# DEVELOPMENT OF A SOLAR THERMOELECTRIC GENERATOR FOR COVERED PATHWAYS LIGHTING OF CAVITE STATE UNIVERSITY - DON SEVERINO DE LAS ALAS CAMPUS

Design Project

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Undergraduate Design Project
Submitted to the Faculty of the
College of Engineering and Information Technology
Cavite State University
Indang, Cavite

In partial fulfillment
of the requirements for the degree
Bachelor of Science in Electrical Engineering



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# ABSTRACT

**BARI, GRAHAM R. and MARJES, REMUND PAOLO R. Development of a Solar Thermoelectric Generator for the Covered Pathways Lighting of Cavite State University – Don Severino De Las Alas Campus.** Undergraduate Design Project. Bachelor of Science in Electrical Engineering. Cavite State University, Indang, Cavite. April 2015. Adviser: Engr. Efren R. Rocillo.

The study was conducted from September 2014 to January 2015 at Cavite State University (CvSU), Indang, Cavite to develop a heat-to-power converter using solar thermoelectric generators (STEG) to be connected in an array configuration and implement it on the covered pathways of the CvSU – Don Severino de las Alas Campus.

Specifically, the study aimed to: 1. determine the power requirement for the STEG module; 2. determine the number and specifications of STEG module for the lighting system; 3. design and construct a solar beam concentrator (SBC); 4. construct a load controller for the power output of STEG to power specific loads; 5. assemble the STEG power system; 6. test and evaluate the power system in terms of power output and efficiency; and 7. conduct cost computation.

The study covered the design and development of the STEG power system that has been evaluated based on the factors affecting the power generation and performance of the STEG such as time, interception of solar radiation and tilting or inclination of the SBC for efficient power generation. The STEG power system showed significant amount of potential in terms of being an alternative source of energy for the covered pathways lighting at CvSU – Don Severino de las Alas Campus.

The total cost of the study amounted to P 25,550.

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# DEVELOPMENT OF A SOLAR THERMOELECTRIC GENERATOR FOR THE COVERED PATHWAYS LIGHTING OF CAVITE STATE UNIVERSITY – DON SEVERINO DE LAS ALAS CAMPUS

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An undergraduate design project presented to the faculty of the Department of Computer and Electronics Engineering, College of Engineering and Information Technology, Cavite State University, Indang, Cavite in partial fulfilment of the requirements for the degree of Bachelor of Science in Electrical Engineering with Contribution No. CEIT-2014-15-090. Prepared under the supervision of Engr. Efren R. Rocillo.

## INTRODUCTION

In our present time, where technological advancements require the use of electrical energy which is widely used in different aspects, and with the gradual increase in the cost of electricity and depletion of energy sources, various ideas have been generated to find alternative ways to generate electricity. It has to be converted to a suitable energy that can be adapted and utilized for the sake of mankind. Our sun produces an incredible amount of power that is believed to last for a very long period of time. Solar thermal electric energy generation concentrates the light from the sun to create heat, and that heat is used to run a solar thermoelectric generator module to make electricity. The sun, however, is the most reliable and abundant source of energy. The electrical energy coming from distribution company that we used is quite expensive and some sorts of ideas are being generated for the reduction of electrical energy consumption through the aid of alternative energies to generate electricity without desired