

# Design And Implementation Of Prepaid Energy Meter

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**Abstract:** A theme of Electricity asking system known as sensible postpaid meter will help to improve income management system for utilization of energy and it reduces the exploitation of man power for taking meter readings and asking for shopper living in isolated areas. Problem of payment collection by each individual can be solved. It reduces the problem related to billing, consumer living in all over India specially for isolated area. Tampering in energy meter & theft of electricity will be avoided by using sensors, saving papers by using GSM technology & prepaid IOT technology tags. when the customer insert a wise card into the cardboard reader that's connected in postpaid energy meter with tariff indicator kit. The card reader will read the stored information and delete the knowledge from the EEPROM IC (smart card) using the MC program in order that the open-end credit can't be reused by others. When the amount is over, the relays can mechanically closedown the complete system. In this paper we have a provision to give an alarm sound to consumer before the entire amount is reduced.

**Index Terms:** EEPROM, GSM, IOT, MC, relays, sensors, tariff indicator kit.

## 1 INTRODUCTION

Electricity is precious source which we create from many Natural Resources on earth. In today's world we can not survive with electricity. Population growth causes uneven distribution of energy in cities and need to monitor and control the consuming of energy on minimum requirement base so proposed system improve the energy supply monitoring and consuming of energy for domestic. A theme of electricity charge system known as sensible paid METER will facilitate in improved income management in energy utilities and reduces drawback related to charge of shopper living in remote area and reduces employment of manpower for taking meter readings. Problem of payment collection by each individual can be solved. Reduces the problem associated with billing. Consumers living in all over India specially for isolated area. Basically like in a mobile phone recharging, the consumer recharged with some amount and gets some energy units in return of the balance amount. The balance quantity can keep reducing for each unit of energy consumed and once zero, the power supply would be automatically cut off. The amount subtracted for each unit of energy consumed are often controlled by the distribution unit in keeping with the height hours.

**GSM has a lot of security system to build safe communication. The main security measurements of GSM security are:**

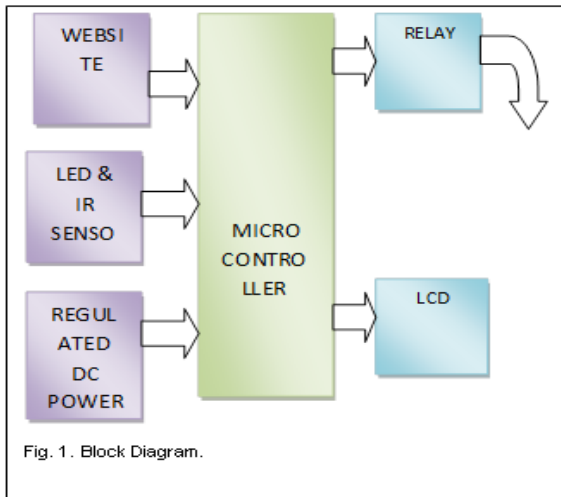
1. authenticating a user
2. ciphering of the data and signaling confidentially of a user identity.

The evaluation is essential so that we can save more power and it will not affect the natural resources which we are using to generate electricity. Due to the consumer's lack of planning of electrical consumption in an There is a lot of wastage of power inefficient way. The distribution company needs to receive Brobdingnagian amounts among the style of unfinished bills, which ends in substantial revenue losses and additionally hurdles to modernization due to lack of funds. The asking system is minimally ready to notice power stealing and even once it will at the tip of the month. Also, the distribution company is facing several issues in terms of losses. The distribution company is unable to stay track of the dynamical most demand for domestic customers. Since the provision of

