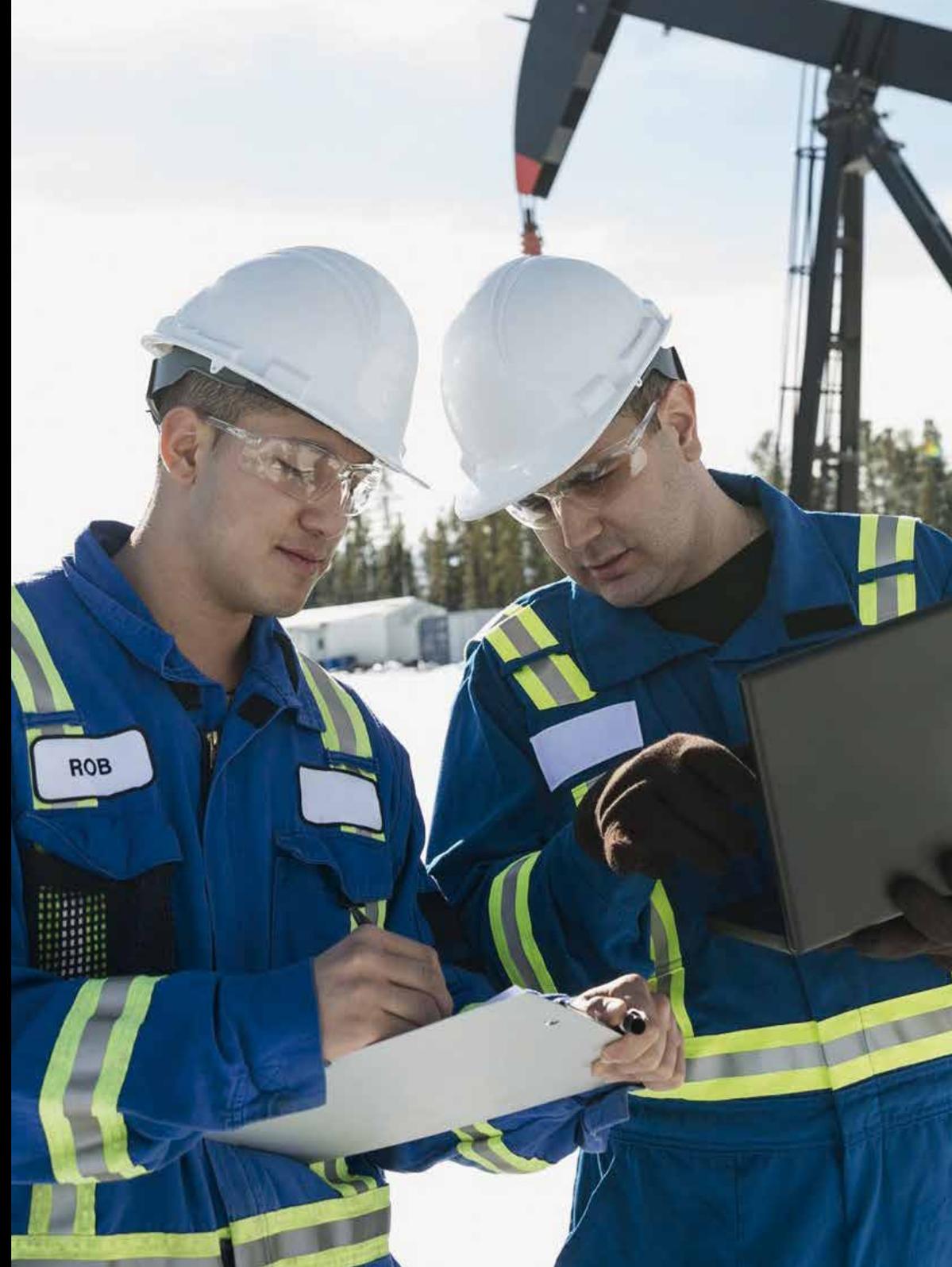


**Reshaping the future of
the oil and gas industry**

**Capturing the next
frontier of value in
a changing market**



**Business
Services**

Reimagining your oil and gas industry business model

In the face of uncertain long-term forecasts, it is time for the highly volatile oil and gas industry to explore new strategies to boost efficiencies and deliver quality, dependable product on time.

