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Study of Lighting Planning to Save Energy and to Minimize Light Pollution for Sustainable Development.

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ABSTRACT

Study of lighting planning in residential areas of Pandharkawada dist. Yavatmal was studied for this paper. The area which is selected for study is limited to Residential areas. The main purpose of this paper is to study lighting planning in houses. Need, importance and proper implementations of lighting planning. This study is very important for saving electrical energy and to minimize light pollution for sustainable development. The proper lighting plan provides us visual comfort without compromising on energy efficiency. The proper lighting plan is very useful for reduction of light pollution. For this paper lighting plans in different houses were studied. For this many parameters are taken in to account such as level of light, light distribution, light colour, colour of objects , glare, shadows , reflections , energy efficiency, fixture positions etc. Results show that lighting systems in maximum houses are without any planning. There is no proper lighting scheme is found. Peoples are unknown to lighting types such as ambient, task and accent. In many cases by just some alterations need of artificial light can be reduce. There is no proper use of natural light found. Present study gives the consequences of lighting planning in residential areas. Some solutions are suggested for the implementation of lighting plan which will be very useful for saving electricity and to avoid light pollution.

Keywords: lighting planning, light pollution, visual comfort, glare, ambient, task and accent.

I. INTRODUCTION

Sustainable development is a development which fulfills the need of the present without compromising the capacity of future generations. Sustainable development makes the balance between economic growth and social well being without disturbing environment. Rapid growth in globalization, industrialization, and flow towards cities shows negative consequences on environment. One of the goals of Sustainable development is to care for the environment combating climate change and protecting the oceans and land ecosystems. Sustainable development expects the careful and proper use of natural and manmade energy resources. Different types of pollutions show negative effect on environment and thus on sustainable development. Production of electricity leads to has limitations. So energy saving is very necessary. Improper use of artificial light produces the light pollution. Light pollution is excessive, misdirected and inappropriate artificial light. Thus proper lighting planning helps us to reduce the electric energy consumption and to minimize the light pollution. Lighting makes a big difference in the interior environment of your home. Good lighting helps you to see, work, provides safety, security and comfort. Lighting in homes consumes near about 15 % of the average household electricity budget. This also depends upon the user behavior , lights used and the lighting plan used for the home. Proper lighting plan can reduce the consumption of electricity and electric bill.

Lighting planning :- Lighting planning or design is a special service that helps to enhance the overall impact of your home. Lighting is a powerful tool in home environment, person's mood , health and their daily activities. Lighting plan is a method to make proper combination between need of lighting , types of lights, their properties, places, positions, costs , lighting effect, energy efficiency, pollution etc. while developing

lighting planning some factors are taken in to account such as nature of home , conditions of wall , ceiling and windows. What activities will take place in room, how much light it required, availability of natural light etc. Think about the new lighting plan or what changes you want to do in existing lighting, the main fact about lighting planning is that how you really use a space and what specific task you do.

Importance of early lighting planning:

The earlier thinking about lighting planning before starting construction is better for avoiding future problems. Once the architecture plan is agreed think about the lighting planning. Early lighting planning can help us to avoid costly material, fixtures, can save energy and helps us to use maximum natural light. The earlier thinking about lighting planning is very useful for thinking exact location of light bulbs according to need and surrounding.

Tips for proper lighting plan:

* Establish the budget. * design a house which does not require artificial light at day time. * Consider room orientations, dimensions and location of rooms for maximum use of natural light. *Draw a floor plan of the area you will be lighting including windows and doors positions, colour of walls and furniture in the room. * Determine the required illumination level for the particular task. * Identify the mood or ambiance you want to create in the room.* Select proper light fixture. * Determine mounting height. * Determine number of fixtures and spacing between them. * think about layer lighting. * consider multifunctional lights. * Determine maintenance factor.

II. MATERIAL AND METHOD

The purpose of present study was to study lighting planning in residential areas. Present condition of Lighting planning and its impact on energy saving and light Pollution in residential areas of Pandharkawada dist. Yavatmal was studied for this paper. The area which is selected to study lighting planning in Pandharkawada is mainly restricted to Residential areas.

