



Effect of Ambient Temperature on Exergetic and Exergoeconomic Parameters of a CHP System

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Abstract

Exergy analysis permits the localization and counting of the inefficiency degree informing the most inefficient components in a system and exergoeconomic analysis methodologies combine economic and thermodynamic analysis by exerting the cost concept to exergy. This paper presents exergetic and exergoeconomic analysis of a Diesel engine based Combined Heat and Power (CHP) system that produces 277 kW of electricity and 282 kW of heat. For this purpose, the CHP system is first thermodynamically analyzed through energy and exergy. Then cost balances and auxiliary equations are applied to subsystems, hence, cost formation in the plant is observed. The exergoeconomic analysis is based on specific exergy costing (SPECOC) method. Finally a parametric study is used to show effect of ambient temperature on important energy, exergy and exergoeconomic parameters of the CHP system. The results show that increasing ambient temperature decreases the exergetic efficiency of the system but it has a positive effect on the work output, heating power and cost of exergy destruction.

Keywords: Exergy, Exergoeconomics, SPECOC, CHP, Ambient temperature