

GSM Based Electricity Theft Detection

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ABSTRACT: This paper presents a detection of power theft in every house and in industry for different methods of theft. Electrical energy is very important for everyday life and spine for the industry. Electricity is indiscipline to our daily life with increasing need of electricity the power theft is also increasing, power theft is a problem that continues to plague power sector across whole country the objective of this project is to design such a system which will try to reduce the illegal use of electricity and also reduce the chances of theft. This project will automatically collect the reading and also detect the theft this model reduces manual manipulation work and try to achieve theft control.

Now a day's electricity theft is a major issue face by all electricity companies. Since electricity theft directly affect the profit made by electricity companies, detection and prevention of electricity theft is necessary. In this paper we present a broad introduction about electricity theft. We also presented the work done in this area up till now, talk about techniques used and their performance. Finally comparison of these techniques is done.

Keywords- GSM, Current Transformer, PIC18F4520, Energy Meter.

I. INTRODUCTION

As we know electricity theft is a major problem for all electricity companies. This problem is not related to Indian companies only; other country's electricity companies also face this problem. Electricity companies losses money every year due to theft. There are two types of losses namely transmission loss and non-transmission loss, some research papers uses term technical loss and non-technical loss respectively. Transmission loss occurs while transmitting energy form generation side to consumer's side. Non-Transmission losses occur due to wrong billing, false meter reading, electricity theft, etc. First two losses can be prevented by taking proper meter reading and calculating accurate bill for electricity consume, but electricity theft hard to prevent since no one predict about which consumer is honest or dishonest. Still losses due to electricity than can be reduce by detecting theft or fraud consumer and taking actions accordingly. Theft detection is done manually by inspecting consumers. This is time consuming process and requires large number of field staff. The cost for this process is too high and detection rate is not so high. To overcome these costs, now a day some data mining, knowledge discovery methods, etc. are used to detect theft.

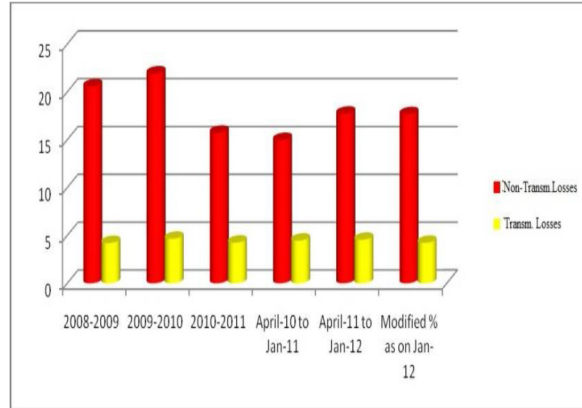


Fig.1. Time span

There are two types of techniques to deliver
The information to the authorized agency to control
The theft of the electricity.

Wired techniques

- Electrical cables
- Coaxial cable
- Optical fiber
- Infra Red
- Wi-max
- Bluetooth

Wireless techniques

- Zigbee technology
- GSM technique
- WI-FI

II. OBJECTIVES

- This system would provide a simple way to detect an Electrical power theft without any Human Interface.
- It will indicate exact zone and distribution line on Which unauthorized tapping is done in real time.
- It will determine transmission line faults.
- To maximize revenue generation by the power Utility companies.
- Its cost is less as compare to other present system.

III. PROPOSED SYSTEM

In this proposed system GSM technology used to transmit the meter reading to the customer and government with the required cost. This process will be happen when needed that means if SMS is received from authorized server mobile transmission between customer and government. Then the energy theft controlled by IR sensor, Bypass detection. Also cut the power supply automatically as per request of authorized server mobile.

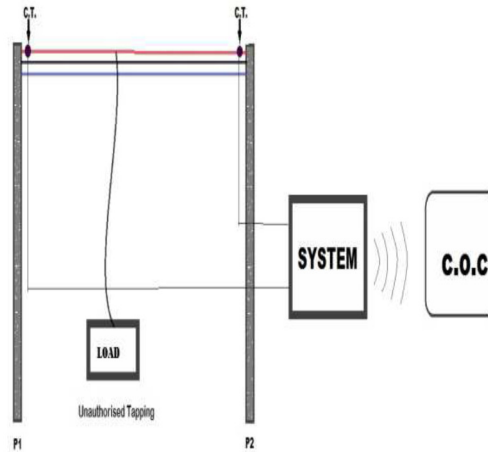


Fig.2- Proposed System

IV. BLOCK DIAGRAM

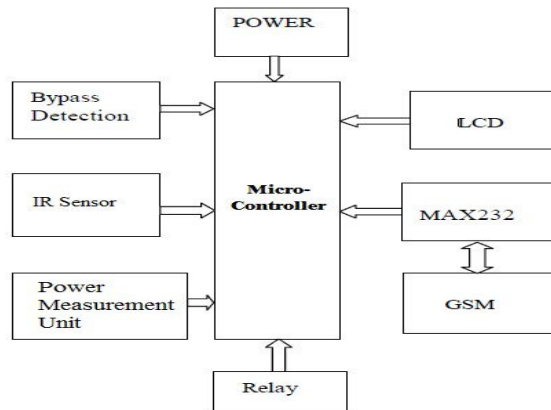


Fig.3-Block Diagram

IV.I PIC 18F4520

The PIC is the main part of automatic reading and theft control. It is based on low power 16 bit microcontroller. PIC 18F4520 consist of high performance and low cost of network technology. PIC 18f4520 belongs to a class of microcontroller of RISC architecture. It has internal 10 bit analog to digital converter.

