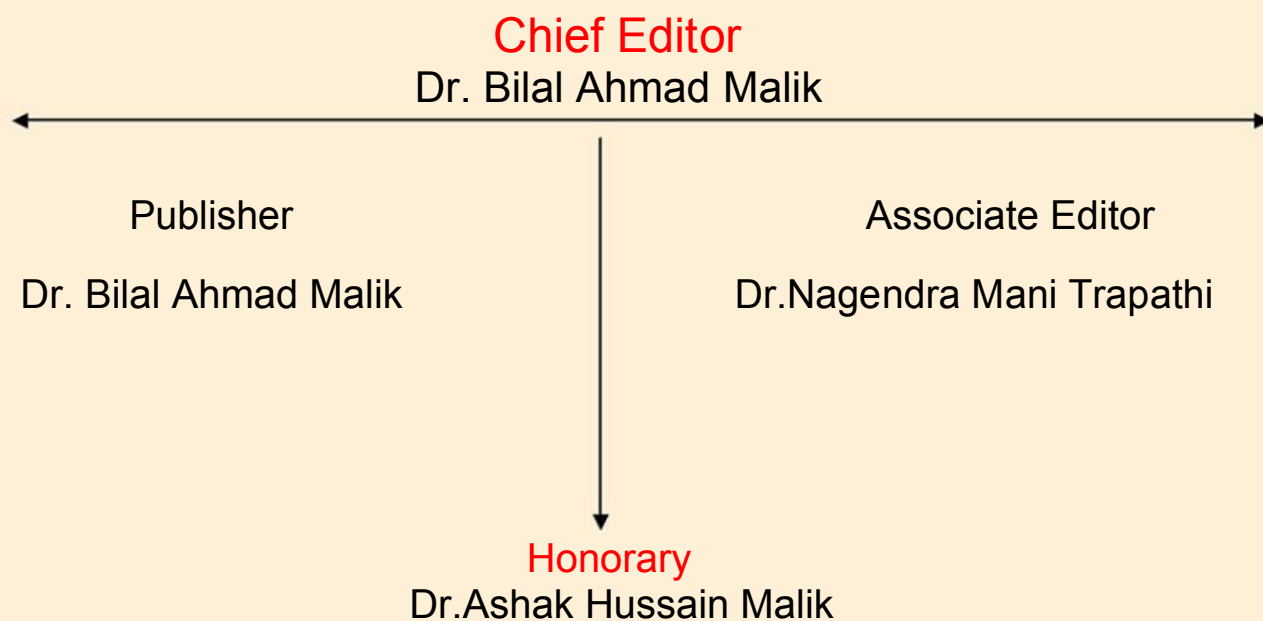


# North Asian International Research Journal Consortium

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## PREPAID ENERGY METER USING GSM TECHNOLOGY

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### **ABSTRACT**

Prepaid meter (PM) is getting very popular especially in developing countries. There are many advantages to use prepaid meter as opposed to postpaid meter both to the utility provider and to the consumer. Brunei Darussalam has adopted PM but it is not intelligent and not wireless enabled. Reading meters and topping up balance are still done manually. Utility provider does not have information on the usage statistics and has only limited functionalities in the grid control. So accordingly a novel software agent based wireless prepaid energy meter was developed using Java Agent Development Environment (JADE-LEAP) allowing agent from utility provider to query wireless energy meter for energy values of every household. These statistics can be used for statistical computation of the power consumed and for policy and future planning.

**KEYWORDS-**Wireless Prepaid Smart Meter, Smart energy meter, GSM, Prepaid Meter

### **1.INTRODUCTION**

The traditional method of electricity billing system involves meter readers to periodically visit every house to take readings. There are many issues related to this method such as taking wrong readings, lack of meter readers, and houses in very remote areas, meters in inconvenient location and so forth. Many technological advancement have been carried out

Advantage of the electronic meter is the possibility of introducing Prepaid metering system. Prepaid metering system is the one in which the consumer pays money in advance to the utility and then feeds this information into his meter. The meter then updates the credit available to the consumer

and starts deducting his consumption from available credit. Once the credit reaches a minimum specified value, meter raises an alarm. If the credit is completely exhausted, the meter switches off the loads of the consumer.

Another benefit is that they get paid in advance. The consumer benefits due to elimination of penalty for late payment. Also it enables him to plan his electricity bill expenses in a better manner. Due to the intelligence built in into the electronic meters, introduction of prepaid metering becomes much easier than in the case of electromechanical meter

## 2. OVERVIEW

The Electrical metering instrument technology has come a long way from what it was more than 100 years ago. From the original bulky meters with heavy magnets and coils, there have been many innovations that have resulted in size & weight reduction in addition to improvement in features and specifications. Resolution and accuracy of the meter have seen substantial improvements over the years. Introduction of the digital meter in the later part of last century has completely changed the way Electrical parameters are measured. Starting with Voltmeters & Ammeters, the digital meter has conquered the entire spectrum of measuring instruments due to their advantages like ease of reading, better resolution and rugged construction. Of particular significance is the introduction of the Electronic Energy Meter in the mid eighties. Now a days, the energy consumption and energy distribution has become a big subject for discussion because of huge difference in energy production and consumption. In this regard, energy consumers are facing so many problems due to the frequent power failures; another important reason for power cuts is due to the un-limited energy consumption of rich people. In this aspect, to minimize the power cuts and to distribute the energy equally to all areas, some restriction should have over the power consumption of each and every energy consumer, and according to that the Government should implement a policy, by introducing Autonomous Energy Meters everywhere in domestic sector. Hence, the need has come to think on this line and a solution has to be emerged out.

