

OpenBuilding OBJECTIVE: A Free Early-Stage Energy Modelling Tool That Actually Works

WE'LL MOVE THE NEEDLE

Canada wastes \$44.6 billion annually** on building energy inefficiency—more per capita than any country on Earth. Despite decades of voluntary standards, expensive certifications, and complex modelling software, the performance gap between modelled and actual building energy use can vary by an incredibly wide margin.

Most energy modelling happens too late in the process to meaningfully impact design, costs tens of thousands of dollars, and rarely validates predictions against real-world performance. The result? Buildings that underperform, owners who overpay, and a climate crisis that needlessly accelerates. ***It's time for something different.***

ENTER OBJECTIVE: EARLY, EASY, FAST, FREE, AND ACCURATE

OBJECTIVE is Canada's first **free, open-source, web-based building energy and carbon modelling tool** designed specifically for **early-stage decision-making**—before contracts are even signed, before detailed designs are half-baked, even at the RFP stage you can develop an OBJECTIVE model. Model early, when it matters most.

Built by architects and engineers aiming for wider adoption of **Building-as-a-System** thinking, OBJECTIVE delivers professional-

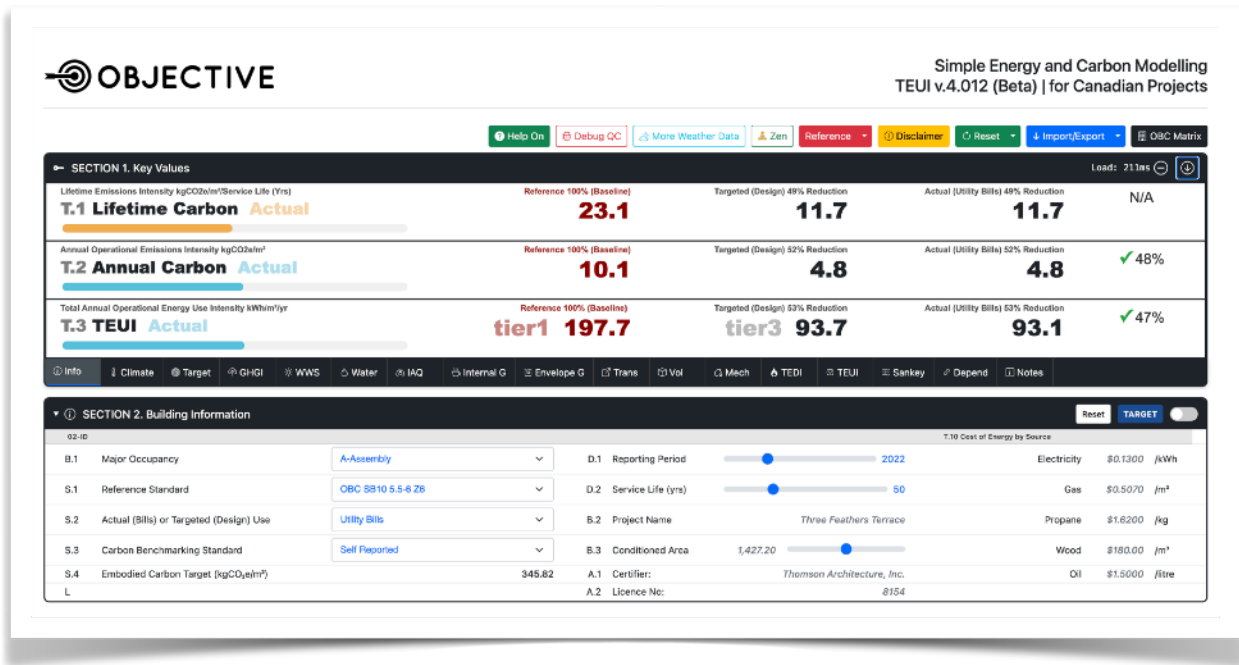
grade energy analysis in *minutes* with accuracy that closes the performance gap to **under 5%*** of actual utility bills—a feat unmatched by complex, dynamic proprietary software costing thousands of dollars. **based on our case studies*

WHAT MAKES OBJECTIVE REVOLUTIONARY

Reverse-Engineered from Reality: Unlike conventional tools that follow established physics standards aiming for a 'similarity of methods', OBJECTIVE was built for Accuracy over Precision, by analyzing real building performance data and working backwards. We looked first at measured utility bills across a wide range of building typologies and reverse-engineered the algorithms to match both Canadian building code requirements paired with actual results.

Post-Occupancy Validation Built In: OBJECTIVE is the only 3-part framework in Canada with integral post-occupancy validation. We include a Reference Model, A Target or Design Model, and an Actual Model, so 12mo after occupancy, utility bills are compared against predicted performance. This isn't a bug—it's the feature that makes the tool smarter with every project. We don't shy away from data or hard truths; we embrace it.

