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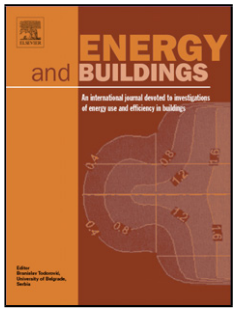

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Analysis of operational energy intensity for central air conditioning systems with water-cooled chiller by decomposition method[1]

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Abstract: Due to the complexity and diversity of energy conversions in HVAC systems, this paper is focus on the central air conditioning systems with water-cooled chiller and its operational energy consumption. Through analyzing the energy flows of the five consecutive loops which begin from extraction energy from the conditioned spaces and rejects it to the environment, the global energy intensity index is first to be put forwarded and then the decomposition method which analyze the influence of the specific consumption (e) and delivered fluid ratios (p) on global energy intensity is proposed. The important conclusion drawn from this method is that it is necessary to decrease both the specific consumption and delivered fluid ratios of the main energy users in order to decrease the global energy intensity of HVAC system. Finally, the global energy intensity of central air conditioning system of a twenty six-story office building in Guangzhou, China in design and real condition is compared and analyzed by e-p decomposition method as a case study.

Keywords: central air conditioning system, operational energy consumption, global energy intensity, decomposition method, the specific consumption, delivered fluid ratios

1. Introduction

Heating, ventilation and air conditioning (HVAC) systems are the most energy consuming building

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