

Energy audit of IMS Engineering College, Ghaziabad

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Abstract - All electrical load or data collections for energy audit of IMSEC was carried out by the fourth year students during July, August 2016 and it is verified again by third year student in January 2017. This audit was done to identify the areas in the institute having wastage of energy and to search different methods to reduce the electricity consumption. Detailed analysis and survey of all electrical loads of IMSEC was done and studied and it was found that if common appliances are used in smart and effective ways it may help to reduce consumption. Data collection consisted loads of all academic areas, hostels, faculty cabins and common areas and it was found that lightning loads are the main electricity consumption area to be focused. The necessity of this audit comes in mind after looking electricity bills every month which are in many lakhs. Saving money on electricity bills are attractive to businesses, industries and institutions. Customers whose electricity bills are large fraction of their income are strongly motivated towards the detailed survey and energy management methods.

The report provided contains certain approximations wherever needed and some loads are ignored during data collection if it was observed low percentage of total load.

1. INTRODUCTION

IMS Engineering College Ghaziabad is established in 2002 and it is one of the top engineering colleges in Delhi NCR providing technical education. The institute has 4 boys hostels, 1 girl hostel, 2 academic blocks, 1 academic cum administrative block, 1 library, 1 sewage plant. As on the date, the student strength of the institute is about 3137 with total faculty plus staff strength of about 300 and over an area of about 10 acre. The institute load demanded is 667 KVA and annual electricity bill keeps up around 1.8 crore. This huge electricity bill attracts the attention naturally. Making the institute energy efficient will not only concern with reduction in electricity expenses but also helps us to remind our moral responsibilities of not wasting this precious resource which may be used by people of the country in need.

1.1 Objective of Audit & Present scenario

The objective of Energy Audit assumes significance due to the fact that IMSEC electricity bill had found to be very large during 2016 -17. The objective is to promote the idea of energy saving, reducing the electrical energy consumption, also it was opportunity for the students to feel practical problems and difficulties in performing energy audit calculations.

2. METHODOLOGY OF AUDITING

2.1 Data collection & Analysis

For suggesting any idea regarding power consumption, it is essential to know consumption in detail. For this, team was formed who went to each department, hostels, library, labs and detailed information about appliances was collected. Many appliances were mentioned rated values on name plate but actual power

consumed is measured by power analyzer. Some other useful information was also obtained with interviewing electricians working in the institute.

Light intensity was measured using luxmeter. Some approximations were taken while there was lack of information or sometimes loads was neglected considering very small fraction of total load.

Main problem was faced during the data collection concerned with time usage of electrical appliances hours per day and days per year. To sort out this particular problem, data collection was verified with electricians, students in hostel, wardens, chief warden and office workers.

2.2 Recommendation& Action plan

Following steps:

1. Estimating total cost after replacing an appliance or process (in rupees)
2. Estimating per year energy saving (in rupees)
3. Calculating payback period (in years) in which above two amounts balances each other.

