![LTIMindtree]

Oil & Gas Trends Report 2025

Executive Summary

Domain meets Digital

#FutureFasterTogether

Foreword

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Chief Business Officer
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"The oil and gas industry stands at the crossroads of transformation, driven by the evolving global energy landscape, regulatory shifts, and rapid technological advancements.

As the world navigates the complexities of energy security, sustainability, and efficiency, the sector is poised to redefine its role in meeting future energy demands. While hydrocarbons remain a critical component of the global energy mix, the industry is actively embracing digital innovations to optimize operations, reduce environmental impact, and enhance profitability.

Across the globe, oil and gas companies are increasingly leveraging robust technologies such as artificial intelligence (AI), cloud computing, Internet of Things (IoT), and automation to streamline upstream, midstream, and downstream operations. Advanced analytics and real-time data-driven insights are enabling predictive maintenance, operational efficiency, and enhanced safety measures. Additionally, the adoption of digital twin technology and blockchain solutions is driving greater transparency, security, and efficiency across supply chains.

Moreover, the shift towards decarbonization and net-zero goals has accelerated investments in carbon capture, utilization, and storage (CCUS), hydrogen production, and alternative energy sources. This transition necessitates a collaborative effort between oil and gas players and technology providers to unlock innovative solutions that balance economic growth with environmental stewardship.
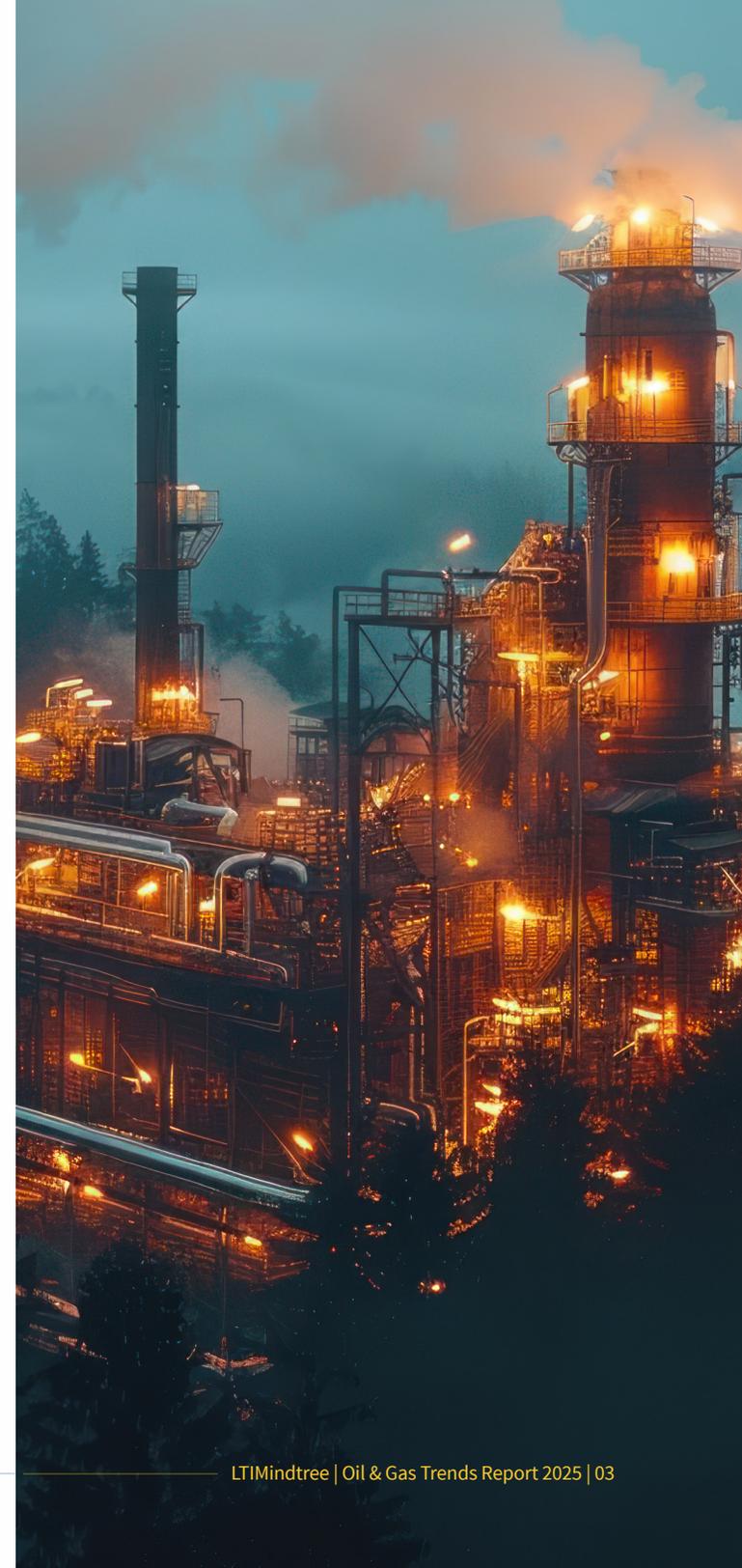
The technology industry plays a pivotal role in this transformation. From cloud-based infrastructure that enhances data accessibility to AI-driven automation that revolutionizes asset management, technology is the enabler of the industry's next phase of growth. Digital workplace solutions are redefining workforce productivity, while cybersecurity frameworks safeguard critical infrastructure against emerging threats. By embracing these advancements, the oil and gas industry can continue to lead in energy production while aligning with global sustainability imperatives.

