

**ENERGY EFFICIENCY APPLICATION IN NON-RESIDENTIAL  
BUILDING (BANGUNAN GUNASAMA PERSEKUTUAN)  
BESUT, TERENGGANU DARUL IMAN**

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## ABSTRACT

*Energy efficiency is important for improving the power consumption of any office buildings or commercial buildings. This report summarized the result and application of the energy efficiency study applied to the Bangunan Gunasama, Persekutuan Besut Terengganu Darul Iman. High efficiency application focuses on upgrading the existing lighting and HVAC system.*

*The study of the lighting and HVAC system facilities of the Bangunan Gunasama was made and the opportunities for improving the energy consumption were identify and evaluated. The economic analysis for lighting system has also been calculated in order to determine the cost effectiveness. The facilities that have payback period not exceeding its life spends will be recommended for installation. The efficiency of the HVAC system can be improved such as; used Variable Air Volume (VAV) and Variable Speed Drive (VSD).*

*Good energy management should result in a reduction in usage by eliminating wastes and increasing efficiency. Using energy efficiently also has several other benefits including that of reduction of pollution to the environment.*

*There's no ref. no in the texts of this  
Thesis though there's references at the back*

# CONTENTS

ACKNOWLEDGMENT	xI
ABSTRACT	xII
1.0 INTRODUCTION	...1
<del>SECTION 1</del> CHAPTER 1	
2.0 UNITS OF LIGHTING SYSTEM	... 4
3.0 GENERAL PRINCIPLES OF EFFICIENT LIGHTING PRACTICE	... 7
3.1 How to choose the right light for the job	...10
3.2 Save energy with fluorescent lighting	... 13
3.3 Compact fluorescent lamps	... 13
3.4 The working principle of magnetic and electronic ballasts	... 18
3.5 Optical reflectors	... 19
3.6 High efficiency luminaires	... 19
3.7 Project Set-up	... 21
4.0 EXISTING LIGHTING SYSTEM	... 23
4.1 Guidelines for design the interior existing lighting system	... 31
5.0 PROPOSED LIGHTING SYSTEM	... 33
5.1 Lamp ballast characteristic	... 33
5.2 Installation of energy saver lamp with the electronic ballast	... 35
5.3 Formula of calculating the cost effectiveness	... 37
5.4 Task lighting	... 39
6.0 DISCUSSION	... 43

## 1.0 INTRODUCTION

The general office buildings (Bangunan Gunasama Persekutuan) is located at Besut, Terengganu Darul Iman, 110 km from Kuala Terengganu. This building was constructed in 1994. The building is made from brick and concrete construction with ordinary glass window. *quite a new building*

The building has five floors including the ground level and roof level. The building contain Jabatan Pendaftaran, Jabatan Imigresen, Jabatan Perdagangan, Pejabat Rela, Jabatan Tenaga Rakyat, Jabatan Tanah dan Galian, Pejabat PESAKA Kecil, Jabatan Perhutanan, Jabatan Pendidikan, Jabatan Kebajikan Masyarakat, Pejabat Belia dan Sukan, Pejabat Perlindungan Hidupan Liar and Pejabat KEMAS.

The building is typically fully occupied from 8.00 a.m to 4.00 p.m on Saturday through Wednesday, and 8.00 a.m to 1.00 p.m on Thursday. The lights are generally turned on at the normal working hours (8.00 a.m to 4.00 p.m) and 8.00 a.m to 1.00 p.m on Thursday. Occasionally, light are turned off in the walled offices and meeting areas when not in use.

The lighting system can consume up to 40% of the total electrical power load, and more than 50% when including the cooling load required for the unwanted heat that the lighting produces.

The Passive Infrared Sensor (PIR) for this building were installed in a number of rooms office to detect whether anybody was actually present. They consist of two components, the sensor and the control unit. The detection system automatically switched off the lights