Smart Building

Apeksha Tarle[1] Siddhi Jadhav[2] Pratibha Khairnar[3] Komal Ughade[4] Prof. Sagar P. Thombare[5]
[1,2,3,4]Student [5]M.E. (PE & D)(Guide)
[1,2,3,4,5]Department of Electrical Engineering
[1,2,3,4,5]Matoshri Aasarabai Polytechnic, Nashik, India

Abstract— Buildings are significant contributors to energy feeding accounting for around one-third of energy spent in cities, where large public buildings are the dominant energy consumers and energy consumption might be significantly decreased through Building Energy Management Systems (BEMS). With the need to mitigate global warming, today's world is shifting towards a sustainable economy by means of Renewable Energy Sources. In smart building there are the presence of renewable sources i.e. solar and windmills. The Solar and wind energy is more effective and conventional form of renewable energy available at most it does not depends on any factor, solar energy begins when the day begin. Within the smart buildings context, electric vehicles (EVs) require an increasing consideration. The energy is also generates due to the piezo electric crystals. This building energy efficiency solution based on smart grid expected to be a critical part of the future smart grid.

Key words: Building Energy Management Systems (BEMS)

I. INTRODUCTION

In this proposed system, we discuss the universal issues about a smart building i.e. energy management for renewable resource. The building have its own guest parking as well as its own jogging track. The solar panels are placed on the buildings, guest parking, control room etc. and placing the wind turbine on the terrace building in addition to solar. The structure of piezo electric crystals is below the jogging track. In order to improve energy efficiency with LED's as the light source The LED's are energy saving, high luminous efficiency and high useful life to the proposed system. Wind Photovoltaic (PV) hybrid power and also due to the piezo electric crystal the energy is generated.

The energy generated then distributed to whole building and street lights. This system also included with LDR sensors which are installed in the street lights that means automatically ON and OFF of the street lamps, the rain water harvesting also done in this concept, therefore energy conservation is also there which save some of the cost.

The solar water heater is also placed on the terrace of the building. Solar water heating (SWH) is the conversion of sunlight into heat for water heating using a solar thermal collector. A variety of conformations are available at varying cost to provide solutions in different climates and latitudes. SWHs are widely used for residential and some industrial applications. Sun-facing collector heats a working fluid that passes into a storage system for later use. SWH are active (pumped) and passive (convection-driven). They use water only, or both water and a working fluid. They are heated directly or via light-concentrating mirrors. They operate individually or as hybrids with electric or gas heaters n large-scale connections, mirrors may concentrate sunlight onto a smaller collector.

Fig. 1: Block Diagram

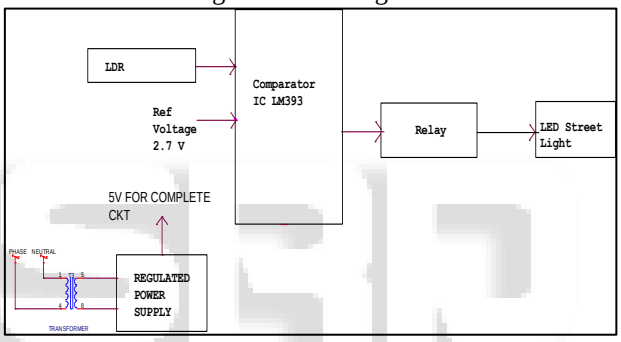

Fig. 2: Voltage Regulators

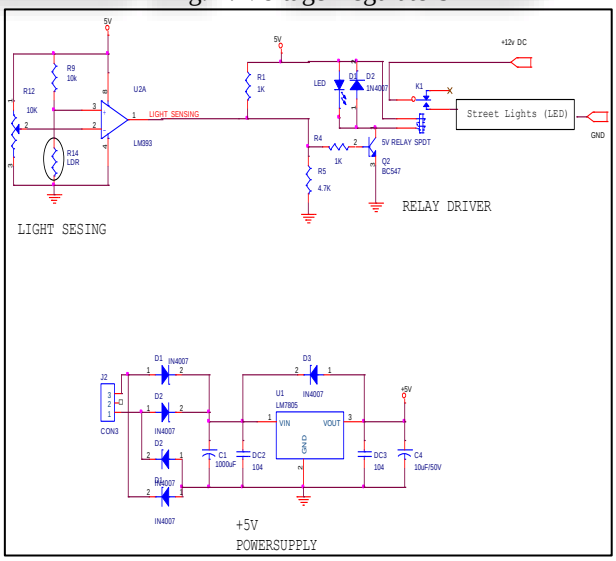

Fig. 3:

It is used to regulate the generated dc supply and to maintain the batteries long life. It will filter the dc signals and then convert into pure dc that is there is no fluctuations in supply and whole system get maintained, continuity also maintained. A voltage regulator is an electronic circuit that provides a stable dc voltage self-governing of the load current, temperature and ac line voltage differences. A voltage controller may use a simple feed-forward design or

may include negative feedback. It may use an electromechanical mechanism, or electronic components. Depending on the design, it may be used to regulate one or more AC or DC voltages.

