Power Systems on the Cusp of Energy and Digital Transformation

Keynote Session C III

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Abstract:

With increasing renewable energy penetration and vision for carbon-neutral future, power systems are facing new challenges: complexity arising from a greater number of widely distributed and less predictable power generation sources; and the need to significantly upgrade and expand grid capacity to accommodate the rapid growth in demand including electric mobility, energy storage and electricity as a carrier of different forms of energy.

Power systems will be required to be more and more resilient, reliable, efficient, predictable, and secure. To achieve more flexibility in real-time, power electronics which used to be niche application will be widely used across the whole power grid. Automation and software in power systems has been evolving strongly since several decades with protection & control, SCADA, network management & control, wide area monitoring, communication technologies and application of advanced and complex mathematical algorithms. The same will be augmented with digital technologies, could computing, data science, AI-ML, AR-VR, digital twins, time-sensitive networking, block chain, and more to provide better predictability, asset & system performance, user experience and values.

Convergence of energy and digital technology platforms together with process and data science will be the key to take power systems to the next level of operation. This needs multiple stakeholders like utilities, industries, infrastructures, academia, and policy makers to co-innovate and co-create power system of future with smarter and sustainable energy grid.