

Smart Meter Using Billing Display System

T. Sasikumar, R. Renuga, S. Sowmiya and S. Vanmathi

Abstract--- Among all these resources, power is one which needs to be monitored and controlled as per the need since electricity consumption is increasing day-by-day. We live in a world where almost everything runs on electricity. With the help of this project we are aiming to receive the daily energy consumption from a individual loads. In this way we can reduce human efforts needed to record the meter readings which are till now recorded by visiting every home individually. In this project we use digital energy meter based on a very cheap distributed components like microcontroller architecture and current sensors. The meter will immediately respond in the form of meter readings upon receiving the request from the energy provider. The power lines which already exist connect every household in a particular area as it does not require any new installation or erection. The main aim of our project is displaying the electricity billing depends upon our power usages. Also, we can analyze our daily power usages to the individual loads. The before intimation sms is very useful to reduce our power usage level.

Keywords--- Arduino, GSM, LCD, Current Sensor.

I. INTRODUCTION

Lack of resources established in the present world is initiating everyone towards energy efficient technologies. Among all these resources, power is one which needs to be monitored and controlled as per the need since electricity

consumption is increasing day-by-day. We live in a world where almost everything runs on electricity. 67% of their sources used to produce electricity are non-renewable sources of energy. Power is the soul of world which is related to electricity and “electricity” is the word which now rules the world. So, proper utilization of these resources is of immense important to us. Though many technological innovations are taking place in this world, existing electricity consumption billing process seems in India to be very old fashioned and does not meet the latest technology available. In this project we use digital energy meter based on a very cheap distributed components like microcontroller architecture and current sensors. The previous method of meter reading was manual where person have to go physically and should take the billing details of meter reading then he have to add the reading in the cell phone according to consumer no then the bill is generated. The electricity department and the user can get the readings of the energy meter of consumers via SMS. The loads can also be controlled by the user of this system via GSM using this project. The reading of the energy meter is also sent to the control room by GSM. This can be achieved by using smart meters. An energy calculation through smart meter is proposed for automatic meter data collection, give intimation through message displayed on led and energy auditing. This project makes the consumer an active part of energy management duly monitoring the various parameters like voltage, current, power factor etc., directly in the smart meter.

II. OBJECTIVE

In this paper, it monitors the daily power consumption. Power consumption can be reduced to a great extent if we can monitor our daily power usage and switch off appliances which are unnecessary consuming electricity. In

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case, we are using this system definitely the system will be find out the power usages in particular appliances, to calculate tariff and to send a message to consumer billing details. The project is most helpful for industries and home applications.

III. EXISTING SYSTEM

In this system we give a unique Id number for every energy meter. This ID number is interlinked to SIM card unique service number. This system continuously monitors energy meter, SMS is sent to the company as per our requirement. We can set the period in the microcontroller for every meter reading daily, weekly, monthly and sends to the central server of the energy Provider Company. Here the SMS is sent to 3 specified phone numbers written in the microcontroller. The meter reading is stored in database server through SMS gateway.

Now bill is sent to the customer by calculating the reading, as stored in the database. Bill issued by energy Provider Company can be sent by SMS. Alternatively we can also send through either by web account, by post and by email. This system provides flexibility to the customer for paying the bill. AMR also sends the information of the power cut, power load, and energy provider can also cut the connection if customer does not require the connection through SMS request. This SMS card service number is used to identify and retrieve customers detail for billing and identification purpose.

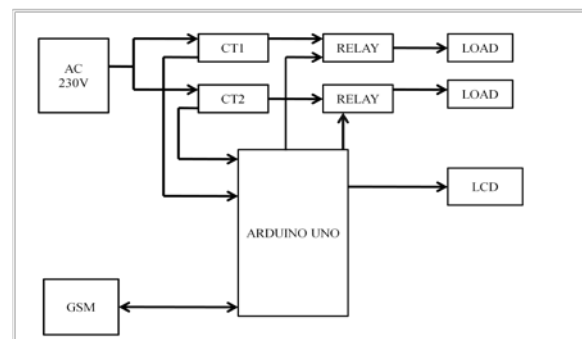
Disadvantages of Existing System

In this system they are used to display the monthly energy consumption only. So we cannot monitor our daily power usages. If we monitor our daily power usages we can easily control our power usage by switch off the unwanted loads. In our project we can calculate the daily power usages of the individual loads and calculate the tariff also but in this system there is no tariff calculation. So this is the disadvantage the existing system

