

**Improving Sustainability and Resilience of Future Cities.  
Positioning of Wind Turbines within the Urban Environment**

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**ABSTRACT**

Wind Energy technology represents the most technically advanced and diffused renewable resource [1]. The willingness to foster its economical profitability has brought to new uses of the technology, especially in unconventional locations. In particular, the Urban environment is promising in reducing the costs associated e.g. to the large infrastructure wind farms require [2]. However, several technical issues remain unsolved, spacing from the understanding of the actual wind resource available to the related response of wind turbines. This contributes to foment the lack of confidence in wind energy and its societal acceptance. An issue that adds sharply to NIMBYism rhetoric mechanisms [3].

In this work, various possibilities and limits of Urban Wind Energy are introduced, with a focus on the urban wind resource. A suitable urban street-canyon/high-rise building configuration is simulated using CFD [4], to investigate possible strategies in optimising the positioning of wind turbines and their relationship with the built environment [5]. The challenges related to such a methodology are also introduced, with special reference to the necessity of considering the actual signature turbulence for the aerodynamic design of the new generation of small and medium size wind turbines.

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