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Private 5G/4G Cellular Networks for Utilities: 2023 – 2030

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Abstracts

Private 5G/4G cellular networks – also referred to as NPNs (Non-Public Networks) in 3GPP terminology – are rapidly gaining popularity across a diverse range of vertical industries. The utilities sector is no exception to this trend and will see global spending on dedicated cellular networks grow at a CAGR of 15% over the next three years. Estimated to account for nearly $2 Billion in cumulative infrastructure spending between 2023 and 2026, private cellular networks for utilities range from wide area 3GPP networks – operating in 410 MHz, 450 MHz, 900 MHz and other sub-1 GHz spectrum bands – for smart grid communications to purpose-built 5G and LTE networks aimed at providing localized wireless connectivity in critical infrastructure facilities such as power plants, substations and offshore wind farms. Some notable examples are listed below:

> American utility companies have made substantial investments in acquiring 900 MHz and 3.5 GHz CBRS PAL (Priority Access License) spectrum within their service territories. Ameren, Evergy, Hawaiian Electric, LCRA (Lower Colorado River Authority), SCE (Southern California Edison), SDG&E (San Diego Gas & Electric), Southern Company and Xcel Energy are among the growing number of utilities that are implementing 3GPP-based private wireless networks in support of grid modernization programs.
>
> 450connect is rolling out a nationwide 450 MHz LTE network for the digitization of energy and water utilities as well as other critical industries in Germany.
>
> Using its 410 MHz spectrum holdings, ESB Networks is implementing a national private mobile network to meet the wireless connectivity needs of smart grid applications for the control, protection and management of Ireland’s utility assets.

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French multinational electric utility group EDF is deploying private mobile networks to bring secure cellular connectivity to its nuclear power plants.

Enel's global private communications platform leverages a multi-national secure MVNO service for connectivity across the Italian energy giant's global footprint and end-to-end private LTE/5G networks to provide localized wireless coverage for reliable communications in business-critical areas.

Following the conclusion of pilots, pre-implementation testing and procurement contracts, PGE (Polish Energy Group) is implementing a 450 MHz mission-critical LTE network for the wide area operations of electricity and gas DSOs (Distribution System Operators) across Poland.

Bahrain's EWA (Electricity and Water Authority) has deployed a 410 MHz private LTE network as part of an effort to modernize, digitize and automate its distribution infrastructure for improved grid efficiency, performance and security.

CSG (China Southern Power Grid) relies on both LTE-based private cellular systems and end-to-end 5G network slicing over commercial mobile operator networks to fulfill the wireless communications needs of its smart electric power grid.

SGCC (State Grid Corporation of China) has deployed a private 5G NR-U (NR in Unlicensed Spectrum) network – operating in license-exempt Band n46 (5.8 GHz) spectrum – to support video surveillance, mobile inspection robots and other 5G-connected applications at its Lanzhou East and Mogao substations in China's Gansu province.

KEPCO (Korea Electric Power Corporation) has implemented private 5G network infrastructure – operating in 4.7 GHz and 28 GHz spectrum – at two of its substation sites to enhance real-time monitoring and control capabilities through digital twin technology, 5G-connected wearable cameras and autonomous robots.

Kansai Electric Power is using a local 5G network and 5G-connected drones at the Eurus Akita Port wind farm in Akita (Tohoku), Japan, to enhance the maintenance and inspection of wind turbine blades.

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Edesur Dominicana relies on a custom-built 2.3 GHz LTE network to connect critical grid assets that require high availability close to 100%.

CPFL Energia has set up a 250 MHz private LTE network in S?o Leopoldo (Rio Grande do Sul), Brazil, to facilitate the automation of devices in distribution and transmission networks.

The 'Private 5G/4G Cellular Networks for Utilities: 2023 – 2030' research package provides detailed market analysis and forecasts for private 5G and LTE networks across 15 vertical industries, including utilities. The package includes the full edition of SNS Telecom & IT's 'Private LTE & 5G Network Ecosystem: 2023 – 2030 – Opportunities, Challenges, Strategies, Industry Verticals & Forecasts' report and a datasheet with additional private 5G/4G infrastructure investment forecasts for the utilities sector.

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