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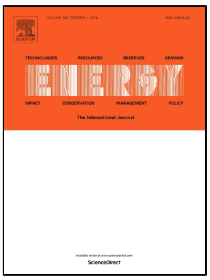

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Impact of climate change on heating and cooling energy demand in a residential building in a Mediterranean climate

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Abstract

A range of energy improvement measures applied to a typical Mediterranean residential building are modelled under various climate-change scenarios. Global Circulation Models (CNRM-CM5 and MPI-ESM-LR), under two emission scenarios (RCP4.5 and RCP8.5), downscaled by the Spanish Meteorological Agency, are used to generate four temperature projections. Energy simulations are obtained with TRNSYS tools in a Mediterranean climate based on temperature projections in two periods: 2048-2052 and 2096-2100, with the same time span. Various energy measures apply thermal improvements to a conventional residential building model that complies with current regulations for this analysis of best practice in passive construction solutions. Sequential implementation of eight different energy improvements measures are applied to the initial building model: six passives (infiltration, insulation thickness, glazing and frame type, window area, shading devices and natural cross ventilation) and two active (mechanical ventilation and a heat recovery system) measures. The climatic trends that