SIZING SOFTWARE OF A SOLAR FARM SYSTEM

Thesis is present in partial fulfilment for the award of
Bachelor of Engineering (Hons) Electrical
Universiti Teknologi MARA (UiTM)

NURIL YAQIN AB RAHIM
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
MALAYSIA

ACKNOWLEDGEMENT

In the name of Allah SWT, the author would like to show gratitude to the Almighty for giving His bless in completing this project and also because of His guidance in order to complete the final year project (FYP) entitled The Sizing Software of a Solar Farm System. Thanks to Allah SWT with His permission to give ideas, health and the opportunity to complete this project within the time duration given.

The author would also like to thank to the supervisors, En. Zulkifli Othman and Dr. Shahril Irwan for their supervision and guidance throughout the project and for being supportive while facilitating the activities, and the Green Energy Research Centre (GERC), Faculty of Electrical Engineering, Universiti Teknologi MARA Shah Alam for providing the facilities required for the work and other lectures that have given us some extra advices and their supports.

A million thanks to family, friends and UiTM staffs for all of their commitments, critiques and suggestions have helped us in the progress of finishing this project. This project is definitely a journey that has taught us to appreciate every person who has been involved in accomplishing the entire task.

ABSTRACT

This paper presents sizing software for the design of a solar farm system. A solar farm is basically a large-scale application of grid-connected photovoltaic system installation. Therefore this software is created to simplify the numerous calculations for the sizing method. The sizing software provides few guidelines to the designer for the planning procedure before the final of optimum array configuration is decided. Some specifications that the designer may consider are the type of PV module, the type of inverter, the available space for installation, the required energy per year and also the sum of money to be allocated for the instalment. The output result of this software will be the suggestion of possible configuration of the total number of modules in series per string with the total number of strings in parallel. This software also does the prediction of the system performances such as final yield, specific yield and performance ratio. The expected income is provided by the software is based on the Feed-in Tariff rates and the energy generated by the system. The software used in the design is Visual Basic where it consists of programming and windows application design.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Electrical energy is one of the most important needs in human life especially for the world today where the developments of technology have gone forward. The generation of electrical energy can be more relevant to replace the existing energy that relied on coal, oil and natural gas. These conventional energy sources usually will eventually diminish and the process could damage the environment, economic progress and human life. Therefore an alternative way to generate electrical energy that could be developed is by making use of renewable energy (RE).

RE is energy that comes from natural processes and does not have a limited supply. Besides being an energy security and as the conventional energy sources are running out, RE is important nowadays since the technologies have much lower environmental impact than the conventional energy technologies which will cause pollution, emission of hazardous gasses and global warming to the environment [1]. Therefore it is advisable to keep on installing the RE power system.

There are many types of RE sources: Solar photovoltaic (PV) energy, hydropower, wind energy, biomass, etc. The type of source that is going to be discussed in this paper is the solar photovoltaic energy. A PV power system uses solar panels to absorb energy from the thus generate electricity through inverter [2].