SURVEY ON ENERGY MONITORING AND CONSERVATION

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Abstract— Accurate metering, detection of energy theft and implementation of proper billing system are required in wise energy management. Energy meter is used to analyse the energy consumed. Most of the population uses manualy reading machines. It has always been a tiresome process for reading the meter manually from all consumers irrespective of industries or households. Different types of energy meter implementations have been introduced since the usage of electricity begun in times. So it will be better if we use advanced system for energy monitoring thereby reducing manual labour and mistakes in meter reading.

Index terms-GSM Smart meter, AMR

I. INTRODUCTION

In the past years electric meter reading has gone through changes with which the electromechanical induction watt-hour energy meter or the electricity meter is now automated in many countries.

An electricity meter is a device which measures the total electrical energy consumed. Electricity meters are a common sight in the households today. And the electricity bill is entirely dependent on this meter.

Automatic meter reading is the technology of automatically collecting data from metering devices and transferring that data to a central database for billing, troubleshooting, and analyzing. This technique has many advantages. It saves energy providers the expense of periodic trips to houses for a meter reading. Billing will based consumption rather than on estimates based on predicted consumption value as in old meters.

This can help both energy providers and customers to control the use and production of electricity. There are different types of electricity meters which measure electricity:

a) **Electromechanicalmeter:** Electromechanical meters were very common in India until now in few rural areas. The working of electromechanical meters is fairly simple. There is a non-magnetic metallic disc attached to it internally which rotates depending upon the power passing through it. So if the power passing through is high, then the disc rotates faster and when the passage of the power is low, the disc rotates slower. The rate of the rotation in turn decides the reading on the electricity meter. Higher the number of rotation, higher is the reading and vice-versa. Since there is rotation of a disc involved, it is bound to consume some electrical energy itself to facilitate the rotations. The power of around 2 Watts is consumed to make it rotate and this power consumption is not registered on the meter.

b) **Electronic meter:** Electronic meters are becoming increasingly popular now-a-days in urban areas. An electronic meter has a LED/LCD display on which the readings of the electricity consumption of the connected appliances. The readings are digital in the electronic meters .Electric meter do register every small unit of electricity consumed.

c) **Smart meter:** Smart meters are the newest addition to the type of electricity meters. They look similar to electronic meters but they are better than both the electromechanical meters and the electronic meters in the sense that in addition to providing the usual services of a regular meter, they are connected back to the utility through the internet. It means that there is no need of an reader manually taking the meter readings. The readings are automatically sent by the internet. Electronic meters are a better than other traditional meters, they provide not only the consumed units but they also provide other information like the instantaneous and maximum rate of usage demands, voltages, power factor and so on.

Problems with the electromechanical meter

Although the electromechanical meters have been quite common in the past years, there are certain problems that are attributed to them.

1) Since electromechanical meters consist of moving parts, they are bound to undergo some wear and tear with the passage
2) The accuracy of a electromechanical meter decreases bye the various environmental factors such as humidity, dust and dirt which significantly affect the operating accuracy of the electromechanical meter.
3) Factors like corrosion, worn out gears and insects can render the electromechanical meter unable to capture the electricity consumption of a property accurately.
4) The mechanical gear lubricants may dry up resulting in the breaking in the gear teeth .
5) Also, the electromechanical meters may get mis-calibrated if they experience a sudden shock or vibration which may cause a jolt or a sudden stoppage of the rotating disk.

II. EXISTING TECHNOLOGIES

AMR system and several related works are available. Many e metering systems have now been proposed, based on GPRS,Bluetooth, GSM as explained in [1], [3], [4], [5], [6], [7] and[8].

2.1. GPRS

Design of an Electric Energy Meter for long-distance data transfers based upon GPRS is proposed in[1]. These systems can't be implemented so easily because the regular use of GPRS is still a dream to the common people.

2.2. Bluetooth

A Bluetooth Advanced Metering infrastructure is an existing one for automatic meter data collection and energy auditing and management. The system operates with multiple channels and frequency hopping. In this method if any tariff variation occurs, the new tariff rate will be changed only through reprogramming otherwise the previous tariff rate will be displayed on the LCD display. This causes major problems in billing. No information is given to the consumers about the status of energy consumption and no details about the previous month's consumption and the amount of bill paid.

2.3. GSM

A GSM Energy meter with instant billing facility is introduced in [2] and [3],but still the problem of missing SMS will be an issue. So a new approach of using an energy measurement technique that encompasses the GSM network as a mean of transmitting energy data is more relevant. The GSM/GPRS network offers most coverage in most developed and developing countries. This method is also effective in rural areas, which are not densely populated, and in which, most people do not have access to a fixed telephone network. So in a country like India we need to focus more on this method as it can be implemented very easily and effectively.

III. CONCLUSION

Various electronic meters have been developed and are still being developed. However the use of GSM provides numerous advantages over methods that have been previously used. Data transmission is charged at standard SMS rates, thus the charges are not based on the duration of Data transmission. The cost efficient transmission of readings ensures that power consumption values can be transmitted more frequently. Can also be able to transmit readings more often will help to generate timely bills, better understanding of energy demand patterns, manage meter failures more efficiently and manage fraud better. Also helpful in online bill payment that reduces the consumers work load. And also it reduces many drawbacks of the traditional system. It is also risk free because there is no manual reading of any sort as in old electromechanical meter reading.

IV. REFERNCES

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