
Thermal efficiency neighbourhoods design applying Performance-Based Planning approach: the case of Mendoza-Argentina.

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Abstract

In the last decades, a set of urban planning guidelines have been developed in order to foster sustainable cities. Performance-Based Planning (PBP) is an efficient and effective decision making tool to attain this goal. The implementation of the PBP approach could be suitable to reduce the energetic and environmental impacts of the built areas. In relation to this, it is known that a climate-sensitive built form is a feasible strategy to reduce and mitigate the urban heat island (UHI). The aim of this paper is to analyse and identify the potentialities of PBP approach in order to improve thermal behaviour at neighbourhood scale in arid cities. For this reason a series of urban indicators were defined to determine a range of values to get optimal thermal conditions. Methodologically, this study was made by twenty-four CFD's simulations, previously adjusted with microclimatic data measured in Mendoza-Argentina. Results show that an adequate combination of layout, street dimensions, block proportions and their orientations, added to an appropriate urban trees configuration and the implementation of cool materials, can improve the neighbourhood microclimate by reducing the air temperature up to 1.6°C. This findings highlight that a neighbourhood design where the planning goals are aligned with the particularly features of the city, can reach sustainable built environments and improve dwellers life quality.

Keywords: Performance, based planning, Urban heat island, Climate, sensitive built form

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