Current and future demand-side management potential related to the thermal mass of residential buildings in Europe. Background and methodological approach

Abstract:

The aim of this article is to present a summary of the state of the art and the methodological approach, included in the research proposal of an ongoing doctoral thesis investigating demand-side management in buildings. This resource can help balance electricity consumption and its variable production from renewable sources. The use of demand-side management could contribute favourably to the transition towards an energy model based on renewable energies, and the achievement of climate objectives set to reduce greenhouse gas emissions. The thesis focuses on the demand-side management potential associated with the use of the building mass, whose thermal properties enable the adaptation of the operation of heating and cooling systems, while maintaining thermal comfort. The impact of climate change and the improvement of the energy efficiency of the building stock on the potential of demand-side management are addressed. To this end, a comparative analysis of the
current and future potentials of residential buildings in Europe, located in continental and Mediterranean climatic zones, is planned by applying a combination of experimental and predictive methods. The considered hypothesis poses that, due to global warming, the demand-side management potential associated with the use of the building mass could increase in the continental climatic zone and decrease in the Mediterranean zone. A drastic reduction of these potentials owing to an overall implementation of highly energy-efficient standards in buildings is additionally assumed.

Stichworte:
Climate change; Energy system; Energy efficiency; Demand-side management; Thermal mass

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