5G

ENABLING INDUSTRY 4.0 AND BEYOND

Smart operations with 5G technology in the **OIL AND GAS** sector
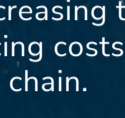
OPEC forecasts global energy demand to rise
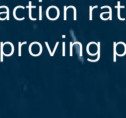
28%

by 2045, with oil and gas accounting for approximately **28%** and **24%** share, respectively.[1]

To cater to this demand, the oil industry alone will need **USD11.8 trillion** in upstream, midstream, and downstream investments.[1]
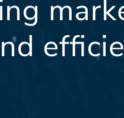
As investments in regional digitalisation intensify, Industry 4.0 will become an integral part of the oil and gas sector's strategy. Embracing 5G will be inevitable as the industry heads toward unmanned and fully remote operations.

These three factors will drive major players to monetise reserves by increasing the extraction rate and capturing market share while reducing costs and improving productivity and efficiency across the value chain.

- Geopolitical tensions
- Pandemic outbreak
- Focus on renewables and decarbonisation

5G-enabled operations have the capability to address cost, productivity, and efficiency. They also ensure unparalleled safety, throughput, security, and reliable performance to power the Industrial Internet of Things (IIoT) and enable Industry 4.0.
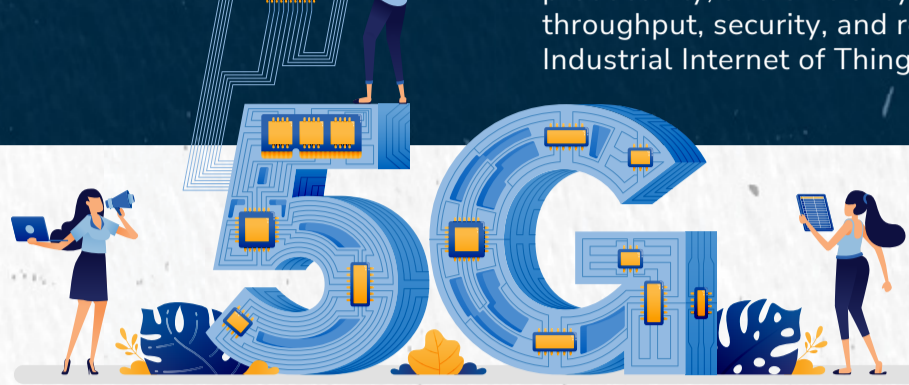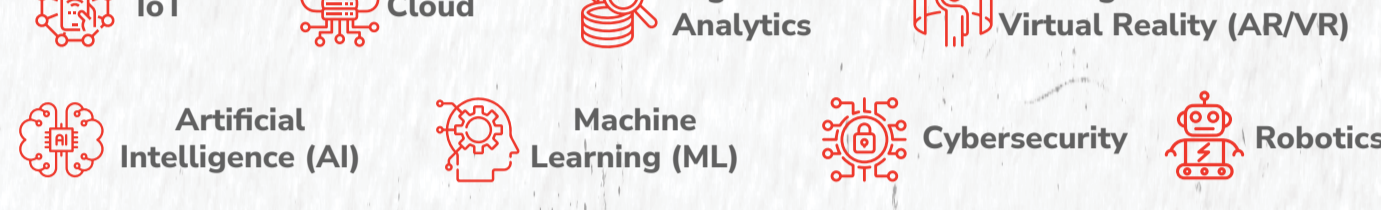
THE IMPACT OF INDUSTRY 4.0 ON OIL AND GAS

Industry 4.0 involves the integration of information technology (IT) with operational technology (OT) with near-real-time connectivity. The concept is unlocking an unprecedented number of opportunities in the oil and gas sector.

As a pioneer in adopting and deploying emerging technologies, the oil and gas sector is poised to lead in Industry 4.0 transformation. The emergence of 5G, digital transformation and automation will drive greater efficiency, and productivity, and encourage application developments, leading to the eventual deployment of unmanned oil production platforms.

When combined with 5G, the key pillars of Industry 4.0, namely

When combined with 5G, the following key pillars of Industry 4.0 will provide industrial players with instant visibility into their entire operations and real-time capability to take informed actions. Going forward, digitalisation, optimisation, and automation will feature on the strategic roadmaps of oil and gas companies.

- IoT
- Cloud
- Big Data Analytics
- Augmented and Virtual Reality (AR/VR)
- Artificial Intelligence (AI)
- Machine Learning (ML)
- Cybersecurity
- Robotics

	Health & Safety	Productivity	Efficiency
Upstream	1. Smart personal protective equipment (PPE) 2. Geo-fencing services	1. Remote monitoring of automated processes 2. Remote inspection	1. Video surveillance and analytics 2. Robotic Process Automation (RPA)
Midstream	1. Discovering and mitigating the impact of abnormal events	1. Process and workflow automation	1. Predictive maintenance
Downstream	1. Health and safety compliance monitoring	1. Smart refinery	1. Digital twins and AR/VR

Source: Frost & Sullivan

With 5G, a smart oil refinery in China has improved work efficiency and production safety[2]:

- Automated data collection at over **98%**
- Reduction in refinery cost by **30%**
- Drop in production incidence by **80%**

Large-scale 5G implementations are allaying fears about the technology and accelerating progress. With scale, solution costs will decrease to allow widespread 5G adoption.

