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**Zhang**

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(54) **ENERGY SAVING MONITORING METHOD AND DEVICE**

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USPC ..... 718/1; 713/324, 300  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0180117 A1 8/2007 Matsumoto et al.  
2008/0104587 A1 5/2008 Magenheimer et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN 102096461 A 6/2011  
CN 102193525 A 9/2011  
WO 2011043317 A1 4/2011

OTHER PUBLICATIONS

Foreign Communication From a Counterpart Application, PCT Application No. PCT/CN2011/084888, International Search Report dated Sep. 13, 2012, 7 pages.

(Continued)

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(57) **ABSTRACT**

An energy saving monitoring method and device are provided. The method includes: acquiring system resource occupation information of an information technology (IT) device layer management system; sending a power-off instruction to the IT device layer management system according to the system resource occupation information, so that the IT device layer management system closes a virtual machine in a no-load state; and receiving a power-off feedback message sent by the IT device layer management system, and sending a refrigeration adjustment instruction to an infrastructure layer monitoring system according to a running state of a corresponding virtual machine in a refrigeration area where the closed virtual machine is located, so that the infrastructure layer monitoring system adjusts refrigeration deployment of the refrigeration area where the closed virtual machine is located.

**22 Claims, 7 Drawing Sheets**