II. IMPORTANT DEVICES USED IN SYSTEM

System needs some of the following devices:

A. Battery

Fig. 4: Battery

An electric battery is an electrical device which convert chemical energy into electrical energy by a chemical action. A battery can deliver electricity in areas that do not have electric power distribution.

We use battery to store electric energy. The generated dc supply is up to 10v to 12v so, the 12v battery is used to store this voltage.

B. Relay

Fig. 5: Relay

A 5v SPDT is installed in the LDR circuit to detect the faults and to safe the system. SPDT is rated up to 5A and it is fully sealed. It has 5 terminals as shown above.

C. LDR Street Light

Fig. 6: LDR Street Light

LDR sensors are located for the street lights. The street lights will automatically ON and OFF. Simultaneously the energy will save. The resistance of LDR is generally low that's why we added some resistances to maintain the current through it to a safe value. It will not operate without Zener diode and LM395. So, LDR need these as well. LDR will compare the obtained value with its reference value and automation is done.

D. Regulated Power Supply

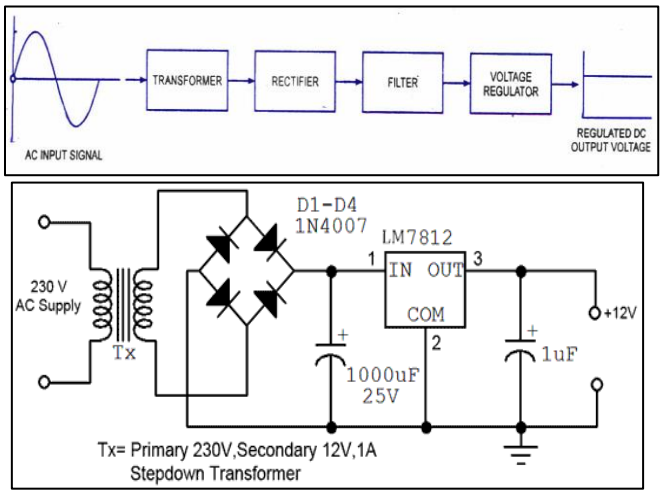

Fig. 7: Regulated Power Supply

Finally we get the regulated dc supply by adding the voltage regulators. The device LM7812 is used for this purpose. It will gives the constant output. Hence this dc supply is distributed to whole building where the consumer uses for lighting load such as fans and lights. And this supply is given to the street light as well.

III. SPECIFICATION TABLE

Sr. No.	Device Name	Ratings
1	Solar panel	5watts
2	Dc motors	3v
3	Relay	5A
4	Battery	12v
5	LDR sensors	-
6	Piezo electric crystals	-
7	Solar water heater	-

Table 1

IV. CONCLUSION

After we have completed the project we are sure the problems in the existing system would overcome. It will also help to save the electricity. Solar power is well known to be an expensive solution to remote electrification. We have focused on the study of photovoltaic wind production of electrical energy. The adopted approach was to improve the chain various parts point by point. This system is able to react to overvoltage, under voltages and frequency variations. It was subjected to an overvoltage, an under voltage and frequency variation. The system showed good results in each cited case.

V. FUTURE SCOPE

We will add invertor in this system, so we can control fans also.

We will give digital display to monitor continues power and calculate the battery percentage, we will provide the buzzer to indicate that battery is low.

REFERENCE

[1] Jianchao Zhang *, Boon-Chong Seet and Tek Tjing Lie," Building Information Modelling for Smart Built Environments", Received: 15 December 2014 / Accepted: 15 January 2015 / Published: 26 January 2015
[2] Han Chen, Paul Chou, Sastry Duri, Hui Lei, Johnathan Reason," The Design and Implementation of a Smart Building Control System", IBM Thomas J. Watson Research Center, 19 Skyline Dr, Hawthorne, NY 10532 {chenhan, pchou, sastry, hlei. 2009 IEEE International Conference on e-Business Engineering.pp.255-265.
[3] Tulika Gadakari1 , Sabah Mushatat2 , and Robert Newman3," Intelligent Buildings: Key to Achieving Total Sustainability in the Built Environment', Engineering Management Received May 31, 2013; received revision July 12, 2013; accepted July 27, 2013 Available online December 13, 2013
[4] A.H. Buckman, M. Mayfield, Stephen B.M. Beck," What is a Smart Building?" Smart and Sustainable Built Environment Vol. 3 No. 2, 2014 pp. 92-109 Emerald Group Publishing Limited 2046-6099 DOI 10.1108/SASBE-01-2014-0003.
[5] Mohammad Hossein Roohi, Amir Khorsandi, Alireza Setayesh," Design and implementaion of smart building lighting system: IEEEConference: 24-25 Feb. 2015.

