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OVERLOADING DETECTION IN RESIDENTIONAL AREA

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Abstract - ***Power utilities in different countries especially in the developing ones are incurring huge losses due malfunctioning of electrical energy. As the population is increasing the electricity demand is also increasing. Power generating plants are been installed to meet the growing demand. Due to depletion in natural resources the gap between the supply and the demand is continuously increasing. Hence, rise in power demand and to reduce the gap between demand and supply, such that both consumer and supplier get benefited simultaneously. But now day the tariff rate of electricity in residential area is high. Consumer try to avoid excessive billing. The overloading occurs on transformer and it may reduce its life span hence government suffers from economical losses to replace it. Due to overloading, some rural areas are facing problems of load shading. Overloading detection model with automatic cutoff is designed to overcome the arising issues.***

***Key Words*: Overloading, GSM, Relay, Arduino, Excessive load.**

1. INTRODUCTION

The most flexible, un-substitutable form of energy in the recent times is electrical energy. It has been a critical resource for all the nation building activities which keep the countries wheel on progress and economy to prosper. Hence, demand for electricity is on the over increasing side due to increasing in demand from domestic, commercial and industrial sector. In recent times, the life in the society is very luxurious, that is, comfortable life with the trend going on electronic goods/application, cause the rise in growth of electrical power demand where the production of the electrical energy is being same, this mounts a huge gap between generation and consumption there is huge responsibility on generating sector to fulfil the need of consumer[1]. The cost of electricity is increasing day by day. Consumers try to get illegal electricity to avoid cost of electricity. Hence, overloading problems occurs in residential area results in loss of electrical energy providing generating sector (MSCDEL, Reliance, etc.) due to overloading, some rural areas are facing problem of load shedding so as to overcome the need of electricity for whole state.

Electrical utilities faces large economic losses every year. In this paper major focus is on residential sector. Consumer operates domestic appliance above the sanction load. If it is occurring for a long time causes overloading on Distribution transformer. Overloading leads to overheating results to failure in the distribution transformer. Cost of transformer is in Lakhs so utility sector faces huge economic losses to replace it[2]. To overcome this problem, the paper is being proposed. Aim of the project is to detect the excessive usage of electrical energy.

Theft can be done in numerous ways. The various types are direct tapping from the line, bypassing the energy meter, injecting foreign element into the energy meter, ESD attack on electronic meter. The common way of malfunctioning is bypassing the meter using a wire. Individual consumer simply bypasses energy meter by placing wire before and after the meter loading unit. Energy meter doesn't count the consumed unit[3]. Proposed system prevents from overloading and system detect the excessive usage of electrical energy, electricity theft.

2: EXISTING SYSTEM

The power system in India is facing huge challenges including power theft, low metering, efficiency, frequent outage etc.it is evident that such critical issues cannot be solved within the confines of the existing system. In existing system, the supply is of 11KV 50Hz Supplied from the generator.11Kv step up to 132KV in the generating station. At the end of transmission line, the feeder is fed by reduced voltage 66kv. The feeder or distribution substation is step down the voltage level from 66Kv to 11kv and send to pole mounted substation. Number of customers are connected at the output side of pole mounted substation. The voltage level is step down from 11KV to 3phase 440V or single phase 230v supply at pole mounted substation. The electrical energy is transferred in residential area from pole mounted substation. Domestic load is the major burden in residential area. Consumer uses the electricity above the sanction load. To avoid billing, consumer try to get illegal power by doing the electricity theft. The theft can be done by bypassing a meter commonly. Besides theft can be done by hooking and tempering. The theft is actual root of overloading. Due to overloading condition, distribution transformer gets

overheated. It suffers a maximum economical loss to the MSEDCL to replace a transformer.

3: OPERATION OF PROPOSED SYSTEM

To overcome the problems of existing system, the proposed and prototype model is designed which prove the concept of feeder protection from overload or short circuit. In the system, current sensors are used to measure the incoming and outgoing current flowing through energy meter. When the outgoing current is greater than incoming then overloading occurs.

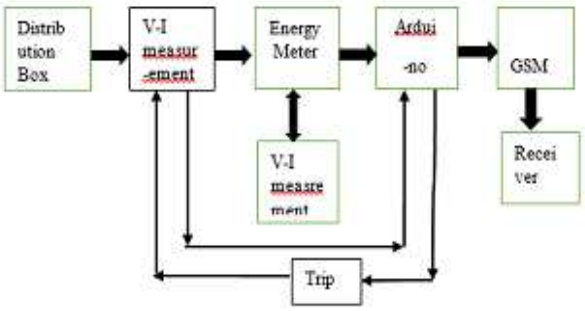

Fig 1:Block diagram of overloading detection in residential area

The measured current will be compared by using Arduino programming as per the conditions. If the results is negative then the warning SMS is send to MSCDCL engineer and consumer as "EXCESSIVE USAGE OF ENERGY". The massage will be sent through GSM technology from the output of Arduino to LCD display and then LCD will display the final results. Relay will perform its operation by tripping and the supply will be cut off. MSCDCL can also trip the circuit by sending the signal to GSM.

