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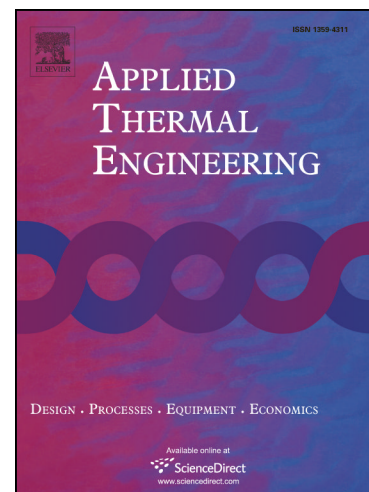
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A Two-Stage Optimization and Control for CCHP Microgrid Energy Management

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Abstract

Combined cooling, heating and power (CCHP) microgrid has the advantage of high energy utilization efficiency. The fluctuation of renewable energy sources and multiple load demands challenges the economic operation of CCHP microgrid. In this paper, we propose a novel two-stage coordinated control approach for CCHP microgrid energy management, which consists of two stages: the economic dispatching stage (EDS) and the real-time adjusting stage (RTAS). In EDS, it utilizes a model predictive control incorporating piecewise linear efficiency curves to schedule the operation based on the forecast information. In RTAS, the schedule obtained in EDS is adjusted based on the real-time information to tackle the power fluctuations. A typical-structure CCHP microgrid is analyzed in the case study and simulation results are presented to demonstrate the performance of the proposed two-stage coordinated control approach.

Keywords

CCHP; microgrid; two-stage coordinated control; model predictive control; energy

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