OPTIMIZING OIL AND GAS FACILITIES

A comprehensive eBook on operational transformation throughout the oil and gas value chain

Rockwell Automation

BEGIN

INDUSTRY IN FLUX

Navigating challenges in oil and gas

Across the oil and gas industry, common challenges span the value chain — such as regulatory compliance, operational efficiency, and the environmental impact of fossil fuels. While companies in various oil and gas sectors increasingly prioritize sustainability, digital transformation, and proactive maintenance, the age-old concerns of improving safety, reducing costs, and minimizing environmental impact are ever present. How can companies start to overcome these hurdles?

- **Addressing rapid technology changes**
  Companies must navigate complex processes and legacy systems, hindering their ability to stay competitive and capitalize on emerging innovations.

- **Overcoming operational inefficiencies and unplanned downtime**
  The industry struggles to optimize its operations, with aging infrastructure and operational inefficiencies — impacting profitability and competitiveness.

- **Balancing profitability with environmental responsibility**
  Companies are navigating stringent regulations, public scrutiny, and investor demands for sustainable practices while maintaining operational efficiency and profitability.

- **Mitigating safety and security risks**
  The industry's infrastructure exposes companies to safety risks, including cyber threats and physical hazards. Ensuring safety demands robust safety protocols and cybersecurity measures.

- **Addressing workforce challenges and skill gaps**
  The evolving industry demands a skilled, adaptable workforce. Workforce shortages and skill gaps challenge efficiency, productivity, and long-term sustainability.

Maintenance costs typically range between 20 – 60% of OpEx spend.

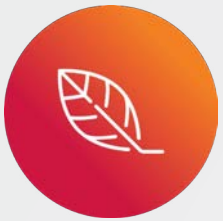
Source: McKinsey & Company

Unlocking growth and profitability in oil and gas

A ROADMAP FOR SUCCESS

Accelerate growth through transformation

Adapt, innovate, and seize new opportunities. Streamlining operations and embracing cutting-edge technologies pave the way for sustained growth and market leadership.



Drive sustainability with net-zero commitments

Ambitious net-zero commitments align operations with environmental goals, fostering long-term resilience. Decarbonization strategies and carbon capture and storage (CCS) technologies drive sustainability and innovation.

Optimize production for maximum efficiency

Digitalization optimizes production processes, reduces downtime and enhances operational efficiency. Data analytics and automation lower costs while maximizing returns.

Build resilience through safety and security

Prioritizing security safeguards assets and personnel against emerging threats. Robust cybersecurity measures and safety protocols mitigate risks, ensuring operational continuity.

Empower people through workforce enablement

Workforce enablement empowers employees with skills and tools for success in a changing environment. Investing in training programs and smart technologies enhances efficiency and sustainability.

