

Abstract

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Energy and Carbon Emission Savings due to Hybrid Ventilation of Office Buildings in Arid Climates

Hybrid Ventilation is an intelligent system of indoor environmental control in which passive cooling measures are supplemented by mechanical systems in order to maintain a satisfactory indoor environment with low energy demands. In order to evaluate hybrid ventilation performance for office buildings in arid climates, preliminary bioclimatic analysis and building dynamic thermal simulation methods have been applied for a single-zone office space with varying internal heat gains. The suitability of four locations for passive and hybrid ventilation strategies was tested through four bioclimatic analysis methods. The results of the bioclimatic analysis are compared with that of dynamic thermal simulations. Energy consumption of the prototypical office buildings using hybrid ventilation is compared to those using conventional cooling systems. The ability of hybrid ventilation strategies to maintain adequate comfort conditions in arid climates with reduced energy demand is demonstrated.