

## 2.2. Buildings

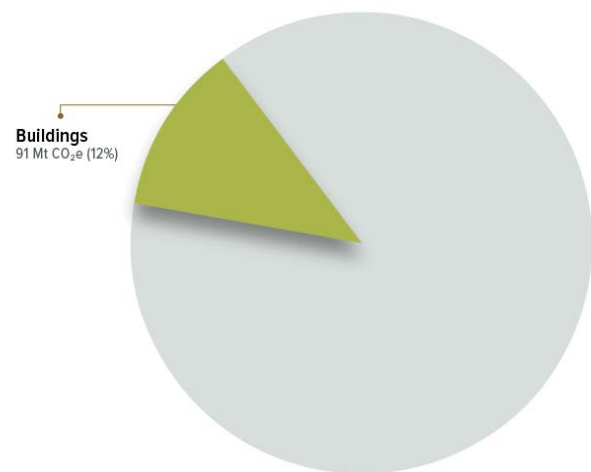
Decarbonizing the buildings sector is critical to Canada's pathway to 2030 and 2050. Emissions in the buildings sector have been trending upwards since 2005 as Canada's building stock continues to grow. In particular, more than 80% of Canada's building stock will be made up of existing buildings that are still in operation in 2030. It is also imperative that new buildings are net-zero ready and energy efficient, to avoid the need for future retrofits.

### Current sector emissions

Buildings accounted for 12% of Canada's direct GHG emissions in 2019, or 91 Mt (2021 NIR). Off-site generation of electricity for use in buildings brings the total to around 17%. This percentage could increase further if accounting for embodied carbon from the manufacturing of building materials such as concrete and steel.

Over 85% of buildings sector emissions come from space and water heating, due to the use of fossil fuel equipment, such as natural gas furnaces, and extra energy demand to heat and cool buildings with insufficient envelope performance. Remaining emissions come from electricity used to power appliances, lighting, and auxiliary equipment.

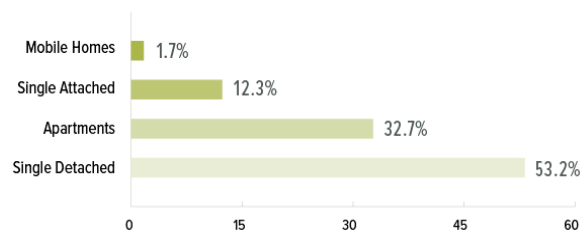
### CANADA'S BUILDINGS EMISSIONS (2019)



### Breakdown of Canada's Building Stock

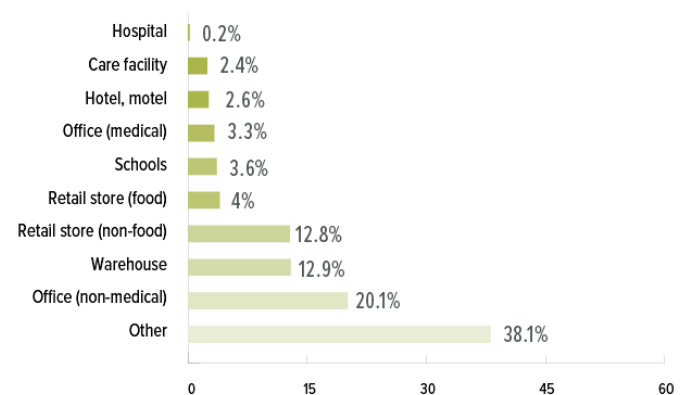
#### % OF TOTAL RESIDENTIAL BUILDINGS

SOURCE : NEUD 2017



#### % OF TOTAL COMMERCIAL BUILDINGS

SOURCE : NEUD 2017



## The buildings sector in context: key drivers

### Challenges to decarbonization in the buildings sector remain, but can be overcome

Much of the technology needed to decarbonize the buildings sector exists today. For example, electrification of heating by switching from fossil-fuels (e.g. oil, natural gas) to electric heat pumps is an economic and viable option in most parts of Canada, particularly as electrical grids expand capacity and decarbonize in parallel. Energy efficiency measures such as upgrading the building envelope with improved insulation, replacing windows and doors, or air sealing are also essential for decarbonization. Combined with fuel switching, energy efficiency can lower heating and cooling loads, minimize demand on the electricity grid, help control energy costs, and reduce the cost of heating with low-carbon technologies. The market up-take for some of these technologies has been slow; however, further innovation will improve affordability and support broader adoption. Reducing embodied carbon in construction materials such as steel and concrete is a key opportunity to further lower emissions in the buildings sector. New research and development will continue to deliver lower cost, higher performing technologies and approaches, creating even more opportunities to economically decarbonize the sector.

