



Net-Zero Brantford

City of Brantford's Vision
for Net-Zero Buildings

September 2022





Introduction

Constructing buildings to net-zero is an important goal being prioritized by many municipalities in Ontario and around the world to help curb the impacts of climate change and drive sustainability. Net-zero buildings are strategically designed with a combination of energy efficiency, renewable energy generation, and either eliminating or offsetting carbon emissions. Net-zero ready buildings are built to the same efficiency standards as net-zero buildings but the renewable energy system (i.e. solar panels) have not yet been installed. Green buildings are a resource-efficient method of construction that produces healthier buildings which leave less impact on the environment and cost less to maintain. The City of Brantford is aiming to achieve net-zero buildings because they produce as much energy as they consume, experience larger operational savings, and see higher greenhouse gas (GHG) emissions reductions.

The City of Brantford's Vision for Net-Zero Buildings presents a goal for reducing GHG emissions produced by buildings throughout the City. GHG emissions and climate change go hand in hand. The goals presented in this Vision align with the City's Declaration of a Climate Emergency and Corporate Climate Change Action Plan (CCAP) as it seeks to reduce GHG emissions by making buildings more sustainable. The goals outlined in the Corporate CCAP include reducing emissions by 30% by 2030, 80% by 2040, and being net-zero by 2050. With the City of Brantford's goal to be carbon neutral by 2050, buildings need to start being designed in such a way to make that goal feasible. If buildings are not built to a net-zero or net-zero ready standard now, then major retrofits will be required to bring the buildings up to the emissions standards required by 2050.

The Corporation of the City of Brantford owns approximately 100 buildings throughout the City that fulfill a wide variety of needs including work, residence, play, and utility. These buildings are of various ages, construction types, purposes, and states of repair. Buildings are a major source of energy consumption and contribute nearly 46% of all emissions produced by the Corporation.

Having a Vision to guide the long-term goals and targets of net-zero building initiatives is key to ensuring that measures being taken are communicated and it is clear how actions impact the long-term goal of reducing GHG emissions from buildings and having them be net-zero. The Vision highlights actions and presents next steps to creating a comprehensive Strategy to develop a strong pathway to achieve net-zero buildings and to ultimately achieve net-zero emissions in Brantford by 2050.



Time for Action

Why Do Buildings Have to Be Net-Zero?

As a City with a commitment to long term sustainability, climate action, and community well-being, the City aims to foster growth and development while ensuring present actions provide future generations with a great or improved well-being.

The total GHG emissions from Corporate buildings in 2018 was 6,754 metric tonnes of CO₂ equivalent which is the same as 1,455 gasoline-powered passenger vehicles driven for one year. The majority of emissions from buildings are due to the use of natural gas for space heating and water heating. A small percentage is a result of electricity consumption from lighting, space cooling, and other electrical plug loads. By designing buildings to be net-zero, the City will:

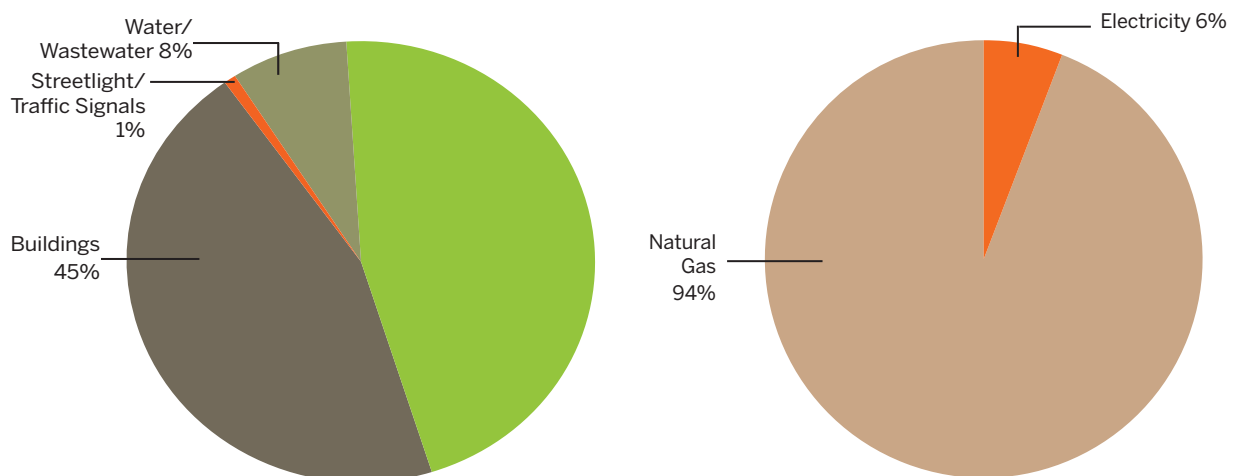
- Lower the demand for energy
- Improve occupant thermal comfort
- Improve energy efficiency

Natural gas produces methane, a potent greenhouse gas that greatly contributes to climate change. Net-zero buildings typically operate by phasing out combustion sources and utilizing renewable energy sources, which ultimately boost the resiliency of the building and electrical power.

By incorporating net-zero building standards into the construction of Corporate buildings, greater long-term energy savings, lower operational costs, and GHG emissions reductions can be observed.

Current State

- The City's GHG emissions from buildings was estimated to be 46% of all Corporate emissions
- The majority of emissions from buildings are due to the use of natural gas for space heating and water heating. A small percentage is a result of electricity consumption from lighting, space cooling and other electrical plug loads





Vision for Net-Zero Buildings

Vision:

Develop a net-zero building strategy where all City buildings are net-zero by 2050. A net-zero City will protect the environment and climate, ensure community well-being, build strong partnerships, spark innovation, and support the local economy.

