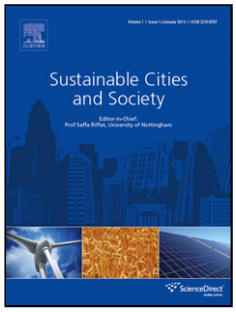

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Energy-saving potential of large housing stocks of listed buildings, case study: *l'Eixample* of Valencia

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Highlights

- Eco-efficiency of listed buildings under micro-scope.
- The energy-saving potential of architectural heritage.
- Energy demand of old existing dwellings.

ABSTRACT

A significant part of the European residential building stock is architectural heritage and is protected by law in different grades. Although these dwellings seldom fulfil the current eco-efficiency requirements, listed buildings are exempt from energy regulations requirements. This paper reviews the constructional characteristics common to 588 multi-storey listed buildings (circa 6000 dwellings) located in *l'Eixample* district in Valencia (Spain). The poor thermal performance of these buildings proven by this study reveal a significant potential for saving energy and reducing CO_2 emissions, particularly when considering the current requirements fixed by the current Spanish building code. Retrofitting measures intended to improve the thermal behaviour of these buildings, while being respectful to their listed nature, are proposed and assessed in terms of energy demand, air pollution and economy

Keywords: Listed buildings; Architectural heritage; Thermal performance; Retrofitting; Residential buildings; Building envelope

Some contents of this paper are based on a preliminary study presented as a short communication to the International Conference on Vernacular Heritage, Sustainability and Earthen Architecture. VerSus2014. Valencia, Spain, in September 11–13, 2014. That contribution has been later selected to be published in "Vernacular Architecture: Towards a Sustainable