As we look ahead, the integration of technology will not only drive operational resilience but also position the oil and gas sector as a forward-thinking, adaptive industry that thrives amidst change. This report explores key trends that have already started shaping the future of the energy sector. It also provides a strategic lens on how technology will continue to redefine the sector's trajectory."
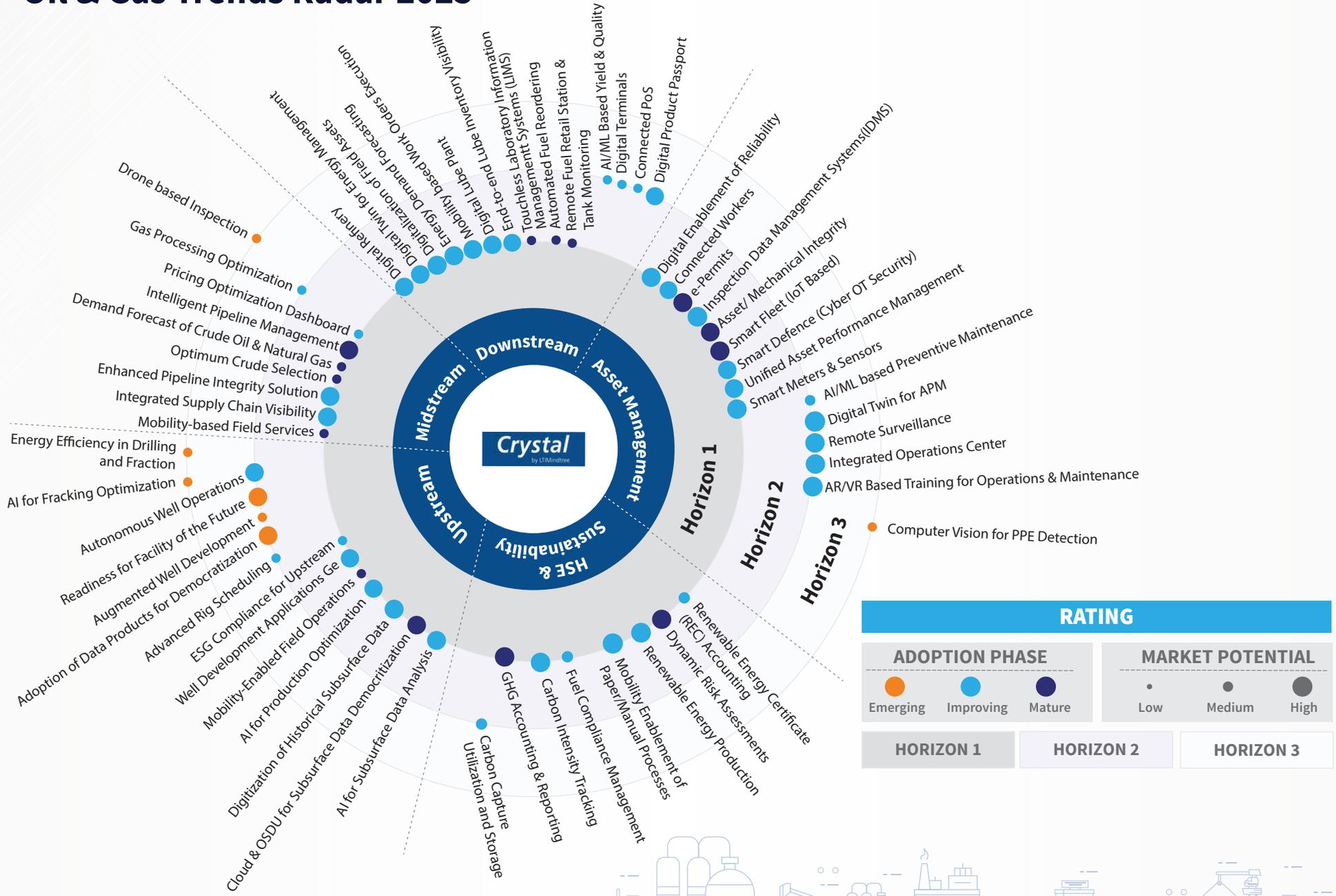
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Key Trends

