MOBILE POWER BANK USING SMALL VERTICAL AXIS WIND (VAWT) GENERATOR

This thesis is presented in partial fulfillment for the award of Bachelor of Electrical Engineering (Hons.)

Universiti Teknologi MARA

AISYAH BINTI ABD RAZAK

2010805292

Faculty of Electrical Engineering

UNIVERSITI TEKNOLOGI MARA

40500 SHAH ALAM SELANGOR

ACKNOWLEDGEMENT

First and foremost, praise is to Allah, the Almighty for giving me the strengths and His blessing in completing this final year project.

I would like to express my sincere gratitude to my supervisor, En. Muhammad Nazree Bin Che Othman, lecturer of B.Eng (Hons.) Electrical Engineering, Faculty of Electrical Engineering. Universiti Teknologi MARA, for the continuous support, for his patience, encouragement, motivation, guidance, enthusiasm, immense knowledge and insightful comment throughout the completion of this project. I could not have imagined having a batter supervisor and mentor for this final year project.

My deepest gratitude goes to my beloved parents, Abd Razak Bin Md Ali and , and also to my family members for theirs endless love, prayers, support and encouragement.

I also want express my token of appreciation to my friends and my course mates who have shared their ideas with me in order to help me understand more about this paper.

Last but not the least, I wish to extend my best regards to all those who haved helped and supported me in any respect throughout the completion of this final year project. Thank you very much.

Aisyah Binti Abd Razak

ABSTRACT

This paper propose a study of mobile power bank using small wind turbine attached to vehicle or used free wind at windy area somewhere in Malaysia. The objective of this study are to develop power bank by using small Verticals Axis Wind Turbine (VAWT) and to prove that energy that have been supply by small VAWT generator can be stored in NiMH rechargeable batteries. The scope of study is to develop small power bank using VAWT using wind energy and to verify the performance of small VAWT in term at its capability to produce electricity. The simple circuit obtained the input source from wind energy using small VAWT. The wind energy was transformed to electrical energy then stored in the batteries. The storage energy used when the output being connected to simple circuit of power bank. It was expected that VAWT can produced power that can be stored inside the rechargeable batteries. The result showed that VAWT can produce power.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS iv

ABSTRACT v

TABLE OF CONTENTS vi

LIST OF FIGURES ix

LIST OF TABLES x

LIST OF ABBREVIATIONS xi

LIST OF SYMBOLS xii

CHAPTER 1 INTRODUCTION 1

1.1 BACKGROUND OF STUDY 1

1.2 PROBLEM STATEMENT 3

1.3 OBJECTIVE OF STUDY 4

1.4 SCOPE OF STUDY 4

1.5 SIGNIFICANT OF STUDY 4

1.6 ORGANIZATION OF THESIS 5

CHAPTER 2 LITERATURE REVIEW 6

2.1 INTRODUCTION 6

2.2 RENEWABLE ENERGY 7

2.3 WIND ENERGY 8

2.4 WIND TURBINE 9

2.5 VERTICAL AXIS WIND TURBINE 11

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Nowadays, electrical energy demand was rapidly growing from time to time, the levels of pollution also increase and the limitation on fossil fuel reserves and supply have led to a rising interest in researching and utilization of renewable energy sources and technologies [1]. Renewable energy as known as energy derived from natural process such as sunlight or wind that replenished, which is can be used again and again at a faster rate and can be consumed effectively . Solar, wind geothermal, hydro and some form of biomass are common sources of renewable energy available nowadays.

One potential renewable energy source is wind power that has been developed rapidly since the late 1970s. Wind power produce clean energy with no air or water pollution, no needs any fuels that are harmful to the environment with toxic or hazardous substances and poses no threat to public safety. This is in contrast to coal, oil and gas, which rely on fossil fuels from mines or oil and gas fields that will one day run out of supply.

Wind power generated through the creation of wind turbines. Wind turbine systems are used to convert the energy available from the kinetic motion of air particles into electricity. Small wind turbine is suitable for location where average wind speed is more than 2.5 m/s. The higher wind speed, the batter is the output. In Malaysia, research study of potential wind power stated that good potential for farms based on the East Coast of Peninsular Malaysia that face the South China Sea., good potential during the monsoon season (November - February) and during the monsoon season,