

Energy-efficient smart communication sites for mining use



AI Overview

Energy-efficient smart communication in mining leverages private 5G, LPWAN, and mesh networks to ensure reliable, low-power, and high-performance connectivity for safety, automation, and operational efficiency.

Key Technologies

Private 5G Networks Private 5G solutions provide high-capacity, low-latency, and secure connectivity for mining operations, supporting autonomous vehicles, remote-controlled machinery, and real-time monitoring. These networks enhance efficiency and safety while enabling digital transformation in remote and challenging environments. For example, Newmont's Cadia operation in Australia uses Ericsson Private 5G to control bulldozers remotely, improving productivity and operational control.

Low-Power Wide Area Networks (LPWAN) LPWAN technologies, including LoRaWAN, NB-IoT, and Wirepas, are ideal for energy-efficient communication across large mining sites. They support battery-powered sensors that can operate for years, reducing energy consumption while providing long-range coverage. LoRaWAN is effective for underground monitoring, NB-IoT offers excellent penetration through dense materials, and Wirepas provides a decentralized mesh network for scalable, low-power communication.

Ruggedized Wireless Systems Mining environments require networks that withstand extreme temperatures, dust, vibration, and transient site conditions. Systems like Hytera's narrowband solutions and Hitachi Energy's wireless networks provide reliable voice, GPS tracking, and sensor data transmission. These networks can be easily relocated as mining sites shift, ensuring continuous coverage without excessive energy use.

Deployment Strategies

Modular and Flexible Nodes Deploying modular nodes, such as Hytera's E-pole and BDNode systems, allows mines to expand coverage efficiently. Fixed nodes in tunnels or open-pit sites maint...

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TEKTELIC | Enhance mining safety and performance

Learn how TEKTELIC's industrial IoT solutions enhance efficiency, reduce downtime, and improve safety in remote and underground mining sites.

Improve mining operations with smart mining

Our report presents the top challenges facing mining operations as well as five, real-life use cases of how 5G cellular is enabling mines to maximize productivity, safety and output.

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Energy-Efficient Resource Allocation for NOMA-Based

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CONNECTIVITY SOLUTIONS FOR INDUSTRIAL INTERNET OF

Mining Implementing a 5G network can offer a viable solution to these problems. The use of a 5G network for maximum coverage at a large, remote mine enables effective connectivity between a

Mine Communication

Our efforts focus on developing and implementing cutting-edge solutions for asset monitoring, data transmission, and autonomous driving within both underground and open-pit mining environments.

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Wireless Communications for Mining

Wireless mining communication networks transport data, voice, and video, supporting applications that are essential to efficient and safe mine operations.

Smart Underground Mining Broadcast Communication System for

Explore a robust underground mining broadcast communication solution for safety and remote monitoring across coal, metal, and mineral mines. Supports voice, video, and alarm data

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