



Integrated Sustainable Design Standards (ISDS)

Building Energy Performance and Emissions: Energy Modelling Report Guidelines

Performance Measure ER2

Version **May 4, 2023**

Performance Measure: ER2 (Building Energy Performance and Emissions)

The City of Pickering's Integrated Sustainable Design Standards (ISDS) is a tiered municipal green standard that establishes sustainability-related performance measures and design guidelines for new development and redevelopment in the City of Pickering. The ISDS promotes higher building standards and development practices to help prepare, mitigate and adapt to climate change while protecting and enhancing natural features. The ISDS is a requirement for any applicable development applications submitted on or after January 1, 2023. This document has been prepared to assist the applicant in preparing an Energy Modelling Report or other documentation to demonstrate compliance.

An Energy Modelling Report is a Site Plan Control and/or Draft Plan of Subdivision application submission requirement to show how ISDS Energy Performance and Emissions criteria will be met, and describes how the applicant may choose how to address the minimum performance requirements, including interior, exterior, or servicing strategies or a combination therein. All applicable applications must demonstrate compliance with at least Tier 1 requirements of the ISDS. The model may make necessary assumptions when an applicant chooses to pursue strategies beyond design or elements not yet reflected in the drawings. The plans and drawings will support contingent references to the extent necessary to meet the proposed interior measures.

The Energy Modelling Report or other documentation demonstrating compliance with the target standard will identify energy conservation measures proposed and any applicable assumptions made in modelling the energy performance of the building(s). The Planning Rationale and/ or Design Briefs shall also be consistent with the Energy Modelling Report. Energy Modelling Reports shall be completed and signed by an Energy Modeller (a Certified Engineering Technologist (C.E.T), a certified Building Energy Modeling Professional (B.E.M.P), or a Professional Engineer) and a licensed Architect.

The simulation program shall meet the requirements as set out in ASHRAE 90.1-2013, G2.2. 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 Version 3 Energy Efficiency Report Submission & Modelling Guidelines](#) as applicable. With the exception of section 3.2, City of Pickering projects shall use a weather file located geographically closest to Pickering, Ontario, Canada.

Where a site plan application includes an existing building that is expected to remain, the model should consider the scope and delineation of included and excluded components. The Energy Modelling Report will clearly identify the boundary of the energy model. Site Plan Control applications with multiple buildings served by independent heating systems shall submit individual Energy Modelling Report for each building.

An energy model is not required to include existing buildings or building floor areas that are not changing as part of the project. Exemptions to the requirement of an Energy Modelling Report may be determined by City 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 the applicable policy. Buildings that do not

have energy efficiency requirements under the Ontario Building Code do not have to demonstrate energy performance under the ISDS.

At the Site Plan Control and/or Draft Plan of Subdivision 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 following:

- 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 found in SB-10 of the current version of the Ontario Building Code. Reasonable assumptions around mechanical and electrical systems are allowed and should be documented in the Energy Modelling Report or Mechanical and Electrical design briefs if provided as supplementary information.

When Required: an Energy Modelling Report or other documentation to demonstrate compliance., will be included with the ISDS Checklist submission as part of the complete submission package for applications for Site Plan Control and/or Draft Plans of Subdivision. Like the ISDS Checklist, an Energy Modelling Report is applicable to the following:

- **Low-Rise Residential** developments less than four (4) storeys and with a minimum of five (5) dwelling units.
 - Tier 1 (Mandatory) is required to design and construct all buildings:
 - to achieve or exceed the Energy Star® for New Homes, latest version, or demonstrated modelled equivalent (e.g., Better Than Code ® using Home Energy Rating System (**HERS**)); or
 - to meet or exceed the Energy Performance Emissions' Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI) and GHG Emission Intensity (GHGI) targets.
 - Tier 2 (Optional) - Design and construct all buildings:
 - to achieve a minimum energy performance level of 25% or better than the Ontario Building Code requirements in force at the time of application; or
 - to meet or exceed the Energy Performance Emissions' Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI) and GHG Emission Intensity (GHGI) targets.
- **Mid to High-Rise Residential** developments four (4) storeys and higher; and
- **Non-Residential** developments of all industrial, commercial, and institutional buildings.
 - Tier 1 (Mandatory) – applicant is required to design and construct all buildings to meet or exceed the Energy Performance Emissions' Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI) and GHG Emission Intensity (GHGI) targets.

- Tier 2 (Optional) Design and construct all buildings to meet or exceed the Energy Performance Emissions' Total Energy Use Intensity (TEUI), Thermal Energy Demand Intensity (TEDI) and GHG Emission Intensity (GHGI) targets.

Preparing an Energy Modelling Report

As part of the development application submission, the Applicant is required to submit, among other items, an Energy Modelling Report or other documentation that demonstrates compliance with the target standard. The following components should be included in the energy report or documentation:

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 Building Energy Performance and Emissions (ER2) requirements of the ISDS.
2. **Proposed Building Energy Simulation Overview** - this section will provide details of the modelling 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, and peak demands.

Evaluation Criteria

Submission will be evaluated for compatibility with the ISDS based on the Tier 1 requirements identified in the ISDS Checklist and User Guide. Tier 2 requirements or higher is highly encouraged.

Submission

The Energy Modelling Report will be submitted along with the ISDS Checklist and associated documentation. As part of the planning application approval process, the approved Energy Modelling Report will be incorporated in either the Draft Plan of Subdivision Agreement or the Site Plan Agreement.

Resources:

- [ISDS User Guide](#)
- [ISDS Checklist for Low-Rise Residential Developments](#)
- [ISDS Checklist for Mid to High-Rise Residential & Non-Residential Developments](#)
- [Toronto Green Standard \(v3\) Energy Efficiency Report Submission & Modelling Guidelines](#)
- [Home Energy Rating System \(HERS\)](#)
- [ENERGY STAR for New Homes](#)
- [ENERGY STAR for Industry](#)
- [R-2000 Standard](#)
- [CBHA Net Zero Home](#)
- [Passive House Canada](#)