The oil and gas industry is still recovering from a savage round of weak prices, enforced capital discipline, portfolio changes and productivity inefficiencies. At the same time the International Energy Agency (IEA) has been flagging up the possibility of a near-term supply crunch since 2016. With oil demand growing and investment deferred from projects during the downturn there is less potential supply available.

The IEA, however, sees oil demand growing into the 2040s¹. At present just 1 percent of the world's vehicles are electric, for example. This is forecasted to increase just 21 percent by 2035². The demand for oil will require an increase in production, which will face higher risks from digging deeper and further for new sources, and more complex operations to fulfil demand. At the same time, the industry is faced with increasing regulations and scrutiny over health and safety and environmental policies.

Digital transformation is vital to help you sustain profitability in this rapidly-changing market. Digitization is a key enabler in reducing costs, improving reliability, securing assets, ensuring smarter decision making and increasing workforce productivity. It has the ability to revolutionize operations and extract additional profits from existing capacities.

Orange Business Services can provide you with a connected view of your operations that will support increased agility, scalability and better strategic decision making. Read more about the customized services we provide the oil and gas industry.

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Always-on networks for your teams

New technologies promise to make oil and gas operations more efficient, improve workflow and deliver valuable insight from big data. All of these technologies need 24/7, robust, secure and reliable communications.

Connectivity is central to retaining a continuous real-time flow of information onshore and offshore. This originates from a range of different sources from exploration and production right through to refining and distribution, and includes data collected from IoT sensors. However, oil and gas facilities are often in remote locations, making stable connectivity a major challenge.

Orange Business Services is a leading global communications provider addressing some of the most complex business issues in the oil and gas industry today. As a communications expert, we ensure that you have a scalable connectivity infrastructure for your onshore or offshore operations, no matter how remote.

Connect your highly distributed worldwide operations with Business VPN

Orange Business VPN, our flexible and integrated network solution, offers IP connectivity via an any-to-any connection. It allows you to connect all your sites throughout the world from exploration and production

through to refining, distribution marketing and trading. With the largest global MPLS-based VPN in the world, commercially available in 220 countries and territories, we are available wherever you are.

We can manage all your communication flows securely, from file transfer to voice and video communications. We provide a full range of access networks, including Ethernet, Internet, leased lines, mobile and DSL, giving you the most cost-effective access based on your requirements.

In addition, we provide wide area network (WAN) optimization services to help you maximize the speed of data flows across your WAN, increasing the speed of access to critical applications and information.

Gain greater flexibility and link up new sites faster with SD-WAN

SD-WAN technology has been designed to simplify operations and reduce costs. A software-defined hybrid

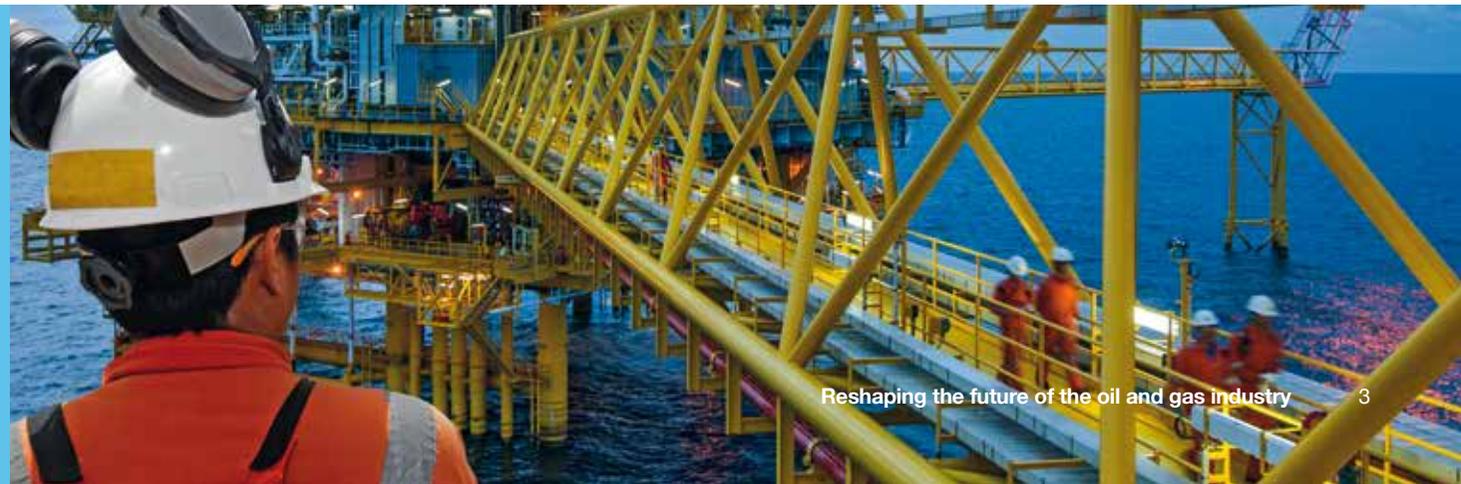
WAN, it constantly monitors all connections and chooses the best path available for the type of traffic crossing the network, enabling you to better control your data spend. SD-WAN also provides an end-to-end view of the communications network, making it easier to ensure a superior end-user experience.

