

DESIGN AND TESTING OF A SMART ENERGY METERING SYSTEM BASED ON GSM MODEM**OYUBU A. O.**Department of Electrical/Electronic Engineering
Delta State University Abraka, Oleh Campus
NIGERIA**NWABUEZE C. A.**Department of Electrical/Electronic Engineering
Anambra State University, Uli
NIGERIA**ABSTRACT**

Over the years, the traditional metering system has proven to be very time consuming, expensive, error prone, highly person dependent and generally ineffective due to topology and human factors among other things. The work in this paper, Smart Energy Metering System based on GSM Modem, overcomes the difficulties of the traditional system. It is a state-of-the-art technology for obtaining electrical energy meter readings from anywhere automatically without human intervention. It is a system for remotely monitoring and controlling domestic energy meter. The system gives the information of meter reading, power cut, total unit used, unit left, power disconnect, and tampering on request or regularly at a particular interval through SMS. Information is sent and received by the energy providing company such as PHCN (Power Holding Company of Nigeria) using the Global System for Mobile Communication (GSM) Network. Two GSM modems each containing a SIM (subscriber identification module) card with unique numbers are used; one is integrated with the system and the user's energy meter while the other is interfaced with a PC (Personal Computer) containing the database of customers at the office of the energy company thus engendering a two-way communication process between the energy provider and the consumer's energy meter. The communication process employed here is achieved by installing sets of AT (Attention) command strings in both GSM modems. With the aid of the installed AT command strings, instructions and data are sent and received by both modems respectively. Data received from the consumer unit are used to update the customer's database at the office of the power providing company. The database which was developed using Microsoft excel software, a spread sheet application contains such information as the customer's meter ID (Identity), SIM ID, Email address, mobile phone number, unit recharged etc. The database is updated each time a customer pays his/her bills via SMS recharge by simply sending a secret pin obtained from a purchased prepaid voucher provided by the power providing company together with the meter ID to an SMS code provided by the power company. Other information such as total energy consumed, total amount paid on consumption, and date(s) of recharge are also contained in the customer's database. User's interface consist of LCD (Liquid Crystal Display) which displays energy consumed, the (unit recharged) amount of bill paid and the amount left to be used. Information such as unit recharged, success of recharge, power disconnect/reconnect by the supply company, and when the unit left is critically low to avoid loss of power supply is communicated through the customer's mobile phone to the customer via SMS. With this new system, customers are confident that they are not being exploited, power pilfering is eliminated, rogue customers are shut off, and the huge revenue loss which was inherent in the traditional metring system is completely avoided.

Keywords: Microcontroller, Metering System, LCD display, Embedded C language.