Mission:

To reduce the demand for energy and improve energy efficiency in an effective and economically feasible way to sustain a clean and healthy community and extend the operating lifespans of the buildings.



Implementation Roadmap to Net-Zero

2022

- **Creation of Net-Zero Building Strategy** – this will outline more in-depth steps to be taken to ensure all City of Brantford Corporate buildings are net-zero by 2050
- **Net-Zero Building Standard** – new Corporate buildings will be analyzed to be built to the net-zero standards but if it is found that it is not economically feasible, buildings will proceed with net-zero ready which incorporates the same efficiency standards as net-zero buildings but does not include the renewable energy system. Net-Zero Ready buildings have been designed and constructed to put in the renewable energy system later on when more economically feasible.
- **Net-Zero Checklist** – provided to designers and consultants that includes recommended measures to help building be close to net-zero.

2023

- **Net-Zero Building Retrofit Strategy** – will be based off of the Net-Zero Building Standard and the results from the Net-Zero Arenas Feasibility Study to begin retrofitting all existing Corporate buildings to net-zero standards.

2024

- **Examine and evaluate the metrics** from the Net-Zero Building Standard and the Net-Zero Building Retrofit Strategy.
- **Reevaluate the recommendations** in the Net-Zero Building Standard and consider changing the suggestions to requirements.





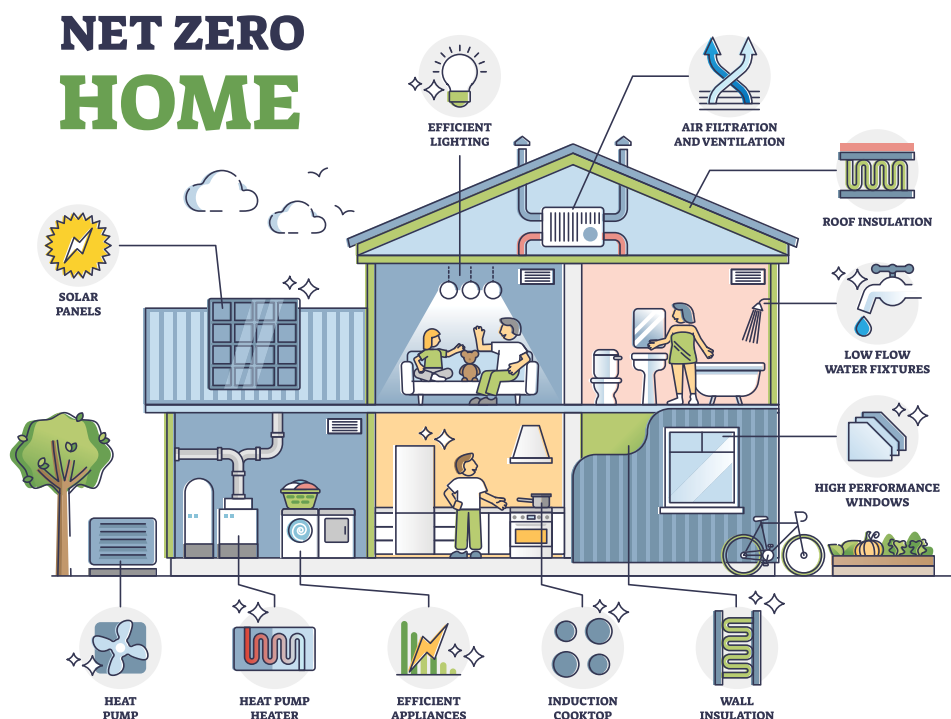
Next Steps

Achieving goals requires access to programs, services, and initiatives and the participation and commitment of Brantford residents and staff. An extensive stakeholder consultation process will be undertaken to gauge user perspectives, incorporate feedback, and gain support.

When necessary, it will be essential to test new technologies, building operations, and initiatives on a small scale before implementing at full scale. Initial building construction and feasibility studies will allow the City to:

- Learn and improve while limiting risk
- Opportunity to forecast and plan for full-scale implementation
- Provide valuable feedback
- Inform efficacy and feasibility
- Learn about operational saving potentials

With the initial building construction and feasibility studies, buildings being constructed to full net-zero will be examined. If payback is found to not be within one-third of the building's operational lifespan, then buildings will be constructed as net-zero ready with renewable energy being implemented in the future to ensure buildings will be net-zero emissions by 2050.



Measuring Progress

It will be important to conduct a comparison of the current and future state to identify strengths and opportunities. Key performance indicators will be established and monitored to measure the performance as the City's Vision progresses.

The City will update the current GHG emissions tracking, monitoring, and reporting systems to provide quantifiable guidance in the plan development. Tracking key performance indicators annually will be used to determine cost savings, energy consumption reduction, and GHG emissions reductions. To ensure the objectives are being met, it is also important to monitor:

- Maintenance costs
- Indoor air quality
- Water consumption
- Occupant comfort

The proposed framework is designed to be adaptive, flexible, and to evolve. As it develops, consideration will need to be given to how grid systems, utility costs, and carbon taxes might change as policy and legislation progresses, technology advances, research evolves, new build products are developed, and building codes change.

The action items within the proposed framework are anticipated to be relevant and effective within the short to medium term and will need to be revisited and continually updated moving forward.

This Strategy will allow the City of Brantford to lead by example and show how the City is being net-zero. Following the implementation of this Strategy, the City will explore private buildings and how this Standard can apply to residential, businesses, and institutional buildings.

