

PREFACE

(We) the commission for Science and Technology (COSTECH) have pleasure to present to you the first Swahili book that gives knowledge about Solar Power; it is about introduction to Solar Power, installation of solar power and reparation & fixing. The book is composed by a Tanzanian Youngman.

It has been written for academic purpose and to be used by engineers and local technicians, technical colleges' teachers, renewable energy projects consultants, sellers of solar items and all those who deal with solar energy technology.

We hope that, after this book has reached the target audience,

- i. The knowledge about renewable energy and the number of professional solar technicians will be increased,
- ii. There shall be increased number of effective systems.
- iii. The book will also enable the projects inspectors of solar power technology to evaluate and recommend on solar PV system.
- iv. The book will also promote the consumption of solar energy as a result of number of consumers enjoying the working system of solar PV.

We would like to congratulate Mr. Godwin Msigwa for his good work of writing this book. We hope that it is going to be a good direction that will facilitate the society to understand the use of sun that has been naturally given to us for producing electricity and at the very same time reducing the use of energy that are environment pollution oriented.

We also take this opportunity to acknowledge each and every one who participated in one way or another to make this work possible.

Dr. Hassan Mshinda

Director General

COSTECH, December, 2014

ACKNOWLEDGEMENT

I have been always in certainty that behind every individual's success, then there is an association or nation behind, that there are people who sacrificed to make things happen.

In most cases successes come after achieving potential things in our life, especially the most valuable things or ideas of our own. It was once said that "unity is the power". So it was in the process of writing this book, this simply means that it wouldn't be possible to have this book in hand without the participations of the associations as well as other individuals.

First and foremost, I m grateful to my God who gave me to realize that any obstacle in life is in the way I determine, perceive and observe things and circumstances in my life. That, if I change the way I think then I will change the way I live.

This comes because previously I regarded book authors as abnormal people like they were not born on same earth. It is only when I changed that attitude then I managed to write the book in your hand.

On the other hand, this book in the positive impact of positive cooperation and assistance from different individuals and institutions to mention but a few;

- i. **INDIVIDUALS:** Hon. Philip Mangula, Hon. Philemon Luhanjo, Hon. Petra Hammelmann, Ms. Inken Bruns, Prof. John Geoffrey, BrGen. Felix Mbenna (Rtd), Dr. Rev. Lechian Kimilike, Dr. Robert Otsyina, Dr. Hartwig Westphalen, Dr. Andreas, Dr. Janosch Ondraszech, Dr. Ngwale, Dr. Thomas Bernhard & his family, Eng. Ngosi C.X.Mwihava (MEM), Mama Andrea Karsten, Eng. Hamisi Mikate and the whole ENSOL family, Eng. Matthew Matimbwi and the whole TAREA family, Eng. Bengiel Msofe (REA), Eng. Gissima Nyamohanga (REA), Eng. Noel Mwakabungu (EWURA), Liz Wachuka and the whole family of Inner Space Africa, Godfrey Sanga (GVEP International)
- ii. **ASSOCIATIONS:** Deutsch Tansanische Partnerschaft e.V, Hamburg Senate, DGS Solar school Thuringia, SunEnergy Europe, Arbeit and Leben, Tanzania Renewable Energy Association, ENSOL (T) LTD, College of Engineering and Technology (CoET), Dar es Salaam Institute of Technology (DIT), Vocational Education Training Authority (VETA) Kyimbila General Supplies.

The fine layout of this book in your hand is the effect of creativity and attentiveness of Mr. Oliver Schoemann and Mr. Simeon Wittenberg. Villen danke alles!!!

Lastly, thanks to each and every one for the backup you provided to have this book published.

May God bless and protect you always.

Thanks.

Godwin David Msigwa

INTRODUCTION

Solar power is the energy produced from the sun. The sun has been always producing electrical energy for billions of years ago. We could also say that solar power comes out of sunrays that reach the earth.

This solar power conception can be analyzed through an object by which the energy is effortlessly collected in sachet (panel) in the car in which the panel is installed.

Either when we wash our clothes they use solar energy (which is in the heat form) to dry up. Solar energy is mostly used to directly heat our houses at a snail's pace. Sunrays penetrate through windows and the rooms get hot. Solar energy is also used to warm water.

By using correct technology solar energy can be changed into varieties of energies such as heat electricity.

Solar energy can be changed into electricity in two ways:

- a) **Photovoltaic (PV devices) or solar cells** – this changes the sunrays directly into electricity. Usually PV system is used in different off grid areas. It is also used to run clocks, calculators and provide traffic light. The word 'photo' is derived from Greek word 'phos' that means 'voltalic' or electricity.
- b) **Solar power machine:** This machine directly generates power when the heat that resulted from accumulation device, the heat is used to warm water that changes into vapor that then is used to run a generator.

Despite the fact that there is weak spot during preparation of solar power, the congestion is not the same and the current technology is insufficient, hence it gives opportunity for the off grid areas because the solar power technologies are:

- i. Amount:
- ii. **Accessible:** This technology has been always existing
- iii. **Easy to use:** The contact between light and electricity is straight; therefore there is no need for mechanical huge generators.
- iv. **Constant and Sustainable:** Less negative impact on environment, there is no need of water for cooling of production system.