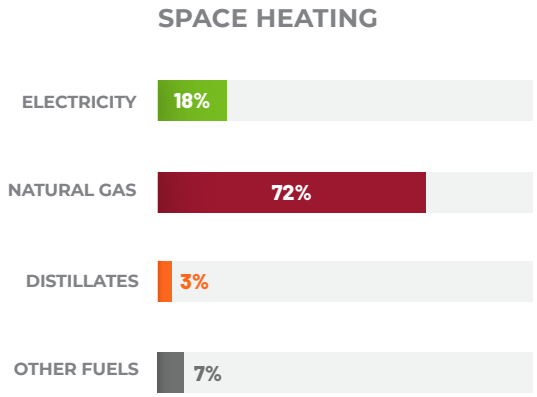
Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**89%**	**9%**	**1%**	**1%**
Bank branch	93%	0%	7%	0%
Public safety - police and fire station	67%	31%	0%	2%
Assisted living facility	81%	16%	4%	0%
Hotel, motel, hostel, or lodge	74%	17%	5%	5%
Preschool or daycare	95%	5%	0%	0%
Primary or secondary school	84%	12%	3%	1%
Restaurant	87%	11%	0%	1%
Food or beverage store	98%	1%	0%	1%
Retail - non-food	96%	3%	0%	1%
Office space - medical	98%	2%	0%	0%
Office space - excluding medical	98%	2%	0%	0%
Recreation centre	97%	3%	0%	1%
Ice rink	90%	7%	1%	2%
Place of worship	94%	5%	0%	0%
Museum or gallery	73%	19%	8%	0%
Library or archives	99%	1%	0%	1%
Warehouse	94%	3%	0%	3%
Vehicle dealership, repair, or storage	96%	1%	1%	2%
Mixed use	92%	8%	0%	1%
Others in scope	75%	25%	0%	0%

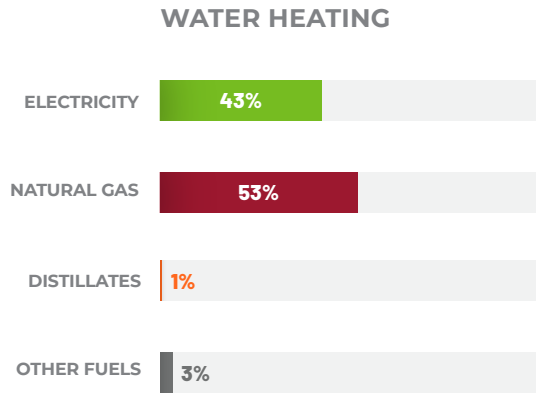
Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

ONTARIO

CURRENT ENVIRONMENT

There were an estimated 145,900 existing commercial and institutional buildings equipped with space heating in Ontario in 2019. This excluded universities, other post-secondary education institutions, and hospitals. Of these, retail (non-food), office space (excluding medical), and mixed-use buildings accounted for a significant portion (38%) of all commercial and institutional buildings. Understanding the mix of energy used to heat these buildings is important as it will dictate the work required to transition away from fossil fuels.





SPACE HEATING

Ontario is heavily dependent on natural gas for space heating in commercial and institutional buildings. On average, 72% of all commercial and institutional buildings in the province were heated by natural gas while 18% were equipped with space heaters powered by electricity. Recreation facilities and ice rinks, in particular, were heavily dependent on natural gas for space heating. The predominance of natural gas spanned most buildings, except for police and fire stations, hotels, motels, hostels and lodges, which relied primarily on electricity for their space-heating needs.

Table 19 illustrates the proportion of commercial and institutional buildings in Ontario by building type and primary fuel types used for space heating.

"On average, 72% of all commercial and institutional buildings in the province were heated by natural gas while 18% were equipped with space heaters powered by electricity."

TABLE 19: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, ONTARIO, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**18%**	**72%**	**3%**	**7%**
Bank branch	15%	79%	4%	2%
Public safety - police and fire station	66%	34%	0%	0%
Assisted living facility	27%	69%	0%	3%
Hotel, motel, hostel, or lodge	60%	24%	8%	8%
Preschool or daycare	12%	80%	4%	4%
Primary or secondary school	13%	82%	4%	2%
Restaurant	21%	59%	4%	17%
Food or beverage store	21%	70%	4%	5%
Retail - non-food	13%	76%	6%	5%
Office space - medical	18%	73%	9%	0%
Office space - excluding medical	12%	79%	3%	5%
Recreation centre	4%	91%	2%	4%
Ice rink	8%	88%	1%	3%
Place of worship	6%	83%	4%	8%
Museum or gallery	4%	63%	0%	34%
Library or archives	10%	74%	5%	10%
Warehouse	17%	78%	1%	5%
Vehicle dealership, repair, or storage	15%	75%	4%	6%
Mixed use	21%	67%	5%	6%
Others in scope	4%	89%	1%	7%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

The mix of fuel sources for water heating in Ontario was a little more balanced than space heating, with approximately 53% of water heaters powered by natural gas, on average, versus 43% powered by electricity.