### Building codes are key enablers of a net-zero buildings sector

Strong building codes set the baseline for building performance and lock in best practices in construction. The Government of Canada actively works with industry as well as provincial and territorial governments on the development of increasingly stringent, performance-based model building codes, including to introduce net-zero energy-ready model codes for new construction and the code for retrofits to existing buildings. Wide-scale adoption of these codes will go a long way to improving the performance of Canada's building stock.

### Decarbonization of the buildings sector will provide economic opportunities and create jobs

Decarbonizing Canada's building sector will create new well-paying local jobs in every part of the country and could stimulate new markets for Canadian industry. Canada's building sector workforce will need to grow dramatically to meet increasing demand, including professional and trades people in construction, renovation, equipment manufacturing, installation and repair, building maintenance, energy assessment and management. Decarbonization of the buildings sector is also expected to create new entry points for workers with diverse professions and identities.

### ***Canada has a vast building stock***

Significant efforts will be required to retrofit existing buildings to achieve Canada's decarbonization goals. The Pembina Institute projects that reaching net-zero in 2050 will require carrying out retrofits at an annual pace of nearly 600,000 homes (11.4 million in total) and the equivalent of 32 million m<sup>2</sup> of commercial property until 2040, at a cost of roughly \$21 billion per year. While a foundation for progress has been laid through federal investments, such as the Canada Greener Homes Grant, the Energy Efficient Buildings program, the Green Municipal Fund, and the Green and Inclusive Community Buildings program, additional investments from the public and private sector are required.

### ***Greening Government Buildings***

As the owner of a significant number of public facilities, the Government of Canada has a role and responsibility to reduce emissions from federal buildings. The Government of Canada has already taken action to this end, including by committing to: ensure all new federal buildings are net-zero emissions and that major building retrofits are low-carbon; ensure that, starting in 2030, 75% of domestic office new lease and lease renewal floor space will be in net-zero carbon, climate resilient buildings; and support emerging clean technologies through procurement to reduce emissions from federal buildings.

#### What have we done so far?

##### Canada Greener Homes Grant



The Canada Greener Homes Grant helps homeowners make their homes more energy-efficient grow domestic green supply chains, and fight climate change. It provides up to 700,000 grants of up to \$5,000 to help homeowners make energy efficient retrofits to their homes, supported by an EnerGuide evaluation. To date, there have been over 130,000 applicants to the program.

##### Green and Inclusive Community Buildings



To help tackle emissions from community buildings across Canada – including community centres, sport facilities, and cultural spaces – the Government launched the Green and Inclusive Community Buildings program. This program commits \$1.5 billion in projects that improve energy efficiency through retrofits, repairs or upgrades, and new builds, 10% of which is reserved for projects benefiting Indigenous communities.

##### Canada Infrastructure Bank's Growth Plan



As part of its Growth Plan, the Canada Infrastructure Bank (CIB) has targeted \$2 billion in financing for large-scale public and commercial building retrofits. The CIB aims to create a model for investment and procurement for energy performance projects that can be self-perpetuating as the market normalizes and accelerates towards net zero targets in 2050.

##### Energy Efficiency in Indigenous Housing



[First Nation Infrastructure Fund](#) (FNIF) supports energy efficiency on reserve and the Northern REACHE program supports Inuit and Indigenous communities in the north with renewable energy and energy efficiency projects

#### What was heard from the 2030 ERP engagement process?

- Canadians and stakeholders expressed support for incentives and grants for home retrofits, including support for transitioning homes to cleaner energy sources. There is also support for low-carbon materials in construction.
- Energy efficiency and retrofits are priority for many Indigenous governments. At the same time, Indigenous Peoples emphasized the need to address the housing crisis they are facing. Nearly

20% of Indigenous people live in housing that needs major repairs, and 20% live in housing that's overcrowded.

