

# AUTOMATED ELECTRICITY BILLING SYSTEM

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## Abstract:

Electricity is one among the energies’ that play a prominent role in human life. In today’s lifestyle, every device starting from watches to large machines every device or gadget works on electricity. It is a vast source where nation’s invests and earn lot of revenue. In today’s lifestyle electricity became the most basic requirement like food, shelter, and clothing. In the past few decades lot of improvement was induced in electricity departments but they did not change the oldest way of manual billing system. This manual billing system has many disadvantages scope for malpractices is more like while billing people bribe the bill generator to reduce number of units consumed, people escape from punishment without paying the bills on time, high manpower for bill generation, collecting payments for bills and paper wastage for billing. Generally, in case of any technical problem or any fire accident the whole lane (transformer) power supply will be disconnected this cause high inconvenience to the peer consumers and a loss to electricity department too. Here in this thesis, we are bothered about the financial loss that arises due to the manual billing system. In the manual billing system, end of every month or a couple of months a person from electricity departments comes to generate bill and this employee goes to each and every house for bill generation from the energy meters based on number of units that a consumer has consumed for a period. Hence, in this thesis, we propose and discuss a new adaptive billing mechanism which reduces all the above-mentioned losses.

**Keywords** — CDM, Subscriber Identity Module(SIM), Short Message Service(SMS), Electricity billing, Smart Retrofitting device, Wireless fidelity.

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## I. INTRODUCTION

The purpose of this paper is to present a mechanism to prevent malpractices that are done while generating electricity bills, and to prevent consumers from escaping from punishment if any imposed, and also to reduce manpower especially at the time of billings, for making payments of bills and to reduce usage of paper for billing. So far we have many unique ideas that are introduced and implemented. This is another unique mechanism that is been introduced to eradicate the above mentioned disadvantages and this prototype requires two devices, they are Integrated device - A device that displays price and power consumed, and is connected to the server by means of a SIM card or Wi-Fi and AADHAR card which is registered on the name of house owner by establishing a link with the electricity bill meter number and also supports e- payments (online payments). This device is fixed to the meter such that it requires technicians to replace or repair so that many malpractices can be prevented. Just by changing the price

per unit in the server variables all the electric bill meters get updated by the new charges. Cash Deposit Machines (CDM) will be situated in all electricity departments. Generally, this machine requests for mobile number (or) AADHAR number and later for electricity bill meter number followed by displaying the charges and asks for payments then returns the change (or) deduce this extra amount in next payment and at last prints a payment receipt for successful transaction. Every minute to minute the display readings get updated based on the power consumed and display’s the price and also pushes the data directly into the server and database. Every month starting an SMS will be sent to the registered mobile number of a monthly bill for consumed energy if this bill remains due by more than permissible days extra fine as the penalty will be added for next bill generation further if the bill is not paid power supply will be closed to the consumer automatically from the server, this cannot be stopped until and unless the pending bill is closed.

## II. RELATED WORK

Many ideas have been proposed in order to reduce the wastage of man power in this manual billing. Nowadays electricity department is using a billing meter that directly detects the meters number(Unique service number) and transfers the number of units consumed followed by bill printing but however, in this case, the manpower is again required in order to carry the device to all the meters. Many people teams proposed almost n number of techniques in order to reduce manpower in electricity billing and tried to make that work simple and efficient. Most of those solutions are GSM Module Based techniques where people place a GSM Module connected to it and sends a message from a mobile/smart phone to the particular SIM/number to which meter it is placed here they generated bills to respective consumers once in a month or in a couple of months [2]. The below-given figure is one such kind of GSM Module based billing system published in July 2015 [1].



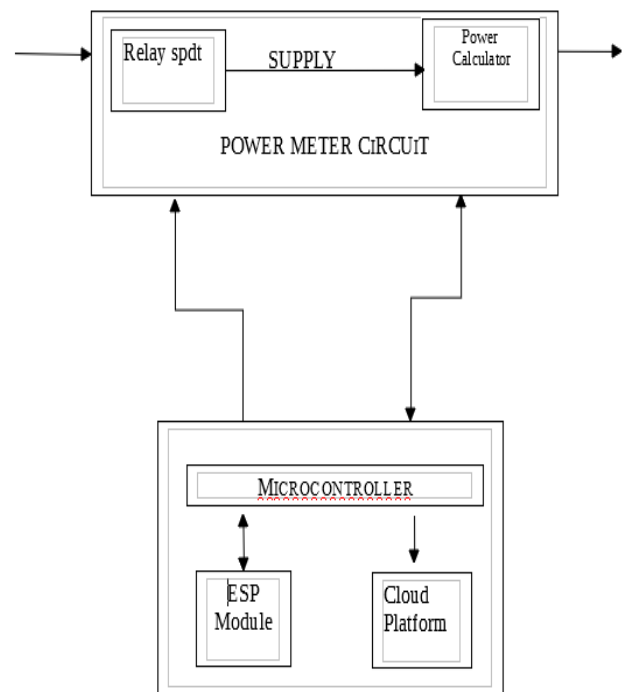
**Fig. 1:** Smart Billing System(GSM) Published in July 2015

