

# Innovative Digital Energy Meter with a Control for Power Theft

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## ABSTRACT

The primary goal of this initiative is to develop a system that automatically generates electricity bills. The entire system will continue to keep an eye on the electricity account, and a microcontroller unit will be used to keep track of every unit. As the month comes to an end, the total units consumed will be calculated, and in accordance, the bill is automatically produced and displayed on the VIRTUAL LCD. Additionally, a notification with the bill's amount can be sent to the electricity board and the customer. A predetermined message is sent by the electricity department to acknowledge the energy meter at the conclusion of each month. Then, a message sent to the electricity department with the total number of units utilized and the calculated amount contained a response from the node MCU connected to the meter. We can see a representative of the electricity board standing in front of our home. This person's job is to measure the energy meter and hand the owner of that home their monthly bills. All that this is is a meter measurement. That passage states that we must settle our bills. The main flaw in this method is that someone has to visit each neighborhood individually, read each house's meter, and pay the bills. Errors frequently occur, such as extra charges on bills or notifications from the electric authority. Even though the bills have been settled, mistakes still happen. We have developed a solution to this problem that will do away with the middleman standing between the customer and the service supplier, eliminating uneven errors.

though bills are paid on time, the consumer still has issues with getting past-due bills for payments that have already been made as well as with the reliability and quality of the energy supply. The solution to all of these issues is to regularly monitor the consumer's load, which will help to ensure correct billing, monitor peak demand, and identify threshold values. All of these elements must be considered when creating an effective energy invoicing system.

The focus of the paper is a smart energy meter that implements the desired functionality using embedded systems, a mix of hardware and software. In order to explain the idea of "Smythe art," the paper compares Arduino and other controllers and applies GSM and Wi-Fi modems. Using a GSM modem and a service provider, the provider will be able to read the amount of energy that has been used. Consumers will also receive text notifications via GSM when they are about to hit the threshold value that they have set. Additionally with the aid of a WiFi router, With the help of this system, the electricity agency can check the meter readings monthly without having to send someone to each home. A device called an Arduino can be used to accomplish this because it continuously monitors and stores the energy meter measurement in a permanent (non-volatile) memory location. The live meter reading can be requested by the customer and is available on the webpage where this system constantly captures the reading. When necessary, this system can also be used to cut off the electricity to the home.

Block Diagram

## I. INTRODUCTION

Distribution companies are unable to keep up with the shifting maximum demand of customers under the current billing system. Even

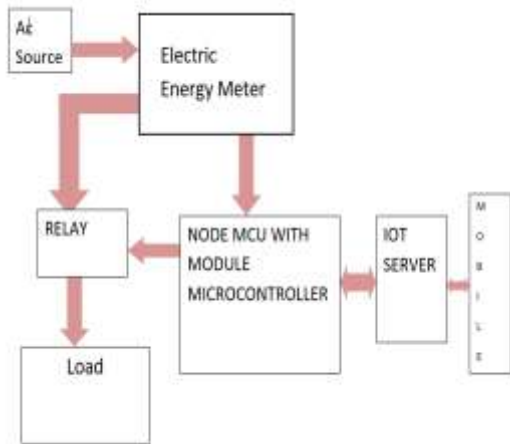


Fig a. Block diagram

1) ESP 32 Microcontroller:



**ESP32** is a low-power microcontroller having Wi-Fi and dual-mode Bluetooth, making it suitable for designing and prototyping IoT solutions.

2) 5V POWER SUPPLY



It is popularly used power supply which is the combination of transformers, diodes and transistors.

3) RELAY



A relay is an electrically operated switch, control high-voltage electronic devices. A Relay is a switch that is electrically operated by an electromagnet. The electromagnet is activated with a low voltage.

4) Energy Meter



The Energy meter is used for measuring the energy utilises by the electric load is known as the energy meter. Electric meters installed at customers' premises for billing purposes used for calibrated in billing units, in form of the kilowatt hour (kWh) which used in billing period.

Some metres may measure demand and the highest use of power at certain intervals if energy savings during those times are desired. Electric rates can be adjusted throughout the day with "time of day" metering to record usage during peak, high-cost times and off-peak, lower-cost periods. Additionally, in some locations, metres have load-shedding relays for demand response during high load times. Demand and the maximum use of power in some intervals. "Time of day" metering allows electric rates to be changed during a day, to record usage during peak high-cost periods and off-peak, lower-cost, periods. Also, in some areas meters have relays for demand response load shedding during peak load periods.

### WORKING

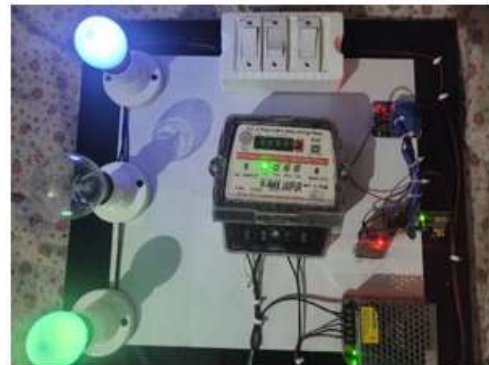


Fig. b Innovative Digital Energy meter.

Fig b Show the energy-saving experimental setup that was also used to measure

the energy. The customer's house is equipped with an MSEB demand meter. The goal of this project was to show that the readings obtained from the three entities—MSEB, consumers, and reading staff—were identical. To maintain the reading, bill payment, and demand meter turn off, we are using the Blynk consoler application.



Fig c User login interface

The above fig. c show the user's power consumption reading and bill which have to be paid by the user. Consumer also have rights to turn 'ON' or 'OFF' the meter supply using Blynk consoler application provided the username and password by the MSEB as a admin. Turning off the Switch will enable us to conserve energy when no longer needed.



Fig d. Graph of energy meter

Fig d. explained the power consumption for the hour, day, Week, Month is shown in above graph. It also used to measure the per unit rate bill utilized by the one entity in form of rupees.

## II. CONCLUSION:

The project demonstrated meter reading system is designed to continuously monitor the meter reading and service provider can disconnect the power source whenever the customer does not pay the monthly bill and also it eliminates human involvement, delivers effective meter reading, and prevent billing mistake.

The Project has attained the following objectives:-  
Ease of accessing information for consumers from energy meters through IoT.

APP displays energy consumption units.

Disconnection of service from a remote server.

The project is mainly concentrated on the IoT network.

We are doing automatic reading and also connection and disconnection of meters using a WIFI module.

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