- Provinces, territories, and municipalities are also prioritizing emissions reduction efforts in the buildings sector, with support for greater alignment of programs and incentives between governments.
- The Net-Zero Advisory Body noted the importance of laying out a clear path forward for the sector, and using regulations and complementary actions to further the transition. They also encouraged: leveraging building codes and equipment regulations; ensuring that enabling and financing systems are put in place to support and scale up deeper retrofits; accounting for embodied carbon associated with building materials; and, leading by example.

### What's next?

A whole-of-government and whole-of-economy effort focusing on regulatory, policy, investment, and innovation levers is needed to drive decarbonization of the buildings sector. The Government of Canada will continue to put in place actions to provide the certainty and market signals needed by the private sector to make investment decisions. Complementary actions from all orders of government will be needed to accelerate building code adoption, transform space and water heating, and build the workforce needed to achieve net-zero. Successful decarbonization of the buildings sector will also depend on a number of enabling conditions, such as electrification and clean grids, a zero/low-carbon supply chain, innovation in construction practices, and private financing. To meet Canada's 2030 target and prepare for net-zero emissions by 2050, the Government of Canada will:

### Chart a path to net-zero emissions

To lay the foundation for a net-zero buildings sector, the Government will invest \$150 million to develop a national net zero by 2050 buildings strategy, the Canada Green Buildings Strategy. Working with partners, the strategy will build off existing initiatives and set out new policy, programs, incentives and standards needed to drive a massive retrofit of the existing building stock, and construction to the highest zero carbon standards. The Buildings Strategy will:

- Develop a Low Carbon Building Materials Innovation Hub to drive further research, building code reform, and demonstration activities, all promoting the use of lower carbon construction materials (e.g., wood, steel, cement, etc.) in the built environment;
- Develop regulatory standards, and an incentive framework to support the transition off fossil-fuels for heating systems;
- Develop an approach to require EnerGuide labeling of homes at the time of sale, and design a complementary Climate Adaptation Home Rating Program;
- Launch a new Net Zero Building Code Acceleration Fund to accelerate adoption and implementation of the highest performance tiers of the national model energy codes, incentivizing stakeholder participation while addressing persistent challenges in Canada's codes system and paving the way to a code for alterations for existing buildings;
- Improve federal capacity and technical support to provinces, territories and key stakeholders for the development and adoption of net zero emission codes, and alteration to existing buildings codes; and,
- Develop an approach to increase the climate resilience of the built environment.

The Net-Zero Advisory Body recommended accelerating the adoption of national model building codes, and supporting research and development for innovative net-zero technologies, such as developing readily available and affordable net-zero building materials. The Buildings Strategy proposed in this plan aligns with this advice.

#### Accelerating retrofits and net-zero new builds in communities across Canada

Supporting communities to upgrade homes and buildings, including affordable housing, is key to reaching Canada's climate goals. To help meet those goals, the following additional investments are being made:

- \$458.5 million in contribution and loan funding to support the low-income stream of the Greener Homes Loan Program, which will support increased energy savings.
- \$33 million to establish a Greener Neighbourhoods Pilot Program, which will retrofit homes or units in up to six communities across the country using an aggregated building retrofits approach based on the Dutch "Energiesprong" model. This support for community-level home retrofits aligns with the Net-Zero Advisory Body's recommendation to seek out opportunities to decarbonize multiple buildings at once.
- \$200 million to support deep retrofits of large buildings through a retrofit accelerator initiative, which will provide help to address barriers to deep retrofits (such as audits or project management).
- \$183 million to support a decarbonized and climate resilient construction sector through the development of standards and building codes, the establishment of a Centre of Excellence, research and development activities -- including a concrete and cement R&D initiative, timber construction R&D initiative, and multi-sector collaboration challenges -- and a procurement challenge.

Going Further – the Government of Canada commits to explore additional opportunities, including:

- Mobilize private sector financing to support deep retrofits in existing residential, commercial, and institutional buildings.
- Mobilize Indigenous sector financing to support deep retrofits and clean energy initiatives.
- Link infrastructure funding (e.g., public transit) to housing outcomes.
- Review of Canadian Mortgage and Housing Corporation's market tools to promote climate compatibility in new construction and within the existing housing stock.
- Increase energy efficiency standards of National Housing Strategy (NHS) programs.
- Lead by example by decarbonizing the federal government's highest emitting buildings.