

THE CITY OF BARRIE

Corporate Net-Zero Strategy

2025 - 2050

Prepared by:

ENERGY MANAGEMENT BRANCH



Executive Summary

The City of Barrie's Net-Zero Strategy (NZ0 Strategy) is a comprehensive plan designed to achieve net-zero greenhouse gas (GHG) emissions from its corporate operations by 2050. Created in response to the City's 2019 Climate Emergency declaration, the strategy builds on more than two decades of climate action, including Barrie's involvement in the Partners for Climate Protection Program since 2001 and the adoption of the Community Energy and GHG Emission Reduction Plan in 2022. The NZ0 Strategy emphasizes an asset management framework, focusing on transitioning to low-carbon alternatives as assets reach the end of their useful life. Developed using a bottom-up approach, the strategy analyzes the City's operations at the asset level to project future GHG emissions, relying on data and evidence to guide decision-making and set a clear path toward emissions reduction.

'Net-zero emissions' means balancing GHG emissions to zero by reducing as much as possible first, then removing the remaining emissions from the atmosphere.

The City aims to achieve net-zero emissions by 2050, in alignment with global climate goals and the Paris Agreement. "Net-zero emissions" refers to balancing greenhouse gas (GHG) emissions to zero by first reducing them and then removing any remaining emissions from the atmosphere. At the global and national levels, a carbon budget has been set to limit emissions and keep average global temperature rise below 1.5°C, and the City's plan strives to meet these same objectives.

Undertaking a robust bottom-up approach the 2025 plan will not fully align with these objectives, due to existing technological limitations, as well as current operational and financial constraints. However, by developing the NZ0 Strategy through a bottom-up methodology, the City is able to fully understand and assess current constraints while taking practical and achievable steps toward its net-zero aspirations now. In this context, the NZ0 Strategy offers a clear, evidence-based pathway forward that is ready for immediate implementation.

The NZ0 Strategy establishes a solid foundation for integrating net-zero practices across the organization, while fostering the development of the knowledge, structures, and capacities necessary to accelerate the transition in the future. This approach will ultimately enable the City to expand its ability to meet its long-term net-zero targets.

The NZ0 Strategy also acts as an update under Ontario Regulation 25/23 (formerly On. Reg 507/18) which mandates public sector entities in Ontario to report annually on energy consumption and GHG emissions from buildings, as well as update their Conservation and Energy Demand Management Plans (CDM) every five years. Further details have been included within the Appendix of this report to highlight the required updates from the City's 2019 CDM plan and also provide a summary of projected future intensity metrics, a requirement outlined from the City's previous plan.

WHERE ARE WE TODAY?

The City of Barrie's Net-Zero Strategy follows established municipal accounting protocols, including the Partners for Climate Protection (PCP) Protocol and the Global Protocol for Community-Scale Greenhouse Gas Inventories (GPC). These protocols provide a standardized approach for quantifying and reporting greenhouse gas (GHG) emissions at the municipal level. The strategy's emissions inventory includes two primary categories: Scope 1 and Scope 2 emissions.

- **SCOPE 1**

GHG emissions resulting from on-site fossil fuel combustion, such as natural gas, biogas, and propane in facilities and diesel and gasoline to power vehicles. Scope 1 GHG emissions also includes methane produced from the decomposition of solid waste.
- **SCOPE 2**

GHG emissions that occur outside of the City's boundary as a result of the generation and distribution of electricity utilized by the City.
- **SCOPE 3**

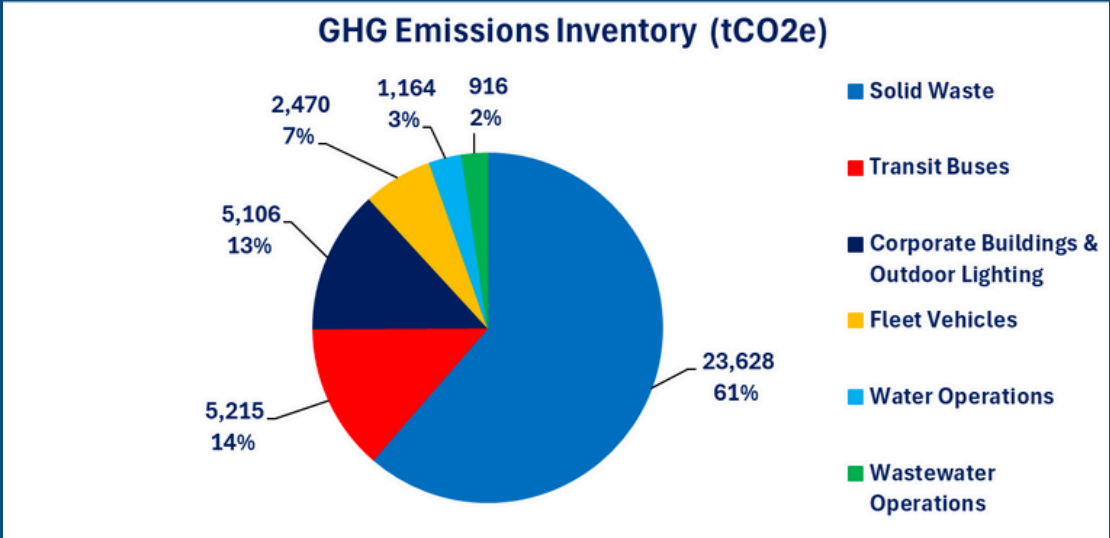
GHG emissions resulting from activities considered outside of the City's operational control, including from embodied carbon in the supply chain, process and fugitive emissions from wastewater treatment, and contractor travel.

