# SMART ELECTRICITY BILL GENERATION WITH ALERT AND AUTO CUTOFF USING IOT

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*Abstract— Electricity is one of the most important blessings that science has given to mankind. Our government provides more electricity to industries. Every month the bill amount and unit is calculated regarding the usage of power for the entire month by the employee from electricity board. Sometimes they may forget to pay the bill amount within the due date. This project is to give the alert message to the consumer and generates the bill amount with unit used. If the consumer did not pay the amount after alert message then the power will be automatically cut-off using IOT. Once they pay the amount that information will send to the EB office through cloud. Then they will get the power supply.*

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## 1. INTRODUCTION

Generally the bill amount for the power which is consumed for the entire month is calculated manually. This consumes more time and man power. In order to overcome this disadvantage,  in our project we have designed the meter that automatically generates the bill and alert the consumer regarding the usage of power. In addition to that it also shuts the power to off when the consumer fails to pay the amount after the final alert message. The alert messages are given at many intervals. Initially when consumer uses more than the subsidy unit the first alert message is send to the consumer, then the next alert message is given along with bill generated at the end of a month. The third alert message is given when the fine amount is generated. Further time is also given to pay the bill amount along with fine. Still the bill amount is not paid final alert message is given to indicate the power cut-off. The alert message is given by the help of Global System for Mobile Communication (GSM). The electricity board has a webpage which is used to monitor the status of every industry. The information about each industry is send by the help of cloud.

## 2. LITERATURE SURVEY

From the different papers we have analyzed various technologies have been used related to our project. In paper [1][2012] Abinadan Jain and Dhilip Kumar has published paper on Design and development of GSM based energy meter. In that paper AMR system is used for remote monitoring and control domestic energy meter. AMR technology has disadvantages in security and privacy theft. In paper [2][2013] Sravanthi and Vijayalakshmi has published the paper on Prepaid electricity billing system using GSM mobile. In that paper they have used prepaid billing process but it has disadvantage that it does not give the Information about the usage of power. It requires the frequent recharge of amount. In paper [3][2014] Aradhana Sontake and Jharna Agarwal has published paper on GSM

based monthly energy meter billing via SMS. Here special SIM card number is used to get information about the bill. If the consumer changes the mobile number the information cannot reach the consumer. In paper [4][2017] Sunil V. Bavache and Santhosh N. Kashid has published the paper on Automatic meter reading of electricity by using power line communication. As power line carrier modem is used it does not transfers the higher frequency and also noise is high.

## 3. OBJECTIVE

The main objective of our project is to shut down the power automatically when the consumer is not paid the bill. Initially alert messages are given to the consumer's mobile phone using GSM. Along with the consumed unit amount fine amount is also generated. It will reduce the consumption of time.

## 4. BLOCK DIAGAM
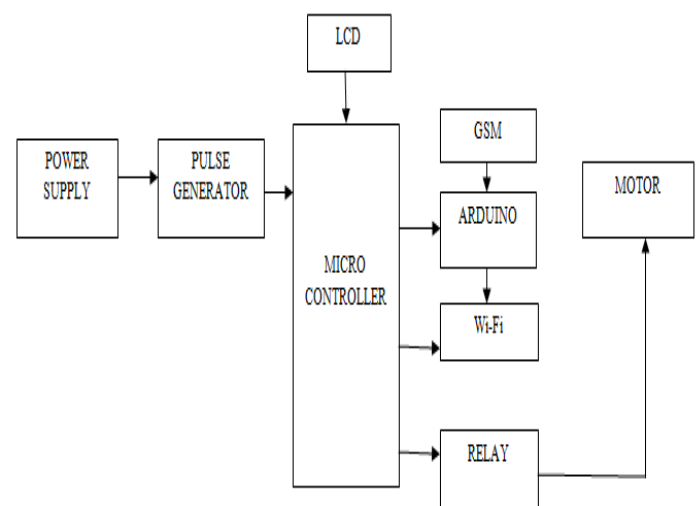
**Power Supply:** A power supply is an internal hardware component that supplies voltage to other components. It converts 230 volt alternating current into a steady low voltage direct current. Voltage regulator is used to regulate 12 volt direct current to 5 volt direct current.

