Smart use of Energy in Lightning

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Abstract— Universal energy access to modern energy services is essential for socio-economic development including poverty alleviation. However, globally over 1200 million people lack access to affordable basic energy services, such as effective lighting and clean cooking. Although 300 million Indians (approx 24%) have no access to power, millions more in the country of 1.2 billion people live with spotty supplies of electricity. The Indian government has launched an ambitious project to supply 24-hour power to its towns and villages by 2022 — with plans for miles of new feeder lines, infrastructure upgrades and solar microgrids for the remotest areas. The present review paper "Smart Use of Energy in Lightning" focuses on the optimized use of the available energy capacity with the natural light effectively and minimized the electricity consumption in lightning without affecting the quality of need. The concept of Smart Use of Energy in lighting also involves utilizing natural light from the sun and to reduce the use of man-made lighting. It may result in energy savings up to 90% when the lighting system implements an adaptive behavior as opposed to a rigid, predefined behavior.

Key words: Smart LED Bulb, Time and Power Scheduling, Energy Saving, Wireless Communication, Online Monitoring

I. INTRODUCTION

Economic growth in India has largely been associated with increased energy consumption. While 60% of total energy needs in India are met by commercial energy sources, remaining 40% are comprised of non-conventional fuels.

While energy demand grows significantly with economic growth, this coupling varies over time, depending on various other things. Technological progress, energy efficiency programmes and structural changes contribute towards the variation in energy demand.

Smart use of Energy in Lighting is the smarter way which enables/allows consumer to save energy by scheduling of the light as per the user requirement on specific time by remotely control of lighting in manual/ Auto mode. Its control system is an intelligent network based lighting control solution that incorporates communication between various system inputs and outputs related to lighting control with the use of one or more central computing devices. Lighting control systems are widely used on both indoor and outdoor lighting of commercial, industrial, and residential spaces. Lighting control systems serve to provide the right amount of light where and when it is needed. Lighting control systems are employed to maximize the energy savings from the lighting system, satisfy building codes, or comply with green building and energy conservation programs. Lighting control systems are often referred to under the term Smart Lighting.

The major advantage of a lighting control system over stand-alone lighting controls or conventional manual switching is the ability to control individual lights or groups of lights from a single user interface device. This ability to control multiple light sources from a user device allows complex lighting scenes to be created. A room may have multiple scenes pre-set, each one created for different activities in the room. A major benefit of lighting control systems is reduced energy consumption. Longer lamp life is also gained when dimming and switching off lights when not in use. Wireless lighting control systems provide additional benefits including reduced installation costs and increased flexibility over where switches and sensors may be placed.

From outside the traditional lighting industry, the future success of lighting will require involvement of a number of stakeholders and stakeholder communities.

This ability saves energy and minimizes electricity bills without affecting a level of comfort and convenience of the consumer, moreover the saved energy can be used to light-up the un-lighten homes.

AS LED Bulbs is Energy Efficient than the conventional Incandescent Bulb (Tungsten, Sodium, Neon, Halogen etc.), Florescent Lamps (Tube-Light, Compact Florescent Bulbs etc.).

Smart LED Bulbs may be one of the best solutions to conserve Energy as 22% of the Energy is used for the lightning in Homes, Industries and Public places. Smart bulbs use light-emitting diodes (LEDs) and a variety of technologies to work, so they are more expensive than traditional bulbs. That's important to keep in mind, But smart bulbs also use less energy and last a lot longer -meaning you can save money in the long run.

A. Features

Smart bulbs offers a degree of control and interactivity you just can't get with traditional bulbs, like scheduled timers and remote control options. They're also more convenient; it's easier to tap on a Smartphone screen than to get up and trudge over to a wall switch.

B. Control:

Lightning Intensity, Lightning Focus, Time of Operation in Manual and Auto Mode (both) Power Consumption Control by controlling number of LED's lightning at the time of use. Scheduled Timer as per the environmental condition can be User defined for a calendar Year or monitored Online through Smartphone.

C. Technology:

Wireless Communication with Smartphone and between Smart Bulbs. Bluetooth (<10 meter), ZigBee (<10 meter), 6LoWPAN (<10 meter), Wi-Fi (<100 meter) etc.

D. Components:

1) Smart LED Bulb:
(house in a Bulb Unit : LED, Power Supply, Control Unit, Lens, Relay, Magnet Switch/ Stepper Motor etc.)
2) Daylight sensors:
Daylight-linked automated response systems to further reduce energy consumption.

E. Smartphone

- Application to establish communication between Smartphone and the Smart LED Bulb.
- Electrical Wiring with Conventional Bulb Holder to fix the Smart LED Bulb.
- Smart LED Bulb with inbuilt control unit works on wireless communication technology, which enables consumer to schedule/control their energy uses.

II. CALCULATION

		Room Detail	in feet									
fill Data ➡		Room Length =	10									
fill Data ➡		Room width =	10									
		Room area in square ft =	100	or	9.3	Square Meter						
		LED lumens per watt (80-110) = 90			B	W	Y	C mi=B x W x Y	R	R mi=(CmixR)/1000	RC mi	
Mode	Range	Room Using for	Light required	Total Light	SEM LED	LED On time	No. of Days in a	energy Consumption with Smart LED Bulb	energy @	Total Bill Modewise	Bill with other installed bulb	energy Consumption with other installed bulb
			lumens/m²	reqd. in room	wattage	hrs/ day	Month	Wh per month	Rs per kWh	per month	per month	Wh per month
M1	300-500-750	Study	300	2790	31.00	1	30	930	9	8.37	8.37	930
M2	200-300-500	Family time/ Dinner	200	1860	20.67	2	30	1240	9	11.16	16.74	1860
M3	100-150-200	Watching TV/ Normal Day	150	1395	15.50	6	30	2790	9	25.11	50.22	5580
M4	30-50-100	Sleeping	50	465	5.17	0	30	without light	9	0	without light	0
						9		4960	Monthly bill =	44.64	75.33	8370
		Cost of the LED Bulb =	1500	INR				Can save/room/month with=		30.69	INR	40.74%
		Saving per Room/Month =	30.69	INR				31 watt bulb		3410	Wh	40.74%

A. Conclusions

Smart use of Energy in Lighting is the smarter way which enables us to enlighten more houses with the existing power generating capacity.

New Research in effective LED's and Solar Photovoltaic Cells are ongoing and it will definitely meet our purpose. Smart Use of the Energy in Lightning plays a major role in the "Smart Energy Management."

- Calculation shows that by using Smart LED Bulb 90% of the power can be saved.
- It also reveals that Energy can be saved from 50-80%.
- Easiest and Economical way to solve energy crises of current scenario.
- It will reduce the Carbon emission, which may result due to increased power generation to meet the increasing demand.
- It will increase the social responsibility in the society.

Satisfaction of serving humanity as saved power to be used by the un-lighten houses

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