1. AI for Subsurface Data Analysis
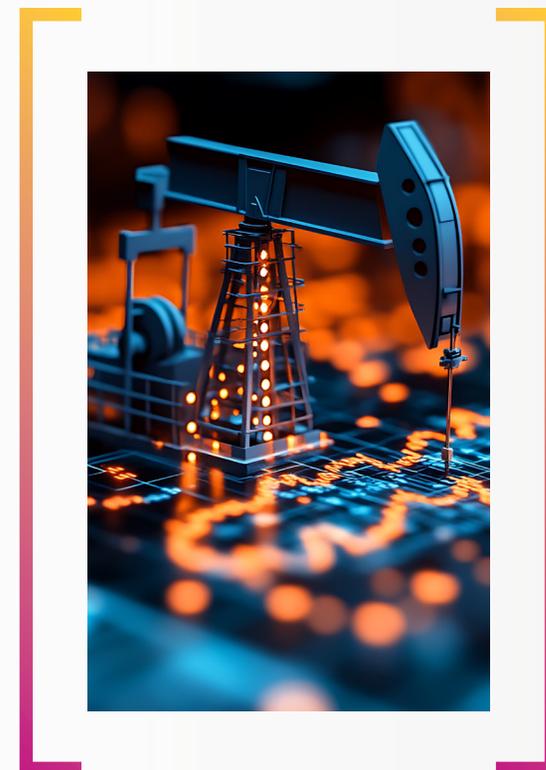
Why is it a Game-changer?

AI for subsurface data analysis improves the interpretation of seismic data, well logs, and core samples. It allows for quicker and more precise identification of hydrocarbon reserves, optimizes maintenance schedules through predictive analytics, and facilitates real-time decision-making. This results in lower operational costs, higher productivity, and enhanced safety. By automating routine tasks and efficiently managing large volumes of data, AI fosters innovation and efficiency in exploration and production.

Opportunities

AI algorithms, especially deep learning models, can automate the analysis of 3D and 4D seismic data, enhancing the identification of subsurface structures and stratigraphic features. This leads to more accurate and faster detection of hydrocarbon reserves. Additionally, AI plays a crucial role in designing Enhanced Oil Recovery (EOR) strategies by simulating various injection scenarios and predicting their outcomes.

LTIMindtree Case Study

LTIMindtree has developed an AI and ML-based tool for electro-facies classification of well log data. This tool quickly interprets log data from drilled wells, predicting lithology and formation properties. It enhances the accuracy and efficiency of subsurface data analysis, significantly improving decision-making. The log data is interpreted using workstations and specialized petro-technical applications to predict and correlate formation properties.

