

# Development of Mobile Based Energy Monitoring System

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**Abstract:** *The need for energy savings has been crucial in recent years due to increased reliance on electronic devices in day-to-day lives of people. We proposed a system which will help in understanding the energy usage and in future, reduce the wastage of electricity. Use of mobile app to get instantaneous knowledge of electrical parameters is a way to make users aware of the energy used and to better optimize the power usage.*

**Keywords:** cloud, android app, monitoring, electrical, real time

## 1. Introduction

In everyday life we come across situations where we want updated information just about anything related to us. That may include updates about car, credit/debit card etc. We live in a modern society that is connected through internet. But in electrical sector things are still behind. It means that consumers of electricity are not fully utilizing the potential. In past years, power transfer was only unidirectional; which meant that consumers could only receive power and were unable to transfer back. Recent advancements [1] allow consumers to transmit power to exiting grid as well. Introduction of smart meters enables us to view power received and transferred to the source. Going even further, now consumers can receive notifications about the power usage through their mobiles via an app. This convenience is hugely beneficial to everyone who wants to optimize their power usage and save money on their electricity bill. In everyday life we come across situations where we want updated information just about anything related to us.[2] That may include updates about car, credit/debit card etc. We live in a modern society that is connected through internet. But in electrical sector things are still behind. It means that consumers of electricity are not fully utilizing the potential. In past years, power transfer was only unidirectional; which meant that consumers could only receive power and were unable to transfer back [4-5]. Recent advancements allow consumers to transmit power to exiting grid as well. Introduction of smart meters enables us to view power received and transferred to the source. Going even further, now consumers can receive notifications about the power usage through their mobiles via an app. This convenience is hugely beneficial to everyone who wants to optimize their power usage and save money on their electricity bill [7].

This paper focuses on the displaying of information on an android app in a smartphone. To better understand the concept, following paper is divided as follows – Section I is

about the current scenario and it describes the need for a system best suited for end user convenience. Section II is about our project's main objectives. Section III and IV are about the methodology used to better implement the concept and the respective block diagram. Section V is the readings taken from the server used in real time.

## 2. Objectives

### 1) Developing a mobile APP

As more and more developments in technology happen, a need of smart apps arise as well. Hence to better suit the needs of a customer; app is the most efficient way of communicating with the devices.

### 2) Convenience of an APP

We can now view the readings and previous data anywhere and anytime with our app. It features interactive user interface which fully utilizes the potential of proposed method.

### 3) Real Time Energy Monitoring

As said before, the data is real time. Due to advancements in cloud technology we used it to gather information whenever and wherever the user needs to be informed.

### 4) Instantaneous Knowledge Of Parameters

Depending upon the connectivity of cellular data and cloud traffic, we guarantee instantaneous knowledge of parameters through our app.

### 5) Cloud Storage

Cloud storage is the essential component of our project. It is used to store data and previous data to be accessed at any time.

## 3. Methodology

To implement this project, the tasks were divided into following parts. Each task is equally important.

1) **Gathering required values**

Parameters such as voltage, current, power factor, load angle, reactive and active power are all monitored using the app. The values are gathered from meters placed in the site location. As the meter reads the current, voltage etc. values, it is then stored in cloud via MODBUS protocol. It is used to transfer and receive data to and from various devices.

2) **Storing on cloud**

After the data transfer happens, it gets stored on servers which are connected to the system. It not only provides ease of access, but a large number of data logger files can also be stored with no real restriction on storage capacity. As servers are properly maintained, users would not face any lag or interruption when accessing the desired file.

3) **Communication between devices**

Mobile app will communicate with the main server using a GSM gateway. It is also a method of communication between devices. Once the data is shared, it is ready to be displayed in mobile app.

4) **Displaying information**

Mobile app is one of the most important part of this project. When user desires to view a particular file stored, it should be easily accessible anytime. Hence any delay or interruption can hamper the user experience and required information may not be available at its intended time. Transferring data as fast as possible really depends on reliability of connections; Users must make sure that the connection is stable enough for proper functioning of app.

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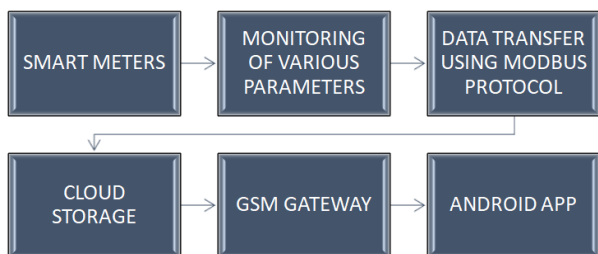
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**4. Basic Block Diagram**



**5. Readings**

Phase	Line vtg (V)	Phase vtg (V)	Line current (A)
R	235.430	409.721	27.139
Y	236.565	411.126	28.728
B	239.546	411.571	15.764
N	-	-	15.128

**6. Conclusion**

As expected, the performance was observed excellent. Lack of connectivity is the only factor which can harm the user experience. Other factors such as uploading of logs of files was smooth and without any problems. Overall the expectations were met with some room for improvements.