Transitioning away from fossil fuels, particularly natural gas, will require many water heater retrofits in assisted living facilities and ice rinks across the province. Police and fire stations, bank branches, and vehicle dealerships will face a lower requirement for water heater retrofits as these are already primarily running on electricity.

Table 20 illustrates the proportion of commercial and institutional buildings across Canada by building type and primary fuel types used for water heating.

"The mix of fuel sources for water heating in Ontario was a little more balanced than space heating, with approximately 53% of water heaters powered by natural gas, on average, versus 43% powered by electricity."

TABLE 20: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, ONTARIO, 2019

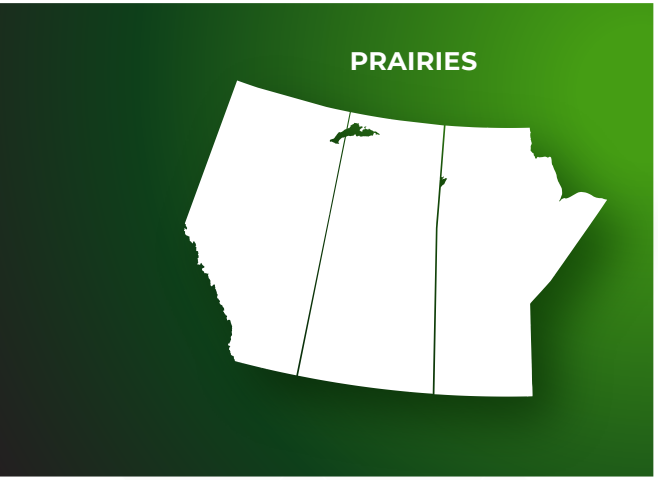
Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**43%**	**53%**	**1%**	**3%**
Bank branch	64%	33%	3%	0%
Public safety - police and fire station	71%	29%	0%	0%
Assisted living facility	6%	92%	0%	2%
Hotel, motel, hostel, or lodge	24%	64%	0%	12%
Preschool or daycare	27%	69%	0%	4%
Primary or secondary school	28%	70%	1%	2%
Restaurant	53%	44%	0%	3%
Food or beverage store	57%	42%	1%	0%
Retail - non-food	48%	50%	0%	3%
Office space - medical	47%	43%	1%	9%
Office space - excluding medical	44%	53%	2%	2%
Recreation centre	26%	72%	0%	2%
Ice rink	4%	88%	0%	9%
Place of worship	54%	46%	0%	0%
Museum or gallery	53%	42%	0%	6%
Library or archives	55%	41%	0%	4%
Warehouse	56%	43%	1%	0%
Vehicle dealership, repair, or storage	63%	34%	1%	2%
Mixed use	49%	47%	1%	3%
Others in scope	37%	58%	0%	5%

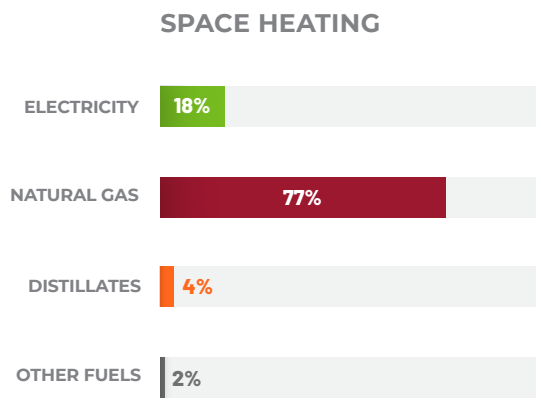
Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

