



Lara McKendrick,
Architect
OAA President

AN OBJECTIVE WAY TO UNDERSTAND A BUILDING'S ENERGY PERFORMANCE

As the regulator of the practice of architecture in the province, the Ontario Association of Architects (OAA) is always focused on the public interest. How can the built environment, and the profession responsible for its design, best serve Ontarians and society? This is why climate action — in terms of both mitigation and adaptation — is an important component of the OAA's [Strategic Plan](#), serving as a lens through which we view all our programming and policies.

Given the significant emissions generated by our built environment, we need to substantially reduce or eliminate fossil fuel loads through thoughtful design. Improving the energy performance of our new and existing buildings is instrumental in advancing climate action. Importantly, dozens of building models, verified through case studies, show we can do this with no additional capital cost burden on owners.

Recent changes to Ontario's enhanced building standards include the elimination of municipal green standards, brought about by Bill 98, *Building Homes and Improving Transportation Infrastructure Act, 2026*. The OAA is steadfast in its position that the Ontario Building Code should include regulations governing the carbon emissions associated with the construction and operation of buildings. The OAA strongly believes the public would be well served by Ontario adopting the National Energy Code of Canada for Buildings (NECB), which contains a four-tier energy step code for large buildings, and the National Building Code of Canada (NBC), which contains a five-tier energy step code for smaller buildings, into the Ontario Building Code.

With the release of the 2025 National Model Codes, which include new compliance pathways, updated climatic data, and explicit, measurable requirements to limit operational greenhouse gas

(GHG) emissions, there appears to be an acknowledgement that energy efficiency is a core building code issue. The 2025 codes (NECB and NBC) maintain the previous 2020 national tiered framework for building performance (sometimes referred to as the "national step code"), which provinces can adopt to facilitate consistent climate action nationwide. They also include both performance and prescriptive requirements to limit operational GHG emissions.

As the Authorities Having Jurisdiction (AHJ), municipalities have an important role to play in ensuring that owners and designers (including but not limited to architects) are aware of why buildings should be climate-friendly and how design and material choices directly impact this building performance.

Amid the global climate emergency, policymakers must look toward reducing and ultimately eliminating carbon emissions from both existing and new buildings as a key strategy for advancing climate action. It is in the public interest to ensure we do not exacerbate the climate crisis; rather, measures should be taken to mitigate further crisis by adapting to and embracing climate considerations in new and existing buildings. By incorporating sustainable, low-carbon practices into standard building methods, the energy efficiency of buildings will be improved. This benefits both the environment by reducing GHG emissions and building users by reducing operating costs and improving occupant comfort.

RAISING AWARENESS ABOUT CLIMATE PERFORMANCE

The embodied energy of our buildings is important, but the energy used to operate them throughout their lifetime is often far greater. This is why the OAA continually promotes the value of objective, tiered performance metrics that help people understand energy use in buildings and that can assist the province in achieving emissions reduction targets. Such metrics provide clear targets aligned with science-based emissions reduction pathways, and facilitate apples-to-apples comparisons between buildings, that enable all of us to understand how "green" a building truly is.

The challenge is to find a way to empower both the public and non-specialists to clearly understand a building's energy performance and identify opportunities to make it "greener." By being able to evaluate different design choices early on, we can better understand how those decisions affect a building's overall performance. For these reasons (among many others), the OAA has long supported objective targets based on the metric of Total Energy Use Intensity (TEUI).

Taking up that challenge, the OAA offers free access to different types of TEUI calculators on its [website](#) — these tools are designed for use by the architecture profession but are intuitive and easy for anyone in the design/construction world or the broader public to use too. The calculators easily

identify opportunities to make existing buildings more efficient and facilitate energy modelling of buildings still in the design process.

Showing the size of a building's carbon- and energy-use footprint increases public awareness and appreciation of the built environment's role in mitigating climate impacts through responsible design and operations. In an accessible and easy-to-understand format, these TEUI calculators show how much energy a building or home is using, and guide choices to reduce that consumption.

The OAA's original calculator, [TEUI v1](#), determines an existing home or building's energy performance when straightforward data (i.e., utility bills and building size) is entered into its easy-to-use interface. Users then receive instant metrics on the building's energy performance and the option for a printout to share. This first tool is intended for Part 9 buildings, and there is a [short video](#) on the OAA YouTube channel explaining how to use it.

In 2022, work began on [a more advanced option](#) for both Part 9 and Part 3 buildings, which was developed by [OpenBuilding](#).

