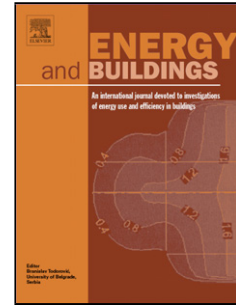


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## Operation strategy optimization of BCHP system with thermal energy storage: a case study for airport terminal in Qingdao, China

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### Abstract

Building cooling heating and power (BCHP) system is widely used in various public buildings, due to its high energy efficiency, low pollution emissions, high energy supply reliability and safety. Integrating thermal energy storage (TES) equipment with BCHP system proves to be an effective way to improve the system performance. However, some practical TES-BCHP systems show bad economic performance due to unreasonable operation. Thus to reduce the operation costs of TES-BCHP system through operation strategy optimization is important for realizing the advantages of TES-BCHP system compared to traditional systems. In this paper, the practical TES-BCHP system designed for the new airport terminal building energy supply in Qingdao, China is taken as the illustrative example. Aimed at minimizing the operation costs for such a system, the simplified system optimization model is established and the optimal operation strategy is determined through inverse problem and variation method. The preliminary results show that system operation strategy highly depends on the local natural gas price and electricity price. The optimal operation strategy for the studied case is as follows: (1) during the night, electrical chiller works at full capacity and the extra chilled water is stored in the water tank; (2) during the daytime, gas turbine is turned on and the absorption chiller is activated to produce low temperature water. Meanwhile, the water stored in the tank is discharged

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