

Energy Audit

Introduction

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“Energy Audit” means the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption.

Significance of Energy Audit

Energy audit is an important process to be carried out for energy conservation. In energy conservation, the thrust is given on the saving of energy while carrying out the required work.

Need for Energy Conservation

- Increased cost of energy.
- Reduction of cost of product.
- Pollution.
- Reduction of use of natural energy sources.

Potential for Energy Conservation in various process:-

1. Energy conservation in Illumination:-

a) Operational means:-

- i. Keep walls and ceilings clean.
- ii. Keep luminaries(reflectors) clean.
- iii. Open the windows to permit maximum sunlight.
- iv. Activity sensors maybe used to switch off lights when not required.

b) Constructional means:-

- i. Use high efficiency lamps. Replace filament lamps with compact fluorescent lamps (CFL).
- ii. Give bright color to walls and ceilings.
- iii. Use electronic chokes for fluorescent, mercury and sodium vapour lamps.
- iv. Use transparent roofing sheets wherever possible .
- v. Suitable reflectors maybe used so that light can be concentrated on the required plane of illumination.

2. Energy conservation in ventilation:-

a) Operational means:-

- i. Keep the windows open for helping cross ventilation and maintaining the air flow.
- ii. Supplement natural ventilation with artificial ventilation.

b) Constructional means:-

- i. Use fans having motors of higher efficiency.
- ii. Use electronic regulators which have losses of about 0.5-1W as compared to 8-10W of resistance regulator.

Numerical

Example:

Replace the 40 watt Fluorescent Lamp with 29 Watt CFL lamp :-

a) Wattage of Existing Lamp = 40 w

Duration of use / year / lamp days = 8Hrs. X 365 = 2920hrs

Total Number of lamps = 100

Total energy consumption (40 X 2920 X 100) = 11680Kw

Wattage of CFL (proposed) = 29 w

The difference in energy consumption = 11 w

Total energy consumption with replacement = 8468 Kw

The difference in energy consumption = 3212Kw

Saving, i.e. difference in energy bill:

Cost / Unit @ Rs.5/- (1 unit = 1 KWh)

Saving (3212 KW X 5) = Rs.16060 /-

b) Cost of Installation of 29 W of Lamp = Rs.100x100 = Rs.10000/-

c) Pay Back Period (10000/16060) = 0 .622 years

Types of Energy audit

Based on available resources, the size and type of building, and the energy audit objective there are two types of Energy Audit namely:

- a. Preliminary Energy Audit
- b. Detailed Audit

Energy Audit methodology

a. Preliminary Energy Audit Methodology:

The preliminary energy audit uses existing or easily obtained data. It is a relatively quick exercise to:

- Determine energy consumption.
- Estimate the scope for saving.
- Identify immediate (especially no-cost/low-cost) improvements/savings
- Identify areas for more detailed study/measurement.

b. Detailed Energy Audit Methodology:

The Information to be collected during the detailed Audit includes:

1. Energy consumption by type of energy, by department, by major equipment.
2. Energy cost and tariff data
3. Sources of energy supply (e.g., electricity off the grid or self-generation)
4. Energy Management procedures and energy awareness training programs within the establishment

Energy Audit instruments



1. Trivector meter



2. Energy Monitor

3. Clamp on ammeter



4. Energy meter



Conclusion

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It can be concluded that as it is not economically feasible to increase generation capacity to cater to the complete demand, we have to adopt energy efficient measures. A general appeal can be made to the public to reduce the energy consumption. Also in industries, if not constructional means then at least the operational means should be adopted which do not require capital investment. This will definitely help in reducing the load shedding which is a great problem for the growing economy. And at last it can be obviously stated that “ENERGY SAVED AND ENERGY GENERATED”.

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