Solutions for the entire value chain

OUR APPROACH

POWERING PROGRESS ACROSS THE OIL AND GAS VALUE CHAIN

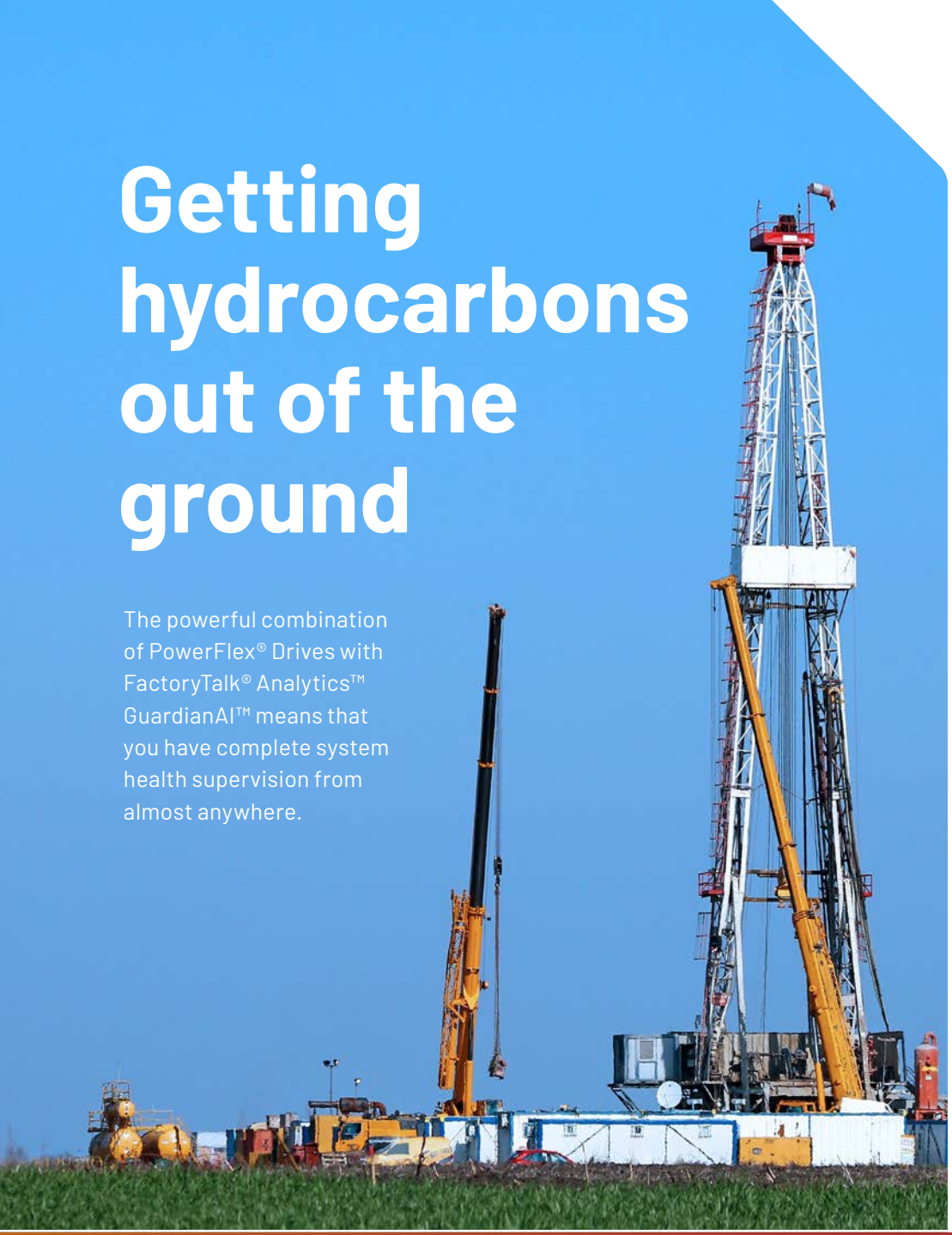
Given the dynamic state of the oil and gas industry, success hinges on innovation, efficiency, and sustainability. At Rockwell Automation, we understand the critical role technology plays in driving growth and profitability for organizations within this industry. These key drivers shape the future landscape, empowering organizations to thrive.

Across the oil and gas value chain, our solutions enable sustainable growth as companies seek to maximize production efficiency, minimize unplanned downtime, and optimize resource utilization.

From upstream exploration and production, to midstream transportation and storage, and finally downstream refining, our control systems, safety solutions, and asset lifecycle management tools optimize operations, ensuring efficiency and reliability. Cybersecurity measures safeguard critical infrastructure, while digitalization and analytics enhance decision-making and resource allocation. Energy management solutions minimize environmental impact, promoting sustainability throughout production processes.

By integrating these technologies, we empower the oil and gas industry to reduce costs and drive long-term profitability while meeting evolving regulatory, environmental, and market demands.

Getting hydrocarbons out of the ground



The powerful combination of PowerFlex® Drives with FactoryTalk® Analytics™ GuardianAI™ means that you have complete system health supervision from almost anywhere.

Whether expanding existing or developing new fields, drilling is the critical first phase of oil and gas operations, making efficiency and safety of drilling operations paramount. With project success hinging on time to first oil, consistent and predictable progress becomes crucial. Delays due to asset failure or operational error can be mitigated by introducing the right blend of technology.

By automating drilling systems, companies can improve accuracy, reduce cost, and increase time to total depth while reducing the number of no lost time accidents. Rockwell Automation is a trusted supplier of reliable technologies that have been used in drilling rig automation around the globe.

The powerful combination of PowerFlex® Drives with FactoryTalk® Analytics™ GuardianAI™ means that you have complete system health supervision of remote and hard to connect assets.

