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Oil Review Middle East

Oil · Gas · Petrochemicals

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LNG investments set to surge

- NEOM redefines the future of energy
- The role of ammonia in the hydrogen fuel economy
- Reliable leak monitoring for pipelines
- Kuwait advances upstream & downstream ambitions
- Unlocking the value of IIoT

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Editor's note

INVESTMENTS IN LNG infrastructure are set to surge, as the global energy crisis deepens due to Russia's war with Ukraine and restrictions placed on Russian gas exports. That's good news for Qatar; the country is set to solidify its position as a leading LNG producer and exporter with its North Field expansion project which is set to significantly boost its production capacity (see p18).

We take a look at Saudi Arabia's megacity NEOM, where clean energy developments are taking centre stage (p16). Also on the theme of clean energy, we examine the potential for green ammonia to boost the development of the hydrogen fuel economy (p34). We look at reasons for making the switch from diesel to electric portable compressors (P22), highlight the importance of connectivity to fully benefit from the IIOT (p36), address the challenges of multiphase flow meters (P30) and discuss the latest fire safety solutions (p32).

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➔Executives' Calendar, 2022-2023

OCTOBER			
3-5	**SPE ATCE**	HOUSTON	www.atce.org
3-6	**Saudi Pipelines Int'l Conference & Exhibition**	DAMMAM	https://spiconx.sa
3-7	**Africa Oil Week**	CAPE TOWN	www.africa-oilweek.com
4-6	**Energy Intelligence Forum**	LONDON	www.energyintelligenceforum.com
30-3 Nov.	**ADIPEC**	ABU DHABI	www.adipec.com
NOVEMBER			
30	**Leadership Excellence Awards & Symposium**	MANAMA	www.lewa-symposium.org
JANUARY 2023			
16-18	**World Future Energy Summit**	ABU DHABI	www.worldfutureenergysummit.com
17-19	**Intersec**	DUBAI	www.intersec.ae.messefrankfurt.com
22-24	**Middle East Energy & Sustainability Forum**	MANAMA	www.europetro.com/events
25-26	**Middle East Bottom of the Barrel Conference**	MANAMA	www.europetro.com/events

Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.

Geopolitics & Energy: Can They Be Separated?

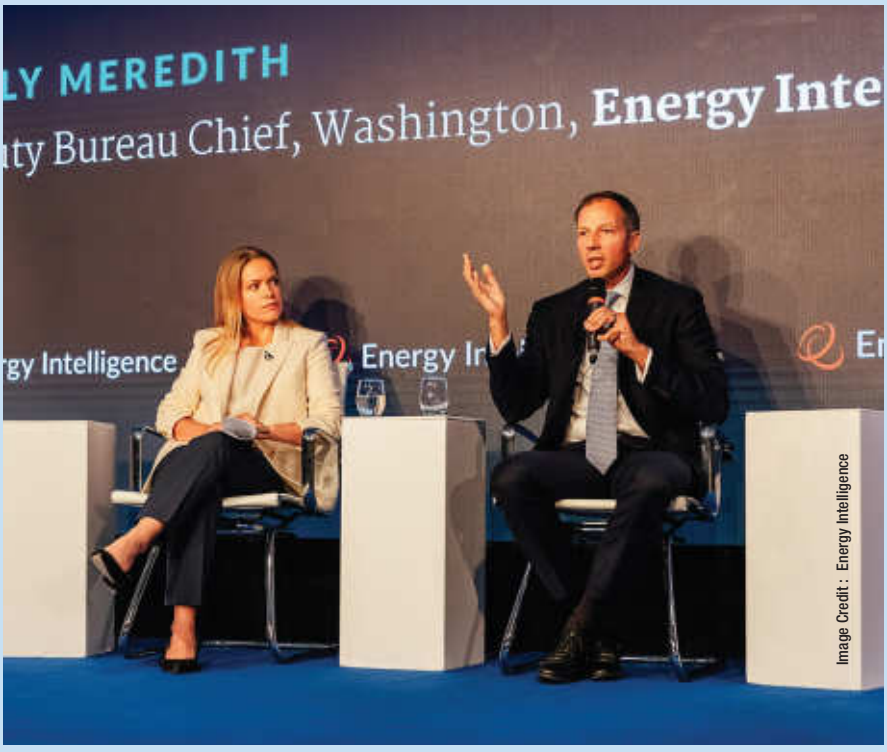
THE WORLD IS navigating its greatest energy challenge in a generation. War in Europe has upended corporate strategies and government policies. Energy geopolitics and security of supply are back at the top of the agenda.

Everyone – politicians, executives and broader society – feels whiplashed by events. Companies and governments suddenly face conflicting pressures to provide more oil and gas supply now, while maintaining or accelerating the low-carbon transition.

How will they resolve this? What is the best balance of fossil fuels, renewables and nuclear power? The safest, quickest road to energy security and independence?

The 2022 Energy Intelligence Forum, taking place from 4-6 October in London with the theme 'Geopolitics & Energy: Can They Be Separated?' will bring together decision-makers and innovators from the worlds of energy, finance, politics and civil society to debate how to navigate volatility and uncertainty to forge an energy future that is reliable, affordable and clean.

The event, comprising live interviews, panel sessions and networking, will attract more than 50 expert speakers and 500 delegates. Speakers include H.E. Saad Sherida Al-Kaabi, Qatar Minister of State for Energy Affairs; president & CEO QatarEnergy; H.E. Dr. Sultan Ahmed Al Jaber, UAE Minister of Industry & Advanced Technology, managing director & group CEO ADNOC Group; Professor Lord Nicholas Stern, IG Patel Professor of Economics & Government, chair of the Grantham Research Institute on Climate Change & the Environment, LSE; Ben van Beurden, CEO Shell; Linda Z. Cook, CEO Harbour Energy; Vicki Hollub, president & CEO, Occidental; Amin Nasser, president & CEO Saudi Aramco; and Meg O'Neill, CEO & managing director, Woodside.



The event will debate how to forge an energy future that is affordable, reliable and clean.

For further information, see the website at www.energyintelligenceforum.com

All subsurface data in one platform

SCHLUMBERGER AND COGNITE, two leaders in technology innovation, have announced a strategic partnership to integrate Schlumberger's enterprise data solution for subsurface with Cognite Data Fusion, Cognite's open industrial DataOps platform. Through the partnership, customers can integrate data from reservoirs, wells and facilities in a single, open platform and leverage embedded AI and advanced analytics tools to optimise production, reduce costs and decrease operational footprint.

Customers can leverage embedded AI to optimise production.

Image credit: Adobe Stock

"Operational data in the production domain is a vastly underutilised customer asset due to its complexity and lack of contextualisation at scale. Our strategic partnership with Cognite leverages Cognite Data Fusion to extract better and faster insights from our domain-specific applications in flow assurance, process simulation, and bespoke AI solutions developed with customers. Combined with Schlumberger's enterprise data solution for subsurface, Cognite and Schlumberger are creating the first offering in the market with access to contextualised data in an interoperable platform," said Rajeev Sonthalia, president, Digital and Integration, Schlumberger. "Together, we will make vast quantities of data easily available for customers to use and innovate at scale quickly, to increase production, improve financial performance, and achieve sustainability goals," he said.

Schlumberger will be the lead commercial partner and exclusively provide customers with access to the enterprise data solution. The partners will co-develop compatible applications and solutions, leveraging decades of digital solutions expertise from Schlumberger and Cognite Data Fusion's unique capabilities. Schlumberger's domain-driven AI, IoT and simulation engines integrated with Cognite's high-performance data and automation technologies help customers accelerate returns from their producing assets.

Fugro opens new facility in JAFZA

GLOBAL GEO-DATA SOLUTIONS provider, Fugro, has inaugurated a new facility in the Jebel Ali Free Zone (JAFZA), expanding its footprint in the Middle East and India region. With this new facility, Fugro will be offering expertise and advanced geo-data solutions to the rapidly growing energy, infrastructure and construction industries in the Middle East and India.

Image credit: Fugro

The new facility was inaugurated by the Fugro board of management.

The new 28,000 sq m facility will act as a regional base, advancing collaboration between teams. It will also host a state-of-the-art Remote Operations Centre (ROC), expanding the company's remote and autonomous capabilities, transforming the maritime sector.

Since entering the Middle East in the early 1970s, Fugro has established itself in multiple strategic locations like Qatar, Egypt, India and Saudi Arabia.

The new facility was inaugurated by the Fugro board of management, Mark Heine and Barbara Geelen, and attended by Abdulla Bin Damithan, the CEO and managing director of DP World UAE and JAFZA, among others.

Weatherford to offer directional and logging-while-drilling services to ADNOC

WEATHERFORD INTERNATIONAL PLC has received a five-year framework agreement from Abu Dhabi National Oil Company (ADNOC) to provide directional drilling and logging-while-drilling services. The contract is currently valued at over US$400mn, and ADNOC has an option to extend it for an additional two years.

The Weatherford Drilling Services portfolio includes a suite of technology that combines real-time information analysis and innovative drilling tools to maximise efficiency in any environment. They will help ADNOC's drilling operations by minimising OPEX, reducing risks and optimising production.

Girish Saligram, Weatherford president and CEO, said, "We are thrilled about this award as it showcases our commitment to creating value for every customer through our differentiated technology and services. Our field-proven directional and logging-while-drilling services and technology will support ADNOC in expanding its operations and achieving its production goals. Our manufacturing facility in Abu Dhabi will further bolster its In-Country Value Programme – an initiative Weatherford has supported since the beginning."

OQ achieves global accredition

OMAN-BASED ENTERPRISE, OQ, has achieved ISO 17025 certification across seven parameters covering its polymer lab.

Focusing on testing and calibration laboratories, ISO 17025 enables organisations to demonstrate and certify that they can competently operate testing systems and generate valid results, thereby promoting confidence in their products, both nationally and around the world.

Image credit: OQ

OQ receives ISO 17025 across seven parameters.

It also enables cooperation between laboratories and other entities by generating alignment and more efficient acceptance of results across the globe.

The parameters of the accreditation cover key processes measuring properties relating to PP and PE, such as polymer oxidisation, film quality and identification of contaminants. Gilles Rochas, managing director – OQ Polymer Marketing, said, "This reassures customers of the reliability of OQ's quality control. ISO 17025 was developed by laboratory experts from all over the world together with key industry bodies such as the International Laboratory Accreditation Cooperation. By adhering to these globally recognised standards, our customers can be confident in our existing product quality as well as the research that underpins our product development."

Thunder Cranes re-launches Middle East base

THUNDER CRANES, A leading provider of portable, modular offshore rental cranes with a lift capacity ranging up to 60 tons, has re-opened its operations in the Middle East.

The company's temporary installation cranes are designed to be versatile and adaptable with numerous tie-down scenarios, on-deck placement configurations and boom length options to choose from.

The cranes allow clients to efficiently and cost-effectively support P&A, well intervention, facility engineering and decommissioning jobs, without compromising safety, time, and performance.

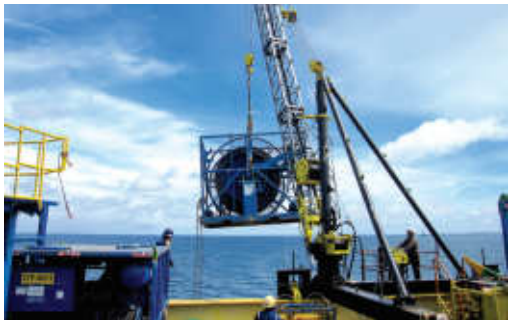


Image credit: Thunder Cranes

A TC15 stiffleg crane lifting the tubing reel for a CTU package.

The company previously operated in the region with a base in Dubai from 2009 to 2019. The new office will allow Thunder Cranes to efficiently serve the UAE and Middle East.

