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DEMAND SIDE MANAGEMENT (DSM) WITH LOAD DISTRIBUTION STRATEGY AND OVERLOADING PROTECTION USING AUTOMATION

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Abstract - Efficient Demand Response or Demand-Side Management (DSM) has long been one of the important factors of the Energy Sector. In Smart Grids, there could be many opportunities for semi-automated DSM, assuming proper coordination mechanisms are in place. Nowadays the Demand Side Management is the major and important parameter in the power system. And also overloading of the load is also important part in system. In the earlier system for the fault like overloading and power theft correct fines and were not implemented towards the consumers. The main disadvantage of old method is that they can only function manually. It requires man power and it has less reliability so, we are introducing automatic system for the load distribution and protection of overhead line against overload fault it is operated by PLC system.

Keywords: ***Transducers, Auxiliary power supply, Switches, PLC, Circuit Breakers, Relays.***

1. INTRODUCTION

DEMAND-SIDE Management (DSM) commonly refers to programs implemented by utility companies to control the energy consumption at the customer side of the meter. Usually, the goal of demand-side management is to encourage the consumer to use less energy during peak hours, or to move the time of energy use to off-peak times such as night time and weekends. Peak demand management does not necessarily decrease total energy consumption, but could be expected to reduce the need for investments in networks and/or power plants for meeting peak demands. An example is the use of energy storage units to store energy during off-peak hours and discharge them during peak hours. A newer application for DSM is to aid grid operators in balancing intermittent generation from wind and solar units, particularly when the timing and magnitude of energy demand does not coincide with the renewable generation. The American electric power industry originally relied heavily on foreign energy imports, whether in the form of consumable electricity or fossil fuels that were then used to produce electricity. During the time of the energy crises in the 1970s, the federal government passed the Public Utility Regulatory Policies Act (PURPA), hoping to reduce dependence on foreign oil and to promote energy efficiency and alternative energy sources. This act forced utilities to obtain the cheapest possible power from independent power producers, which in turn promoted renewable and encouraged the utility to reduce the amount of power they need, hence pushing forward agendas for energy efficiency and demand management.

1.1 Objective

The main objective of our project is to prevent overloading of the transmission line using current sensor. There are combinations of a circuit breaker and a relay protection system in a typical fault cleaning system.

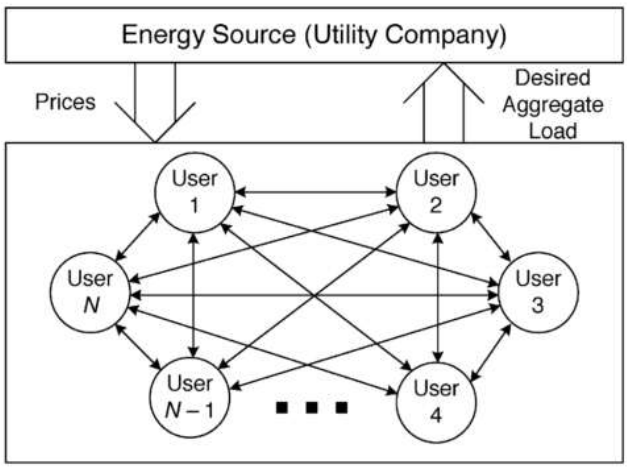

Fig No 1 Demand Side Strategy For Smart Grid

1.2 Problem Definition

- The most common problem is overhead condition which creates fault in operation and it may damage system.
- As fault analysis became important requirements of the electric power system to become more accurate.
- So as to avoid such cases we designed simple and economical equipment which will give a solution to the above mentioned problems.
- Types of fault may be depending atmospheric parameter and component property.
  There are mainly two types of faults:
  1. Symmetrical faults

2. Unsymmetrical faults

1. Symmetric fault: A symmetric or balanced fault as name indicate affects each of the three phases equally. Transmission line faults normally, 5% are symmetric.

2. Asymmetric fault: An asymmetric or unbalanced fault which does not affect each of the three phases.

- The overload done by the industries against their sanctioned load with surely make a failure in transmission.
- These programs are employed to use the available energy more efficiently without installing new generation and transmission infrastructure.

