

APPLICATION OF SOLAR-POWERED SIGNBOARD USING LED LIGHT FOR COMMERCIALIZATION

by

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Report submitted in partial fulfillment
of the requirements for the degree
of Bachelor of Engineering



JUNE 2013

**APPLICATION OF SOLAR-POWERED SIGNBOARD
USING LED LIGHT FOR COMMERCIALIZATION**

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**SCHOOL OF ENVIRONMENTAL ENGINEERING
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2013

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ACKNOWLEDGEMENT

My grateful and would like to express my sincere gratitude to my supervisor, Ir. Muhammad Arkam Bin Che Munaaim for his invaluable guidance, continuous encouragement and constant support in making this research possible. I really appreciate his guidance from the initial to the final level that enabled me to develop an understanding of this research thoroughly. Without his advice and assistance it would be a lot tougher to completion. I also sincerely thanks for the time spent proofreading and correcting my mistakes.

My sincere thanks go to staff of the School of Environmental Engineering, UniMAP, for their concern on the final year project and providing the facilities to carry out the project. The equipment in lab is very useful for students in completing the project. Many thanks go to all my friends for their excellent co-operation, inspirations and supports especially for Building Engineering during this study. This experience with all you guys will be remembered as important memory for me to face the new chapter of life as an engineer.

I acknowledge my sincere indebtedness and gratitude to my parents for their love, dream and sacrifice throughout my life. I am really thankful for their sacrifice; patience and understanding that were inevitable to make this work possible. Their sacrifice had inspired me from the day I learned how to read and write until what I have become now. I cannot find the appropriate words that could properly describe my appreciation for their devotion, support and faith in my ability to achieve my dreams.

Lastly, I would like to thanks any person which contributes to my final year project directly or indirectly. I would like to acknowledge their comments and suggestions, which was crucial for the successful completion of this study.

APPROVAL AND DECLARATION SHEET

This project report titled Application of Solar-powered Signboard Using LED Light For Commercialization was prepared and submitted by Eila Masni Binti Ab Latif (Matrix Number: 101200199) and has been found satisfactory in terms of scope, quality and presentation as partial fulfillment of the requirement for the Bachelor of Engineering (Building Engineering) in Universiti Malaysia Perlis (UniMAP).

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June 2013

APLIKASI PAPAN TANDA SOLAR DENGAN MENGGUNAKAN LAMPU LED UNTUK DIKOMERSIALKAN

ABSTRAK

Kajian ini membincangkan mengenai aplikasi papan tanda kuasa solar menggunakan lampu LED untuk dikomersialkan yang merupakan reka bentuk inovatif di mana infrastruktur ini dilengkapi dengan lampu dan papan tanda daripada sistem tenaga solar. Sistem baru ini adalah bertujuan untuk memberi keselesaan manusia pada tahap yang lebih tinggi serta maklumat kepada pengguna dan prototaip direka untuk Pusat Pengajian Kejuruteraan Alam Sekitar (PPKAS), Universiti Malaysia Perlis. Ia adalah alternatif menilai potensi papan tanda solar menggunakan lampu LED berbanding dengan papan tanda konvensional sedia ada yang menggunakan lampu pendafloor. 2 unit panel solar 20 watt disambungkan kepada bateri dan pengawal cas solar disambungkan kepada bateri untuk mengelakkan cas yang berlebihan pada bateri. Lampu LED dipasang di dalam papan tanda yang direka. Objektif kajian adalah untuk menilai potensi cahaya LED dan untuk merumuskan satu konfigurasi papan tanda menggunakan sistem solar dan LED. Tempoh masa lampu menyala pada waktu malam telah direkodkan secara pemerhatian untuk mengetahui kapasiti bateri menyalakan lampu pada waktu malam sekurang-kurangnya selama 4 hingga 8 jam. Kos permulaan untuk sistem solar lampu LED adalah lebih tinggi daripada sistem konvensional lampu pendafloor yang sedia ada. Pemerhatian telah dibuat bahawa kos operasi adalah bergantung kepada sumber pemasangan iaitu bagi papan tanda solar, ia menggunakan lampu LED yang mempunyai kos operasi percuma kerana menggunakan tenaga matahari secara terus. Penggunaan tenaga solar dan sistem lampu cekap dapat menjimatkan 50% jumlah tenaga, sifar dalam kos operasi, dan juga secara tidak langsung mengurangkan 142.96 kg pelepasan gas karbon dioksida.

ABSTRACT

This study presents the application of solar power signboard using LED light for commercialization which is an innovative design of signboard was proposed where the infrastructure equipped with lamps and electrical signboard powered by solar PV energy system. The new system was aimed to provide higher level human comfort as well as information to user, and the prototype was applied in School of Environmental Engineering, “Universiti Malaysia Perlis”. It alternatively evaluates the potential of solar-powered signboard using LED light with comparison to the existing conventional signboard using fluorescent lamp. 2 unit of solar panel 20 watt was connected to the battery and solar charge controller connected to the battery to avoid battery overload charge. The LED lights were installed in the signboard designed. The objectives in this study, to evaluate the potential of LED light and to formulate a signboard configurations using solar powered and LED. The period of time the lighting at night was recorded by observation to consider the battery capacity which is at least lighten at night for 4 to 8 hours. The initial cost for solar-powered system LED light was higher than the existing conventional signboard system fluorescent lamp. The observation was made that operating cost is depending to the sources of the installation which is for solar-powered signboard using LED light was directly used the energy from the sun so it had free for operating cost. Use solar energy and efficient lighting system saved 50% amounts of energy, zero in operating cost, and also indirectly reducing emission 142.96 kg of carbon dioxide.

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

LED	Light-emitting Diodes
PV	Photovoltaic
kWh	Kilowatt-hour
m ²	Meter square
%	Percentage
ft	Feet
°	Degree
V	Voltage
CIS	Copper-indium-diselenide
RM	Ringgit Malaysia
m	Meter
CFL	Compact Fluorescent Lamp
EEFL	Electrode less Fluorescent Lamps
RTP	Rapid Thermal Processing
°C	Degree Celsius
W	Watt
CCT	Correlated Colour Temperature

CRI	Colour Rendering Index
RGB	Red, Green, Blue
P	Power
Amp	Ampere
mm	Millimeter
DC	Direct Current
TNB	Tenaga Nasional Berhad
g	Gram
Kg	Kilogram
CO ₂	Carbon Dioxide

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LIST OF APPENDICES

Appendix A	Glossary
Appendix B	Configuration of Method and Apparatus
Appendix C	Table of Results

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