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THE ROLE OF AN NMI IN PROVIDING SUPPORT TO THE ELECTRICAL POWER INDUSTRY IN THE ERA OF SMART GRID

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Abstract

The existing electrical power generation, transmission, and distribution grid systems in most countries use technologies and strategies that are more than 50 years old, long before the proliferation of digital communications and control technologies that we rely on today. This limits the systems capabilities to detect and address emerging problems before they affect services. In a broader sense, this will also prohibit the systems to respond to local and system wide inputs for other system problems, for example, performing extensive measurements, rapid communications, centralized advanced diagnostics and feedback control, etc. are not feasible. However, all these capabilities are necessary for quickly returning the system to a stable state after interruptions, disturbances or even outages. The current grid system is straining under outdated technology and increasing demand for high-quality power. The stresses of increased power needs exert on the grid are shown through unreliable service and blackouts, which pose significant economic and safety threats to the society.

In the present grid system, many NMIs are already providing support to the electrical power industry in the area of power and energy measurements, including related quantities such as high voltage AC and DC, power quality, harmonics, voltage, current, impedances, etc. In a number of countries where changes to implement Smart Grid have already started, such as, USA, Canada, Sweden, etc. the NMIs have either started to have an R&D program to further support the electrical power industry in certain key areas of Smart Grid or are already directly involved in providing support on issues related to Advanced Metering Infrastructure or Smart Meter, Interoperability, etc.

The presentation will provide an overview of the changes and evolutions of the present grid system to the future grid system, known as Smart Grid, including their key performance characteristics that determine them to be a Smart Grid or an intelligent modern grid system. The role of an NMI in providing support to the electrical power industry in the era of Smart Grid, in particular on issues related to their key performance characteristics, will also be discussed.