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Energy Audit and Energy Management in Residential House

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Abstract:- The fundamental and most crucial need of the present world is electricity. Today we can't envision our lives doing anything without electricity. With power, electrical energy has become our consistent requirement. The acquaintance of power was to make human existence simpler, decrease human work, make work more productive and less time consuming. With its few benefits, we likewise have the dread to make it accessible to us as well as to our people in the future by saving our most weak assets from which it is generated. This is just conceivable by doing an energy review to an alternate sector. Our essential point is to save electrical energy by directing an Electrical Energy audit. We have finished electrical energy review of a private house and have given it in this paper with appropriate proposals.

Keywords:- *Energy Audit, Energy Management, Efficiency, Energy Conservation opportunities.*

I. INTRODUCTION

The interest of energy protection and its assets is expanding day by day. We can't disregard the way that our weak assets are our genuine strength and with its consumption human existence stops so investigating this situation of saving power, energy review is done. An energy review is an examination overview and an examination of energy streams for energy preservation in a structure. It might incorporate an interaction or framework to lessen the measure of energy contribution to the framework without adversely influencing the output. In review, we check how much energy is devoured and squandered, what are the territories where it tends to be limited and how alterations can be done to decrease energy consumption. It is trailed by a few errands relying on the kind of review we need to perform. For our private house, electrical energy review we have investigated past energy utilization information to outline performing review well and arranged a few power bills, checked the quantity of apparatuses as of now in use, how much energy is devoured by every machine and how adjustment we can deal with diminish the energy utilization.

II. ENERGY AUDIT

Energy review is an authority logical investigation of energy utilization of an association/measure/plant/hardware focused on decrease of energy utilization and energy costs without influencing efficiency and comforts and proposing the techniques for energy saving and decrease in energy cost. Energy review is done in arranged, official way by each energy concentrated association/plant the board.

The energy review distinguishes the expenses of energy and where and how it is utilized. It will recognize the measure of energy exhausted in an interaction with the assistance of mass and energy balance for each cycle.

III. DESTINATIONS OF ENERGY REVIEW

The primary motivation behind energy review is to set up rapidly and dependably, the fundamental relative expenses of the different types of energy bought their principle use and to distinguish main areas where misfortunes, wastages or failure happens.

In straightforward language we can say that, energy review assists with seeing more about the manners in which distinctive fuel sources are utilized in the business and assists with distinguishing regions where waste can happen and where scope for development might be conceivable. Accordingly, energy review is one of the concepts utilized in the energy the board and it includes methodological assessment and compre-hensive survey of energy use in enterprises.

IV. PROCEDURE FOR ENERGY AUDIT

The principal period of energy review begins with house visit which was booked with the proprietor of house. In this paper the principal activity we have done reviewing in a house is by gathering all the current and accessible information of family in regards to socioeconomics alongside the quantity of individuals living in the house and burning through the accessible energy than giving them a suitable outcomes with single line chart in ETAP reproduction programming and proposal in regards to their use of power while giving ideas on the most proficient

method to lessen the duty of the power bill. The technique embraced for our work is introduced underneath:-

- Collected all the Heap subtleties with a most extreme interest of the Electrical Hardware.
- Calculated the Use of Burden.
- Detailed burden profile information was gathered during site inspection (all machines and energy utilizing gadgets).
- Plot the single line outline as indicated by the ETAP recreation programming.
- Calculated the absolute energy use of the multitude of significant apparatuses each day.
- Determined the associated load regarding single line chart.
- Plotted a chart among years and Tax.
- Recognized and determined the superfluous utilization of force wastage in the format with diagrams.
- Drawn the Force Use Outline regarding the Format.
- Determined the day by day use of Force by every one of the machines or energy devouring gadgets and addressed in a pie outline.
- Information Assortment of the relative multitude of significant types of gear and discover the presentation.
- Connection about the energy utilization with appropriate review.
- Identified the Energy Saving and Preservations Opportunity.
- Report on appropriate proposal with existing and execution ideas.
- Plotted structured presentation of utilization of force by the machines throughout the long term.
- Check the earth obstruction and report on the situation with earthling in that worry.
- Provide Mindfulness on Electrical well-being to the Individual there.
- Accommodation of Appropriate Energy Review Report with Breakeven Examination.

