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Energy Audit and Remedies

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***Abstract*:-- In this paper, we have conducted a brief study of present assessment of AC system in Shri. Hanuman Gramin Bigar Sheti Sahakari Patsanstha Ltd. Nagaon, by carrying out detailed energy audit in Shri. Hanuman Gramin Bigar Sheti Sahakari Patsanstha Ltd. Nagaon premises systematic methodology specified as per Bureau of Energy efficiency (BEE). By conducting an investigation of the energy consumption, the energy audit focuses mainly on the equipment consumption, especial on air-conditioning system, electronically equipment, lighting system, and elevators, etc. On the other hand proper handling of AC system for improving better performance of AC can also result in saving of energy. Thereby our objective is to achieve energy conservation through rearranging and replacing earlier AC system by some new efficient one.**

Energy is one of the major inputs for the economic development of any country. In the case of the developing countries, the energy sector assumes a critical importance in view of the ever increasing energy needs requiring huge investments to meet them. For reducing cost and increasing efficiency, then use energy conservation, management and audit. The objective of Energy Management is to achieve and maintain optimum energy procurement and utilization, throughout the organization as to minimize energy costs / waste without affecting production and quality. Energy Audit is the key to a systematic approach for decision making in the area of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility.

I. INTRODUCTION

An Energy Audit is an inspection, survey and analysis of energy flows. While the overall concept is similar to a home or residential energy audit. Here we were evaluate the consumption of various types of devices

AUDIT:

Evaluate floor wise load- For getting maximum load.
Evaluate time wise load - For getting actual load.

II. METHODOLOGY

Step No	Plan of action	Purpose/Results
1	• Plan and organize •Walk through Audit •Informal Interview with Energy Manager, Production / Plant Manager	•Resource planning, Establish/organize a Energy audit team • Organize Instruments & time frame • First hand observation & Assessment of current level operation.
2	•Conduct of brief meeting / awareness programmed with all divisional heads and persons concerned (2-3 hrs.)	•Building up cooperation • Issue questionnaire for each department • Orientation, awareness creation
3	•Primary data gathering, Process Flow Diagram, & Energy Utility Diagram	•Historic data analysis, Baseline data collection • Prepare process flow charts • All service utilities system diagram •Design, operating data and schedule of operation • Annual Energy Bill and energy consumption pattern (Refer manual, log sheet, name plate, interview)
4	•Conduct survey and monitoring	•Measurements : Motor survey, Insulation, and Lighting survey with portable instruments for collection of more and accurate data. Confirm and compare operating data with design data
5	•Conduct of detailed trials /experiments for selected energy guzzlers	•Trials/Experiments: 24 hours power monitoring (MD, PF, kWh etc.). •Load variations trends in pumps, compressors etc. •Boiler/Efficiency trials for (4 – 8 hours)
6	•Analysis of Energy Use	•Energy and Material balance & energy loss/waste analysis
7	•Identification and development of Energy Conservation	•Identification & Consolidation ENCON measures •Conceive, develop, and refine ideas

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	(ENCON) opportunities	Review the previous ideas suggested by energy audit if any •Use brainstorming and value analysis s •Contact vendors for new/efficient technology
8	•Cost benefit analysis	•Assess technical feasibility, economic viability and prioritization of ENCON options for implementation •Select the most promising projects
9	•Reporting & Presentation to top management	•Documentation, Report Presentation to the top management

