

IOT BASED SMART ENERGY METER USING THEFT DETECTION

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Abstract - In presence, India faces large scale of power crisis. Active power and reactive power monitoring system which works on Wi-Fi module is introduced in this project. Nowadays Energy data collection system is major part of research and development. Through this technique, if any consumer are consuming reactive power then their behaviour with energy uses can easily know and bill also get reduced. Wi-Fi based smart energy meter method is given in this paper to minimize electricity theft, absence of consumer can know reactive power consumption by connecting smart energy meter in office. There are many methods for assembly of energy detail uses. The main goal of the project is to start reducing reactive power consumption by IOT base, microcontroller and LDR sensors. Single phase induction motor are for reactive power consumption and Current Transformer (CT) which generates high amount of current. This all data, Sensors data are given to microcontroller and then it sends to Wi-Fi module according consumer know their power used. Then finally show all energy data, unit utilization, reactive power, penalty factor (power factor) on LCD.

Key Words: Energy meter, IOT, WI-FI Module, LCD display, Microcontroller

I. INTRODUCTION

Proper energy utilization is very important in today's generation. Energy neither be created nor be destroy but it only converted into one form into another. so the best way is properly monitoring of all energy uses and avoid wastage of power. But energy monitoring cannot do correctly instead of people theft of electricity the cost paid by an distributor in checking electricity theft by their consumers greater than the costs of whole industry. When theft of electricity is detected by one of its customers, the supplier may suffer responsibility associated to generation, Network and balancing costs related to entry of settlement system of with the entry to estimates of electricity creep by that customer.

Discover theft of electricity is common method of directly checking for evidence by department person and by detecting meters. These techniques measurement of consumption of electricity Indeed, seals can be easily break. But the security can sense weakness of active Power meters, the resolution of electricity uses data accumulate by this smart technology that will contingent conventional detection

tools. This method have proper probable to better meter reading, pay scale and collection of all data, and ascertain of smart practice and wrong Circuit. The main reason for the theft is not giving focus on the customer who stolen the electricity and compromise all securities related to power supply. The lack of mechanism and due to improper distributor of electricity are the major contributes to this problem.

II. LITERATURE SURVEY

By researching paper we understood that Bharath..D , Dhivya C, Monisha A smart energy meter using IOT.

By using Advanced Technologies researchers trying every system making automatic and reliable this paper gives idea about techniques of monitoring of energy consumption by smart energy meter by connecting meters system gives continuous reading through microcontroller.

Ajeeba A A ,Anna Thomas, Risa Rasheed IOT based meter reading theft detection and disconnection .

In this paper microcontroller-based design and implementation of energy meter so consumers can track at any location of some misbehave is occurring in the system.

III. WORKING PRINCIPLE

We made mechanism in which KVAR meter are connected to IOT (Internet Of Things), which monitor reactive power consumption.

The main component of this system are ATMEGA328 microcontroller, energy meter, LDR sensor ,WI-FI Module, Crystal frequency meter ,inductive load, bulb load , and LCD display and power supply.

Wi-Fi base composition and execution of meters operates on IOT and theft turn up . All the data collected by microcontroller which is shown in LCD Display. Inductive load is added for reactive power generation and bulb is connected for resistive load. Power factor display on LCD, by using this data, penalty factor is calculated. LDR Sensor are used, crystal frequently meter 16MHZ is used which measures machine cycle which generates. For each measure

parameter separate LCD is connected. All this data is given to microcontroller accordingly it displays on LCD.

