Journal of electrical engineering and electronics technology

Short Communication

A SCITECHNOL JOURNAL

Global Summit on Electronics and Electrical Engineering -Distribution automation application functions in smart grid

Jovitha Jerome

PSG College of Technology, India

Power is universally acknowledged as critically important infrastructure for economic development. Transmission and distribution losses are very high in developing countries. Distribution loss is 60-80% of the total loss. Smart grid technology is a necessary condition for very large amounts of renewable electricity on the grid for this reason. Smart grids are advantageous because of their reliability, flexibility in network topology to handle possible bidirectional energy flows, efficient demand-side management, load adjustment, peak curtailment and systematic communication between suppliers and consumers. Computer aided monitoring, control and management of electric power distribution networks is "Distribution Automation (DA)". Distribution systems are not developing according to a planned program in developing countries, resulting in uneconomical utilization of fund and poor service to customers. The disadvantages are over-loaded feeders, lengthy feeders and poor power factor of load, inefficiency of billing system, poor voltage profile, higher power and energy loss, reduced per capita consumption and loss of revenue. Distribution load flow algorithm developed for distribution proved to be efficient, robust & guarantees convergence. It can handle single phase, three phase, balanced and unbalanced loads. It was found suitable for multi-conductor and multi-feeder with high r/x ratio. The proposed algorithm can be applied to reactive power compensation and network reconfiguration. State estimator, network observability and bad data processor along with fault detector algorithm were robust. It was helpful for optimal ordering of nodes, analyzes system in real-time, estimate current operating state, process measurement data and determines fault type and location.

Keywords: Smart Grid, Distribution Automation, Advanced Distribution Automation, Self-healing, Distributed Substation Control.

INTRODUCTION

Challenges arising from the aging utility infrastructure, rising energy demands, and growing concerns over the excessive use of exhaustible resources such as carbon- based fossil fuels for energy generation. In order to build intelligent features into the existing traditional power grid, a comprehensive technological approach compromising of real-time monitoring systems, decision-making algorithms, control systems, forecasting and optimized algorithms are essential. For implementing this technologies in smart grids must include: Distribution Automation (DA), asset management, Advanced Metering Infrastructure (AMI), renewable energy resources. In simultaneousness with the deployment of information technology and telecommunication networks, smart grids now allows the utility companies to monitor and optimize the production and distribution of power in near- real time. This is possible because of the smart power generation that allows and involves the two way flow of electricity and information. The generation is based on the consumption or the expected demand and the demand can drive the generation as or when it desires.

The term Advanced Distribution Automation (ADA) can be put up as the automation of all the features related to the distribution system using the information that has been collected from various sub-stations, devices deployed on the grids and the smart meters at the end location. The most important aspects while designing an effective distribution automation system is protection and switching functions. Nowadays, various DA devices have been deployed in the distribution lines to track current and voltage state at various times, to exchange device information and to reconfigure the network to meet the regular changes in the environment.

SCADA (Supervisory Control And Data Acquisition) that monitors and controls the various distribution substations is considered as Advanced Distribution Automation. This system provides an extra benefit of remotely controlling and observing the renewable energy sources (RES). The SCADA system monitors and can make slight changes in the system to function properly. This system is a closed loop system and works with very less human intervention and also has the ability to monitor the entire system in near-real time.

CONCLUSIONS:

This paper presents a conversation on the brought together way to deal with advance the conceptualization of Smart Grids for the Indian Power Scenario. Beginning from a survey of the improvements in India in the field of computerization, it underscores on the sending of open principles for accomplishing measured quality and interoperability. A model design is then proposed, suggesting a change from current innovation based norms to execution based principles. Taking into account the huge number of advantages that could be accumulated, it is recommended that there ought to be adequate Government administrative help and strategy activities to move towards Smart Grids. India is in its beginning phases of executing principles for ADA, requiring a patched up viewpoint to adjust the current guidelines according to its distinguished conditions and needs. Committed cooperative examination ought to be urged to encourage a smoother progress towards making and coordinating secluded Smart Grids for an across the nation development of this progressive methodology in India. In this association, this paper should go about as a starting pointer in delivering the noteworthiness of supporting the Smart Grid reasoning and actualizing it based on the proposed engineering in the Indian subcontinent. Further, changes as far as principles, money related 6 components, innovation sharing and strategy structures should be rigourously tended to.

Note: This abstract is received at the Global Summit on Electronics and Electrical Engineering which was in the November 03-05, 2015 at Valencia, Spain.