Our Intelligent Motor Control systems use predictive analytics to foresee potential equipment failures before they occur while our Integrated Architecture® system enables seamless integration and monitoring of all drilling equipment, ensuring that any mechanical issues are quickly identified and addressed. The powerful combination of PowerFlex Drives with FactoryTalk Analytics GuardianAI means that you have complete system health supervision from almost anywhere.

Through automation of manual steps in the red zone and safety systems coupled with robotics applications, workers can be removed from many potentially dangerous situations. By using these technologies, the uncertainty and risk in drilling operations can be reduced, leading to improved operations that scale across your operations.

PRODUCTION AT SCALE THAT FLOWS SMOOTHLY

Digital technologies are crucial in enabling reliable remote automation.

Through our expertise in modular and open automation engineering, implementing a Design-One-Build-Many strategy provides a flexible, scalable, and reusable approach for multi-well pad automation systems. This involves designing a standardized automation solution that can be easily replicated across multiple well pads, significantly reducing engineering costs and accelerating profitable operation.

With our large partner ecosystem, including Sensia a JV created with SLB, Rockwell Automation can supply the technology needed to execute a digital well pad for today's challenging regulatory and competitive landscape to optimize production while helping to decarbonize your operations.

Artificial lift automation: Boosts production efficiency and minimizes downtime for all types and configurations of wells.

Motor control centers: Centralizes equipment control, enhancing safety and streamlining operations for well pads.

Multi-well pad automation: Enhances productivity and cuts costs by automating processes across multiple well pads.

Electrification: Increases sustainability and reliability with electric powered assets, reducing emissions.

Mitigation of flaring: Efficiently manage flaring, minimizing waste and environmental impact on the well site.

PIPELINES:

Connecting energy to infrastructure

PIPELINES GO DIGITAL

FactoryTalk software (surveillance)

+

PlantPAx® DCS
(process automation and power control)

+

Cybersecurity solutions

Columbia Pipeline Group saved $2.3 million in maintenance costs in 1 year by standardizing on one platform:

PlantPAx DCS on virtualized servers, implementing Rockwell Automation power control solutions

Ensuring that pipeline and midstream operations are safe, secure, sustainable, and reliable, while meeting regulatory compliance requirements is crucial. Rockwell Automation helps customers to optimize material movement through modern control techniques, unmanned maintenance capabilities and secure remote monitoring.

GuardLogix® Safety Controllers offer integrated safety control and consistent operation. Help enable continuous, precise control of pipeline operations, reducing unplanned downtime and enhancing system reliability. With shutdown capabilities and other safety features, risks associated with leaks are diminished, helping to protect personnel, and comply with safety regulations.

Optimize movement and reduce wear on equipment with Intelligent Packaged Power solutions, including PowerFlex Medium Voltage AC Drives. Control compressor and pump speeds for efficient fluid transport and saving on energy output. Support sustainability efforts even more with edge automation. Real-time data processing at the edge optimizes energy use and minimizes environmental impact through predictive maintenance and efficient resource management.

Bringing further value to the midstream landscape, we leverage Sensia's advanced solutions for intelligent metering systems, reporting, and throughput optimization, all delivered via remote operations. The integration of our technologies enhances accuracy, efficiency, and safety, delivering optimal performance while simplifying compliance and reporting.

GAS PROCESSING

OPTIMIZATION THROUGH PROCESS AUTOMATION

In the intricate landscape of gas processing, efficiency and reliability are the keys to tackling market volatility. By harnessing validated technologies tailored for gas processing applications, facilities can achieve high levels of recovery, leading to significant benefits that boost your bottom line.

PLANT-WIDE EFFICIENCY AT A GLANCE

PlantPAx DCS: A modern distributed control system offering plant-wide visibility and streamlined operations for process automation and power control, PlantPAx DCS provides operators with insights into plant performance, facilitating proactive decision-making and quick responses to changing conditions.

Motor Control Centers (MCC): Centralized MCC systems provide protection and monitoring for motors and other electrical devices, enhancing safety, reliability, and productivity. Integrated with PlantPAx DCS, MCCs ensure seamless coordination between process automation and power distribution, optimizing energy usage and reducing electrical downtime.

