"DESIGNING AND TESTING STAND-ALONE PHOTOVOLTAIC SYSTEM USING 11WATT BULB"

EZATUL NAJWA BINTI USOF

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Physics
in the Faculty of Applied Sciences
Universiti Teknologi MARA

JANUARY 2013

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deepest praise to Allah S.W.T., the Almighty God for given me strength, faith and determination to complete this project.

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks goes to my supervisor, Assoc. Prof. Dr. Sulaiman Bin Shaari who had given me valuable information, suggestion and guidance in order to complete my Final Year Project. Not only that, Iwould also like to extend my appreciation to Mr. Langga, the research assistant at Green Energy Research Centre (GERC) on his guide to do and run the experiments. Last and surely not least, I would like to express my appreciation to my wonderful family and friends who provided me moral and financial support, and to everyone who have involved in the success of this study, either directly or indirectly. However, without the support and guidance from all of them, I would not have been possible to complete my project. Lastly, I would like to extend my sincere thanks to all of them.

Ezatul Najwa Binti Usof.

TABLE OF CONTENTS

ABSTRACT

DESIGNING AND TESTING STAND-ALONE PHOTOVOLTAIC SYSTEM TO POWER UP 11WATT BULB USING SPM050-M POLYCRYSTALLINE PHOTOVOLTAIC MODULES

Concerns on the issues about lacking on non-renewable energy, solar energy are the best solution for electricity generation. Solar energy is a renewable energy resources which is the least polluting and most inexhaustible of all known energy resources. The energy resource which directly produced by the sun can be converted to electricity by using solar cell. The intention of this project is to design the simple software of system sizing for stand-alone photovoltaic system using Microsoft Excel. This system was build up to make it easier to calculate the number of module, battery, inverter, charge controller and also load because it involved many calculations to sizing it manually. The system designing using 11W load was successfully light up the bulb with duration in ranges 4 to 5 hours suitable with the expected time from the system design. This project also conducted several test such as open circuit voltage, short circuit current, charge controller as well as inverter test. This project was run the experiment for 1 complete cycle which the battery had used during discharging and charging it until full. During discharging, the load can sustain up to 4.5 hours and then the charge controller disconnect the system when the voltage battery is 11.10 V. the initial voltage during charging the battery is 11.92 V and the voltage of battery when it was fully charge is approximately 12.5 V.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Environmental concerns are growing and interest in environmental issues which become more attractive in generating electricity with less pollution. Photovoltaic solar power is one of the most promising renewable energy sources in the world.

Renewable energy is the energy that comes from sources that have been replaced by natural process, is not subjected to depletion in human time scale and it can be producing everyday (Rajeev *et al.,* 2010). Solar, rivers, wind and geothermal are some examples of renewable sources that have potential to generate energy.

Among all the renewable energy, solar energy nowadays becomes popular for energy generation. Solar energy use free electricity from the sun. This is because it is unlimited and clean energy (Furkan Dincer, 2011). Besides that, A. Nafeh, 2009 said that solar energy is safe, pollution-free energy and in which living things have thrived since they first appeared on earth.