Future Scope in Smart Grid

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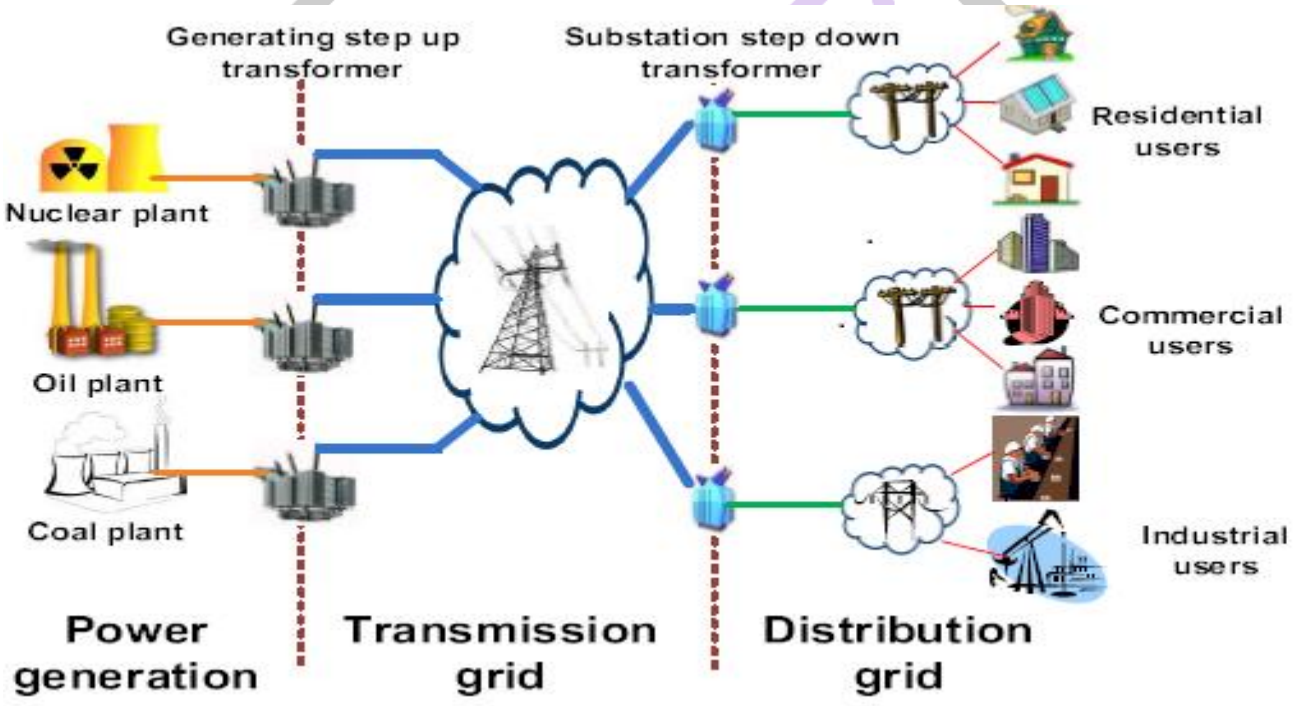
***ABSTRACT*: The smart grid mission increases the involvement of customer in the power supplying system. The opportunity of service contributor has been limited in the power transmission and distribution systems across the world. However the wish to improve the service quality of the power delivery, system has led to incorporation of new features in the system. Smart grid is consider as the next generation power grid, which supply bi-directional flow of electricity and information, with better power grid reliability, security, and efficiency of electrical system from generation to transmission and to distribution. As smart grid continues to develop, realization of a reliable and stable system is necessary. This paper reviews on the future scope in smart grid and failure in protection mechanism.**

***Keywords*:** smart grid, ANN, power system, wireless communication

Smart Grid Structure A smart grid structure is shown below. It consists of four subsections which are generation, transmission, distribution and control network. Each network interconnected from various locations, information exchange and communicates through smart communication subsystem such as an access point with wired or wireless communication infrastructure. smart information subsystem such as a smart meter, sensor and phasor measurement unit (PMU) gives Rough information on the network. The control network such as the electric utility control center performed Real time network monitoring, management and control. When dispersed generation (DG) (renewable energy resources) is embedded a distribution network can be an individual, that allowing electricity supply from both DG and utility.



