

عنوان مقاله:

Intelligent Energy Costs and Comfort Management in Office Buildings

محل انتشار:

چهارمین کنفرانس بین المللی برنامه ریزی و مدیریت محیط زیست (سال: 1396)

تعداد صفحات اصل مقاله: 12

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خلاصه مقاله:

There is a strong relationship between occupants' comfort conditions and their level of productivity. Indoor environment has an impact on the mental and physical performance of occupants that influence their level of productivity. Generally, occupants in a shared space, have varied preferences over the indoor environment conditions. Moreover, their perception of the indoor environment, such as their thermal and visual sensations depend on their positions inside enclosed spaces. For energy management system, inability to acknowledge occupants' preferences and personalized parameters would cause occupants' productivity losses. Salaries of office workers in commercial buildings are many times higher than costs of energy consumption, hence, improving office workers' productivity offers significant economic benefits. The main interest of this research is to propose a Multi-Objective Optimization (MOOP) method for intelligent energy and comfort management in office buildings. Occupants' different thermal and visual preference and behavior models, as well as their positions inside the rooms and tasks they performed, are the parameters considered during decision-making. Personalized parameters, alongside energy prices and indoor and outdoor weather conditions, are included in the MOOP method problem formulation for hourly automated control of the indoor environment. Intelligent energy and management system, enhanced with the MOOP method simultaneously optimize energy costs, thermal comfort, visual comfort, and IAQ of the occupants. The operation of the proposed method is studied by energy performance simulation of an office building, located in Montreal, Canada. Based on provided results, the importance of personalization of energy and comfort for occupants' productivity improvement is observed.

کلمات کلیدی:

Energy Efficiency, Green Buildings, Intelligent Buildings, Comfort Conditions, Productivity

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