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Energy Audit

Abstract

An energy audit is an inspection, survey and analysis of energy flows in building, process or system with the objective of understanding the energy dynamics of the system under study. Typically an energy audit is conducted to seek opportunities to reduce the amount of energy input into the system without negatively affecting the outputs when the object of study is an occupied building then reducing energy consumption while maintaining or improving human comfort, health and safety are of primary concern. Beyond simply identifying the sources of energy use. An energy audit seeks to prioritize the energy uses according to the greatest to least cost effective opportunities for energy savings.

The energy audit report establishes the needs for plant metering and monitoring enabling the plant manager to institutionalize the practice and hence, save money for the years to come. The steps and sets the preliminary budget for the energy management program.

Keywords: *Energy audit and management (E.A.M.)*

1. INTRODUCTION

An energy audit is systematic study or survey to identify how energy is being used in a building or plant, and identify energy savings opportunities. Using proper audit methods and

equipment, an energy audit provide the energy manager with essential information on how much, where and how energy is used within an organization(factory or building).

This will indicate the performance at the overall plant or process level. The energy manager can compare these performances against past and future levels for a proper energy management. The main part of the energy audit report is energy savings proposals comprising of technical and economic analysis of projects. Looking at the final output, an energy audit can also be defined as a systematic search for energy conservation opportunities.

This information can be transformed into energy savings projects. It will facilitate the energy manager to draw up an action plan listing the projects in order of priority. He will then present it to the organization's management for approval. Providing tangible data enables the management to be at a better position to appreciate and decide on energy efficiency projects. Adopting this activity as a routine or part of the organization's culture gives life to energy management, and controlling the energy use by energy audit is what we refer to as Energy Management by Facts .

2. ENERGY AUDIT STAGES

Energy audit can be categorized into two types, namely walk-through or preliminary and detail audit.

A) Walk-through or preliminary audit

Walk-through or preliminary audit comprise one day or half day visit to a plant and the output is simple report based on observation and historical data provide during the visit. The findings will be a general comment based on rule-of-thumbs, energy best practices or the manufacturer's data.

B) Detail audit

Detail audit is carried out for the energy savings proposal recommended in walk-through or preliminary audit.It will provide technical solution option and economics analysis for the factory management to decide project implementation or priority. A feasibility study will be required to determine the viability of each option.

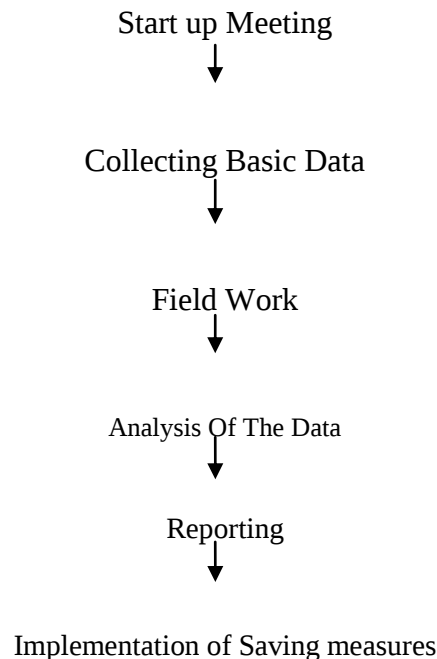
3. DETAIL ENERGY SURVEY

Detailed evaluation of energy use pattern

- By process and equipment
- Measurement of energy use parameters
- Review of equipment operating characteristics
- Evaluations of efficiency

- Identify DSM option and measures
- Recommendation for implementation

4. ENERGY AUDIT PROCEDURE IN GENERAL



5. EXECUTIVE SUMMARY

After the historical data, the Field Measurements we observed following points and we present herewith following recommendation to reduce the Energy consumption in the Street Light Facility, with Investment requires and the payback period.

5.1 Observations (Street Lighting):

1. Indapur Nagar Parishad has about 18 DPs
2. The Total lighting Load is about 157.5kw
3. It is observed the various types of lights fittings used for Street Lighting include.
 - 250 W mercury vapour lamps
 - 250W sodium vapour lamps

It is observed that the operation of Lights switching ON and OFF is manual. This is disadvantageous from following aspects namely:

- a. It consumes extra time of almost 2 hours per day

- b. It requires at least manpower of 4 to 5 members
- c. It consumes Petrol.

