THAPAR POLYTECHNIC COLLEGE

SECOND ASSIGNMENT

Department: Electrical Engineering
Semester: 6th
Subject: Energy Management
Teacher Name: Dr. Anurag Joshi

Q.1 Explain BIS salient design features.

Q.2 Explain the working and advantages of Amorphous core transformer.

Q.3 Write a advantages and disadvantages of CFL with electronic ballast block diagram.

Q.4 Explain the various factors that determine the selection of power cables.

Q.5 Explain working and advantages of LED?

Q6. Explain the placement of capacitor arrangement for distribution system with neat figure.

THAPAR POLYTECHNIC COLLEGE

THIRD ASSIGNMENT

Department: Electrical Engineering
Semester: 6th
Subject: Energy Management
Teacher Name: Dr. Anurag Joshi

Q.1 What is Environmental Impact Assessment & what is its need?

Q.2 Draw the flow chart of phases of EIA from screening to follow-up.

Q.3 What are EIA guiding principles?

Q.4 What are the different types of impact in evaluation of EIA?

Q.5 Write short note on Impact Prediction also explain the important consideration for impact prediction.

Q6. Explain the evaluation of impact & how is impact significance determined?

Thapar Polytechnic College, Patiala
Department of Electrical engineering

Seminar Topic
SESSION:- JAN-MAY 2020

Semester/Branch: - 6th Electrical **Subject Name**

S.No	Name of the student	Roll no.	Seminar Topic
1.	Abhishek	2017/81	Energy Management
2.	Akash Kumar	2017/82	Energy Management
3.	Akshdeep Singh	2017/83	Energy Management
4.	Amritpal Singh	2017/84	Energy Management
5.	Ankush Pandey	2017/86	Energy Management
6.	Ashish Jindal	2017/87	Energy Management
7.	Balwinder Singh	2017/88	Energy Management
8.	Bikram Singh	2017/89	Energy Management
9.	Bobby sharma	2017/90	Energy Management
10.	Damanpreet Singh	2017/91	Energy Management
11.	Deepak Gupta	2017/92	Energy Management
12.	Deepak Ram	2017/93	Energy Management
13.	Deepak Singh	2017/94	Energy Management
14.	Dishant Joshi	2017/95	Energy Management
15.	Gagandeep Sharma	2017/96	Energy Conservation
16.	Gaurav Garg	2017/97	Energy Conservation
17.	Gautam	2017/98	Energy Conservation
18.	Gunjot Singh	2017/99	Energy Conservation
19.	Gurpreet Singh	2017/100	Energy Conservation
20.	Harinderpal Singh	2017/101	Energy Conservation
21.	Harsh Thakur	2017/103	Energy Conservation
22.	Harwinder Singh	2017/104	Energy Conservation
23.	Jagjeet Singh	2017/105	Energy Conservation
24.	Japkirat Singh	2017/106	Energy Conservation
25.	Jivesh Bhambri	2017/107	Energy Conservation
26.	Madhur jain	2017/109	Energy Conservation
27.	Manpreet Singh	2017/111	Energy Conservation
28.	Manpreet Singh	2017/112	Energy Conservation
29.	Mukul Rahela	2017/113	Energy Efficient Devices
30.	Navdeep Singh	2017/114	Energy Efficient Devices
31.	Parvesh Noria	2017/115	Energy Efficient Devices
32.	Pooja Rani	2017/116	Energy Efficient Devices
33.	Prabhjot Singh	2017/117	Energy Efficient Devices
34.	Prabhsimran Singh	2017/118	Energy Efficient Devices
35.	Prince Goyal	2017/119	Energy Efficient Devices
36.	Prince Thakur	2017/120	Energy Efficient Devices

