

REVIEW OF ELECTRICAL ENERGY AUDIT AT KINETIC GEARS

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Abstract - - In Today's scenario India is facing a shortage of electrical power availability. The large area in high energy consumption in world is industrial area. The gap between demand and supply is increasing due to increase in demand of electrical energy. Day by day, energy demand expanding so that it is necessary to diminish energy consumption for that energy conservation is required. The energy audit is the best alternative for Conservation. The main aim of this project is to calculate use of energy in above industry for lighting load, machine load purpose and find the opportunities for energy saving.

Key Words: Energy Conservation, Energy Audit, Energy Consumption

1. INTRODUCTION

According to energy conservation act 2001, Energy audit is defined as the verification, monitoring and analysis of 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". The three top ranker operating expenses in an industry are energy, labour and material. The most expenses required for energy. Hence it is necessary to reduce operating cost. An energy audit gives various methods for energy saving opportunities, Maintenance methods, quality control of energy, information of new upgrade technologies in energy saving area which require energy conservation and improvements.

1.1 Energy Audit

Energy Audit is the key to a systematic approach for decision-making in the area of energy management.

Energy audit will help to find out more about the ways energy and fuel are used in any industry, and help in recognize the areas where waste can take place and where scope for enhancement exists. The main aim of an energy audit is to find out the ways to reduce energy consumption per unit of product output.

Energy audit gives a "bench-mark" (Reference point) for handling energy in the firm and also gives the basis for planning a more systematic use of energy throughout the firm.

1.2 Type of Energy Audit

1. Preliminary energy audit

This is also known as walk through energy audit. In this audit simple analysis of energy use and performance of the plant is checked. These audits take a relatively less time and the results are more general providing common opportunity for energy efficiency.

2. Detailed energy audit:

Three phases of detailed energy audit;

Phase I – Pre-audit phase

Phase II - Audit phase

Phase III - Post audit phase

2. ENERGY AUDIT FOR KINETIC GEARS

2.1 Introduction of company

We planned to conduct Energy Audit of industry "Kinetic Gears in MIDC, Hingna, Nagpur" is a top player in the category Bevel Gear Box Manufacturers in the Nagpur.

The products of the company are as follows :-

1. Bevel Gear Box Manufacturers
2. Transmission Gear Manufacturers
3. Tractor Gear Manufacturers
4. Excavator Sun Gear Manufacturers
5. Gear Box Manufacturers
6. Transmission Gear Manufacturers
7. Pinion Gear Manufacturers
8. Gear Part Manufacturers



Fig.-1: Product Gallery

2.2 Details of connected Load

Table -1: Details of Connected load

Sr. No.	Connected Load	Quantity
1.	VMC (Vertical Milling Centre)	3
2.	CNC (Computerised Numerical Control Machine)	8
3.	HOBBS Machine	4
4.	Broaching Machine	1
5.	Surface Grinder	2
6.	Cease Fire	4
7.	C Less Grinder	1
8.	Milling	1
9.	Drilling Machine	1
10.	Lights	20
11.	Fan	13
12.	Cooler	3
13.	Computer	4

2.3 Details of Electrical Load

1. Total connected load:-103 KW

Table-2: Consumption of Energy in 2019

Bill Month	Consumption (Units)	Bill Demand (KVA)	Bill Amount (Rupees)
Dec 2018	23,567	37	1,74,722.18
Jan 2019	13,413	33	1,09,808.50
Feb 2019	12,254	34	1,00,742.30
Mar 2019	13,652	33	1,13,189.39
Apr 2019	11,812	33	1,01,176.39
May 2019	17,890	33	1,35,914.71
Jun 2019	16,604	33	1,40,730.57
Jul 2019	15,461	39	1,34,500.18
Aug 2019	7,110	33	69,581.42
Sep 2019	5,722	33	60,580.78
Oct 2019	6,061	33	63,831.20
Nov 2019	7,923	33	78,911.62

ENERGY CONSUMPTION IN UNITS

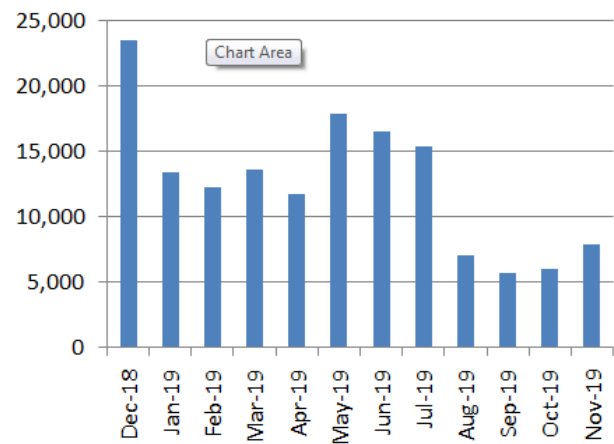


Chart -1: Energy consumption in 2019

3. PROBLEM STATEMENT

Variety of machines are used in industry on regular basis their maintenance and repair is a crucial problem in industry. This plays an important role in consumption of energy which increases the energy bill. Hence, proper utilization of energy in this area is required. This paper aims to focus on the proper utilization of machines in the industry.

4. METHODOLOGY TO BE ADOPTED

1. Deciding area of energy audit.
2. Analysis and collection of data required.
3. Observations drawn from general working condition.
4. Calculate energy consumption by measurement.

5. RECOMMENDATIONS

5.1 LIGHTING

In industrial lighting most of the power get wasted due to improper utilization, inadequate maintenance, etc. Here energy can be saved by taking few precautions.

- 1) Regular maintenance which helps to maintain quality illumination.
- 2) Minimize Off time energy used.
- 3) Prefer natural light during day time.

5.2 FAN

In the industry fans and blowers are widely used for ventilation purpose. The energy saving measures can be taken in this area as follows:-

- 1) Provide maximum natural ventilation.
- 2) Use of energy efficient fan.
- 3) Minimizing the requirement using proper media.

5.3 MOTOR

Electric motor is the leading energy consuming area in industrial sector. It includes different types of machines such as CNC, VMC, HOB machine, Broaching Surface Grinder, C less Grinder, Milling, Drilling machine. Proper handling and regular maintenance plays important role in minimizing electricity wastages. Few steps can be taken to achieve this

- 1) Selection Of Motor
 - i) Proper rating of motor helps to avoid overloading & under load operation.
 - ii) As industrial drive work on variable speed control in speed requirement is required.
 - iii) Availability of auxiliary equipment in case of failure.
 - iv) Cost of motor.
- 2) Proper Handling of Motor
 - i) Providing regular maintenance.
 - ii) Proper ventilation.
 - iii) Replacement of improper part of motor.
 - iv) Using proper speed controls.

5.3 MAINTENANCE OF POWER FACTOR

The power factor shows the quantity of power generated in all the industries having inductive load. It is mandatory to maintain power factor close to unity. Low power factor causes various undesirable operations such as increase in losses which reduces efficiency. The low power factor or quality of power factor can be improved by using various compensator such as static capacitor, synchronous condenser, etc.

6. CONCLUSION

India is a developing country with highest industrial development energy audit is the best tool for calculating the efficiency of industrial sector. This study also give

general as well as work specific recommendation to improve use of energy during production. This analysis saves the cost of production, cost of energy & cost of time. BEE has made energy audit compulsory for industrial sector. This paper summarize the general concept of energy audit and probable recommendations for improvement of efficient use of energy in lighting, fan, motor, etc. which leads the energy saving up to 65-70%.

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