

CRITERIA 7.1.2

The Institution has facilities for alternate sources of energy and energy



Sensor Based Energy conservation

Introduction

1. Using sensors we can certainly minimize the consumption of electrical power. Power crisis is one of the most common problems in India. With the help of the sensors we can eliminate this shortage by minimizing the wastage of electrical power or saving our generated power. PIR is the type of sensor that gives us signal when anything crosses its rays. It is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. It is a low-cost device used to detect a change in motion in its surroundings within different range of radius. In many offices there are pavements where lights kept switched on for the whole night and day. But if we use the sensor then only when it gets motion it will give signal and the lights will be switched on. So, this project is very lower costing and also power saving. It also minimizes the electric bills of any office. Moreover, it creates an opportunity for minimizing the load shedding in the cities and villages.

Based on this principle a motion sensor LED bulb is being used in the campus and in various rooms, corridors and offices of the college.

2. Similarly another LDR sensor that gets activated by light is also being used to minimize electrical wastage.

The sensor is placed over the lights and when the day ends the sensor gets activated in the absence of light and the LED bulb is switched on automatically.

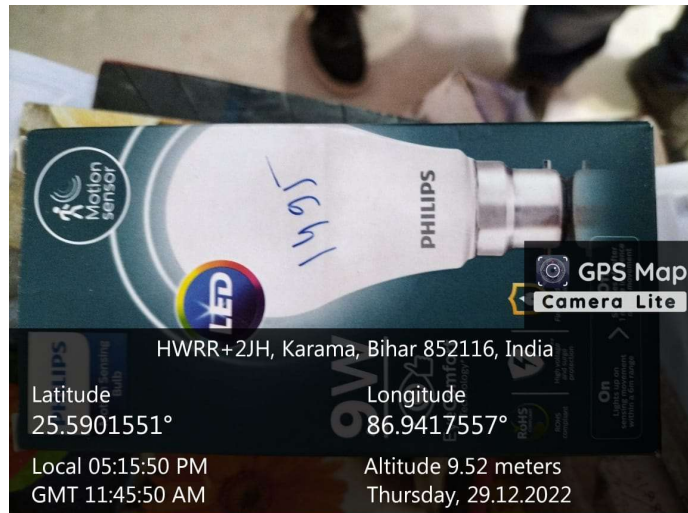
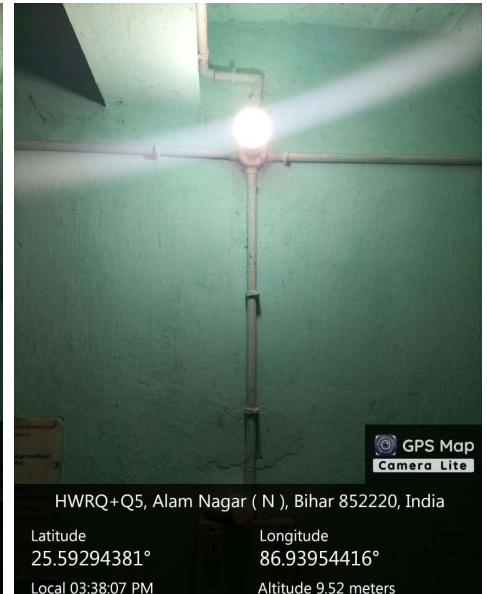
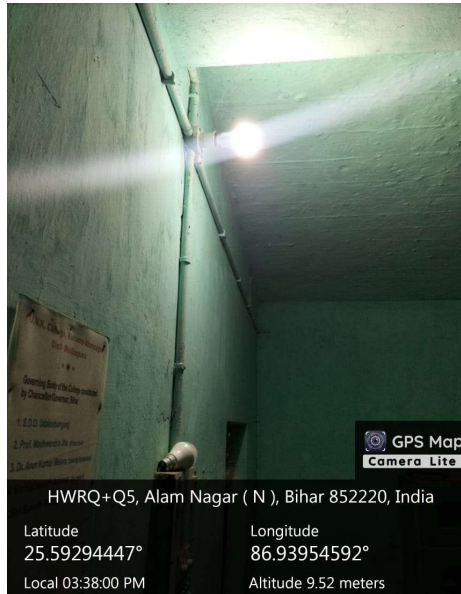
When the sun comes back up and the daylight falls on the sensor it gets activated and the LED bulbs connected to it is automatically switched off.

This helps us reduce the electricity consumption and accidental powered on lights in and around campus are now minimized.

