

Integration of Smart Distribution- and Transmission-Grids Using Synchronized Measurement Technology

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A broad spectrum of advanced technology solutions and novel protection and control techniques will deliver new modes of integrated power system protection and control. Supported by the Global Positioning System, the Synchronized Measurement Technology (SMT) is one of those key technologies. While the SMT is already commercially available, the development of its applications is still in its infancy. The focuses of this keynote are to discuss the challenges related to the development of such applications, the need for them in terms of the structure of future networks, the deployment of architectures for multi-purpose applications given different grid sizes and topologies, generation mixes, level of the penetration of renewable energy sources and diverse operational challenges. Wide-Area Monitoring, Protection and Control (WAMPAC) is a concept that involves the use of system-wide information and the communication of selected local information to a remote location to counteract the propagation of large disturbances. SMT is an important element and enabler of WAMPAC. The communication requirements for future real-time applications can be high, so an optimal design of WAMPAC architecture is a prerequisite for the successful implementation of the SMT. However, the first control and protection, suitable for integrated smart distribution- and transmission-grids applications based on SMT require a host of challenges to be addressed. They will be discussed in the keynote. Some practical solutions examples will be also presented and discussed.