



Building Energy Modeling Tool for Residential Buildings

Toward Zero Energy Housing in Lebanese Coastel Region



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Background

In 2030 the energy consumption of building in Lebanon is expected to reach 250% the energy consumption in 2010. This fact is exacerbated by the inadequate existing building performance, such as excessive energy consumption, thermal comfort issues, and insufficient daylighting. These deficiencies are often the result of an inability of the design team to consider a wide variety of design options for all these criteria in an integrated and systematic way during the early design stage.

For this reason, researchers are developing an advancements in computer-based Building Information Modeling (BIM) and energy modeling software that allow architects and engineers to simulate building performance in a virtual environment (Fig.1). The potential of this technology will enhance the early stages of the design process, and have a great impact on the performance of existing and new buildings.

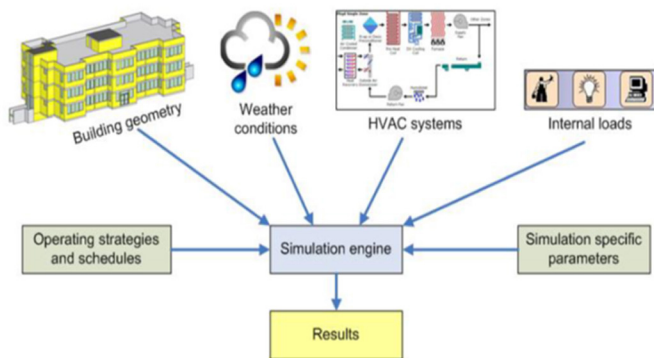


Figure 1: Basic of building performance simulation with different building systems integration

These design tools could be considered as a practical way to apply the latest energy efficient policy and thermal standards in Lebanon (Fig.2).

Despite the proliferation of energy modeling software, no specific applications and software exists that cater specifically for the Lebanese climates and their comfort conditions. In addition, there is a lack of knowledge and database to apply these software in the architectural practice.

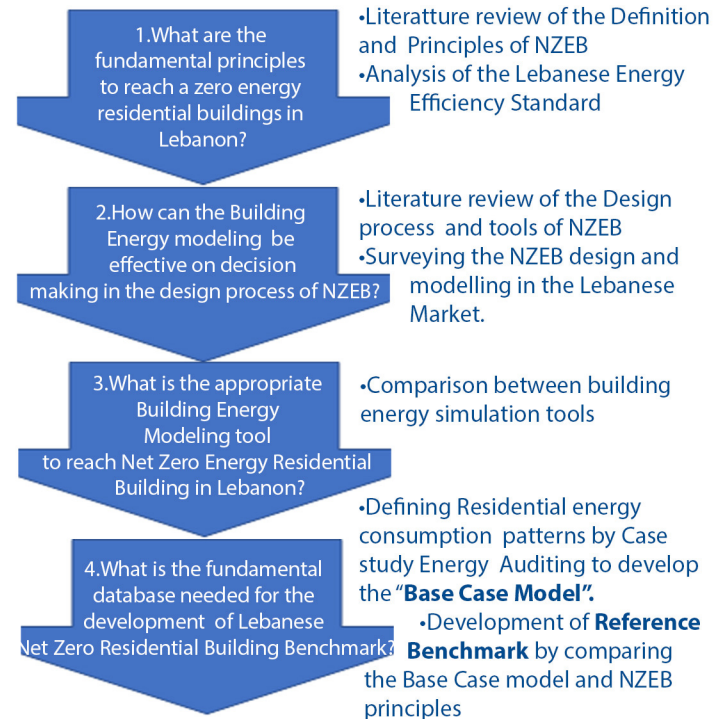


Figure 2: The Absence of the Tool to apply the Lebanese EE Standard in the new design.

Research Aim

The research presents a method and decision-support database for Building Energy Modeling that can be used as a proactive guide in the early design stages of residential Net Zero Energy Building design in the Lebanese coastal region.

Research Questions and Methodology



Formulation of guidelines for design process for NZEB in Coastal Region of Lebanon