

# Energy Modeling Report

## Draft Terms of Reference

### Description:

The Energy Modeling Report is a Site Plan Control application submission requirement to show how Climate Change Mitigation, and Energy objectives will be met through exterior building design elements. **The focus should be on exterior design solutions but,** an applicant may choose how to address the minimum performance requirements which may include interior, exterior, or servicing strategies, or a combination therein. Where an applicant chooses to pursue strategies beyond exterior design or elements not yet reflected in the drawings, the model may make necessary assumptions and, the plans and drawings will support contingent references to the extent necessary to meet the interior measures proposed.

The Energy Modeling Report will identify energy conservation measures proposed and any applicable assumptions made in modeling the energy performance of the building. In addition, site plan applications within an approved Secondary Plan area or Plan of Subdivision may have an associated Community Energy Plan which should be referenced and followed. The Planning Rationale and/or Design Briefs shall also be consistent with the Energy Modeling Report.

### Preparation:

Energy Modeling Reports shall be completed and signed by the energy modeler and licensed Architect, C.E.T., B.E.M.P., or Professional Engineer.

Energy Models should be completed using the following software:

- eQUEST version 3.64 or higher
- Energy Plus
- IES Virtual Environment

The model will follow simulation guidelines from sections 3 through 7 of the [Toronto Green Standard Modelling Guidelines as applicable](#). With the exception of section 3.2 Ottawa projects shall use an Ottawa weather file.

Where a site plan application includes an existing building that is expected to remain, the model should consider scope and delineation of included and excluded components. The Energy Modeling Report will clearly identify the boundary of the



energy model. An energy model is not required to include existing buildings or building floor area that are not changing as part of the project. Site Plan Control applications with multiple buildings served by independent heating systems shall submit individual Energy Modeling Reports for each building.

At the Site Plan Control application stage, it is understood that many of the building design details, equipment and other required inputs are not fully complete. The applicant is to supply enough information and supporting documents to describe the energy conservation measures to be applied to the project, including measures related to the followings:

- Building articulation
- Orientation
- Building envelope
- Glazed area
- Solar control, such as external shading devices
- System choice and major mechanical and electrical energy decisions

Where a building system or part of a building system has not been specified, it shall be assumed and modelled as equal to the prescriptive requirements of SB-10 2017. Reasonable assumptions around mechanical and electrical systems are allowed and should be documented in the Energy Modeling Report or Mechanical and Electrical design briefs if provided as supplementary information.

Energy models are encouraged to be started as early in the design process as possible to maximize impact on design, the Energy Modeling Report is only required to be submitted prior to release of the Delegated Authority Report and once all minimum required documentation is available. It is recommended that project teams aim to submit the Energy Modeling Report during the first SPA submission.

### **When Required:**

An Energy Modeling Report will be required as part of the submission package for applications for Site Plan Control and plans of condominium.

Exemptions to the requirement of an Energy Modeling Report may be determined by staff where it is demonstrated that the energy component of a project is not relevant to the review of the application in the context of applicable policy.



Buildings which don't have energy requirements under the Ontario Building Code do not have to demonstrate energy performance under this standard. Buildings under 2,000 m<sup>2</sup> are not required to submit an energy model.

Tier 1 requires the submission of an Energy Modeling Report prior to Site Plan Approval this is considered to be a preliminary or design development stage energy model. Upper Tiers require the submission of an additional As-Constructed Energy Modeling Report based on as-built construction drawings.

## Contents for Energy Modeling Reports:

### 1. Summary

This section will provide a high-level summary of the assumptions, modelling tool and results. It will clearly identify how the project complies with the energy model requirements.

### 2. Proposed Building Energy Simulation Overview

This section will provide details of the modeling simulation approach and building assumptions such as occupancy type areas, operation hours, and weather data.

### 3. Simulation Details for Proposed and Reference Buildings

This section will provide a table outlining the proposed and reference building details for the following parameters.

- Building Envelope
  - Wall floor and roof assemblies- general type, assumed R value, thickness
  - Doors
  - Window to wall ratio
  - Fenestration type(s)
  - Air Infiltration assumptions
- Interior Loads
  - Lighting and power density assumptions
- Mechanical Systems
  - Mechanical system assumptions

### 4. Energy Model Compliance Results

This section will provide the model results such as energy use, emissions, peak demands.

### Evaluation Criteria:

Submission will be evaluated for compatibility with the High Performance Development Standard. Projects must demonstrate:

- a) Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI) and GHG Emission Intensity (GHGI) targets by building type per table. Multi Unit Residential Buildings are referred to as MURB in the table. Mixed-use buildings will use an area weighted average by occupancy type.

	Tier 1			Tier 2		
	TEUI (KWh/m <sup>2</sup> /yr)	TEDI (KWh/m <sup>2</sup> /yr)	GHGI (kg CO <sub>2</sub> <sup>e</sup> /m <sup>2</sup> /yr)	TEUI (KWh/m <sup>2</sup> /yr)	TEDI (KWh/m <sup>2</sup> /yr)	GHGI (kg CO <sub>2</sub> <sup>e</sup> /m <sup>2</sup> /yr)
MURB (≤6 Storeys)	147	62	19	108	38	13
<b>MURB (≥ 4 Storeys)</b>	142	52	19	108	33	13
<b>Commercial Office</b>	142	42	19	108	30	11
<b>Commercial Retail</b>	132	52	12	98	33	7
<b>All Other Building Types</b>	25% over OBC			50% over OBC		

- b) 25% (50% Tier 2) energy efficiency improvement above the Ontario Building Code, SB-10, Division 3 (2017);

OR

- c) Commitment to pursue certification program such as the ones listed below or an approved equivalent.  
 Tier 1: ENERGY STAR® for New Homes, version 17, Energy Star for MURBS, LEED v4 with minimum 4 energy points  
 Tier 2: R-2000®, CHBA NZe, NZEr, or Passive House, CaGBC Zero Carbon Standard

AND

Where a local Community Energy Plan exists compatibility with this plan must also be demonstrated. Other applicable policies to reference may include:

- Official Plan and all supporting master plans;
- Zoning By-law;
- Secondary Plans;



- Community Design Plans; and
- Other relevant documents.
- Any site-specific evaluation criteria will be confirmed at the time of the pre-application consultation stage.

### **Submission:**

Final Copies will include:

- One digital copy of the Energy Modeling Report
- One electronic copy energy model simulation file.

### **Resources:**

[Toronto Green Standard Energy Modeling Guidelines](#)

[CaGBC Zero Carbon Building Standard](#)

[Passive House standard](#)

[Ontario Building Code](#)

[CHBA Net Zero](#)

[Energy Star for New Homes](#)

[Energy Star for Multi Unit Residential Buildings](#)

[Leadership in Energy and Environmental Design \(LEED\) v. 4](#)

### **Contact**

Please contact Energy Evolution at [energyevolution@ottawa.ca](mailto:energyevolution@ottawa.ca) for further information about meeting the High Performance Development Standard energy performance measures, contents of Energy Model Report submissions.