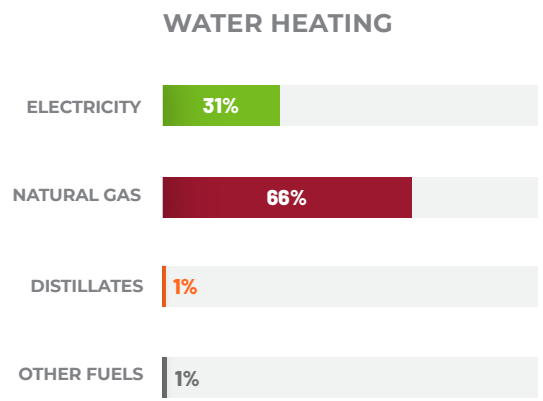
PRAIRIES

CURRENT ENVIRONMENT

The Prairie provinces, which include Manitoba, Saskatchewan, and Alberta, were estimated to have approximately 59,800 commercial and institutional buildings equipped with space heating, excluding universities, other post-secondary education institutions, and hospitals. A large number of these buildings were retail and office spaces. This is important to note as the primary energy source in use to heat these buildings may skew the demands for retrofits across these provinces.







SPACE HEATING

Based on 2019 data, the Prairie provinces relied significantly on natural gas for heating in commercial and institutional buildings. In the region, a large proportion (77%) of buildings used natural gas for space heating. Libraries and archives, primary or secondary schools, and museum or galleries were notably dependent on this energy source. While natural gas was the dominant heating source, certain buildings like hotels, motels, hostels, or lodges primarily used electricity for heating.

Table 21 illustrates the proportion of commercial and institutional buildings across the Prairie provinces by building type and primary fuel types used for space heating.

"In the region, a large proportion (77%) of buildings used natural gas for space heating. Libraries and archives, primary or secondary schools, and museum or galleries were notably dependent on this energy source."

TABLE 21: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, PRAIRIES, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**18%**	**77%**	**4%**	**2%**
Bank branch	18%	75%	5%	3%
Public safety - police and fire station	18%	82%	0%	0%
Assisted living facility	14%	72%	15%	0%
Hotel, motel, hostel, or lodge	68%	32%	0%	0%
Preschool or daycare	26%	45%	26%	3%
Primary or secondary school	2%	97%	1%	0%
Restaurant	7%	93%	0%	0%
Food or beverage store	3%	93%	0%	4%
Retail - non-food	12%	88%	0%	0%
Office space - medical	21%	76%	1%	2%
Office space - excluding medical	32%	66%	1%	1%
Recreation centre	13%	86%	1%	0%
Ice rink	31%	70%	0%	0%
Place of worship	43%	57%	0%	0%
Museum or gallery	1%	96%	1%	3%
Library or archives	1%	98%	0%	1%
Warehouse	9%	76%	1%	14%
Vehicle dealership, repair, or storage	10%	75%	15%	0%
Mixed use	10%	87%	0%	3%
Others in scope	14%	69%	17%	1%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

Natural gas was also the main energy source for water heating in the Prairies, although a slightly higher proportion of commercial and institutional buildings used electricity for water heating – on average 31%. Building types where significant retrofits are anticipated include museums or galleries and primary or secondary schools, wherein 2019, the proportion of water heaters in use powered by natural gas and other fossil fuels exceeded 95%.

Table 22 illustrates the proportion of commercial and institutional buildings across the Prairie provinces by building type and primary fuel types used for water heating.

"Natural gas was also the main energy source for water heating in the Prairies, although a slightly higher proportion of commercial and institutional buildings used electricity for water heating – on average 31%."

TABLE 22: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, PRAIRIES, 2019

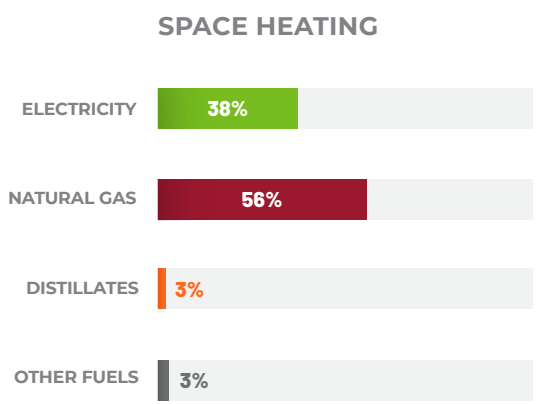
Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**31%**	**66%**	**1%**	**1%**
Bank branch	42%	58%	0%	0%
Public safety - police and fire station	18%	82%	0%	0%
Assisted living facility	29%	68%	2%	0%
Hotel, motel, hostel, or lodge	13%	86%	0%	0%
Preschool or daycare	60%	40%	1%	0%
Primary or secondary school	4%	95%	1%	1%
Restaurant	12%	88%	0%	0%
Food or beverage store	14%	86%	0%	0%
Retail - non-food	40%	58%	0%	2%
Office space - medical	32%	67%	0%	0%
Office space - excluding medical	43%	56%	0%	1%
Recreation centre	26%	73%	1%	0%
Ice rink	24%	77%	0%	0%
Place of worship	69%	31%	0%	0%
Museum or gallery	3%	96%	0%	1%
Library or archives	90%	10%	0%	1%
Warehouse	33%	51%	1%	15%
Vehicle dealership, repair, or storage	22%	78%	0%	0%
Mixed use	39%	61%	0%	0%
Others in scope	16%	66%	18%	1%