2. Adoption of Data products for Democratization

Why is it a Game-changer?

The adoption of data products for democratization allows broader access to critical data at all organizational levels. This fosters a data-driven culture, empowering employees to make informed decisions swiftly and efficiently. It enhances collaboration, breaks down silos, and accelerates innovation by providing real-time insights and analytics. Ultimately, this leads to improved operational efficiency, cost savings, and a competitive edge in the industry.

Opportunities

The adoption of data products for democratization in oil and gas faces challenges such as silos, security risks, and resistance to change. However, it offers opportunities, including real-time analytics for enhancing operational efficiency, AI-driven predictive maintenance, IoT-enabled asset monitoring, and advanced reservoir modelling. Leveraging AI, advanced analytics, and cloud platforms enables seamless data access, fostering collaboration, innovation, regulatory compliance, and ensuring a competitive edge in the evolving energy sector.

LTIMindtree Case Study

A US-based upstream oil and gas company faced lengthy data processing times. LTIMindtree addressed this by developing a data model integrated with Databricks and Power BI for Azure cloud migration. This automated the entire extract, transform, and load (ETL) process, significantly reducing execution times and achieving a 300% reduction in data size from 18 GB to 6 GB through vertical partitioning.

3. Integrated Supply Chain Visibility
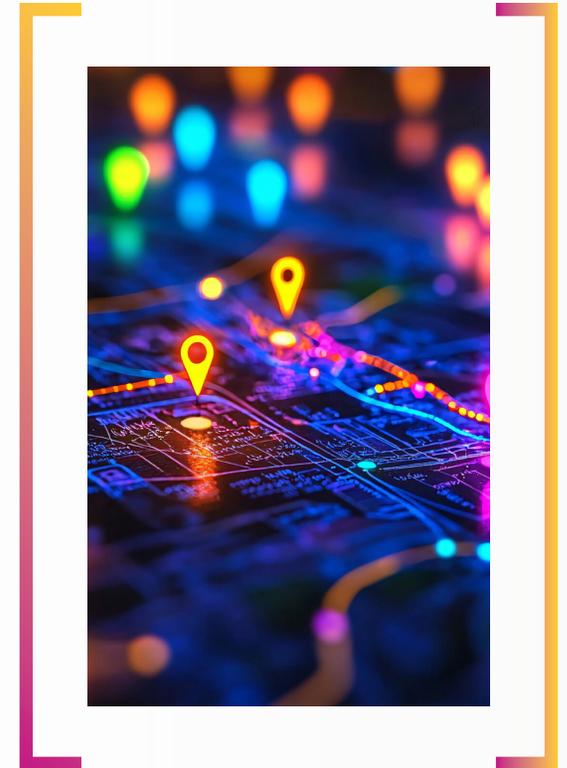
Why is it a Game-changer?

Integrated supply chain visibility transforms the oil and gas industry by improving real-time decision-making, lowering operational costs, and boosting efficiency. It allows for seamless tracking of materials and processes, minimizes disruptions, and ensures timely deliveries. This transparency enhances collaboration, optimizes resource allocation, and drives profitability and sustainability.

Opportunities

Key opportunity areas for integrated supply chain visibility in the oil and gas industry encompass real-time material tracking, predictive maintenance, enhanced supplier collaboration, and robust risk management. These elements reduce operational costs, increase efficiency, and ensure timely deliveries, enhancing overall profitability and sustainability.

LTIMindtree Case Study

A US-based Oil & Gas company sought to enhance supply chain spend and performance visibility across its value chain including S&OP, Logistics, Materials (MRO) & Warehousing, and Supply Chain Networks. LTIMindtree transformed their operations by integrating over 60 industry- best KPIs and enabling key initiatives through data remediation, data products, and advanced analytics.