Intelligent Packaged Power (IPP): IPPs bolster the reliability and efficiency of power distribution. Integration with PlantPAx DCS and MCCs allows comprehensive control and monitoring of power systems, ensuring optimal performance and reliability throughout the plant.

Pavilion8® Model Predictive Control (MPC): Pavilion8 MPC leverages advanced algorithms and real-time data analysis for predictive optimization of various processes, adding sophistication to gas processing operations.

Balance of Plant (BoP) Optimization: Optimizing auxiliary systems like water treatment, HVAC, safety systems, and environmental controls is crucial for reducing operating costs, minimizing environmental impact, and enhancing overall operational efficiency.

Reduce the risk of unplanned downtime

Minimize energy consumption

Increase efficiency and reliability of processes

Achieve greater throughput with existing equipment

REFINING WITH ENHANCED EFFICIENCY

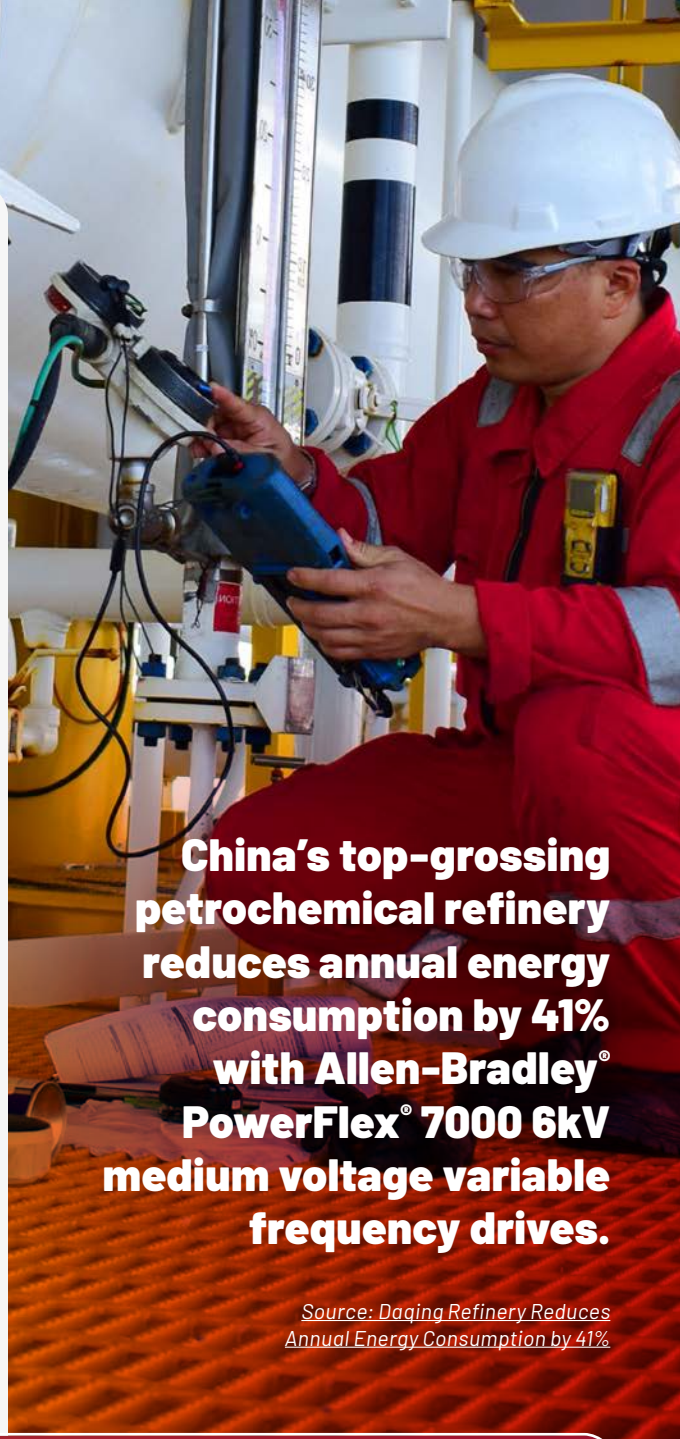
Refineries place paramount importance on safety, efficiency, and continuous operation. Relying on manual plant adjustments and analog instruments to control processes introduce risks that smart systems and digital tools can address. Minimize unplanned downtime and make sure that your plant meets its production targets.

