

**MONITORING TEMPERATURE & SMOKE FOR SUBSTATION
USING GSM TECHNOLOGY**

**This is represented in partial fulfillment for the award of the Bachelor of
Electrical Engineering (Hons)
UNIVERSITI TEKNOLOGI MARA**



**AMRAN BIN AYUB
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR, MALAYSIA**

ACKNOWLEDGMENT

In The Name of Allah, The Most Gracious, The Most Merciful

First and foremost, I would like to express my deepest thanks to the most compassionate, the most gracious, Almighty Allah S.W.T for giving me strength to complete this Final Year Project report. To complete this complete, I have faced many obstacles and difficulties. Thus, I owe upon the successful completion of this final year project to all those who have willingly and relentlessly offered their guidance and assistance.

I would like to extend my gratitude to En Muhammad Adib Bin Haron, the supervisor of my final year project for his full support and guidance. Without his guidance and suggestion, I wouldn't able to complete the project. Her direct supervision has enabled me to remain on course without deviating into areas outside the objective of the project.

I would also like to convey my utmost appreciation to my dearest family and friends for their support. And also thank you to my colleagues for their valuable cooperation and opinion.

Lastly, I would like to apologize to any party that has been unwittingly left out from this acknowledgement. Your support is much appreciated.

CHAPTER 1

INTRODUCTION

1.0 BACKGROUND OF STUDY

A remote monitoring of various devices that are located in wide area is required to cut down the maintenance expenses. In industry, such monitoring system can be used among others, to control the temperature in industrial refrigerators, humidity management of biological waste disposal equipment and periodic inspection on switchboards. In other words, many unreachable parts can now be monitored if such system is implemented. The need for such system is also important for an organization or company that has several important devices that requires constant monitoring from afar as not to fully utilize the need for technical personnel to go and check due to safety reasons. Particularly if the area that need to be monitored is hazardous to health such as at waste disposal treatment area or where the area is need to be monitored without the existence of living organism such as at clean room at wafer production facility.

Therefore in response to this need, it is essential to control the total system costs, including equipment maintenance to promote the remote control system. If the scope of such topic is narrowed to less demanding but yet as important as oil and gas, power generation plants areas such as universities and hospitals where the location of substations are located the remote monitoring can come in handy. Particularly when wireless application is used for data transmission and communication between two points are taken into consideration.

It is also to be noted that for large scale monitoring a high end software along with the equipments are needed example for Petroleum Development of Oman where the wireless application is needed as to connect its 2500 well to a single gateway. The gateway in return will communicate back to the central stations using low range-wireless Ethernet radios. In term of gathering information can be seen in Shell Oil project in Venezuela where high optimum in data transfer is needed since the wells there are having a low marginal production. Here the remote monitoring along with the wireless application are emphasize to ensure the data is transferred to control unit every 5 minutes. It is proven based on the current ongoing in the said location, the cost has been reduced to 20% , less frequency on having personnel to do the checking and an increased by 15% in production due to the effective data transfer and optimization .

The famous alternative when it comes to remote monitoring would be SCADA which stands for Supervisory Control & Data Acquisition. It consists of collecting of information, transferring to the central site, carrying out any necessary analysis, control and displaying the information on operator screen. The required control actions are passed back to the process [1].

Control unit in remote monitoring is main role to form a bridge between an energy source and the load. Power electronic also can control the amount of electric energy to desire the output. The controller has programmable hardware that used PIC as its main software and for interfacing part it is based on Visual Basic (VB6) software. To make it simple, each of the devices, range from the control unit at control room, the data collector equipments at the targeted transformers and the interfacing GSM for communication are all inter-related with the help of wireless medium which is important for signal transmitting signals.

When referring back to SCADA, it is noted for some reasons not only the cost involved will be inexplicably high but also for this proposed study the idea of having data on the condition of transformer to be sent via online is not always there to be analysis. Example, the information on the loading of distribution transformer substations is not real time but is limited and based only on technical checks, performed few times a year by a visiting maintenance transformers. Utilities find the implementation of communication between numerous monitoring systems too expensive and thus they are ignored entirely [3]. However with the improvement on the wireless infrastructure, mobile network give another choice to monitor the distribution transformers at substations.

Therefore, this thesis is made after considering several factors such as cost and practicality for applying such system to area that consists several substations that are built to accommodate a certain proximity of area such as universities. Currently, this thesis is made based to improve the current monitoring of substations in UiTM Shah Alam. The focus of monitoring will be transformers inside one of the substations since the demand of electricity is keep on increasing day by day and the effective monitoring by the responsible operator where he or she can quickly attend the required machine in short notice, should there be a problem when automatic recovery is not applicable. This in return will retain the utilization for longer term use and finally and for the safety of the personnel who are responsible to do the checking or other necessary actions.

The important element when it comes to monitoring unit is the ability to transmit data from various sensors to the control unit for further action via wireless medium. GSM has the ability to do that with low cost and high reliability. The short message is a digital part that is provided by the GSM for the user. The operation can lead to the network terminal or the control unit to know whether the message is received. The network will save the message in case the message fails to get through to the receiver. For this advantages and the low cost implementation, GSM is seen as a suitable medium for long-distance data communication in remote monitoring and controlling system.