

**“ DEMAND SIDE MANAGEMENT ”  
ENERGY EFFICIENCY (LIGHTING SYSTEM) IN PTAR1**

**Thesis presented in partial fulfilment for the award of the  
Bachelor of Electrical Engineering (Hons) of  
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## **ABSTRACT**

Energy efficiency is important for improving the power consumption of any building or factory. Energy efficiency is increasingly becoming more important due to the increasing in costs of electrical energies. The advance developments in the technology in producing devices and products that can save energy enhance energy efficiency applications in the existing building. This report summarised the result of the energy efficiency study perform for the Perpustakaan Tun Razak1 (PTAR1), main campus, Mara Institute of Technology, Shah Alam Selangor Darul Ehsan. The primary concern is on upgrading the existing lighting system in the PTAR1. The studied of the facility of the PTAR1 building were made and the opportunity for improving the energy efficiency facility and reducing the energy consumption were identified and evaluated. The economic analyse has also been calculated in order to determined the cost effectiveness. The facility that has pay back period not exceeding its life spends will be recommended for installation.

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## **1.0 INTRODUCTION**

### **1.1.0 Side Information and Facility Background**

Perpustakaan Tun Abdul Razak1 (PTAR1) building was build in 1971. The area covered by PTAR1 is approximately 116,956 square foot. PTAR1 consist of five floors, where each of the floors served different function and facilities. Generally each floors served as:

- Ground floor, standby room and chillier room.
- Floor 1, Control Room & Technician Office.
- Floor 2, Lobby Area & Information Counter.
- Floor 3, Reading Area & Reference Room.  
(Examination paper & Magazines)
- Floor 4, Reading Area & Audio Room.

In the early semester PTAR1 open from 7.30am to 10.30pm (15 hrs/day) from Monday through Friday (301 days/year). On Saturday, it opens from 8.45am to 1.00pm and on Sunday from 2.00pm to 5.00pm. On the examination month, the opening time of the PTAR1 extended from 8.45am to 11.00pm from Monday to Friday but for Saturday and Sunday the opening time remains the same. During the semester break the time opening of the PTAR1 follow the office hours time. It opens from 8.45am to 4.45pm (8.00 hrs/day) and Saturday from 8.45am to 1.00pm. PTAR1 was closed on Sunday during semester break.

The lighting systems used in the PTAR1, mostly fluorescent fixtures that recessed in permanent acoustic tile ceiling. These fixtures predominantly operate with two or three lamp per fixture. Before 1996 the 40W, T12 lamp (38 mm in diameter) was used but after