Performance Analysis of Solar Cell

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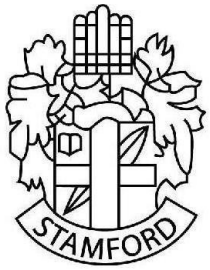

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Declaration

This is to certify that the Thesis entitled **"Performance Analysis of Solar Cell"** has been completed satisfactorily and no part of the work has been published elsewhere for the requirement or fulfillment of any degree.

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Abstract

Solar cells are semiconductor devices that convert light directly into electricity. Solar PV panels consist of dozens of solar cells. Solar cells are made from silicon or other semi-conductive materials. They are manufactured in thin layers of film and are arranged into square-shaped panels and larger PV arrays. When sunlight strikes these panels chemical reactions aggravate resting electrons and the result is a consumable current.

Solar home system consists of several components and individual work by those make a successful operation of the system. Current generated within the cell of the panel flows through the charge controller and charges the battery. The battery stores electricity generated by the PV system. When the load is on, battery gives backup. To protect the components and to harmonize the functions between the components of a solar home system the charge controller plays vital role. It controls the charging system of the battery i.e. Protects the battery from over charge and deep discharge.

The aim of this work is to analyze the performance of Solar Home System. The responsibility of the work was to test the different components of a Solar Home System in the laboratory and compare the test results with the desired results. Some solar home system of remote Bangladesh was visited and some test was done in the field to find the malfunctioning in the real life.

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Dedication

To Our Beloved Parents & Teachers of Dept. Of EEE – Stamford University Bangladesh.

List of Figures

List of Tables

Symbols and Abbreviations

BIPV- Building Integrated Photovoltaic
CIGS- Cu (In, Ga) Se2
CIS- CuInSe2
DC-Direct Current
DOD- Depth of Discharge
FF- Fill Factor
I - Current
I_D- Diode current
I_o- Reverse saturation current
I_{Ph}-Photocurrent
IR-Infrared
I_{sc}-Short-circuit current
IV- Current-voltage
I_{MMP}- Current at the Maximum power point
MPP- Maximum power point
P_{max} -Maximum power
PV- Photovoltaic
P_{MPP}-power at the Maximum power point
q- Charge
R-Resistance
R_p- Parallel resistance
R_s- Series resistance
SG- Specific Gravity
SOC-State of charge
T-Temperature
V-Voltage
V_D-Diode voltage
V_{MPP}-Voltage at the Maximum power point
V_{OC}-Open-circuit voltage
η- Efficiency

Contents