Dinesh Arumugam, CEO of Thunder Cranes, said, "As a market-leading provider or portable-modular offshore rental cranes, Thunder Cranes is committed to helping customers in the UAE and across the region with cost-effective and efficient lifting solutions to support offshore projects."

TotalEnergies sells 18% interest in Sarsang field

TOTALENERGIES HAS COMPLETED the divestment of its 18% interest in the onshore Sarsang oil field in the Kurdistan Region of Iraq. The interest was sold to ShaMaran Petroleum Corp., a Canadian and Swedish listed company which focus on oil exploration and development in the Kurdistan Region, for a firm consideration of US$155mn.

A contingent consideration of US$15mn is payable in the future depending on production and oil prices.

The Sarsang field, discovered in 2011, is operated by HKN (62%), with KRG owning a 20% interest. TotalEnergies' share of the production was approximately 3,500bpd in 2021.

TotalEnergies began activities in Iraq during the 1920s, with the discovery of the kirkuk field. Now, the company's production in the country is approximately 14,000boepd in 2021.

In September 2021, TotalEnergies signed major multi-energy agreements in Iraq covering the construction of a new gas network and treatment units, the construction of a large-scale seawater treatment unit and the construction of a 1GW photovoltaic power plant.

The company also sells lubricants in Iraq through distributors on the local retail market.

Petrofac and OHC sign MoU for green hydrogen future

PETROFAC, A PROVIDER of services to the global energy industry, has signed a Memorandum of Understanding (MoU) with Oman Hydrogen Centre (OHC) to collaborate on expanding Oman's green hydrogen capabilities.

OHC is the first research facility of its kind in the Sultanate, supporting the country in accelerating its transition to renewable energy, aligned with Oman Vision 2040.

Image credit: Petrofac

The MoU between the two companies will bring considerable benefits to renewable project in Oman.

Petrofac has previous experience in supporting new energy projects across the globe, and has recently completed front-end engineering design (FEED) for large-scale green hydrogen productions facilities all over the world.

The MoU will bring considerable benefits to the efficient implementation of green hydrogen projects and help accelerate the Sultanates's energy transition.

Dr Khalid Al Jahwari, Petrofac's country manager, said, "Our partnership with OHC is designed to meet the needs of new complex energy assets, with the focus on engineering excellence and an ever-more skilled workforce."

Dr Sausan Al Riyami, director of OHC, commented, "Our cooperation with Petrofac is aiming to develop certain studies regarding renewable energies and green hydrogen economy by focusing on technical training that includes a hands-on operation session."

ADNOC Refining progresses waste heat recovery project

ADNOC REFINING, A joint venture company between the Abu Dhabi National Oil Company (ADNOC), Eni, and OMV, is set to complete the first phase of its innovative Waste Heat Recovery project at the General Utilities Plant in Ruwais, Abu Dhabi.

The Waste Heat Recovery project is one of several strategic initiatives to decarbonise ADNOC's operations and builds on the company's heritage of responsible environmental stewardship.

Started in 2018, the US$600mn Waste Heat Recovery project will recycle waste heat generated from the plant to produce up to an additional 230MW of electricity per day – enough to power hundreds of thousands of homes. It will also produce 62,400 cu m of distilled water per day for use in the plant.

Image credit: ADNOC

The Waste Heat Recovery project has commenced at the Ruwais site in Abu Dhabi.

Overall, the project will increase power production and thermal efficiency at the plant by around 30% with no additional carbon dioxide (CO_2) emissions.

Phase one of the project, which includes the operation of two new boilers and turbines, will be completed before the end of the year, while phase two, which includes a further two boilers, will be completed by mid-2023.

The project is designed to capture exhaust heat from the gas-powered turbines at ADNOC Refining's General Utilities Plant, which is currently vented into the atmosphere, to produce steam that is subsequently used for power production.

Abdulla Ateya Al Messabi, CEO of ADNOC Refining, said, "At ADNOC Refining we are committed to finding innovative ways to improve the efficiency and sustainability of our operations. The Waste Heat Recovery project will revolutionise power and water generation at our plant in Ruwais, and is vital to the ongoing expansion of Ruwais as part of ADNOC's 2030 smart growth strategy."

The need for a credible energy transition plan

Aramco president and CEO Amin H. Nasser highlighted the need for a credible energy transition plan, in a keynote speech at the Schlumberger Digital Forum in Lucerne, Switzerland.

Amin H. Nasser, president and CEO, Aramco.

Image Credit: Aramco

DURING THE EVENT, Nasser stressed the importance of achieving a new global consensus on the way forward, and outlined three strategic pillars that should be central to the response. Those are:

- Recognition by policymakers and other stakeholders that supplies of ample and affordable conventional energy are still required over the long term
- Further reductions in the carbon footprint of conventional energy, and greater efficiency of energy use, with technology enabling both
- New, lower carbon energy, which steadily complements proven conventional sources.

Outlining how Aramco is addressing all three pillars, Nasser said,

"We are working to increase our oil production capacity to 13mn bpd by 2027. We are also growing our gas production, potentially increasing it by more than half through 2030 with a mix of conventional and unconventional gas.

"At the same time, we are working to lower our upstream carbon intensity, our gas flaring and our methane intensity, which are already among the lowest in the world. We are also intensifying efforts to advance key enabling technologies, particularly CCUS, which is mission-critical for a sustainable future.

"Meanwhile, chemicals will become a much larger and more strategic part of our portfolio, showcasing the non-combustible uses of oil.

"Importantly, we are steadily adding new, lower carbon energy to our own portfolio such as blue hydrogen and blue ammonia, renewables, and electro-fuels. This is our plan to be part of a practical, stable, and inclusive energy transition; others need theirs.

"We must partner to drive innovation and value on an unprecedented scale and speed to successfully deliver results across the three pillars," he continued. "In my view, technologies of the Fourth Industrial Revolution are ripe for such partnerships, especially the rapid digital transformation of our industry. Because the right digital investments now could help deliver greater efficiency, lower costs, lower emissions, higher reliability, and higher profits over decades.

"For example, at Aramco we have deployed machine learning techniques to predict and prevent safety hazards, monitor emissions, avoid breakdowns, optimise energy use, and predict potential cyber threats. These AI-powered systems are saving us time and money. And improving our ability to reliably supply energy to our customers.

> "The fear factor is still causing the critical oil and gas investments to shrink."

"But we want to go further, and we are stronger when we act as a network. That is why I am proud to announce that Aramco and Schlumberger are working on a smart sustainability platform that could commercialise a number of digital solutions and support our net-zero ambitions."

Highlighting the consequences of a flawed transition plan, Nasser did not mince his words.

"When you shame oil and gas investors, dismantle oil- and coal-fired power plants, fail to diversify energy supplies (especially gas), oppose LNG receiving terminals, and reject nuclear power, your transition plan had better be right. Instead, as this crisis has shown, the plan was just a chain of sandcastles that waves of reality have washed away. And billions around the world now face the energy access and cost of living consequences that are likely to be severe and prolonged."

On the importance of greater investment in the oil and gas sector, he said, "The fear factor is still causing the critical oil and gas investments in large, long-term projects to shrink. And this situation is not being helped by overly short-term demand factors dominating the debate. Even with strong economic headwinds, global oil demand is still fairly healthy today. But when the global economy recovers, we can expect demand to rebound further, eliminating the little spare oil production capacity out there. And by the time the world wakes up to these blind spots, it may be too late to change course." ■

NESR awarded long-term directional drilling contract in Saudi Arabia

NATIONAL ENERGY SERVICES Reunited Corp. (NESR), an international, industry-leading provider of integrated energy services in the Middle East and North Africa (MENA), has announced that the company has been awarded a long-term contract for directional drilling services in the Kingdom of Saudi Arabia.

Image credit: Adobe Stock

The award showcases NESR's ability to drill and deliver vertical and directional wellbores in record time.

The contract covers directional drilling (DD), measurement while drilling (MWD), performance drilling, well engineering and logging while drilling (LWD) services for up to four years, starting with immediate effect.

The award reflects the culmination of several years of research and development investment in several field trials to demonstrate NESR's ability to drill and deliver vertical and directional wellbores in record times with cutting-edge technology.

NESR CEO and chairman, Sherif Foda, said, "These awards represent a major milestone in our growth strategy to establish NESR as one of the major players in the Directional Drilling market and paves the way to introduce our next gen technologies which enable our customers to get access to best-in-class technologies being adopted globally."

NESR's successful partnership with Phoenix Technology Services (PHX) has led to several DD records across multiple fields which have saved significant drilling time for customers. This award also provides NESR the platform for the introduction of next generation technologies in the drilling and measurement spheres which the company anticipates introducing over the course of this contract.

"We are very proud of our partnership with John Hooks and PHX for their highly differentiated Velocity MWD system and Atlas motors which, along with our Well Engineering capabilities, have led us to showcase to our customers what can be achieved in terms of drilling efficiencies that have exceeded or met field standards in a large majority of runs," Foda commented.

New gas discovery in Malaysia for Mubadala Energy

MUBADALA ENERGY, AN international energy company headquartered in Abu Dhabi, has confirmed the discovery of a good quality gas reservoir penetrated by the Cengkih-1 exploration well in Block SK320, off the coast the Sarawak province, Malaysia.

Preliminary analysis shows a significant gas column of more than 110 m within the pinnacle carbonate reef reservoir.

Mansoor Mohamed, CEO of Mubadala Energy, said, "This discovery further cements our position in Malaysia as a reliable and trusted operator with deep technical capabilities. Gas demand in southeast Asia continues to grow and we look forward to helping meet those energy needs, in line with our strategy to play an active role in the energy transition."

The Cengkih-1 exploration well is located near the Pegaga field, one of the fields within the SK320 Block, which recently marked the successful production of commercial gas. The field recorded the discovery of one trillion cubic feet of additional gas initially in place.

Image credit: Mubadala Energy

Mubadala Energy's asset map in Malaysia.

Building on Mubadala Energy's strong position in Malaysia, these results also bolster the company's strategy to expand its position in natural gas as a key bridge fuel in the energy transition.

Since entering Malaysia in 2010, Mubadala Energy has made six gas discoveries displaying a success ratio of 75%, a significantly higher number than the industry average.

TotalEnergies signs ESPA for Oman's Block 11

TOTALENERGIES, ALONG WITH its partners, has signed an Exploration and Production Sharing Agreement (EPSA) with the Ministry of Energy and Minerals (MEM) of the Sultanate of Oman in the onshore Block 11. The first stage of the EPSA activities will see seismic acquisition in late 2022, with a first exploration well planned to be drilled in 2023.

Laurent Vivier, senior vice president Middle East and North Africa, Exploration and Production at TotalEnergies, said, "Our recent activities in Oman are a demonstration of TotalEnergies' strategy of transformation into a multi-energy company. Today's entry into Block 11 gives us the opportunity to unlock additional potential to meet domestic and export gas demand."

Image credit: Adobe Stock

TotalEnergies will hold a 22.5% interest in Block 11.

TotalEnergies will hold a 22.5% interest in the block, OQ with 10% and Shell, with its 67.5% interest, will be the main operator. Block 11 contains undeveloped discoveries and exploration potential for all parties involved.

"It strengthens our strategic relationship with the Sultanate of Oman, as illustrated last December by our entry into the neighbouring Block 10 gas concession, and the start of construction last July of 17MW peak-solar photovoltaic systems providing power to a desalination plant." Vivier continued.

Salim bin Nasser Al Aufi, minister of energy and minerals in Oman, said, "There is a continuous focus in MEM on enhancing the natural gas reserves of the Sultanate of Oman through exploration and appraisal activities undertaken by several companies in the country. This agreement strengthens the strategic relations with partners in the sector such as Shell, TotalEnergies, OQ and others to ensure Oman's security and attract more foreign investment, adding the highest value to the local supply chain."

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Mubadala Petroleum rebranded to Mubadala Energy

MUBADALA PETROLEUM, THE international energy company headquartered in Abu Dhabi, has launched its new brand name: Mubadala Energy.

