Energy auditing of Boys Paying Guest Building

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Abstract

In many countries, reducing energy usage in buildings has become a common concern. This makes the effort to save energy consumption extremely significant. The audit energy is a point of departure for energy saving activities. With audit energy, a machine can accomplish the energy usage trend and the energy consumption scheme can be drawn up. An energy audit is a preliminary practice for the creation of energy conservation programmes. The survey data was analyzed in detail and the scope of saving was identified by the most likely and easiest area for attention. This paper presents energy auditing in a 2 Storey Boys Paying Guest building in order to achieve effective usage of energy.

Keywords: consumption, building, energy, pattern, audit.

I. Introduction

Power is a significant resource for the growth of human civilization. However, with the global economy, world population, and human living conditions rapidly rapid energy use contributes to rising competition for energy supplies and environmental pollution [1-3]. The loss of global fossil fuels is imminent and will end profoundly in the 21st century. The world-wide oil reserve could generate for 30 years or longer, natural gas and coal for 53 years and 140 years. Around the same time, rising CO2 emissions and reducing greenhouse gas emissions is going to be a significant problem. Emissions of environmental pollution (as carbon dioxide , nitrogen oxide, particulate matter) have risen year after year with the rise in world oil use, and fossil energy is seriously detrimental to the atmosphere and global climate day after day[4]. The more reliable and clean energy sources , such as solar energy, are better off than other traditional sources of energy because of the world's renewable energy source 's growth and usage trend[5]. Wind power technology prices are significantly smaller than the traditional energy supply, so renewable energy technology grows more quickly in industrial manufacturing and rises by 27 per cent annually. The amount of consumption of energy is rising every day[6]. Power has a big part to play. It is the secret to our productivity, our relaxation and our climate. There is a direct correlation between energy usage per person and living standards in each economy. Greater oil consumption per household means a greater gross domestic product per capita[7]. The basic elements of industrial goods, employment, economic development, climate and comfort are electricity. Energy can be categorized as:

- Primary and Secondary Energy
- Commercial and Non-Commercial Energy
- Renewable and Non-Renewable Energy

Primary and Secondary Energy

The principal sources of energy are those contained or deposited in nature. Coal, gas and biomass are the common primary sources of energy. The primary sources of energy are primarily made into secondary sources of energy such as coal , oil and gas into steam and electricity[8].

Commercial and Non-Commercial Energy

The energy sources available on the market at such prices are classified as industrial sources of energy. Non-commercial sources of electricity, which may not be available on the commercial market at a profit, are listed. These include conventional fuels such as firewood, animal dung and farm waste.

Renewable and Non-Renewable Energy

Renewable energy is energy derived primarily from inexhaustible sources. Examples of renewables include wind , solar, geothermal and mains electricity as well as hydropower. Non-renewable energy is energy extracted from fossil fuel sources such as coal, oil , and gas, which are accused of being exhausted over time.

II. Energy audit

An energy audit is an assessment, evaluation and review of energy flows in a building, a procedure or a device and aims at identifying the energy dynamics of the system under research and maintaining a high energy efficiency. The energy analysis usually aims to minimize the amount of energy input into the device, without impacting the output(s) negatively[9]. "The Energy Audit is used to classify all energy sources in an installation and to measure energy consumption through distinct tasks, equivalent to the monthly accounting framework closing statement." If an inhabited building is studied, so energy consumption is decreased while the comfort and protection of the human being are preserved or enhanced. In addition to merely defining energy sources, an energy audit attempts to prioritise energy consumption in compliance with the largest and least cost-effective energy savings opportunities[10]. A critical step in saving and rising energy efficiency is the on-going energy management that has taken place in energy usage audits both in the past and present. The following steps are part of the energy audit:

A. *Data collection*

In estimating building energy use it is very important to collect the historical details of energy use, and to consider the condition of energy use. The electricity bill and metre reading are used to gather such information. The monthly

energy usage data for the last three years or older are at least expected to achieve a detailed examination of the results.

A. *Surveys and measurement*

The energy consumption of the building should be established as recently as possible by means of field surveys and measurements. The acts to boost energy efficiency may be calculated by evaluating energy usage results.

B. Energy consumption benchmarks

Benchmarks for energy usage vary from metrics for energy consumption. They are crucial instruments for determining the situation in various forms of energy usage. Energy efficiency should be compared with the energy consumption benchmark in the same style of building

C. Location of Building

The 2 story boys paying guest building is located in Ludhiana district of Punjab state. It is located near to famous club "Lodhi club".

III. Objective

The project's goal is to develop the building's energy infrastructure to reduce heat usage and to conserve energy and money.