On another level, software defined networking (SDN) and network function virtualization (NFV) can give you unprecedented levels of control and management over your network, providing you with the agility and flexibility to deploy network functions as needed.

Orange Flexible SD-WAN will allow you to instantly provision virtual network functions (VNF) with self-service ordering, customer care and reporting functions via a user-friendly portal. SD-WAN also provides the agility to get connectivity links up and running quickly to new sites or connect smaller sites such as your gas stations.



A typical oil drilling platform uses around 30,000 sensors, collecting data from dozens of systems³



3. In Lee (Western Illinois University), IoT in the modern business environment, 2017

Always-on networks for your teams

The power of satellite connectivity for your offshore and remote operations

Oil and gas operations often take place in locations where there is no terrestrial infrastructure, such as out at sea. But critical data on pump activity, corrosion monitoring and the drilling recorder on oil rigs at sea still needs to be shared with experts onshore. Satellite communications are essential to support business in these scenarios.

Our satellite connectivity allows you to combine different technologies and networks onshore and offshore, offering end-to-end integration and in-house satellite connectivity. It also provides drilling sites and offshore platforms with continuous, reliable connectivity, for example.

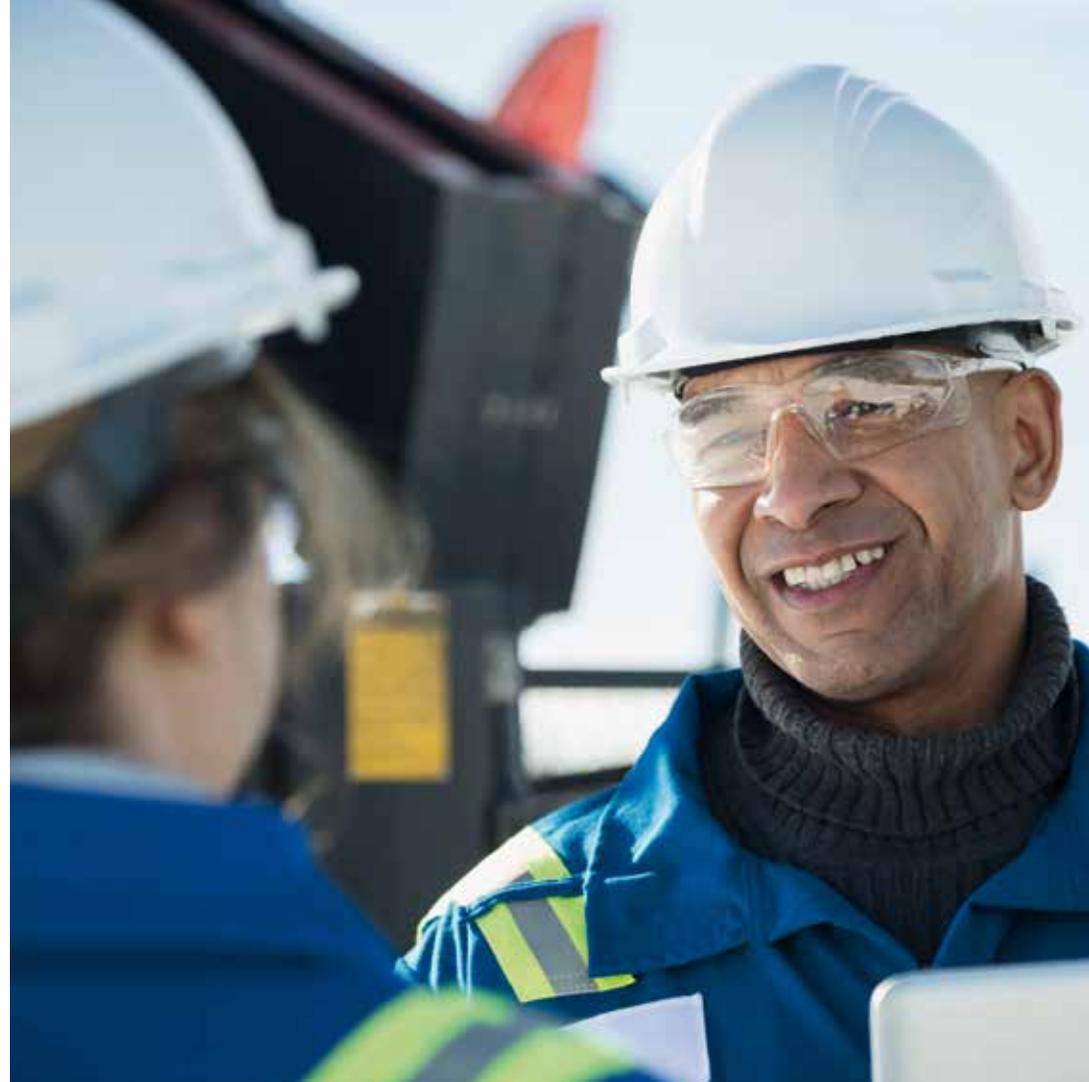
“ **Maritime Connect combines multiple networks, including satellite, to ensure connectivity for ships and oil rigs in any location. It gives offshore staff access to a single virtual corporate network.** ”

