Energy Management in Smart Mushroom Factory

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***Abstract*— Mushrooms are classified as vegetables in the food world, but they are actually fungi. Although they are not vegetables,mushrooms provide several important nutrients and they have a very important part in the food market.This project main objective is to build an energy efficient system using iot and run the factory on renewable energy. This project mainly focuses on renewable energy in mushroom farms.Smart mushroom factory will use lot of electric energy to keep the cooler rooms under controlled temperature of 18 degrees to 25 degrees,to maintain that temperature we use inverter AC to run the factory 24 hours and exhaust air come from ac ventilation is used for compost preparation since preparation of compost requires 45 to 60 degrees of temperature. By using hot air in the compost preparation chamber in mushroom factory,reduces the energy consumption in the factory.**

Keywords – smart mushroom factory,inverter ac,renewable energy.

I. INTRODUCTION

Mushroom farming is practiced in more than 100 countries. White button mushroom (Agaricus Bisporus) cultivation began in France two hundred years ago and has developed into a thriving industry not only in Europe, but world over. Green house production is one of the most intensive parts of the world agricultural production. It is intensive in the sense of yield and annual production, but also in sense of the energy consumption, investments and costs.Efficient use of resources is one of the major assets of eco-efficient and sustainable production, in agriculture.Efficient use of energy is one of the principal requirements of sustainable agriculture.

Energy use in agriculture has been increasing in response to increasing population, limited supply of arable land, and a desire for higher standards of living. Energy use is one of the east longitude.Renewable energy button mushroom growing rooms was based on sources coming from agricultural crops could random sampling method.The need of food and limitation of space or land as an agro-economic activity make urban farming technology is becoming popular and has become one of promising solution for securing food supply.

Apart from that,extreme weather changes and climates affect the production of crop,thus increasing their prices and lowering the quality of the crops produced.Hence, this project present an internet of things (IOT) based monitoring and environment control for indoor cultivation button mushroom, which is a smart urban farming system that requires less maintenance, less manpower and saves a lot of space. this project is dedicated to improve and enhance the conventional plantation system in general.

Using IOT platform will enhance the capability of current equipment for remote monitoring purpose and at the same time log the data for analysis and references. The fundamental goal of energy management is to produce goods and provide services with the least cost and environmental effect. Smart mushroom factory will use a lot of electric energy to keep the cooler rooms under controlled temperature of 18 °c to 25 °c. IOT device will receive a data from the attached sensor and sent the data to the database via internet connection

II.LITERATURESURVEY

Ke Meng et al (2017) proposed that a challenge to organize several groups of aggregate air- conditioners for delivery system load managing. This projected method aim to present a challenge to synchronize compound group of Virtual Power Storage Space Scheme (VPSSS) to deal with complex load. A circulated manage system is future to distribute the essential dynamic control reduction among the aggregators during limited announcement to switch in order with nearby aggregators and an balance position can be met between complicated aggregators. In a distributed manage approach; the essential dynamic energy restriction can be collective amongst the participate aggregators.

Mario Collotta et al (2017) has proposed system present an Artificial Neural Network (ANN) as maintain for a Home Energy Management (HEM) arrangement base on Bluetooth low energy, called BluHEMS. The objective of infrastructure technology is to realize an extensive energy savings, in order to cut greenhouse gas emissions and to reach effectual ecological security in more than a few contexts, counting infrastructure, developed, transport, buildings, electricity generation and delivery.

S. L. Arun et al (2017) has deals with an Intelligent Residential Energy Management System (IREMS) for producer of neat housing buildings are planned. The most important purpose of IREMS is decrease in electrical energy bills whereas maintain the power require less than the maximum demand limit subjected to the variety of constraints principal the procedure of household demand and Renewable Energy Resource (RER).

Neeraj Kumar et al (2016) has presented a smart, energy- efficient system in smart grid Cyber-Physical

Systems (CPSs) by means of coalition-based game theory. Mobile Cloud Networking (MCN) is a rising tools in which mobile policy are linked to a cloud server with Access Points (APs). Game is formulated connecting the smart strategy (players) and the service provider (clouds) in which together players and service providers aspire to exploit their proceeds through admiration to the accessible resources.

Xin Wang et al (2016) proposed with active energy management for smart-grid powerdriven Coordinated Multi Point (CoMP) transmission. An infinite-horizon optimization difficulty is formulated to attain the most favourable downlink hand on grin formers that are robust to control reservations. Leveraging the stochastic dual-sub gradient method, expand a virtual queue base online control algorithm.Relying lying on the supposed Lyapunov optimization method as well as the exposed distinctiveness of the optimal schedules, properly launch that the proposed algorithm yields a feasible and asymptotically most favourable supply management approach for the innovative difficulty.

