

## Using Building Information Modeling in Green Building Design and Performance Optimization

**Authors :** Moataz M. Hamed, Khalid S. M. Al Hagla, Zeyad El Sayad

**Abstract :** Thinking in design energy-efficiency and high-performance green buildings require a different design mechanism and design approach than conventional buildings to achieve more sustainable result. By reasoning about specific issues at the correct time in the design process, the design team can minimize negative impacts, maximize building performance and keep both first and operation costs low. This paper attempts to investigate and exploit the sustainable dimension of building information modeling (BIM) in designing high-performance green buildings that require less energy for operation, emit less carbon dioxide and provide a conducive indoor environment for occupants through early phases of the design process. This objective was attained by a critical and extensive literature review that covers the following issues: the value of considering green strategies in the early design stage, green design workflow, and BIM-based performance analysis. Then the research proceeds with a case study that provides an in-depth comparative analysis of building performance evaluation between an office building in Alexandria, Egypt that was designed by the conventional design process with the same building if taking into account sustainability consideration and BIM-based sustainable analysis integration early through the design process. Results prove that using sustainable capabilities of building information modeling (BIM) in early stages of the design process side by side with green design workflow promote buildings performance and sustainability outcome.

**Keywords :** BIM, building performance analysis, BIM-based sustainable analysis, green building design

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