### Electrical Metering Instrument Technology

Today the metering instrument technology grown up significantly, such that the Consumed energy can be calculated mathematically, displayed, data can be stored, data can be transmitted, etc. Presently the microcontrollers are playing major role in metering instrument technology. The present project work is designed to collect the consumed energy data of a particular energy consumer through wireless communication system (without going to consumer house), the system can be called as automatic meter

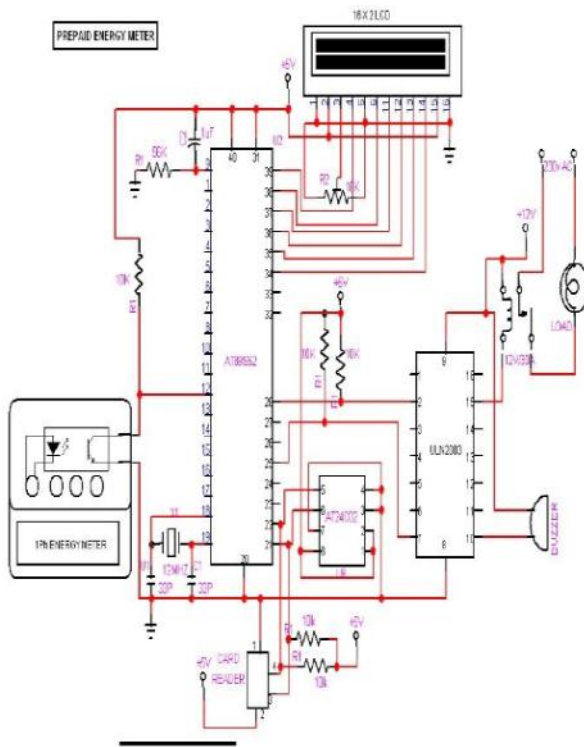
reading (AMR) system. The Automatic Meter reading system is intended to remotely collect the meter readings of a locality using a communication system, without persons physically going and reading the meters visually.

### Remote Metering of Energy Meters

The introduction of electronic energy meters for electrical energy metering has resulted in various improvements in the operations of utilities apart from the increase in revenue due to better recording of energy consumption. One such additional benefit is the possibility of reading the meters automatically using meter-reading instruments even without going near the meter. Meter reading instruments (MRI) are intelligent devices with built in memory and keyboard. The meter reader can download the energy consumption and related information from the electronic meter into the meter reading instrument either by connecting the MRI physically to the meter using their communication ports or by communicating with the meter from a distance using Radio Frequency (RF) communication media. RF communication method is similar to a cordless telephone, which is quite common these days. The meter and the MRI are provided with an antenna. When the meter reader presses a button on the MRI, it communicates with the meter through RF and asks for all the data that are preset. The meter responds with all relevant data like meter identification number, cumulative energy consumed till that time etc. After reading many meters like that in one MRI, the meter reader can go to the office and transfer all these data into a computer, which will have all these data for the previous billing period. Using these two data, the computer calculates the consumption for the current billing period and prepares the bill for each consumer.

### 3.CIRCUIT DIAGRAM

#### Circuit diagram



### 4.ADVANTAGES OF PREPAID ENERGY METER

#### Improved operational efficiencies:

The prepaid meters are likely to cut the cost of meter reading as no meter readers are required. In addition, they eliminate administrative hassles associated with disconnection and reconnection. Besides, going by South Africa's experience, prepaid meters could help control appropriation of electricity in a better way than conventional meters.

#### Reduced financial risks:

Since the payment is up-front, it reduces the financial risk by improving the cash flows and necessitates an improved revenue management system.

### 5. FUTURE SCOPE

In the present time of 21<sup>st</sup> century we have no space for errors or faults either in

any technical system or in general applications. Prepaid energy meter is an advantages concept for the further. It's facilitates the exemption from electricity bills. Electricity coupons will be available at nearby shops.

The word prepaid means "pay before use" one of the advantageous feature of this concept prepaid energy meter is used to prepaid the ongoing supply of electricity to homes, offices etc.

### 5. CONCLUSION

The monopolistic power distribution market in asia is gradually transforming into a competitive marketplace. Differentiation in service is going to be the key competitive factor to the improve market share in the deregulated power markets prepaid meters with their advantages over conventional ones are likely to help power distributors to differentiate and offer value-added services to consumers. Encourage consumers to opt for prepaid meters on a voluntary basis and offering tariff or non-tariff incentives to those consumers who prepaid their power changes would help the utilities to implement this system

## 5. ACKNOWLEDGEMENT

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