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House Hold Theft Detection Using Differential Relay

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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.

Keywords*:* GSM, Current Transformer, differential relay, LCD display.

1. Introduction

Electricity theft is a very common problem in country, were population is very high and the use of electricity is ultimately tremendous. In India, every year there is very increasing number of electricity thefts across domestic electricity connection as well as industrial electricity supply, which results in loss of electricity companies energy and because of which we are facing the frequent problems of load shading in urban as well as rural areas so as to overcome the need of electricity for whole state. Also the ways using which theft can be done are innumerable so we can never keep track of how a theft has occurred, and this issue is needed to be solved as early as possible.

In This abstract we propose an electricity theft detection system to detect the theft which is a made by the most common way of doing the theft and that is bypassing the meter using the a piece of wire, people simply bypasses electricity meter which is counting the current unit by placing a wire before and after the meter reading unit. The proposed system will be hidden in such meter and as soon as an attempt is made for the theft, it will send SMS to control unit of electricity board.

Electricity is the modern man's most convenient and useful form of energy without which the present social infrastructure would not be feasible. The increase in per capita production is the reflection of the increase in the living standard of people. When importance of electricity is on the increasing side, then how much should theft of this energy or illegal consumption of power from the transmission lines be averted? Power theft has become a great challenge to the electricity board. The dailies report that Electricity Board suffers a total loss of 8 % in revenue due to power theft every year, which has to be controlled. Our paper identifies the Power theft and indicates it to the Electricity board through GSM. The electricity is needed to be protected for efficient power delivery to the consumer because electricity is indispensable to domestic and industrial development activity.

2. LITERATURE REVIEW:

In many poor countries economic growth is hampered by inadequate and irregular supplies of electricity. Indian firms ranked electricity problems as the number one issue facing their businesses in the 2006 World Bank Enterprise Survey. Every year the electricity companies fare the line losses at an average 20-30% according to power ministry WAPDA Company's loss more than RS.125 billion. The scarcity and unpredictable supply of electricity are in part results of widespread theft, as well as lack of adequate generating capacity. Given its high value, the relative ease with which it is diverted, and the difficulty of identifying individual offenders, theft of

Electrical power is easily accomplished as well as useful to enterprises and individuals. As a result, it is widespread across much of the developing world and the reason for huge revenue loss for government. In this system current transformer are used, here one current transformer is placed in input side of the post line. Other current transformers are placed at the distribution points of the house lines. The output of CT values is given as input to ATMega328 microcontroller convert analog inputs to digital. Then PIC compares the input current and the same of output current. If compared result has any negative values then this particular post is detected as theft point. This compared value is transmitted to electricity board, this value display in LCD display. The information will then be quickly processed by the microcontroller and a SMS will be send through the GSM technology.

There are various methods of power theft in society. Some of them are hooking of the main overhead transmission line, meter tampering and also includes types like meter bypassing by illegally connecting to switch before meter, mechanical impediment to rotating disk, placing magnets and meter tilting and illegal wiring.

3. METHODS OF ILLEGAL CONSUMING ELECTRICITY:

1. Using a fixed magnet:

As is well known, the recorded energy is proportional to electromagnetic field. A subscriber can use a fixed magnet to change the electromagnetic field of the current coil .Seal tampering which is provided on energy meter An electric meter tamper detection system for sensing removal of an electric meter from a corresponding meter socket and for generating a tamper signal is disclosed.

2. Bypassing in energy meter connection: This method gives subscribers free energy without any record.

4. EXISTING SYSTEM:

In this existing system wireless communication system of energy meter used, relay control and GPRS. The cryptographic method is used to secure the communication channel and for the transmission of data in a serial process. Drawback of this process is to collect the readings, going in the particular range of area and manually cut power supply if needed.

5. ANALYSIS OF LOSSES IN POWER SYSTEMS:

There are lots of operational losses from the generation through transmission and distribution to the consumer's meter. Losses normally occur at the distribution level, which includes internal impedance losses in transmission lines and transformers and losses due to physical property in power system components. Losses are mainly of two types:

•Non-technical losses

•Technical losses or commercial losses A technical loss, based on the fact that to the end user power delivered them is not perfect. These losses are natural occurring and comprise mostly of power dissemination in electrical system such as, transmission lines and power transformers [10]. These losses are caused by the property of the component of power system such as I2R and copper loss. In transformer and transmission line losses are caused by internal impedance. Non-technical losses or commercial losses: these losses are independent of technical losses. Common source of such loss is component breakdowns which increase losses before the component change and other is power theft. Other causes of commercial losses are

• Unmetered supply of agricultural pump/works

•Pilferage and larceny of energy

•Deficiencies in metering and billing system

•Want of energy Accounting

•Slackness in the system for meter reading, meter checking and calibration Willful tampering

