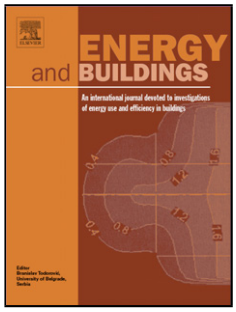

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The impact of climate change on building heat demand in different climate types

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Abstract

Heat demand may decrease in the future due to changing weather conditions and building renovation policies, possibly impacting the efficiency and profitability of renewable heat production and distribution systems which are commonly proposed in the literature as an adequate measure for building sector emissions mitigation. In this work, the potential evolution of building heat demand in characteristic locations (within heating dominant climates) is assessed for different scenarios by using a sample building as a case study. Three future weather scenarios were created based on a previously developed methodology, along with one building renovation scenario based on market penetration rates of different renovation measures. Heat demand was calculated through a heat demand model previously developed and validated by the authors. To represent the results, heat demand-outdoor temperature function parameters were used.

The results indicated that the impact of changed weather conditions was significantly lower than the impact of building renovation. Overall, the difference in the parameters rate of decrease/increase was lower than 2% between weather scenarios for the same year considered. After the initial building renovation in 2020, the slope coefficient of the outdoor temperature-heat demand function increased between 45% and 51%, while the intercept decreased within the range