

# Electricity And Load Shedding Monitoring

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**Abstract**—The demand for electrical energy is increasing. Today over 21% of the total electrical energy generated in India is lost in transmission (4-6%) and distribution (15-18%). The electrical power deficit is currently about 18% in the country. Clearly, reduction in distribution losses can reduce this deficit by significantly. Its possibility to bring down the distribution losses to a 6-8% level in India with the help of newer technological option (including information technology) in the electrical power distribution sector which will enable better monitoring and control. The project “Electricity and load shedding monitoring” are designed such that distribution point or grids monitored and load shedding from one central location. And also the cut of the power of specific zone by electrically. In this project we will monitoring the current of different zones and also cut off the power to the particular area and the system is provided to check door of DP is open or close whenever the door is opened an SMS is sent to the MSEB office as well as to the concerned electrician responsible for that DP.

**Index Terms**-- Load Shedding; Distribution points; SMS Based System ; Substation; grid.

## I. INTRODUCTION

Most common problems that we face is monitoring all these feeders, substation, Distribution Transformers and Distribution points from one central location.. In this project we will be making a prototype to monitor a distribution point from a central location and if any problem occurs information will be sent to the central unit. Moreover theft is also quite common at the distribution points as it is not possible for someone to monitor them 24 hours.

When load shedding occurs in an area the complete power to the concerned area is cut off, these include street lights, traffic signals and important utilities like hospitals, police stations & fire brigade even their power is turned OFF. In this project the MSEB can cut off the power to specific area by just sending an SMS to the concerned Distribution Point there by retaining power for the basic utilities.[1]

In this project we will be monitoring current of two zones which are being diverted via the Distribution Point. Two relays are also provided to cut off the loads in these two

zones for load shedding or any other emergency purpose. A sensor is provided to check if the door of the DP is open or closed so whenever the door is opened an SMS is sent to the MSEB office as well as to the concerned electrician responsible for that DP.



**Figure 1. Normally open distribution point.**

In India the most common problem that is the number of DP are open because of increases the level accident. If the power in the zones go off due to any wiring problem an SMS is sent to the MSEB office so you do not have to place a complaint for them to come and repair the unit. Moreover the MSEB can at any instance get the status by just sending an SMS to the DP.[1]

## II. METHODOLOGY

The purpose of electric power system is to attach the power system to consumers loads. An electric power system consists three parts:

1. Power station
2. Transmission lines
3. Distribution system

Electric power is normally generated at 11-25kV in a power station. For transmitting over long distances, it is then stepped-up to 400kV, 220 kV as necessary. Power is carried through a transmission network of high voltage lines. Usually, these voltage lines run into hundreds of kilometers and it deliver the power into a common power pool called the grid.

These grid is connected to load centers (cities) through a sub-transmission network of normally 33kV (or sometimes 66kV) lines. These lines terminate into a 33kV (or 66kV) at substation, where the voltage is stepped-down to 11kV for power distribution to load points through a distribution network of lines at 11kV and lower.[2-4]

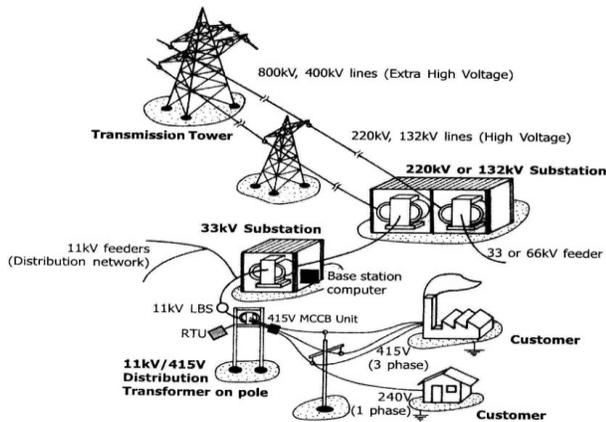


Figure 2. Methodology

This section depicts a review of a number of load shedding.

**1. Manual load shedding:**

In the load shedding process at substation who perform cut of the power for certain period of time to control shortage of electrical energy used by locality.

Power system of some area are manually cut down by the workers for a period of time. workers are engaged at substation. In this way the load shedding done by manually at substation to cut of the power. There were several conventional method or implementation of the above mentioned manual load shedding scheme .out of this,

**2. SMS based electrically load Shedding:**

In this method the distribution point monitored by one central location. The relay are use to operate a circuit breaker to cut off the supply of the zone. User can send commands in the form of SMS messages to read the remote electrical parameters .This system can be automatically send the real time electrical parameter periodically in the form of SMS. It can be designed to send SMS alerts when relay trips. In this system micro-controller are used to effectively communicate with the sensors. The controller is provided with internal memory to hold the code. This internal memory is used to dump some set of assembly instructions into the controller. The functioning of the micro-controller is dependent on the these assembly instructions.[2-4]

**III. PROPOSED SYSTEM**

The proposed system will overcome manual effort for controlling the load shedding time interlude in a systematic way by sending SMS. MSEB can cut off power to specific area by just sending an SMS to the concerned Distribution Point there by retaining power for the basic utilities. This

relay gets activated whenever the electrical parameters exceed the predefined values. The proposed system is designed to Load Monitoring.[5]

