

Energy Scrutinize and Efficient Recommendation in Educational Institute.

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Abstract - As we all know energy consumption is enhanced day by day sharply. Audit energy is a rating of energy consumption in a home, business, institute, hospitals, stadium, or any other premises. Energy conservation can be the best way for raising energy demand. Energy Audit is the analysis of energy consumption of an organization. An audit can help to determine how much energy an organization uses, where that organization is losing energy, and which problem areas and fixes it should prioritize to make your home more efficient and comfortable. It indicates the methods that organization can reduce energy consumption and save energy costs. The equipment's used in it can be digital cameras, infrared cameras, led flashlights etc. It involves gathering of system information, usage of energy, developing the energy conservation strategies and implementing changes. This paper deals about the analysis of power usage in educational institutes. Power economy can be done by improving techniques and efficient machinery. So, this paper is just a step ahead to achieve efficiency of energy. This paper briefly explains about importance of energy audit and energy management in and around places of living.

Key Words: audit, energy, Energy audit, conservation

1.INTRODUCTION

Numerous countries throughout the world are working towards sustainable development. Making sustainable development involves factors such as engineering, technology, health, environmental stewardship, economics, welfare of communities, strategies planned by government etc. BEE India have implemented strategies, policies and actions towards attaining a sustainable economy in various fields such as energy efficiency and renewable energy. An important facet of sustainability is energy management. In 2016, India stood fourth worldwide, as the largest consumer of energy. It is also expected that nearly 315 million Indians will move to cities and this in turn will lead to a rise in the energy demand. A large amount of energy and money can be saved by employing energy management in the country. An energy management systems standard was released by ISO 50001 for more efficient use of available energy sources and reducing greenhouse emissions. Launched in 2006, Standards and labeling programmed by BEE provides users

to save energy facility. The energy audit is the process of systematic approach for decision making in the field of energy conservation and energy management. Energy audit is an effective tool in defining and pursuing a comprehensive energy utilization in commercial buildings is increasing rapidly with utilization of more and bigger capacity electrical equipment. Energy audit is the first step which can be conducted within an organization for the development of electrical energy efficient measures. The goal of the energy audit is to emphasize the concept of energy conservation in the campus of an educational institute.

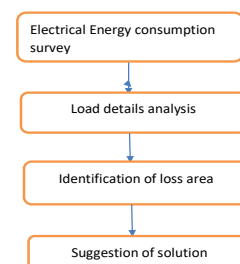
The scope of energy audit study involves:

- Identification of energy saving potential based on the energy wastage in different locations.
- Calculations of energy saving potential based on energy wastage in different locations.
- Recommending low-cost measure to enhance the effectiveness of energy use.

1.1. AUDIT FLOWCHART

As per the energy conservation act, 2001 (pass by govt. of India), Energy audit is defined as "verification, monitoring and analysis of the use of energy including submission of technical report containing recommendation for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption consist of four phases." [1]

The procedure of the audit is presented in the following chart:



[1]

1.2. REPORT-

- **PRE-AUDIT PHASE:**

- Plan and organize.
- Walk through audit.
- Macro data collection.
- First-hand observation and assessment.

- **AUDIT PHASE:**

- Analysis of energy use
- Identification of energy conservation opportunities.
- Select most promising techniques.
- Cost benefit analysis.

- **POST AUDIT PHASE:**

- Implementation of ideas
- Follow up and periodic review.
- Monitor the performance!

1. PRE-AUDIT PHASE

A structured methodology is necessary to carry out an energy audit for efficient working. An initial study of the site should always be carried out as the planning the procedure necessary for an audit is most important.

2. PLAN AND ORGANISE

Planning and organizing are an integral part of the detailed energy auditing. An initial visit to the site is organized. The areas to be inspected are listed. The details regarding the energy consumption of various blocks in the near past are procured and a planned analysis is carried out.

3. WALK THROUGH AUDIT

It is also called as simple audit & screening audit. The main purpose of walk-through audit is to obtain general information. More specific information can be obtained from the maintenance and operational people during the time walk through audit. It also involves a brief review of facility utility bills and other operating data and a walk through of the facility to become familiar with the building operation.

4. MACRO DATA COLLECTION

Current level operation and practices within the campus is assessed and then the data regarding the number of electrical loads connected in each block is collected. The power ratings of each component and their respective hours of operation is observed.

5. FIRSTHAND OBSERVATION AND ASSESSMENT

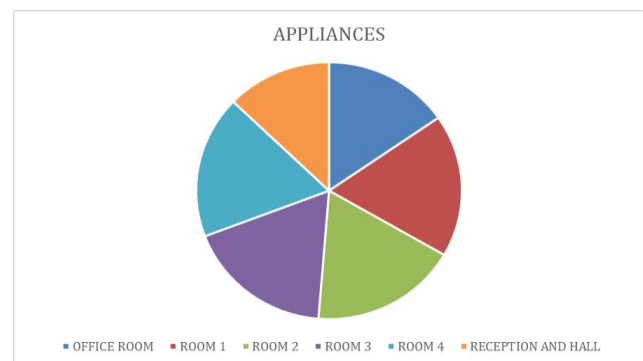
The data collected during the above observation is manipulated and then interpreted. The energy consumed in each room is measured and then the data is visually represented for better understanding. Thus, the energy pattern of the campus can be determined in this assessment. Significance energy conservation opportunities that are appropriate to the campus can also be obtained.[2]

OBSERVATION AND ANALYSIS:

The average energy expense of Paathshala coaching per day is around 1 thousand rupees and thus the monthly expense would be 30 thousand. During macro data collection the following were inspected, and the data were collected.

