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# Ranking of Optimal Materials for Building Walls from the Perspective of Cost and Waste of Electricity and Gas Energy Using AHP-TOPSIS 1 Technique: Study Example: Sari City

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**Abstract :** The walls of the building, as the main intermediary between the outside and the inside of the building, play an important role in controlling the environmental conditions and ensuring the comfort of the residents, thus reducing the heating and cooling loads. Therefore, the use of suitable materials is considered one of the simplest and most effective ways to reduce the heating and cooling loads of the building, which will also save energy. Therefore, in order to achieve the goal of the research "Ranking of optimal materials for building walls," optimal materials for building walls in a temperate and humid climate (case example: Sari city) from the perspective of embodied energy, waste of electricity and gas energy, cost and reuse been investigated to achieve sustainable architecture. In this regard, using information obtained from Sari Municipality, design components have been presented by experts using the Delphi method. Considering the criteria of experts' opinions (cost and reuse), the amount of embodied energy of the materials, as well as the amount of waste of electricity and gas of different materials of the walls, with the help of the AHP weighting technique and finally with the TOPSIS technique, the best type of materials in the order of 1- 3-D Panel 2-ICF-, 3-Cement block with pumice, 4-Wallcrete block, 5-Clay block, 6-Autoclaved Aerated Concrete (AAC), 7-Foam cement block, 8-Aquapanel and 9-Reinforced concrete wall for use in The walls of the buildings were proposed in Sari city.

**Keywords :** optimum materials, building walls, moderate and humid climate, sustainable architecture, AHP-TOPSIS technique
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