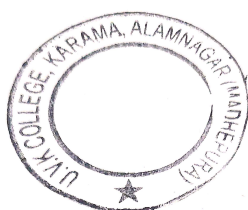
Plan of Action

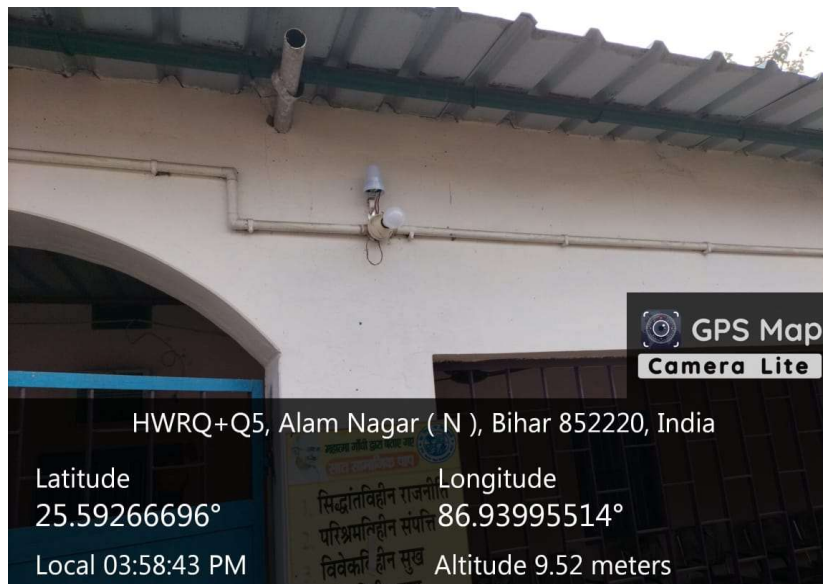
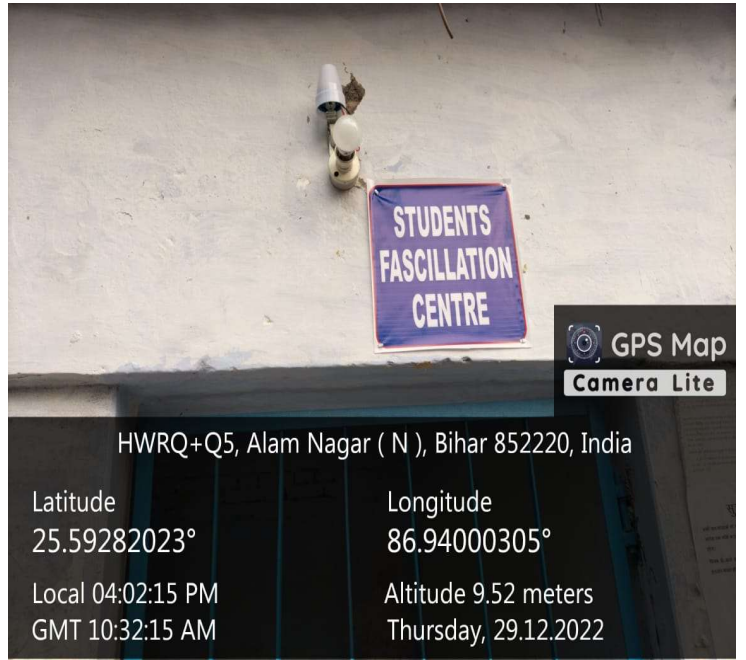
Phase 1 - Mapping of Spots for placing sensors in Campus – Complete.





Motion Sensing LED lights





LDR Light Sensor Switch



Use of Light Emitting Diode (LED)

Introduction

Power crisis is one of the most common problems in India. With the help of LED we can eliminate this shortage by minimizing the wastage of electrical power or saving our generated power. Light-emitting diode (LED) is one of today's most energy-efficient and rapidly-developing lighting technologies. Quality LED light bulbs last longer, are more durable, and offer comparable or better light quality than other types of lighting.

Energy Savings with use of LED

LED is a highly energy efficient lighting technology, and has the potential to fundamentally change the future of lighting in the United States. Residential LEDs -- especially ENERGY STAR rated products -- use at least 75% less energy, and last 25 times longer, than incandescent lighting. Widespread use of LED lighting has the greatest potential impact on energy savings

How LEDs are Different

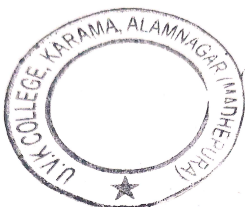
LED lighting is very different from other lighting sources such as incandescent bulbs and CFLs. Key differences include the following:

- Light Source: LEDs are the size of a fleck of pepper, and a mix of red, green, and blue LEDs is typically used to make white light.
- Direction: LEDs emit light in a specific direction, reducing the need for reflectors and diffusers that can trap light. This feature makes LEDs more efficient for many uses such as recessed downlights and task lighting. With other types of lighting, the light must be reflected to the desired direction and more than half of the light may never leave the fixture.
- Heat: LEDs emit very little heat. In comparison, incandescent bulbs release 90% of their energy as heat and CFLs release about 80% of their energy as heat.

So, this project is very lower costing and also power saving. It also minimizes the electric bills of any office. Moreover, it creates an opportunity for minimizing the load shedding in the cities and villages.