Challenging weather conditions can make communications difficult at sea. Orange Maritime Connect seamlessly integrates offshore oil rigs into the corporate network for real-time decision making. The single integrated solutions platform provides reliable connections over diverse communications interfaces, including Very Small Aperture Terminal (VSAT), L-band terminals, 3G/4G and Wi-Fi. Maritime Connect has been designed to deliver voice, VoIP, data and internet access in one solution, independent of the communication technology used.

Low-power wide area networks for asset tracking

Asset tracking and inventory management are critical in the day-to-day operations of the oil and gas industry, which ships huge amounts of parts and equipment daily. Low-powered LoRa® technology is capable of transmitting data over large areas wirelessly making it suitable for rugged locations and multiple campuses, such as refineries. It allows assets to become connected via low-cost modules running on batteries that can last for decades.

Orange Business Services IoT Connect Anywhere is a low-power wide area network (LPWAN) connectivity offering based on LoRa® open standard technology. IoT Connect Anywhere provides on-premises connectivity suitable for a range of applications, including fluid management, on-site asset tracking and geo-fencing.



47%

Oil and gas companies are among the leading adopters of IoT across all industries with 47 percent having adopted or planning to adopt connected technologies⁴

Unite teams and share knowledge

Oil and gas companies are highly dispersed and globalized. Access to the right information where and when your teams need it can improve productivity, responsiveness and business agility and reduce operational costs. Input from remote experts, for example, can make a huge difference in costly activities such as exploring new wells.

New energy sources like shale gas require the rapid setup of infrastructure, such as rigs and platforms. You need to move fast to make the most of these opportunities to put new supply chains and skills in place, for example. Innovative collaboration tools can help capture these new business opportunities more effectively.

At the same time, team-based analytical collaboration is supporting informed decision making. Real-time drilling data can be paired with data from nearby wells, for example, to adapt drilling strategies to make production faster and more efficient. Collaboration tools also allow for knowledge capture and distribution, which is pivotal in an industry with an aging workforce and skills gap.

Build a responsive team environment with UCC and conferencing

Fast decision making is vital in the oil and gas industry. Our unified collaboration and communications solutions enable your teams and partners working from even the most remote and inhospitable sites to exchange ideas and share information effectively, capitalizing on experience and talent. Video and voice conferencing, for example, can speed up remote troubleshooting.

Our maritime conferencing solution provides high-quality video conferencing solutions for teams based on offshore oil rigs. It enables secure collaboration in areas with limited bandwidth, so that offshore workers can communicate with engineers and geology experts onshore, for example.



Unite teams and share knowledge

Empowering mobile workers

Flexible working enables oil and gas executives to manage their mobile workforce and work schedules far more effectively. They can keep up to date with process changes and production figures, for example, to improve the efficiency of supply chain operations.