With an integrated power and control solution provided by PowerFlex drives and the PlantPAx Distributed Control System, meet your targets by:

- **Integrating process and safety control** in one platform, ensuring comprehensive safety management.
- Providing **advanced process control** capabilities to optimize refinery operations.
- **Supporting redundancy and high availability**, ensuring continuous operation.
- **Enhancing energy management** and process efficiency, contributing to sustainability goals.
- **Including built-in security features** to help protect against cyber threats.

Our comprehensive process control solutions incorporate advanced concepts such as Balance of Plant, WAGES (Water, Air, Gas, Electricity, Steam) optimization, and Energy Management which further enhance operational efficiency. These tailored optimization solutions address variability, waste, and energy consumption and help in achieving production goals. Through the implementation of these solutions, refineries can track, monetize, and manage these costs to give your plant a strategic cost advantage.

FactoryTalk software can be used to centralize asset monitoring in a converged IT/OT platform. By understanding where, when and how their facilities use energy, operators can scope out energy savings opportunities and define key metrics.



China's top-grossing petrochemical refinery reduces annual energy consumption by 41% with Allen-Bradley® PowerFlex® 7000 6kV medium voltage variable frequency drives.

Source: Daqing Refinery Reduces Annual Energy Consumption by 41%

Safeguarding oil and gas operations in a digital era

Across the oil and gas industry, the advancement of interconnected systems enhances safety and efficiency through real-time monitoring and automation. However, it also introduces the potential for cyber threats, requiring robust cybersecurity measures. While these systems improve worker security and reduce human error, vigilance against potential cyberattacks remains crucial.

CYBERSECURITY

With increasing reliance on interconnected systems and data analytics, the industry faces heightened cyber threats. Robust cybersecurity measures are crucial to help prevent operational failures, financial losses, and environmental damage. These measures include advanced intrusion detection, regular security audits, employee training, and compliance with standards like the NIST Cybersecurity Framework. Integrating cybersecurity across all operational layers ensures resilience against cyber threats.

WORKER SAFETY

Cutting-edge technologies like wearable safety devices, real-time monitoring, and automated safety protocols are essential for enhancing worker safety. These innovations provide instant hazard alerts, monitor health metrics, and enforce safety compliance. Cultivating a safety culture through continuous training and robust incident response plans can significantly reduce workplace accidents.

REMOTE OPERATIONS

Remote operations improve efficiency and safety, particularly in hazardous areas. Technologies such as remote monitoring systems, drones for inspections, and advanced robotics minimize human exposure to danger. These systems also enable real-time data analysis and decision-making, boosting operational efficiency and safety.

SUSTAINABLE PRACTICES FOR OIL AND GAS FACILITIES

Empowering the future

Rockwell Automation advances sustainability in oil and gas through electrification and carbon capture. Our PowerFlex variable frequency drives optimize energy efficiency, while PlantPAx distributed control systems facilitate carbon capture processes, reducing greenhouse gas emissions and supporting more sustainable operations. Help meet your net-zero goal by enabling energy management and automation technologies.

CARBON CAPTURE AND STORAGE (CCS)

CCS technology captures CO2 emissions from industrial processes and stores them underground, significantly reducing greenhouse gas emissions. This process helps oil and gas companies meet stringent environmental regulations and enhance their reputation as responsible corporate citizens. By investing in CCS, companies can participate in carbon credit markets and explore new revenue streams, such as selling captured CO2 for enhanced oil recovery.

ENERGY MANAGEMENT

Effective energy management strategies optimize energy use, reduce waste, and lower operational costs. Integrating renewable energy sources like solar and wind, alongside smart grid technologies, ensures more efficient energy distribution and use. This not only cuts down on fuel costs but also minimizes the environmental footprint of oil and gas operations, aligning with global sustainability goals and improving overall profitability.

ELECTRIFICATION

Electrifying onshore facilities involves transitioning from fossil fuel-based systems to electrical ones, such as electric drilling rigs and vehicles. This shift reduces GHG emissions and enhances operational efficiency. Electrification supports sustainability targets, reduces dependence on volatile fuel prices, and demonstrates a commitment to innovation, making oil and gas companies more attractive to investors and stakeholders focused on environmental, social, and governance (ESG) criteria.

BACK

Connect with us.

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