

# Accepted Manuscript

Research Paper

Performance of Distributed Energy Systems in Buildings in Cooling Dominated Regions and the Impacts of Energy Policies

Jing Kang, Shengwei Wang, Wenjie Gang

PII: S1359-4311(17)34284-9

DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.08.062>

Reference: ATE 10944

To appear in: *Applied Thermal Engineering*

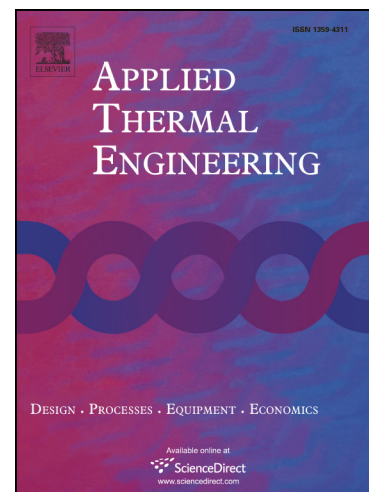
Received Date: 27 June 2017

Revised Date: 28 July 2017

Accepted Date: 9 August 2017

Please cite this article as: J. Kang, S. Wang, W. Gang, Performance of Distributed Energy Systems in Buildings in Cooling Dominated Regions and the Impacts of Energy Policies, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.08.062>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



# Performance of Distributed Energy Systems in Buildings in Cooling Dominated Regions and the Impacts of Energy Policies

Jing Kang<sup>1</sup>, Shengwei Wang<sup>1,2\*</sup> and Wenjie Gang<sup>1,3</sup>

<sup>1</sup> Department of Building Services Engineering, The Hong Kong Polytechnic University, Kowloon, Hong Kong

<sup>2</sup> Research Institute for Sustainable Urban Development, The Hong Kong Polytechnic University, Kowloon, Hong Kong

<sup>3</sup> Department of Building Environment and Energy Engineering, Huazhong University of Science and Technology, Wuhan, China

**Abstract:** The distributed energy system (DES) is an energy efficient and economical alternative to the centralized energy system (CES). However, quantitative performance assessment, the influential factors and the impacts of energy policies in cooling dominated regions are still not well studied. This paper therefore presents an investigation on the building integrated DES in Hong Kong, a typical city with cooling demand year-around. Considering the characteristics of the energy demands, DESs, which integrate distributed generations, chillers and the utility grid, are designed. The performance of DESs in buildings is tested on a simulation platform using dynamic models. The primary energy saving and the payback period are estimated. The impacts of major design parameters and energy policies on the DES performance are studied. Results show that DESs achieve energy saving only when integrated in large-scale buildings of certain functions. Moreover, the performance can be improved by optimizing the equipment capacities. The comparison between two different energy policies with respect to the grid interaction illustrates that DESs can achieve better performance when selling electricity is permitted. The gas price has very significant impacts on economic benefits of DESs and the current market gas price could allow cost-effective application in some circumstances.

**Keywords:** Distributed energy system, building energy, primary energy saving, performance assessment, influential factors.

---

\* Corresponding author: Shengwei Wang, email: [beswwang@polyu.edu.hk](mailto:beswwang@polyu.edu.hk)

Download English Version:

<https://daneshyari.com/en/article/4990718>

Download Persian Version:

<https://daneshyari.com/article/4990718>

[Daneshyari.com](https://daneshyari.com)