Energy Modeling
What It Is & Why It Matters

BC Housing has committed to LEED® Canada-NC 1.0 Gold for its construction projects to reduce energy consumption and Greenhouse Gas Emissions (GHG's). The following information bulletin provides background on what energy modeling means for non-profit housing providers and how it can be effectively used to evaluate buildings. This information bulletin is meant as a tool to assist in providing guidance and background for LEED® and the Integrated Design Process (IDP).

This information bulletin has been developed as a resource for employees and partners by BC Housing's Smart Building + Energy Management department. Please visit www.bchousing.org

WHAT IS IT?

Energy modeling is an effective computer-based tool that is used to review various design strategies for a building. The model provides a prediction of possible energy savings of a proposed building against that of a baseline building.

It is a valuable tool within the Integrated Design Process (IDP) as it simulates the energy use of a building throughout an entire year of operation. It evaluates the energy performance of different materials, construction types and mechanical and electrical system options. Energy modeling is commonly referred to as 'annual energy use simulation' or 'energy simulation'.

HOW DOES IT WORK?

1. An energy model is created, ideally very early in the design phase of a project.
2. A baseline or typical building is then developed and will be used for comparison purposes. The baseline building is required to meet minimum requirements of the local building code and applicable energy code (typically either the Model National Energy Code or ASHRAE 90.1).
3. Various options or Energy Conservation Measures (ECM's) of building systems and components are then created and analyzed. Typically, this process will start with envelope options and then move to mechanical and electrical choices.
4. Finally, a variety of measures will be selected and analyzed to determine the energy performance of the proposed design option against the baseline or reference building in terms of energy savings, energy cost savings and net capital costs associated with each.

The above process allows the team to effectively evaluate building system and components within a project.

WHAT CONTRIBUTES TO SUCCESS?

Effective review of energy modeling takes Life Cycle Costing (LCC) into account as opposed to simple payback alone. Simple payback only takes initial capital cost and annual energy savings into account providing the number of years to pay back, while LCC identifies all factors that influence the total system including inflation, cost of money and ongoing repair and maintenance costs.

While energy modeling does not provide an accurate prediction of future utility costs, it is an effective comparison tool in evaluating various options to ensure a better performing building. For this comparison to be as accurate as possible and to be the best decision-making tool available, it is important to inform the energy modeler as much as possible about how a facility will be operated. A good energy model is a helpful tool that can contribute to ongoing operational success.

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