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TECHNO - ECONOMIC ANALYSIS OF BUILDING ENERGY SYSTEM WITH NET METER SOLAR PV IN SRI LANKA

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Thelisinghe Mudiyanselage Sudhari Chathurika Jayasinghe

139562X

Dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Science in Electrical Installations.

University of Moratuwa
TH3318

Department of Electrical Engineering

University of Moratuwa
Sri Lanka

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(T.M.S.C. Jayasinghe)

The above candidate has carried out research for the Masters Dissertation under my supervision.

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..... 2017-02-15

Signature of the supervisor Date:

(Dr. K.T.M. Udayanga Hemapala)

ABSTRACT

In Sri Lanka net meter PV energy is popular in building sector and also it is promoted by the government. Every building owner would be like to have optimum energy design while minimizing the cost of energy when new buildings are at design stage. According to the 2014 Sri Lana energy balance, the energy consumption of commercial buildings accounts for about 25% of energy. So it is important to optimize consumption of fossil fuels in the building sector in order to reduce greenhouse gas emissions.

Optimum net meter solar PV capacity to be installed is depend on various factor such as tariff category, solar irradiation, building load profile, maximum demand of the building etc. Thus it is essential do analysis to decide the PV system capacity. But this analysis is tedious to do without data and expertise knowledge on high end analysis software.

In this research, a methodology is proposed to develop an optimum energy solution tool using techno- economic analysis for building energy system with net metered solar PV in Sri Lanka which are differ from load profile, tariff Scheme and the maximum demand.

The software HOMER was used to model the energy system and the simulation is validated using two actual situations.

From this research intelligent tool is developed which is very easy to use by anyone without expertise knowledge or practice to select optimum solar PV capacity to be installed and get details on investment cost, cost of energy, payback period etc. If the user cannot go for the optimum PV capacity due to the limitations on cost or area, then this tool can be used select whatever the possible feasible capacity using this tool. This developed tool have been verified considering two actual situations.

Key words: PV capacity, load profile, tariff Scheme, maximum demand, investment cost, cost of energy, payback period

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to Dr. K.T.M. Udayanga Hemapala who encouraged and guided me to conduct this research and on perpetration of final dissertation.

I would like to take this opportunity to extend my sincere thanks to Head of the Department of Electrical Engineering and all the lectures and visiting lectures of the Department of Electrical Engineering for the support extended during the study period.

My sincere thank goes to Eng. MR Jeychandran; director general, Eng. G Bogahawaththa; former director general, Eng (Ms) EDMS Gunarathne; chief electrical engineer, my superiors and colleagues in department of buildings for their support and encouragement.

I extend my sincere gratitude to Mr. Kapila Gunasena,; GSMB, human resource manager; ELS Lanka (Pvt) ltd, Mr. Thilina Maduranga; GENSO power technologies (Pvt) ltd, Mr. Sampath Abeysekara; Hayleys Industrial Solutions (Pvt) Ltd, Mr. Harsha Fernando; Trade Promoters (Pvt) Ltd, Mr Dinesh; Winseth Solar (Pvt) ltd and Mr. Chamara Adhikari; BAM green (Pvt) ltd who spent their valuable time to provide me valuable information and data required for this study.

Further, I extend my sincere gratitude to NREL for providing the HOMER software update. My special thanks go to Ms. Kanchana Amarasekara, PhD student at University of Wollongong, Australia and Mr. Chandana Ruwan ; assistant lecturer at University of Peradeniya for providing valuable information required for this study.

It is also with great pleasure that I remember the encouragement and support extended by my mother and my husband. May be I could not have completed this research without their valuable support.

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LIST OF ABBREVIATIONS

Abbreviation	Description
PUCSL	Public Utilities Commission of Sri Lanka
CEB	Ceylon Electricity Board
LECO	Lanka Electricity Private Limited
SLSEA	Sri Lanka Sustainable Energy Authority
kVA	kilo-Volt-Ampere
kWh	kilo Watt hour
kW	kilo Watt
PV	Photovoltaic
CoE	Cost of Energy
NPC	Net Present Cost
NREL	National Renewable Energy Laboratory
GSMB	Geological Survey and Mines Bureau

LIST OF ANNEXURES

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