

IMPROVING ASSET
PERFORMANCE



Operational excellence
in the oil and gas industry.

LISTEN.
THINK.
SOLVE.

 Allen-Bradley • Rockwell Software

**Rockwell
Automation**



Introduction



World energy demand is set to grow by 37 percent by 2040 according to the IEA's World Economic Outlook 2014. To meet forecast demand, it is estimated that the industry needs to invest over \$900 billion a year in upstream oil and gas development by the 2030s. By this time, unconventional gas will have accounted for around 60 percent of global supply growth.

At the same time, producers are facing unprecedented challenges around market volatility. Resource availability, safety and regulatory issues, and the current skills gap are other key challenges the industry needs to address.

Market *volatility*

Volatile oil markets affect industry and consumers alike, but producers are among those most impacted. The need is for cost containment and efficiency, not just in the short term, but for the future. Employees need to be able to access multiple sites from wherever they're located, and have the right amount of contextualized data to help make the right decisions. This helps to minimize downtime by predicting failures before they occur, taking appropriate actions to avoid such failures, or respond fast to an unexpected problem by being able to accurately and quickly diagnose the issue and move the correct parts and personnel to the production site.

Resource *availability*

As the oil and gas industry is seeing more of its existing oilfields mature, growing demand has to be met in other ways, often in hostile, remote locations. Subsea installations, for example, present a variety of challenges including water pressure, temperature, access for service, and the cost of deploying vessels for installation and service. In existing fields, mature assets with declining production need very efficient maintenance schedules to keep production profitable.



Risk and *regulation*

Regulations and reputation dictate that producers take every measure possible to avert health, safety and environmental incidents. Effective production control, condition monitoring and predictive shutdown systems are fundamental to safe and secure operations in remote locations. Used to best advantage, rather than being a barrier and an additional cost, an effective safety strategy using the right equipment can be a productivity driver, maximizing efficiency and minimizing downtime.



Talent and *experience*

In the oil and gas industry 60 percent of employees are over the age of 45*. Continuing staff shortages and high staff turnover have an impact on asset safety. At the same time, operations move further offshore in search of natural resources and into new environments in sometimes remote locations onshore. Staffing facilities such as these requires a precise blend of training, experience, knowledge and career years in hand that can be hard to find, and can involve expensive relocation.

60%

* The Society of Petroleum Engineers <http://www.europeanoilandgas.co.uk/article-page.php?contentid=12698&issueid=382>

Automation can provide the solution

As circumstances change, digital automation technologies support the industry in finding new ways to ensure demand is met. Cloud, mobility and analytics offer the flexibility and the real-time production information to help operators respond appropriately to dynamic market conditions and make better business decisions wherever they're based.

Having the right staff with the right equipment reduces operating costs and increases productivity. Essentially, the technology available today makes it possible to get closer than ever to operational excellence and the business value attached to this.





Capitalizing on *The Internet of Things*

Across industry sectors, smart production processes are seeing devices and machines beginning to control and regulate themselves. Initiatives globally are applying the concept of the Internet of Things (IoT), connecting devices that communicate via the internet. Guided by our industrial expertise, and accelerated by advances in the enabling technologies that bring the IoT to life, we've developed The Connected Enterprise, a model that enables producers to harness information and put it to work.

It drives better decision-making, exposes inefficiencies and sparks collaboration. It helps operations managers profitably manage and improve industrial processes, and IT executives reduce network complexities and exposure to cyber security risks. It shares productivity – improving information to workers across the organization in a context that is meaningful for each role.

The oil and gas industry can learn from other industrial sectors, and adapt technology to suit its own specific needs and meet its own business goals.

IoT



IMPROVING **ASSET PERFORMANCE**



Operational
excellence
in terms of

OEE

Energy companies have implemented process instrumentation systems to increase uptime and optimize production. However, the energy industry has historically lagged behind other industries in the area of asset performance, often referred to in manufacturing as operational equipment effectiveness (OEE). The Aberdeen Group reports that on average, oil and gas companies have OEE of about 73 percent compared with process industry leaders with scores in the high 80s.

Combining operations, maintenance, and quality measurements in a single key performance indicator, overall equipment effectiveness is an objective way of collecting the lifecycle performance of processing equipment. Variations in OEE for a piece of equipment directly relate to the business performance of a plant. The events and responses to those variations can be used to turn condition-monitoring data into valuable maintenance, reliability, and safety information.

There are differences, of course, between oil and gas and other industries. In manufacturing, if a machine produces 10,000 parts, and it goes down, at the end of the shift it will be a number of parts short of its target. In oil and gas, if a compressor goes down, it reduces production, but the dynamics are more complex, so it is more difficult to measure the impact.