S.No	Name of the student	Roll no.	Seminar Topic
37.	Rajnish Pushkar	2017/121	Energy Efficient Devices
38.	Rajwinder Singh	2017/122	Energy Efficient Devices
39.	Ram Kumar	2017/123	Energy Efficient Devices
40.	Ramandeep Singh	2017/124	Energy Efficient Devices
41.	Rekha Rani	2017/125	Energy Efficient Devices
42.	Rishab	2017/126	Energy Efficient Devices
43.	Sahil	2017/127	Energy Audit
44.	Sahil Dhall	2017/128	Energy Audit
45.	Sakshi Sharma	2017/129	Energy Audit
46.	Sanskar Sagar	2017/130	Energy Audit
47.	Simarpreet Kaur	2017/135	Energy Audit
48.	Shiv Kumar	2017/131	Energy Audit
49.	Shivreet Singh	2017/132	Energy Audit
50.	Shobit Kumar	2017/133	Energy Audit
51.	Shubhdeep Singh	2017/134	Energy Audit
52.	Snehdeep Sharma	2017/136	Energy Audit
53.	Sonu Garg	2017/137	Energy Audit
54.	Taranbir Singh	2017/138	Energy Audit
55.	Tushar Gautam	2017/139	Energy Audit
56.	Vikas Kumar	2017/140	Energy Audit
57.	Vishal Kumar Bawa	2017/141	Environmental Impact Assessment
58.	GAUTAM	2018/147	Environmental Impact Assessment
59.	INDERJEET SINGH	2018/148	Environmental Impact Assessment
60.	KOMALPREET SINGH	2018/149	Environmental Impact Assessment
61.	LABH SINGH	2018/150	Environmental Impact Assessment
62.	NARINDER KUMAR	2018/152	Environmental Impact Assessment
63.	SACHIN	2018/153	Environmental Impact Assessment
64.	SANDEEP SINGH	2018/154	Environmental Impact Assessment
65.	SIMRANJIT SINGH	2018/155	Environmental Impact Assessment
66.	VIKAS KUMAR	2018/156	Environmental Impact Assessment
67.	Gurwinder Singh	2017/577	Environmental Impact Assessment

1. Life cycle costing
   https://www.youtube.com/watch?v=nwGmEgdRyDs

2. Replacement of conventional motors with energy efficient motors
   https://www.youtube.com/watch?v=UTAJtFQb-0M

3. Energy efficiency in motors & how to calculate efficiency of an induction motor
   https://www.youtube.com/watch?v=wMo2vGBKpl8
   https://www.youtube.com/watch?v=ZRiry6Gcojg

4. Common Electric motor failure types & causes
   https://www.youtube.com/watch?v=rRG2sAde57g

5. Motor maintenance and troubleshooting
   https://www.youtube.com/watch?v=ntOc4h792UE

6. Motor nameplate details
   https://www.youtube.com/watch?v=mKSKnYWTJ0M

7. Electrical standards / IEC Standards / IEEE Standards
   https://www.youtube.com/watch?v=IHMIiv_bdDI
   https://www.youtube.com/watch?v=JNBCqXTP6SY
   https://www.youtube.com/watch?v=eRu3oHA1ZIw

8. Power sources
   https://www.youtube.com/watch?v=0c4xk5dB014
   https://www.youtube.com/watch?v=UER0fYNsv2U
   https://www.youtube.com/watch?v=uStFvcz9Or4

9. Incandescent and halogen lamp & LED light manufacturing process
   https://www.youtube.com/watch?v=_cs3_fjjCbI
   https://www.youtube.com/watch?v=Dns-TSudyh4
   https://www.youtube.com/watch?v=vKHCSRYcEYo
   https://www.youtube.com/watch?v=9iUfCHzDUzY

10. Distributed energy resources , Electrical grid & electrical distribution system
    https://www.youtube.com/watch?v=5uSOp9tvVrA
    https://www.youtube.com/watch?v=DlGSGJISxUI&list=PLLy_2iUCG87DxrqJr3dBhSruMiRHK0rNr
    https://www.youtube.com/watch?v=nbPmsBmo03Y
    https://www.youtube.com/watch?v=Y7_zKCnGgsI

11. Power factor and its improvement
    https://www.youtube.com/watch?v=Dq95iXYeTaw
    https://www.youtube.com/watch?v=PdCwlYbgxho
    https://www.youtube.com/watch?v=Tv_7XWf96gg

Energy Audit

Definition of Energy Audit

- **As per Indian Energy Conservation Act 2001, Energy Audit is defined as:**

"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 "

Energy monitoring & targeting Importance

An effective monitoring & implementing system with adequate technical ability for analyzing energy saving options is key to ENERGY MANAGEMENT

