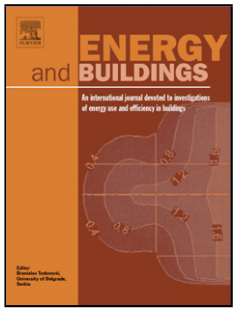

Title: Personalized Energy Costs and Productivity Optimization in Offices

Authors: Farhad Mofidi, Hashem Akbari

PII: S0378-7788(16)31636-X
DOI: http://dx.doi.org/doi:10.1016/j.enbuild.2017.03.018
Reference: ENB 7443

To appear in: *ENB*

Received date: 21-11-2016
Revised date: 7-3-2017
Accepted date: 8-3-2017

Please cite this article as: Farhad Mofidi, Hashem Akbari, Personalized Energy Costs and Productivity Optimization in Offices, Energy and Buildings http://dx.doi.org/10.1016/j.enbuild.2017.03.018

Personalized Energy Costs and Productivity Optimization in Offices

Farhad Mofidi[1], Hashem Akbari[2]

Department of Building, Civil and Environmental Engineering, Concordia University, 1455 De Maisonneuve Blvd. W., Montreal, Quebec, Canada
f_mofidi@encs.concordia.ca

Highlights

- Personalized energy and comfort management, according to occupants' thermal preferences and behavior, as well as indoor air quality
- Simultaneous optimization of occupants' productivity and energy consumption costs

Abstract

There is a strong relationship between occupants' comfort and their productivity. Indoor environmental conditions have impacts on the mental and physical well-being of occupants that subsequently, influence their productivity. Generally, occupants in a shared space have varied preferences for the thermal conditions of the indoor environment. For energy management systems of office buildings, inability to acknowledge occupants' thermal preferences may cause productivity losses. Salaries of office workers are many times higher than the costs of energy consumption, hence, improving the productivity of office workers can offer significant economic benefits. The main interest of this research is to propose a Multi-Objective Optimization (MOOP) method for personalized energy and comfort management in offices. The MOOP method simultaneously optimizes the energy costs and collective productivity of office workers, by proposing Pareto optimal solutions for the automated control of the indoor environment, based on occupants' thermal preferences and Indoor Air Quality (IAQ). Alongside thermal preferences and IAQ, several continuously changing inputs are also considered including indoor and outdoor environmental

[1] Farhad Mofidi, Ph.D. Candidate. Research fields: Energy efficiency, intelligent buildings, integrated building control and optimization, green energies, renewable energies. Tel: +1 514-589-2811

[2] Corresponding author: Hashem Akbari, Professor. Research fields: Integrated building control and optimization, energy efficiency, urban heat islands, global cooling. E-mail: hakbari@encs.concordia.ca Tel: +1 514-848-2424 X3201