IV.II POWER SUPPLY

The input to the circuit is applied from the regulated power supply. The AC input that is 230V from the main supply is step down by the transformer to 12V and is fed to a rectifier. The output obtain from the rectifier is a pulsating DC voltage. So in order to gate a pure DC voltage, the output voltage from the

rectifier is fed to a filter to remove any AC components present even after rectification. Now this is given to a voltage regulator to obtain a pure constant dc voltage.

IV.III SEAL TEMPRING UNIT

If the person theft the power in energy meter like, if he remove the seal which on energy meter then IR sensor will send the signal to PIC microcontroller then it will send the message to substation controller mobile through GSM modem.

IV.IV BYPASS DETECTION UNIT

If the person use a the power without connecting to energy meter, that means if he is bypassing the connection in energy meter without any reading in energy meter the person use power in houses at time our circuit send a message to substation controller through GSM with help of PIC controller and cut the power supply automatically by using relay.

IV.V POWER MEASUREMENT UNIT

In the power measurement unit, the one CT is used to measure total current used and measuring voltage, we use bridge of diode for converting AC to DC and then voltage divider circuit reduce voltage level at measurable scale.

IV.VI GSM MODEM & MAX 232

GSM Modem-Max 232 is built with dual band GSM engine-SIM 900A. As mentioned in the above Sensing circuit there is power theft then it will send message to microcontroller as per our program and it will send message to GSM through Max 232. Also if mobile received SMS from authorized mobile phone to cut the supply, then supply is off by using relay.

IV.VII LCD Display

The commonly used 16x2 LCD display custom made characters, numbers, alphabets, and special characters. When there is no theft occur in energy meter then the LCD will display voltage current and power. If theft is occurs then it display THEFT IS DETECTED.

V. CIRCUIT CONNECTION

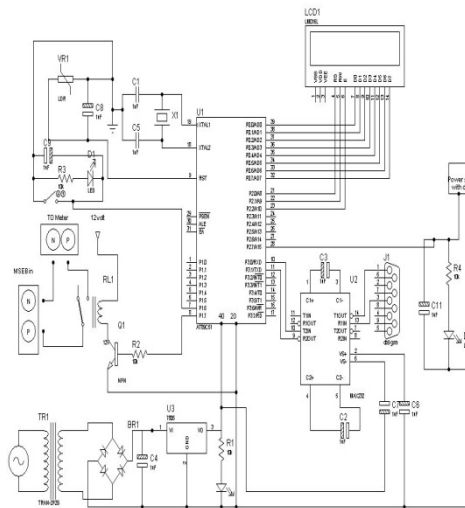


Fig.4- Circuit Connection

VI. MATHEMATICAL EQUATION

Whenever input power is passing from Supplier to the receiver, at that time if the total amount of power is not received by the receiver then There is possibility of theft of energy.

$$\sum P_{sent} = \sum P_{consumed} + Loss \dots \dots \text{No theft}$$

$$\sum P_{sent} \neq \sum P_{consumed} + Loss \dots \dots \text{Theft Occured}$$

Here,

P_{sent} = Power measured by pole side energy meter

$P_{consumed}$ = Power measured by load side energy Meter.

VII. HARDWARE DESIGN



Fig.5-Proposed Design



Fig.6- Output on LCD display

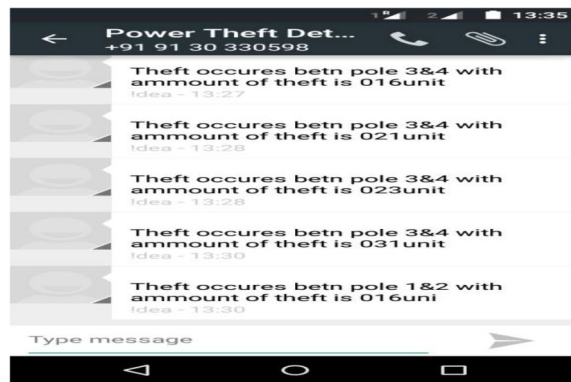


Fig.7- SMS Received on Mob.

VIII. CONCLUSION

The project model reduces the manual manipulation work and theft. Use of GSM in our system provides the numerous advantages of wireless network systems. The metering IC ensures the accurate and reliable measurement of power consumed. Hence we are trying to manipulate cost wise low when compared to other energy meter without automatic meter reading and theft control.

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