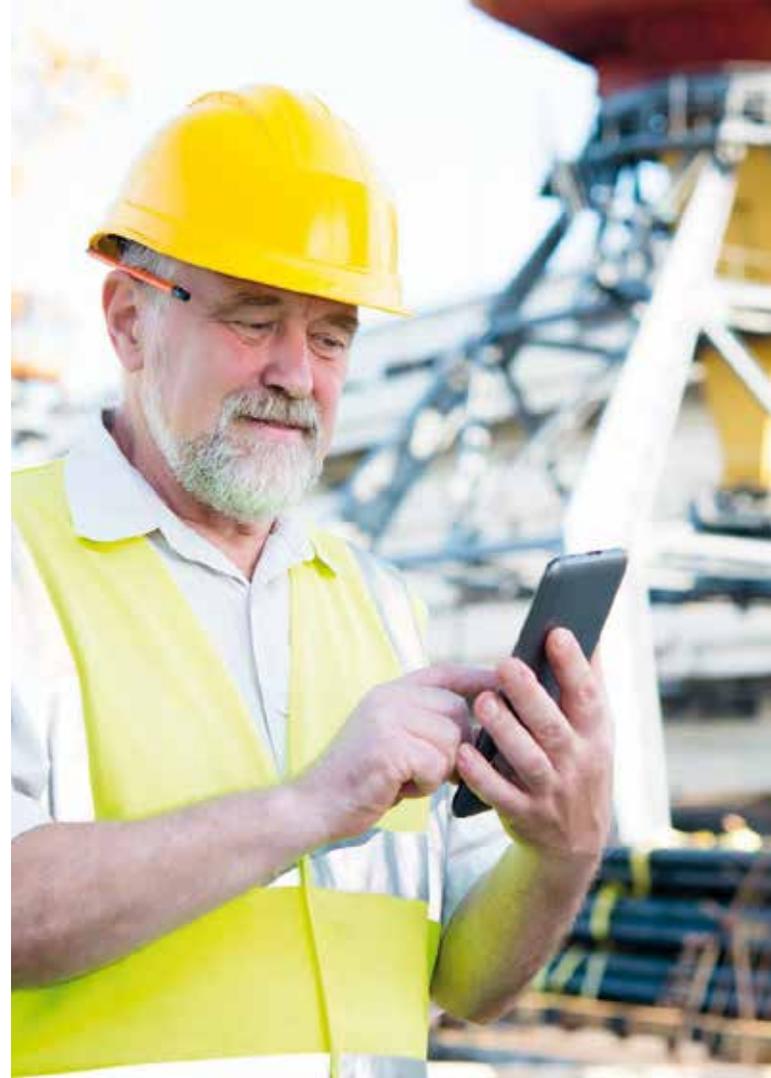
Orange Mobile Device Management (MDM) gives your employees secure access to your IT systems and applications from mobile devices, via a choice of network connections, including Wi-Fi, 2G, 3G, 4G and DSL.

The Orange solution reduces and controls the cost associated with managing and supporting heterogeneous fleets of devices, both professional and personal. It allows your employees to securely access corporate resources and collaborate effectively from any mobile device. A mobile workspace is invaluable for processes such as surveys and inspections for real-time diagnostics and equipment maintenance.

Enable real-time decision making with the cloud

The oil and gas industry has significant data storage and processing needs. Exploration, for example, can generate petabytes of data a day. Our end-to-end cloud services, global coverage and security expertise can provide you with tailored, integrated cloud platforms supported 24/7 that will enable you to respond to changing market situations fast – and manage your assets easier. It will enable you to deliver IT services quickly, such as provisioning drilling engineers with the compute power where and when they need it. You can use cloud-based analytics to unlock valuable insight from big data. Here, it allows joint venture enterprises to bring new partners on board easily, for example.

Our hybrid cloud services include private links into hyperscale cloud providers, hosted in 38 secure Orange data centers at 15 global locations, along with end-to-end service level agreements (SLA) from the cloud application data center, across the network, to your devices. We can orchestrate a mix of in-house and remotely hosted cloud services to deliver customized services that meet your business needs.



25%

By 2020, 25 per cent of oil and gas companies will have moved critical applications to the cloud, improving security, efficiency, performance and cost⁵.

5. IDC Futurescape, Worldwide oil and gas predictions, 2018



Countering the threat of cyber attacks

Digitization brings huge benefits for the oil and gas industry. However, greater connectivity and the rise of IoT are opening up the threat vista. In addition, the oil and gas industry has become a target for deliberate and malicious attacks, where operations are in geopolitically difficult areas.

