

# Terms of Reference: Energy Modelling Report for Green Development Standards

## **Purpose:**

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To outline the requirements of Energy Modelling Report submissions for multi-unit residential, commercial, and industrial buildings in support of Caledon's Green Development Standards (GDS).

## **Prepared By:**

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Certified energy modeler or professional engineer and a licensed architect

## **Required in Support of:**

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The Energy Modelling Report is a submission requirement for the Town of Caledon's Green Development Standard's (GDS) for Site Plan applications to demonstrate compliance with metric 3.1: Operational Energy and GHG Emissions. The Energy Modelling Report is used to demonstrate compliance with the Greenhouse Gas Intensity (GHGI), Thermal Energy Demand Intensity, and Total Energy Use Intensity (TEUI) targets for multi-unit residential, commercial retail, commercial office, and industrial buildings.

## **Content:**

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### **Overview**

The Energy Modelling Report must identify the proposed energy conservation measures and the applicable assumptions made in the modelling of the building's energy performance. 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. 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. It is expected that the project's performance will be maintained or improved throughout the remainder of the design and construction process.

The Town of Caledon requires applicants to follow the standardized assumptions identified in the [Toronto Green Standard Modelling Guidelines](#).



**Table 1. Greenhouse gas intensity performance pathway for multi-unit residential, and institutional, commercial, and industrial sites**

Building Type: GHGI (kg CO <sub>2</sub> e/m <sup>2</sup> /yr)	2024 Target	2027 Target	2030 Target	Net-Zero Emissions
Multi-Unit Residential	15	10	5	0
Commercial Office	15	8	4	0
Commercial Retail	10	5	3	0
Industrial	15	10	5	0
Mixed Use <sup>1</sup> (calculated using a weighted average of the above)				

**Table 2. Thermal Energy Demand Intensity and Total Energy Use Intensity performance pathways**

Energy Performance Measure kWh/m <sup>2</sup> /yr	2024		2027 Target		2030 Target	
	TEUI	TEDI	TEUI	TEDI	TEUI	TEDI
Multi-Unit Residential (> 6 storeys)	135	50	100	30	75	15
Multi-Unit Residential (≤ 6 storeys)	130	40	100	25	70	15
Commercial Office	130	30	100	22	65	15
Commercial Retail	120	40	90	25	70	15
Industrial	130	60	100	50	70	37
Mixed Use (calculated using a weighted average of the above)						

## Energy Modelling Report Requirements

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.

<sup>1</sup> 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.



- 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.

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.