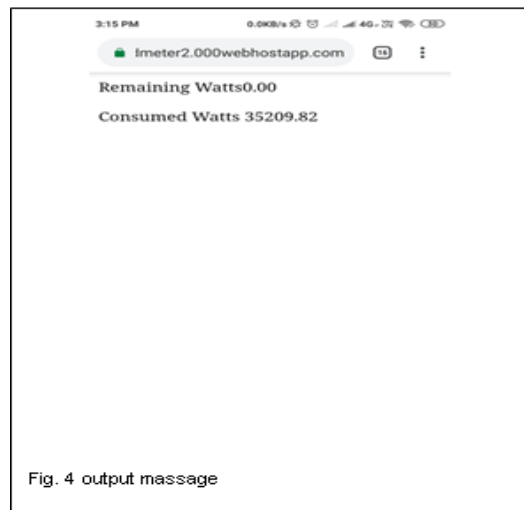
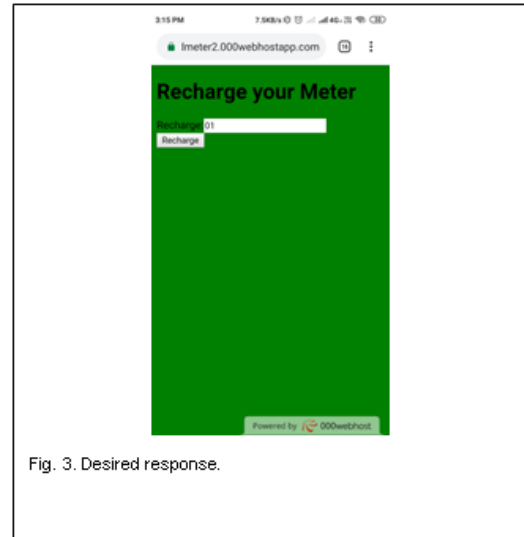
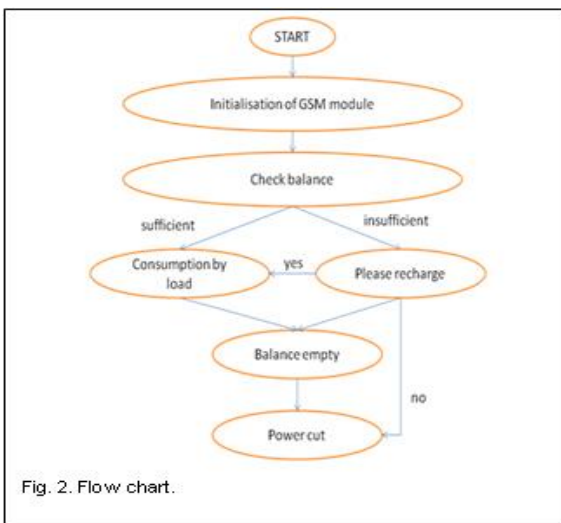
power is restricted, as a responsible citizen, there is a need to utilize electricity in a better and efficient way, The consumer is facing problems like receiving due bills for bills that have already been paid also as poor dependableness of electricity provide and quality although bills square measure paid often. We propose a system to automate the billing of the consumption of energy and the control of energy meters using a blend of both technologies: GSM networks and embedded systems. When the proposed system will be on, power will be consumed that will be measured by ACS712 current sensor. Power consumed will be subtracted from the total power which will give us remaining power. The load or the electricity power will be ON until the recharge gets fully consumed. Once the recharge is fully consumed, it will recharge through internet prepaidmeter 2.000 webhostapp.com/prepaidmeter.html. Once the recharge is done, will be allotted some amount of power (1rs = 1000 watt) Ex:20 Rs=20000. Tampering in energy meter & theft of electricity will be avoided by using sensors. Saving papers by using GSM technology & IOT Technology. We will be able to see power remaining in webpage and we will be able to recharge from web pages . The card reader will read the stored information & delete the information from the EEPROM (Electrically Erasable Programmable Read-Only Memory) IC (smart card) using the MC program. Reducing amount values will be notified to consumers and once the amount is zero, the relays will automatically shutdown the whole system.

## 2 ALGORITHM

If load is connected, the power will be consume so the power consumed will be measured by acs712 sensor. So, the power consumed is subtracted by the power which is remaining after recharge. The load or the electricity power will be on until the recharge gets consumed. Once, the recharge is fully consumed, we will have to continuously recharge. We will recharge through internet on site prepaidmeter 2.00 webhostapp.com/prepaid meter.html Once the recharge is done you will be allotted some amount of power. and (Rs.1=1000 Watt). Ex:Rs.5 recharge=5000 Watt.



registered number before threshold units and after zero unit. By doing this we are saving the manual labour work as well as the paper we are using in complex billing system. We also design a webpage where it will display the amount of energy that we consumed as well as remaining energy will be displayed on webpage. After system installation we compiled the program and our system gave the desired response.