## III. METHODOLOGY

This approach has been divided into two parts:

- 1) **Retrofitting electronic device:** This Retrofitting electronic device consists of four parts likely a AtMega uC, Relays, GSM SIM 800A Module and LCD Display. Here the microcontroller is used in- order to program and control the GSM Module, Relay, LCD display to achieve required necessary functionalities [4]. The relay is placed between the mains supply that enters the house and this relay is operated by the microcontroller on the bases of the message signal that has been received by the GSM module in case of any emergency. Here the messages to the GSM module will be sent by the electricity provider substation.

- 2) **Cash Deposit Machine:** Generation of electricity is a task and also collecting those charges is also a time taking process for the electricity board. Here Cash Deposit Machines works similarly as a kind of ATM's. This CDM's are to be placed at each and every electricity sub-station and also in the offices that comes under the control of electricity department so that ,customers can make their payments of electricity bills at any time with 24\*7 service provided this reduces the manpower too and also generates employment opportunities for the educated [7].



**Fig. 2:** Block Diagram showing the Proposed Methodology using GSM Module

The Retrofitting electronic Device is set with instructions such that it should respond only for the messages that are received from two numbers so that, no other person or group can get control over that energy meters .for every certain period of time, according to the instructions provided the display will get updated automatically with the new values of power consumed and charge for respective consumption. The cost of the unit can be updated by sending an update query from the server to device by a message. The SIM card

number will be same as registered mobile number of the house owner that is given at the time of purchasing meter in case, if they change their mobile number they should update their registered mobile number with new number details in electricity department by providing an acknowledgment letter [6]. This number should also be linked with the AADHAR number of the customer that will help at the time of bills payment. Every month end or for couple of months the GSM Module will automatically generate a message to the house owner's registered mobile number of monthly consumption. If at all any payments left pending the GSM module will automatically add fine to that generating bill. If the late payment is above the time limit, automatically power supply will be discontinued from the mains to house so that until and unless they pay the bill the power supply will be left as open circuit. In case of any sudden fire accidents or any other emergency situations, consumer can make a call to the electricity department and inform them so that they will turn off the relay board using GSM module Message so that it will be secure and helps in preventing extra damage or loss. CDM can be used for bill payments by using your registered mobile number or by passing consumers AADHAR number including Unique service number. As these devices are connected to the server that instantaneously update your meters display with new values [8].

#### **IV RESEARCH LIMITATIONS & PRACTICAL IMPLICATINS**

This method leads to vast changes where it prevents all the manual billing systems and also by reducing manpower for generating and collecting the bills. It helps the government proper implementation of collection of bills. Most of the malpractices can be prevented. Easy payment method for the consumers, however, the CDM's will serve for 24\*7. In case of any sudden breakdown of fire accidents, easy handling of power is implemented. This system helps to save lots of paper in tones and the data can be stored in database so that a soft copy can be generated as on required [5].

#### **V ORIGINALITY & OUTCOMES**

This helps as a smart way of using technology to reduce manpower and increase work efficiency with increase in accuracy without any malpractice encouragement. Here the work done in efficiency rate is outcome of smart devices.

- Efficient in billing and Low cost of manufacture.
- Reduces paper wastage.
- It can be implemented in rural areas, remote areas and urban.

- Reduces manpower.
- Eradicate scope for malpractices by consumers.
- Automatic (programmed) penalties will be implemented which prevents revenue loss to DISCOMs.
- Power consumption and charges for consumed energy can be monitored through display on meter.
- Implementation of new charges (per unit) by update query/message from server side.
- Power supply can be stopped immediately from server in-case of fire accidents.
- The regular alerting system of bill payments delays through recorded calls, voice-assistances and messages.
- User-friendly.

#### **VI CONCLUSIONS & FUTURE SCOPE**

In this present world of technology, a smart way of solving a problem is the most important challenge. This method will bring a smart solution for the wastage of high manpower, un-efficient and in- accurate billing system that we are using at present, abundantly increased malpractices, irregular payments. Proper implementation of bills, In-time tax payments will enhance the nation's economy. If the government is interested to make it through online payments a mobile application can be developed or an updated version of the present existing Mobile application can be used this helps in making the transactions more easier. The Mobile application should support to file complaints and should be user- friendly, apply for new Meter connections, etc..

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