The fresh re-brand reflects the strategic direction which will see Mubadala Energy build on its contribution to the energy transition by expanding its gas-weighted portfolio while exploring new energy sectors, including blue hydrogen and carbon capture. The strategy will also see a focus on decarbonising the business while driving innovation and technology across all operations.

Musabbeh Al Kaabi, chairman of Mubadala Energy and a chief executive officer at Mubadala Investment Company, said, "Mubadala Energy has earned its place as a major player on the international energy stage. This new brand identity accurately reflects the business in its next phase of growth aligned with the energy transition through a gas-weighted portfolio and an increased focus on more sustainable energy sectors."

CEO of Mubadala Energy, Mansoor Mohamed Al Hamed, commented, "We are tremendously proud of what we have achieved since we were founded 10 years ago. We are building on a track record which has seen significant growth through an expanding gas portfolio, and with our deep capabilities and strong partnerships around the world we are well positioned to embark on a new chapter in our story as Mubadala energy."

Image credit: Mubadala Energy

Mubadala Energy CEO, Mansoor Mohamed Al Hamed said the company is ready to continue to grow and start a new chapter in the energy sector.

Abu Dhabi DoE announces ambitious hydrogen policy at Gastech 2022

IN LINE WITH the UAE's Net Zero by 2050 Strategic Initiative and global climate change commitments, the Abu Dhabi Depart of Energy (DoE) has revealed at Gastech 2022 it is working on a pipeline of new policies, including a hydrogen policy and regulatory framework, to accelerate a carbon-neutral future for the people of Abu Dhabi and the UAE.

Image credit: Abu Dhabi Department of Energy

The DoE's new hydrogen framework will set out policies and regulations for the industry to become globally competitive.

Speaking on a high-profile ministerial panel, 'Collaborative policy blueprints to enable decarbonisation and inclusive energy security', the DoE chairman, His Excellency Awaidha Murched Ali Al Marar, shared details of the Abu Dhabi 2035 integrated energy framework and the new hydrogen policy that would drive the country's energy transition.

The framework will set out policies, regulations, standards and certifications for the hydrogen industry to become globally competitive. It aims to fast track the UAE's national hydrogen strategy and place Abu Dhabi at the global forefront of countries producing low carbon hydrogen.

"We are very excited about hydrogen as a new energy vector in our energy transition plans and to develop Abu Dhabi as a low-carbon hydrogen industrial hub," said H.E. Al Marar.

His Excellency further emphasised the transition to a decarbonised economy could only be achieved through broader collaboration and significant investment in clean energy technologies. Abu Dhabi has been investing in decarbonisation for the last 15 years, with more than US$40bn financing clean energy projects.

"Abu Dhabi has already made progress in reducing its carbon footprint by investing in a power generation mix that includes nuclear, solar, and decoupling power and water production.

"The transition away from carbon-based energy will be highly dynamic, but our projections and scenarios provide long-term visibility and policy signalling to guide the investment decision needed to deliver on a carbon neutral future for the emirate of Abu Dhabi, and the UAE."

Halliburton signs MoU with SDAIA to use AI to boost sustainability

HALLIBURTON COMPANY HAS signed a Memorandum of Understanding (MoU) with the Saudi Data and Artificial Intelligence Authority (SDAIA) to address national and global energy challenges in order to create AI applications and solutions.

Through the Artificial Intelligence Centre for Energy (AICE), a joint centre between SDAIA and the Ministry of Energy, the collaboration agreement pairs AICE's significant resources in the data and AI space with Halliburton's cloud-first AI and machine learning exploration and production tools. The two groups will share technologies and co-develop innovative solutions to aid in sustainability and subsurface predication efforts for the oil and gas sector.

Image credit: Adobe Stock

The MoU will see the joining of AI and production tools to promote sustainability in the energy sector.

CEO of SDAIA's National Centre for AI, Dr. Majid Altuwaijri, said, "This partnership is part of our efforts to promote advanced technologies in the energy field; our aim is to address hydrogen, hydrocarbons and new energy verticals through data and AI applications and solutions for the country and global market, support expertise exchange and contribute to building national AI capabilities and competencies in the energy sector."

The Ministry of Energy's assistant minister for Development and Excellence, Ahmed Al-Zahrani, commented, "This agreement allows us to use AI to drive the energy transition in hydrocarbons as well as accelerate the development of new energy verticals such as CCUS."

Scott Regimbald, vice president of Halliburton, Saudi Arabia and Bahrain, said, "We are excited to collaborate with SDAIA to use data science and AI to enhance the ways we develop and produce hydrocarbons. Our joint efforts will address national and global energy challenges through data and AI applications that will create more sustainable solutions for the energy sector."

Energy sector sees rise in **global employment**

According to a new IEA report, hiring has increased in clean energy, surpassing pre-pandemic levels.

GLOBAL EMPLOYMENT IN the energy sector has risen above pre-pandemic levels, led by increased hiring in clean energy, according to a new IEA report that offers the first worldwide benchmark for employment across energy industries.

The inaugural edition of the *World Energy Employment Report*, which will be published annually, maps energy sector employment by technology and value chain segment. It provides a data-rich foundation for policymakers to understand the labour-related impacts of clean energy transitions and shifts in energy supply chains following Russia's invasion of Ukraine.

The number of energy jobs worldwide has recovered from disruptions due to Covid-19, increasing above its pre-pandemic level of more than 65mn people, or around 2% of the total labour force. The growth has been driven by hiring in clean energy sectors. The oil and gas sector, meanwhile, saw some of the largest declines in employment at the start of the pandemic and has yet to fully recover.

With the recent rebound, clean energy surpassed the 50% mark for its share of total energy employment, with nearly two-thirds of workers involved in building new projects and manufacturing clean energy technologies. At the same time, the oil and gas sector is also experiencing an upswing in employment, with new projects under development, notably new liquefied natural gas (LNG) infrastructure.

The energy sector is set to see its fastest employment growth in recent years in 2022. High input costs and inflationary pressures are, however, adding to hiring and supply chain challenges already present in some regions and subsectors, such as solar, wind, oil and gas.

> "New projects are in development in the oil and gas sector, notably in LNG infrastructure."

Image Credit : Adobe Stock

More than 50% of workers in energy employment are involved in clean energy.

Policy responses to the pandemic and Russia's invasion of Ukraine, including the US Inflation Reduction Act, will continue to add to new hiring demand and to shifting the status quo of global energy supply chains.

Energy jobs counted in this report span the value chain, with around a third of workers in energy fuel supply (coal, oil, gas and bioenergy), a third in the power sector (generation, transmission, distribution and storage), and a third in key energy end uses (vehicle manufacturing and energy efficiency). More than half of energy employment is in the Asia-Pacific region. It reflects rapidly expanding energy infrastructure in the region and access to lower-cost labour that has enabled the emergence of manufacturing hubs that serve both local and export markets, notably for solar, electric vehicles and batteries. China alone accounts for 30% of the global energy workforce.

In all IEA scenarios, clean energy employment is set to grow, outweighing declines in fossil fuels jobs. In the Net Zero Emissions by 2050 Scenario, 14mn new clean energy jobs will be created by 2030, while another 16mn workers switch to new roles related to clean energy. New energy jobs may not always be in the same location nor require the same skills as the jobs they replace, requiring policy makers to focus on job training and capacity building to ensure that energy transitions benefit as many people as possible.

"Countries around the world are responding to the current crisis by seeking to accelerate the growth of homegrown clean energy industries. The regions that make this move will see huge growth in jobs," said IEA executive director Fatih Birol. "However, ensuring a people-centred and just transition for affected workers must remain a focus for policy makers, especially in the coal sector where employment has been declining consistently for several years." ■

Kuwait advances ambitions - upstream & downstream

The launch of new refinery exports, and the mouth-watering prospect of offshore drilling, have intensified the focus on Kuwait's rich oil and gas sector. Martin Clark reports.

Oil still accounts for nearly half of Kuwait's GDP and around 95% of exports.

Image Credit : Adobe Stock

KUWAIT PETROLEUM CORPORATION (KPC) is Kuwait's national oil champion and oversees the country's vast energy industry, from mighty upstream assets such as the Greater Burgan field, right through to an expanding and increasingly sophisticated downstream sector.

Oil Minister Mohammed al-Fares said recently that the country has just upped its crude oil production to meet its commitment of 2.811mn bpd in line with OPEC+.

That is pushing close to capacity but there are grand ambitions to elevate this significantly, with KPC stating its intention to elevate oil production potential to 4.75mn bpd by 2040. Whether that is possible, or even desirable in the current climate, remains to be seen, but there's no doubt that KPC is now pushing ahead on several crucial fronts.

That includes developments in the high-profile upstream oil and gas sector. The Greater Burgan field still produces around half of Kuwait's crude oil, and though it is still a hugely important and strategic asset for the nation, the field is also ageing.

> "If the work is successful, it could trigger huge interest in Kuwait's offshore potential."

While looking after Burgan is a long-term priority, it also means that a lot of KPC's current upstream focus is elsewhere, such as the development of the Jurassic gas and heavy oil fields in the North of the country. After years of waiting, that could also extend into the country's offshore territory as well.

After signing a contract with KPC three years ago, US services giant Halliburton looks set to drill the first of up to six exploration wells offshore, an exciting test that could reinvigorate interest in the upstream sector. Kuwaiti officials indicated recently that the commencement of drilling operations is nearing close, with the Oriental Phoenix drillship now located in the northern Gulf and making preparations.

If the work is successful, it could trigger huge interest in Kuwait's offshore potential.

The country has conducted very little offshore drilling activity outside of the Partitioned Neutral Zone (PNZ) area, which it shares with neighbouring Saudi Arabia. There are controversial plans to move ahead with the joint development of the disputed Durra gas field in the neutral zone too – a field that is contested by Iran, which it refers to as Arash.

With Halliburton, Kuwait has a long-standing ally, with the US-based group engaged in various other upstream initiatives. In 2021, it signed a separate deal with KPC subsidiary, Kuwait Oil Company (KOC), for digital solutions to boost operational efficiency and increase production in upstream work. The scope of this project applies to all fields including West Kuwait, South and East Kuwait, and heavy oil, complementing a recently awarded contract for similar services in North Kuwait.

KOC is also working with Halliburton's arch-rival, Schlumberger, recently handing it a seven-year contract for more than 400 installations of progressing cavity pump (PCP) equipment and services. This contract includes supply, installation, and commissioning of PCPs, which are ideally suited for increasing production from KOC's mature, heavy oil assets. Work on this project commenced during the second quarter of 2022.

Another upstream KPC unit, the smaller Kuwait Gulf Oil Company (KGOC), oversees activity in the neutral zone.

KPC's overseas arm, Kuwait Petroleum Exploration Company (KUFPEC), is also actively tracking upstream deposits in new markets worldwide, from Canada to Indonesia, underlining KPC's global ambitions.

As well as boosting its crude oil capacity, KPC also wants to increase domestic natural gas production to 4bn cubic feet per day by 2030, although this ultimately will hinge on successes in the field. Kuwait's production costs are also climbing, however, as it targets more complex reservoirs, a problem compounded by rising manufacturing costs and supply and logistics constraints. However, KPC has powerful friends and plenty of access to funding, securing a US$1bn loan insurance deal from Japan's Nippon Export and Investment Insurance (NEXI) in June. Japan is a major importer and buyer of Kuwait's crude oil. The new line of financing is designed to support Kuwait's various oil businesses and efforts in the advancement of decarbonisation, a challenge that is testing all oil operators across the Gulf.

> "There has been plenty of activity to report in the refineries sector as well."

Kuwait's downstream sector is proving dynamic.

Image Credit : Adobe Stock

While there are clear signs of movement in Kuwait's upstream sector, critics might point to the slow progress historically in getting things done, hence scepticism on potential targets.