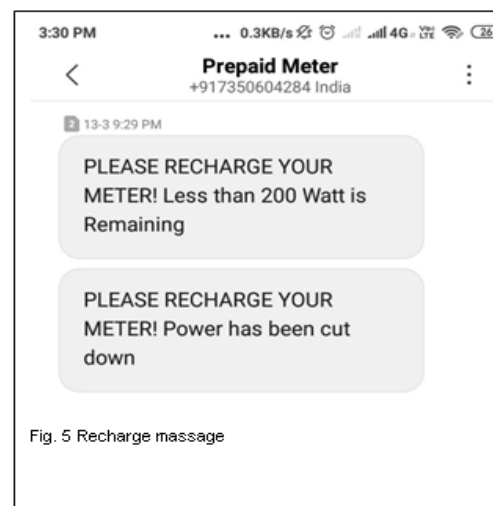
### 3 INTERFACING

#### 3.1 Current sensor interfacing with Arduino

Measuring voltages (DC Voltages) with Arduino is incredibly straightforward. If your demand is to live but or adequate to 5V, then you'll directly live mistreatment the Arduino Analog Pins. If you would like to live over 5V, then you'll use an easy resistor network or a voltage detector module. When it involves measurement current, Arduino (or the other microcontroller) desires help from an obsessive Current detector. So, Interfacing associate degree ACS712 Current detector with Arduino helps United States in measurement current with the assistance of Arduino. As ASC712 are often used for measurement either AC or DC currents, Arduino are often enforced to live constant.

### 4 RESULT

Firstly, our aim was to implement the system which will measure the energy flow from the prepaid energy meter and display it on LCD. For that, we perform calibration of sensor and calculate the calibration factor. After implementation of the model, our next goal was to send the message wirelessly to the customer so we interfaced the GSM module with the arduino. It will send the warning message to the customer. where the customer or the consumer will be alerted of their usage of energy. The customer will be notified to their



## 5 FUTURE SCOPE

Replacing this prepaid billing system with conventional system used currently will overcome the limitation of human error interventions, less accuracy, etc...The proposed system is "Smart" as it indulges less man power and is capable of providing only required amount of energy. We can also buy our own domain for cloud hosting and design completely meter based website. This will reduce the server problems while recharging and monitoring, making the process faster. We can replace single channel relay by more channel relays for the meter to be used at commercial level.

## 6 ACKNOWLEDGMENT

Completing a task isn't a 1 man effort. It is often the results of invaluable contribution of number of people during a direct or indirect manner. The inspiration was given to me by my husband Mr. P. B. Kamble for this project he has given many valuable suggestions and inspiring generously throughout. I wish to convey our gratitude to my family member. With their encouragement has been a constant source of inspiration for me.

## 7 REFERENCES

- [1] publisher : IEEE published in 2016 IEEE 7<sup>th</sup> Power India International conference(PIICON) INSPEC Accession number :17289376,DOI : 10.1109/Powerl.2016.8077253
- [2] "The 8051 Microcontroller and Embedded systems" by Muhammad ali Mazidi and Janice Gillispie Mazidi, Pearson education.
- [3] M.Wassim, Radd, Tarek Sheltami, M.Sallout,"A card Based Prepaid electricity system ", 2<sup>nd</sup> International conference on Pervasive computing and applications, IEEE 2007.
- [4] Md Mejbul Haque," Microcontroller based single phase digital prepaid energy meter for improved metering", International Jomal of power electronics and Drive Systems (ICISS), pp.430-432,22-24,Dec 2010.
- [5] Ubi. K,Mareena J,"Prepaid energy Meter with GSM Technology", American International Journal of Research in Science, Technology, engineering & Mathematics, vol.1.pp.195-198, 2010.
- [6] Koav B.S.Cheah. S.S. eng.Y.H.Chong. P.H.J. Shun. P.Tong. Y.C. ," Design and Implementation of a Bluetooth energy meter", Joint 4<sup>th</sup> International conference on Information, communication and Signal Processing Vol.3, pp. 1474-1477, 2003.
- [7] Zhang J. Oghanna, Bai. C.L., "DSP based electricity meter with remote readings", 4<sup>th</sup> International conference on Signal Processing, Vol.2, pp.1581-1584,1998.