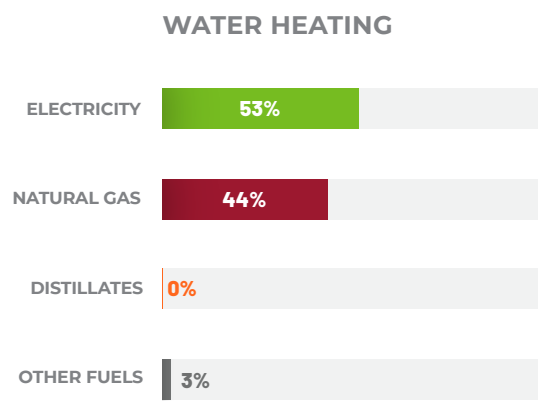
Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

BRITISH COLUMBIA

CURRENT ENVIRONMENT

Approximately 69,900 commercial and institutional buildings equipped with space heating were in existence in British Columbia in 2019, excluding universities, other post-secondary education institutions, and hospitals. A significant share of these were mixed-use facilities, retail buildings, and offices. This is important to note as the primary energy source used to heat these buildings will have direct impacts on the demand for, and nature of, the required retrofits across the province.





SPACE HEATING

In 2019 in British Columbia, the majority of commercial and institutional buildings (56%) used natural gas as their main fuel sources for space heating, making it the most common energy choice. Electricity ranked second in prevalence for the heating of these types of buildings. The balance employed distillates like fuel oil, diesel, and kerosene, or utilized other energy forms such as propane, steam, hot water, wood, solar, and various alternatives for their heating needs. Ice rinks, primary or secondary schools, and places of worship ranked highest in their use of fossil fuels for space heating. Museums or galleries and bank branches rank lowest.

Table 23 illustrates the proportion of commercial and institutional buildings in British Columbia by building type and primary fuel types used for space heating.

"In 2019 in British Columbia, the majority of commercial and institutional buildings (56%) used natural gas as their main fuel sources for space heating, making it the most common energy choice."

TABLE 23: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR SPACE HEATING AND BUILDING TYPE, BRITISH COLUMBIA, 2019

Primary fuel types for buildings with space heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**38%**	**56%**	**3%**	**3%**
Bank branch	80%	19%	0%	1%
Public safety - police and fire station	53%	38%	0%	9%
Assisted living facility	15%	76%	1%	8%
Hotel, motel, hostel, or lodge	63%	28%	0%	10%
Preschool or daycare	17%	78%	4%	1%
Primary or secondary school	10%	75%	13%	3%
Restaurant	43%	51%	0%	7%
Food or beverage store	27%	69%	0%	4%
Retail - non-food	66%	33%	1%	0%
Office space - medical	49%	46%	2%	2%
Office space - excluding medical	46%	49%	3%	1%
Recreation centre	18%	58%	17%	6%
Ice rink	10%	85%	0%	5%
Place of worship	12%	84%	4%	0%
Museum or gallery	91%	9%	0%	0%
Library or archives	28%	70%	0%	2%
Warehouse	39%	56%	1%	4%
Vehicle dealership, repair, or storage	16%	80%	3%	2%
Mixed use	39%	59%	0%	2%
Others in scope	36%	59%	4%	1%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

WATER HEATING

Electricity was the most-used fuel source for water heating in British Columbia's commercial and institutional buildings, accounting for 53% of all water heaters, on average. Natural gas was the second most-used energy source for water heating in the province, accounting for 44%.

If all fossil-fuel-powered water heaters are to be replaced by electric ones in British Columbia, this will have significant implications for assisted living facilities, ice rinks, and preschool or daycares, as these building types are predominantly equipped with water heaters powered by natural gas or other fossil fuels.