SECTION 1. Key Values				
Lifetime Emissions Intensity kgCO ₂ e/m ² /Service Life (Yrs)	Reference 100% (Baseline)	Targeted (Design) 49% Reduction	Actual (Utility Bills) 49% Reduction	
T.1 Lifetime Carbon Actual	23.0	11.7	11.7	✓99%
Annual Operational Emissions Intensity kgCO ₂ e/m ²	Reference 100% (Baseline)	Targeted (Design) 52% Reduction	Actual (Utility Bills) 52% Reduction	
T.2 Annual Carbon Actual	10.0	4.8	4.8	✓48%
Total Annual Operational Energy Use Intensity kWh/m ² /yr	Reference 100% (Baseline)	Targeted (Design) 52% Reduction	Actual (Utility Bills) 52% Reduction	
T.3 TEUI Actual	tier1 195.2	tier3 93.3	93.1	✓48%

The new Objective tool, which serves as a TEUI calculator, has a dashboard that is responsive to any change made to input parameters — this eliminates the need to dig through 50 pages to find summary values.

By offering these state-of-the-art, yet easy-to-use TEUI resources, the OAA aims to provide fair, accessible, and valuable tools that empower both the profession and the public we serve. Small, local practices and their clients gain direct access to sophisticated energy and carbon modelling capabilities — a level of computing and comparative analysis that might otherwise be financially inaccessible because of expensive enterprise software subscriptions or the cost of specialized consultants.

Increasing awareness and understanding of the various contributing factors to total energy use — as well as providing metrics that illustrate how specific design, building systems, and material choices impact energy consumption — also advances the capacity of the entire design and construction industry. This can move us forward collectively, working together to solve immediate problems of construction economics, durability, and housing affordability while keeping in view the total energy impact of our decisions.

A QUICK PRIMER ON TEUI CALCULATORS

In simple terms, TEUI is the “kilometres per litre” rating or total energy needed to operate a building, divided by building area, over the course of a year, measured on a floor area basis. Its principal metric is kWh/m² per year. The OAA encourages its members to become more familiar with this increasingly common performance benchmark. For example, any practice wishing to submit a project for consideration in the Association's Design Excellence Awards program must supply its specific TEUI data.

[ca](#) with the support and endorsement of the OAA. This version allows a project to be measured against the proposed 2025 and 2030 NBC and NECB. This Excel-based tool is open-source donation-ware, distributed under a Creative Commons license. It is also fully compliant with privacy legislation, as project data is only stored on the user's own machine and never in the cloud.

The most recent release of TEUI calculators the OAA is helping to fund is the new **Objective Energy and Carbon Modelling Software (Objective)**, also by OpenBuilding.ca and a team that includes architects Andy Thomson and Joanne McCallum. To support uptake, OpenBuilding offers not-for-profit, [in-person workshops](#), travelling to various stakeholders to demonstrate how the software operates and provide insight into its easy-to-use benefits. Additionally, case studies of various building types are [available free of charge](#).

Currently, Objective exists as a free, beta version at [objective.openbuilding.ca](#) for anyone to try. (A second “pro” version of the tool is poised to launch next year and will include more financial modelling components and advanced features.) The beta version incorporates harmonization and tiered codes for NBC, NECB, and the Ontario Building Code, as well as partial standardization to SB10, SB12, CMHC Building (MLI Select) Submissions, and review forms and reporting formats, with ASHRAE 140 and CSA-F280 compliance on the roadmap.

Importantly, Objective has evolved from the spreadsheet-based versions of the earlier TEUI calculators into a web-based software. This has resolved issues with accessibility limitations,

SECTION 11: Transmission Losses													
11-ID	Transmission Losses Units	Area m ²	Rimp T/F-hr/Btu	RSI K-m ² /W	U-Value W/m ² -K	% of Ae & Ag	Heatloss kWh/Heating	Heatloss %	Heatgain kWh/Cooling	Heatgain %	Reference	Status	Surface °C
B.4	Roof	1,304.07	53.09	9.35	0.107	55.22%	15,397.79	20.12%	656.08	19.67%	176%	✓	17.72
B.5	Walls Above Grade (Exclude Openings)	705.27	37.99	6.69	0.149	29.87%	11,638.54	15.21%	495.90	14.87%	163%	✓	17.49
B.6	Floor Exposed	0.00	54.05	9.52	0.105	0.00%	0.00	0.00%	0.00	0.00%	144%	✓	
B.7.0	Doors	7.50	3.79	0.67	1.500	0.32%	1,242.00	1.62%	52.92	1.59%	133%	✓	12.93
B.8.1	Window Area North	81.14	6.31	1.11	0.900	3.44%	8,062.07	10.54%	343.51	10.30%	158%	✓	14.96
B.8.2	Window Area East	3.83	6.31	1.11	0.900	0.16%	380.55	0.50%	16.21	0.49%	158%	✓	14.96
B.8.3	Window Area South	159.00	6.31	1.11	0.900	6.73%	15,798.24	20.65%	673.14	20.19%	158%	✓	14.96
B.8.4	Window Area West	100.66	6.31	1.11	0.900	4.26%	10,001.58	13.07%	426.15	12.78%	158%	✓	14.96
B.8.5	Skylights	0.00	6.31	1.11	0.900	0.00%	0.00	0.00%	0.00	0.00%	158%	✓	
B.9	Walls Below Grade (Conditioned Space)	0.00	22.71	4.00	0.250	0.00%	0.00	0.00%	-0.00	0.00%	222%	✓	
B.10	Floor Slab (Conditioned Space)	1,100.93	21.01	3.70	0.270	100.00%	13,996.69	18.29%	-5,998.58	-179.89%	106%	✓	17.63
B.11	B.11 Interior Floors (incl. garages)	29.70	-	-	-	-	-	-	-	-	-	-	-
B.12	Thermal Bridge Penalty (%)	20%	0.200	0.00	-	-	15,303.49	20.00%	-666.93	-20.00%	250%	✓	
ET	Envelope Totals	3,462.40	0.00	-	-	-	76,517.45	100.00%	-3,334.65	-100.00%	-	-	-

