

## Smart Grid in Transmission

Electricity is now becoming the 4<sup>th</sup> basic necessity of the mankind after food, clothes & shelter. Its demand/consumption is increasing continuously at an exponential rate. It compels electricity utilities to expand their infrastructure to supply reliable and quality power to customers. Consequently, day by day, the power system is becoming giant & complex. To built, operate & maintain such giant & complex power system is a big challenge and hence, now it became inevitable for all the segment of power system - Generation, Transmission & Distribution - to go for some solution which makes easier the installation, operation and maintenance of the power network and at the same time it should help in energy management including integration of renewable energy, data communication, information analysis, asset management and CO<sub>2</sub> free energy as well. Simultaneously it shall be robust, reliable, modular, plug & play type, sustainable over a long period of time, cost effective, requires least maintenance, least human interface and finally the last consumer shall get benefited in terms economical & quality power.

The solution is Smart Grid.

A “smart grid” is an electric power delivery system that stretches from point of generation to point of consumption integrated with advanced communications and information technology. All equipment and devices in a smart grid are connected by sensory elements to form a complete power network. The information is integrated and analyzed to optimize power resources, reduce costs, increase reliability, and enhance electric power efficiency.

A smart grid is also an intelligent automated system for monitoring the flow of electricity and making the distribution of electricity more efficient.

### **Smart Grid in GETCO Context**

We, being a transmission utility, must identify and adopt all such smart grid technologies which meet the above objectives of electrical system. Smart grid is an evolving concept and its application for improvement is resulting with new technologies. Some of them, which are currently deployable, are as follows:-

<u>Equipments / System</u>	<u>Benefits</u>
• SCADA - Automation System & limited Digital Sub Station	Reliable, Accurate, Human interface at points
• PMUs & WAMS	Monitoring power system and give signals on its health
• OPGW and FOTE Communication	High-bandwidth, low-latency
• FACTS devices	Optimum utilization of transmission infrastructure
• Intelligent Primary Equipments (CB, Isolators, Optical CTs)	Enhance accuracy and speed

- GIS, Hybrid and Compact Switchgear Maintenance free and economical on life cycle cost basis
- Condition Monitoring equipments Predictive maintenance through quick data capturing & analysis
- Mono pole tower structure Reduce tower foot prints
- Innovative conductors Bulk power transfer and reduce tower foot prints
- Solar power for auxiliary power in Sub station Energy Conservation
- Innovative and smart working devices Zero accident in operation & maintenance for safety
- GIS mapping of transmission Assets Long term benefits for maintenance, laying new lines and interface with other agencies
- Prediction model for renewable energy Forecasting and scheduling of Renewable - Wind & Solar Energy for grid management

In nut shell, the days are not far when utilities would be questioned for frequent planned and forced outages due to troubles in system as well as in equipments. It is therefore important to learn, adopt and invest in Smart Grid Technologies before it is too late.

Smart Grid Cell under Engineering in Corporate Office has been formed to implement above technologies with concrete action plan.