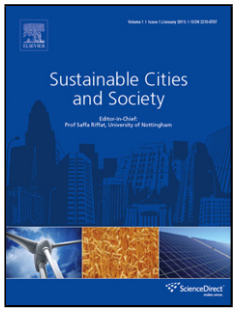

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Performance analysis of a wind tower in combination with an underground channel

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Key words: Wind tower, Underground channel, Ventilation, Passive cooling, Renewable energy, HVAC

Highlights

- Performance of a novel design of a wind towers in combination with an underground channel was investigated.
- The research was performed numerically and the computational model was generated and validated based on previous close experimental works.
- For two types of wet and dry channels, 7.6 and 15.4 degrees temperature drop was achieved for the entering air to the room, respectively.
- Using wet channel, the air relative humidity was increased by 52% with the rate of water consumption of 0.006 kg/s.
- Considering heat comfort conditions, wet channel is more effective in comparison with the dry one for cooling application of this new system.

Abstract

In the present work, a new method was introduced in order to improve the performance of wind towers. In hot seasons, underground temperature is lower than that of the surface and it can be