That is not so much the case in the downstream sector, where there has been more obvious dynamism, much of it through KPC subsidiary Petrochemical Industries Company (PIC). It is a stakeholder in Equate, a global producer of petrochemicals and the second largest producer of ethylene glycol (EG) in the world.

It posted revenues of US$2.2bn in H1 2022, up slightly from the same period in 2021.

Naser Aldousari, Equate's president and chief executive, said that while current market dynamics in the sector "remain challenging" the results reflect the strength and agility of the group's business portfolio. It owns and operates industrial complexes in Kuwait, North America and Europe that annually produce over 6mn tons of ethylene, EG, polyethylene and other petrochemical products. As well as PIC, other Equate shareholders include The Dow Chemical Company, Boubyan Petrochemical Company and Qurain Petrochemical Industries Company.

Likewise, there has been plenty of activity to report in the refineries sector as well, an area headed by another KPC subsidiary, Kuwait National Petroleum Company (KNPC). It follows the completion in 2021 of the so-called Clean Fuels Project to upgrade and expand the Mina Abdulla and Mina Al-Ahmadi refinery complexes.

As well as boosting overall capacity from these sites, the new refineries also now produce state-of-the-art clean fuels for international export.

In August, KNPC confirmed the export of its first shipments of low sulphur and aromatic gasoline (car fuel) to conform to the latest global environmental standards, out of the Mina Al-Ahmadi Refinery.

US engineering group Fluor has been instrumental in the roll out of Kuwait's new refining infrastructure, which also includes a new project, Al Zour, on a greenfield site, south of Kuwait City. ■

Subsidiaries oil Kuwait Petroleum Company (KPC)

Kuwait Oil Company (KOC)	Upstream oil and gas	www.kockw.com
Kuwait Gulf Oil Compnay (KGOC)	Manages Kuwait's oil and gas resources in the partitioned zone	www.kgoc.com
Petrochemical Industries Company (PIC)	Petrochemicals manufacture	www.pic.com.kw
Kuwait National Petroleum Company (KNPC)	Oil refining	www.knpc.com
Kuwait Integrated Petroleum Industries Company (KIPIC)	Integrated refining & petrochemicals, LNG import	www.kipic.com.kw
Kuwait Oil Tanker Company (KOTC)	Transport of oil, petroleum products and LPG	www.kotc.com.kw
Kuwait Foreign Petroleum Exploration Company (KUFPEC)	Upstream oil and gas exploration and development outside Kuwait	www.kufpec.com
Kuwait Petroleum International (KPI)	Refining and marketing petroleum products globally	www.q8.com

Supporting the energy transition

Sami Baqi, technical director at Petroleum Development Oman (PDO) discusses the company's exploration & production strategy, its growing focus on the energy transition and progress in driving In-Country Value.

The delivery of the Yibal Khuff project was a major milestone for the company and the country.

Image Credit : PDO

Can you outline PDO's exploration and production objectives for oil and gas, and some of the main projects planned and underway to achieve them?

Petroleum Development Oman (PDO) is the leading exploration and production company in the Sultanate of Oman. We deliver the majority of the country's crude oil production and natural gas supply, but above all we focus on delivering excellence, growth and sustainable value creation within and well beyond our industry. We operate 202 producing oil fields, 43 gas fields, 29 production stations, more than 9,400 active wells, more than 33,000 km of pipelines and flowlines and 230 operating units in our well engineering fleet, including 52 rigs and 51 hoists.

Our strong delivery focus also helped complete another successful year on the exploration front, with a total of 111mn barrels of oil and 0.6 trillion cubic feet of gas booked as commercial contingent resource volumes. Despite the Coronavirus constraints on the mobility and availability of personnel and pressures on our supply chain, we delivered a combined oil, gas and condensate production of 1.223mn boepd. Total oil production closed at 635,000 bpd, 5,000 bpd short of the target. Annual gas production fell 14mn cubic metres per day short of the 71mn cu m/d target due to lower customer demand, while condensate output was slightly under the 104,000 bpd target. At any point and time, PDO executes more than 200 projects that support sustainable oil and gas production.

The production effort was underpinned by the impressive delivery of 684 wells against a plan of 622, 2,350 hoist interventions against a plan of 1,980 and 22,666 completion and well interventions against a plan of 20,948. We also managed to reduce our Non-Productive Time to 4.8%, the lowest ever recorded in the Wells function.

The delivery of the Yibal Khuff project, the second largest and most technically complex in PDO's portfolio, was a major milestone for both the company and the country, especially given the ongoing Coronavirus constraints. With a production of five million cubic metres of gas and around 20,000 barrels of crude oil per day, it will provide the energy and generate revenue which will help to secure the nation's future for many years to come.

How is PDO supporting the energy transition, and to what extent does hydrogen development feature in your plans?

PDO remains committed to the Oman Energy Master Plan 2040 as it seeks to turn climate change challenges into opportunities, while at the same time working to meet rising energy demands.

As we continue to grow our core hydrocarbon production business, we are also investing to ensure we improve our energy efficiency, especially in energy-intensive activities such as artificial lifting and water management, which account for more than half of our power consumption. PDO will seek to fulfill its role as Oman develops new low-carbon business chains and accelerates the development of low-cost, low-carbon and renewable projects in solar, wind and hydrogen.

We must leverage partnerships both inside and outside our sector as a matter of priority to combat the risk of a material drop in revenues, projected by the International Energy Authority for hydrocarbon-dependent economies. In this respect, we are proud of our role in the new National Hydrogen Alliance, which represents a landmark collaboration between 13 public and private sector organisations. This will place Oman firmly on the map for the development and deployment of clean hydrogen as we transition to a more sustainable and diversified economy.

> “We have developed a Decarbonisation Roadmap, which sets out a clear pathway to achieve our aim of halving our GHG emissions by 2030.”

What measures is PDO taking to support emissions reduction and decarbonisation?

During 2021, we made significant progress by further reducing greenhouse gas (GHG) emissions and continuing to minimise GHG intensity through our Carbon and Capital Efficiency programme. PDO emitted 10.7mn tonnes of carbon dioxide, well below our target of 11.3mn. There was a 22% drop in the volume of gas flared and 18 energy efficiency opportunities were delivered,

Sami Baqi, technical director, Petroleum Development Oman (PDO).

resulting in 0.2 million tonnes of CO_2e savings. GHG intensity fell 7%. Had we not acted intently and proficiently, our emission levels would have been 30% higher than current emissions.

We continue to develop solar projects after the success of our Miraah venture and the ground-breaking Amin 100 MW Photovoltaic Power Plant, which generated more than 340 terawatt hours of solar energy in 2021 alone. This is expected to provide an equivalent annual gas saving of 95.5mn cu m.

Importantly, we have developed a Decarbonisation Roadmap, which sets out a clear pathway to achieve our aim of halving our GHG emissions by 2030 (compared to 2019). This will enable the right technical and commercial choices to be made, and at the right pace, to help pivot PDO towards becoming a competitive, sustainable energy company by the end of the decade.

> “We are also investing to ensure we improve our energy efficiency, especially in energy-intensive activities.”

How important is digital transformation in achieving sustainable, efficient and cost-effective operations?

Digital transformation is reshaping operations in the oil and gas industry. The availability of an avalanche of data and advancement of technology are what make the future possible today. From the ability to understand the behaviour of the machines and intervene to minimise any downtime; having a digital twin of the facilities to run what if scenarios; automating processes using robotics; and deploying drones to identify any integrity breaches, are some of the examples that are enabling PDO to achieve the sustainability of its operations, increase efficiency and become more cost effective. Currently we are executing more than 200 digital projects, both in IT and digital domains.

What progress has PDO made in driving In-Country Value, and are there any initiatives you would highlight in this regard?

PDO's In-Country Value programme has transformed thousands of lives for the better, by retaining more of our total spend in country to benefit business development, build Omani capability and capacity and stimulate productivity and diversification in the country's economy.

Our business philosophy has been based on four key pillars – the Omanisation of skilled contractor personnel, maximising the procurement of Omani goods and services, local vendor development and social investment.

Our total spending retained in-country to benefit business and human capability development, and stimulate productivity in the Sultanate's economy rose 4% to 38% in 2021. A total of 34 new contract tenders were floated with an average ICV increase of 10% throughout the cycle of those deals. Our overall ICV has risen more than 20% since 2013, when the ICV Blueprint Strategy for the oil and gas industry was unveiled. ■

NEOM plans to redefine the future of energy

The first-of-its-kind project has lined up a plethora of clean energy developments to transform the mega-city into a sustainable haven. Leah Kelly reports.

NEOM plans to use nature and the surrounding landscape in harmony with technology to create a sustainable lifecycle the world is yet to experience.

Image Credit : Adobe Stock

DURING ITS CONCEPTION in 2017, NEOM was simply a spark of an idea that dared to hope of bridging the gap between reality and a renewably driven future.

Five years later and it is no longer just an idea, but instead a US$500bn investment into destroying the bridge and firmly making that future a reality. The Saudi-Arabian mega-city has promised to be 100% self-sufficient in renewable energy by 2030; an accomplishment that has never been achieved anywhere in the world.

Work has already begun on the three key regions in the area. They comprise of TROJENA, a fully sustainable mountain-tourism destination, OXAGON, a smart-city focused on enticing entrepreneurs and innovators to take their ideas to the next level, and THE LINE, a vertical living experience with a 100% renewable transport system to the other regions.

In order to implement this future, NEOM launched ENOWA (NEOM Energy and Water Company), a major shareholder in all energy projects, in March 2022 to oversee and conduct clean energy developments across the district. The subsidiary's mission statement is to 'create a sustainable abundance of life's basic elements by partnering with nature' by issuing a circular design, wherein taking from nature must come full circle to give back.

> "It is no longer just an idea, but instead a US$500bn investment into firmly making that future a reality"

Upon its launch, ENOWA has branded itself the 'Accelerators of Change', specifying how NEOM intends to bring the future forward and make the dream of being a facilitator of 100% clean energy a reality.

The first factor in this journey is to supply water and electricity to the ENOWA community while providing sustainable fuels, namely green hydrogen, to international users, which will be generated locally. Another factor is to use the waste products of energy, water and hydrogen processes to generate other beneficial products to shape new industries and complete the cycle of a sustainable economy. Furthermore, NEOM aims to partner with best-in-the-business stakeholders within the energy, water and hydrogen industries to achieve this vision and work collaboratively to expand ENOWA's framework across new industries globally.

Energy initiatives

NEOM's dream of becoming the world's first 100% renewable city relies on numerous initiatives aiming at different key aspects of the energy industry.

The mega-city has identified the attractive opportunities presented by the wind and solar

locations within the region, and plans to utilise them to the fullest, with the joint venture with ACWA Power and Air Products to construct more than two wind farms and two solar farms projected to be completed by 2026. The total power issued by the farms is expected to be 1.6GW and 6.5GW respectively.

The proposed energy system, however, is where the majority of international interest lies. ENOWA has initiated the first grid infrastructure project, which sees the designing and executing of substations and transmission lines across hundreds of kilometres with the objective of transmitting clear solar PV and wind energy to the demand points across the region, mostly concentrated in OXAGON to power the smart city sustainably.

ENOWA plans to link the operating system to a digital energy platform (DEP) in order to connect all energy assets and related hardware via a data connection to all power plants, substations and houses.

The power of water

Moving away from the production of energy, ENOWA signed a Memorandum of Understanding (MoU) in June 2022 with ITOCHU and Veolia to create a 100% renewably-powered desalination plant, with a focus on the desalination of seawater, zero waste output and the reuse of recycled water.

Gavin Van Tonder, head of water at NEOM, said, "What we are planning to do is use high-efficiency reverse osmosis using solar panels that we plan to do on the islands in NEOM. If we can do that successfully, we will also be able to do that on the coast of any country that has a shortage of water. In other words, we can create self-sustaining desalination and even salt-making facilities that require no energy."