Section 11 of Objective shows the target building's pass/fail rating with respect to the Code tier selected; NBC, NECB, SB12, and SB10 methods are supported. Better than 100% = U and RSI values are compliant. Heat loss and gain per construction element (e.g., roof, wall) is clearly visible.

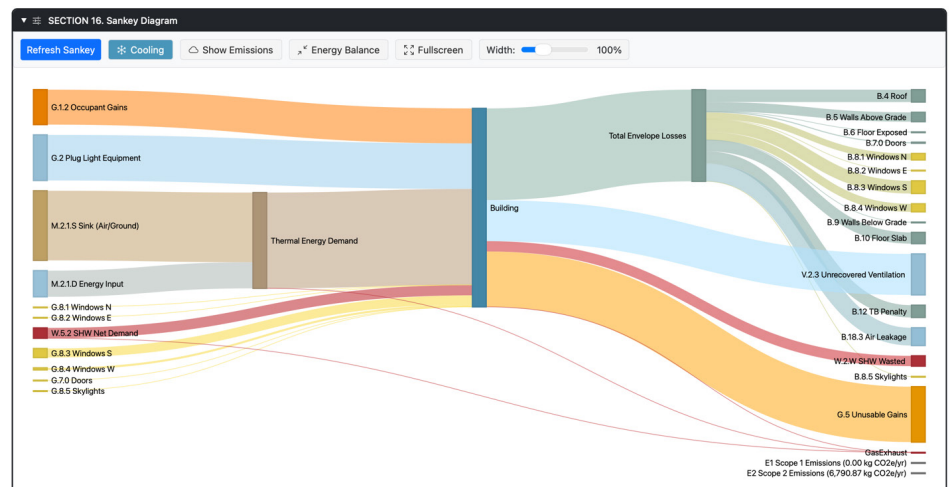
while allowing OpenBuilding to keep the tool continuously updated and bug-free. It has also improved collaboration, privacy, compatibility, and integration with design workflows for users.

The Objective tool helps not only members of the architecture profession and their clients, but also all levels of government and AHJs. It enables everyone involved to clearly see the factors contributing to a building's overall energy and carbon intensity by acting as a data-driven advisory tool and reporting framework. It has been, and will continue to be, developed with direct references to numerous Canadian codes and standards so that it can be used to demonstrate project compliance for all levels of government programs. On an aspirational level, the tool has already proven to broaden and improve coordination among various organizations, and we hope this will grow to include the OBOA, utility providers, builders, building operators, and municipalities.

Conclusion

These TEUI calculators are only part of the OAA's wider strategy to increase awareness about climate action, building economics, and energy metrics, as well as increase the industry's ability to offer simplified new approaches to early building modelling. You can access other tools and resources, ranging from case studies and third-party articles to information on the ongoing work the Association is doing with its own headquarters building and surrounding landscape, at the [OAA website](#).

As always, the architecture profession looks for ways to continue to partner with and support the municipalities, province, and building officials in reducing the climate impact and improving the climate responsiveness of our built environment. Please do not hesitate to reach out to our Policy and Government Relations team at policy@oaa.on.ca if you would like further information.



The star of the show: OBJECTIVE's Sankey diagram shows all building energy inputs and outputs, emphasizing the scale of loads to losses in a balanced method. It provides a visual summary of where a building can be optimized — the example in the screenshot above is a high-performance building where only "unrecovered ventilation" and "unusable gains" could be further optimized. The split in Thermal Energy Demand (TED) into sink and input streams shows the energy advantage of a heat pump system.

Lara McKendrick is the OAA Council President, where she helps lead the governing board of directors for the regulating body of the practice of architecture in the province. An Ottawa-based Architect with 25 years of experience, she is the founder of Lara McKendrick Architecture Inc. (LMA), specializing in adaptive reuse of existing buildings and sites, custom residential projects, and deep energy retrofits. Her work is guided by a first-principles approach to sustainability, creating healthy, flexible, durable, and beautiful spaces. A graduate of Carleton University's School of Architecture, McKendrick worked at several prominent Ottawa firms before establishing her own practice in 2011.