However, achieving leading-class OEE scores has been shown to help dramatically improve bottom-line results in capital-intensive industries like oil and gas production. In a hypothetical 20,000 barrel-a-day facility, assume that the facility is currently running at a level below optimum availability.

A one-point improvement in the facility's availability score would result in a minimum one percent gain in production. Over the course of a year, that one percent gain could amount to roughly 73,000 barrels of oil produced, resulting in a significant financial gain from the facility through improved throughput.



How remote monitoring can

improve efficiency

Historically, accessing information from pumps, lifts, wellheads and other equipment was a labor-intensive and sometimes risky process. Onshore, workers had to drive from well to well and physically gather data. Offshore, most platforms needed to be manned to monitor and operate it or operations and maintenance crew needed to move by boat from platform to platform to do this.

Today, oil and gas companies can remotely access and monitor machine data with fully automated and integrated systems to help capture and send data from a remote-asset site to a centralized location.

Remote monitoring technologies enable operators to access and manage equipment and production data across multiple applications from one single location. This technology seamlessly integrates software, hardware and sensors to extract important operational information across a variety of production equipment and applications and feeds it back to a centralized location in real-time. Centrally-based operators can continuously monitor current operating conditions, troubleshoot any potential issues, and make process adjustments at an earlier stage to help increase uptime.

Beyond remote monitoring, these systems gather, analyze, contextualize and share information to help oil and gas producers optimize operations. By pairing production intelligence with intuitive dashboards and historian functionality, operations-management systems can automatically collect production data, calculate KPIs and present easy-to-understand displays via wireless, remote technology.





24/7

Practically speaking, remote monitoring reduces downtime by eliminating the need to fly maintenance specialists out to a problem site, which takes time, costs money and lengthens equipment downtime. It supports safer working practices in that fewer staff are required to work in hostile environments. And it addresses the skills gap, with centrally-based experts available in real-time, enterprise-wide, 24/7, making better use of time and reducing wage bills.



Using connectivity

to support operational excellence

By connecting devices and equipment using modern technology, operators are better able to gather and analyze data, and transform it into actionable, real-time production information. These connecting technologies enable collaboration between global and remote operations, assets and people, resulting in faster problem-solving and improved innovation.

Equipment and devices are transformed into intelligent assets capable of reporting a wealth of production information including energy and diagnostics, with the convergence of IT and OT driving a fully integrated approach, from the plant floor throughout the organization and across the supply chain.

This provides access to the vital business information that supports better decisions, increasing productivity and helping to meet demand more precisely and cost-effectively.

In oil and gas, a connected production environment breaks down geographical barriers, securely providing access to data, onshore and offshore, that has traditionally been trapped in operations' historians and contextualizing it to provide the right intelligence to the right people. Actionable information is related to key performance indicators and improved business value, including production throughput, process quality, asset health and energy efficiency.

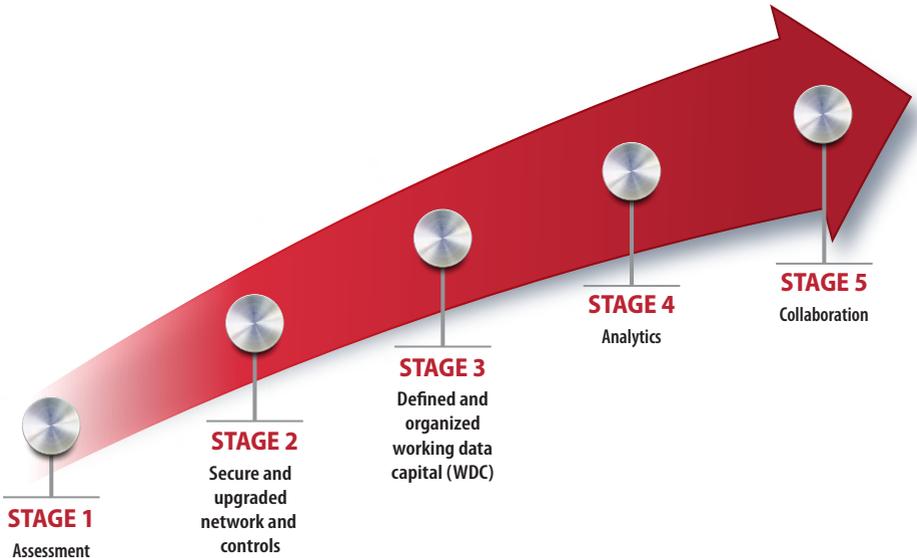
From a practical perspective, instead of flying an expert out to a remote oil and gas site to troubleshoot a problem, video technology can allow remote experts and onsite workers to share data and collaborate on solving an issue. This can allow people onsite and the management team at the home office to look at well and sensor data to manage a number of onshore or offshore wells and work with value chain partners and customers to solve problems more quickly.



