



ERICSSON

Transforming the energy sector:

How private networks
enable remote
operations



Energy and natural resources driving efficient operations through digital transformation

As digital transformation accelerates, the energy sector is embracing new ways to streamline operations, improve safety and boost productivity. Private cellular network solutions are bringing the promise of industrial digitalization to life, enabling autonomous and virtualized remote operations across energy and natural resources. With centralized control now achievable, operations are becoming more intuitive, efficient and compliant than ever.

Why digital transformation matters in the energy sector

In today's rapidly evolving digital landscape, remote operations are reshaping the energy sector. Emerging technologies, such as autonomous vehicles, robotics and drones, allow for unprecedented levels of monitoring, control and automation. The energy and natural resources industry—including mining, oil and gas and renewable energy—stands at the forefront of this transformation by adopting industrial digitalization innovations.

Technologies like the Internet of Things (IoT), big data analytics, virtual reality (VR) and digital twins are revolutionizing productivity, uptime and safety. However, these advancements require robust 5G infrastructure to reach their full potential.



Key challenges in the energy and natural resources industry

The mining, oil and gas, and renewable sectors face constant pressure to secure more abundant energy and natural resources to meet the growing demands of expanding economies—all while maintaining safety, affordability and competitiveness. Their transformation challenges include:



Workplace safety

Extraction and production often require workers to operate in hazardous environments with heavy machinery and extreme conditions, ultimately, creating ongoing safety risks.



Costly inspections

Inspecting remote sites often involves transporting personnel via helicopters, cars or boats, which is both time-consuming and expensive.



Regulatory and public scrutiny

Energy and natural resources companies operate under strict regulatory requirements and are closely monitored by investors and the public for sustainability and CO2 emissions.



Data management overload

Remote operations generate vast amounts of data from vehicles, equipment and workers, requiring fast transmission and analysis for effective decision-making.



Need for speed and precision

Heavy machinery requires ultra-low latency and high-speed communications to ensure accurate, real-time control.¹



No room for (human) error

Automating routine tasks minimizes human intervention and errors, allowing operators to focus on critical decisions.

¹ <https://techblog.comsoc.org/2017/06/06/xselected-applicationsuse-cases-by-industry-for-itu-r-international-mobile-telecommunications-imt-3g-4g-5g/>

The power of connectivity in transforming remote operations

With an effective communications system design, remote operations enhance safety, optimize resource use, and improve compliance and reporting. By minimizing the need for personnel movement, operations can focus more on production. Operators can manage multiple machines across different sites from a centralized control center, significantly reducing the costs associated with building control infrastructure in hard-to-reach locations.

As environmental regulations tighten, companies must transition from traditional manual inspections to continuous monitoring solutions. This shift is essential for maintaining compliance in a rapidly evolving landscape.

Private cellular networks capitalize on sensor and device-driven data while minimizing installation delays, power consumption and maintenance issues. In sectors like energy and natural resources, where extraction and production sites can be temporary or rapidly expanding, these networks provide the flexibility and ease of installation needed. They support mobile equipment, unhindered by the limitations of fixed networks and cabling.

Key benefits



Enhanced safety

Reducing the need for on-site personnel minimizes exposure to hazardous conditions.



Cost efficiency

Remote control centers reduce the high cost of infrastructure in remote or challenging environments.



Improved compliance

Continuous data monitoring helps meet stringent environmental regulations.



Operational flexibility

Private cellular networks support flexible, easily scalable solutions that adapt to changing site needs and expansion.²

Private cellular networks: A platform for innovation

Private cellular networks provide the high-bandwidth, low-latency connectivity essential for complex energy operations with robust coverage tailored to large, remote environments. These secure networks are engineered to meet the unique demands of remote and data-intensive applications; while enabling real-time monitoring and support for fully autonomous machinery.

With private cellular networks, companies can:

- Enhance safety through real-time condition monitoring and automation.
- Improve productivity and safety by enabling centralized, remote control of equipment.
- Ensure compliance with continuous, data-driven monitoring for regulatory reporting.
- Optimize workforce deployment by reducing the need for personnel at dangerous extraction sites.
- Maintain reliable, high-speed communication for seamless operations.

By enabling innovative technologies like the Industrial Internet of Things (IIoT) and digital twins, Ericsson's private cellular networks bridge the gap between human oversight and machine autonomy, driving safer, faster, and more efficient operations.



² <https://techblog.comsoc.org/2017/06/06/xselected-applicationsuse-cases-by-industry-for-itu-r-international-mobile-telecommunications-imt-3g-4g-5g/>

Enabling innovation in remote operations

Autonomous transportation

Automating a fleet management system can provide both safety and bottom-line benefits. Autonomous haulage vehicles can reduce fuel consumption and maintenance costs and increase productivity while ensuring that vehicles are where they are supposed to be, on time and with complete awareness of worker location or obstructions. Autonomous robots can scan for oil and gas pipeline leaks or damage and dynamically monitor gauges for potential dangers.

Remote machine operation

Autonomous machines, which can instantly analyze and adjust guidance and trajectory controls, significantly enhance productivity and reduce premature component failure. Cellular protocols provide high minimum bit rates to transmit high-resolution images, fast frame rates, stereoscopic video, immersive video or multiple viewpoints from simultaneous camera feeds.

Real-time condition monitoring

With private cellular networks, massive machine-type communication is enabled by high-bandwidth, reliably low latency and extensive site coverage—ideal for real-time condition monitoring. This connectivity supports the production of vast amounts of data needed to ensure safe and effective remote operations. Smart devices, such as drones for wind turbine surveillance or connected bolts that stabilize mining tunnels, rely on a network capable of prioritizing critical data traffic.

Ericsson's partnership with Epiroc is a firsthand example of 5G-enabled, low-latency solutions powering unmanned drone inspections and extending to autonomous vehicles and robots, setting new standards in automation and safety.

[Read the case study](#)

Why choose Ericsson private network solutions?

Ericsson private networks maximize the potential of industrial digitalization and the innovations that enhance productivity, efficiency and safety. Built on Ericsson's advanced 4G/5G technology these networks support a wide range of remote applications across diverse environments—on land, at sea, above and below ground.

Ericsson's private cellular networks seamlessly integrate with business-critical operations, devices and applications, enabling energy and natural resources operators to achieve greater productivity, achieve sustainability commitments and deliver more value to their customers—all with a secure, future-ready solution.

Discover the future of remote operations

At Ericsson, we're dedicated to advancing the future of remote operations by delivering seamless connectivity in even the most challenging environments. Our partnership with Agnico Eagle exemplifies this commitment, showcasing how Ericsson's remote connectivity solutions are transforming the mining industry. Through real-time data exchange and enhanced safety measures, we're helping redefine what's possible in remote operations.

Explore the full case study [here](#).

Learn more about how Ericsson's private cellular networks can transform your operations with unparalleled safety, productivity and flexibility.

ericsson.com/oil-and-gas

ericsson.com/mining



About Ericsson

Ericsson enables communications service providers and enterprises to capture the full value of connectivity. The company's portfolio spans the following business areas: Networks, Cloud Software and Services, Enterprise Wireless Solutions, Global Communications Platform, and Technologies and New Businesses. It is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally. Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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