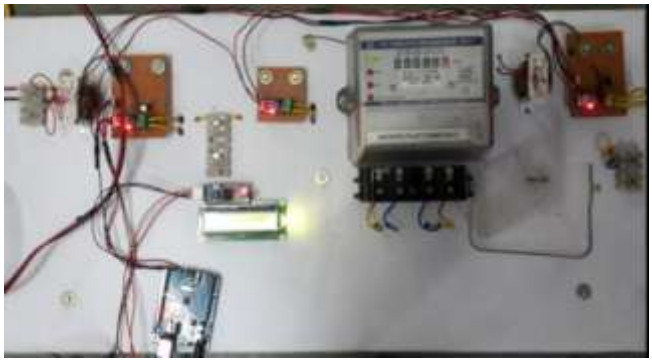

Fig 2. working model of proposed system

4. BASIC BLOACK DIAGRAM OF COMPONENTS:

Current Transformer:
The Current Transformer is type of "Instrument Transformer". The Current Transformer is a device are used to convert high voltage current to a much lower value. CT'S are series connected type of instrument transformer and current transformer is described with the help of primary to secondary. eg. 30:1. its secondary winding then provides a much reduced current which can be used for detecting overcurrent, undercurrent, peak current or over current conditions.

Energy Meter:
Energy meter is a device that measure the amount of electrical energy used by an electrically power device. electric utilities use electric meter which are installed at consumer premises for billing units ,the most common one being the kilowatts hour (kwh) .They are usually read once each billing period.

GSM Module:
GSM is a mobile communication modem.it is stands for global system for mobile communication .GSM is an open and digital cellular technology used for transmitting mobile voice and data service operates at the 850 MHZ, 900MHZ, 1800MHZ and 1900MHZ frequency bands. The GSM delivers performance for voice, SMS, data and fax in small form factor and with low power consumption. With tiny configuration. The global system for mobile communication that used for communication between the cellular device. GSM phone make use of a system card to identify the user account.

Arduino:
Arduino is a 16 bit microcontroller which gives output response of a circuit according to the programmed condition. Arduino can be connected to software on user computer to develop the standalone system interactive electronic object.

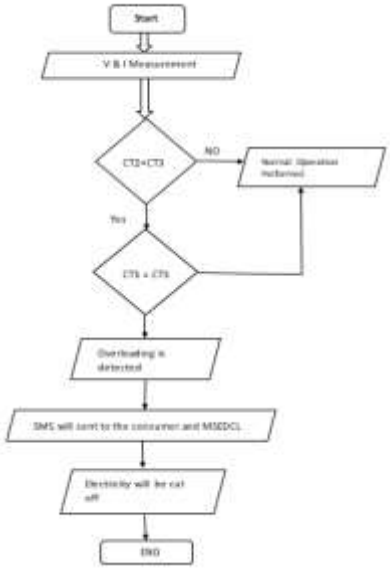

Fig.3.Flowchart of proposed system.

5. CONCLUSION

Overloading occurs in residential areas due to excessive usage of energy and electricity malfunctioning. The model of overloading detection system detects illegal use of electricity. Model detect the location from where power being stolen directly from utility side. Solve the problem of unpaid bills of consumers.

6: REFRENCES

[1] Anitha.K, Anitha.V, "Smart Energy Meter Surveillance Using IoT", International Conference on Power, Energy, Control and Transmission Systems (ICPECTS), 978-1-5386-3817-0/18/$31.00 c 2018IEEE.

[2] J. A. La Salvia, Tyco Electronics Brazil, "TYCO Technological Components for an Anti-Theft System in Overhead Networks" Transmission and Distribution Conference and Exhibition 2005/2006 IEEE PES, May 2006, pp-1307-1314.

[3] 1D. Dangar, 2S.K. Joshi "Electricity Theft Detection Techniques for Distribution System in GUVNL" | ISSN: 2321-9939 in INTERNATIONAL JOURNAL OF ENGINEERING DEVELOPMENT AND RESEARCH | IJEDR(www.ijedr.org) (Two Day National Conference (RTEECE-2014) -17th ,18th January 2014)

[4] Muhammad Saad, Muhammad Faraz Tariq, Amna Nawaz, Muhammad Yasir Jamal "Theft Detection Based GSM Prepaid Electricity System" in 2017 IEEE 3rd International Conference on Control Science and Systems Engineering, 978-1-5386-0484-7/17/$31.00 ©2017 IEEE

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