ERICSSON

Solution brief

How private 5G delivers superior operational capabilities for oil and gas

Accelerating digitalization with private cellular networks

Addressing operational challenges with advanced connectivity

The oil and gas industries are under increasing pressure to boost operational efficiency, enhance productivity, and improve worker safety while maintaining cybersecurity and reducing environmental impact. These mounting pressures are accelerating digital transformation as companies recognize that traditional operational methods can no longer deliver the performance gains needed to remain competitive.

Multiple converging factors are driving this urgency. Volatile commodity prices demand greater operational flexibility and cost control. Aging infrastructure requires more sophisticated monitoring to prevent costly failures. At the same time, stricter environmental regulations are becoming more stringent, requiring real-time visibility into emissions and waste streams. Meanwhile, an aging workforce and difficulty attracting younger talent are driving the need for more automated, digitally enabled operations that maintain safety standards with fewer personnel.

The question is no longer whether to digitize but how to maximize value from digital investments. As oil and gas companies adopt automation, smart safety solutions, and environmental monitoring technologies, advanced cellular connectivity has emerged as a crucial enabler. According to McKinsey, using advanced connectivity to optimize drilling, improve planned maintenance, and streamline field *operations could unlock up to USD 250 billion in value for upstream oil and gas operations by 2030. The firm's research indicates that offshore operators can achieve cost reductions of 20 to 25 percent per barrel through connectivity-enabled digital tools and analytics.*

Seeking a balance between efficiency, safety, and sustainability

Oil and gas companies are navigating complex demands to drive operational efficiency, manage costs, ensure worker safety, and meet environmental and cybersecurity goals. Industry 4.0 solutions now allow companies to target measurable gains that drive operational excellence, protect the workforce, and make tangible progress towards net-zero goals. This technological capability, combined with mounting external pressures, is accelerating transformation across three key areas including digitalization, safety, and decarbonization.

Cost pressures are intensifying
Profit margins are shrinking due to economic shifts, industry consolidation, and lasting changes in work patterns. Companies are under pressure to find operational savings and boost productivity while continuing their digital transformation journeys.

Environmental expectations are rising
Zero routine flaring commitments by 2030 and climate-positive goals by 2050 require continuous real-time monitoring of operations. Many of the biggest gains come from optimizing infrastructure in rugged and remote locations where digital visibility is limited today but essential for reducing waste and emissions.

Safety remains paramount
Oil and gas production involves inherent risks, with manual site inspections among the most hazardous and time-consuming tasks. These processes require many workers to perform manual routine work that automated systems can handle daily. Advanced robotic platforms with AI capabilities can collect and monitor thousands of data points every day. By utilizing these AI-powered platforms, operations teams can reduce production losses and improve unplanned maintenance downtime while keeping experienced workers focused on planned maintenance and away from dangerous conditions.

At the same time, attracting and retaining skilled workers has become increasingly difficult. Digital-native employees expect mobile connectivity, modern workflows, and access to technologies such as augmented reality (AR), digital twins, and real-time collaboration tools. Companies still operating with outdated processes struggle to compete for talent without these capabilities.

Meeting modern workforce demands
As the industry modernizes, attracting skilled workers for digital operations has become a critical challenge. Companies operating with outdated analog processes struggle to attract tech-savvy workers who expect modern digital workflows, mobile connectivity, and advanced technologies like AR, digital twins, and real-time remote collaboration tools. Private cellular networks enable the always-on connectivity that makes these modern work environments possible, helping companies compete for talent while improving operational efficiency.

Ericsson private 5G: an enabler for transformation
Ericsson's private 5G solutions help energy companies capture this opportunity—enabling safer operations, driving automation, and unlocking new efficiencies across the oil and gas sector.

Beyond Wi-Fi: It's better with private 5G
While Wi-Fi networks meet basic needs, they fall short when coverage, reliability, and mobility can't be sacrificed, especially needed in environments with heavy equipment and interference. Connected devices on Wi-Fi are essentially operating without awareness of nearby access points, leading to handoff challenges and lag time that can be detrimental to critical applications. Wi-Fi also cannot guarantee throughput, making it difficult to rely on for business-critical applications operating 24/7.

Private 5G overcomes these limitations, delivering predictable performance, stronger security through licensed spectrum and SIM-based authentication, and seamless mobility across even the most complex sites. It also blends the cost control and management simplicity of Wi-Fi with the reliability, flexibility, security, and enterprise-grade performance of public cellular. This powerful combination enables organizations to unlock the full potential of the Industrial Internet of Things (IIoT) while keeping complete control over network performance—paving the way for critical new capabilities:

Asset monitoring and automation allow real-time monitoring using connected sensors so companies can detect equipment at risk for damage or malfunction before failures occur. This predictive approach reduces costly downtime and extends asset life across distributed operations. Industry analysis shows that smart maintenance can deliver 10 percent reductions in maintenance costs while boosting production through fewer unscheduled shutdowns.*

Connected workforce solutions equip workers with mobile devices, AR and virtual reality (VR) capabilities, and real-time communication tools to become more productive and safer. Digital workflows replace pen-and-paper forms, while remote expert support enables faster problem resolution. Lone worker and worker-down support align with industry Health, Safety, and Environment (HSE) policies and procedures.

Autonomous operations enable drones and robotic systems to perform dangerous inspections without putting employees at risk. McKinsey reports these technologies can reduce inspection costs by 35 percent, while advanced drilling automation cuts idle time by up to 50 percent and increases drilling speeds by 25 percent or more. These systems require highly reliable, high-bandwidth connectivity to send real-time imagery and data. Only cellular networks provide the performance and reliability needed across diverse operational environments, from offshore platforms to remote onshore facilities.*

Digital transformation delivers measurable value

- USD 250 billion in potential value for upstream operations by 2030*
- 20-25 percent reduction in cost per barrel through connectivity*
- 50 percent reduction in drilling idle time*
- 35 percent reduction in inspection costs*

*All McKinsey data and analysis in this report is from: McKinsey & Company, "How tapping connectivity in oil and gas can fuel higher performance," McKinsey.com, 2020.