IV. Data Analysis and Discussion

The energy consumption by CFLs(total 12) connected in 6 rooms were compared with the energy efficient LEDs light. The energy consumption pattern per day is shown in table 1 and figure 1.

Table 1. Energy consumption By CFLs

Time	No. of Hours	No. of CFLs used	Total wattage	Total energy consumption in
12:00am-5:00am	5	1@18Watt	18W	90Wh
5:00am-7:00am	2	5@18Watt	90W	180Wh
7:00am-9:00am	2	2@18Watt	36W	72Wh
9:00am-12:00pm	3	3@18Watt	54W	162Wh
12:00pm-3:00pm	3	2@18Watt	36W	72Wh
3:00pm-5:00pm	2	3@18Watt	54W	162Wh
5:00pm-7:00pm	2	4@18Watt	36W	144Wh
7:00pm-12:00pm	5	6@18Watt	108W	540Wh
Total	24	26@18Watt	432W	10.368Kwh

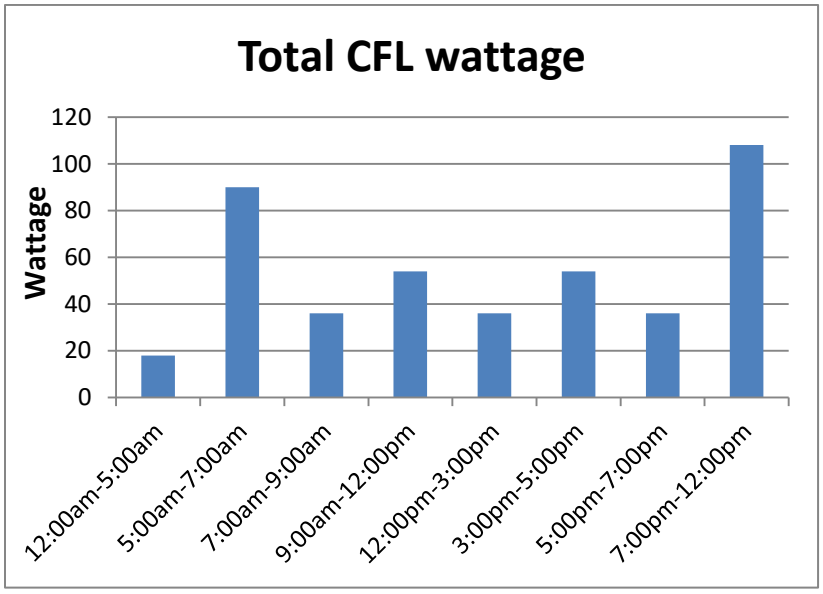

Figure 1. Energy consumption pattern

Table 2 shows the energy consumption by LEDs. The substitution of current CFL with LED per fitting reveals in Table 3, with savings of 2417.76kWh per year (365 days and 24 hours of regular work). The disparity in price between the two lamps is Rs 985. Therefore, Rs11820 is the cumulative price gap. The payback period (see Table 4) is estimated from net spending and savings and amounts to 0,75 years (almost nine months).

Table 2.Energy consumption by LEDs

Time	No. of Hours	No. of CFLs used	Total wattage	Total energy consumption in
12:00am-5:00am	5	1@6Watt	6W	30Wh
5:00am-7:00am	2	5@6Watt	30W	60Wh
7:00am-9:00am	2	2@6Watt	12W	24Wh
9:00am-12:00pm	3	3@6Watt	18W	54Wh
12:00pm-3:00pm	3	2@6Watt	12W	36Wh
3:00pm-5:00pm	2	3@6Watt	18W	36Wh
5:00pm-7:00pm	2	4@6Watt	24W	48Wh
7:00pm-12:00pm	5	6@6Watt	36W	180Wh
Total	24	26@6Watt	156W	3.744Kwh

Table 3 Energy Savings in kWh

Energy Consumption	Per day	365 Days
CFLs	10.368Kwh	3784.32kWh
LEDs	3.744Kwh	1366.56kWh
Savings	6.624kWh	2417.76kWh

Table 4 Payback period

Total Saving per annum	2417.76kWh
Amount @Rs 6.51/kWh	Rs15739.62
Replacement cost of CFLs by LEDs @ Rs985	Rs11820
Payback period(Years)	0.75year =9 Months

Conclusion

The exponential increase in the use of electricity made energy saving very important at the time. In 2-story lighting, boys paying for the guest house will conserve electricity to a greater degree by replacing the old obsolete CFLs with modern powerful and stable LEDs. LED are the CFL, Halogen, and Candle Lamp replacements etc. Different non-star ranking systems shall be replaced by star rating machinery. The Diesel generator sets must be run either at partial or full load according to requirements. Energy will then be saved to a large degree with the effect that energy efficiency is improved.

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