ENERGY AUDIT FOR ENERGY EFFICIENCY AT FACILITY MANAGEMENT OFFICE IN UNIVERSITI TEKNOLOGI MARA, SHAH ALAM

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

FACULTY OF ELECTRICAL ENGINEERING

UNIVERSITI TEKNOLOGI MARA

MALAYSIA

SITI NOR AYU BINTI SHAHARUDIN
Faculty of Electrical Engineering
Universiti Teknologi Mara
40450 Shah Alam
Selangor Darul Ehsan

JULY 2012

ACKNOWLEDGEMENT

In the name of ALLAH S.W.T, The most Beneficent, The most Merciful. It is with the deepest sense of the Al-Mighty Allah that gives me the strength and ability to complete this project.

I wish to express my appreciation to my supervisor, Associate Professor Pauziah bt Hj. Mohd Arshad and my co-supervisor, Mr. Razali bin Hj. Abd Hadi for their guidance and advices in supervising my project from the beginning until the completion of this project thesis.

Also, thanks to my truly beloved parents for their encouragement and prayers. Last but not least, to everyone that is involved directly in completion of project. May ALLAH S.W.T bless all of you. Thank you.

ABSTRACT

This report presents a detail study of energy audit at Facility Management Office in Universiti Teknologi MARA (UiTM), Shah Alam. The main purpose of the study is to reduce energy consumption without affecting human comfort. Reduction in energy consumption can be achieved through energy efficiency. The energy audits was conducted for several buildings under Facility Management Office which are Pejabat Pembangunan Fasiliti (PPF), Pejabat Pembangunan, Annex, Bahagian Khidmat Elektikal dan Telekomunikasi (BKET), Pembangunan dan Pengurusan Fasiliti (ICT), Cabin and Bendahari Zon 5. Energy consumption was recorded using Fluke Meter to identify energy savings of the specific area. Based on the data obtained, air conditioner consumed very high energy followed by lighting, computers and other electrical appliances.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Currently, buildings consume considerable amounts of energy that lead to the emission of carbon dioxide ($C0_2$) which is "greenhouse gas" that contributes to global warming. Therefore, energy efficiency is required to reduce this problem. . Energy efficiency is the efforts to reduce the amount of energy required to provide the same products and services [1]. Improving energy efficiency can help to conserve energy and at once it can reduce the utility bill. The application of green technology is one of the best methods to use energy more efficient. Green technology is defined as the application of technological expertise to change the processes, methods and techniques of producing goods, from energy consuming, environmentally unfriendly resources, to energy saving, economically viable and environmentally friendly products [2]. Energy audit can be conducted as a useful way of determining how efficient the energy is used and what improvements can be made to enhance efficiency [3]. An energy audit can be simply defined as a process to evaluate where a building or plant uses energy and identifies opportunities to reduce energy consumption [4]. It is also a useful procedure to find out the best options for energy savings. Energy saving is defined as the difference between actual energy intensity and anticipated energy intensity [5].

In Malaysia, the government is fully committed in its effort to ensure that energy is utilized efficiently. Therefore, the energy management team in UiTM takes this opportunity to implement energy efficiency to UiTM buildings. This project was carried out in a few buildings that come from one substation which are Pejabat Pembangunan