> "We are now shaping the energy transition of the future. This will be our legacy"

Looking further afield, the interests focus heavily on advanced water recycling treatment and brine processing. The facility is forecast to be capable of changing 133,000 cu/m of brine into minerals and metals by the end of this year.

It is projected to be completed by 2030, where it promises to deliver one million cu m per day.

Longer term, the process of seawater harvesting is of great interest to the mega-city. The promise of zero waste and total sustainability comes to fruition with the proposed 5,000 km of smart wastewater collection and recycled water distribution networks spreading throughout the region.

Image Credit: Adobe Stock

Due to its geographical location, NEOM is one of the six prime locations in the world for solar and wind energy to be harnessed to the fullest potential.

They will be connected by advanced Internet of Water (IoW) infrastructure to minimise water loss and demand management.

By 2030, NEOM has said it will provide water to a population of more than one million residents. Saudi Arabia is quickly running out of water, with reserves predicated to run dry within the next 13 years. NEOM is trying to counteract that discovery by building smart water systems that encompass the factors of water delivery and distillation and connects them via one continuous system. The smart water systems aim to serve each development area to deliver quality drinking water while removing waste water and runoff with reduced leakage.

The system will include potable water; mineralised drinking water; recycled and fire water; sewage water and runoff water, all within the IoW infrastructure.

The future is green hydrogen

The global investment into green hydrogen has grown exponentially over the last five years, and NEOM plans to capitalise on its abundance of solar and wind power to become the world's leading supplier of green ammonia.

With over 4GW of combined solar and wind power, 2,000MW of water electrolysis and its own Hydrogen Innovation and Development Centre, NEOM will be able to produce 650 tonnes of virgin green hydrogen per day, which can be converted into 1.2mn tonnes of green ammonia per year. Partnering with Air Products and ACWA Power, predictions estimate that NEOM could mitigate more than three million tonnes of CO_2 emissions per year.

The development of renewably-powered transport has brought many opportunities to NEOM; firstly, the development of green hydrogen powered transport. A demo fleet was created to transport the workforce to various places throughout the region, including buses, trucks and forklifts.

Secondly, and more prominently, was the multi-year partnership with Extreme E, which aims to bring green hydrogen into the motor sports industry and showcase the potential for the technology.

ENOWA has also reached an agreement with McLaren to drive innovation and development into electric motor sport.

August 2022 saw NEOM's partner, the Mercedes-EQ Formula E team, celebrate its third successful season. Formula E has just concluded its eighth season, proving there is a demand for the sort and a gateway to expand further into the sporting world.

Looking forward

NEOM is aiming to bring the future forward, to pioneer a new way of living which combines sustainability with technology to work in harmony with nature.

CEO of ENOWA, Peter Terium, commented on the legacy he wishes to leave for future generations. His vision focuses on the growth of NEOM and the power of partnering with nature to be the key to moving forward.

"Our future cities are designed to embrace growth. Everything you need will be only five minutes away, plus we will have built it all around nature and not over it. Powering this legacy is crucial and we believe that partnering with nature is the only way forward. We are now shaping the energy transition of the future. This will be our legacy." Terium said.

With the eyes of the world on its every move, NEOM hopes it can inspire nations globally to follow in its footsteps and make the changes to attain a sustainable future for all before it is too late. ■

LNG investments set to peak in 2024

As the global energy crisis deepens and countries scramble to secure reliable energy sources, investments in new LNG infrastructure are set to surge, according to Rystad Energy research, with Qatar among the top producers.

Investments in LNG are expected to surge, driven mainly by a short-term increase in gas demand.

Image Credit: Adobe Stock

INVESTMENTS IN NEW LNG infrastructure are expected to reach US$42bn annually in 2024, says Rystad – twice current levels. Greenfield investments are 200 times the amount in 2020 when just US$2bn was invested in LNG developments, due to the pandemic. However, project approvals after 2024 are forecast to fall off a cliff as governments transition away from fossil fuels and accelerate investments in low-carbon energy infrastructure.

The new LNG projects are driven mainly by a short-term increase in natural gas demand in Europe and Asia due to Russia's war in Ukraine and ensuing sanctions and restrictions placed on Russian gas exports. Spending on greenfield LNG projects this year and next will stay relatively flat, with US$28bn approved in 2021 and US$27bn in 2022. Investments sanctioned in 2023 will show a modest increase, nearing US$32bn, before peaking at US$42bn in 2024. After this date, investments will decline and drop back near 2020 levels to reach US$2.3bn in 2029. Despite an expected jump in 2030 when project announcements are forecast to total nearly US$20bn, investment in greenfield LNG is unlikely to ever return to 2024 levels as countries scale up investments in low-carbon technologies.

> "Total LNG supply is expected to almost double in the coming years."

Natural gas is a core component of many countries' power generation systems and, although there is a determination to reduce fossil fuel dependency and transition to a low-carbon power mix, demand for LNG is set to grow over the short term. Global gas demand is expected to surge 12.5% between now and 2030, from around four trillion cubic metres (Tcm) to around 4.5 Tcm. Gas demand in the Americas will remain relatively flat up to 2030. In contrast, on the back of strong economic growth and pro-gas policies from governments, regional demand in Asia and the Pacific will soar, growing 30% from about 900 billion cubic meters (Bcm) to around 1.16 Tcm by 2030. The Americas – primarily the US – will account for 30% of cumulative gas demand by 2030, while Asia-Pacific will account for 25%.

Helped by this new infrastructure, total LNG supply is expected to almost double in the coming years, growing from around 380 million tonnes per annum (Mtpa) in 2021 to around 636 Mtpa in 2030, with several major LNG projects already underway or in the pipeline. LNG production is predicted to peak at 705 Mtpa in 2034.

"Recent price surges in natural gas markets worldwide have somewhat constrained gas demand, triggering a resurgence of coal-fired power generation in many countries. However, governments remain bullish on gas as an affordable, transition fuel for power in the coming years as demonstrated by the rapid growth in LNG infrastructure investments," said Palzor Shenga, vice president of analysis with Rystad Energy.

Major producers

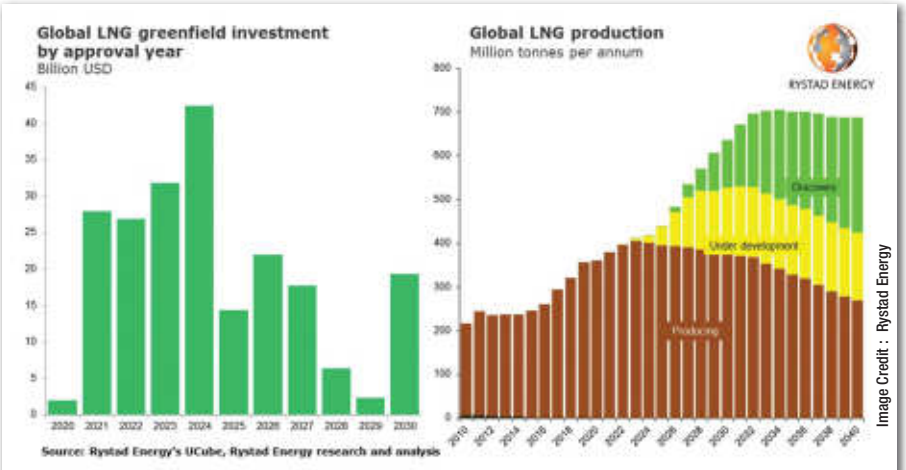
The US is set to solidify its place as a top LNG exporter as increased domestic supply and higher prices in Europe and Asia

encourage operators to sell gas overseas.

Qatar, already a major producer, aims to boost LNG export capacity to 126 Mtpa by 2027 from a current 77 Mtpa. International industry heavyweights ExxonMobil, Shell, TotalEnergies, Eni and ConocoPhillips have been chosen to join state-owned QatarEnergy in the North Field East expansion project, which is set to raise capacity to 110 Mtpa.

Russian volumes are under threat as a result of sanctions against Russia over the Ukraine conflict, while in Africa, Mozambique will see its first LNG production by the end of 2022 via the Eni-operated Area 4 (Coral South) LNG project, currently under development. The project will provide around 150mn cubic feet per day (MMcfd) of gas to the domestic market.

Projects that have been approved or are currently being developed will recover about 300 trillion cubic feet (Tcf) of LNG, led by the US with approximately 97 Tcf, then Qatar with around 52 Tcf and Russia at 50 Tcf. These top three nations hold around 70% of the total sanctioned, yet-to-be-produced global LNG resource. ■



Global LNG investment and production.

LNG innovations on display at Gastech 2022

A NUMBER OF LNG-related developments and innovations were showcased at the Gastech 2022 conference & exhibition, which took place in Milan in September.

Schulte Group presents new design for LNG bunker vessel

Schulte Group presented its next generation design for an LNG bunker vessel (LBV). The unique vessel design does away with the need for fenders and spacer pontoons, which take time and manpower to manually deploy, replacing them with an integrated outrigging system that is compatible with any vessel type and can be operational in five minutes with the push of a button. Likewise the telescopic crane, which extends more than 40 metres over the water and can be adjusted to any required reach.

The vessel fits with all known and soon-to-come LNG-fuelled vessels. It also features warming-up, gas freeing and aeration equipment to prepare LNG-fuelled vessels for drydock, and flexible design options so that the LBV can be tailored to specific requirements. The bunker vessel can be operated by a smaller crew while still ensuring high safety standards.

Johan Lillieskold, gas solutions specialist, LNG Competence Centre, at Schulte Group said during his conference presentation at Gastech, said, "We have gone back to the drawing board and defined the operational specifications of what the ideal LNG bunker vessel should offer, doing away with any additional or unnecessary gear and cumbersome operations.

"The number of LNG-fuelled vessels planned to enter into operation in the next few years is significant, as operators increasingly turn to LNG to reduce environmentally and climate-harmful emissions. This new flexible vessel design will serve both today's tonnage and future newbuilds."

LR approves LNG carrier steam-to-hybrid conversion design

Lloyd's Register (LR) has awarded Approval in Principle (AiP) to Empresa Naviera Elcano for their patented steam-to-hybrid conversion design for the transformation of steam turbine LNG carriers to a dual-fuelled propulsion system. The AiP certificate was presented at a ceremony at Gastech.

The transformation consists of a modification to the propulsion and electrical power generation system, upgrading the vessel from steam powered to a hybrid system with a steam turbine and dual fuel generator. The dual fuel generator will supply electrical power to the ship's switchboard with electric propulsion motor/s coupled to the ship's propulsion gear box/shaft. The hybrid system also includes devices that can recover energy from the dual fuel generator exhaust gases and engine cooling systems, which will be integrated into the existing steam plant systems.

Elcano's solution will ensure the steam turbine LNG fleet will meet EEXI MARPOL regulations by substantially reducing greenhouse gas (GHG) emissions on converted vessels, prioritising both energy security and climate alignment for the maritime industry. Emission reduction and energy savings will increase dramatically if a vessels conversion includes the retrofitting of a reliquefication plant driven by a dual fuel generator.

Andy McKeran, chief commercial officer, Lloyd's Register, said, "Around a third of the LNG fleet stand to benefit from this technology solution that has been developed by Elcano. As the most prominent class partner in LNG shipping, we applaud the novelty and the timing of this innovation which can extend the life of LNG carriers that rely on steam propulsion and are at risk of being non-compliant with the IMO's EEXI and CII regulations."

Trelleborg showcases LNG transfer solutions

Trelleborg showcased its world-leading LNG transfer solutions and shared some of its latest product developments and innovations. The company's stand featured large and small-scale systems including the KLAW LNG CryoFC and CryoFCV quick connect, a Vee Bee filtration system, as well as the Gutteling White, multi-LNG composite hoses.

