

Future Grid Utilizing Smart Grid Technologies for Sustainable Development

Keynote Session D IV

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Abstract:

Reliable Power supply system, a critical infrastructure, plays a key role that support entire economy and day-to-day life of the citizens in the country. Legacy power supply system is undergoing through significant changes in the way electricity is generated, transmitted, distributed and utilised stimulated by the pressing need to decarbonize electricity supply, replace ageing assets and to make effective use of rapidly developing Information and Communication Technologies (ICTs). The supply system is gradually transitioning towards digital system through data-driven decision process and automation in addition to increasing penetration of renewable capacity, energy storage system etc. There is a paradigm shift from concentrated large conventional generation (thermal, hydro) to distributed renewable generation (wind, solar etc.). In the past one decade, the share of Renewable capacity in the overall capacity portfolio has substantially increased to about 102 GW. Under the changing scenario, the reliance on reliable power supply with self-healing and resilient grid is ever increasing.

Today, uninterrupted power supply with quality at an affordable price in an environmental friendly manner is the major area of concern. Recent developments in the sensing, monitoring, Information and communication technology, IoT applications like intelligent servers and computation, robotic process automation etc. have revolutionized the way complex, geographically distributed resources and power supply systems are monitored and controlled. This transformation is commonly referred to as Smart Grid, an emerging field of power supply system. It is a collection of complex, interdependent systems whose key functions is to ensure reliable and efficient power delivery through improved visualization, monitoring, enhanced situational awareness, integration of variable and intermittent renewable energy resources through forecasting, real time monitoring & control and energy storage system, efficient asset management etc. In addition, digital power supply system is vulnerable to possible cyber attacks. Thus, continuous cyber-physical security vulnerability assessment and identification of mitigating measures are also an evolving area to maintain reliable and resilient digital power supply system. In order to transform the power supply system to digital system with above features in future, integration of various emerging technologies, policy advocacy, regulatory framework etc. suitable to Indian context along with awareness creation, capacity building and skill sets development are essential.