4. Digital Refinery
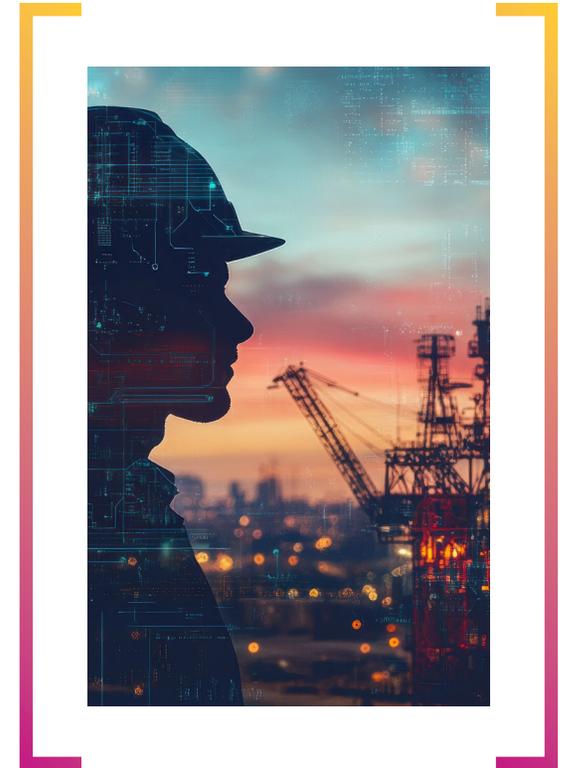
Why is it a Game-changer?

Digital refineries boost productivity, efficiency, and safety by digitizing processes. They facilitate real-time data analysis, predictive maintenance, and seamless asset monitoring, which reduce operational costs and enhance decision-making. This transformation drives profitability and sustainability, positioning digital refineries as a game-changer in the industry.

Opportunities

Real-time data analysis, predictive maintenance, and enhanced asset monitoring are the key areas for digital refineries in the oil and gas industry. These technologies enable better decision-making, reduce operational costs, and improve efficiency. Additionally, digital refineries can enhance regulatory compliance by providing accurate, up-to-date data on emissions and other environmental factors. Leveraging these digital tools, the industry can achieve greater safety, sustainability, and profitability.

LTIMindtree Case Study

A Middle Eastern refinery aimed to achieve top quartile performance and set a global benchmark in refining excellence by adopting next-gen processes and Industry 4.0 technologies. LTIMindtree conducted a digital maturity assessment, identified gaps, and provided a roadmap for improvement, including investment plans and projected ROI. The benefits included a 10 cents/barrel increase in refining margins, a 0.5% boost in plant reliability, and over USD 2 million in annual maintenance savings.

# 5. Readiness for the Facility of the Future

Why is it a Game-changer?

Redefining operational excellence, future-ready facilities empower the oil & gas industry with intelligent, connected, and adaptive systems. By integrating AI, IoT, and automation, they enhance efficiency, safety, and sustainability. This transformation enables real-time decision-making, supports decarbonization goals, and builds resilience positioning companies for long-term success in a rapidly evolving energy landscape.

Opportunities

The Facility of the Future initiative introduces smart, modular, and remotely managed oil & gas facilities. Leveraging automation, drone surveillance, and remote monitoring, it minimizes staffing and offshore risks. Prefabricated construction enhances efficiency, while advanced, eco-friendly materials ensure durability in harsh environments. This approach drives safety, sustainability, and cost-effectiveness redefining how future energy infrastructure is built and operated.

