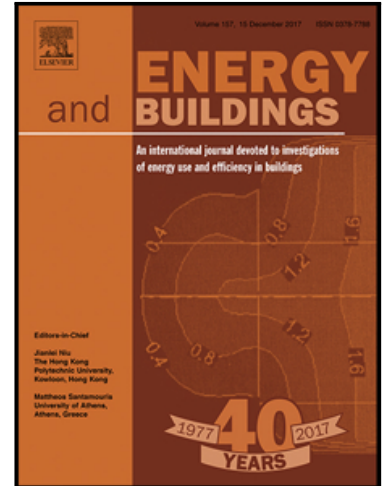


Accepted Manuscript

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PII: S0378-7788(17)34069-0
DOI: [10.1016/j.enbuild.2018.04.047](https://doi.org/10.1016/j.enbuild.2018.04.047)
Reference: ENB 8520



To appear in: *Energy & Buildings*

Received date: 17 December 2017
Revised date: 15 March 2018
Accepted date: 23 April 2018

Please cite this article as: Yang Geng , Wenjie Ji , Borong Lin , Jiajie Hong , Yingxin Zhu , Building energy performance diagnosis using energy bills and weather data, *Energy & Buildings* (2018), doi: [10.1016/j.enbuild.2018.04.047](https://doi.org/10.1016/j.enbuild.2018.04.047)

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Building energy performance diagnosis using energy bills and weather data

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ABSTRACT

In order to resolve the contradiction between the lack of building energy data and the need of more detailed information about energy performance, this paper presents a simplified building energy performance diagnosis method which can assess the energy performance from building level to system level with only limited information. Based on multiple-parameter regression between the whole building energy bills and outdoor weather data, the proposed diagnosis method uses the regression coefficients to identify the energy use of main systems (i.e., lighting-plug system and cooling/heating system), as well as other detailed information about physical properties of the building and cooling/heating system (i.e., cooling or heating load, the operation of cooling/heating system and the efficiency of cooling/heating system). One case study was conducted in an office building in China to test the application of this diagnosis method. In addition, the regression result of simulated energy consumption served as benchmark data to further diagnose the performance gap between the operation stage and the design stage and help locate the poor performance and key points of energy-saving. Finally, all diagnosis results have been verified by the performance data from advanced energy consumption monitoring system together with field surveys and measurements.

KEYWORDS

Building energy consumption; Energy performance diagnosis; Performance gap; Energy bill; Outdoor weather

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