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Sustainability assessment of energy saving measures: a multi-criteria approach for residential buildings retrofitting – A case study of the Spanish housing stock.

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Abstract

The building sector is well known to be one of the key energy consumers worldwide. The renovation of existing buildings provides excellent opportunities for an effective reduction of energy consumption and greenhouse gas emissions but it is essential to identify the optimal strategies. In this paper a multi-criteria methodology is proposed for the comparative analysis of retrofitting solutions. Life Cycle Assessment (LCA) and Life Cycle Cost (LCC) are combined by expressing environmental impacts in monetary values. A Pareto optimization is used to select the preferred strategies. The methodology is exemplified by a case study: the renovation of a representative housing block from the 60s located in Madrid. Eight scenarios have been proposed, from the Business as Usual scenario (BAU), through Spanish Building Regulation requirements (for new buildings) up to the Passive House standard. Results show how current renovation strategies that are being applied in Madrid are

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