**Pulse Generator:** Pulse generator using 555 timer uses pulse width modulation (PWM) technique. It generates pulse signal which is considered as electrical unit. Each 5 pulses are considered as 1 unit.



**Microcontroller:** Microcontroller is a general purpose device, which has inbuilt CPU, memory and peripherals to make it as a mini computer. In this paper pic microcontroller is used. It has the capability to re-program the library functions.



**GSM Module:** GSM (Global System for mobile communication) is a digital mobile telephony system. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands. GSM system was developed as a digital system using time TDMA technique for communication purpose.



**Wi-Fi:** ESP8266 is a low cost Wi-Fi module suitable for adding Wi-Fi functionality to an existing microcontroller project via a UART serial connection. In this paper Wi-Fi module is used for internet connection in-order to transfer the data from consumer side to electricity board.
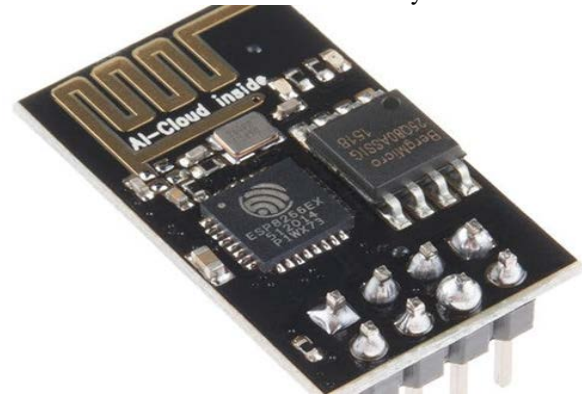


**Arduino:** Arduino pro mini is a microcontroller board based on the ATmega328. This board was developed for applications and installations where space is premium. It is available in 3.3V and 5V.



**Relay:** Relay circuits are used for switching the consumer's main consumption line between cut-off and power supply mode.
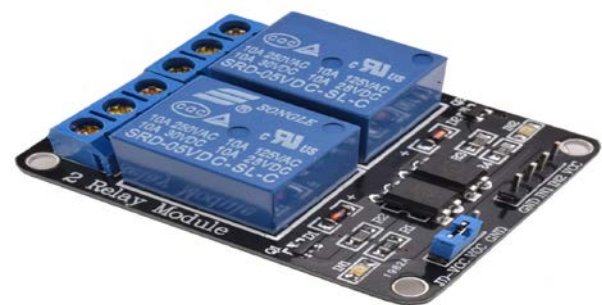


**LCD:** LCD (Liquid Crystal Display) screen is an electronic display module. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. It has 14 pins. It uses 8lines for parallel data plus 3 control signals, 2 connections to power, one more for contrast adjustment and two connections for LED back light.

**Motor:** An electrical motor is an electrical machine that converts electrical energy into mechanical energy. Here motor is to indicate whether the power is on or off.

## 5. PROPOSED SYSTEM

In this system pulse generator is deployed with the help of 555 timer circuit which generates the pulses by pulse width modulation technique. Each five pulses are considered as one unit. According to the pulses, power supply is given to motor. Then we continuously monitor the units that are consumed by the help of pic microcontroller.. After it reaches the threshold limit an alert message is given that it reaches the subsidy unit. Then the unit consumed is still monitored. After it reaches the month limit, it gives an alert message indicating the bill amount. If the bill is not paid then power will be automatically shut down after a period of time. The alert message is produced by the help of GSM. The information about the particular consumer is transferred to the EB office by the help of internet connection. The internet connection is given by the help of Wi-Fi device
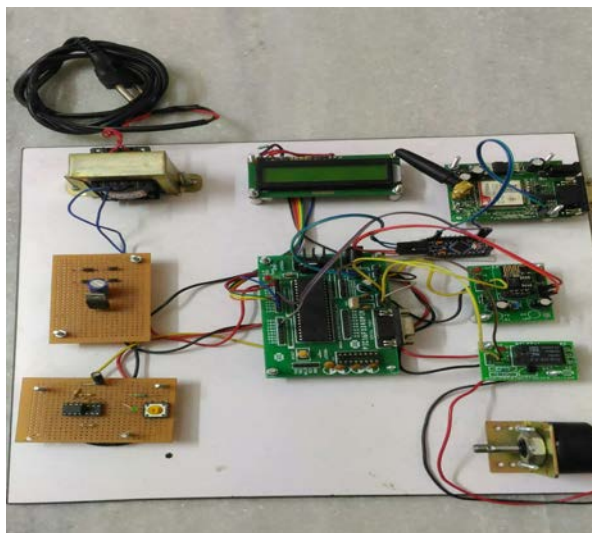