Also on display were industry-leading Ship-Shore Link (SSL) docking and mooring systems, ISO 17357-1:2014 compliant pneumatic fenders as well as SafePilot solutions that form a highly accurate piloting and navigation system for offshore and pilotage applications.

SafePilot CAT PRO is Trelleborg's newest system, the smallest and lightest portable piloting unit with RTK capabilities, which aims to improve communication, reduce delays and maximise vessel throughput. The completely independent portable pilot unit delivers speed accuracy down to 1 cm/s and heading accuracy down to 0.01°, making it ideal for the most challenging operations for LNG vessels. Utilising new S-102 bathymetric sea charts and ultra-precise positioning, as well as roll, pitch, and heave measurements, this device is extremely accurate.

Looking ahead to ADIPEC 2022

Christopher Hudson, president of dmg events, highlights some of the key themes of ADIPEC 2022, taking place from 31 October-3 November in Abu Dhabi.

Image Credit : dmg events

Christopher Hudson, president of dmg events.

How is ADIPEC 2022 shaping up in terms of exhibitor and visitor participation etc.?

Despite the impact of COVID-19 last year, ADIPEC 2021 still exceeded expectations, and this year is shaping up to be even bigger. Exhibition spaces have already sold out and a huge number of visitors are registered to attend, with an expected 150,000 energy professionals from over 160 countries.

We'll be hosting 2,200 exhibiting companies, more than 50 national oil companies and country pavilions. Also, in attendance will be more than 1,200 ministers, CEOs, policymakers, and influencers providing strategic insights across the conferences to 12,000 delegates, 135 of which will be technical sessions on the latest and most innovative forms of energy technology.

The dedicated zones will include offshore and marine, digitalisation in energy, smart manufacturing, and for the first time a decarbonisation zone, reflecting the growing need for decarbonisation strategies in the energy industry.

What role do you think ADIPEC can play in accelerating the industry's climate commitments and shaping the direction of the global energy transition?

We are at a critical point for energy transition. The energy industry is rapidly evolving and has a long history of successfully adapting to overcome challenges. Today it is committed to proactively identifying and delivering solutions to support net-zero ambitions. Many leading energy companies have made pledges, emission reduction commitments, and are investing in new technologies, but a successful energy transition won't be achieved by entities acting alone – this is where ADIPEC comes in.

At ADIPEC we convene policymakers, industry experts, business leaders and tech innovators from across the value chain to debate and deliberate on pathways to translate climate pledges into action. It is the place that not only facilitates strategic dialogues, but also expedites synergies between decision-makers, business leaders, and companies that can implement those solutions.

> "ADIPEC will once again have a real impact on shaping the global energy agenda and the industry's efforts in the energy transition."

ADIPEC is far more than a trade event, it's a global platform that gives the oil and gas sector the opportunity to showcase its evolving role in a pragmatic and progressive energy transition. Occurring strategically before COP27 and ahead of COP28 in the UAE, ADIPEC will once again have a real impact on shaping the global energy agenda and the industry's efforts in the energy transition.

Image Credit: dmg events

ADIPEC 2021 exceeded expectations, and this year is shaping up to be even bigger.

Are there any other major themes that will be at the top of the agenda at ADIPEC?

Beyond environmental sustainability, the current energy system is trying to balance energy security and energy equity. This is known as the Energy Trilemma and ADIPEC will be at the centre of finding its solution.

It involves weighing net zero targets against a growing global population, increasing energy requirements and the cost/implementation of reliable energy sources.

The global energy sector needs credible and diverse thought leaders to facilitate the dialogue on these issues and advance an equitable and responsible energy transition. We're putting security and equity in focus on our agenda through our various leadership perspectives, opinion and live sessions and strategic panel sessions, providing an opportunity for industry leaders to participate in the path toward a flexible and resilient energy transition.

You introduced the Smart Manufacturing Zone and Conference last year; how does it tie in with the UAE's industrial strategy, and how does it reflect the changing relationship of energy and manufacturing?

In 2021, the UAE launched its industrial strategy, Operation 300bn, which aims to develop the UAE's industrial sector and enhance its role in stimulating the national economy. This strategy not only supports, but actively pushes forward the UAE's commitment to advancing sustainable economic growth, deploying clean energy solutions, driving industrial innovation, and promoting responsible consumption and production. As such, three sectors lie at the heart of this ambition: the energy industry, innovative technologies, and manufacturing.

> "The Decarbonisation Zone is an important new addition."

The purpose of ADIPEC's Smart Manufacturing Exhibition and Conference is to bridge the gap between the energy, manufacturing, and high-tech sectors. These three sectors need to be deeply interconnected to facilitate knowledge sharing and create new cross-sector dynamics to advance a strategy of economic and environmental sustainability. By providing leading local, regional, and global manufacturers the opportunity to engage with energy decision makers and vice versa, ADIPEC plays an agenda-setting role for the next successful phase of growth in both the energy and manufacturing industries.

How do you think ADIPEC will advance the debate and showcase the latest in technology innovation?

Technologies such as augmented and virtual reality, advanced composites, robotics, and nanotechnologies have helped the industry move towards more sustainable and resilient smart ecosystems. These technologies, among many others, will be the essence of the Smart Manufacturing Exhibition and Conference.

Highlighting technological advances and innovation remains at the core of ADIPEC's goal to drive change across the industry and provide the sector with a competitive edge by transforming the value chain. As such, the 2022 event will host leading industry experts and high-tech companies and support them in strengthening existing business partnerships and forming new models of cross-sector collaboration. The discussions around innovative technological solutions are the drivers of innovation.

Are there any other ADIPEC highlights or features that you would like to mention?

The Decarbonisation Zone is an important new addition that reflects the growing need for decarbonisation strategies in the energy industry. The platform will promote ideas, collaboration and showcase the latest innovations as we drive towards cleaner energy and the development of low carbon practices.

The Decarbonisation Theatre will provide an adjacent space for leading industry innovators and solution providers to discuss issues and engage in high-level thought leadership.

The programme includes sessions aimed at providing the latest innovations that will enable all stakeholders to address the growing demand for green solutions, attract strategic partnerships and cross-industry participation, generate funding mechanisms, and convert innovative ideas into a practical solution towards leading a cleaner energy future. ■

For more information, see the website at www.adipec.oom

ADIPEC in numbers

Exhibition			
150,000 Energy Professionals	**2,200** Exhibiting Companies	**54** NOCs and IOCs	**28** Country Pavilions

Conferences				
8 Conferences	**40+** Ministers	**1,200** Speakers	**12,000** Sessions	**350+** Delegates

Image Credit: Adobe Stock

Abu Dhabi will once again play host to ADIPEC in October 2022.

Why going electric is good for business

Atlas Copco gives 10 reasons for making the switch from diesel portable compressors to zero-emission electric.

1. Clean, green, sustainable

Sustainability is not a trend: it is a driver. All industries play an important role in cutting carbon emissions, and in becoming environmentally and socially responsible. Switching to zero emission electric compressors will help businesses achieve their sustainability goals by transitioning away from fossil-fuel dependency, and commit to a cleaner, greener future.

2. Silent

Sustainability is more than just cutting CO_2 output. Cities want to ban pollution – but noise is also a pollutant. Here, even the latest diesel engines are noisy, whereas electric compressors are extremely quiet – the same level as a conversation. They will remove noise distraction, enhancing both productivity and noise safety.

3. Versatile

The combination of zero emissions and almost zero noise means compressors can work indoors, and the lack of moving parts (and their insulation from the elements) compared to an ICE compressor means they can work in extreme conditions of temperature and dust with total protection from the elements.

4. Consumer demand

Carbon reductions will become a more important differentiator as more and more companies publicly commit to more ambitious targets, and the industry is now waking up to the fact that compressors are perfect to go electric. It is likely that ambitions to go green will accelerate rather than slow down – not just out of necessity, but because people demand it.

5. Innovation

At Atlas Copco, we have a saying that "there is always a better way". An example of this is our latest Stage V-compliant diesel portable compressors, which perform far better and are far cleaner than those of even just a decade ago. Add in biofuels such as HVO and their CO_2 emissions shrink by over 90% – to almost nothing. Turning to an electric compressor is merely a natural evolution in aiming for "always better" and staying ahead of the competitive curve by driving innovation..

Image Credit: Atlas Copco

Using electric compressors can bring many benefits.

6. Maintenance

Electric compressors have far fewer parts than their diesel alternative. This means less to go wrong and maintain. So much so that service intervals are four times longer for diesel compressors – from 500 hours, compared to 2,000 for the E-Air range.

> "The lack of moving parts means they can work in extreme conditions of temperature and dust."

7. User friendly

The lack of a relatively heavy combustion engine or a heavy battery pack offers several convenience advantages. Plug-in electric compressors are far lighter and have a 40% smaller footprint than their equivalents, making them easier to tow and manhandle. Atlas Copco's E-Air range is also equipped with PACE (Pressure Adjusted through Cognitive Electronics) technology, an electronic pressure regulation system which locks in the perfect combination for the simplest usage.

8. Reliable

Why plug-in? Well, what site nowadays can operate without electricity? The majority of urban sites have access to the electrical grid,

and even those that don't use gensets. Electric machines also provide oil-free air in environments where even the slightest contamination would ruin the product, such as pharmaceutical or electronic component manufacturing.

9. Efficient

Our electric motors work at more than 90% efficiency, leaving diesel engines' 35% efficiency in the dust. Sites that use gensets are often working at very low levels of capacity. Connecting our electric compressors often improves the emission performance of gensets, and will also assist European businesses in the industrial sector to achieve the EU's energy efficiency standards.

10. Cost effective

Over the course of their lives,the total cost of ownership for an electric compressor is cut considerably in comparison to diesel-run variations. Atlas Copco's E-Air H185 compressor working at 75% load will, for example, cost €20,000 (US$19,688) less to run over the course of its life than a comparable ICE powered unit – cutting 41,400 kg of CO_2 in the process. ■

Why site conditions are critical when selecting your compressor

CENTRIFUGAL COMPRESSORS SUPPLY compressed air for a variety of applications in diverse industries, ranging from food and beverage processing to petrochemical plants and oil refineries. They cover a range of air flow rates and discharge pressures, causing different levels of power consumption.

In a blog, FS Elliott stresses it is imperative that you consider the proper site conditions when selecting a compressor, which include ambient temperature, ambient pressure and relative humidity.

Choosing the correct size compressor will lead to savings in capital and operating costs, as well as a reduction in power consumption. Choosing the wrong compressor can be a costly mistake.

The blog can be accessed here: https://www.fs-elliott.com/Blog-Item-Site-Conditions-to-Consider-When-Sizing-your-Compressor

Ariel and Hoerbiger partner to provide non-lube compressor solutions for hydrogen mobility markets

ARIEL CORPORATION, THE world's largest manufacturer of separable reciprocating gas compressors and Hoerbiger, a global leader in reciprocating gas compressor components technology, have announced their agreement to provide non-lube compressor solutions capable of fulfilling the hydrogen compression requirements of the future hydrogen mobility market. These include public transportation, large fleet vehicles, private trucking companies, trains, boats/ships and other high volume, high pressure, vehicle-fuelling applications.

Ariel and Hoerbiger have worked together over the past year, leveraging the combined research, development, design, material science, manufacturing, and assembly capabilities to provide compressor solutions required by many of the high volume/high pressure vehicle fuelling projects in planning or realisation stages around the world.

Reliable leak monitoring for pipelines

Jay Gadhavi, KROHNE Middle East and Africa solutions director, discusses the benefits of Extended Real Time Transient Modelling (E-RTTM) leak detection systems as a central component of pipeline safety design.