At present, the inventory excludes Scope 3 emissions, which arise from activities outside the City's direct control, such as supply chains, contractor travel, or employee commuting. While some Scope 3 sources were analyzed during the strategy's development, they were excluded from the current inventory due to uncertainties in data accuracy and gaps in available information. As the strategy evolves, future updates to the GHG emissions inventory will focus on addressing these gaps. The City plans to prioritize actions to improve data collection and accuracy, with the goal of including Scope 3 emissions in future iterations of the inventory.

The NZ0 Strategy establishes 2022 as its baseline year, with the City generating a total of 38,500 tonnes of CO₂e emissions. The largest share of these emissions, 61 percent, comes from the decomposition of solid waste, which includes all waste produced by the community. The remaining emissions from City operations are mainly attributed to energy use across various sources, with total energy consumption in 2022 amounting to 100,270 MWh.

38,500

Tonnes GHG Emissions
in 2022



WHERE WILL WE BE TOMORROW?

A business-as-usual (BAU) GHG emission pathway projects future emissions based on current trends, practices, and known plans, assuming no significant changes in policies, technologies, or behaviours. It serves as a reference scenario, offering a forecast of what emissions would look like if the City continues its existing activities without implementing new measures to reduce emissions.

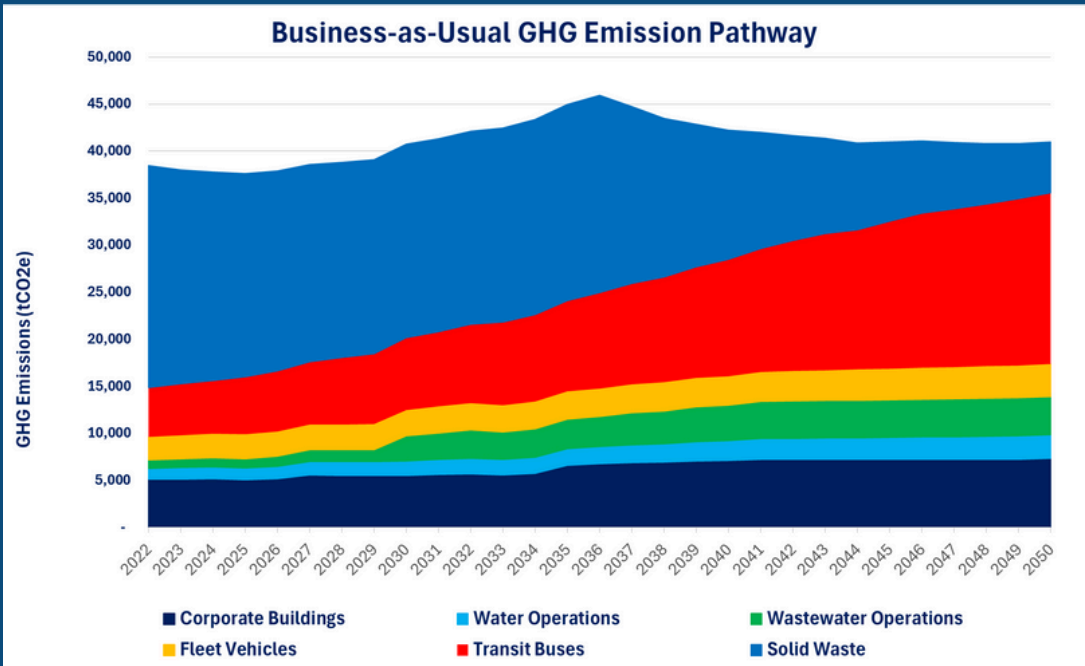
40,100

Tonnes GHG
Emissions by 2050



For the Corporation, the BAU pathway predicts a 6% increase in emissions, which would result in a total of 40,100 tonnes of CO₂e by 2050. This projection reflects the continued reliance on current systems and operations without any transformative changes to address climate goals.

