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Review on Smart Energy Meter for Economizing Energy Bills (Prepaid Bill) using IOT.

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Abstract

While innovative solutions are offered continuously to meet ever increasing energy demands, progressive applications and technologies needing more energy are being developed simultaneously. Given that smart grids are being set up at various locations in the country to address the problem of ever increasing energy demand and with the change in the grid type there is a change required to the traditional metering system. Thus to address this problem, a smart meter has been designed. This smart energy meter incorporates Energy Management System and is connected to the internet to provide seamless control over home loads. The designed energy meter is centered around the concept of real time prices of electricity which vary with time in the installed smart grids and a generalization that Electricity pricing is high during the day time and vice versa has been taken into account.

Keywords— *Energy meter, Electricity, Internet, Smart, Energy management system.*

I. INTRODUCTION

A Smart meter may be a advanced digital electrical grid meter that simplifies the gathering and dispensation of details with relevance the usage of power by supplier and client. so outcome of this be electricity services turning into additional reliable, efficient, efficient, and ecological. good grid perpetually comes equipped with good meter that truly ar a next generation meter for each gas and electricity. they're a replacement for traditional meters, that use technology created decades past that were terribly venerable to ancient meters and need households track their own readings and check whether or not the bill received is correct. Smart meters uses a secure national communication network (called the DCC) to mechanically and wirelessly send your actual energy usage to your provider. this suggests households can not accept calculable energy bills or ought to give their own regular readings. good meters will go together with Associate in Nursing in-home show. This show offers the house time period usage data, together with kWh use and price. The good meter designed is Associate in Nursing enabler for energy management: empowering customers to avoid wasting and manage their energy consumption!

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II. LITERATURE SURVEY

Elisa Spanò, Luca Niccolini, Stefano Di Pascoli, Giuseppe Iannaccone [1]Last-Meter good Grid projected a demonstrator that has been engineered and tested with purposely-developed Zigbee good meters and gateways, a distributed IoT server, and a versatile program. Maytham S. Ahmed, Azah Mahomet, Raad Z. Homod. [2]This paper presents the event of a sensible plug with a wireless Zigbee detector for measurement power consumption of electrical appliances within the HEMS. Tatiana Balikhina, Ali Al Maqouswi, and AbdElkarim Albanna [3] a paradigm has been engineered to validate the projected system design and it shows a large potential in exploitation AWS IoT for good home system. Labib Labib, Masum Billah [4] Designed and enforced low-priced universal good energy meter with demand. The good meter contains of a possible electrical device Associate in Nursingd microcontroller unit with an embedded communication module. Carlos R. Baier, Miguel Torres [5]. This paper presents the modeling and management of A battery energy storage system connected to the grid by one part current supply electrical converter. A duplex DC/DC device connects the battery bank to the DC bus of the electrical converter permitting power flow in each the directions. Ahmed S. Musleh, MahdiDEbouza, Mahomet Farook [6] Designed and enforced a sensible plug. good plug could be a power watching and management system. it'll target the matter of energy saving by enhancing the user's information of energy consumed by the appliance connected to the plug. Aradhana Sontakke, Jharna Agarwal , Khushboo blue blood [7]GSM primarily based monthly energy meter asking via 'sms'. the aim of this project is to remote watching and management of the Domestic energy management. Luis L. Minchala-Avila, Jairo Armijos, Daniel [8] Designed and enforced a sensible meter with demand response capabilities. The DMS deploys Associate in Nursing energy management that runs a straightforward demand response program supported time of use consisting in peak and off-peak rates.

III. PROPOSED METHODOLOGY

The design of a smart system into energy measurement device (energy meter) using a wireless link for control and monitoring of energy consumption could be considerably complex. The device is built around a microcontroller and a GSM modem as a wireless link and is interfaced with the energy meter with its serial port allowing the power company to control the amount of energy consumed by the user and to take accurate meter readings.

Hardware Requirements

Current sensor acs712, zmpt101b ac single phase voltage sensor, IOT, arduino uno, relay, GSM, lcd display.

Software Requirements

Embedded C, Arduino IDE, Thingspeak (User Interface)