Made for Architects, by Architects: Most energy modelling software was designed for



Above: Interface of *OBJECTIVE TEUI v.4.012*, now with parallel NECB/NBC Reference Modelling, designed originally to resemble a ‘Nutrition Facts’ label, *OBJECTIVE* consists of ~50 key input parameters on a single page format that incorporates a best in class methodology for evaluating whole building carbon and energy performance metrics. This tool can be completed in minutes by a qualified professional, compared with dozens of hours for more complex tools that arrive at similar totals. *OBJECTIVE* developed OpenBuilding, Inc. is Open-Source and retains copyright of the tool under a **CC-BY-NC-ND 2024** license.

engineers doing compliance or complex equipment-based calculations that occur in the mid-to-late phases of the design process. **OBJECTIVE** was created for the people who shape buildings earliest—when massing, glazing, and budget decisions have the greatest influence on performance and carbon reductions. Our interface uses familiar architectural terminology (ie. similar inputs and methods required for Building Permit submissions), with sliders and switches that provide immediate visual feedback, and a range of options. McGill Architecture students learned to use it in a single 4-hour session. You can too!

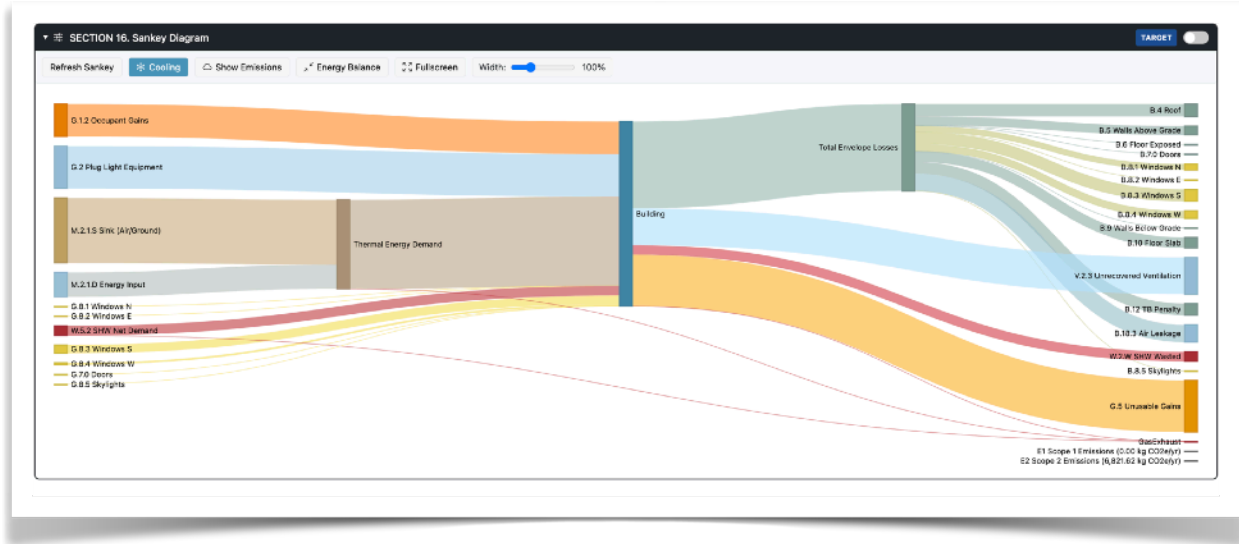
BY THE NUMBERS

1. **116,000** lines of code managing **599+** interconnected variables

- 2. **564 documented formula relationships** across multiple standards (NBC/NECB/OBC/PH/SB12/SB10, etc.)
- 3. **679 Canadian current and future weather locations by ECCC/NRC** integrated for immediate climate analysis
- 4. **296+ interactive parameters** enabling over **10²⁰** unique building configurations
- 5. **Accuracy: 1-2%** of actual TEUI across 90% of case study buildings measured
- 6. **Speed & Ease:** The realtime calculations of parallel **Reference** and **Target** models with every input change, together with an intuitive heads-up dashboard means you can test options and obtain immediate feedback, no blind calculation runs.

Compare this to typical building energy models that can significantly diverge from actual





OBJECTIVE's web-app (now in BETA) includes a rich suite of data-visualization tools such as our Energy-Balanced Sankey Diagram, which allows designers optimize systems and parameters such as waste-heat recovery options for water and air, increased COP or AFUE efficiencies to reduce emissions and waste-flows, all with dynamic energy and Scoped (1&2) GHG emissions feedback. Cooling and Emissions Sankey Diagrams have also been added in v4.012.

performance due to weather variations, occupant behaviour and modelling assumptions that don't correlate to current, observed load patterns across a range of building typologies.

THE OPPORTUNITY: UP TO 90% ENERGY REDUCTION

Example: just six proven, **low-capital cost interventions** can slash building energy use that can be easily tested in **OBJECTIVE**:

1. **Air sealing**: Save 30% of thermal energy (TEDI)
2. **Mechanical ventilation with heat recovery (MVHR)**: 90% thermal energy recovery with 100% fresh air
3. **Drain water heat recovery (DWHR)**: Recapture 40-70% of hot water loads
4. **High-efficiency heat pumps**: 30% reduction in total energy use intensity

5. **Improved insulation**: Up to 50% reduction in heat loss
6. **Demand-based scheduling**: Cut total energy and carbon emissions by 50%

OBJECTIVE makes these opportunities visible for the Architect/Engineer team **before** committing to a design direction, when changes cost nothing and impact is maximized.

