Prepaid Energy Meter Using Labview

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Abstract: *This is a paper with the idea of a prepaid energy meter using LabVIEW. The concept providedwill be a cost efficient manner in electricity billing. The present systems for energy billing are not accurate and are very slow. They are also consume a lot of time and labour. The major drawback of traditional billing system is theft of power and energy which is reduced by using a prepaid energy meter.It is based on the concept "Pay and use". Prepaid energy meter also reduces the error made by humans while taking readings to a large extent where in here, there is no need to take reading in this system. The prepaid energy meter uses a recharge in various ranges (i.e. Rs.20, Rs.50, Rs.100, etc.). The recharge is done by using LabVIEW and the balance is updated with the amount. According to the power consumption, the amount will be reduced. A buzzer is used as an alarm which starts when the balance is zero. And we can also send the data through SMS.*
Keywords:*LabVIEW, GSM, energy meter.*

I. Introduction

The present traditional billing system have many problems like problem of payment collection, energy thefts etc. due to which the traditional billing system is slow, costly and unreliable[1]. The present billing system has chances of error and it is also time or labour consuming. A paper suggests a design of digital energy meter for improved metering and billing system [2]. Poly-phase prepaid energy metering system has also been proposed and developed based on local prepayment and card reader [3]. Another paper suggests prepaid energy meter using a microcontroller from microchip technology Inc.PIC family, used due to low cost of microcontrollers[4]. So it is essential to develop a billing system which solves the problem of billing manually and also reduces the manpower.

In this paper we proposed and designed a prepaid energy meter using LabVIEW. We used this because of its high performance and design flexibility etc. In this paper, an initial recharge is done and after that, a recharge amount is available in various ranges (i.e. Rs.20, Rs.50, Rs.100 etc.). Suppose aconsumer does a recharge for Rs.50 he/she can insert this amount through LabVIEW so that the prepaid energy meter will be activated. According to the power consumption the amount will be reduced.

In this project we also have provision to give an alarm sound using buzzer to the consumer when the amount is nullified.

II. Prepaid Energy Meter

Prepaid energy meter is technique which is cost efficient and can reduce problems associated with billing and also reduces deployment of manpower for taking meter readings. Prepaid energy meter has many advantages both from suppliers as well as consumer's point as follows:

Why Prepayment – From supplier point of view?
- Pay before use
- Keep customers on supply
- Recover money owed (debt)
- No bill production
- No bill distribution
- No need to chase payments
- No further actions such as disconnections
- Social acceptability
- Customer responsible for disconnection
- Load and demand side management
- Limit load
- Load based
- Time based

Why Prepayment – From Customer point of view?
- >70% mobile phones used in India are prepaid
- Flexible payment solution
- Pay to suit your income status
- Daily, weekly , monthly budgeting
- Show true cost of consumption and money left
- Reduce consumption when income is tight– make money last
- Reduce waste – conserve energy
- No bills
- No billing errors
- No socially unacceptable disconnections.

III. Working

A. Block Diagram of Prepaid Energy Meter

The block diagram of prepaid energy meter is shown in figure below. (ii). It consist of NI MyDAQ, GSM, Power Supply, Output Load, Display.
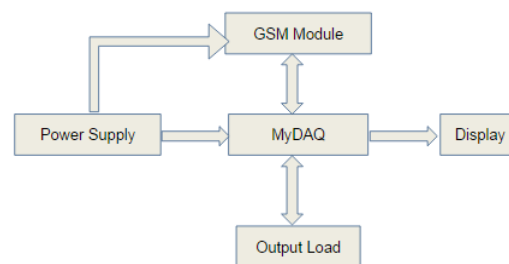

Fig.(ii) Block Diagram Of Prepaid Energy Meter

B. Functioning of Project

NI MyDAQ is connected to the LED with probes attached and a LabVIEW code is written in a way that it calculates the current consumed. According to that, some math calculations are done and Units value will be taken and the balance will be deducted accordingly.

When the balance is zero, we can recharge with some amount.

C. Energy Calculation

Energy is the measure of how much work has been required over a known period of time. We are using a LED as a load which consumes very less power so, some mathematical calculations are done from the current measured from DAQ and is converted to the Power. Here 1000 Watts = 1 Unit.

Accordingly, we can give the input as the value of a unit. Here I have given 1 unit = Rs.1. So, Re.1 will be deducted whenever a unit is consumed.

IV. Result

The energy meter was tested by using an LED. The value of a unit is also given by the human. This can be implemented and made constant in further productions.

V. Conclusion

From all these we can conclude that if we implement this prepaid energy meter then it can become more beneficial.

The paper is intended to present an overview of prepaid energy meter, which can control the usage of electricity on consumer side to avoid wastage of power. Prepaid energy meter is a concept to minimize the Electricity theft with a cost efficient manner.
1. The users are not bound to pay excesses amount of money, users have to pay according to their requirement.
2. It can reduce problems associated with billing consumers living in isolated areasand reduce deployment of manpower for taking meter readings.
3. Prepaid energy meter is more reliable and user friendly.

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