Environmental compliance and monitoring
Meeting stringent environmental regulations, including zero routine flaring by 2030 and climate-positive carbon goals by 2050, requires continuous monitoring and real-time reporting across all operations. Private 5G supports advanced monitoring technologies from wireless gas-detecting sensors to corrosion-tracking cameras, enabling safe deployment even in hazardous zones. These systems help reduce emissions, cut energy waste, and provide the data needed to prove regulatory compliance.

Industry-leading technology with proven partnerships

Oil and gas operations demand more than standard connectivity solutions. When operational failure isn't an option, companies need networks they can control and depend on. Ericsson's private 5G solutions are purpose-built to meet these demands, delivering consistent, secure, and high-performance connectivity across complex environments.

Ericsson's 3GPP-based LTE and 5G solutions provide enterprises with:

- **Reliability at scale:** Standards-based performance with guaranteed throughput for demanding industrial use cases.
- **Stronger native security:** Licensed spectrum and SIM-based authentication built in from the start.
- **Seamless mobility:** Consistent connectivity across offshore platforms, onshore facilities, and remote sites.

Advanced technologies enhance this foundation:

- **Ericsson Uplink Booster** maximizes throughput and signal quality with real-time beamforming and interference suppression, delivering up to a tenfold boost in signal strength at the cell edge, ideal for uplink-heavy use cases like computer vision and remote operations.
- **Ericsson Massive MIMO** radios, including the 64T64R system with 192 antenna elements, further enhance coverage and resiliency through advanced beamforming, supporting applications such as remote-controlled and autonomous heavy equipment.

Deployment advantages that matter

The business case extends beyond performance. Fiber installation on live onshore oil rigs can require shutting down operations, potentially costing 100,000 barrels per day in lost production. Private 5G can be deployed in as little as two hours without operational impact, making deployment speed alone a compelling business case.

Ericsson's multisite-capable architecture enables companies to deploy consistent connectivity and centralized management across diverse environments, allowing equipment and workers to move seamlessly between sites without reconfiguration.

Specialized solutions for oil and gas environments

Oil and gas sites require specialized capabilities that go beyond off-the-shelf solutions. Ericsson's private cellular solutions deliver:

- C1/D2 and ATEX-certified equipment with intrinsically safe enclosures for hazardous environments
- Geo-redundancy with backup systems across core and radio components for mission-critical reliability
- Scalability from 500 to 25,000+ users with streamlined installation and cloud-based management
- Flexible architectures from radio-only sites to fully autonomous operations
- Neutral host capability for multiple mobile network operators in refineries and processing plants

Ericsson ecosystem partners

Success requires the right combination of technology, industry expertise, and specialized partners. Ericsson delivers complete solutions through a comprehensive ecosystem that addresses the unique demands of oil and gas operations.

Success requires more than just connectivity; it takes specialized expertise. Ericsson delivers complete solutions through a broad ecosystem of partners including:

- Certified device partners for C1/D2 and ATEX-certified devices
- Autonomous inspection robots and AI-powered monitoring systems
- Gas detection and environmental monitoring providers
- Connected worker solution partners offering AR/VR tools, mobile applications, and safety platforms

Service provider partnerships. Ericsson's extensive relationships with leading service providers worldwide enable hybrid solutions with:

- 24/7 managed services
- Local expertise
- Ongoing lifecycle support from planning through operations
- Open API integration for seamless IT/OT connectivity and investment protection

Reference cases

Centrica Storage: Modernizing gas operations
Centrica Storage Limited digitalized operations and launched connected worker solutions to increase facility safety. Using Ericsson radio and core networking gear, Vodafone built a private LTE network upgradeable to 5G, allowing staff to connect maintenance, operation, and safety applications via handheld devices. The 5G-ready infrastructure enables Centrica Storage to automate, monitor, and centralize critical maintenance and engineering operations.

Learn more

"Safety is critical at CSL and this solution will reduce risk for everyone on our site. The mobile private network will help us address 1970s problems with a 21st century solution, taking our business to the future from the moment it's live."

Paul Stevens, Information Systems and Technology Director, Centrica Storage Limited

Ooredoo Qatar: Enterprise transformation
Communications company Ooredoo Qatar partnered with Ericsson to implement a private cellular solution supporting offshore operations. The deployment modernizes oil and gas communication infrastructure, simplifying customer communications while ensuring safety, reliability, and security across Ooredoo's network.

Learn more

Transform your operations with Ericsson private 5G networks
Ericsson's private 5G solutions empower oil and gas companies to achieve a triple bottom line:

- Safer operations
- Lower environmental impact
- Measurable efficiency gains

Built on industry-leading 3GPP standards private 5G provides scalable, reliable connectivity across global operations while supporting seamless integration with existing systems. Combined with a robust ecosystem of industrial partners and service providers, Ericsson enables tailored, hybrid solutions that meet the sector's toughest challenges.

With 5G-ready infrastructure and advanced automation, companies can not only overcome today's operational constraints but also unlock new opportunities, drive innovation, and shape the future of energy.

Learn more: ericsson.com/oil-and-gas

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, including Networks, Cloud Software and Services, Enterprise Wireless Solutions, Global Communications Platform, and Technologies and New Businesses. It is designed to help 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. www.ericsson.com/oil-and-gas

Notes
*All McKinsey data and analysis in this report is from: McKinsey & Company, "How tapping connectivity in oil and gas can fuel higher performance," McKinsey.com, 2020.

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