"DESIGNING AND TESTING STAND-ALONE PHOTOVOLTAIC SYSTEM USING 26WATT COMPACT FLUORESCENT BULB"

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This Final Year Project Report Entitled "**Designing and Testing Stand-Alone Photovoltaic System to Power Up 26Watt Compact Fluorescent Bulb using BP275 Mono-Crystalline Module**" was submitted by Siti Khadijah, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

DESIGNING AND TESTING STAND-ALONE PHOTOVOLTAIC SYSTEM TO POWER UP 26WATT COMPACT FLUORESCENT BULB USING BP275 MONO-CRYSTALLINE MODULE

Solar energy is one of the renewable energy that environmental friendly and can operate nicely. Concerns on the issues about lacking on non-renewable energy, solar energy are the best solution for electricity generation. The main point on this research is to designing system sizing for stand-alone photovoltaic system using Microsoft Excel because of the complicated way and involved many calculations to sizing it manually. Selection of all the components of the stand-alone PV system includes photovoltaic panel, battery, charge controller, inverter and the load itself. The ability of system designing was proven based on the experiment that have been done using 26W load. The load was successfully light up with duration in ranges 6 to 8 hours; suitable with the expected time comes from system design. This research also do several tests such as short circuit test, voltage at open circuit test, charge controller and inverter test. During this test, the percent difference between measured value and expected value are found. Another than that, this research was complete by run the experiment for 2 cycles. One complete cycle means the battery had been used during discharging and then charging until full. During discharging, the load can sustain up to 8 hours and 8.1 hours for first and second cycle. For both cycle, battery start to discharge at 12.6V and charge controller disconnect the system when the voltage battery is 11.07V and 11.16V. The initial voltage during charging the battery is 12.3V for both cycles. For both cycles, charging needs up to 2 days to fulfil the capacity of battery. The voltage of battery since it was fully charge is approximately 13.7V.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Renewable energy is the energy comes from sources that have been replaced by natural process, is not subjected to depletion in human time scale and it can be producing every day (Rajeev *et al.,* 2010). An effort to do some investigation on renewable energy is because sources are scarcity on non-renewable energy such as fossil fuels, minerals become much less, exhausted and cannot be supplied. Since it's gone, it cannot be renewed. On this reasons, it's necessary to find the solution to overcome on this problem that can be supply heat and electricity.

Except geothermal and tidal energy, all the renewable energy comes from the sun. Among all the renewable energy, solar energy is the most important nowadays. Solar energy becomes an important source because of the environmental issues and concerns on global warming (Wang *et al.,* 2009). Another than that, A. Nafeh, 2009 said that solar energy is non-polluting, free in its availability, high reliability, inexhaustible, clean and free.