

IOT Based Smart Energy Meter

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Abstract— Smart meters based on the Internet of Things employ Arduino. In this system, we reduce human participation in the maintenance of electrical energy. Electricity theft increases the cost paid by customers. Therefore, this system is used for theft detection. Arduino verifies the readings of the main meter and auxiliary meter. If there is a discrepancy between the primary meter and the secondary meter, the theft message will be displayed on the LCD and it will also be displayed on Thingspeak. Customers can access Thingspeak from anywhere. By using the consumer number, it can be accessed globally at any time.

Index Terms— IoT, Arduino Uno, Energy-meter, LCD Display, Current Sensor.

I. INTRODUCTION

Now-a-days, one of the major problems that the world faces is energy emergencies. The best therapy for this is not the increase of energy production, but energy conservation. Energy emergency can be reduced to a certain amount by properly monitoring the energy consumption and avoiding wastage of energy. But the main problem is that the energy monitoring cannot be done efficiently because consumers are not responsive to their power consumption. When the consumption of power is acknowledged, only then the electricity bill is issued. Bill is distributed only once in a month in India.

During this period, consumers have no idea of their energy usage. This procedure has to be repeated a number of times to efficiently control the energy usage in a month. If customers can check their energy consumption on their mobile phone or laptop instead of checking the energy meter, it will be a great leap in the area of energy management. Since nearly all of the people are today 24*7 online, it will really be a benefit if they can check their energy consumption online from everywhere on the globe.

II. METHODOLOGY

This article presents a technical research wattmeter based on the concept of the Internet of Things. In this plan, we use the Internet of Things idea to debug the energy meter. The whole program is mainly based on Arduino. The Internet of Things is built by connecting the Internet activities of body units through the Internet of Things, which allows objects to transmit data from the current meter of the device to the Internet. Therefore, there is a way to adjust and maintain electricity use over time so that buyers can discount their expected electricity use. The machine is suitable for buyers and suppliers. This method eliminates the tasks associated with changing the billing process. It plays an important role in notifying suppliers about sensor theft.

III. COMPONENTS USED

1. ARDUINO UNO – It is a microcontroller based on Atmega328P. It has 14 pins with 6 input and 6 output ports, a USB port, a header port, power button and reset button. Its main purpose is to support the microcontroller to connect it to a computer by using a USB cable. In this Arduino Uno, Uno stands for Arduino software IDE 1.0.

hence it works on the principle of blocking light rather than emitting it.



- 2. ESP8266 WiFi MODULE - It is a SOC that consists of TCP/IP protocol stack which is used for giving access to microcontroller over your wifi network. This module had an AT command inbuilt in it, which makes the process of its enablement very easy. The Esp8266 module is cheap and cost effective which increases its demand in the market.



- 3. TRANSFORMER – It is a device that converts the electric energy from one Alternating Current to another by just stepping up and stepping down the voltage. It consists of two types of coil - Primary coil, Secondary coil.



- 4. LCD - It is also called Liquid Crystal Display. It is so called because during its display it uses liquid crystals for its primary function. It is mainly based on polarization techniques that use light-modulating properties of Liquid Crystals, and



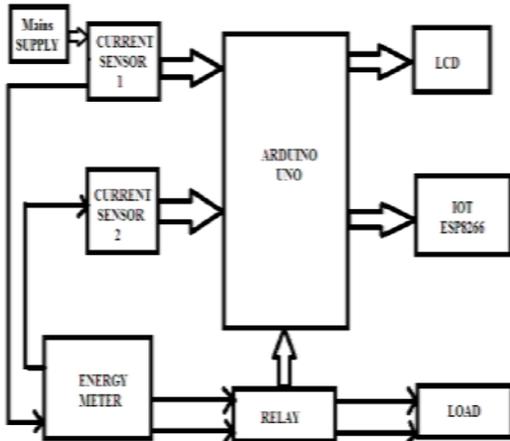
- 5. ENERGY METER – It is a device that we basically see in every household and in industrial areas. It is generally used for measuring the total energy consumption done by the load attached to it. It measures the energy consumption by finding the total power consumed by the load in a given interval of time.



- 6. SPDT RELAY- SPDT stands for Single Pole Double Throw Relay. It basically consists of a coil, one open and one closed terminal, one common terminal. The main purpose of this relay is to control high power circuits with the help of low power circuits.



BLOCK DIAGRAM



ADVANTAGES:

- Error free and accurate
- Reduced man-power or manual labour and labour cost
- Cost Effective
- Theft Detection
- Improved Efficacy
- Faster processing time
- Faster response time
- Globally accessible
- User friendly

CONCLUSION

The Internet Of Things based Smart Energy Meter helps in energy monitoring through the internet which provides us with real time power consumption and allows us to keep our consumption constantly in check. It eliminates the chances of manual error delay in processing and electricity theft thus we get accurate readings and justified electricity bills. The direct exchange of data between the meter and the utilities, made possible because of IOT, transforms it into an automated system that offers improved service quality and faster response time despite the reduced manual labour which in turn reduces the labour cost thus providing us with furthermore economic benefits.

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