6. INRODUCTION TO SREET LIGHTING FACILITY

The Indapur Nagar Parishad receives Electricity Supply from MSEDCL at 11 kV Supply Voltage. In the total Indapur City, there are about 18 Distribution Poles with Transformers at various locations. The connections to Street Lighting Facility are through these D.P.s.

6.1 Types of light

The various types of Fittings used for Street Lighting Facility are listed as under.

No.	Types Of Fitting	Load In KW	% Contribution to Total Load
1	250 W MVL	83.25	52.44
2	250 W SVL	75.5	47.55
	Total	158.75	99.85

Table 1 : Types Of light

6.2 Fitting wise load distribution

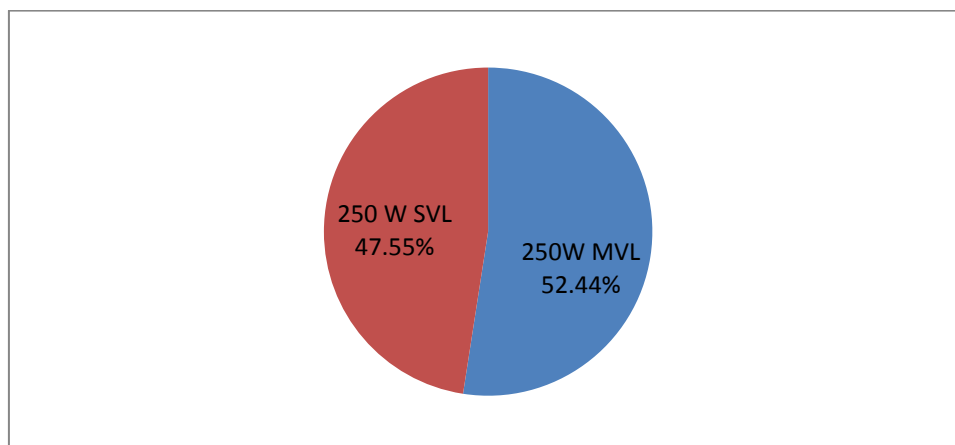


Chart 1 : Fitting wise load distribution

Sr.No.	Present Condition	Recommendation	Saving Potential In KWh/Day	Annual Saving Potential in KWh/Annum	Annual Monetary Saving In Rs/Annum	Investment Required	Simple Pay Back Period
1	Manual operation of switching On/OFF operation Of Street Lights	Usage an Automatic Timer Controller with Voltage Control	316	115340	461360	396000	11 Months
2	Usage of Nos.630 250 W Sodium Vapour lamp	Usage of CFL	1323	482895	1931580	1040000	7 Months

Table 2 : Simple Pay Back period

7. ENERGY CONSERVATION PROPOSAL-1

Particular	Value	Unit
Present condition		
Total lighting electrical load	158.75	Kw
Energy is wasted for a period of	2	Hours
Total energy wasted per day for 2 hrs	317.5	Kwh
Thus daily energy wasted	317.5	Units
Annual energy loss	115887.5	Units
Recommendation: usage of timer		
This will avoid 2 hrs energy loss		
Saving calculations:		
Energy loss avoidable with the usage of auto timer device	115887.5	Units
Rate of electricity	4.00	Rs/unit
Annual monetary saving	463550	Rs
Investment required		
Cost of timer	22000	Rs/units

Total Investment Require for 18 DP's (22000*18)	396000	Rupees
Simple Pay Back Calculation:		
Simple Pay Back Period	11	Month

Table 3 : Energy conservation proposal-1

8. ENERGY CONSERVATION PROPOSAL-2

Change Of 630 Lamps by CFL (45 Watt)

Particular	Value	Unit
Present Condition:		
Usage Of 630 Lamps		
Total Electrical Load Of these Lamps	158.75	KW
Total Energy consumed per Day	1905	KWh
Recommendation: Usage of CFL Fitting		
Saving Calculation:		
Energy Saving Potential with The Usage Of CFL Fitting Per Day	1323	Kwh/Day
Saving in Annual Energy	482895	KWh/Annum
Rate Of Electricity	4.00	Rs/Unit
Annual monetary Saving(482895*4)	1931580	Rupees

Table 4 : Energy conservation proposal-2

9. INVESTMENT REQUIRED

Cost of each fitting	825.50	Rs/Unit
Total Investment Required For 1260 Fitting	1040000	Rupees
Simple Pay Back Calculation:		
Simple Pay Back Period	7	Month

Table 5: Investment Required

10. CONCLUSION

Energy audit is the most important factor to save the electricity and we study the street lighting of indapur nagar parishad and how to save the electricity

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