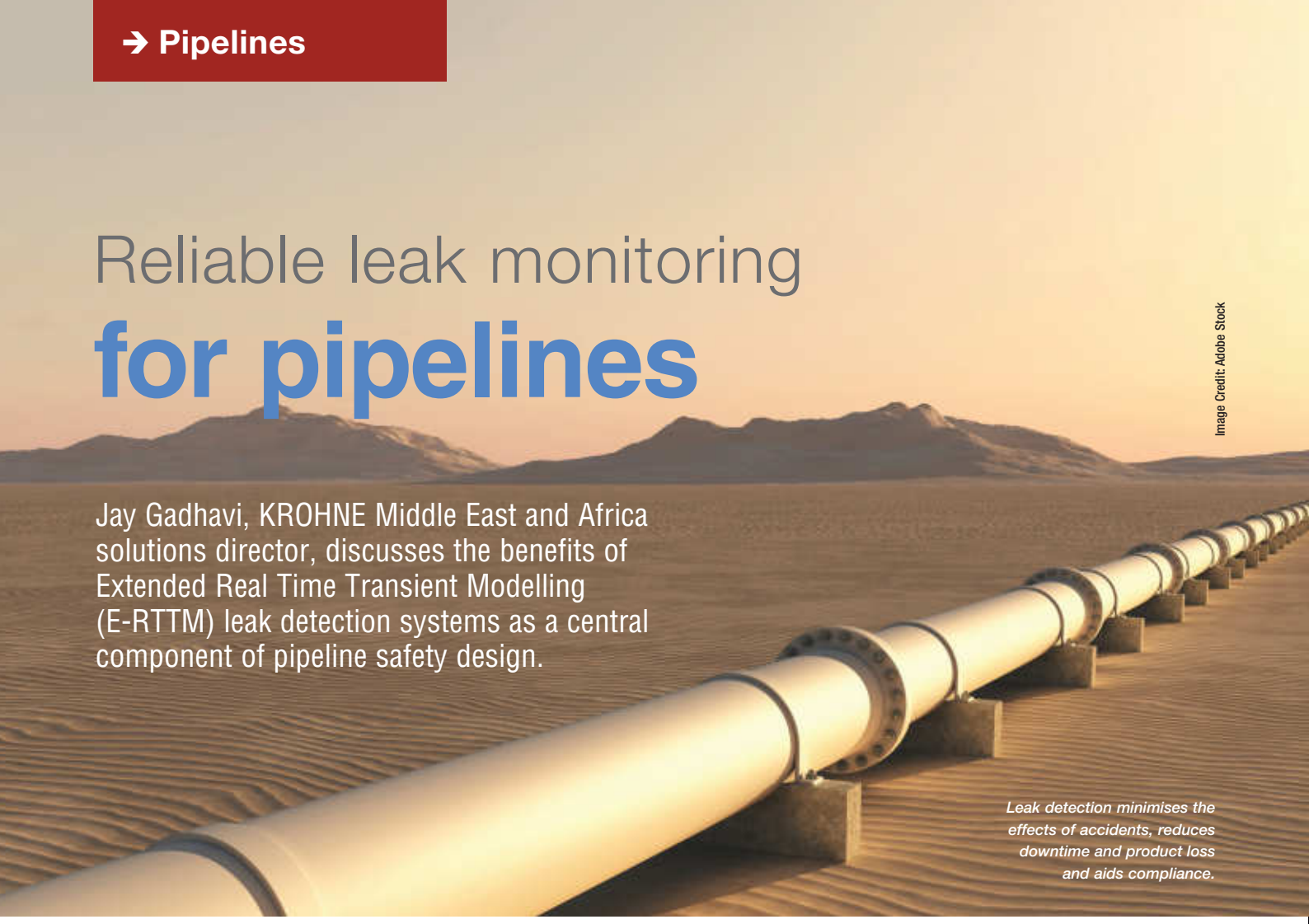


Image Credit: Adobe Stock

Leak detection minimises the effects of accidents, reduces downtime and product loss and aids compliance.

Transportation of fluids in pipelines is increasing all over the world, and with good reason: pipelines are among the safest and most economical transportation systems over long routes. Special leak detection systems are often used to limit the risks. In general, leak detection in pipelines refers to the recognition and quick localisation of product leaks.

Reasons to employ leak detection include the following:

- To minimise the effects of accidents
- To minimise downtime
- To minimise product loss
- Regulatory compliance.

Leak detection in pipelines can be performed in various ways, from simple visual controls during inspections, to computer-supported systems that monitor conditions, even for underground and undersea pipelines.

Getting started

Selecting a suitable leak detection system is not an easy task for pipeline operators. API RP (Recommended Practice) 1130 is even more specific with regard to leak detection systems. Among other items, it includes a collection of general recommendations for operating leak detection systems, such as clear presentation of the results for the operator and for maintenance. It also includes performance criteria for selecting a leak detection system: these criteria are very detailed and explain how leak detection systems work. The criteria are outlined below, and it is easy to see that they are linked and interdependent.

- **Sensitivity:** the leak detection system should detect even small leaks within a short period.
- **Precision:** the leak detection system should locate leaks precisely. The leakage rate, the quantity of escaped product (leakage rate multiplied by time) and the product that is escaping should all be indicated.
- **Robustness:** the leak detection system should continue active monitoring despite unsteady or non-ideal conditions. It also includes unsteady operating conditions, also known as transient operation, for example due to effects triggered by pumps or valves.
- **Reliability:** the leak detection system should not generate false alarms, even though it is highly sensitive.

> “Leak detection in pipelines can be performed in various ways.”

Canadian Standards Association CSA Z662 Annex E represents recommended practice for liquid hydrocarbon pipeline system leak detection in Canada. Hereby, the CSA Z662 Annex E is the only recommended practice to include precise uncertainties for leak detection systems.

When the operator has clarified relevant requirements of the appropriate regulatory for their application, other characteristics that affect the choice of leak detection system can be considered.

Combining principles has several advantages. In 2012, the U.S. Department of Transportation Pipelines and Hazardous Materials Safety Administration published a Leak Detection Study, DTPH56-11-D-000001, which states: “The leak detection system itself should always be redundant, by using multiple techniques that differ from each other and therefore compensate for any inherent weaknesses they do not share.” It also describes the benefits of combined leak detection methods: “There is no reason why several different internal leak detection methods should not be implemented at the same time. As an example, the Extended-RTTM system trademarked by KROHNE uses an RTTM in conjunction with several other API 1130 techniques”. (E-RTTM stands for Extended RTTM, which combines the RTTM principle

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with leak signature analysis using leak pattern detection).

Benefits of E-RTTM systems

An E-RTTM leak detection system creates a virtual image of a pipeline based on real measured data. If the model detects a flow discrepancy, the leak signature analysis module then determines whether it was caused by an instrument error, a gradual leak or a sudden leak.

The increased capacities of modern computers allow leak signature analysis to apply powerful statistical hypothesis testing. Based on modern statistical tests, the signature analysis decides whether the pipeline is affected by a leak or not. It provides a high degree of sensitivity and quick leak detection with real-time comparison of existing measuring results against leak signatures, which are stored in a database. E-RTTM-based leak detection systems are able to handle changing or transient operating conditions that are not recognised by less sophisticated internal leak detection systems. An E-RTTM-based leak detection system works with dynamic values, which also affects robustness: the system can adapt automatically and very quickly to changes in the operating conditions such as sensor failure, communications failure, a valve closing or a product change in the pipeline.

The precision of the E-RTTM is based on three different methods of leak localisation: the gradient intersection method, the wave propagation method and the extended wave propagation method. The leak detection system calculates the most probable leak location(s) by comparing the results of these methods. The gradient intersection method is based on the pressure profile of a pipeline: the occurrence of a leak changes the pressure gradient along the pipeline in characteristic manner. Without a leak, the drop in pressure in a liquid pipeline is linear. The leak position can be determined by calculating the intersection point.

The second option for leak localisation is the wave propagation method, which analyses the pressure waves that result from a leak. If a sufficiently large enough leak occurs suddenly, for example if the pipeline is damaged by an excavator, a negative pressure wave spreads at the speed of sound in both directions along the pipeline. The leak position can be calculated by comparing the arrival time of the pressure wave at the pipeline inlet and outlet pressure sensors.

The extended wave propagation method is based on the same physical principle as the wave propagation method. This enables more precise localisation of the leak by reducing errors due to delayed sensor reaction or slow signal transfer.

The E-RTTM introduced here is the basis of the PipePatrol leak detection system by KROHNE. The user interface can run on a separate workstation, or be integrated into an existing control system. The user interface features intuitive operation: only the information that the current user needs for his scope of work is displayed.

Image Credit: KROHNE

An E-RTTM leak detection system creates a virtual image of a pipeline based on real measured data.

In principle, PipePatrol can be integrated into any new or existing infrastructure. Operators can learn to use the system in just a few hours. In addition to the visualisation of the pipeline operating conditions, PipePatrol can indicate leak positions on a map, which simplifies and speeds up a service technician's work.

> “E-RTTM-based leak detection systems guarantee reliable leak monitoring for various types and lengths of pipelines.”

Leak detection in practice

An example application in Canada demonstrates how quickly and precisely leak detection functions in practice. Following thorough consultation, the company opted for the PipePatrol leak detection system. PipePatrol used the measurement values provided by the process control system and was integrated into the pipeline monitoring system at the customer’s request. The leak tests performed for the site acceptance tests were conducted using valves in the pipeline to simulate leaks by real fluid withdrawal into a vacuum truck. The detection threshold for leaks is set to 1.1 m^3/h / 4.84 gal (US)/min . After starting the leak test with a leak rate of 5 m^3/h / 22.01 gal (US)/min, the system recognized the signature of the leak within 55 seconds and went to “Leak Signature Detected” state.

The gradient intersection method calculated a leak position of 24,689 m / 15.34 mi, while the wave propagation method calculated a leak position of 24,677 m / 15.33 mi, both less than 0.1% of pipeline length away from the real leak position.

The second pipeline is a sales oil pipeline with a length of 59,700 m / 37.1 mi. The detection threshold for leaks is set to 3 m^3/h / 13.21 gal (US)/min. After starting the leak test with a leak rate of 3.5 m^3/h / 15.41 gal (US)/min, the system recognised the signature of the leak within 50 seconds and went to “Leak Signature Detected” state. The gradient intersection method calculated a leak position of 0 m / 0 mi, less than 0.1% of pipeline length away from the actual leak position. The wave propagation method was disabled for this test because time stamping was temporarily not available for the measurements, but has been activated in the meantime.

Modern leak detection systems are based on various mathematical and physical models. E-RTTM-based leak detection systems guarantee reliable leak monitoring for various types and lengths of pipelines, even under transient operating conditions. KROHNE supplies the PipePatrol E-RTTM-based leak detection system either installed on separate hardware or for integration into an existing control system and measurement installation, always to international standards trusted by the industry.

N'GENIUS launches new series of austenitic stainless steels

N'GENIUS has launched a new series of high-strength, austenitic stainless steels, which can transform how materials are specified and utilised across the oil and gas sector. It is a reinvention of conventional austenitic stainless steels and has been specifically developed to out-perform, supersede and supplement the majority of existing grades.

CV Roscoe, inventor of the original 25Cr super-duplex stainless steel and CEO of N'GENIUS Materials Technology, explained, "The extensive range of alloy types, variants and grades in the N'GENIUS Series have strength properties equivalent to duplex and super-duplex stainless steels, ductility and toughness levels normally associated with conventional austenitic stainless steels but with far superior corrosion resistance to suit all major oil and gas projects.

"In terms of oil and gas production system design, the series has been developed to be the total system material solution. A vast array of wrought and cast products and equipment can be manufactured and supplied in the series for onshore and offshore oil and gas production systems."

Subsea umbilicals, catenary risers and flowlines, manifolds, subsea bundles, well heads, fittings, flanges, compact flanges, hub connectors and engineered products such as pumps and valves are among these products and equipment. As are fabricated products such as offshore topside systems including spools, modules, static risers, process piping systems, seawater cooling systems, firewater systems, filtration systems, heat exchangers and various ancillary equipment including tanks, vessels and structures.

