International Journal of Scientific Research & Engineering Trends
Volume 6, Issue 4, July-Aug-2020, ISSN (Online): 2395-566X

Smart Energy Meter Surveillance and Billing Using IOT

Asst. Prof. Syed Shajih Uddin Ahmed, Mohd Owais Khan, Syed Omer, Mohd Asif Uddin
Dept.of EEE
ISL Engineering College, Bandlaguda Hyderabad, India
shajihroyal@gmail.com

***Abstract*-Electricity plays a cordial role in a day to day life. The electrical energy consumption inIndia is the third biggest after china and USA with 5.5% global share in 2016. The per person energy use rate in India is closer to 0.7 kw. India share with global energy demand will rise to 9% by 2035. Internet of things is an emerging field and IOT based devices have created a revolution in electronics and IT. The foremost objective of this project is to create awareness manual work, our existing electricity billing system has major has major drawbacks. This system gives the information on meter reading, power cut and the alert system for producing an alarm when energy consumption exceeds beyond the specified limit using IOT. This idea is being implemented to reduce the human dependency to collect the monthly reading and minimize the technical problems regarding billing process. This paper extends the design and implementation of an energy monitoring system with pre-intimation of power agenda using Arduino micro controller and GSM module. The advantage of this system is that a user can understand the power consumed by electrical devices on the daily basis and can take a further step to control them and thus help in energy conversation. From the electricity board section, the information regarding the bill amount, payment and the pre -planned power shut down details are communicated to the consumer. If the customer does not pay the bill in time, the user is informed through a message. If still the customer does not pay a bill, then as per designated consideration on, one alert message will be sent automatically power connection is disconnected from the remote server.**

***Keywords*-IOT, Arduino, GSM module, energy monitoring.**

I.INTRODUCTION

The utility sector in India has one national grid with an installed capacity of 330.86 GW as on November 2017. Renewable energy plants constituted for 31.7%of total installed capacity. During the year 2016-2017 the gross electricity generated by utilities in India was 1236.39 TWH and the total electricity generation in the country was 1433.4 TWH.

The power generation capacity in India is surplus but the needy adequate infrastructure for supplying electricity to all needy people is lacking. In order to develop the infrastructure to supply adequate electricity to all the needy people in the country by march 2109, the government of India launched a continuous and uninterrupted power supply to all industries, households and commercial establishment by improving necessary infrastructure. It is joint responsibility by the government of India with states to share funding and create overall growth of the economy.

The electricity sector in India is dominated by fossil fuels, particularly coal, which produced about two thirds of all electricity in the year 2016. However, only the investment of renewable energy is increased by the government. The draft national electricity plan of 2016 prepared by the government of India states that the country does not need additional non-renewable power plants in the utility sector until 2027, with the commissioning of 50025 MW coal based power plants under construction and achieving 275,000 MW total installed renewable power capacity.

The idea is being proposed to reduce the human interference to collect the monthly reading and to minimize the technical problems regarding the billing process. From the electricity board section, the information regarding the bill amount, payment and the pre-planned power shut down details are communicated to the consumer.

If the customer does not pay the bill in time, the user is informed through a message using IOT. If still the customer does not pay a bill, then as per designated consideration on, one alert message will be sent automatically power connection is disconnected from the remote server. It provides the pre-intimation of power cut details and also the energy cut details and also the energy consumption on daily basis.

It provides an alert if the energy consumption exceeds beyond the certain limit. It also has the facility of terminating the power supply through a message when the residents are out of the station to minimize the wastage of energy. It is an effective way of greater accuracy, improved billing.

II. PROPOSED SYSTEM

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

The proposed system gives the information about the Energy consumption on daily basis, billing and payment through IOT, pre-intimation of shut down details, alert systems when the energy consumption exceeds beyond the critical limit and the disconnection of power through a message when the residential are out of station to prevent the wastage of energy.

III. HARDWARE DESCRIPTION

In this system, a unique ID is given for each energy meter. This unique ID number is interlinked with the customer mobile ID number. It constantly monitors the energy meter. The energy consumption from each house is sent to the control station through the web server and the billing and power cut details are sent from the control station to the residential energy meter.