IV. PROPOSED SYSTEM DESIGN

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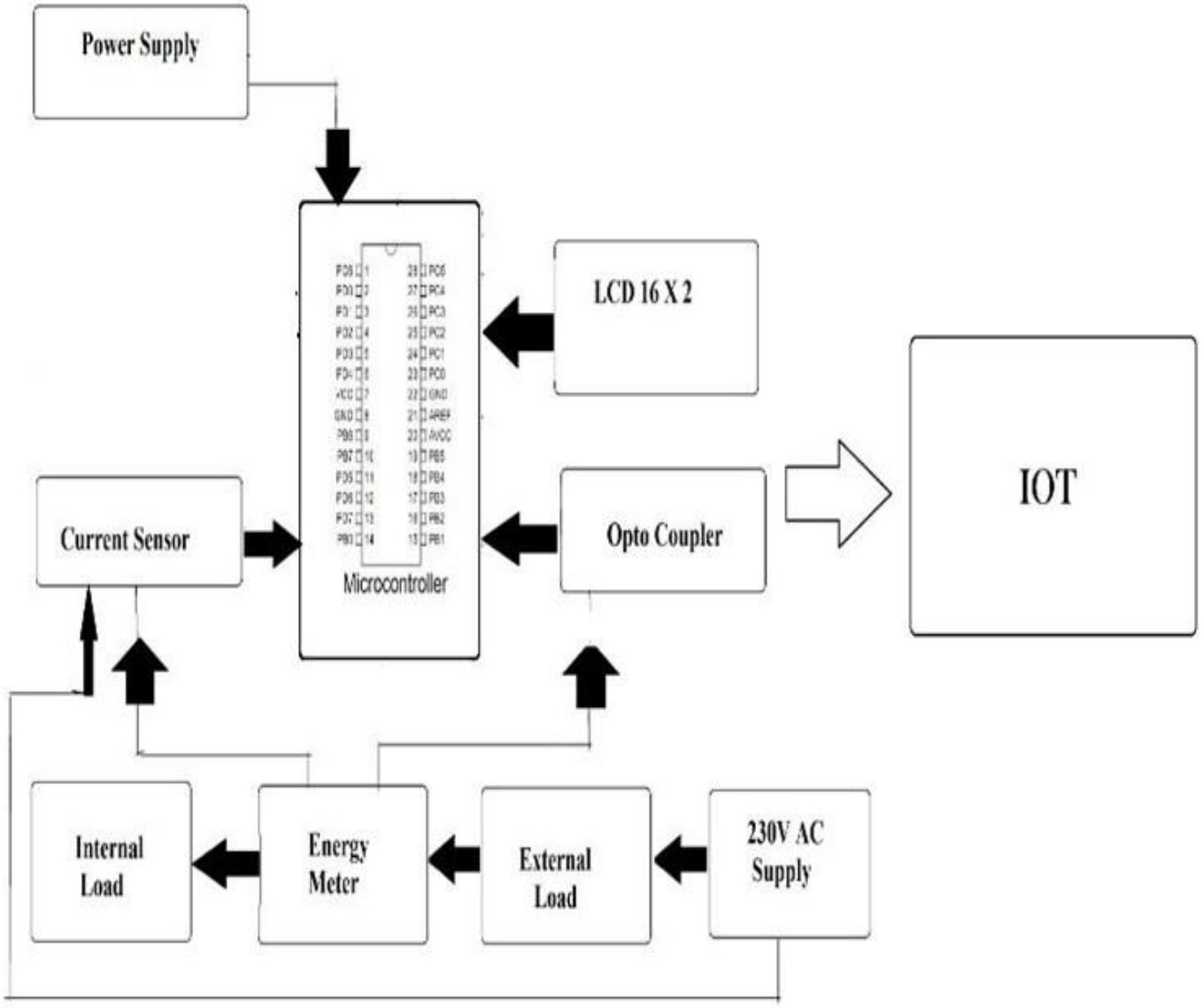

Fig. 1. Proposed System Design

The whole system consists of 4 modules. Module one is liable for stepdown of voltage provide and changing 12V Ac to 12V DC. Module 2 is liable for communication interface mistreatment NODE MCU, GSM module, Arduino and liquid crystal display screen. Module 3 depicts masses i.e.AC Bulb and DC Motor, beside GSM module.
Module four is supposed for duplex flow of power just in case of breakdown.

Module 1

In this module 230V AC is being regenerate to 12V Ac and this12V AC voltage is any corrected mistreatment rectifier circuit to convert 12V AC to 12V DC.A full wave rectifier circuit with four diodes 1N4007 is employed to convert AC provide to DC supply. to get multiple voltages from the ability provide board in addition transformer 7805 is employed to offer constant 5VDC.

Module 2

This module depicts the communication interface of the designed system. With the assistance of

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embedded system, an ideal communication protocol was achieved. AN Embedded system may be a controller programmed and controlled by a time period package (RTOS) with a zealous operate at intervals a bigger mechanical or electrical system, usually with time period consumptions of embedded systems computing constraints. Connecting the house appliances and also the embedded system is created potential with the assistance of NODE MCU. that in itself may be a microcontroller embedded with a Wi-Fi module (ESP8266) and entirely liable for web commands to be dead at the native system. Arduino is equipped 5V DC provide. One digital pin of Arduino is connected with two channel relay driver and this relay is high-powered with 12V DC provide and also the relay is connected with the masses i.e

bulbs and motor. extra Arduino is employed for metering purpose that displays energy consumed and toasts the consumer's registered device with the worth incurred via SMS mistreatment GSM module.

Module 3

Bi-directional flow of power is being achieved during this module by embedding a electrical converter that converts the keep DC into 230V AC. This regenerate AC provide either is wont to power the house appliances or perhaps to feed the grid.

RESULTS

The planned paper is an summary of one of the innovative application of internet of things (IoT) for "Energy monitoring". The system updates the knowledge in each one to a pair of seconds on the web victim is at on public cloud THINGSPEAK. within the gift system, energy load consumption is accessed victim is station Wi-Fi and it'll facilitate customers to avoid unwanted use of electricity. Also, a system wherever a user will receive SMS, once he/she crosses threshold of electricity usage block will be equipped for observation purpose. we are able to build a system which might send SMS to the involved meter reading man of that space once thieving is detected at shopper finish. additionally victim is station cloud analytics we are able to predict future energy consumptions.

In future we can also update the tariff within the energy meter by writing a program in the java and it must be connected to the energy meter using USB port which automatically updates the program in the micro controller And we must also make easy to the customers for buying the watts using SMS request. This makes flexible for both user and the company.

ADVANTAGES

Smart plug, Energy metering, Load scheduling, Reliable bi-directional flow of power, Controlling home units via IOT .

CONCLUSION

The projected paper is an summary of 1 of the innovative application of web of things (IoT) for "Energy monitoring". The system updates the data in each one to two seconds on the net mistreatment public cloud THINGSPEAK. within the gift system, energy load consumption is accessed mistreatment Wi-Fi and it'll facilitate shoppers to avoid unwanted use of electricity. Also, a system wherever a user will receive SMS, once he/she crosses threshold of electricity usage block

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will be equipped for observance purpose. we will create a system which may send SMS to the involved meter reading man of that space once stealing is detected at client finish. conjointly mistreatment cloud analytics we will predict future energy consumptions.

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