The smart grid is a network of computers and power support that examine power system parameters and control energy usage. In the present scenario higher reliability is expected with dramatically different and challenging design criteria. Consumers are more responsive to outages, low voltage and harmonic issues. A smart meter is the intelligent electronic device at each consumer end. Each smart meter contains a processor, nonvolatile storage and communication facilities.

3. The mission of the ideal smart grid is

Superior more efficient and more flexible use of the network Price cutting for network use Introduction of more customer options including time of day charge Improve Power quality, especially in voltage control and voltage sag impact Self healing to five better reliability.

4. Smart Grid Objectives

Objectives of smart grid are as follows:

The objectives are to provide grid observability, controllability of assets, enhance power system performance and security, reduction in operating cost, maintenance and system planning.

To accommodate a wide variety of generation centralized and distributed, intermittent and dispatchable.

To communicate with energy management system in smart buildings to enable customers to manage their energy use and reduce their energy cost.

To provide improved power quality to the users.

To provide real time information, lower operation cost and electricity available to everyone.

To use information technology for monitoring and control to optimize its capital and operational cost.

To predict and instantly respond to system problems in order to avoid power outages and power quality problems.

To make the nation energy independent.

To provide employment. Smart Grids is not felt to be a necessity only for the integration of distributed generation, renewable energy sources and plug-in (hybrid) cars into the electricity grid but also for active participation of consumers for improvements in overall system efficiency, meet the peak demand without investment in generation and variable pricing system.

Failure in protection Mechanism

If there is any failure in protection mechanism network then it is required to restore network from failure to normal operation in the fastest possible time. This protection mechanism can be divided into two topics as identification, diagnosis and recovery of failure & predication and prevention of failure.

1. Identification, diagnosis and recovery of failure - If failure occurred , it must be indentified quickly in the shortest possible time to avoid future damaging or cascading of event.
2. predication and prevention of failure.

In this subsection, the protection mechanism briefly reviewed. .

Failure to Predict and Prevent: In smart grid **to** locate weak points is also one approach to predict the failure location. Chertkov *et al.*, [9] have developed an approach to efficiently predict power grid weak points, and identify probable failure mode in static load distribution

In preventing network failure instead of accurate predicting the weak point accurate forecasting of short circuit fault and its magnitude in smart grid are also essential. In power distribution systems to perform short-circuit current forecast, Chen [02] implemented the artificial neural network (ANN). The algorithm was verified on hardware system based on TMS320F2812-DSP and the formulated model was demonstrated through computer simulation In the shortest possible time **t**he algorithm was verified to be efficient in predicting the magnitude of short circuit

Failure to Identify, Diagnose and Recover:

If there is any failure in the system it is necessary to indentify in the shortest possible time, so that further damaging or cascading is to be avoided. Again when fault is cleared then the system must be resynchronized and restored quickly to normal operation. , based on the design of Petri Net (PN) theory Calderaro *et al.*, [10] presented a method to identify and localize failure in smart grid. By using matrix operation, from the captured modeling data in distribution network we can detects the failure in data transmission and fault in distribution network. they have verified the method In their research, with two case studies while avoiding occurrence of cascading failures in power system protection ,described its effectiveness and identify the method is useful to erase more complexity associated in data analysis and permit quick assessment and evaluation of information. As per their research the proposed detection strategy is regular with the current trend and direction in smart grid development. So, that they were looking ahead on the model to be accepted in smart grid protection.

Conclusion: - Technology or science could have not been possibly developed without electricity. In future, electricity demand is continue to grow further, to provide the power quality and to achieve the rising demand economically, more power generation is needed at centralized level or at distribution level.

But there are various problems associated with effective functioning of the electric grids which cause a serious loss of power and even create severe scarcity in future. Also the latest advancements in generation of electricity from renewable sources also require a means for effective utilization.

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