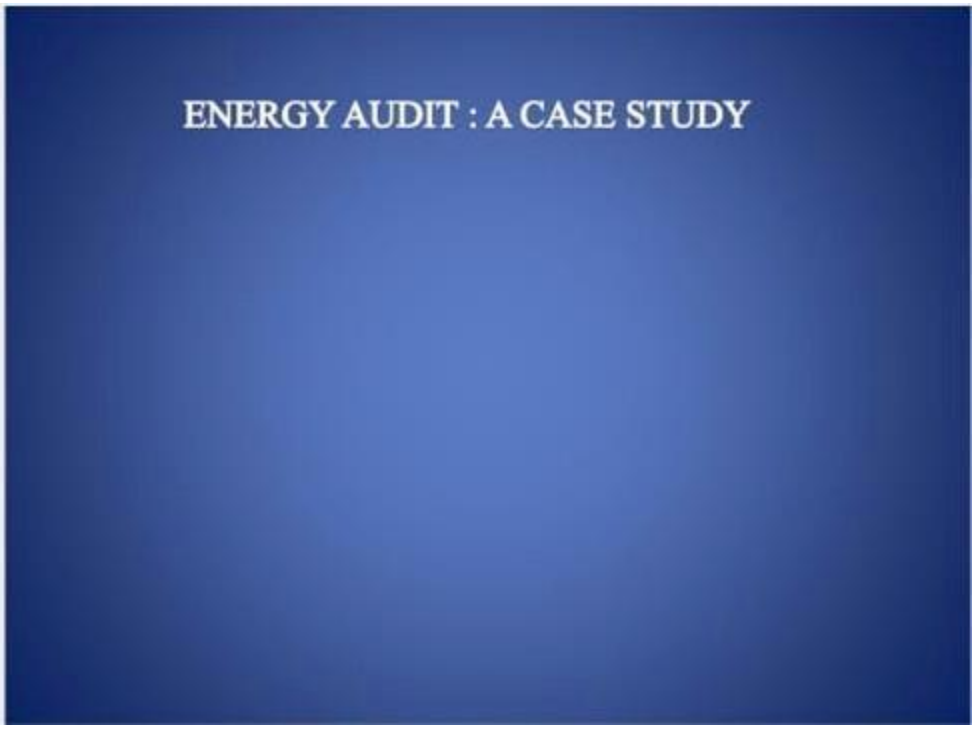
Energy monitoring and targeting is primarily a management technique that uses energy information as a basis to eliminate waste, reduce and control current level of energy use and improve the existing operating

procedures.

These techniques covers all plant and building utilities such as fuel, steam, refrigeration, compressed air, water, effluent, and electricity are managed as controllable resources in the same way that raw materials, finished product inventory, building occupancy, personnel and capital are managed.----It Becomes the **"Energy Cost Centers."**

Why the Need for Energy Audit

- The three top operating expenses are energy (both electrical and thermal), labour and materials.
- Energy would emerge as a top ranker for cost reduction
- primary objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating costs
- Energy Audit provides a " bench-mark" (Reference point) for managing energy in the organization



Contents:

Need for Energy Conservation

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

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.

Continued...

4.7. CASE STUDIES OF ENERGY AUDIT

✦ 4.7.1. Distribution system

This detailed study was carried out in August 27, 2007 to study power quality and energy conservation potential of the entire facility at corporate office and main building of one of the leading public sector bank in India.

Electricity was received at 11 kV from the sub-station of the state electricity board. The sanctioned contract demand for the facility was 1450 kV A, but in April 2007, the demand was exceeded to 1478 kV A.

Present power factor was varying between 0.94 and 0.95.

