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A review paper on wireless communication technologies for smart grid systems

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Abstract:

The smart grid is envisioned as the solution to meet 21st-century energy demands with a sophisticated, real-time approach by seamlessly integrating the latest digital communications and advanced control technologies into the existing power grid infrastructure. This innovative system aims to connect users worldwide through an energy-efficient and awareness-enhancing network. This paper offers a thorough examination of Wireless Communication Technologies (WCTs) for the implementation of the smart grid in a methodical manner. Various network attributes, such as Internet Protocol (IP) support, power consumption, and data rates, are taken into account to compare communication technologies within the smart grid context. Techniques suitable for Home Area Networks (HANs), such as ZigBee, Bluetooth, WI-Fi, 6LoWPAN, and Z-Wave, are discussed and evaluated based on consumer concerns and network attributes. Similarly, an analysis is conducted for wireless communication techniques for Neighborhood Area Networks (NANs), encompassing WiMAX and GSM-based cellular standards, from the perspective of utility concerns. Furthermore, this paper elaborates on smart grid applications, associated network issues, and challenges, providing a comprehensive overview of the subject matter.

Keywords:

Analysis, assessment, intelligent grid, technologies for intelligent grids, communication infrastructure for intelligent grids, wireless connectivity, wired connectivity, and security measures for intelligent grids