



The importance of energy modeling

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Energy modeling has become a buzz word in the design and construction world. An energy model is a computer-based tool that simulates the energy performance of an entire building or a specific system within a building over the course of a set period of time, most often one year. It is an important tool, even in the early design phase, to help designers and engineers make the best choices possible. Energy modeling allows for the building owner to understand their expected energy consumption, make informed decisions in the design process, and perform a cost benefit analysis. The variables the energy model will take into account include, but are not limited to, building orientation, massing, envelope, glazing, and mechanical systems.

Many have become familiar with energy modeling as it can validate local code compliance and it can be a useful tool in the LEED certification process. Often alternatively referred to as Whole Building Energy Simulation, it is frequently utilized to achieve the prerequisite and/or to gain additional points in the Energy & Atmosphere credit category. The building must show it has a 10% improvement above the ASHRAE 90.1-2007. Additional percentages in 2% increments above that will garner extra points. LEED certification is a great reason to develop an energy model, yet it should not constitute the only rationale for pursuing one.

The energy model can be an integral part of the design process from conceptual design through construction documentation. When creating the model, a series of inputs will assist in best determining the energy outputs. Input examples include:

Location - climate data

Envelope - Infiltration rates

Internal Gains - plug loads in watts/s/f

Schedule - lighting schedule

Systems - fan and pump inputs, renewable energy systems

Conversely, it is also important to note that the results of the model can only predict how the building will perform, and cannot say in absolute certainty what the final energy consumption will be. When the building is running in real time, variables will certainly be present like a spike or dip in seasonal temperatures or employee working hours that don't reflect what the model accounted for.

It is without question that the energy model is a great tool to use in the design or retrofit of a building. Despite the in-depth knowledge of the team members, it is incredibly valuable to analyze how all the components in the building design will come together and work with the local environmental factors. The whole building energy simulation assists the design team and owners in creating and operating the most efficient building possible within their project goals.

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