Planning and Building Department
Development and Design Division
T: 905-615-3200 x5522
www.mississauga.ca

City of Mississauga Green Development Standard: Energy Modelling Report Terms of Reference

Description

The Energy Modelling Report is a Site Plan Approval submission requirement for the City of Mississauga's Green Development Standard's (GDS) EB1: Energy Performance metric. While the focus is on exterior design solutions, applicants may opt to meet the performance requirements with a combination of exterior design solutions, interior design solutions, or servicing strategies.

Buildings that do not have energy requirements under the Ontario Building Code (OBC) do not have to demonstrate energy performance under this standard. The Energy Modelling Report applies to buildings over 2,000 m^2. Buildings under 2,000 m^2 are not required to submit an Energy Modelling Report.

The Energy Modelling Report must identify the proposed energy conservation measures and the applicable assumptions made in the modelling of the energy performance of the building. It is expected that the energy models submitted will reflect the systems that are likely to be designed and built and that any performance liabilities are already understood and mitigated in the form of assumptions used in the energy model.

The results of the energy modelling are intended to show compliance with Mississauga's GDS performance requirements for Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI), and Greenhouse Gas Intensity (GHGI). However, the thermal comfort and energy performance of the constructed buildings will depend on factors outside of the standardized assumptions, such as occupant behaviour, weather, and hours of use. The standardized assumptions align with those identified in the Toronto Green Standard Modelling Guidelines. It is expected that the project's performance, as modelled at the Site Plan Approval, will be maintained or improved throughout the remainder of the design and construction process.

The energy modelling process should be started as early in the design process as possible to maximize impact on design, but the Design Development Stage Energy Modelling Report is only submitted prior to Notice of Approval Conditions and once all minimum required documents are available. It is recommended that the project teams aim to submit the report during the first Site Plan Approval submission.

Planning and Building Department
Development and Design Division
T: 905-615-3200 x5522
www.mississauga.ca

Performance Requirements

Projects must demonstrate: TEUI, TEDI, AND GHGI targets by building type per Table 1.

A building is considered mixed-use, if it consists of different use-types each contributing at least 10% of the total modelled floor area (MFA). Mixed-use buildings with different performance targets, calculate the TEUI, TEDI, and GHGI targets based on an area-weighting.

Table 1. Summary of Energy Performance requirements by building type and Tier. Multi-unit residential buildings are identified as MURBs in the table.

Building Type	Tier 1	Tier 2	Tier 3
Medium- and high-rise MURBS	GHGI: 15 $kgCO_2e/m^2/yr.$ TEUI: 135 kWh/m^2 TEDI: 50 kWh/m^2	GHGI: 10 $kgCO_2e/m^2/yr.$ TEUI: 100 kWh/m^2 TEDI: 30 kWh/m^2	GHGI: 5 $kgCO_2e/m^2/yr.$ TEUI: 75 kWh/m^2 TEDI: 15 kWh/m^2
Commercial Office and institutional	GHGI: 15 $kgCO_2e/m^2/yr.$ TEUI: 130 kWh/m^2 TEDI: 30 kWh/m^2	GHGI: 8 $kgCO2e/m^2/yr.$ TEUI: 100 kWh/m^2 TEDI: 22 kWh/m^2	GHGI: 5 $kgCO2e/m^2/yr.$ TEUI: 65 kWh/m^2 TEDI: 15 kWh/m^2
Commercial Retail	GHGI: 10 $kgCO_2e/m^2/yr.$ TEUI: 120 kWh/m^2 TEDI: 40 kWh/m^2	GHGI: 5 $kgCO2e/m^2/yr.$ TEUI: 90 kWh/m^2 TEDI: 25 kWh/m^2	GHGI: 5 $kgCO2e/m^2/yr.$ TEUI: 70 kWh/m^2 TEDI: 15 kWh/m^2
Industrial	GHGI: 15 $kgCO_2e/m^2/yr.$ TEUI: 130 kWh/m^2 TEDI: 60 kWh/m^2	GHGI: 10 $kgCO_2e/m^2/yr.$ TEUI: 100 kWh/m^2 TEDI: 50 kWh/m^2	GHGI: 5 $kgCO_2e/m^2/yr.$ TEUI: 70 kWh/m^2 TEDI: 37 kWh/m^2

Documentation Submission Requirements

Tier 1: Design Development Stage Energy Modelling Report

Tier 1 requires the submission of a Design Development Stage Energy Modelling Report prior to Site Plan Approval. This is considered a preliminary or design development stage energy model. The Design Development Stage Energy Modelling Report includes the following documents:

- Energy Modelling Report.
- Electronic energy model simulation files.
- Mechanical and Electrical Design Brief; and
- Related supporting drawings and calculations.

