

# **EXTENSION OF EOQ MODEL WITH EMERGENCY ORDERS AND EXPLICIT ENERGY COST CONSIDERATIONS**

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## **ABSTRACT**

Given the rising cost of energy, this research studies the effect of energy cost on logistics decisions by analyzing the effect on inventory ordering policies for production systems with constant production rates but small, underlying possibilities for undesirable circumstances to threaten the production schedules. Rather than fulfilling any emergency demand with a more expensive and energy cost sensitive emergency order, the proposed model extends the classic EOQ model to provide multiple, more cost effective, options to fulfill the emergency demand. Under explicit energy cost considerations, the objective of this model is to determine optimal sizes for scheduled order quantity, safety stock, and inventory cycle length that minimize the expected cost per unit time of a product.

In order to investigate the effect of energy cost on inventory decisions as well as investigate the environments in which the proposed inventory model is most cost effective, the proposed inventory model is analyzed and compared to the traditional EOQ model while many of the model parameters are varied. The results of this analysis suggest that the environments most significantly affected by energy cost and most receptive to the proposed inventory model consist of high levels of at least one of the following key parameters: product weight, regular demand, or emergency demand.