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On the use of waste heat in a two-stage production system with controllable production rates

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Abstract

Industrial energy consumption accounts for approximately one third of the energy consumed by the four major end-uses of energy (i.e., residential, commercial, industrial, and transportation energy). Manufacturing is thereby responsible for the majority of energy that is consumed in industry. The scarcity of resources, rising energy prices, and an increasing awareness that lowering energy usage is a prerequisite for sustainable production processes has induced researchers to consider energy consumption in the management of production systems. This paper contributes to this emerging stream of research by studying the role of waste heat in production planning and control. More specifically, it investigates the case where industrial waste heat can be converted into electricity, which can then be used to support operating the production stages. This paper introduces the generation and transformation of waste heat into a lot size model and investigates how lot sizing policies change if waste heat is used to operate the

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