## 6. FLOW CHART
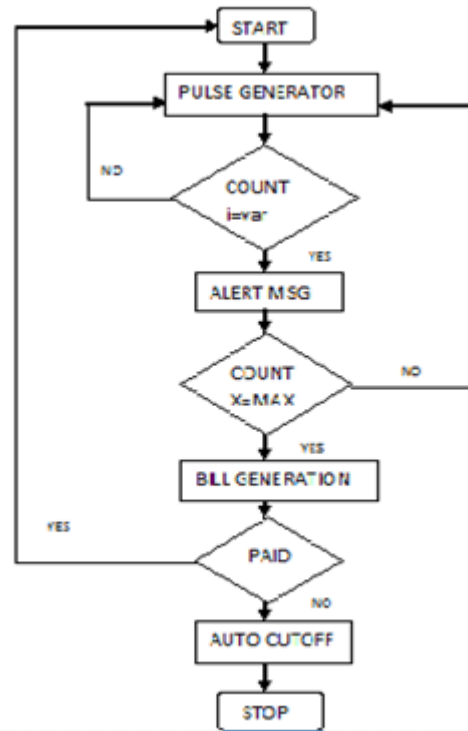


## 7. ALGORITHM

- Step 1: Pulse generator generates required input signal by using 555 timer circuits.

- Step 2: Assume 5 pulse equals to 1 unit.

- Step 3: Counter starts to count the pulses until it reaches the threshold.

- Step 4: It generates the alert message once it reaches the threshold.

- Step 5: When it reaches the maximum value the bill for the particular month is generated.

- Step 6: If the bill amount is not paid within the due date, the power supply will be automatically shut down using IOT.

- Step 7: When the bill amount is paid then it continues to calculate the bill for next cycle.

## 8. EXPERIMENTAL RESULTS AND DISCUSSION

An implementation of the above proposed system gives the following results. This report explains how much power is consuming and remaining units will be displayed in LCD. A graph can be drawn between units and date. It will give the details of units consumed at different intervals of time.
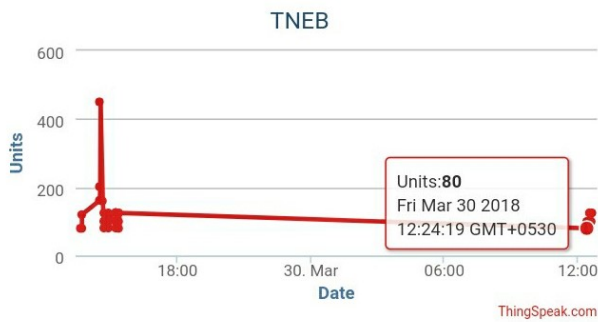
## 9. CONCLUSIONS

Thus the smart electricity bill generation system is used to alert the consumer regarding his everyday consumption of electricity. A small module consisting of the ARDUINO board, ESP8266 and GSM can be installed with energy meter to make the electricity consumption smarter.

## REFERENCES

[1] Abinandan jain, Dhilip kumar, Design and development of GSM based energy meter, International journal of computer science applications, volume 47– No.12, June 2012.

[2] T.Sravanthi, O.Vijayalaksmi, Prepaid electricity billing system using GSM mobile(International Journal of Advanced Research in Computer Science and Electronics Engineering, volume 2, Issue 2, February 2013.

[3] Aradhana Sontake, Jharna Agrawal GSM based monthly energy meter billing via 'SMS' (International Journal of Computer Science and Network, May 2014.

[4] Kanthimathi ,Krishnammal, GSM based automatic electricity billing system International Journal of Advanced Research Trends in Engineering and Technology, vol. 2, Issue 7, July 2015.