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Role of IoT for Smart Grids: A Review of Systems, Technologies and Design Challenges

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Abstract: With the growing demand for electricity, India is struggling to meet the electric power demands of a fast expanding economy. According to the Ministry of Power, India's transmission and distribution losses are amongst the highest in the world, averaging 26 per cent of total electricity production, and as high as 62 per cent in some states. This scenario has propelled the implementation of Smart Grids. Recently, the convergence of emerging embedded computing, information technology, and distributed control became a key enabler for future Smart Grid technologies. Among others, a new generation of systems, known as Internet of Things (IoT), with integrated computational and physical capabilities that can interact with Humans through many new modalities. Now the IoT technology will be widely deployed in future smart energy systems. The purpose of this research paper is to provide a brief overview of smart grids and its role in the development of electricity systems. We define smart grids; highlight the major drivers for deployment, challenges outlining the range of technologies that need to be engaged, and a vision for electricity system development. This work also reviews the progress made in Smart grid technology research and development since its evolution. We also highlight the current and future issues involved for the development of Smart Grid technology for future demands in Indian perspective.

Keywords *: Electricity, smart grids, IoT, information technology, embedded computing, smart energy systems*