Implementing

a more intelligent Information (IT)/Automation (OT) network

To help oil and gas producers take steps towards connected production, we have developed a five-stage maturity model that incorporates measures and best practices necessary to achieve effective change in both technologies and organizational cultures. We have also partnered with Cisco Systems®, Microsoft®, Panduit®, and others to establish an OT/IT knowledge bridge for industrial operators.





Hilcorp

remotely monitors critical assets via the cloud



Hilcorp Energy Company, which operates oil-drilling platforms off Alaska's rugged Kenai Peninsula recently upgraded its pump controls using medium-voltage drives, which are remotely managed by Virtual Support Engineer from Rockwell Automation. This standard off-the-shelf service helps to keep this critical piece of equipment operating within specified parameters.

- Real-time monitoring speeds troubleshooting, with data from Hilcorp's drives coming directly to a Rockwell Automation global support center via the cloud where it is analyzed in real-time, 24/7/365
- Industry expertise provides peace of mind. Rockwell Automation support centers are hubs of deep domain expertise that help fill in gaps in in-house knowledge and experience
- Data analysis reduces costs. Rockwell Automation engineers not only aggregate and analyze historical data, but also develop additional algorithms and logic to help the oil producer deploy cost-saving, preventative maintenance programs to reduce the effects of future downtime



M.G. Bryan

pioneers cloud-computing asset performance management



M.G. Bryan, a leading heavy-equipment and machinery supplier to the oil and gas industry, knew it needed a way to remotely monitor the performance of its trucks in real-time, from anywhere. The company gained real-time visibility into remote-asset data with a unique cloud-based, remote asset management and fleet management system designed and implemented by domain experts at Rockwell Automation. M.G. Bryan's story demonstrates many of the industrial benefits that come with migrating to the cloud:

- Monitoring asset health and improving reliability. Remote dashboards detail the condition and process performance of an individual vehicle, as well as maintenance trends related to entire fleets
- Scalability with lower upfront overhead. Fleet can grow from dozens to hundreds of assets/users with little-to-no additional IT capital expenditures
- Multi-tenant access. The OEM, its customers and vendors across the supply chain have access to specific content based on security permissions, enabling truck operators in the field to directly interact with suppliers
- Competitive advantage. M.G. Bryan has differentiated itself in this market because its innovative cloud approach reduces project risk and cost of ownership, while improving time-to-value

Production

intelligence solution enhances visibility for energy pipeline operator



A major North American transporter of liquid and natural gas lacked access to reliable data from their pipeline network, threatening performance, profitability and even pipeline and product integrity.

Cybertrol Engineering developed a production intelligence strategy for the pipeline network based on the FactoryTalk® software suite for improved integration with varied information sources. The new system dramatically improved visibility into operating conditions:

- Increased the scalability and reliability of information collected at pump stations from a dozen points to over 1,200 points
- Expanded access to system data and reports previously only accessible or interpretable by engineering staff
- Increased integrity and speed of data, enabling deeper diagnostics and troubleshooting – significantly reducing maintenance costs and improving overall pipeline performance



Pipeline operator

uses standardized control solution
to increase uptime and reduce
cost of ownership



CNP-MRT faced challenges in efficiently controlling the performance of their reciprocating engine compressors, a significant factor in moving the highest quantity of natural gas at the lowest cost.

The PlantPAX™ process automation system vastly improved asset visibility and production information gives station operators the data necessary to respond faster on maintenance, operation and flow control issues.

- Scalable, open-architecture platform provided advanced reciprocating engines and compressor control, continuously collecting critical operating data, simplifying communications and lowering installation costs
- Tightly integrated visualization software enabled instant access to real-time information and operational trends
- Advanced networking, monitoring and diagnostic capabilities cut system downtime, increasing preventative maintenance capabilities, and reducing repair costs

The key benefits



of connectivity

More flexible operations

Productivity is increased with smarter, more flexible operations, meaning better utilization of global assets, lower costs and improved time-to-market.



Information anywhere

Turning data into information available in real-time to anyone, anywhere creates a smarter, more productive workforce. Using global expertise, both internal and external, helps to keep operations running at capacity.



Protected assets

With visibility across operations, you can better protect your company's assets wherever they are, through a safer, more secure architecture.



Optimized assets

A connected production environment improves energy usage, equipment reliability and longevity, and provides expanded capacity from existing assets.



Improved maintenance

Automating maintenance can increase efficiency and minimize risk of catastrophic failures and process disruptions, while maximizing equipment reliability.

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For more information on our oil and gas solutions, please visit:
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www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846