Tier 2 and Tier 3: As-Constructed Energy Modelling Report

Tier 2 and Tier 3 require the submission of an additional As-Constructed Energy Modelling Report based on as-built construction drawings. The As-Constructed Energy Modelling Report reflects the building's final design, including any changes made during the construction phase. This must be evaluated by a third-party project evaluator registered with the City of Mississauga. The As-Constructed Energy Modelling Report is submitted after occupancy begins and once all necessary shop drawings are available to create the energy model.

The third-party evaluator is responsible for conducting a site visit to ensure that equipment has been installed as part of the design documentation. The evaluator cannot conduct a review while the project is still under construction. The As-Constructed Energy Modelling Report submission documents include:

- Energy Modelling Report.
- Electronic simulation files.
- Modelling notes.
- Take-off calculations.
- Zoning diagrams.
- Outdoor air calculation spreadsheets.
- Architectural, mechanical, and electrical drawings and specifications (issued for construction/as built).
- Product cut sheet(s)/spec sheet(s)/shop drawings for installed energy-efficient measures.
- Declaration template filled in by the energy modeller confirming that as-constructed energy model incorporates the equipment, schedules, and operations, as described in the design documentation, and also signed by the architect and mechanical and electrical engineers/consultants confirming that the equipment installed on site is as per the design documents and the Energy Modelling Report.

Energy Modelling Report

The contents for the Energy Modelling Report should include the following sections: executive summary, project background, simulation overview, simulation details, and compliance results.

Section 1: Executive Summary

Provide a project summary, a high-level summary of the modelling assumptions, the energy model inputs and results, and identify how the project complies with the energy performance targets for TEDI, TEUI, and GHGI.

Section 2: Project Background

Provide a project background with the following information:

- Project description: project name, project address, building use and occupancy. If applicable, include different use-types present in the building.
- Project team: identify energy modeller, architect, coordinating registered professional (CRP), and mechanical and electrical engineers.
- Drawing set: referenced drawing set file names, and dates.
- Building size: MFA, Gross Floor Area (GFA), number of storeys and units.
- Climatic information: simulation weather file names.
- Energy Modelling Tool and Simulation: state the software and version used, and simulation file name.
- Performance targets: state the TEDI, TEUI, GHGI performance targets achieved in the modelling.
- Summary of energy efficiency measures: provide a summary of the efficiency measures that are provided in Section 4 of the Energy Modelling Report.

Section 3: Simulation Overview

Provide details of the modelling simulation and building assumptions, including occupancy type areas, operation hours, and weather data.

Section 4: Simulation Details

Provide simulation details for the proposed and reference building details with the following information:

- Mechanical systems: provide details on the HVAC, ventilation, mechanical plant, domestic hot water systems.
- Lighting, plug, and other loads: provide details on the interior and exterior lighting, plug and process loads, and other loads.
- Architectural and building enclosure: provide details on the assembly description and R-values, and infiltration.

Section 5: Energy Model Compliance Results

Provide results from simulation, including energy use, emissions, and peak demands. State the performance targets achieved for TEUI, TEDI, and GHGI.

Preparing the Energy Modelling Report

The Energy Modelling Report must be completed and signed by the certified energy modeller and a licensed architect, C.E.T., B.E.M.O., or professional engineer. The reference building performance shall be

calculated according to SB-10 2017 Division 3, using a computer simulation model for the entire building project. The acceptable software include:

- EQuest version 3.64 or higher.
- Energy Plus.
- IES Virtual Environment.

The proposed building design must meet the following requirements and criteria:

- City of Mississauga GDS EB1: Energy Performance requirements.
- Mandatory provisions with current Ontario Building Code (OBC) and any of its referenced energy codes.
- Inclusion of all building energy consumption within and associated with the building project.

The simulation model must comply with the following requirements and criteria:

- Designed to meet EB1: Energy Performance requirements.
- City of Mississauga's Energy Modelling Report Terms of References and ANSI/ASHRAE/IESNA Standard 90.1-2013 as modified by SB-10 2017 Division 3 Chapter 2 (as applicable). OR
- National Energy Code of Canada for Buildings 2015 as modified by SB-10 2017 Division 3 Chapter 3 (as applicable).

Mississauga's Energy Performance requirements have been designed to align with the Toronto Green Standard (TGS) requirements, as such applicants should follow the modelling parameters identified in the following sections of the Toronto Green Standard Modelling Guidelines:

- Section 3.0 Building Simulation Details.
- Section 4.0 TEDI.
- Section 5.0 Absolute Performance Targets Pathway Modelling Guidance.