Frost & Sullivan projects the number of IIoT devices to reach roughly **11.6 billion** by 2026, nearly four times the adoption in 2020.[3]
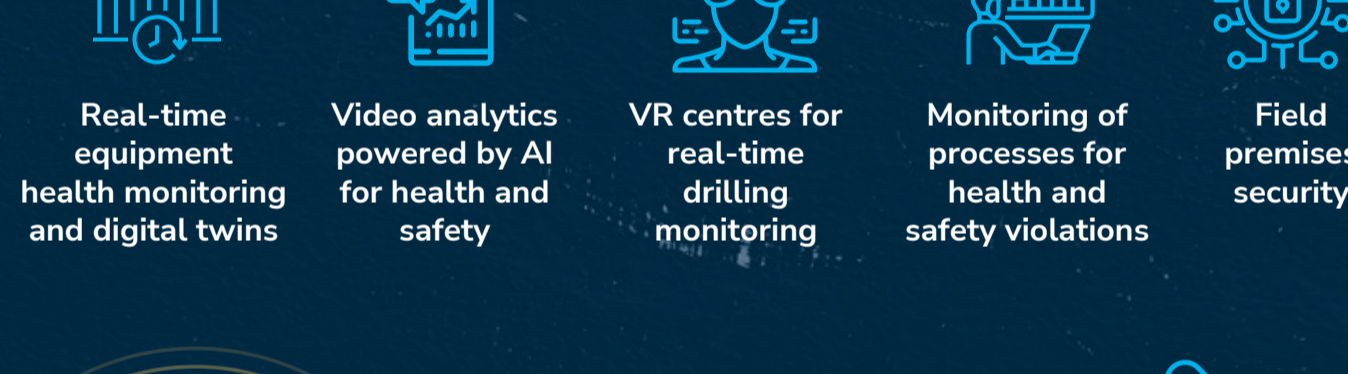
By 2025, IIoT applications targeting operations optimisation, predictive maintenance, inventory optimisation, and health and safety, are expected to **impact the global economy by up to $3.7 trillion.**

5G IN OIL AND GAS

Oil and gas companies are transitioning from the use of emerging technology to monitor production to efficiently managing and controlling production platforms remotely with the ultimate goal of remote operations of unmanned oil production platforms.

Frost & Sullivan expects the more promising 5G use cases in the oil and gas industry to include:

- Real-time equipment health monitoring and digital twins
- Video analytics powered by AI for health and safety
- VR centres for real-time drilling monitoring
- Monitoring of processes for health and safety violations
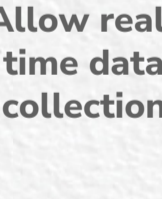- Field premises security

5G ENABLING A MORE INTELLIGENT AND NET ZERO FUTURE

5G, together with the critical pillars of Industry 4.0, has the potential to drive sustainability by enabling new operating models. 5G applications in the energy and utilities sector could save up to **1.7 billion tons of CO2e emissions globally over the 2020 to 2030 period.**[6]
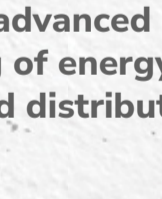
5G adoption in oil and gas will:
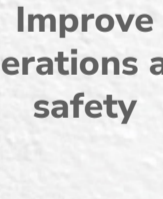
- Improve operations and safety
- Allow real-time data collection
- Enable advanced strategic planning of energy systems and distribution

IS 5G RIGHT FOR YOUR ORGANISATION?

5G brings the biggest opportunity for mission-critical services such as oil and gas, where it is critically required and monetisable.

Oil and gas providers that will benefit from 5G need to have:

- Scale
- Value proposition that addresses a specific market need and target segment
- Digital maturity

5G enterprise monetisation will work better with the right "enablers" and "attributes"

ENABLERS

Business Objective
1. Direction
2. Clarity on End Goal
3. Target Customer, Pricing and Cost
4. Value Proposition for Use Case supported by a viable business model for Partnership to leverage on solutions

5G Attributes
1. Low Latency
2. High bandwidth

5G Capabilities
1. Network Slicing
2. Broadcasting
3. Location based

Coverage Requirement & Approach
1. Limited - Private Networks
2. Nationwide
3. Seamless
4. Roaming and Redundancy

Computing Requirements & Approach
1. Compute
2. Analytics
3. Storage
4. Networking
5. Security

Optional Edge Capabilities
1. Compute
2. Storage

ATTRIBUTES

1. **Simple**
   - Less complexity
   - Easy to use
2. **Flexible**
   - Modular or template-based concepts
   - Customisable
3. **Real time**
   - Any time
   - Any where
   - Any use
4. **At the Right Cost**
   - Minimum customers
   - Scale

FOR MORE INFORMATION, DOWNLOAD THE FULL WHITEPAPER - 5G: ENABLING INDUSTRY 4.0 AND BEYOND

Sources:
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3. Frost & Sullivan, 2021 Update: Total Internet of Things (IoT) Device Forecast, 2020-2026, 2021, https://store.frost.com/2021-update-total-internet-of-things-iot-device-forecast-2020-2026.html
4. Investcorp, Emerging use of Industrial Internet technologies (IIoT), 2019, https://www.investcorp.com/wp-content/uploads/2019/11/Emerging-use-of-IIOT.pdf
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