A STEP TOWARDS ENERGY EFFICIENT CONCEPT: A CASE STUDY OF B.V.M. ENGINEERING COLLEGE

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Abstract:

For so many years, Green / Sustainable construction have been the way of sustainable life in India. Building structures decades ago in India were built, using resources available nearby the location of construction site.Like this, using the same practices with latest technological advancement, will go a long way in buildings of future, which are ecological and economic. Adopting green design and construction practice would result in lower energy use, less use of material and reduced carbon footprint. Suistainable buildings are also helpful to reduce the energy consumption by 35–40%, fresh water usage by 20–25%, and at the same time recycling will be promoted. Usual building has many disadvantages which should be considered. And lighting facility, air conditioning, water heating facility create ease to the user of green building. The facilities requires higher energy which leads to higher carbon footprint. Thus, green building is the solution of this problem.People should be aware of the concept of the green building. For this we need to make public buildings sustainable which are frequently used or utilized by common man. They can be Public Libraries, School, Colleges, Temples, Theatres, Town halls. Thus, more people can be made aware about green building concept. In this way, we can make the earth healthy and sustainable without compromising future.

Keywords: ***Sustainable Development, Electricity Conservation, Equpments, Green Building***

I. Introduction:

A building that makes use of natural resources like water, energy, building materials and other resources efficient for sustainable development of environment is called a green building.

There various rating systems for Green Building in India:

- **GRIHA (Green Rating for Integrated Habitat Assessment)**
- **IGBC (Indian Green Building Council)**
- **BEE (Bureau of Energy Efficiency)**

There are several parameters on which a building is evaluated before being given a green rating:

- Efficiency of planning and building's design
- Soil Conservation during construction.
- Reducing demand of conventional energy.
- Incorporating renewable sources of energy and renewable energy based systems such as solar water heater to reduce the use of conventional energy.
- Efficient water and waste management for reducing water usage and waste.
- Maintaining of indoor environment quality like indoor air.
- Efficiency in selection of sustainable materials for construction.
- Optimization of operation and maintenance.

During Construction period and post construction period, maximum energy is used in the form of electricity. So, the conservation of electricity can make the building more sustainable and efficient.

Using energy efficient lighting system like CLFs and LEDs, technologies like sensor system for air conditioning and lighting to save energy and reduce emission of carbon dioxide, appliances that consumes less energy and reduce the usage of water and other water saving technologies makes a building green and make it different from other conventional buildings.

So, In this paper electricity practice in the B.V.M. Engineering College, Vallabh Vidyanagar is studied and analyzed by replacing old equipment with latest equipment.

II. Objective of Study :

- To analyse the existing electrical practice.
- To find out feasible and sustainable replacement option.

III. About B.V.M. Engineering College:

Study area is Birla Vishvakarma Mahavidyalaya Engineering College (BVM) which is an engineering institution located in the educational town of Vallabh Vidyanagar. V.V.Nagar is known as educational hub of Gujarat, India. It is the oldest engineering college of Gujarat. It was founded in 1948. Its infrastructure includes land of 18.96 acres and built up area of 35704 sq.m. It includes Classrooms, Laboratories, Administration Buildings, Auditorium, Canteen, and Conference Room.

IV. Methodology:

The study is proposed to be carried out using within college campus. And electrical efficiency of equipment used currently is calculated. Then these data will be compared with the data of new equipment's electricity consumption. Thus electrical efficiency will be compared. Data has been collected from various sources i.e. No. of Students in each and every department, Electricity bills of MGVCL, counting equipment in the whole campus by survey. No of equipment in each block and each street within campus of have been listed and their energy consumption is considered to calculate the cost.

ABBREVIATIONS AND ACRONYMS:

MGVCL - Madhya Gujarat Vij Company Limited
CFL - Compact Fluorescent Lamp
LED - Light Emitting Diode
AC - Air Condition
TOU - Time of Use
KWH - kilowatt hour
KVA - kilo-volt-ampere

Table 1 : Energy Consumers of B.V.M. Engineering College

Sr.no.	Category	No of People
1	Total no. of Faculties	197
2	Total no. of Students	3111
	Total	3308

V. Existing Senario of Infrastructure :

The data collection is done by calculating No. of Students in each and every department, Electricity bills of MGVCL of B.V.M. college, counting equipments in the whole campus by survey.

Table 2 : List of Various Equipments and theirreplacement

Sr. No.	Equipment	No of equipment	Current Watt	Replaced watt	Price of new equipment per piece
1	Fan	640	100	60	1500
2	FTL	1758	50	18 (LED)	550

Here in above table, it is shown the no of old equipments and their respective Watt. Moreover also shown that with which equipments we can replace them. Price of new electrical equipment per piece is also suggested. Here, total no of Air Condition in the campus is 79. And if we replace them with new 3 star A.C. We will be able to save 15% of electricity.

Table 3 : Working hour calculation of equipments

Sr. No.	Load	Summer	Winter	Monsoon	Total
1	Lighting	636	390	360	1386
2	Fan	530	0	300	830
3	A.C.	530	0	0	530

Table 4 : Saving Summary By Implementing Proposed Lighting and FAN load

Sr. No	Equipment	Average investment (Rs.)	Average Saving (Rs.)		Average Payback (Rs.)	
			Yearly	Monthly	Yearly	Monthly
1	Lighting	966900	536700	44725	1.8	21.62
2	Fan	960000	181852	15154	5.28	63.35
3	Street Light	22800	68716	5726	0.33	3.98

In Above Table, It Is Shown That How Much Investment Is Necessary To Replace The Existing Equipmentswith New Equipments. Calculation Of Yearly Saving And Monthly Saving Gained By This Replacement Practice Is Also Shown. In Addition To, In Howmuch Time We Will Get Payback That Invesrment Is Also Shown In This Table.

VI. Major Findings:

Electrical equipments are big part of basic infrastructure facility which is necessary to provide in any infrastructure. Now a days, major innovation is going on in these electrical equipment. Most of the modern equipments are energy saving. So, we should be aware of such new equipments, which are energy saving as well as economic. By replacing old equipments we can save energy and for long run they are economic and environment friendly.If same practice will be carried out in B.V.M. it will turn into environment friendly and economic decision.

VII. Future scope of work:

Based on findings and data collecting we can apply the same practice for all the institutes which has older electrical equipment. It can also be applied to the public infrastructure like Schools, Hospitals, Busstations, Railway stations.

VIII. Conclusion:

This paper shows that how the replacement of old electrical equipment by new equipment is can save electrical energy as well as it is economic for the institution itself. And with new equipment we get better quality of service. Moreover, it is environment friendly decision, too. This study is limited to the institute which is using older electrical equipment.

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