IV. PROPOSED SYSTEM

In our project, it monitors the daily power consumption. Power consumption can be reduced to a great extent if we can monitor our daily power usage and switch off appliances which are unnecessary consuming electricity. In case, we are using this system definitely the system will be find out the power usages in particular appliances, to calculate tariff and to send a message to consumer billing details. The project is most helpful for industries and home applications.

V. BLOCK DIAGRAM OF PROPOSED SYSTEM



Our project is smart meter using billing display system in our project the main component is ARDUINO UNO. This is the heart of our project and we also use current sensor, relay, GSM, LCD display etc... when the power supply is given to the load the project start to work. Current sensor and relay are interconnected between the AC supply and the load. The current sensor is a device which is used to measure the amount of current flow through the wire. It produces the analog or digital signal proportional to amount of current flow which is used to measure the amount of current flow in the circuit. Relay is a protective device, it is used to protect the loads from the over voltages or any other faults .Next the measured current value from the sensor is given to the Arduino. Arduino is similar to the microcontroller it is a programmable device. In this is embedded device with the help of hardware and software we develop our project. In this Arduino we develop a program that is used to get maximum demand, tariff, how

many units are consumed by individual load. Then that information will be displayed in LCD. GSM is a communication device it is used to give the intimation to the customer about their power usages through the message.

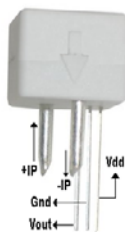
VI. HARDWARE MATERIAL

Arduino Module



Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller. An Arduino board consists of an Atmel 8-bit AVR microcontroller with complementary components to facilitate programming and incorporation into other circuits.

Current Sensor



A current sensor is a device that detects electric current in a wire, and generates a signal proportional to that current. The generated signal could be analog voltage or current or even a digital output. The generated signal can be then used to display the measured current in an ammeter, or can be stored for further analysis in a data acquisition system, or can be used for the purpose of control.

GSM-Global System for Mobile Communication



A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection. A GSM modem can also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. GSM modem is usually preferable to a GSM mobile phone.

Digital Energy Meter



An electricity meter, electric meter, electrical meter, or energy meter is a device that measures the amount of electric energy consumed by a residence, a business, or an electrically powered device. Electric utilities use electric meters installed at customers' premises for billing purposes. They are typically calibrated in billing units, the most common one being the kilowatt hour (kWh). They are usually read once each billing period. When energy savings during certain periods are desired, some meters may measure demand, the maximum use of power in some interval. "Time of day" metering allows electric rates to be changed during a day, to record usage during peak high-cost periods and off-peak, lower-cost, periods. Also, in some areas meters have relays for demand response load shedding during peak load periods.

VII. ADVANTAGES

- It can be easily installed.
- In this project we can monitor daily power usage.
- We can also monitor the individual load consumption.
- Reduce Man power.
- Reduce Time.
- Reduce paper.

VIII. FUTURE SCOPE

- Though many technological innovations are taking place in this world, existing electricity consumption billing process seems in India to be very old fashioned and does not meet the latest technology available.
- In this project we use smart energy meter based on microcontroller and current sensors. So, we can get a idea about our daily power usages, it will very useful for industries.

IX. CONCLUSION AND FUTURE WORK

The 21st century has brought great discoveries and advancements in the field of technology. These advancements also brought many challenges and require approaches to handle these challenges. Smart metering system is one such approach. This paper has presented a comprehensive survey of smart metering and electricity smart meter data analytics. Although there has been much opposition to electric meters due to privacy concerns, it is obvious that smart meters are here to stay and will be a “way of life” in the future. GSM based energy meter is easy to installation and beneficial for both energy Provider and Customer. This reduces the manual cost and also reduces the errors done by the humans.

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