

Table 1: Jurisdictional Scan Municipal Net-Zero Building Standards

City	Standard	Date	What's Included
Toronto	Net Zero Existing Buildings Strategy for all buildings	2021	- City has a goal of reducing city-wide emissions to net zero emissions by 2050 or sooner - Created the Net Zero Existing Buildings Strategy to chart a path to a decarbonized and net zero emissions building sector - Five systems to reduce emissions are included: user-driven loads and occupancy-based controls, enclosure, HVAC delivery, HVAC plant, and renewable energy - Expects to see a reduction in annual emissions by 114,000 to 131,000 - Avoidance of \$90 million per year in utility costs by 2040
Oxford	No official standard but follows Passive House and Net-Zero Energy standards for new corporate buildings	2015	- Aim to design new municipal buildings to Passive House Standard or if that is not viable, to Zero Net Energy verifiable through the New Buildings Institute program - City trying to be 100% renewable energy by 2050 and target 55% reduction in energy use compared to Ontario Building Code
Kitchener	Corporate Green Building Standard for new construction and expansions over 500 sq m	2019	Updated in 2019 from the previous LEED Gold Standard to an energy intensity-based standard which requires minimum 25% energy efficiency above Ontario Building Code or net-zero/net-zero ready energy where site allows
Guelph	100% Renewable Strategy Loosely following CaGBC Zero Carbon Design Standard for all new corporate buildings	2017	- Strategic Plan requires facilities and operations to use 100% renewable energy by 2050 - Using CaGBC Zero Carbon Design Standard for new construction but applying it flexibly to achieve the most effective energy management for each building - Considering having the City meet ISO 50001 Energy Management Standard
Thunder Bay	Climate Forward City: Thunder Bay Net-Zero Strategy	2020	- Community-based strategy - Goal of net-zero emissions by 2050 100% of buildings are retrofit for energy efficiency and switch to electric heat pumps and electric water heating - Combined heat-and-power systems are switched to low carbon sources by 2040

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			90% or more of new buildings meet net-zero standards or equivalent by 2030 - All municipal buildings are zero emissions by 2035
Peterborough	Green New Building Policy for corporate buildings	Short-term priority	- Policy will require new municipal buildings and major renovations be built to high environmental standards - Look into geothermal heating and cooling systems and explore the feasibility of district energy - Conduct full lifecycle analysis costing process
Cambridge	Green Building Policy for new corporate buildings	2015	- Updated policy will assist in achievement of 2050 GHG emission targets of 80%. May move to requiring new buildings to be net-zero carbon - Current policy requires new municipal buildings and any renovations over 500 sq. m that are designed for public use, to be minimum LEED Gold certified
Vancouver	Zero Emissions Building Plan	2016	Plan lays out four action strategies to require the majority of new buildings in Vancouver to have no operational GHG emissions by 2025 and that all new buildings have no GHG emissions by 2030
Hamilton	Recharge Hamilton: Our Community Energy & Emissions Plan	2022	- Plan supports the retrofitting of existing buildings to be more energy efficient and to encourage fuel switching - Also includes actions that support improving the energy efficiency and GHG profile of new buildings within the City
Ottawa	High Performance Development Standard	2022	- Includes a Site Plan and a Plan for Subdivision - Developed as a tiered standard - Tier 1 is mandatory for all projects requiring either a site plan or plan of subdivision application - At this time, Tier 3 is only referenced in building energy emission targets which aligns with the 2030 emission targets
Halton Hills	Green Development Standards v3	2021	- Standard applies to all developments and major additions subject to an Official Plan and/or Zoning By-law Amendment, Draft Plan of Subdivision, or Site Plan Control approval - Consists of 12 measures in five categories: energy & water, ecology, resiliency, transportation, innovation
Waterloo	Green Building Policy	2018	Requires all newly constructed municipal buildings over 500 sq. m to be designed and certified to at least LEED Silver

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			Policy also requires a minimum 25% energy and GHG efficiency improvement beyond Ontario Building Code
Whitby	Whitby Green Standard	2020	- Ensures that minimum sustainability criteria are being met during a development application - Tiered approach with Tier 1 having mandatory criteria that need to be met by all new development applications and Tiers 2 to 4 have ways developers can achieve high-performance sustainable development on a voluntary basis
Sudbury	Community Energy and Emissions Plan	2021	- Green retrofits over the past 10 years have resulted in more than \$2.6 million in savings - Plan includes designing buildings to Passive House standards
Halifax	HalifACT: Acting on Climate Together	2020	- Commitment to reducing emissions, switching to clean and reliable energy sources, and demonstrating leadership - Since 2018, the municipality has implemented approximately 200 energy efficiency projects, saving over \$2 million annually and reducing GHG emissions by 15% \$1 spent in preparation of climate measures saves \$6 in future impact costs \$22B spent on emissions reductions will save \$41.9B in avoided energy-related costs

Table 2: Net-Zero Building Examples

Building	Location	Savings	Details
Fire Hall	Coldstream	Over \$50,000 in annual utility savings Additional utility savings at adjacent municipal building	Exceeded net-zero target Measures implemented: upgraded building envelope, solar panels, geothermal wells, all electric equipment, in-floor heating
3M Manufacturing	London	Reduced energy by 12 GWh Reduce costs by \$1.5 million annually	Adopted energy efficiency measures which included: VFDs on manufacturing equipment, boilers, and chillers; LED lighting; upgraded HVAC systems
Earth Rangers Centre	Vaughan	Operate on less than \$0.80 per sq. ft. for energy use	Measures implemented include: geothermal technology, solar panels, extensive building automation, green roof, earth tube

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		Designed to be 63% more efficient than National Energy Code	ventilation
Joyce Centre for Partnership and Innovation - Mohawk College	Hamilton	Net energy positive by 29% Building consumption 25% less than expected	Incorporates a high performance envelope, solar arrays, geothermal system, natural light, stormwater harvesting, and high efficiency fixtures. First building in Canada to receive Zero Carbon Building Certification
South End Community Centre	Guelph	Expected to see 62% savings in energy and 85% savings in GHG emissions Expected savings are \$200,000/year	Will incorporate optimized window-wall ratio, increased insulation, heightened airtightness, air source heat pump, heat recovery, electric ice resurfacers, solar PV panels
Junction East project	Sudbury	Estimated payback period is 15 years	First net-zero building owned by the City Building will use solar panels, geothermal heating, and upgrades such as triple-pane windows
Library	Pelham	Received over \$5 million in federal funding	Three-storey facility will include accessibility features and green energy and climate resiliency components, such as solar panels, glazing, and abundant natural lighting
Pickering Heritage & Community Centre	Pickering	Received \$17 million in federal funding	Community centre will be the City's first net-zero facility, featuring enhanced insulation, triple glazed windows, solar panels, air source heat pumps, etc.
Emergency Services Headquarters	Toronto	Expected to deliver \$294,000 in annual energy savings, 55% reduction in energy use, and 62% reduction in GHG emissions Expected payback is 19 years	Project includes: electrified heating system with geo-exchange, air-source heat pumps, heat recovery systems, 500 kW solar PV canopy over the parking garage
City Waterfront Building	Toronto	Expected to use 71% less energy, 83% reduction in GHG emissions, cost less to operate	Project being completed in three stages. Stage 1 included LED lighting retrofit completed in 2018, Stage 2 included rooftop solar PV and energy storage completed in 2021, and Stage 3 will include comprehensive retrofit including hydrothermal to be completed in 2022