LTIMindtree Case Study

A leading U.S. energy firm struggled with fragmented processes and compliance gaps across oil fields. LTIMindtree's 'Smart Well Factory' solution automated operations, unified control, and improved regulatory adherence. This transformation enhanced visibility, reduced costs, and significantly boosted operational efficiency across the enterprise.
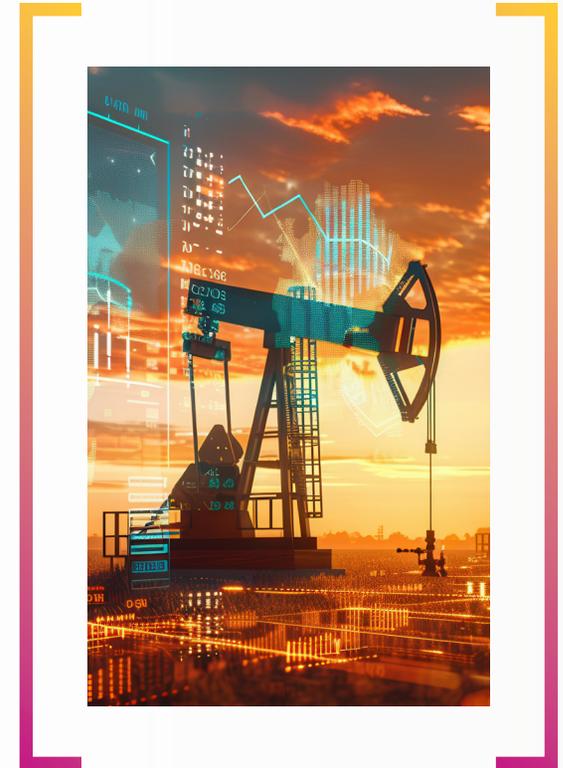
6. Unified Asset Performance Management

Why is it a Game-changer?

Managing extensive assets in the energy industry is challenging due to aging equipment and scattered sites. Intelligent Asset Management (IAM) tools are essential for improving real-time asset tracking, data consolidation, visibility, and decision-making. Innovations like digital twins, Augmented Reality (AR), and drones optimize asset utilization and improve sustainability in energy production. They also enhance workflow operations amidst regulatory and economic pressures.

Opportunities

As renewable energy systems expand, asset management becomes complex. Connecting more assets to the grid heightens the complexity of deployment, tracking, and maintenance. IAM tools proactively monitor critical assets like power plants, transmission lines, and renewable energy systems. In the energy sector, IAM optimizes operations, reduces costs, and enhances sustainability using data analytics, IoT sensors, and AI.

LTIMindtree Case Study

LTIMindtree's IAM uses IoT, AI/ML, and predictive analytics to boost asset reliability and performance. Solutions include SAP Intelligent Asset Management for digitizing maintenance and the iNXT platform for real-time equipment visibility. These services enhance equipment availability, safety, and cost efficiency, helping clients make smarter decisions and significantly improve asset management.

7. AI/ML-based Predictive Maintenance

Why is it a Game-changer?

IoT can transform organizations' ability to manage consumption and optimize energy management systems in real-time. IoT devices like smart meters and sensors allow energy companies to monitor energy usage patterns, predict demand, and adjust supply. This enhances energy supply chain management, resulting in cost savings, improved reliability, and reduced carbon emissions.

Opportunities

The Internet of Energy (IoE) offers advancements in smart grids, renewable energy integration, predictive maintenance, and energy optimization. IoE's sensor networks, analytics, and automated controls detect and respond to grid disturbances, reducing outages and enabling self-healing grids. It also supports prosumers in monitoring and optimizing their energy generation and consumption.

LTIMindtree Case Study

LTIMindtree and Vodafone have partnered to provide smart IoT solutions using the Insight NXT platform and Vodafone's IoT-managed connectivity. This collaboration supports industry X.0 and digital transformation across sectors. It creates scalable, end-to-end solutions with IoT, metaverse, AI, and ML, ensuring secure, connected ecosystems.

8. GHG Accounting and Reporting

Why is it a Game-changer?

The increasing adoption of carbon pricing is reshaping the business environment, making it essential for corporate strategy. Carbon pricing encourages reduced energy use and cleaner fuels, promoting investment in clean technologies. According to the World Bank, there are over 64 global carbon pricing initiatives and 75 carbon pricing instruments in operation as of 2024. This demonstrates the effectiveness of market-based tools in driving the transition to a low-carbon economy.

Opportunities

Achieving net-zero emissions by 2050 requires stronger carbon-pricing policies, technological advancements, and international collaboration. Transparent carbon pricing aids decision-making, reduces competitive imbalances, and minimizes carbon leakage. It encourages investment in renewable energy and energy-efficient technologies like CCUS. Emission standards can lead to financial benefits through rebates and reduced fees, incentivizing organizations to cut Green House Gas (GHG) emissions.