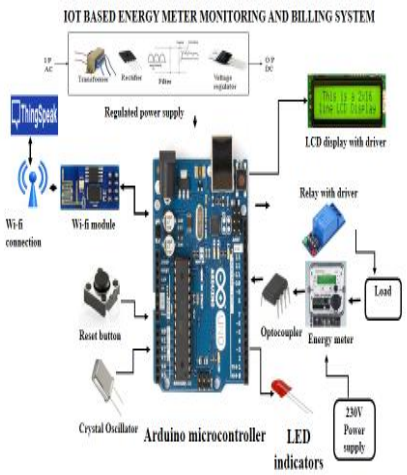

Fig. 1 Hardware Discription.

1. Energy Consumption On Daily Basis:
In the existing energy meter, the meter shows the energy consumed from the date of installation. In this system, the daily energy consumed is calculated using the Arduino micro controller and it is displayed in the LCD. It is also communicated to the consumer mobile using IOT.

2. Billing and Payment Through IOT:

The billing detail for the energy consumed is communicated to the consumer monthly through the web server using IOT and as a message through the GSM module. The payment is also made through the web server. This helps in eliminating the manual dependency to collect the reading.

3. Alert systems:

Our electricity billing system has a format that when the energy is consumed beyond the certain limit, double charges are collected i.e, they are charged twice the normal rate. In order to create awareness to the public, an alarm will be provided when the energy consumed by the consumer reaches a nearer value of critical limit. The message is also displayed in the LCD display. It is also displayed in the LCD. It is a time saving process and it helps to eliminate the human interference.

IV. SOFTWARE DESCRIPTION

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IOT (Internet of Things) solution!

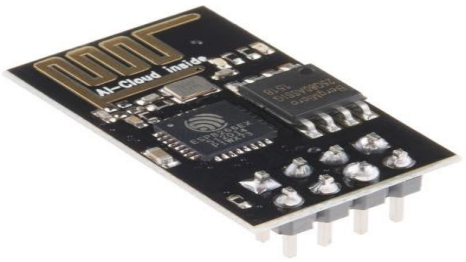

Fig.2 ESP8266

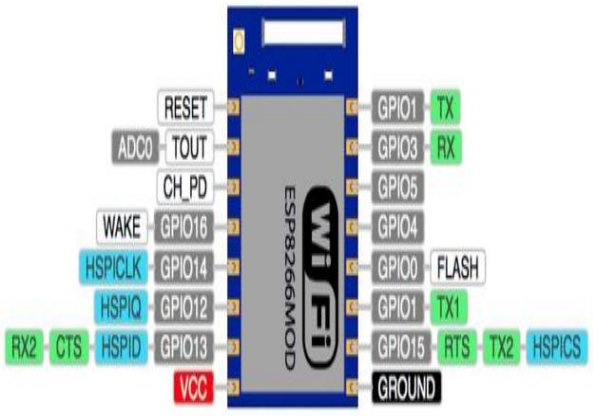

Fig. 3 Software Discription.

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

A smart energy meter for micro grids with load monitoring and Billing System. The traditional and conventional application of the smart meters was mainly used to establish a wireless communication which is used to provide the billing details of the energy consumed via internet to things peak to the end users.

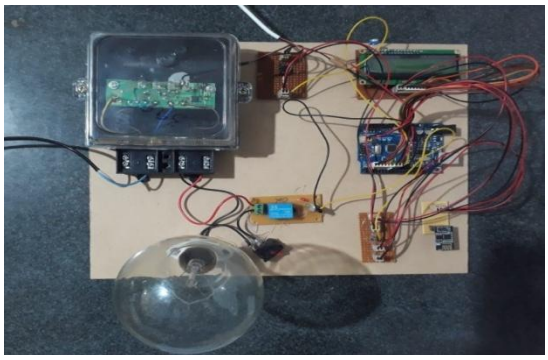

Fig. 4 Billing System.

V. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

VI. FUTURE SCOPE

This paper can be extended using Picamera which helps to provide security to the home. It can add power theft detection system to this project. This paper can be extend using raspberry pi3 processor as it has an inbuilt Wi-Fi so no need to connect extra Wi-Fi module and also it can control the devices from anywhere in the world. It can store the data on cloud.

REFERENCES

[1] Ashna. K and Sudhish N George, "GSM based automatic energy meter reading system," IEEE Wireless communications, 2013.

[2] Sapna Ganurkar and PraveshGour, "Prepaid energy meter for billing system using microcontroller and recharge card," International Journal of Core Engineering & Management (IJCEM), vol. 1, issue 1, April 2014.

[3] Internet of things (http://en.wikipedia.org/wiki/Internet-of-Things)

[4] CoiNet Technology solutions LLP, LPC2148 ARTIST Instruction manual.