- The Corporation's GHG emissions from energy consumption are mainly driven by increased transit service to support population growth and rising ridership. However, it is important to note, that transit will be key in reducing the Community's overall emissions under both pathways.
- The GHG emission trend is also significantly influenced by accounting protocols for solid waste emissions. Under the BAU Pathway, the City-owned landfill is assumed to be closed in 2035 and that waste will be exported outside the City's boundary which impacts how GHG emissions from the community's waste is reported.
- Water and Wastewater Operations will experience higher GHG emissions due to increased energy demand from population growth. Additionally, Wastewater Operations will see a significant rise in electricity usage as upgrades to meet stricter effluent standards are implemented.



WHERE COULD WE BE TOMORROW?

The NZ0 Pathway enables the City to reduce GHG emissions by 53 percent from the baseline by 2050, resulting in remaining emissions of 18,200 tCO₂e. Strategies for each Operational Group were identified and thoroughly evaluated to determine the total possible reductions, considering both current and anticipated technological advancements.

18,200

Tonnes GHG
Emissions by 2050



Furthermore, the strategies are grouped into broader categories, as illustrated in the pyramid diagrams below. This tiered structure provides a clear, logical order of operations, balancing both GHG emission reduction with financial priorities. By organizing strategies in this way, the approach ensures consistent and coordinated implementation across all operational groups, aligning each step with the Corporation's overall net-zero objectives.

Operational Group Strategies



Corporate-Wide Strategies



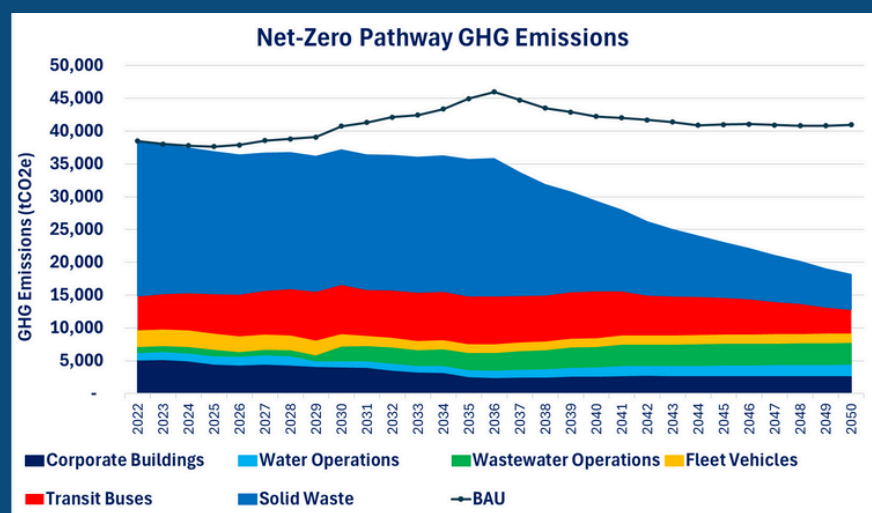
Under the NZ0 Pathway, GHG emissions from all reported sources would result in a decrease of GHG emissions of 53 percent below the 2022 baseline. This reduction is achieved through a combination of energy efficiency improvements, the adoption of renewable energy, and the gradual transition to low-carbon technologies in key operational areas. The NZ0 Pathway

-53%

Reduction below
baseline by 2022

demonstrates the potential reduction in GHG emissions based on the specific strategies identified for each operational group. It illustrates the impact of internal measures and actions, showing what can be achieved within each operational area before broader corporate-wide strategies are applied to address any remaining emissions.

- Transit bus fleet is converted to battery electric models.
- Heating in buildings is transitioned from natural gas to electric.
- Solid Waste emissions follow the same pathway as the BAU.

