Energy efficiency of residential complexes using BIM-integrated analysis of building design, climatic conditions and facilities optimization

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ABSTRACT

This study investigated the cost benefits of BIM-integrated energy optimization for a residential complex. The aim of this research is to optimally design residential buildings for energy efficiency by observing climatic conditions and the proportion between energy-consuming facilities using a building information modeling system in a temperate and humid environment. Revit software was used for modeling and simulation and Green Building Studio for scenario comparisons. Both are web-based and resource-efficient. The project aimed to assess energy cost variations due to BIM optimization, considering the building's size and seaside location. Building Information Modeling (BIM) was also used to examine building form and orientation. The building is a four-block residential complex exceeding 18,000 sqm with a central corridor. Located near the Caspian Sea, it experiences hot summers and mild winters with high humidity and frequent fog. The research steps include: (1) Initial building modeling using parameters common in the Iranian construction industry; (2) Initial energy analysis ...

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