

AUTOMATED ENERGY METERING SYSTEM

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Abstract:- Electricity is vital in every country, In electricity we have analog and digital meters to calculate the usage of power. In this method we are facing many problems like human errors in calculation, power theft by the customer, difficulties in payment, availability of the customer and wastage of power. Each of the loads are connected to a wireless sensor to send data to the controller which is used to control the energy meter, to send data to the sub-station and to the customer. By using this method, the customer can also predict their daily usage of power to reduce the power wastage.

Keywords : Energy Meter, Energy Monitoring, Wireless Network, Wireless Control, Monitoring.

I. Introduction

Energy meter is an integral part of every buildings in any country. Currently the old analogy energy meter is being replaced with digital meters. Even by doing it so, the disadvantages of an energy meter have not completely over ruled. With the existing system, there are power theft, human errors, monitoring difficulties from the supplier and analyzing incapability for the consumer which leads to power wastage.

The proposed system will overcome the above said disadvantages. Smartphone and internet have taken over almost all the fields and has made everything flexible for everyone. The proposed system will monitor each load or appliances that is connected to the electricity. The power that is used by each appliance will be calculated by the microcontroller with the help of the sensors. The information regarding the usage will be updated in the mobile application for the consumer to analyses the excess usage and wastage of power in the respective buildings. On the other hand, the suppliers will also have all the data. Power theft can be easily identified since all the appliances are connected via wireless to the server. In this method payment also can be made by via the mobile application. This will enable us to rectify the human error and it will reduce the man power for calculating the unit cost for the consumer.

II. Existing Systems

For this work existing meter reading techniques in India are analyzed and conducted an extensive study on different energy measuring instruments available now. In existing system either an electronic energy meter or an electro-mechanical meter is fixed in the premise for measuring the

usage. The meters currently in use are only capable of recording kWh units. The kWh units used then still must be recorded by meter readers monthly, on foot. The recorded data need to be processed by a meter reading company. For processing the meter reading, company needs to firstly link each recorded power usage datum to an account holder and then determine the amount owed by means of the specific tariff in use [1]. Wireless electric power management and control system for short distance is developed using Zigbee technique [2] [3], [4]. For this IEEE 802.15.4 standard protocol is used as a Zigbee standard, microcontroller is used to manage energy data and Zigbee to enable communication between the energy meter and data centers. The secure mobile agent concept was presented in [5], instead of one person for one meter according to geographical area energy meters can be organized. Sensors is used to sense the voltage and current values. This sensed value is sent to the microcontroller to calculate the power used for each appliance. This will be displayed in the LCD display and the microcontroller will send a message to the consumer about the power usage of the individual appliance in their house. By this message the consumer can aware of their daily usage and can control the power wastage.

For one location energy meters a security manager can do his work. Local mobile agent can do his duty for a specific location to avoid the visit of external mobile agent to energy meters directly. The major disadvantage of a post-paid system is that there is no control of usage from the consumer's side. There is a lot of wastage of power. Since the supply of power is limited, as a responsible citizen, there is a need to use electricity in improved and efficient way. To avoid this problem in post-paid system, this new technique going to be implemented.

III. Problem Statement

In existing system, the meter readings is calculated by the operator. For each area the substation has allotted an operator for the calculating purpose. This operator must go the area for the meter reading. In one area there will be more than 300 houses, so the operator must visit the 300 houses one by one. It may take more than two days. In this situation there is a possibilities of making mistakes in meter reading calculation. It is very difficult to note and calculate the readings during the rainy reason. In his busy schedule we cannot except in all houses the consumer will be available. If the consumer is not available, then the reading will be in the pending process or the consumer must pay the last month billing amount.

In many house power theft is happening without the knowledge of suppliers. Power theft is very difficult to find out in the existing meter system. In the power theft, the usage of power is different from their billing i.e., they will pay the bill for the less power usage, but their usage of power will be high.

Power wastage is the common problem in all houses. Without paying much attention, we will leave the lights, fan in ON condition, leaving the electronics equipment's in the plugged-in condition. Due to this criteria power wastage will be takes place. It is not only the power wastage, it is also the wastage of money. In power wastage consumer's paying money for not using power. These problems can be avoided by using this proposed system.

IV. Proposed System

Existing system has many problems. To avoid a new energy meter technique is introduced which can reduce the problems associated with the billing problem, power theft and power wastage. This method has advantages in both suppliers and the consumer's side. The billing process is done automatically in the proposed system it mainly reduces the man power. It is also reducing the power theft as well as the power wastage in the consumer's side.

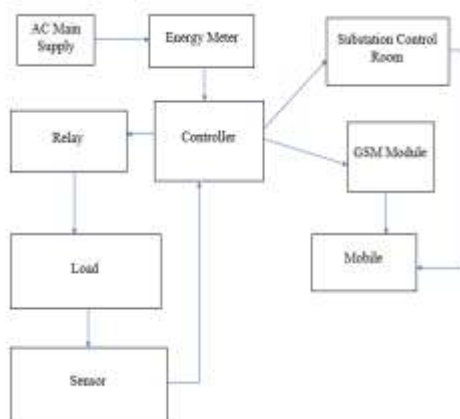


Fig: 1 Block diagram of proposed system

The input of the energy meter will be from the Main AC supply. From the energy meter the supply will be given to the controller by using regulated power supply. The controller will give signal to the relay to give supply to the Load. Sensors will be connected for each appliance. These sensors will sense the voltage and current. Sensors will send signal to the microcontroller by using wireless network. GSM modem will receive the signals from the controller to send the message to the customer. The controller will also update the customer usage of power to the substation control room. From the substation control room, the bill will be generated and send it to the customer mobile. By using the mobile application customer can pay online. Relay can be used to cut the power supply to the consumer if the customer fails to pay.

V. Conclusion

Using this method, the customer can monitor their daily usage of the power and can reduce wastage. The control room can analyze the data and can reduce the power theft. Mainly this method will avoid the human error while calculating the units in individual houses/buildings. This method will provide a better interface between the consumer and the provider of electricity.

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