Cyber security breaches can take your business offline, lead to loss of production and raise health, safety and environmental risk. This can have an enormous negative impact – both to your reputation and financially.

With a highly complex IT infrastructure, networking, and operational processes spread around the world, the industry has a very large attack surface. In the Middle-East, which now accounts for more than a third of global crude production, cyber-attacks cost the oil and gas industry \$1 billion last year in downtime and loss of confidential data, according to the Ponemon Institute⁶.

The risk of cybercriminals using the dark web to steal your intellectual property, injecting your systems with malware or using DDoS attacks to bring down your networks are all very real threats. In fact, the oil and gas industry was identified as the second most targeted industry for cyberattacks in 2016⁷.

6. Ponemon Institute, Assessing cybersecurity readiness in the oil and gas industry, 2018

7. Deloitte Oil Industry Insights 2017

68%

of US oil and gas cybersecurity risk managers said their organization has had at least one cybersecurity breach in the past year⁸

8. Ponemon Institute, State of Cybersecurity in the oil and gas industry, 2017



Enterprise security is paramount

You need multiple layers of defense to thrive in a digital world. We support organizations across the globe to securely operate their business via expert advice and a range of delivery and service models. We have partnered with key vendors, start-ups and leveraged internal expertise to provide best-of-breed security solutions tailored to each defense layer: web, network, cloud, applications, data and endpoints.



Continuously improve your security

Our consultants and auditors can assess the level of security of your IT infrastructure, websites, devices and applications, and provide actionable recommendations and training to improve the protection of your essential assets in terms of technology, processes and people engagement.



Anticipate, detect and respond to cyber threats

Attacks on oil and gas companies are growing in terms of frequency and sophistication. The oil and gas industry's security maturity, however, is relatively low. Orange security monitoring, threat intelligence and incident response solutions can protect your IT systems, digital assets, sensitive data and intellectual property in real-time 24/7/365. Our cybersecurity experts can help you detect and analyze events through data analytics, identify countermeasures and trigger corrective actions, providing high-quality security monitoring and alerts.

Leveraging IoT and big data for smarter operations

Controlling costs is critical to the way oil and gas companies operate today. An end-to-end solution incorporating IoT and big data-based services can provide better visibility and control of operations, drive accuracy and streamline processes through greater automation. At the same time, it can help to increase data security and simplify day-to-day workflow.

Digital technology can help you gain real-time visibility of your drilling operations to reduce downtime and improve asset performance, for example. It can also allow you to monitor pipelines in midstream to check for corrosion, pressure cycles and pipeline conditions. High-frequency data analysis provides a whole new level of performance monitoring by minimizing hidden lost time and anticipating asset maintenance.

Asset monitoring and predictive maintenance

The oil and gas industry by its very nature has a huge equipment and parts inventory. IoT and data analytics can enable you to predict issues that might affect not only equipment, but also your entire refining process.

With Orange asset monitoring and predictive maintenance solutions, you can monitor your equipment in real time. Sensors will detect operating issues and send alerts. Your teams will be notified when parts need replacing or repairing and will no longer lose time identifying the problem. By collecting and analyzing data from equipment, wear and tear is anticipated and interventions can be planned ahead.

Orange Traceability-as-a-Service and Asset Virtualization can help you track your equipment through IoT. The data will help you to improve machine productivity, reliability and availability and detect any unscheduled problems. State-of-the-art management tools will help you to manage assets more efficiently, thereby reducing downtime and improving asset performance.

An IoT device catalog is available to choose your connected objects – all managed on a secure platform. Data collection and virtualization increases simplicity and visibility. The smart data it generates allows you to evaluate assets and make forecasts, while data analytics provides a route to educated decision making.

Monitor the state of your pipelines

Large breaks in pipelines often start as pinholes that human monitoring can't detect. The Orange Pipeline Integrity service collects and analyzes data from your pipelines providing you with complete visibility of their condition. This allows you to easily run an effective preventive maintenance program.

Orange experts can also help you build a 3D model of your pipeline network to optimize its safety and performance via a partnership solution with Aveva. This “digital twin” is stored in the Orange cloud for accessibility from anywhere and provides a complete view of your pipelines, so you can quickly detect faults and other issues.

