Project minimizing energy usage engineering essay

Engineering

CHAPTER 2

LITERATURE REVIEW

INTRODUCTION

The main concept for of this project Minimizing Energy Usage in the Office is to reduce electric consumption in the office. By using energy saving device power consumption can be reduce and financial monthly office can save more cost. Beside that reducing power consumption can save pollution in the world. Environmental pollution causes of removal material or energy into water, land or air. Excessive electricity usage causes power plant should generate a lot of electricity to meet demand. Therefore a lot of pollution that occurs when electrical power is generated. Electric power plants that cause occurs pollution is hydro, steam and coal power plants. Energy saving device can reduce power consumption and it also suitable concept to be energy safer, more efficient and more reliable. Better device energy saving using this project is: Daylight detectorElectronic ballastLow-emission glassTime switch

Daylight detector

Lighting in office especially in working areas is subject to regulations prescribed by 'Suruhanjaya Tenaga' such as it needs a enough luminance level which depend on the type device in the office. Power consumption can be reduced by using energy efficient equipment such as daylight detector [12]. By using daylight detector it used natural sunlight. During switch lighting ON it will be in automatic mode [10]. The system will operate depend on sunlight. When day the sensor detect sunlight automatic switch OFF. By

using natural sunlight power consumption can be reduced. Figure 2. 1 show circuit KNX lighting control to daylight detector. The device is from Schneider electric named KNX. The KNX-System is solutions for lighting control with respect to energy savings and reducing cost [13]. In time controlled switch (ON / OFF) of lighting in temporarily used in office defined occupancy times up to 10% energy savings. Time control can use as time switches and it can integrate a timer function of the touch panels. In a KNX installation the time controlled switching and dimming of any lighting can be realized without additional wiring to install. Using automatic daylight detection in office and in temporarily used rooms up to 20% energy savings. Switching lighting ON and OFF or sending values can also be controlled in combination to ambient light levels. Combining time control with daylight detection allows can be a guaranteed basic illumination for well-defined periods. Different lighting control scenarios according to the weather on a day such as sunlight dependant switching of the lighting for short periods at relatively low levels at certain times or higher light levels for longer periods, for example, during peak times. Additionally, increased the life time of the lamps can be increased by dimming down to a basic brightness instead of switching OFF completely during active periods [14]. http://knxforbms. files. wordpress. com/2011/09/untitled2. png? w= 500&h= 349Figure 2. 1 : KNX Lighting Control To Daylight Detector

Electronic Ballast

In recent years, user of incandescent lamps has been replaced to fluorescent lamps, especially in commercial spaces and industrial. However, fluorescent lamps require ballasts to provide the necessary high voltage for starting the

lamps and for regulating lamp current during operation [15]. Ballasts have been two categorized types such as electromagnetic ballasts and electronic ballastsElectronic ballasts are a one device energy saving have some advantage like absence of flicker, light weight, high efficiency and audible noise as compared to electromagnetic ballast [3]. By using electronic ballast energy efficiency will increase and power consumption will reduce [8]. Electronic ballast is one of the simplest and most cost effective suitable used fluorescent in office. With used electronic ballast power consumption can be reduces without reducing output light. Before office improvement used choke ballast. Figure 2. 2 shows improvements from choke ballast to electronic ballast. In circuit fluorescent lamp using choke ballast it should lamp starter. Electronic ballast can reduce power consumption with improved lamp power factor and efficiency. For using electronic ballast not need to change and rewiring in office [2]. C: UsersjohnDownloadschoke ballast to electronic ballast. jpgFigure 2. 2: Improvement from Choke Ballast to Electronic Ballast

Low-Emission Glass

Low-Emission glass (low-e glass) is improving the insulating value of the window to block sunlight through in building. A thin coating based on tin oxide is deposited on the glass and either silver . This coating sends to see the light, but reflects longer wavelength infrared light associated with radiating heat emitted by all warm objects. By reflecting this radiating heat back into the building and the coating reduces heat loss from the building. [16]Low-emission glass is a type of window used in the office. Its use allows sunlight to pass through the glass into the building and keep cooling in office

[4]. Before this office used to tint in the window it can allow heat from outside through the window and many heat leaving from the office. This causes a lot electric consumption using an office to keep cooling. With low-emission glass temperatures can stable and air conditioner can set energy saving mode. Figure 2. 3 shows how low-e glass work. http://stormwindows. com/wp-content/gallery/new-pictures/innerglass-low-e-illustrati. jpgFigure 2. 3: Low-E Glass Work

Time Switch

Controlling load time switch in a system to improve its function by reducing power consumption. Circuit it is possible to decide when the sunlight detected lighting will be switched OFF in an office based on the working hours based on the daylight level. Programming of the control in time switch electric loads has been measurable advantages in terms of reduction of power wastage and comfort. The range of time switches has been several versions that ensure to closing and opening of electrical load circuits according to a scheduled program [17]. Time switch as Figure 2. 4 is a device energy saving by reducing light time of use through preprogrammed scheduling. It's a simple device designed to control a several lighting zone. This project used time control to reduce power consumption in the office. The time control will switch on during office hours after than that switch will off. http://image. made-in-china. com/2f0j00tvZTBguIJbhV/Time-Switch-TB35B-. jpgFigure 2. 4: Time Switch