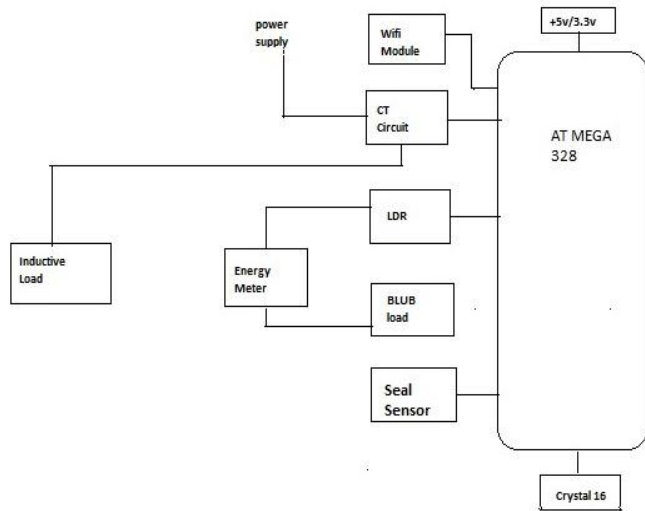


Fig-1 Block diagram

The KVAR meter are connected to every House which detect reactive power consumption will know in consumer premises or if consumers not giving permission for connecting KVAR meters then smart meters get connected to company due to that any one is consuming reactive power then it shows at company panel and accordingly penalty to this consumer will give which includes in their billing. Consumer having Power factor 0 to 3 get penalty of 10Rs, 0 to 7 PF having 5Rs and 8 to 9.5 PF having 3Rs penalty. By accurately utilization of energy uses theft can be eliminate and one step towards power saving as consider ing power demand. unit generate to energy meter will know to company side.

IV. POWER SUPPLY DESIGN

Transformer + Rectifier + Smoothing + Regulator

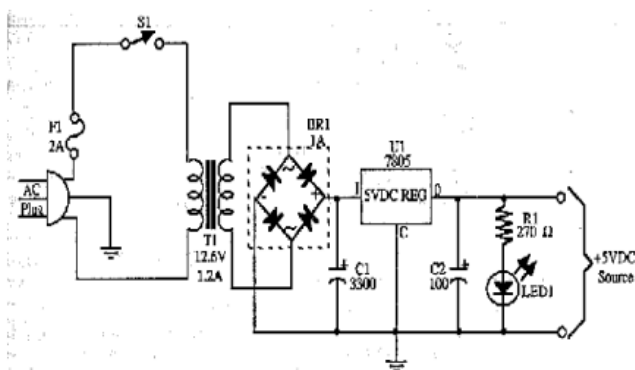


Fig.2. Power supply circuit

There are many power supplies. Which are design to convert high voltage AC to a low voltage level These power circuit having single phase step down transformer, 7812

power circuit, active power measuring meter, KVAR meter or smart energy meter, Arduino 328 microcontroller, current transformer (CT), single phase induction motor for reactive power consumption, bulb load for unit generations is designed by simple circuit arrangement. Capacitive two filter 100uf and 1000uf are used regulator of 7812 IC for +12Vsupply and 7805 for +5V supply are used. Bridge circuit IN4007 used for ac into DC conversion.

V. Hardware Requirement

ENERGY METER

Energy meter is the electrical instrument that measures the power used by the consumers. Secondary consumers are installing these instruments to measures how much power they are consuming with is in unit. Secondary consumers are like home, Industry area, big shops, commercial areas are pay for the power consumption for the loads such as light, fan, refrigerators and motors other appliances.

Energy meter measures power used and give unit in form of consumption.

Wi-Fi MODULE (ESP8266)

Wi-Fi module are use here. Which connects to IOT WI FI is ready to arrange all applications by WI-FI network functions to other applications. Wi-Fi which acts as main component for IOT. Through WIFI consumer can ON and OFF the meter.

ARDUINO UNO MICROCONTROLLER

Arduino also main component used in systems which connects after power supply circuit. In Arduino circuit 7805 IC for +5V supply used further it connects to CT (Current Transformer) which generates high amount of current. All function of system I depends on Arduino board. Arduino works on 5V supply which comes from op to coupler. This all data is stored on web pages.

PROGRAMMING LANGUAGES

As an IOT base project we using program of language HTML. browse will receive HTML documents.

VI. CONCLUSION

Considering energy problems this project is based on monitoring of energy consumption and reactive power. any consumers if consuming reactive power then penalty will give to that consumer. All data of power uses is given to Arduino microcontroller and Wi-Fi module, LDR sensors this accordingly gives accurate utilization of electricity. 3000 blinks consider 1-unit generations but as per monitoring base Here 4 blinks are assuming for 1-unit generations.

The performance of system can increase by connecting all household appliance to IOT. All penalty of power used will add on billing as per consumer will need to pay the billing.

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