V. ELECTRICAL ENERGY AUDIT SURVEY

- A House visit was scheduled with the owner of House-Rani Haveli.
- Collected all the existing and available data of household about demographic and age of people living in the house.
- Detailed load profile data was collected on site (all appliances and energy using devices).
- Consumption analysis of all energy sources.
- Characterized energy consumption into Cooling, Lighting, Heating, Work appliances, Entertainment and others.
- We calculated the total energy usage of all the major appliances per day.
- Noted the age of installation of devices like refrigerator was brought in 2012 and other old devices were highlighted in the list.
- Survey conducted in month of April and energy usage per day was approximately 22 units.

Figure 1. Residential House

Figure 2. A/C, Refrigerator, Ceiling Fan & Light

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- Given below is the data collected:

TABLE 1. DATA COLLECTED

Appliances	Quantity	Actual Load	Daily Usage (in hours)	Daily Power Consumption (in Watts)
Lights	15	20	5	1500
Outdoor Lights	1	200	10	2000
Ceiling Fans	4	80	10	3200
A/C	1	2000	4	8000
Refrigerator	1	90	24	2160
Television	1	130	8	1040
Laptop	1	170	2	340
Mixer	1	550	0.16	88
Washing Machine	1	1000	1	1000
Chimney	1	150	3	450
Water Pump	1	750	0.5	375

- Went through the energy bills for the last 12 months.
- Energy consumption in months of May, June and July was highest while in month of November, December and January it went lowest.
- A charge of electrical energy is 6.5 rupees/unit.
- In Month of April, 660 units were consumed.
- Units consumed graph is given below:

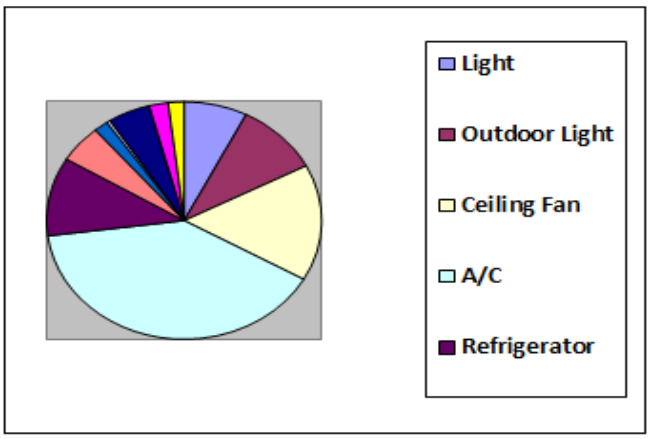

Figure 3. Daily Unit Consumption of the House

VI. RECOMMENDATION

A. Recommendation without investment

- According to the layout of the home, we have recommended some of the best saving tips by which they can save electrical energy and tariff without any investment by proper utilization and also reduce the tariff in their bills. These are some important tips to save energy at home:
- Unplug and switch off the whole electrical gadget of apparatus that isn't in used to decrease no-heap misfortunes.
- Clean the light installations consistently as a weighty layer of residue can impede half of light yield.
- Clean the fans consistently as weighty layer of residue in fan sharp edges decreases engine proficiency and yield.
- Set your cooler temperature as for the climatic condition.
- Defrost the cooler consistently and don't leave your ice chest open, 30% of cool air get escape just as in microwave hot air is gotten away.
- Run the clothes washer with full burden.
- Clean the Air conditioner pipe and channel routinely to lessen the force utilization and increment cooling.

