

Energy Auditing System in Buildings using PIC

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Abstract

An energy auditing is an inspection, monitoring and controlling of energy conservation in workspace, or system to reduce the amount of energy input into the system without affecting the output. In commercial and industrial real estate an energy audit is the first step in identifying opportunities to reduce energy expense. This system reduces energy consumption while maintaining and improving human comfort. Investing to improve the energy efficiency of buildings provides an immediate and relatively predictable positive cash flow resulting from lower energy bills. Typically an energy services company assume all the risk for retrofit project by performing the engineering Analysis and install equipment needed for energy efficiency improvements.

Keywords: Energy analyzer, Human detection, Light intensity control, Real time representation on SCADA Single IR sensor module

I. INTRODUCTION

As an Instrumentation Engineer we should always look for the production of such systems which are more efficient and more reliable, such systems not only reduce the losses but also increase the profit. According to our country, to fulfil the need of electrical power unnecessary use of energy and energy consumption are most important factors. These factors should be controlled and loss of energy should be avoided.

This technical project is basically comes under plc based building automation systems, in this case the unnecessary use of electrical energy can be detected, and accordingly the actions can be taken to save that energy. With the help of this system we not only just save the energy but also can analyze the total consume power. which directly increase the efficiency of the system.

II. LITERATURE SURVEY

Abubakar Aliyu, Abba Bukar, Jamilu Ringim [1] Proposes new emergence equipments with high efficiency and less power consumption to replace the existing less efficient ones. A survey is conducted on the number of electrical appliances used for various applications. The research aims at reducing the amount of energy consumption by using the highly efficient electrical equipments.

Xi Yang, Qing Tong, Xunmin Ou [2] in their paper they proposed two excellent approaches of improving energy utilization efficiency.

Diji, C.J, Ganiyu,[3] provide information about the Electricity Audit of buildings in Ibadan.

Mr. Abhay Kumar Sharma et al [4] This research deals with energy conservation technique by energy audit in service maintenance and production system.

III. ENERGY AUDITING SYSTEM

Energy conservation is the main reason for energy auditing, that can be achieved with the help of various sensors and smart circuits. The power can be conserved by considering various factors like time, human appearance, light intensity and according to these factors circuits are made which will work to conserve the power.

The system can be made which include the time base lamps, which will automatically turn ON for specific period of time. The power supply will be provided for that specific period of time only. So that unnecessary use of power can be avoided and the energy can be used for required time only. It will conserve the energy which is very beneficial.

In this system. human detection can be takes place with the help of single IR sensor module and accordingly the further systems will be turn ON and OFF. The system will be turn ON only and only if there is presence of human. So that unnecessary use of power can be avoided and the proper use of energy can be achieved.

Power can be efficiently used by another way in which light intensity can be sensed by the sensor(LDR) and accordingly the lamps can be made ON. which will save the energy by kipping the lamps OFF during the period in which they are not required. The total power consumed during the above conditions can be displayed and analysis can be done with the help of energy analyzer.

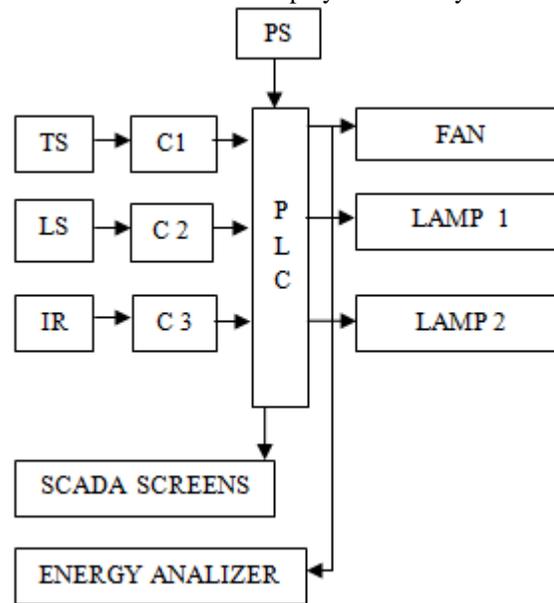


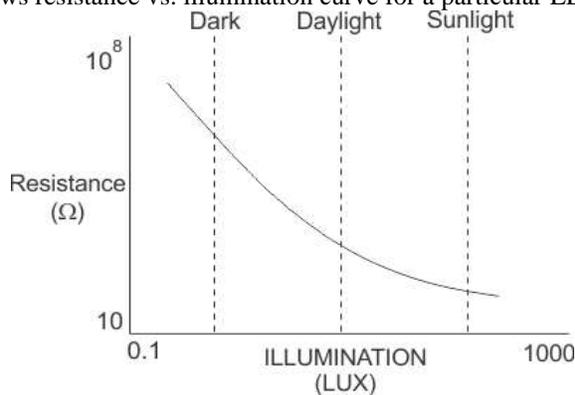
Fig. 1: Block Diagram of implemented System.

where.

- TS: Temperature Sensor (PT 100)
- LS: Light Sensor (LDR)
- IR: Infrared
- C1,C2,C3: Convertor 1,2,3 respectively
- PS: Power Supply
- PLC: Programmable logic controller

IV. RESULTS

- Collection and analysis of relevant information that may affect building energy consumption.
- Review the information, analyse the conditions and performances of existing equipment, systems and installations, and the energy bills.
- Compare with performances at relevant energy efficient modes of operation .
- Identify areas of energy inefficiency and the means for improvement.
- Graph 1. LDR's are light dependent devices whose resistance is decreased when light falls on them and that is increased in the dark. When a light dependent resistor is kept in dark, its resistance is very high. This resistance is called as dark resistance. It can be as high as $10^{12} \Omega$ and if the device is allowed to absorb light its resistance will be decreased drastically. If a constant voltage is applied to it and intensity of light is increased the current starts increasing. Figure below shows resistance vs. illumination curve for a particular LDR.



Graph 1.



SCADA screen.

- SCADA screen. The total energy consumed by the respective electronic devices can be analyzed by Energy analyzer, with the help of SCADA screen, which will display the real time information.

V. CONCLUSION

In today's world it has become very important to utilize the energy very judiciously and efficiently and should satisfy the human comforts. This system is very efficient and cost effective when it comes for industrial use, and can be used in wide variety of applications related to residential buildings as well as commercial buildings. So this paper comes up with an idea of how to efficiently use the energy resources and provide comfort for human by using plc and energy analyzer.

REFERENCES

- [1] Abubakar Aliyu, Abba Bukar, Jamilu Ringim "An Approach to Energy Saving and Cost of Energy Reduction Using an Improved Efficient Technology", Vol.4 No.4, December 2015
- [2] Xi Yang, Qing Tong, Xunmin Ou "Analysis of Technical Energy Conservation Potential of China's Energy Consumption Sectors", Vol.3 No.4, December 2014
- [3] Diji, C.J, Ganiyu, H."Energy Auditing of a Typical Residential Building in Ibadan Metropolis", Volume 6, Issue 5 (Jul. - Aug. 2013), PP 24-29
- [4] Swati Khare, Abhay Kumar Sharma, R. K. Ranjan, Shashank Khare" Energy Conservation Through Energy Audit", Vol. 4, Issue 09, pp.144-148, September 2012