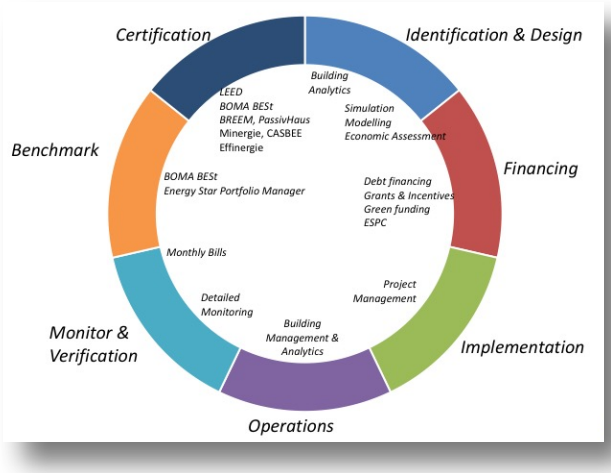
Energy Efficiency Economic Simulator – Energy Sizer

Canada's political reality is oriented toward energy and carbon reduction to address environmental challenges. The introduction of carbon taxes, green incentives and social license has stimulated a range of energy efficiency initiatives. At the same time, the economy continues to struggle in a post-recession atmosphere. The challenge is to sift through the array of energy efficiency solutions to find those that align to provide the best return on investment.

In general, Canadians consume 40% of their energy in buildings, 30% in transportation and 30% in industry. Almost 50% of the GHG's are created in the industry, commercial and institutional (ICI) buildings. As buildings are stationary assets that often have a 75-year life span, there is a clear need energy efficiency solutions for the places where we live work and play.

As the energy and sustainability industry matures, ICI building owners are presented with a plethora of alternatives with no cohesive strategy. An Energy and Sustainability (E&S) strategy needs to incorporate information from their existing facilities, financing options, implementation programs, make changes to operational processes and include verification that the solutions are delivering on expectations.



The first step for any significant energy efficiency initiative is an Energy Study to identify the right solutions for a specific facility. These studies can range from a simple online survey to a more detailed feasibility assessment to a full energy audit, and will provide the building owner/operator with an understanding of their energy consumption and the analyses required to build a business case to support the projects. There are four levels of energy studies:

Level	*Description*
Level 1	Online systems that collect monthly energy consumption and provide a high-level assessment of energy consumption and benchmark against similar buildings Examples: EnergyStar Portfolio Manager, BOMA BESt, RETScreen
Level 2	Using hourly data from utilities, simulate the impact of energy efficiency initiatives on the facility and forecast the financial value of the project Examples: EnergySizer
Level 3	Connect directly to the Building Management System (BMS) to collect detailed energy consumption information down to the device level. Use simulation to understand the financial impact of energy efficiency initiatives. Examples: EnergySizer, SkySpark
Level 4	Engage a team of resources to inventory the energy consuming equipment and identify opportunities for energy savings. Examples: ASHREA

A Level 1 study has little to no cost and can provide a benchmark with other similar buildings. However, this level cannot provide an understanding of where the energy is consumed and what can be done to reduce energy and GHG's.

A Level 2 study is relatively inexpensive, delivers a deeper analysis into the financial impact for a variety of energy efficiency initiatives and provides a business case.

A Level 3 study is more expensive as it requires integration with the Building Management System (BMS) and may require the installation of additional energy meters at key points in the building. However, this audit can demonstrate where the energy is being consumed and identify energy efficiency initiatives that target the right systems – including behavioral changes and operating procedures.

A Level 4 study is the most expensive audit as it requires a team of resources to inventory equipment, map the energy flows and to model the impact of energy efficiency initiatives.

EnergySizer

The EnergySizer project bridges the gap between the Level 1 tools (which are geared towards benchmarking but don't provide a business case for projects) and the expensive Level 4 service offerings (which can discourage starting the E&S journey). This project has developed an energy efficiency solution simulator that forecasts the financial value of projects and quantifies the risks.

The EnergySizer simulator starts by gathering the ICI facility's energy consumption data either from the utilities or by connecting directly to the BMS. Given the details of the facility (size, age, purpose, etc.), EnergySizer will integrate with EnergyStar Portfolio Manager to acquire the EnergyStar score as an initial benchmark.

EnergySizer will then introduce energy reduction solutions (lighting, HVAC, etc.) or energy production solutions (solar PV, CHP, wind, etc.) to determine the economic and environmental impact on the facility's energy requirements. Given the forecasts for electricity and natural gas rates, EnergySizer can then determine the economic value of each solution and provide an E&S strategy that is tailored to the specific facility.

EnergySizer will provide a low-cost E&S strategy that will accelerate the adoption of energy efficiency initiatives in Canada.

Partnerships

This project is seeking partnerships with progressive municipalities that are committed to energy and GHG reduction. Municipalities have a large number of buildings and would benefit from a comprehensive Energy Study that identifies those buildings with the best return on investment. The success of these projects will then encourage the private sector to adopt similar programs.

There are many municipalities that have expressed interest in energy studies, including Edmonton, Vancouver, Surrey, Richmond and others. Universities are also engaging in energy studies, including University of Calgary, Capallano University, Simon Frasier University, and many others.

This project is seeking partnerships with associations such as BOMA that can help to position and promote the availability and value of energy studies.