



**HEAT TO ELECTRICAL ENERGY CONVERSION USING THERMOELECTRIC
GENERATION (TEG) HT-12710 TEG**

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ABSTRACT

Heat to electricity energy conversion is one of an alternative green technology used to benefit the waste heat energy dissipated to surrounding air. Thermoelectric generator (TEG) is one of the solutions to fully utilize the waste heat from the vehicle, power plant or any type of source that emit heat. TEG has a capability to convert heat to electricity energy without need a moving part or working fluid. Electricity energy generates when there is temperature different between two sides of TEG on Hot side and Cold side. The voltage generated is 2.4.80V with temperature on Hot side is 145.020°C and Cold side is 94.730°C. Using a sensory system monitoring, the actual performance of the TEG can be recorded live and continuously. In this research, the test result for heat to electricity conversion efficiency is 4.395% near to the 5% of maximum efficiency of HT-12710 TEG capability. Efficiency of 4.395% shows the efficiency of the whole system.

TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION	1
1.1 BACKGROUND OF THE STUDY	1
1.2 RESEARCH PROBLEM STATEMENT	3
1.3 OBJECTIVE OF THE STUDY	3
1.4 SCOPE OF THE STUDY	3
1.5 METHODOLOGY OF RESEARCH	4
1.6 SIGNIFICATION OF STUDY	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 INTRODUCTION	5
2.2 THERMOELECTRIC GENERATOR	5
2.2.1. Semiconductors	5
2.2.2. Operation.....	6
2.2.3. Efficiency: Figure of Merit (ZT).....	7
2.2.4. Maximum ZT	7
2.2.5. Efficiency relation on ZT and Temperature Difference.....	8
CHAPTER 3 RESEARCH METHODOLOGY	10
3.1 INTRODUCTION	10
3.2 PRINCIPLE OF THERMOELECTRIC DESIGN	10
3.3 THERMOELECTRIC SYSTEM	12
3.3.1 Thermoelectric Generator HT-12710 TEG	13
3.3.2 Heat Container.....	14
3.3.3 Cooling System	15
3.3.4 Main Controller	16
3.3.5 Wireless Data Communication.....	16
3.3.6 Sensor	17

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Due to global warming nowadays, finding a renewable energy has being a main concern on environmental issues because of limited energy resources. According to article [1], there are three truth about energy. First is “step-change in energy use”. First statement said that developing country needs to face the crucial demand of energy due the phase of economic growth cause by the industrial, building infrastructure, and the use of transportation. Second statement is “supply will struggle to keep pace”. In this statement fuel energy in 2015 will easily accessible but it will not able to match the demand growth. Furthermore alternative energy also has become the important of energy mix but there will be not a completely resolve supply-demand constraint. Third statement from the article is “environment stresses are increasing”. The third statement stated the level of CO₂ will keep increases even the moderation of fossil fuel is used to control the CO₂ emission. All the three statement will lead to the global warming of the earth. Ambient temperature will drastically increase due to the CO₂ emission, building construction and transportation.

A new journal claims that harmful greenhouse gas emissions, switching to nuclear or geothermal power, and even seizing carbon in the earth would not hold back massively disturbing climate change. Greenhouse gases are fewer a threat to stable climate than is the excess heat produced when fuel is burned to create energy, according to researchers Bo Nordell and Bruno Gervet [2].

About partial of the energy that humankind creates becomes waste heat. Depending on the technique of energy formation or manner in which it is used, such as to increase the temperature of water, waste heat can be as high as 70% or 80% [2]. In terms of electricity consumption, even tremendously efficient devices, appliances, and devices send out a lot of heat in their operation. That why your laptop needs a fan