

## Abstract

Even in a reasonably large facility, it is challenging to control energy waste due to insufficient light management and lighting distribution. It is also impracticable to rely on people to manually control the light in order to conserve energy. Occupancy sensors, often referred to as motion and/or infrared emissions detectors, are among the many technological innovations that have been produced recently to reduce excessive energy use. These sensors determine activity within a certain region. It's convenient because they switch on instantly when someone walks into a room. The most common flaw is that it fails to consider the natural light already existing in the room. Another energy-saving strategy is to manually adjust artificial light intensity with dimmers.

Numerous studies have confirmed the energy savings that come from daylight harvesting. The California Energy Commission's Public Interest Energy Study Program recommended researching on/off control, however they did not elaborate on over-illumination caused by sunshine. In recent years, the European Union has aggressively supported political campaigns focused on energy efficiency. An energetic management program could follow three basic paths: improving the lighting control system to reduce energy waste for empty spaces and during the day; purchasing new, energy-efficient equipment (lamps, control gears, etc.); and implementing improved lighting design strategies (localized task lighting system).

Light-emitting diodes, or LEDs, are being utilized more often for general lighting in residences, commercial buildings, and office spaces. LED lighting solutions provide easily and flexibly adjustable light output. This is especially useful for managing daylight-adaptable lighting because it contributes to a considerable reduction in the amount of electricity needed for lighting. These lighting control systems allow luminaire light output to be varied with daylight to meet illuminance requirements while conserving energy. When there is sufficient daylight, the luminaires are thus muted to maintain the appropriate level of illumination at the workspaces.

Light Emitting Diodes, or LEDs, has fundamentally altered the interior lighting industry. The use of LEDs to develop artificial lighting systems that closely resemble natural sunshine. LEDs are the main component of modern lighting solutions due to their extended lifespan, energy efficiency, and favourable environmental effects.

One way to reduce lighting-related energy expenses is through daylight harvesting. It utilizes the sunshine that is present. Visible light, which makes up 45% of the solar energy spectrum, may be harnessed to illuminate buildings for nine to eleven hours per day.

### **Keywords:**

Daylight Harvesting, LED, Sensor, PWM LED Driver, Window Blinds, MPPT Boost Converter, Artificial Daylight.