For this paper lighting plans in different houses were studied. For this many parameters are taken into account such as level of light, light distribution, light colour, colour of objects seen, glare, shadows , reflections , energy efficiency, fixture positions , use of natural light, lighting pattern, use of innovative ideas etc. Collection of data was done by survey method and observations method. As per objectives of study raw data is collected and after processing conclusions are drawn. From the present study present lighting pattern, lighting planning, their shortcomings are found out. In this paper some solutions are given for implementations of proper lighting planning.

Findings :

From the study following findings are obtained about lighting planning in residential areas.

1) Peoples are unknown about lighting planning. Maximum homes are constructed without any lighting planning.

2) The use of artificial light is less at day time but it can again reduce by use early lighting planning.

3) Light sources are not chosen according to size and proportion of room. It is found that right bulbs are not selected for right task.

4) Height of the light source makes big difference in light distribution.

5) Reflecting properties of walls, ceiling and furniture has greater impact on light used.

6) There are no proper light fixtures chosen for a required task. It is found that the light coming from the source is not directed properly. They were not fixed in a proper direction for which they supposed to use.

7) There are no dimmer used for lights. Too somber or too brighter lights can pressure our eyes.

Intensity of lights used in homes found inappropriate. Most of the places it is too bright.

8) There is a lack of layer lighting in homes. Generally people use ambient light for all purposes. Use of task light and accent light and decorative light is very less and improper.

9) There is no proper shielding found on bulbs.

10) There is absence of skylights and other innovative ideas during construction.

III. CONCLUSIONS

Present condition of Lighting planning and its impact on energy saving and light Pollution in residential areas of Pandharkawada dist. Yavatmal was studied for this paper. . Sustainable development expects the careful and proper use of natural and manmade energy resources.

For the sustainable development we have to use energy resources very carefully. If we can save electricity then it will be big contribution for reduction of pollution.

Light pollution has negative consequences on environment. Light pollution is the result of poorly designed lighting planning that send unwanted and/or unnecessary light into adjacent areas. The dark side of excessive use of lighting is Light Pollution. With the help of proper lighting planning we can save electricity and can minimize the light pollution. Lighting plan is a method to make proper combination between need of lighting , types of lights, their properties, places, positions, costs , lighting effect, energy efficiency, pollution etc. From the present study it is found that in maximum houses there is no lighting planning. All the light sources are installed without any study or planning. The core of lighting planning is need of proper amount of light for proper work. But generally it is found that only ambient lighting in downward direction is installed in houses. There is lack of layer lighting. Task lights can save energy but they are not installed. Number of accent lights are very less. With a proper combination between home designs, colours, furnitures, actual need of lighting in different working area at different time we can reduce the use of artificial light. We can save electricity and minimize the light pollution for protection of environment for sustainable development. It should be noted that all the data analyzed in this study is raw data. The quality of the data may be affected by the field environments.

Following are the suggested solutions for proper lighting planning.

* If possible make early lighting planning before construction. * Maximum use of natural light can save electricity. * Combine artificial lighting with day lighting. * Placement of furniture and even reflections from surfaces like mirror should also be considered.* Windows in proper directions introduces natural sunlight in to the home. * Fitting of skylights are also very useful for contribution in energy saving and comfort, they are an excellent source of natural lights in homes. * Light coloured interior walls reflects more light than dark colours and reduces the need of artificial light. * Use only energy saving products. Initially high quality lighting product with greater efficiency are costly but they save money due to their long life. . * Use warm white or orange hued bulbs. Use light emitting diodes (LED) technology with long wave length light in a red or yellow tint to minimize impact and save energy. *

When electric lighting controls are used properly energy will be saved and life of lamps can be extended. * Light controls can automatically controls the power , dimming light and save the power. * Use timers, dimmers, and sensors. * Install dimmer on your lights. Dimming will not only save energy but also extend the life of lamps. *Do not use only one type of lighting pattern in homes, use layer lighting. * use the right light for the right task. * Use light only when you need it and where you need it. * Use table and floor lamps with lower wattage instead of intense overhead lights. *Shield and lower the wattage of all outdoor light.

IV. REFERENCES

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