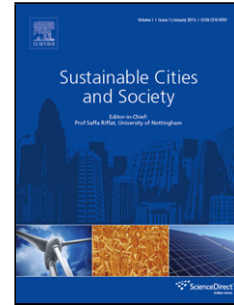


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## Evaluation of energy savings potential of variable reflective roofing systems for US buildings

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### ABSTRACT

This paper explores the potential energy savings of using dynamic cool roofs (DCRs) with seasonally variable reflective surface for various building prototypes when compared to static cool roofs. The analysis conducted demonstrates that the additional energy savings from DCRs depend largely on the climate, insulation level, and reflectance of the roof, as well as but to a lesser extent on the building thermal mass. This study shows that older buildings, with low insulation levels, in colder climates are the best target for retrofit using DCRs. Specifically, the results show that when a variable reflective coating is applied to low insulation buildings, source energy savings can be achieved and range from 4.33 to 19.44 MJ/m<sup>2</sup> (i.e., 1.6 to 4.9%) for residential units and from 1.17 to 18.00 MJ/m<sup>2</sup> (i.e., 0.3 to 3.9%) for offices. Based on an economic analysis, it is found that the break-even cost for a variable reflectance coating system with a 22-year life span ranges from 0.80 to 4.84 \$/m<sup>2</sup> for residential buildings, and from 0.86 to 4.92 \$/m<sup>2</sup> for commercial buildings.

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### Keywords:

Cool Roofs; Cost Analysis; Energy Use Savings, Variable Reflective Coatings

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