

## **Energy Retrofitting Application Research to Achieve Energy Efficiency in Hot-Arid Climates in Residential Buildings: A Case Study of Saudi Arabia**

**Authors :** A. Felimban, A. Prieto, U. Knaack, T. Klein

**Abstract :** This study aims to present an overview of recent research in building energy-retrofitting strategy applications and analyzing them within the context of hot arid climate regions which is in this case study represented by the Kingdom of Saudi Arabia. The main goal of this research is to do an analytical study of recent research approaches to show where the primary gap in knowledge exists and outline which possible strategies are available that can be applied in future research. Also, the paper focuses on energy retrofitting strategies at a building envelop level. The study is limited to specific measures within the hot arid climate region. Scientific articles were carefully chosen as they met the expression criteria, such as retrofitting, energy-retrofitting, hot-arid, energy efficiency, residential buildings, which helped narrow the research scope. Then the papers were explored through descriptive analysis and justified results within the Saudi context in order to draw an overview of future opportunities from the field of study for the last two decades. The conclusions of the analysis of the recent research confirmed that the field of study had a research shortage on investigating actual applications and testing of newly introduced energy efficiency applications, lack of energy cost feasibility studies and there was also a lack of public awareness. In terms of research methods, it was found that simulation software was a major instrument used in energy retrofitting application research. The main knowledge gaps that were identified included the need for certain research regarding actual application testing; energy retrofitting strategies application feasibility; the lack of research on the importance of how strategies apply first followed by the user acceptance of developed scenarios.

**Keywords :** energy efficiency, energy retrofitting, hot arid, Saudi Arabia

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