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# GREEN HOUSE LIGHTING USING OPTICAL FIBERS

**Prof. Mahadev M[1], Shashank Raju P[2], Yogeesh T H[3]**

*Assistant professor[1], Department of civil engineering,*
*Shri Pillappa College of Engineering, Bangalore*
*U G student[2,3], Department of civil engineering,*
*Shri Pillappa College of Engineering, Bangalore*

## ABSTRACT

*Greenhouse technology is a useful tool which can be used in the agricultural sector to harness improvements in marketable yields, significant reductions in the control of pests and weeds, increased density of crops, efficient utilization of water and the accommodation of the use of different cultivation methods. This type of farming system has long been in the background and has not yet explored its maximum capability however; recently observations have been made about the use of greenhouse technology in the agricultural sector. A study of the farming practices, challenges and success of greenhouse and traditional farmers is reported in this research to review the benefits of the greenhouse which would lead to the ultimate enhancement and sustainability.*

*This review seeks to explore and examine the farming methods used by greenhouse and traditional farmers, the challenges and successes faced by these farmers and recommendations for these solutions. A survey was conducted to retrieve the information. The results of this survey established that most farmers involved in the sector were men who had many years of farming experience. Additionally, the observations made indicate that that a lack of knowledge and experience in this new technology was the most pressing challenge faced by greenhouse producers and most traditional farmers, if given the opportunity would consider establishing and operating a greenhouse.*

## I. INTRODUCTION

Fiber Optic Solar lighting: How to bring natural sunlight into a building? Fiber optic is used not only for communications; Fiber optic based solar lighting solution transmits the light from a source through the fiber to a remote location. Many companies are now producing systems for capturing sunlight and transmitting it into the interior. With the growing popularity of high rise apartments and basements and subways, natural light often does not reach various facilities especially the ones located underground. Fiber optic based solar lighting will help to bring natural sunlight into a building. Effectively speaking one can store sunlight and then use it indoors instead of artificial light. Such a concept is going to be a massive hit with people who live in apartments or houses that don't receive ample sunlight.

Several companies are now working on their models to offer natural sunlight using the fiber optic based solar lighting. The companies work on a principle whereby the use a sunlight collector system usually placed on rooftops of buildings and then transmit the sunlight using fiber optic cables into various parts of the building. While the initial setup cost of the sunlight collectors and optic fiber cables is quite high as of now, it is mostly a onetime expenditure considering the amount of money it can save by reducing bills for artificial light. The sunlight collector requires very small amount of power to operate and the sunlight provided is natural and free of cost.