COMPLETE CARBON ACCOUNTING

OBJECTIVE tracks **Scope 1, 2, and 3 emissions with an interactive Sankey Diagram**:

1. **Scope 1**: Direct operational emissions (can be reduced 90% through efficiency + electrification)
2. **Scope 2**: Grid-level emissions with carbon levy projections for all provinces

3. **Scope 3:** Embodied carbon across the 50-year building lifecycle

Low-carbon materials are often more local and less processed—meaning they can actually cost less while dramatically reducing carbon footprint.

A FRAMEWORK BUILT ON INTEGRITY

OpenBuilding registered as a national non-profit in Q4 2024 with a singular mission: *make building performance transparent, accessible, and accountable.*

Our leadership includes architects, engineers, building scientists, and technical advisors with deep expertise in building codes, regulatory bodies, insurance, specifications, and whole-building lifecycle assessment. When architect **Joanne McCallum** joined as Director in Summer 2025, she one word to describe why: **“Integrity.”** That's what sets us apart. No proprietary black boxes. No expensive certifications that collect dust. No Administrative bloat. No Data Harvesting. No Olympic Medals for only 'simulated' performance. Just open-source code, transparent methodology, and real buildings measured with real utility bills.

OUR 5-YEAR PLAN

1. **2026:** 100 certified buildings
2. **2030:** 3,000+ certified buildings across every Canadian province
3. **Goal:** Become the *de facto* framework for Part 9 and Part 3 building code compliance submissions

We didn't ask permission. We're building the future of Canadian building performance, one validated project at a time.

TAKE ACTION NOW

The TEUI3 tool and Workshops are not-for-profit projects of OpenBuilding.ca with the generous support of the Ontario Association of Architects



Ontario Association
of Architects
Ordre des architectes
de l'Ontario

1. **Try the Tool** (5 minutes)

No signup. No passwords. 100% privacy. A sample building is loaded for you and is ready to modify.

[HTTPS://OBJECTIVE.OPENBUILDING.CA/](https://objective.openbuilding.ca/)

2. **Get Trained** (4 hours, CEU eligible)

- Workshops: \$2,000+HST* per 40-person session *Travel Disbursements Extra
- Continuing education units/credits available for OAA architects (engineers pending)
- Contact: andy@openbuilding.ca

3. **Join the 2026 Case Studies Project**

Submit your project to our growing published documentation, earn bursaries and rewards (*based on funding*)

Deadline: February 12, 2026

Help us prove what's possible when design teams embrace real-world accountability.

4. **Learn More**

- Full documentation, case studies, and technical resources:
- <https://openbuilding.ca>

THE BOTTOM LINE

Canada's buildings waste 297 TWh annually—enough to power the entire residential sector twice over. Every architect, engineer, and building owner has the tools they need to cut that waste by 50-90% using proven, cost-effective strategies.

*The only question is: will you be part of the solution? **OBJECTIVE:** Early stage. Accurate. Free. Open source. Built on integrity*

Project Resources Page:
<https://openbuilding.ca/oa>
Contact: andy@openbuilding.ca

****Notes: Overview of Energy Waste in Canada** (courtesy of Efficiency Canada)

- Total Residential Floor Area: 2,176 million m²
- Total Commercial Floor Area: 709 million m²
- Typical Energy Use for Homes: 203 kWh/m²
- Achievable Energy Efficiency Target: 100 kWh/m² or lower
- Total Secondary Energy Use (Residential + Commercial): 2,740 PJ (~760 TWh)

Energy Waste Calculation

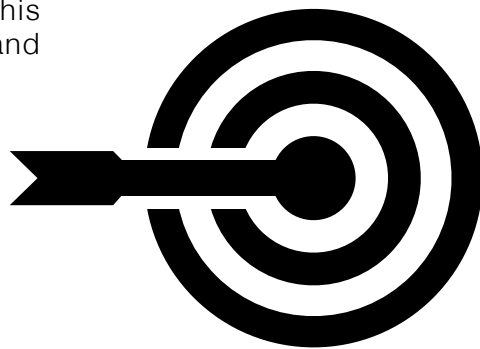
- Residential Energy Waste: 224.1 TWh/year
- Commercial Energy Waste: 73.1 TWh/year
- Total Energy Waste: 297.2 TWh/year
- Per Capita Energy Waste: 7,620 kWh/year/person
- Share of Total Secondary Energy Use: 39.1%

Cost of Energy Waste

- Average Energy Cost: ~\$0.15/kWh
- Cost per Canadian: ~\$1,143/year
- Total National Cost: ~\$44.6 billion/year

Key Insight

Improving building efficiency to achieve ≤ 100 kWh/m² is feasible and could significantly reduce energy waste and costs. This represents both an environmental and economic opportunity for Canada.



OBJECTIVE

THE TARGETED ENERGY USE INTENSITY TOOL