CHAPTER 1

INTRODUCTION

1.1 Introduction

Energy efficiency program will bring great savings if planned and implemented correctly. It cannot be successfully carried out without the commitment from the top management. The top management should be informed about the current level of operating efficiency, additional saving potentials and resources needed to achieve it. Clearly defined and communicate with the top management by developing clear written goals and objectives will help to increase their understanding on efficient operation as part of management asset as well as reduces operating cost and maintain comfort [1]. A successful energy management plan should initiate with energy accounting or energy audit in order to record and track the progress of energy efficiency program.

Energy audit is a process of checking the way energy is used and identify areas where wastage can be minimize if not totally eradicate. Energy audit consists of several tasks which can be carried out depending on the type of audit and the function of audited facility. It started with review the historical data of energy consumption which can be compiled from the electricity bills. These data is important in order to understand the patterns of energy used and their trend. After obtaining the information on energy consumption, the next step is to set up an energy audit program. This program should start with site survey in order to obtain information on present energy used. The energy utilization such as running hours of
air-conditioning, lighting levels, locations of unnecessary air-conditioning and lighting due to unoccupied areas, temperature and humidity, chillers/pump scheduling and setting, efficiencies of equipments and machine and the areas of high energy consumption and the possibility to reduce consumption should be record for further analysis [2, 3].

The energy audit discussed in this paper will only focused in the UMP library building. It is carried out in aim of analyzing and identifying possible energy saving measures in the library, which can later be implemented for energy efficiency program in UMP. The UMP library inherits purpose-built factory building which is converted into the library building with some modifications to provide knowledge and information services to the campus community. No major conversions were done in the three phase electrical systems or design which contributes to energy inefficiency. Energy wasting practices are significant especially in the lighting, air-conditioning and mechanical ventilation system. Some of the equipments such as lighting system and air-conditioning split units are located at unoccupied an area which does not contribute to energy efficiency. The front view of UMP library is shown in Figure 1.1 while Figure1.2 shows the excessive lighting in UMP library building which was located at rack reference book.

Figure 1.1  Front view of UMP Library
The energy audit has been done within a seven days time frame to obtain information of energy used in the UMP library in terms of KVA, KW and KVar which includes the current consumption, voltage and power factor. It has been found that inductive load which came from machines (i.e. Photostat machines) and air-conditioning units has result in low power factor in UMP library. This problem has been solved by installing a capacitor bank at the library main switch board for power factor correction which reduces current consumption. For further analysis of energy saving, the energy audit is continued for another seven days time frame to get the information of energy used in the building including the current consumption and corrected power factor after installation of capacitor bank.

1.2 Objectives of the project

The main goal of this engineering project is to propose energy efficiency project in (UMP Library). This proposal and designation is to reduce the energy consumption with engineering techniques and calculation method.