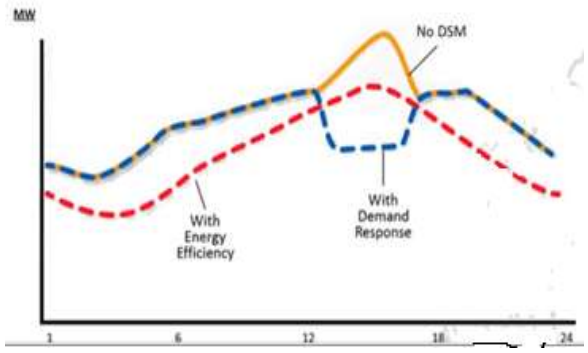

Fig No 2 Energy efficiency without DSM

2. LITERATUR SURVAY

Literature review on fault detection or overhead in transmission line using different technique by some authors and their main observations discussed below. It is very important to know the effect of series compensation on transmission voltages. If the effect of series compensation on voltages is not known, it will cause various operational problems such as high voltages and low voltages. Series compensate on can cause low and high voltages due to different line loading conditions and the method by which the voltage control is adjusted. The protection scheme of double circuit transmission line based on artificial neural network (ANN) has been proposed. Three stages are involved in this scheme to detect and classify different types of faults. Data from one end of the double circuit transmission line has been utilized to calculate the wavelet coefficients. The primary protection is provided to entire transmission line by using one end data only. For forward and backward adjacent transmission line, back up protection is provided. This technique improves the first zone reach setting up to 99% of the length of line for protection of transmission line.

Optimal Coordination of Automatic Line Switches for Distribution Systems Author focuses on distribution feeder automation system; protection coordination; underground 4-way automatic line switch This study investigates the coordination time intervals (CTIs) among the protection devices of the duty point of high voltage customers, automatic line switches lateral protection relays, feeder over current protection relays, bus interconnection over current protection relays, and distribution transformer over current protection relays, so that the entire protection scheme of the distribution systems can be formulated, particularly for the two-level protection scheme below the feeder circuit breaker (FCB).

Multi-Agents for Fault Detection and Reconfiguration of Power Distribution Systems Author introduced system model for fault detection and reconfiguration based on graph theory and mathematical programming. The multivalent models are simulated in Java Agent.

It further shows the potential of the proposed load-control scheme with respect to economic, ecological, and reliable power system operation against the background of increasingly decentralized and renewable generation units.

3. PROPOSED PLAN

This survey includes the relevant fault models, failure effects or manifestations, fault injection techniques used in developing and validating the safety system, requirements for failure diagnosis, and finally the actual failure diagnosis methods themselves.

The development of the algorithm for detecting the faults on the transmission lines has been progressed, especially in recent years. These several decision algorithms have different solutions and techniques. Transmission and distribution lines are vital links between generating units and consumers. They are exposed to atmosphere, hence chances of occurrence of fault in transmission line is very high, which has to be immediately taken care of in order to minimize damage caused by it.

In this paper discrete wavelet transform of voltage signals at the two ends of the transmission lines have been analyzed. Transient energies of detail information for two consecutive data windows at fault are used for analysis. Four-layer feed forward back propagation neural networks are designed to classify and locate the fault at different single line to ground fault conditions. It is done by automation. Automation of system has become the demand of the day.

The authors present a concept on aggregate protection, i.e., on the basis of keeping the independence of existing protective relaying the presented aggregate protection is such a protection scheme in which other protections' and circuit breakers' information related to a certain protection is used to improve its protective function and performance. Research results show that multi-agent system (MAS) is suitable to implement aggregate protection. In aggregate protection different action criteria are used to implement following functions: Accelerating the action of nearby back-up protection to trip out the circuit breaker when miss operation of primary protection occurred; Directly sending the control command to make

the corresponding circuit breaker tripping out to clear the fault when existing protection became invalid; Shortening the action time of remote back-up protection and achieving the effect similar to the action of circuit breaker failure protection for the equipment without circuit breaker failure protection when circuit breaker was in failure; distinguishing transmission line overload from its faults and ahead relieving the overload situation in company with control system.