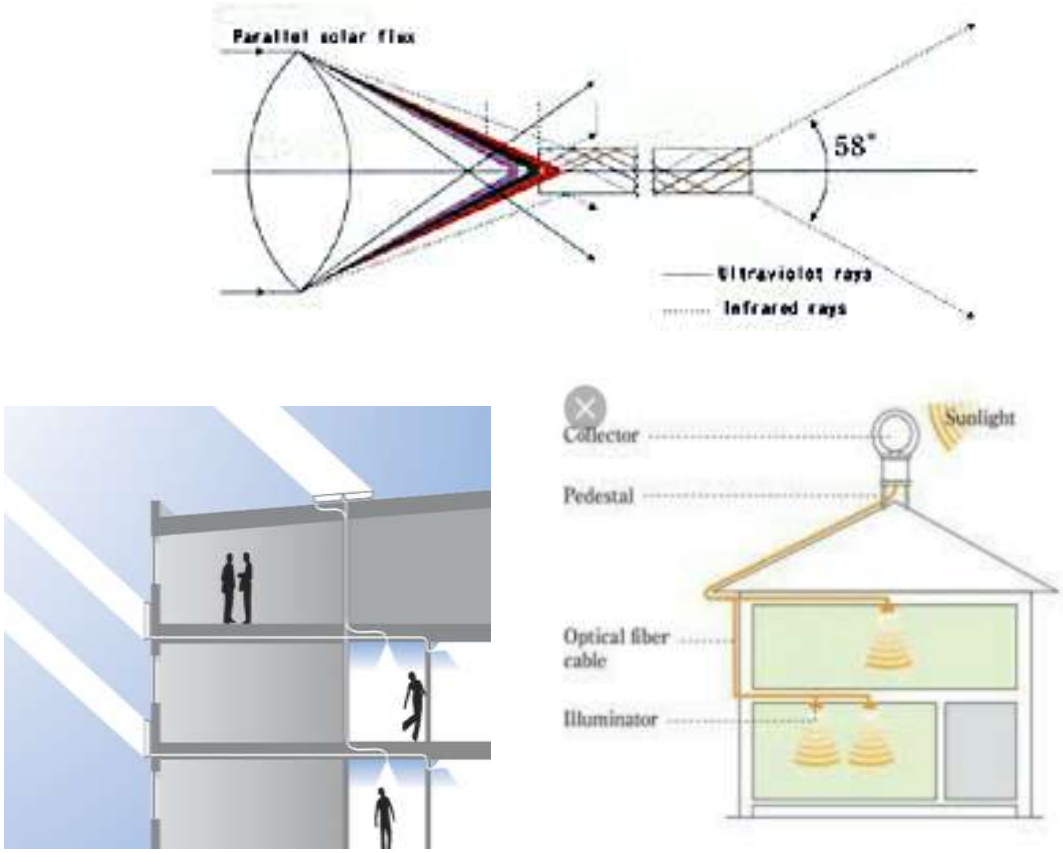


**Fig 1.1: Green house implemented on building**

## II. ROLE OF GREEN HOUSE LIGHTING

Captures the sun light and conduct it towards a room using optical fibers. Delivers the benefits of the natural lighting with the convenience and reliability of artificial light. Hybrid Solar Lighting system helps to bring down the energy consumption and improves the wellness and productivity of residents in the building. Any rooms even underground can be illuminated with real sunlight.

## III. PRINCIPLE AND STRUCTURAL COMPOSITION

Solar optical fiber lighting system, mainly composed of light guiding device—collector, light transmission device—optical fiber, and light output device—light resource, concentrated the sunlight by collector and transmitted it to the places needing lighting through optical fiber or light pipe and then making diffused reflection .The principle and structural composition of solar optical fiber lighting system

(1) The Light Concentrating Way of the Light Guiding Device. The light guiding device concentrated light through lens refraction, which used convex lens or Fresnel lens to focus the sunlight on the focal point of the lens and improve the transmission efficiency of optical fiber by the precise positioning of the optical fiber input terminal.

(2) The Operating Mode of the Light Guide Device. The operation mode of the light collector adopted active light guiding device, namely, installed solar optical tracking sensor, controller, and related mechanical transmission devices to make collector focus on the sun and obtain a higher solar light efficiency, which was also the operating mode used by the most of the solar optical fiber lighting systems at present

(3) The Materials Used for Optical Fibers. Three kinds of optical fibers were currently most used including quartz fiber, plastic fiber, and multicomponent glass fiber, and liquid core fiber, hollow fiber, and other fibers were also used. The different kinds of optical fibers had their own characteristics. The transmission efficiency of quartz optical fiber was the highest with the optical loss reaching 0.01 dB/m and had a great advantage in long distance transmission but with the relatively high cost. The optical loss of plastic fiber and glass fiber was relatively large with 0.15/m dB by contrast, which had some limitations in the distance of optical transmission. But plastic fiber was easy to make into the transfer beam of large diameter to obtain greater luminous flux and high concentrating rate, which now had a wide range of applications . We chosen quartz optical fiber in the study.

(4) The Light Emitting Manner of Light Output Device. The optical fibers with end light emitting were used in the solar optical fiber system for tunnel in this study.


**Fig 3.1: Light Emitting Manner of Light Output Device**

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## IV. ADVANTAGES

- One of the biggest advantages from using the fiber optic solar lighting system or Hybrid Solar Lighting system is the sheer idea of lightening up areas with sunlight where it never reached before.
- While humans have become accustomed to artificial lights indoors, there is no substitute to natural light. The light provided by Fiber Optic Solar Lighting systems would be filtered for ultra violet and Infra Red rays making it safe for use reducing any chances of getting skin cancer associated with sitting in sunlight for longer hours.
- The system uses very little power to capture sunlight compared to other artificial lighting methods.
- Such UV and IR filtered sunlight can be used in places like art galleries which usually has delicate heat and light sensitive collection.

**Fig 4.1: UV and IR filtered sunlight can be used in places like art galleries**


**Fig 4.2: heat and light sensitive collection**

## V. LIMITATIONS

Since the fiber optic solar lighting system or Hybrid Solar Lighting system is still work in progress there are various drawback and limitations of the system as of now. One of the main limitations of all fiber optic solar lighting systems is the length of fiber optic cables. Another negative associated with such fiber optic solar lighting systems is the need for the sunlight collector to receive good quantum on sunshine each day. In case of clouded skies while the system can track the best available quantum on sunlight and align itself accordingly, it may not be sufficient to illuminate the dark.