Tuduce et al (2017) has propose Energy consumption control in wireless ad-hoc networks is a more difficult problem due to non availability of access point in network. A node can be both a data source and a router that forwards data for other nodes. There is no centralized entity such as an access point to control and maintain the power control mode of each node in the network. There are number of challenges offered by mobile ad- hoc network environment like limited power, route failure, synchronization, security etc.

III.METHODOLOGY

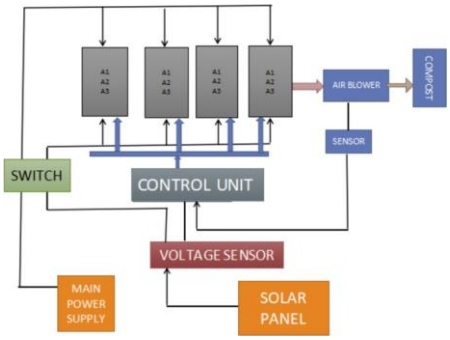

Figure 1 : Block Diagram

A1……..An : Electrical appliances used in mushroom growing rooms. For mushroom growing we need temperature of 18 degree to 25 degree celsius . Air conditioners are use to control the room temperature. For compost preparation 45 to 60 degree celsius hot air is required. So exhausted hot air from the air conditioner will be blowing to compost through air blower. By using this method we can reduce some amount of energy consumed during compost preparation .Here we are also using solar panel in order to use the solarenergy.If this solar energy is sufficient to run all the electrical appliances, then we can use solar energy.Otherwise we can use energy from main power supply to run the appliances.Switch is used to switch over between main power supply and solar energy.

Detailed design :

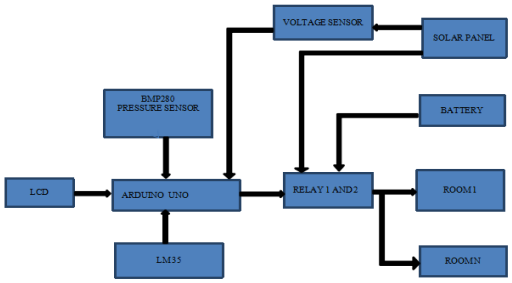

Figure 2 :Block diagram of energy management in smart mushroom factory

Where mushroom factory requires lot of energy to run the factory, so in the factory uses to two power source solar panel and electric grid. In model use 12v battery instead of electric grid.When the solar panel get charged form sun radiation, factory run usingSolar power.

Voltage produced from solar panel measure by voltage sensor if voltage is less then 8v then it will switch to 12v battery using 4 channel relay this is switching part of our project. Each room has an AC, that will extract the hot air inside the room and cool down that room to 18C to 25C and the extracted heat will be fed to tunnel which requires 45C of hot air for compost preparation through air blower.

Where heat air extracted from the air ventilator that are passed through tunnel or channel ,1,2… N number of room will be there, all the rooms heat air is extracted and given to one channel.

Working :

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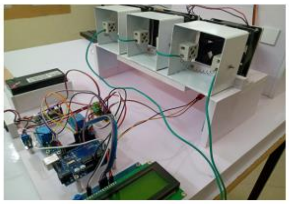
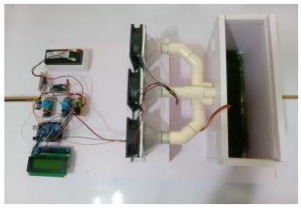
IV. CONCLUSION & FUTUREWORK

The project was tested for its operation to switch input loads between solar panel and battery whenever a necessary threshold voltage sufficient for powering the air conditioner (in our project represented by cooling form) was generated the microcontroller switchs from main (battery) supply to the panel the sensor valves were properly tested and displayed and by doing a estimated on running time of the load with solar panel and cost profit analysis,we can figure out the increased efficiency and calculate the energy (kmh) that was saved by

using our method in the industry thus, the project meets all the criteria it was aimed at.


Future Scope

1) Utilization of free air from conditioners for cuuipment is extremely helpful to mankind.ltivation of crops.

Prevents the need of extra energy consumption of blower so saves energy and cost.

Since hot air from conditioners are used, prevents the use of hot air generators, hence saving electricity.

4) Faster cultivation of crops, since the required environment is created.

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