- Reception and hall
- Office room
- Room 1
- Room 2
- Room 3
- Room 4

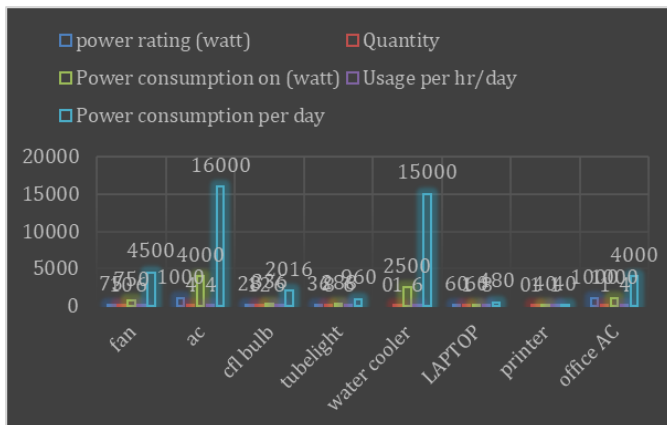
The data collected included various parameters such as number of loads connected to each room, power ratings of each appliance and the operating hours of each appliance.



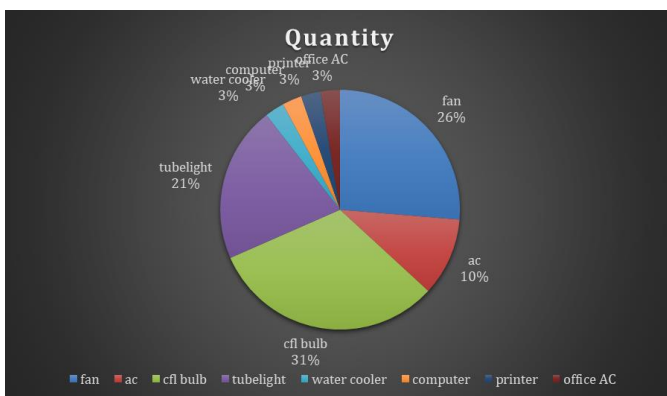
NUMBER OF APPLIANCES

EQUIPMENTS	POWER RATING(WATT)	QUANTITY	POWER CONSUMPTION (W*NO)	USAGE PER HOUR	POWER CONSUMPTION PER DAY (TOTAL NO * NO OF HOUR)
FAN	75	10	750	6	4500
AC	1000	4	4000	4	16000
CFL BULB	28	12	336	6	2016
TUBELIGHT	36	8	288	6	1728
WATER COOLER	2.5per day	1	2500	6	15000
LAPTOP	60	1	60	8	480
PRINTER	30-50	1	40	1	40
OFFICE AC	1000	1	1000	4	4000
TOTAL			8974		43764-WATT HOUR

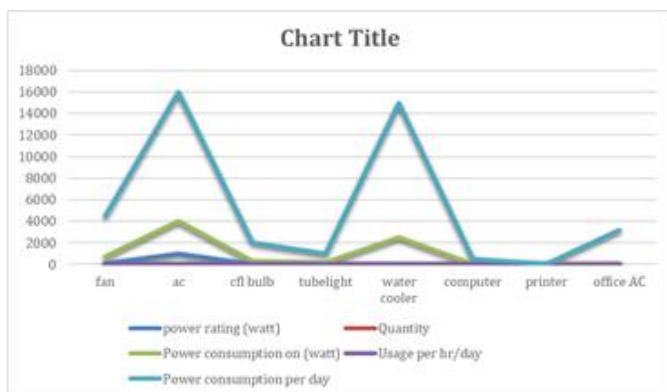
TABLE



GRAPH 1



GRAPH 2



GRAPH 3

RECOMMENDATIONS

Electrical energy and bill can be reduced by some recommendations.

- Tube light and CFL can be replaced by LEDs.
- Normal fans and wall fans can be replaced by 5-star Fans.
- Normal PC can be replaced by 7th generation PCs.
- AC can be replaced by the 5-star rating AC.
- Switch off all the electrical or appliances which are not in use to reduce energy losses.
- Set the refrigerator temperature with respect to the climatic condition.

6. CONCLUSIONS

These audits are important for society, buildings, offices, rooms etc. Energy is one of the major parts for economic development of any nation. In this paper we have suggested necessary changes and net savings after analyzing the amount of wattage consumed by different devices. We can use it for some other devices. By using Energy Efficient appliances, we can save, reduce shortage of energy, and can power hike.

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