B. Recommendation with venture

In this format as per the site survey, it is very well may be seen that cylinder light is utilized a ton. It is proposed for substitution of cylinder light with LED light. The LED has two years of guarantee and it additionally saves the utilization of units analyse to the CFL and cylinder light. In underneath figure, we addresses the examination picture portrayal for the use of cylinder light and LED for next five years. It shows that LED is a lot of viable and furthermore extremely valuable in the utilization of electrical energy. There is one fridge in the home which is of 1000 W rating which is come about underneath half burden test proficiency result. It is suggested for the execution of star evaluated refrigerator. The existing cooler devoured 1642.5 units which covers yearly cost of Rs. 4927.50. In the event that old cooler is supplanted by 3 star appraised cooler, its yearly Power utilization will be 636 units each year which covers yearly cost of Rs. 1878 with the saving of 1016.5 units each year, which thus save Rs. 3050 every year. Additionally 5 appraised cooler will save Rs. 3727.5 each year. The Air conditioner which is utilized of old model and conveyed non performing result after the heap test examination. It is proposed for star appraised one to supplant old one. The current one devoured 20075 units which covers yearly cost of Rs. 60225. On the off chance that old fridge is supplanted by 5 star 1.5 ton split appraised Air conditioner , its yearly force utilization will be 13466.1 units which cover yearly cost of Rs. 40398.30 per year which gives saving of 6608.1 unit each year which thus save Rs. 19826.70 each year.

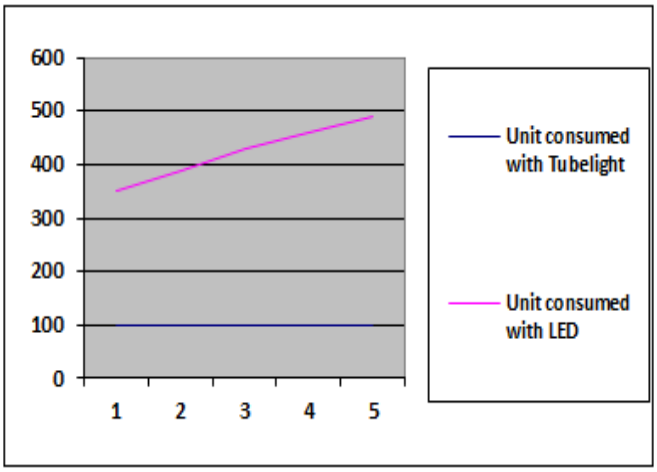

Figure 4. Unit Comparison Graph For Tubelight

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C. Recommendation with Distributed Generation (D.G)

The investigation uncovers that 1kW limit of sun based force is prescribed for execution to run the fundamental electrical machines. The speculation cost for sun based after appropriation is Rs. 65,000. With reference to the heat radiation resulted for 4 to 5 kW power generation per day for 1kw panel. The assessed investment funds in unit utilization and tariff as per the figure below is 25% of the current duty with the restitution time of 5 years.

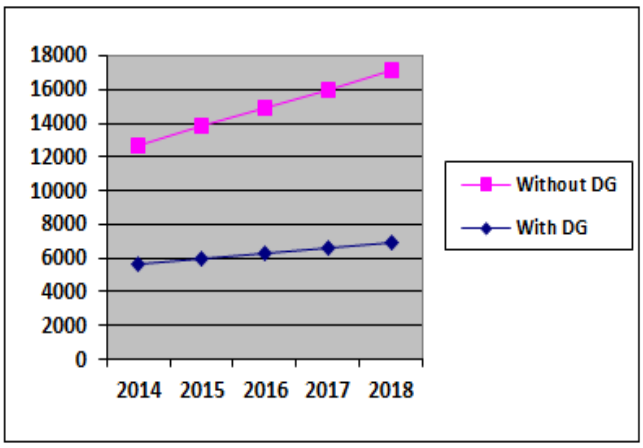

Figure 5. Unit Comparison Graph with DG and Without DG

VII. CONCLUSION

Considering the current situation the wastage of energy is for the most part done by the home-grown clients. In local location clients should consider the establishment of new machines and hardware with ease, compelling and productive strategies to accomplish high productivity of energy client. The current review work executed in a private house in Patna, Bihar, India. The compelling proposal is introduced alongside various charts. The house proprietor consented to carry out the thought introduced in this paper. We suggested the utilization of various techniques for sustainable fuel sources, tree ranch around the structure and changes in the establishment methodology for a successful, proficient, cleaner and greener climate.

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