REPORT

Floor	**Name**	**Description**	**Qty.**	**Each Wattage**	**Total Wattage**
Gr. Floor	**Nagan Branh**				
		Spot light	13	15 w	195 w
		Ceiling fan	3	60 w	180 w
		Wipro Light fixture	4	72 w	288 w
		Wipro Light fixture	6	36 w	210 w
		Computer	3	250 w	750 w
		Printer	2	70 w	140 w
		CCTV Camera	1	15 w	15 w
				TOTAL	**1784 WATT**
	Cashier Room	Spot light	1	15 w	15 w
		Wall fan	1	60 w	60 w
		Wipro Light fixture	1	36 w	36 w
		Cash Counting Machine	1	50 w	50 w
		CCTV Camera	1	15 w	15 w
				TOTAL	**176 WATT**
	Branch Manager Cabin	Spot light	4	50 w	200 w
		Ceiling fan	1	60 w	60w
		Wipro Light fixture	2	36 w	72 w
				TOTAL	**332 WATT**
	Chairman Cabin	Spot light	4	50 w	200 w
		Ceiling fan	1	60 w	60w
		Wipro Light fixture	2	36 w	72 w
				TOTAL	**332 WATT**
FLOOR	**NAME**	**DESCRIPTION**	**QTY.**	**EACH WATTAGE**	**TOTAL WATTAGE**
	Inverter Room	Tube light	1	40 w	40 w
		Ceiling fan	1	60 w	60 w
		Inverter	1	746 w	746 w
		Battery	4		
				TOTAL	**846 WATT**
	Lockers Room	Tube light	1	40 w	40 w
		Incandescent bulb	1	60 w	60 w
				TOTAL	**100 WATT**
	Stair Case 1	Cfl bulb	2	15 w	30 w
				TOTAL	**30 WATT**
	Stair Case 1	Cfl bulb	2	15 w	30 w
				TOTAL	**30 WATT**

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	Entrance	Cfl bulb	1	15 w	15w
		CCTV Camera	1	15 w	15 w
				TOTAL	**30 WATT**
	Board Light	Flood Light	2	22 w	44 w
				TOTAL	**44 WATT**
			GRAND TOTAL		**3704 WATTS**

IV SOME OTHER VIEWS

Incandescent and Halogen have a natural Power factor of 1, but Compact fluorescent and LED lamps are using input rectifier and this causes high harmonics content in input current and also reactive power consumption. This causes extra loss (harmonics) and power transfer cost (copper usage) toward the power plant and energy cost will be distributed to all customers by rising energy bills. Future developments may implement PFC-circuits to bring the PF up to 1, but higher material cost and volume of electronics will result. Dimmable LED-Lamps typical have higher PF by using so called Valley-fill circuits, non-dimmable uses cheaper bridge rectifiers. The EU-Standard requires a PF better than 0.5 for power up to 25 Watt.

Energy Star qualification- Energy Star is an international standard for energy efficient consumer products. Devices carrying the Energy Star service mark generally use 20–30% less energy than required by US standards.

Energy Star LED qualifications:

- Reduces energy costs — uses at least 75% less energy than incandescent lighting, saving on operating expenses.
- Reduces maintenance costs — lasts 35 to 50 times longer than incandescent lighting and about 2 to 5 times longer than fluorescent lighting. No bulb-replacements, no ladders, no ongoing disposal program.
- Reduces cooling costs — LEDs produce very little heat.
- Is guaranteed — comes with a minimum three-year warranty — far beyond the industry standard.
- Offers convenient features — available with dimming on some indoor models and automatic daylight shut-off and motion sensors on some outdoor models.
- Is durable — won't break like a bulb. To qualify for Energy Star certification, LED lighting products must pass a variety of tests to prove that the products will display the following characteristics:

Remedies:

- Brightness is equal to or greater than existing lighting technologies (incandescent or fluorescent) and light is well distributed over the area lit by the fixture.
- Light output remains constant over time, only decreasing towards the end of the rated lifetime (at least 35,000 hours or 12 years based on use of 8 hours per day).
- Excellent color quality. The shade of white light appears clear and consistent over time.
- Efficiency is as good as or better than fluorescent lighting.Light comes on instantly when turned on.
- No flicker when dimmed.
- No off-state power draw. The fixture does not use power when it is turned off, with the exception of external controls, whose power should not exceed 0.5 watts in the off state.

REFERENCES

[1] M. S. Isasare and S. A. Zadey, "A case study: Energy audit at AVBRH, Sawangi (M), Wardha," 2016 International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT), Chennai, 2016, pp. 1745-1749.

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[2] R. Sharma and R. K. Jain, "Energy audit of residential buildings to gain energy efficiency credits for LEED certification," 2015 International Conference on Energy Systems and Applications, Pune, 2015, pp. 718-722.

[3] R. Rayhana, M. A. U. Khan, T. Hassan, R. Datta and A. H. Chowdhury, "Electric and lighting energy audit: A case study of selective commercial buildings in Dhaka," 2015 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), Dhaka, 2015, pp. 301-304.