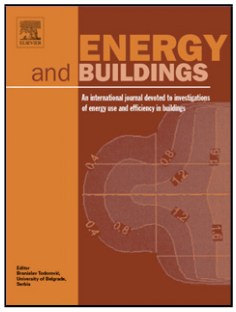

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Application of Phase Change Materials in Gypsum Boards to Meet Building Energy Conservation Goals

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Highlights

- The efficiency of PCM-impregnated gypsum boards to improve the thermal performance of buildings was studied by conducting various computational simulations.
- Utilizing these boards was shown to be a promising strategy to achieve the governmental plans and buildings codes to decrease the energy consumption in buildings.
- Using these boards in new buildings, as well as existing buildings, increases the occupant comfort, and decreases the cost and energy required by the HVAC system.
- Increasing the amount of the utilized PCM leads to diminishing returns on efficiency.

Abstract

Energy consumption in buildings has increased drastically during the last two decades. Reducing the energy demand in buildings by improving their thermal performance has therefore been the subject of many governmental plans and building codes. This study aims to evaluate the efficiency of PCM-impregnated gypsum boards on improving the thermal performance of buildings in order to achieve such energy reduction goals. Computational simulations using Typical Meteorological Year data were conducted to study the performance of PCM-incorporated walls subjected to the real temperature profiles of different cities. Four different criteria were considered and a simplified