Continuously track what's happening in the field

Downstream demands efficient distribution. Orange Fleet Performance is a complete fleet management solution that delivers real-time, consistent awareness into field operations and driver behaviors, as well as vehicle and asset conditions. Our solution will allow you to track vehicle speeds, driver performance and location; monitor vehicle use, mileage and maintenance; improve fuel efficiency; and reduce vehicle idle times. In addition it can help you react to emergency situations quickly. Smart fleet management allows you to dispatch vehicles immediately to get technicians on the scene without delay.

By 2020, to rapidly diagnose and help solve oilfield-related problems, 25 percent of large oil and gas operators will have equipped technology-focused talent with cognitive assistants and AR-enabled devices⁹

9. IDC Futurescape, Worldwide oil and gas predictions, 2018



Improving health, safety and the environment (HSE)

Health and safety of workers, often working in risky and remote locations, together with increasing environmental responsibilities are a top priority for the oil and gas industry.

The physical demands on workers together with periods away from home can increase risk of human error and inconsistent procedures that lead to higher chances of accidents.

At the same time oil and gas companies need to improve their environmental footprint to meet growing legislation. This includes closely assessing extraction, production and distribution methods to obtain licenses to operate and provide a transparent picture of environmental management activities. Using digital technology can provide a better, safer environment for workers, while promoting environmentally-responsible operations.

Better work-life balance and health

Orange Business Services can equip remote sites with internet connectivity based on your requirements. Easier communications with friends and family and access to social applications can help to improve working conditions, lowering stress and anxiety levels. You can also ensure the same at sea with our Maritime Connect solution. No matter how remote the location, telemedicine can also be provided, so that you are safe in the knowledge that your workforce is being cared for at all times.

Ensure employee safety

Locating new oil and gas sources is becoming more difficult, forcing the industry to operate in harsh locations and conditions. While optimizing productivity, you always want your workforce to be safe.

With Orange geolocation and embedded alert systems you can avoid incidents through early detection of potential hazardous situations. In the case of an incident, you will be able to intervene immediately to limit the situation. In addition, Orange surveillance solutions can help you monitor locations for both security purposes and worker safety.

Wearables to monitor staff location relative to safety events

Wearable IoT devices can help to protect your workers by monitoring biometrics, broadcasting data back to control rooms and warning workers of potential risks.

Orange incorporates RFID tags inside workwear, enabling you to track the location of workers and set off an alarm if any rule-based incidents happen. Workers can also be tracked via GPS and virtual geographic boundaries can easily be set up with geofencing.

For personalized safety requirements, Orange can help you develop your own wearable vests using a developer's kit. Through the customized, connected wearables you can collect, analyze and manage data via your own service platform or via the Orange Business Services' Datavenue platform to track hazards, monitor fatigue and so forth.

Get ahead of environmental issues

Proactive detection helps to avoid hazards such as spills and waste, which can cost your company dearly both financially, through huge fines and loss of production, as well as reputation.

Orange can help you establish more eco-friendly operations with our IoT and data analytics solutions. Our embedded intelligence and real-time energy consumption-tracking solution provides real-time insight that enables you to carefully monitor resources.

Air pollution from fossil fuel production is a growing environmental issue. We can help you reduce the problem by controlling emissions and finding and fixing leaks by analyzing data from your connected objects, so you can take direct action as required.



Build smarter oil and gas operations with Orange Business Services

Orange Business Services has extensive experience working closely with the oil and gas industry around the globe.

With our wide range of services, we can help you overcome today's challenges, making your company more agile and ready to take advantage of new business opportunities and succeed against current competition.

As a global provider of digital services and a carrier-grade integrator, we help the oil and gas industry achieve growth and create competitive edge by enabling knowledge sharing and innovation, safely, securely and responsibly.

We are powered by data, driven by people; global in our reach, local in our approach.



Unique expertise as a global infrastructure operator



700 developers, integrators and specialized IoT experts



Asset virtualization of your equipment and pipes



2,400 data intelligence experts



Comprehensive fleet management services



1,600 cloud experts, engineers and project managers



Large catalog of wearables with ability to provide IoT managed connectivity



Over 5,000 researchers and engineers focused on innovation in research centers around the world.



Expertise in managing over 11 million B2B active objects and 65 million data bytes per minute



1,200 cyber defense experts





Contact us to find out about the smart solutions
Orange Business Services offers for the oil and gas industry
here: www.orange-business.com/en/focus/natural-resources-transformation



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