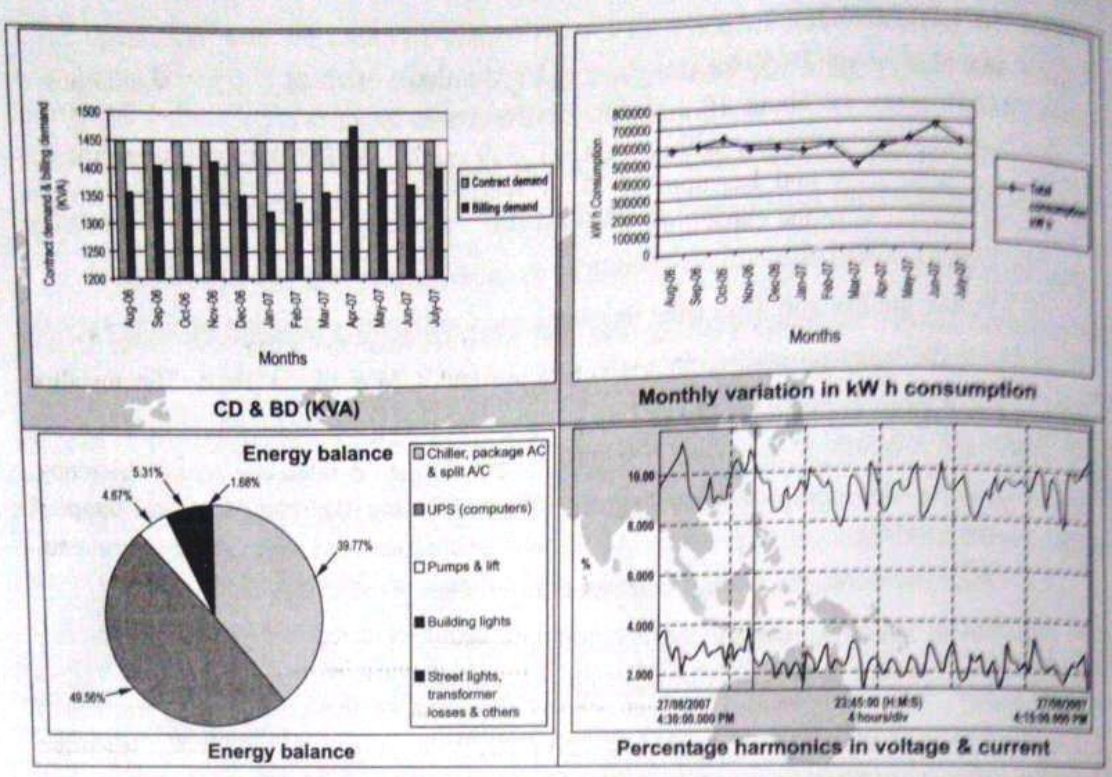


Fig. 4.7. Graphical observations of measurements in energy audit.

Findings and Recommendations :

1. Average billed power factor was 0.94 to 0.95. Significant saving will be achieved by increasing the power factor from 0.94 to unity (1) at the distribution side by installing additional capacitors. This will result in 7 to 8% savings in the electricity bill with payback in few months.
2. Sometimes it was observed that maximum demand is exceeding the contract demand, therefore it is recommended to install Maximum Demand (MD) controller to reduce the MD. Hence, penalty is avoided and demand charges are reduced.
3. The motors having percentage loading less than 50% are recommended to make changeover of connections from delta to star and replace FTL/ copper chokes with electronic chokes.
4. Numbers of window air conditioners and split air conditioner units had been installed as per the requirement. It is recommended to transfer this air conditioning load to centralized air conditioning system as the kW/TR of window air conditioners or split air conditioners is high as compared to water cooled condenser systems (1.5 to 2 versus 0.7 to 1 kW/TR). This is possible by installation of additional AHUs. This will result in 5 to 6% saving in total electricity bill with a payback of less than year.

About the Assignment :

Power and energy audit had been carried out considering BEE and ECBC guidelines, IS guidelines and IE rules. In this audit, main objective had been to study :

1. HT/LT sub-stations with DG sets and its adequacy.
2. Installed UPS systems and its performance, Adequacy of the back-up/redundancy.
3. Energy conservation in air-conditioning, lighting, pumping and any other area.
4. Power quality and associated problems and thoroughly evaluating earthing system.

How did audit was approached ?

Power and energy audit in buildings was comparatively more recent than industrial energy audits. Approach followed in this study had been as follows :

1. Figure out complete distribution system including the hardware and operating parameters.
2. Measurements for energy consumption, efficiency and losses evaluation.
3. Identification of energy conservation opportunities.
4. Quantification of energy conservation opportunities.
5. Recommendations for energy saving measures.
6. Effects of harmonics on the UPS and main transformer.
7. Studied for safety measures at sub-stations and transformer locations.
8. Earth pit resistance measurement.

Overall focus had been on measurements, quantification and analysis of energy transmission and usage, identification and quantification of losses in distribution system, air-conditioning system, pumping system etc. and finally to evolve solutions to improve energy efficiency. Harmonic study had been carried out for the main transformer and uninterruptible power supply.

Observations :

Overall balance in terms of energy, kW h and cost had been carried out. Variation in kW h consumption, voltage, current and harmonics had been studied.

THD → Total Harmonics distortion

5. The recorded value of percentage THD voltage of about 5% and percentage THD current of about 38 % for transformer-1 and voltage of about 5.2 % and percentage THD current of about 18.2 % for transformer-2, which were recorded under full load conditions are not within the IEEE-519 guidelines for Harmonics permits the V_{thd} upto 3 % and I_{thd} upto 15 % as reasonable limit, when measurements are carried out with the capacitors switched ON.