Table 24 illustrates the proportion of commercial and institutional buildings in British Columbia by building type and primary fuel types used for water heating.

"Electricity was the most-used fuel source for water heating in British Columbia's commercial and institutional buildings, accounting for 53% of all water heaters, on average."

TABLE 24: PROPORTION OF COMMERCIAL AND INSTITUTIONAL BUILDINGS BY PRIMARY FUEL USED FOR WATER HEATING AND BUILDING TYPE, BRITISH COLUMBIA, 2019

Primary fuel types for buildings with water heating, by type	Electricity	Natural gas	Distillates	Other fuels
All building types (average)	**53%**	**44%**	**0%**	**3%**
Bank branch	92%	8%	0%	0%
Public safety - police and fire station	37%	61%	0%	2%
Assisted living facility	8%	85%	0%	7%
Hotel, motel, hostel, or lodge	41%	54%	0%	6%
Preschool or daycare	21%	77%	1%	1%
Primary or secondary school	35%	63%	1%	2%
Restaurant	57%	37%	0%	5%
Food or beverage store	71%	27%	0%	1%
Retail - non-food	83%	16%	1%	0%
Office space - medical	58%	19%	2%	20%
Office space - excluding medical	62%	35%	3%	0%
Recreation centre	69%	30%	0%	0%
Ice rink	12%	83%	0%	5%
Place of worship	52%	47%	1%	0%
Museum or gallery	86%	14%	0%	0%
Library or archives	37%	61%	0%	2%
Warehouse	70%	29%	0%	1%
Vehicle dealership, repair, or storage	62%	38%	0%	0%
Mixed use	35%	65%	0%	0%
Others in scope	63%	35%	0%	1%

Source: 2019 Survey of Commercial and Institutional Energy Use (SCIEU)

CONCLUSION

The work associated with transitioning Canada's buildings away from fossil-fuel-powered heating equipment to meet the greenhouse gas emissions reduction goals of the federal government will have significant impacts on the country's economy, and particularly the construction industry.

The residential construction sector alone could see investments of over $81 billion between 2023 and 2032 as the sector is tasked with installing 4.9 million cold-climate air-source heat pumps and 4.6 million electric water heaters to replace existing heating equipment powered by fossil fuels and build new homes powered by electricity. Additionally, the residential sector will be required to renovate older homes to improve their energy efficiency to minimize the increase in electrical demands. This will translate into significant employment gains. Residential employment would be required to grow by more than 94,000 workers, or 17% above the forecast base year.

Although concrete estimates of the impact from transitioning commercial and institutional buildings was not possible in this iteration of the analysis, it is to be expected that this change will lead to significant demands for non-residential construction workers as well. A significant portion of the nation's space and water heating installed in these buildings is powered by fossil fuels.

The breadth of work required will vary by province, with impacts relatively lesser for some Atlantic provinces and Quebec, and significantly higher for Ontario and the Prairie provinces. This is because the latter are heavily dependent on natural gas for heating residential, commercial, and institutional buildings.

Employment gains across the country will span a variety of construction trades and occupations but will be particularly significant for heating, refrigeration and air conditioning mechanics, with growth ranging from a 200% increase above the current workforce, as is the case for New Brunswick and Quebec, to a 1,000% increase in Saskatchewan.

Moving away from fossil fuels should limit the demand for gas fitters across the country. This presents a potential for these workers to transition to heat pump installations, which could alleviate the current heavy demand for heating, refrigeration, and air conditioning mechanics. Based on industry input, in the residential sector, it is estimated that the majority of gas fitters do not currently have the training and certification to do this work. Retraining would therefore be required. Conversely, the majority of gas fitters working in the commercial and institutional buildings sector possess multiple certifications and can more easily transition into the retrofitting of existing buildings for electrical space and water heater installations.

With such sharp increases in construction employment demands anticipated related to this work, recruitment challenges are likely to arise for select trades and occupations across the country. Meeting these demands will require the industry to invest heavily in the retraining of gas fitters to enable them to remain active in the construction sector, as well as the recruitment of new workers with the required skills to facilitate the transition of buildings away from fossil fuels towards the greater use of electrical sources for space and water heating in homes, businesses, schools, hospitals and other commercial and institutional buildings across the country.

Building a Greener Future

Estimating the impact on construction labour demands
from transitioning Canada away from fossil fuels

APRIL 2024

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