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WIRELESS DATA ACQUISITION SYSTEM FOR ENERGY TAPPING IDENTIFICATION

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Shaik Aayubpasha, Babu Rao Paddam, Seelam Naga Durga Sree
[1] [2] [3]
Assistant Professor, HOD& Assoc.Prof, Student
Department of EEE
Abdul Kalam Institute of Technological Sciences, Kothagudem, Telangana

ABSTRACT

The project's goal is to create a device that can detect energy theft straight from the grid system. The primary issue facing our nation is energy theft straight from the main line. A lot of energy is tampered with, especially in rural areas, and our electricity department lacks the necessary instruments to pinpoint the exact location of the theft. Thus, the state electricity department is the beneficiary of this project activity. The idea behind the system is to measure the current flowing through energy transmission lines at sensitive areas, which are defined as locations where people use energy to run pump sets and where transmission lines pass very close to villages or over agricultural fields. Two CTs (current transformers) are used to measure the current in these locations. They are placed in series with phase, one on each side of the sensitive area. The current passing through the CT primary is now sent to the microcontroller in digital form. Since the current of two CTs needs to be measured—two distinct systems are built with two microcontroller units—the controller shows the current in amps. A master unit is one unit that is intended to be positioned at the beginning of a specific zone. The other device, which might be put at the other end of that specific zone, transmits the current through a digital signal. This data is received by the master unit and shown on the LCD. The data obtained remotely via the Zigbee network is compared with the output of the master CT, and the differences are shown in distinct rows. The system is set up so that when the difference is more than three to four percent, the alarm is activated automatically. The current flowing through both CTs is nearly equal, line loss is taken into account, and whenever energy is tapped between the two CTs, more current is passed through the first CT.

1. INTRODUCTION

The project aims in designing an instrument for identifying the energy tapping directly from the grid system. Energy stealing directly from the main line is the major problem in our country, especially in rural areas lot of energy is tampered and our Electricity department doesn't have any appropriate instrument to detect exactly where the energy is looted. Therefore this project work is taken up for the benefit of state Electricity Department.

The concept involved in the system is to measure the current flowing in the energy transmission line at sensitive areas, sensitive area is defined as where the transmission lines are passing very near to a village or passing over an agriculture field and people are tapping energy to run the pump sets. At these areas the current is measured with two CT's (Current transformers), these CT's are arranged at either side of the sensitive area, in series with phase. Now the current flowing through the CT primary is converted into digital and is fed to

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microcontroller. The controller displays the current in amps, since two CT's current is to be measured; two different systems are designed with two microcontroller units. One unit, which is supposed to be installed at starting point of particular zone, can be called as master unit. The other unit can be installed at other end of that particular zone, the current flowing through this unit Ct is transmitted in digital form. The master unit receives this data and displayed in LCD, the remote data acquired through Zigbee network is compared with master CT output and difference is displayed in separated row. The current flowing through both the CT's is almost equal, line loss is considered, whenever the energy is tapped between the two CT's, more current is passed through first CT, and the system is programmed such that when the difference is more than3-4% approximately, system energizes the alarm automatically.

2. PROPOSED SYSTEM

schematic diagram and interfacing of PIC16F876 microcontroller with each module is considered**.**

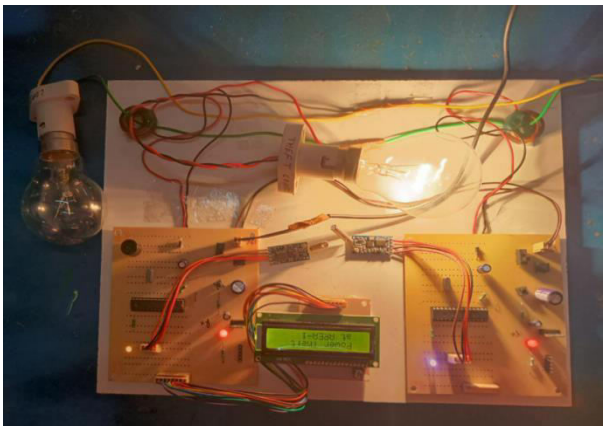

Fig 1: Schematic diagram of Energy Tapping Identifier Through Wireless Data Acquisition System

The above schematic diagram of **Energy Tapping Identifier Through Wireless Data Acquisition System** explains the interfacing section of each component with micro controller and energy meter. At the transmitting end transceiver is connected to pc through RS 232 cable and DB9 serial pin connector.

The crystal oscillator is connected to 9^{th} and 10^{th} pins of micro controller and regulated power supply is also connected to micro controller and LED's also connected to micro controller through resistors.An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers.

Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result.

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The project "**Wireless energy meter reading and display on PC**" using PIC Microcontroller is an exclusive project that can be used

Advantages:

1. Automatic identification of power theft.
2. Very helpful for electrical department.
3. Alerts the electricity department if any tapping is done.
4. Continuous monitoring can be done on LCD Display.

Disadvantages:

1.Range of wireless communication is limited.

2.Alarm indication is for limited distance. (GSM technology can be used for longer range alerting) **Applications:**

1. Can be implemented in real time to find the tapings.
2. Electricity department can use this for distribution lines.

The project "**Energy Tapping Identifier Through Wireless Data Acquisition System**" is designed such that it makes the electricity department to find out the tapings of high voltage bars easily without manually checking through the lines.

3. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

FUTURE SCOPE

Our project "**Energy Tapping Identifier Through Wireless Data Acquisition System**" is mainly intended to design a system which helps in continuous monitoring of energy taping of high voltage bars without checking manually through the line. This system has two current transformers connected to high voltage bars at two points. Current transformers (CT) are used to measure the current. Basing on the fact that the current flowing through the line is constant, the system continuously checks the current at each point and transmits this information to other system which compares the current at that point and alerts if there is an error rate above threshold through LCD display available in the system. For having this operation the Microcontroller is programmed using embedded 'C' language. Here, in the system Zigbee modules are used for wireless transmission whose distance is limited to around 80m. This project can be extended by using GSM module which overcomes the distance limitation of the system..

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