LTIMindtree Case Study

LTIMindtree offers diverse Environmental, Social, and Governance (ESG) solutions via iNXT, including ESG NXT, Smart Spaces, Energy NXT, and Worker NXT. These platforms provide robust ESG management and reporting capabilities. Smart Spaces, from LTIMindtree's industry X.0 practice, transforms the build environment, ensuring operational excellence and exceptional user experiences.

Executive Viewpoint

> "In today's dynamic energy landscape, technology is the key enabler of transformation across the oil and gas value chain. From exploration to refining and distribution, integrated digital solutions are redefining operational efficiency, sustainability, and resilience. AI-driven analytics, cloud-enabled collaboration, and automation are optimizing assets, reducing emissions, and driving cost efficiencies. As the industry accelerates its transition towards a smarter, more sustainable future, it continues to focus on identifying best-in-class technology solutions that enhance agility, security, and profitability. By embracing innovation, energy companies are navigating challenges and unlocking new opportunities in a rapidly evolving global market."

KG Saravanan
Vice President, Global Sales

> "In an era of digital transformation, owner-operator asset management performance is evolving to enhance real-time efficiency, reliability, and sustainability. AI-driven predictive/proactive maintenance, IoT-enabled real-time monitoring, and digital twins are revolutionizing over-arching asset lifecycle management, minimizing downtime and compliance issues, and optimizing performance. Advanced analytics and automation ensure proactive decision-making, reducing operational risks and lowering planned maintenance costs. As we continue to embrace Industry 4.0, integrating smart technologies with domain expertise enables owner-operators to achieve higher throughput and energy efficiency, and ensure regulatory compliance. By leveraging data-driven engineering insights, owner-operators are maximizing asset longevity and resiliency, while ensuring sustained profitability in an ever-dynamic energy market."

Cory William Joe Sutherland
Associate Vice President, Customer Success

> "The energy sector is undergoing a seismic shift, driven by affordability, sustainability, and security – commonly known as the 'Energy Trilemma.' Advanced analytics, AI, and automation are redefining the entire energy value chain from exploration to the sale of refined products, including drilling, completion, production, midstream, and refining. Cloud computing and IoT enable real-time decision-making, while predictive insights help optimize production. By integrating digital innovation with domain expertise, energy operators are navigating market volatility, unlocking new reserves, and driving long-term value in a fast-evolving energy landscape."

Ashok Dixit
Associate Vice President, Energy - Americas

> "The oil and gas industry is undergoing a profound shift, with technology playing a central role in enhancing efficiency, sustainability, and resilience. Cloud-based ERP systems are streamlining operations, AI-driven analytics are optimizing asset performance, and digital twins are improving predictive maintenance. As the industry embraces these advancements, the focus is on leveraging data, automation, and security to drive long-term value. With increasing demands for efficiency and regulatory compliance, adopting the right technologies will be key to navigating the evolving energy landscape and ensuring future growth."

Lisa Kaye
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Acknowledgements

Energy Leaders

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About LTIMindtree Crystal

LTIMindtree Crystal brings technologies and trends to cross-industry enterprises. It presents exciting opportunities in terms of foresight to future-ready businesses keen to make faster and smarter decisions on existing and emerging technology trends. The LTIMindtree Crystal is an output of rigorous research by our team of next-gen technology and domain experts and meticulously rated by them across a set of parameters. We hope you enjoyed reading the Oil & Gas Trends Report 2025.

Please reach out to crystal@ltimindtree.com for any queries

LTIMindtree is a global technology consulting and digital solutions company that enables enterprises across industries to reimagine business models, accelerate innovation, and maximize growth by harnessing digital technologies. As a digital transformation partner to more than 700 clients, LTIMindtree brings extensive domain and technology expertise to help drive superior competitive differentiation, customer experiences, and business outcomes in a converging world. Powered by 86,000+ talented and entrepreneurial professionals across more than 40 countries, LTIMindtree — a Larsen & Toubro Group company — solves the most complex business challenges and delivers transformation at scale. For more information, please visit https://ltimindtree.com