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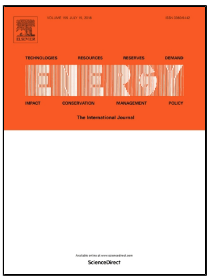

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Economic Environmental Unit Commitment for Integrated CCHP-Thermal-Heat Only System with Considerations for Valve-Point Effect Based on a Heuristic Optimization Algorithm

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Abstract

For the purposes of lowering environmental emission and total cost, energy efficient combined cooling, heat, and power (CCHP) units can be integrated with conventional separate cooling, heat, and power production units to meet demands. The goal of this study is to develop and examine a heuristic and deterministic optimization algorithm for solving the unit commitment problem for integrated CCHP-thermal-heat only system for (i) satisfying demands for cooling, heat, and power, (ii) providing spinning reserve for power, (iii) reducing environmental emission, and (iv) accounting for valve-point effects for steam turbines of thermal units. When environmental emission cost and valve-point effects are considered, the utilization of CCHP units in an integrated CCHP-thermal-heat only system results in environmental emission and total cost reduction by and 38.37 and 0.03%, respectively, as compared with those resulting from operating thermal and heat only units separately.

Keywords: Combined cooling, heat and power, Unit commitment, Environmental emission, Valve-point effects, Absorption chiller.

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