•By passing of a meter

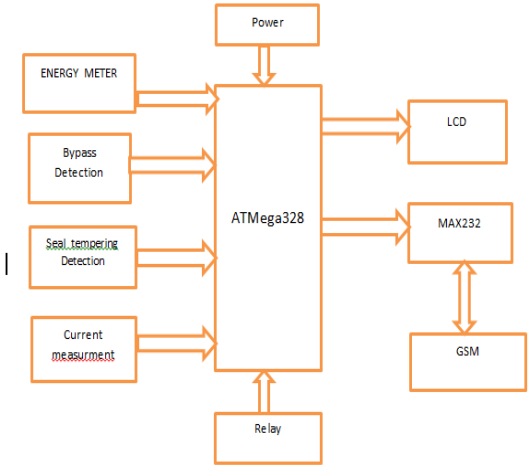
6. PROPOSED SYSTEM:

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 switch , Bypass detection. Also cut the power supply automatically as per request of authorized server mobile.

6.1. Block Diagram Description

The ATMega328 is the main part of automatic reading and theft control. It is based on low power 16 bit microcontroller. ATMega328 consist of high performance and low cost of network technology. ATMega328 belongs to a class of microcontroller of RISC architecture. It has internal 10 bit analog to digital converter

6.2 block diagram



6.3 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.

The theft in energy meter is the major drawback in our country because of theft more

than lakes of money loss per state in our country. So our project deals about the theft control in energy meter by using embedded systems. To control the theft we use two types of theft controlling process namely tapering of seal in energy meter,

Underground power theft control .The first process of theft control by using micro switch. Micro switch is

fixed in the energy meter screw for identifying the tapering of seal. After the ATMega328 micro controller and then message send to the government office by using GSM.

6.4 Seal Tempering Circuit

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.

6.5 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.

6.6 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.

6.7 GSM Modem &MAX232 IC

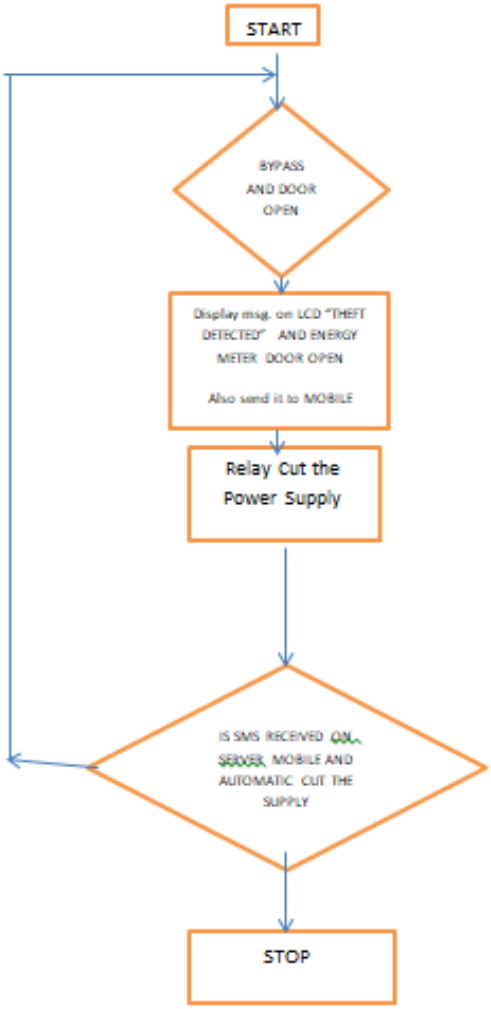
GSM Modem-Max 232 is built with dual band GSM engine-SIM 900A. As mentioned in the above sensing circuit there is power theft then it will send message to microcontroller as per our program and it will send message to GSM through Max 232. Also if mobile received SMS from authorized mobile phone to cut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

6.8 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.

6.8 Hardware mode:

6.9
Flowchart



7. ADVANTAGES:
1] Electricity Theft Detected.
2] It is very economical and reliable solution when it is compared with economical loss cause by illegal used
3] Increase efficiency of power distribution system
4] Automatic cut the supply and restore again when theft load is removed.

8. FUTURE SCOPE:
In developing countries electricity theft is a common practice especially in remote areas, as they do not pay utility bills to a government company in case of electricity. To solve these problem governments must think of an idea to provide help in terms of subsidy to manage this issue. And this project may help to identify the power theft in house and in industrial also. And this is the easy way to identify theft in house compare to other technique like Power line communication and wireless. Because in power line communication there must be match with both impedances and frequency, and in wireless there is limit distance to send the signal to the controller. This system will reduce operations cost required for maintenance and troubleshooting as it eliminates the need of labor and operations team. It will give more and accurate results as in case of any difference between the powers calculated the authorities will be notified through SMS. It enables complaints regarding key performance indicators to be resolved instantly thus attracting more and more subscribers to the network operator.

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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