

# Thermoelectric Power Generation Using Waste Heat From A Refrigerator

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**Abstract:** *This project explores the potential of utilizing waste heat from a refrigerator to generate electricity, contributing to energy efficiency and sustainability. Refrigerators are essential household appliances, yet they dissipate a significant amount of heat as a byproduct during their cooling process. By capturing this waste heat and converting it into electricity using thermoelectric generators (TEGs), we can harness an otherwise lost energy source.*

*The concept leverages the Seebeck effect, where a temperature difference between two materials generates an electric voltage. This study focuses on the design, implementation, and efficiency analysis of a system that integrates TEGs into the heat-exchanging components of a refrigerator. The generated electricity can either supplement the refrigerator's energy needs or be stored for other purposes, reducing overall energy consumption.*

*This approach not only improves the energy efficiency of refrigerators but also offers a novel method to recycle waste heat, contributing to environmental conservation. The feasibility of this technology is evaluated through experimental setups and simulations, highlighting its potential applications in residential and commercial settings. This project aims to demonstrate how innovative engineering solutions can play a crucial role in achieving sustainable energy goals.*

**Keywords:** Waste heat recovery, Refrigerator, Thermoelectric generators (TEGs), Seebeck effect, Energy efficiency, Sustainable energy, Heat-to-electricity conversion, Environmental conservation, Renewable energy, Innovative engineering solutions