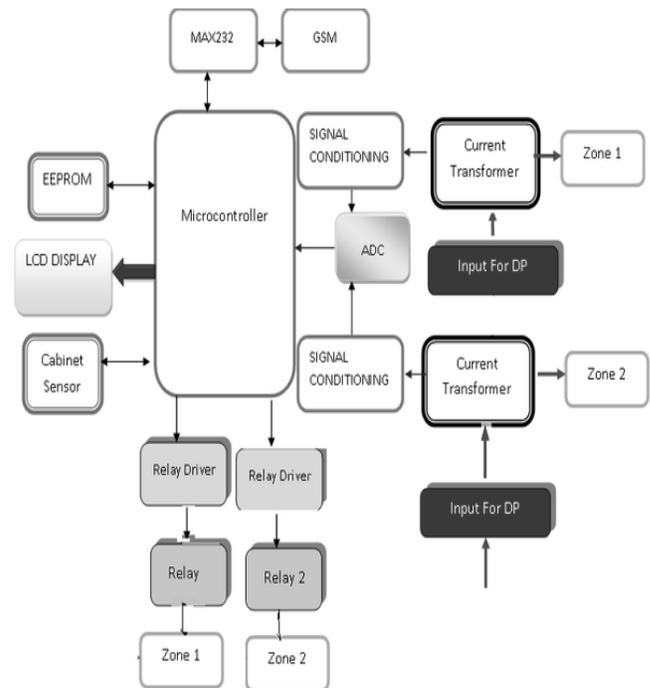


Figure 3. Block diagram

We continuously watch the system load by measuring the input rates and estimating the load level on each server accordingly.

For this system, the following requirements are there:  
16 MHZ crystal oscillator.

- Micro-controller
- Current transformer
- Signal conditioning
- ADC
- Relay
- GSM
- EEPROM
- Cabinete sensor
- MAX232

**1)MICROCONTROLLER:**

Controller monitors the output of ADC which is displayed on the LCD. The controller is provided with the internal memory to hold the code. This internal memory is used to dump some set of assembly instructions into the controller.

**2) CURRENT TRANSFORMER:**

Current transformers are devices used to scale large primary currents to a smaller. The input from DP which is inhigh ampere of current. A 4000:5 current transform would provide an output current of 5 amperes when the primary

was passing 4000 amperes we are using 700:1 current transformer.

A current transformer is useful for measurements made on AC waveforms. It acts just like a regular voltage transformer but typically has only one primary winding (the wire carrying the current to be measured). Unlike a regular voltage transformer, there is no physical connection made to the measured line. The CT uses magnetic fields generated by the AC current flowing through the primary wire to induce a secondary current.

**3) SIGNAL CONDITIONING :**

The output of current transformer is current. The signal conditioning circuit used to convert current into the voltage and interfaced to ADC.

**4) ADC:**

The MCP3204 type ADC are used to interfacing with the controller. Which convert analog input to digital output. It converts the analog input from the dp and gives digital output to controller.

**5) RELAYS :**

Relays are components which allow a low-power circuit to switch a relatively high current on and off. the current become zero it does load shedding of that particular zone. To make a relay operate, you have to pass a suitable pull-in and holding current through its energizing coil. In each case the coil has a resistance which will draw the right pull-in and holding currents when it is connected to that supply voltage. So basic idea is to choose a relay with a coil designed to operate from the supply voltage you are using for your control circuit capable of switching and then provide a suitable relay driver circuit so that low-power circuitry can control the current through the relays coil. Typically this will be around 70ma.

**6) GSM:**

The SIM 900 GSM module has been chosen to achieve the SMS functionality. MSEB can at any instance get the status by just sending an SMS to the DP. As SIM900 has the facility to read the received Message. we have written a Assembly program to control the DP through message without any hardware changes.

**7) EEPROM :**

It is secondary storage device that once written (programmed) can hold data even when the power is removed. EEPROM stands for electrically erasable programmable read only memory.

It is a type of non-volatile memory used in computers and other electronic devices to store small amounts of data that must be saved when power is removed. e.g. calibration tables or device configuration.

Various EEPROMS are available in market EEPROMS with I2C interface, with SPI interface, Micro wire & parallel interface.

**8) MAX232:**

MAX232 is a very common IC basically required for interfacing your controller to PC. MAX 232 IC basically converts RS232 voltage level into TTL voltage level i.e.  $\pm 10V$  to 5V. MAX 232 is used not just used for PC interfacing. MAX 232 is used not just used for PC interfacing it is also used to interface following modules.

- GSM Module.
- GPS Module.
- RFID Reader.
- Bluetooth Modules.
- Wi-fi Modules.

**IV. COMPARATIVE ANALYSIS LOAD SHEDDING SYSTEMS**

Sr. No.	Load shedding systems	Advantage	Disadvantage
01	Manual Load shedding	Increased level of service	Overloading
02	Electrically load shedding	Reduces Manpower.	Initial installation cost

**Table.1**

**V. CONCLUSION**

The proposed system along with remote communication with SMS will be running automatically and minimized a huge amount of manual work and enhance efficiency to the existing manual system. Load shedding is one the main actions that can be used to prevent further spread of a wide area disturbance and restoration of the load generation balance in a separated part of the system.

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**REFERENCES**

[1] JIOSR Journal of Electrical and Electronics Engineering (IOSRJEEE)  
 ISSN: 2278-1676 Volume 1, Issue 6 (July-Aug. 2012), PP 13-21

[2] E Wong "A Phone-Based Remote Controller for Home and Office Automation", IEEE Trans Consumer Electron. , vol. 40,no. 1, pp. 28- 33, February 1995.

[3] Dwijen Rudrapal "SMS based Load Shedding Period Control System" International Journal of Computer Applications Volume 29- No.7, September 2011

[4] RANGAN BANERJEE† "LOAD MANAGEMENT IN THE INDIAN POWER SECTOR USING US EXPERIENCE"  
 Energy Vol. 23, No. 11, pp. 961-972, 1998

[5] Daponte, M. Di Penta and G.Mercurio, "TRANSIENTMETER: A

Distributed Measurement System for Power Quality Monitoring",  
IEEE  
Transactions on Power Delivery, Vol. 19, Issue. 2, pp: 456-463,  
2004..

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