3. POWER CONSUMPTION ANALYSIS

3.1 Overall campus energy consumption

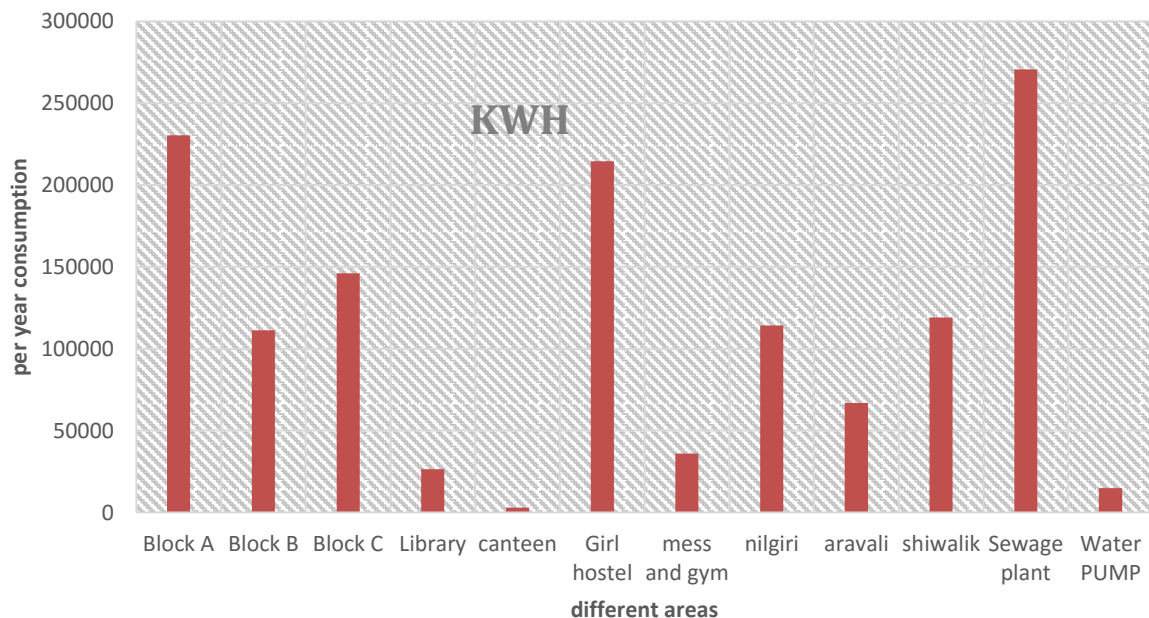
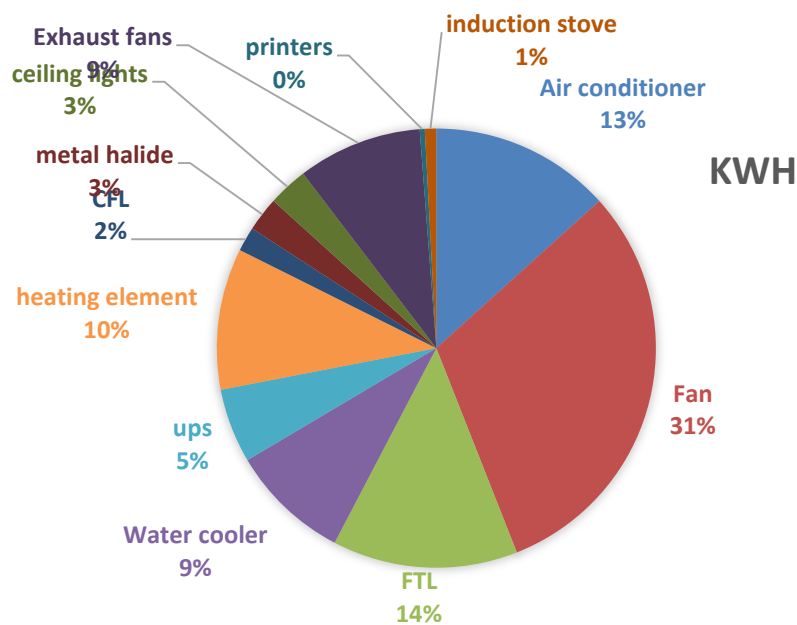


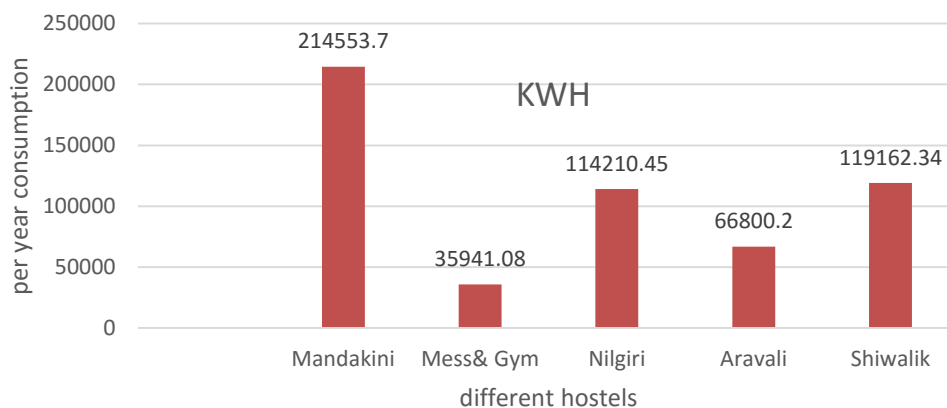
Fig1.1: Bar graph representing overall campus energy consumption

In the above chart maximum consumption is observed in Sewage plant which might be due to the large rating motors continuously running whole day. Second largest consumption was seen in block A. it was observed that huge amounts of Air conditioners (split and windows) together with centralized one consumes power significantly. Mandakini (girl's hostel) was third highest consumption area and more than Block B. The reason was clear that more numbers of Fans, FTLs with more time duration of use, also blocks open for 5 days generally but it was not the case of Hostels which were open all over the week. Mess and library consumes less energy due to less quantity of Fans and FTLs. Canteen load was observed negligible.

3.2 Equipment wise consumption



3.2 Consumption of hostel



Conclusion

There are various ways of improving present situation. Based on previous analysis it is quite clear that as far as overall campus & hostels are concerned, if Fans of low rating is used it may be very useful in reducing the electricity bill. However during block wise load analysis it was found that UPS and Air conditioners cannot be underestimated as these areas seems to be having a lot of potential of improving energy efficiency.

1. Use of energy saver for air conditioner
2. Installation of solar water heating system
3. Installation of biogas plant
4. Lighting saving
5. Improvement of power factor

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