Different type of LED lights



**Comparison between LED vs CFL vs. Incandescent Bulb Table 1:
Comparison between LED vs CFL vs. Incandescent Bulb**

Light Output	LED	Incandescent Bulb	CFL
Lumens	Watts	Watts	Watts
450	4-5	40	9-13
800	6-8	60	13-15
1100	9-13	75	18-25
1600	16-20	100	23-30
2600	25-28	150	30-55

Energy saving by replacing CFL with LED

Dominant light source at most places in the campus is traditional 23W CFLs As per our data collection, the campus has in total 372 CFLs. If these CFLs are replaced by LEDs 10-12W power can be saved per CFL.

Cost Analysis of Replacing CFLs with LEDs

- Total No. of CFLs in Campus = 372
- Average Power of CFL = 23W
- Average Power of LED = 12W
- Power saved per LED = (23-12)W = 11W
- Total Power saving = 372*11W = 4092W = 4.092Kw
- Average Use of CFL per year = 270*7h=1890h
- Total Energy saved per year = 4.092*1890 kWh = 7733.88kWh
- Saving in Rs. Per year = 7733.88*4 = Rs. 30935.52
- Average Cost of Replacing each CFL = Rs. 110
- Total Cost of Replacing all CFLs = 372*110 = Rs. 40920
- Capital Cost Recovery time = (40920/30935.52) = 1.387 yr

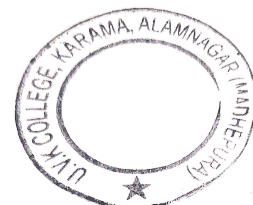
Plan of action

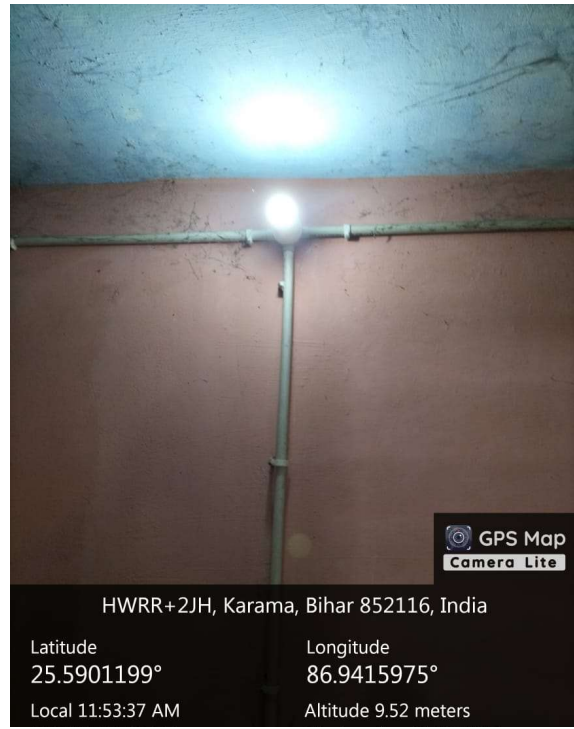
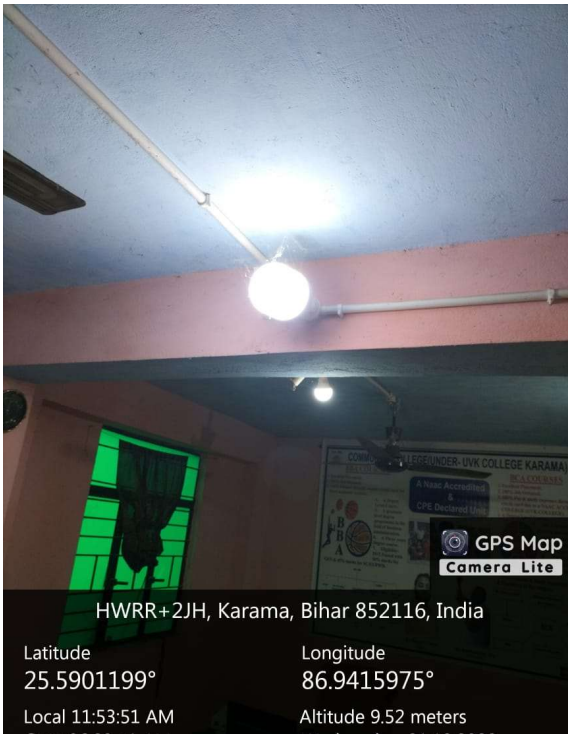
Phase 1 - Mapping of Spots of in Campus – Complete.

Phase 2 : Ordering LED's for replacement

Phase 3:Replacement of LED's as per requirement(as soon as any CFL needs replacement it is being replaced by LED

Phase 4:Campus wide installation – in process





LED in college campus

**Principal/ Chairman
U.V.K. College, Karama
Alamnagar (Madhepura)**