## VI. GAINS OF USING GREEN HOUSE OPTICAL LIGHTING IN KARNATAKA

### 6.1. Karnataka's demand for power has risen to 8,939 MW

With Karnataka experiencing its hottest March in years, it is unsurprising that the consumption of energy this month went up by nearly 10 per cent compared to last year. While the total energy consumed in March 2016 in the State was 5,264.4 MU, the total energy consumed in March 2017 was 5,767.5 MU, resulting in a difference of 9.55 per cent.

KERC's data According to data available with the Karnataka Electricity Regulatory Commission (KERC), the highest consumption was recorded on March 26 with 204.11 MU. In 2016 on the same day, the consumption was 173.73 MU. The highest consumption recorded in March 2016 on a single day was 177.34 MU.

The highest difference in consumption between March 2016 and March 2017, when the percentage of difference in energy consumed was 37.81 per cent. While 200.96 MU were consumed on that day this year, 163.15 MU were consumed on the same day last year. As for the maximum demand during the peak load in March this year, 9,168 MW was the consumption recorded. For the rest of the month, the maximum amount of energy during the peak load consumption was above 7,000 MW, according to data. The month ended with a 36.6 per cent difference in energy consumed. While it was 195.2 MU this year, it was 158.54 MU last year on the day.

### Generation

Regarding power generation, the Karnataka Power Transmission Corporation Ltd.'s Karnataka State Load Dispatch Centre showed that out of the total generating capacity of 8,429 MW (including major independent power producers), 6,529 MW was being generated. The general summary showed that the State's demand was 8,939 MW, while generation was 6,478 MW.

Maximum demand recorded during peak load in March was 9,169 MW

Current power generation capacity is 6,478 MW, according to KPTCL

By using solar optical lighting we can reduce the electric energy demand by upto 20%-25% .Because the optical lighting reduces energy consumptions due to artificial day lightings and it even stores certain amount of solar energy by utilizing solar panels.

Therefore by implementing solar optical lighting, our state of KARNATAKA will be self-sufficient for its electric energy demands and there will be no requirement of electricity purchase from any of our neighbouring states.

## VII CONCLUSION:

After reviewing One of the biggest benefits of using the fiber optic solar lighting system or Hybrid Solar Lighting system is the sheer idea of lightening up areas with sunlight where it never reached before. While humans have become accustomed to artificial lights indoors, there is no substitute to natural light. The light provided by Fiber Optic Solar Lighting systems would be filtered for ultra violet and Infra Red rays making it safe for use reducing any chances of getting skin cancer associated with sitting in sunlight for longer hours. The system uses very little power to capture sunlight compared to other artificial lighting methods.

## REFERENCES

1. Bartok, J.W., Jr. 2005. Fuels and Alternative Heat Sources for Commercial Greenhouses. http://www.umass.edu/umext/floriculture/fact_sheets/greenhouse_management/jb_fuels.htm.
2. Bartok, J.W., Jr. 2005. Selecting and Building a Commercial Greenhouse http://www.umass.edu/umext/floriculture/fact_sheets/greenhouse_management/jb_building_gh.htm
3. Cox D.A. How to Use pH and EC "Pens" to Monitor Greenhouse Crop Nutrition. University of Massachusetts Extension. http://www.umass.edu/umext/floriculture/fact_sheets/greenhouse_management/phecpens.html

## PROJECT BY:

**SHASHANK RAJU P**

**U G STUDENT**

**SHRI PILLAPPA COLLEGE OF ENGINEERING**

**YOGEESH TH**

**U G STUDENT**

**SHRI PILLAPPA COLLEGE OF ENGINEERING**

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**Prof. Mahadeva M** is working as Assistant Professor in Civil Engineering Department form last 3 years in Shri Pillappa College of Engineering and he also worked as Assistant Professor in K S Institute of Technology. He received is **B E in Civil Engineering** and **M.Tech** with specialization in **CAD Structures** from Visvesvaraya technological university. He is national advisory board member and Conference Convener for international conference and he secured "***Active Young Research Award"*** in international journals for his continuous contribution in research field. He is Indian Institute of remote sensing outreach program college coordinator. He is member of AMIE, MIRED,MNG,MISTE. His research interest is in the field of soil structure interaction, structural engineering, earth quake engineering.