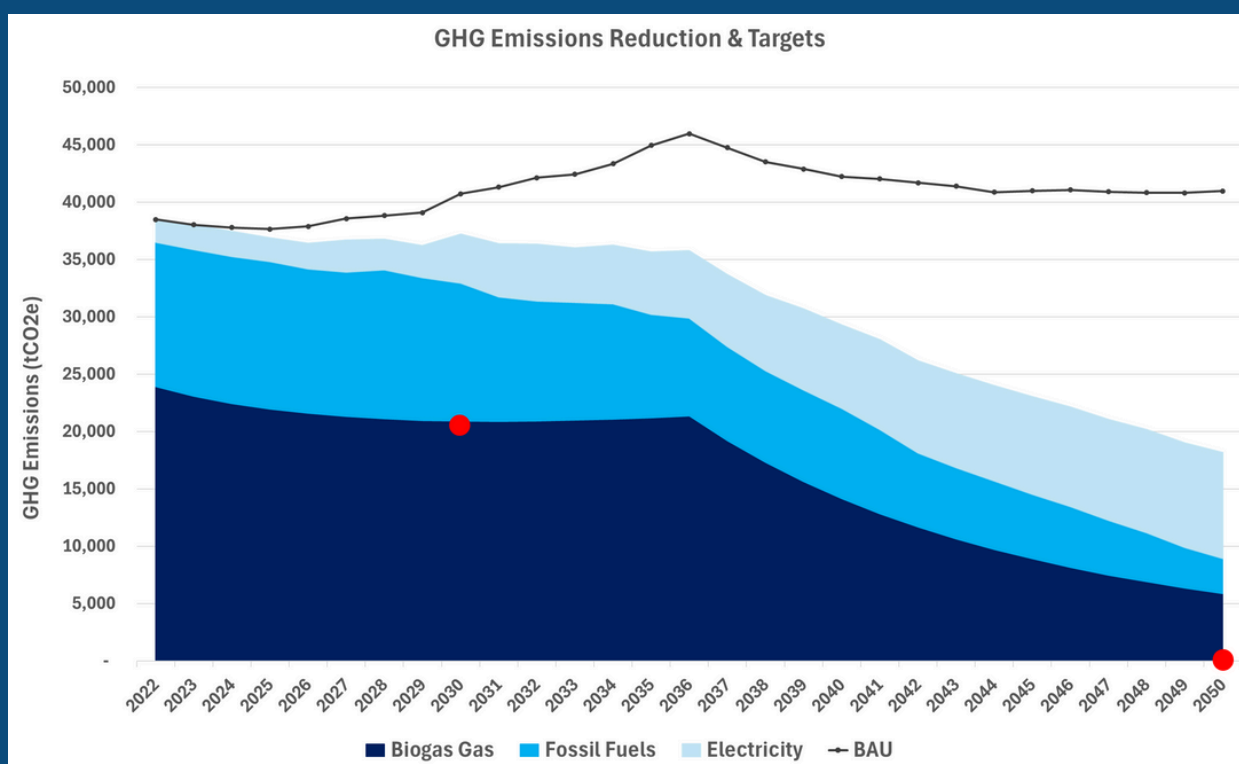


WHAT ABOUT THE REMAINING EMISSIONS?

The NZ0 Pathway moves the City on a pathway towards net-zero emissions by 2050. Developed utilizing a bottom-up approach, current constraints can be recognized and assessed in order to take practical and achievable steps on a NZ0 Pathway. The graph below shows the projected trajectory of remaining emissions by energy source compared to the BAU pathway. The light blue area represents emissions from electricity consumption from the Ontario grid. Renewable Solar PV electricity can serve as method to mitigate these emissions, reducing these emissions to zero, and reduce the overall remaining emissions outlined by 50 percent by 2050.

The other two segments on the graph include remaining fossil fuels and biogas emissions which should first be offset through nature-based solutions, such as carbon sequestration, and then, if necessary, through carbon offsets.

The two red dots on the graph represent the recommended GHG reduction targets as specified by the international scientific community. At 2030, this would mean a reduction in GHG emissions from the baseline of 45 percent, or 21,000 tonnes CO₂e, and reaching zero by 2050.



HOW TO ENSURE SUCCESS?

The effective implementation of the NZ0 Strategy across City departments will necessitate a comprehensive range of activities and strategies. Key actions essential to achieving the plan's objectives include proposed modifications to the City's capital planning and renewal processes, with a particular focus on prioritizing low-carbon alternatives. Additionally, integrating NZ0 objectives into existing planning documents during routine updates is crucial to ensuring alignment with the strategy's long-term goals. Moreover, a commitment to ongoing improvement in data monitoring, as well as the establishment of standardized reporting structures and frequencies, has been identified as central to the successful execution of the 2025 NZ0 Strategy.

1

Capital Planning & Renewal



Net-zero objectives will be integrated into the City's capital planning and renewal framework, with a focus on an inclusion and evaluation of low-carbon alternatives. Low-carbon options that demonstrate a life cycle payback will be incorporated as standard business-as-usual solutions. Conversely, where substantial initial capital investment is required without a projected return on investment, such items will be explicitly highlighted for Council's consideration.

2

Plan Governance & Integration



The NZ0 Strategy will be executed through a collaborative effort between the EMB and the Operational Groups, ensuring alignment with the City's net-zero goals. Each group will be guided by an annual carbon budget, informed by the NZ0 Pathway, to help track progress. Successful implementation will be supported by integrating net-zero strategies into existing policies, ensuring consistent and effective execution across all departments.

3

Data Monitoring & Plan Reporting



Data monitoring and plan reporting will support the asset-based approach by emphasizing evidence-driven decision-making, emphasizing the reliance on data to guide planning and actions. Regular progress updates will maintain momentum, recognize successes, and identify areas for improvement, ensuring continuous progress toward long-term goals.