3.1 Block Diagram

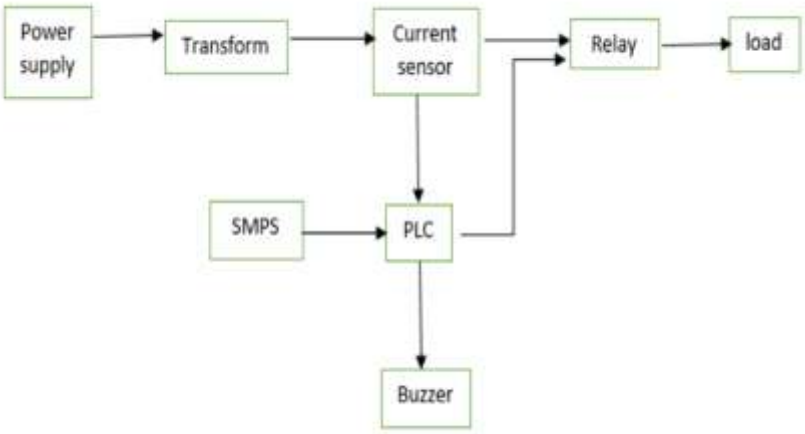

Fig No 3 Block Diagram of System

3.2 Working

In this project we are using conventional AB Switch for automation by using PLC system and the AB Switch is normally used for the disconnection or to de-energize the supply from the line. The main working of the AB Switch is to disconnect the faulty section without interrupting the whole section or feeder line. So project's main purpose is to disconnect the faulty section using current sensor, which is connected in series with the AB switch which detect the current value as the current value is increases then PLC is gives instruction to circuitry to open or disconnect the AB switch by using mechanism which directed through DC motor and instructed by PLC from Substation and faulty section is easily disconnected and after 5 second of time PLC gives instruction to circuit to close the open contact for trial of the faulty section if once again fault is detected on line it declared as faulty section.

3.3 Flow Diagram

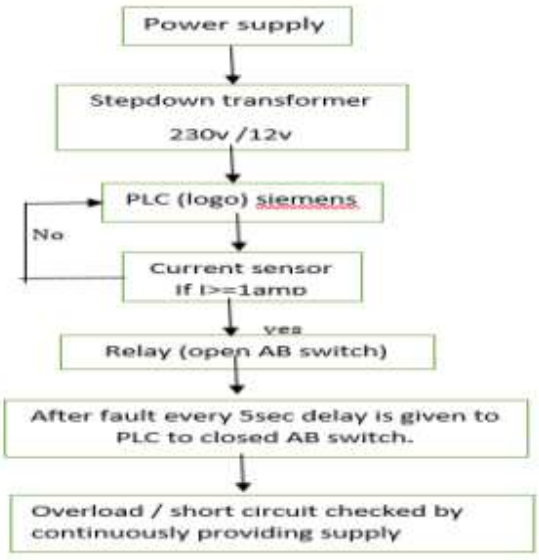

Fig No 4 Flow Chart

4. APPLICATION

- Increased throughput or productivity.
- Improved quality or increased predictability of quality.
- Improved robustness (consistency) of processes or product.
- Increased consistency of output.
- Reduced direct human labour costs and expenses.
- Installation in operations reduces cycle time.
- Can complete tasks where a high degree of accuracy is required.
- Replaces human operators in tasks that involve hard physical or monotonous work (e.g., using one forklift with a single driver instead of a team of multiple workers to lift a heavy object)
- Reduces some occupational injuries (e.g., fewer strained backs from lifting heavy objects)
- Replaces humans in tasks done in dangerous environments (i.e. fire, space, volcanoes, nuclear facilities, underwater, etc.)
- Performs tasks that are beyond human capabilities of size, weight, speed, endurance, etc.
- Reduces operation time and work handling time significantly.

5. CONCLUSIONS

The aim of this paper is to develop a system that could improve the power quality of the transmission lines. In order to increase the reliability of the system, it is of immense important to classify and locate the fault rapidly and to isolate the faulty section precisely.

The electric energy produced at generating stations is transported over high voltage transmission lines to utilization points. In the early days, electric systems were operated as isolated systems with only point-to-point transmission at voltages that are considered low by today's standards.

The choice of a device for fault consideration, best suited to particular field conditions, is not only a technical issue but also an economical one.

6. FUTURE SCOPES

The modifications to be done in this project are in a new recognition method the modifications to be done in this project are addition of voltage sensor or voltage comparator to detect voltage fault or fluctuation in transmission line. This system can be more accurate in term of timing and data recording with the help of PLC. We can use GSM module to receive information. This system can be used in DC parameter fault analysis

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