Image Credit: N'GENIUS

Typical applications for the new austenitic stainless steels.

The N'GENIUS Series of CRA line pipe grades are available in both seamless and welded product forms. Specifically, they will address the need for a much wider selection of corrosion resistant alloy (CRA) line pipe materials that are suitable in a wide range of service conditions and process media environments for all types of onshore projects and offshore projects in shallow, deep and ultra-deep water that can be installed using the various installation methods including S-lay, J-lay, Reel-lay and subsea Bundle installation techniques.

Perfectly suited for Oil Country Tubular Goods (OCTG) casing and tubing, the series helps overcome the dilemmas caused by elevated temperatures, high pressures and higher mechanical loads, while its improved corrosion resistance provides a robust defence even in harsh process media environments containing various levels of chlorides, CO_2, H_2S and other constituents. It also ensures the very best resistance to hydrogen embrittlement and, in particular, stress corrosion cracking (SCC) in aggressive media environments which can often be a major obstacle for OCTG.

For details, visit: www.ngeniusmaterials.com.

MoU signed for Nigeria-Morocco gas pipeline project

Image credit: ECOWAS

The MoU attests to the commitment of ECOWAS and the concerned countries to the pipeline's development.

A MEMORANDUM OF Understanding was signed on 15 September in Rabat, Morocco between the Economic Community of West African States (ECOWAS), the Federal Republic of Nigeria and the Kingdom of Morocco, for the Nigeria-Morocco gas pipeline project. The three sides were respectively represented by Sediko Douka, ECOWAS commissioner for Infrastructure, Energy and Digitalisation, Mallam Mele Kolo Kyari, group chief executive officer of Nigerian National Petroleum Company Limited (NNPC) and Amina Benkhadra, director general of Office National des Hydrocarbures et des Mines (ONHYM).

According to a published joint communiqué, the Memorandum of Understanding attests to the commitment of ECOWAS and all the countries crossed by the gas pipeline, to contribute to the feasibility and technical studies, the mobilisation of resources and execution of this strategic project. This project, once completed, will supply gas to all the countries of West Africa and will open a new channel of export to Europe. It will contribute towards improving the living standards of the population, integrating the economies in the region, decreasing the level of desertification thanks to a sustainable and reliable gas supply and a reduction in or outright end to gas flaring, among others, according to ECOWAS.

16 countries including 14 ECOWAS member states, are involved in this project. The project will also assist other countries such as Ghana, Côte d'Ivoire, Senegal and Mauritania to export their surplus natural gas.

The strategic Nigeria-Morocco gas pipeline project will traverse the West African coast from Nigeria to Morocco, through Benin, Togo, Ghana, Côte d'Ivoire, Liberia, Sierra Leone, Guinea, Guinea Bissau, The Gambia, Senegal and Mauritania. In the long term, it will be connected to the Maghreb-Europe gas pipeline and to the European gas network. It will also help cater to the land-locked countries of Burkina Faso, Mali and Niger.

Commissioner Sediko Douka, speaking on behalf of the ECOWAS Commission president, H.E Dr Omar Alieu Touray, said, "We, as a regional economic community, are convinced that it is indeed a viable project, one that holds great promise, and we will spare no effort for its success."

The ECOWAS commissioner for Infrastructure, Energy and Digitalisation further reaffirmed, on behalf of the ECOWAS Commission president, total support for this regional project which would positively impact the lives of more than 400mn people.

"The project's impact is far reaching because it would help ensure electricity supply in the West African region, and in the long term the export of natural gas as fuel in Europe. We have carefully monitored from beginning to end the feasibility studies at the various levels of validation," he revealed, adding that the next phase would involve the detailed design of execution, resource mobilisation and the actual construction.

With the launch of the project, efforts will be made to attract public and private investors including multilateral or commercial banks, pension funds and insurance companies, among others. The project will span 6,000 km and cost US$25bn. The financing of the project is expected to involve several stakeholders.

Hiber debuts satellite-powered pipeline monitoring solution

HIBER, THE IOT as a service provider that serves the oil and gas sector, has expanded the capabilities of its HiberHilo solution to transform remote pipelines into continuous digital streams of operational data. HiberHilo pipeline monitoring makes it economically feasible to include constant monitoring of even the most remote pipelines to reduce risk, increase uptime and lower operational and maintenance costs.

"Our oil and gas customers have been extremely satisfied with the capabilities of HiberHilo on wellheads, and challenged us to deliver a more comprehensive network view of their extraction and distribution operations – especially those situated in remote areas where it's economically unfeasible to implement an over-the-air digital connection," said Hiber CEO Roel Jansen.

Image credit: Adobe Stock

Pipelines can present environmental and reputational risk to oil and gas operators.

Pipelines present potentially enormous environmental and reputational risk to oil and gas operators, but until now, monitoring them has been expensive. For example, the pigging of a pipeline is important for maintenance and to optimise flow, but it is costly. By monitoring the pressure, flow, or temperature of a pipeline and its contents at strategic points, HiberHilo helps optimise the operation of pipelines at a low price. This is especially valuable for pipelines in gathering networks or remote parts of transmission networks.

"With HiberHilo's new, expanded capabilities, we can deliver reliable monitoring services to remote pipelines at a breakthrough price. This means operators gain access to efficient and economical operation of more of their pipelines, enabling higher throughput, improved pipeline integrity and safety across more of their pipeline networks, while meeting risk management and sustainability goals," added Jansen.

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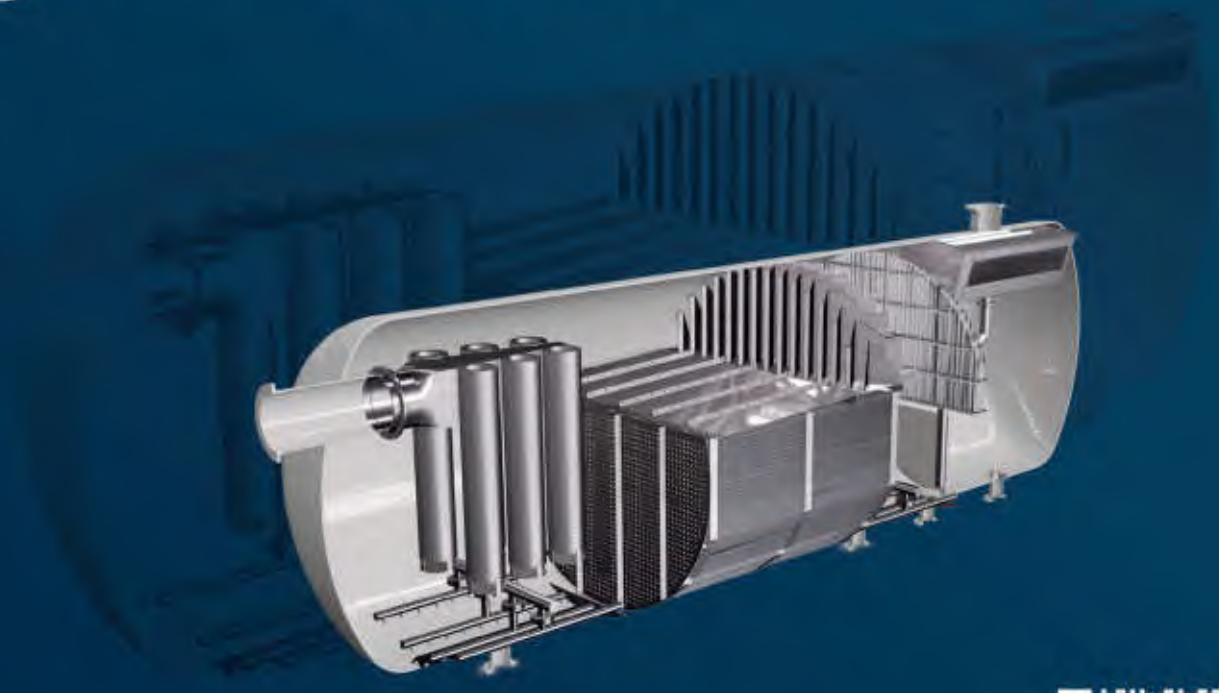

Vicocostacurta

DISCOVER MORE

Achieving in situ flow meter calibration utopia

Dr. Bruno Pinguet, multiphase domain senior advisor at TÜV SÜD National Engineering Laboratory, addresses the challenges in the use of multiphase flow meters.

FOR THE OIL and gas industry, accurately measuring a mixture of oil, water and gas in field conditions is a major challenge. Multiphase flow meters (MFMs) have opened the door to the development of marginal assets and promote more efficient exploitation of larger fields. However, because of the costs required to send them back to facilities for calibration, the challenges of validating them in situ throughout their time in service must be addressed. This is becoming an even more significant issue as the oil and gas industry continues to exploit deeper and more remote fields. Additionally, accurate flow measurement near the wellhead enables users to make informed decisions about critical operational procedures. However, the use of multiphase flow meters in oil and gas applications, particularly when installed for remote or subsea applications, is fraught with challenges.

All metering devices monitoring oil and gas flows provide information on the in situ conditions (i.e. at line pressure and temperature). Meanwhile, the volumetric flow rate of water, oil, and gas needs to be estimated at standard conditions because of the business requirement that any fluid must be sold at stabilised conditions, which is referred to as 'standard conditions'. To accurately convert meter readings from in situ to report flow rates at standard conditions requires knowledge of fluid properties, or pressure-volume-temperature (PVT) following pressure and temperature change. This is irrespective of the type of meter or technology used.

MFMs are particularly affected by the use of the PVT information. This will have a significant effect on flow measurement accuracy if not properly accounted for. Also, because no separation is made between the different flow phases, a large amount of gas can be dissolved inside the oil, or some of the condensates could be in gas phases at meter conditions when liquid at standard conditions.

An uncertainty budget for the flow meter when in use must therefore be constructed, taking account of additional uncertainties arising from interpolation and extrapolation from calibration conditions. Traceability is the process of proving the performance of equipment for each stage of calibration. To provide the highest quality of measurement and therefore, the lowest uncertainty budget, flow meters should be traceable to primary standards, which are calibrated against the National Measurement Standards.

Image Credit : istock.com

There are more than 10,500 multiphase and wet gas flow meters in use globally.

> "The use of multiphase flow meters in oil and gas applications is fraught with challenges."

It is important to have a proper mapping of the performance/uncertainty of an MFM, and this is based on the expected profile of oil and gas production. However, end-users face a substantial challenge when trying to select and review accurate meter performance because MFM manufacturers use the set of output parameters to state the performance of their product with the most attractive uncertainty or very generic information.

Our research has shown that stated meter performance levels are, in general, overly optimistic. It was also shown that usually, manufacturers do not provide the end-user with the expected output specification of oil, water, and gas flow rates. Instead, they provide a combination of different parameters at line conditions because expertise in fluid properties is scarce nowadays. This leaves the end-user to translate any numbers to the expected parameters and associated values themselves, if the manufacturer has provided them with enough relevant data to achieve this. As this information is left to the manufacturers' discretion, there are no standard requirements.

Many combinations of technologies exist on the market, and none address the entire spectrum of parameters possible in multiphase or is systematically better than the others. When the end-user has selected an

MFM, the fluid behaviour should also be considered as this establishes the true performance under standard conditions. This step is especially important because it will highlight the level of uncertainty that should be achieved in the different fluid properties faced in field conditions.

It should be remembered that it is the combination of the performance of the MFMs under well-established flow and process conditions, and the estimation of the uncertainty of the relevant PVT package, from line to standard conditions, that will provide the overall uncertainty of the system in field conditions. This does not have to be physically in the field to establish the overall uncertainty for two reasons:

(1) the uncertainty in field conditions is low because of a lack of accurate reference measurement. Test separators are rarely better than 5-10% following the conditions. This can be highlighted by the fact that the allocation factor is in general smaller than 1 and in the range of 0.85, and

(2) the capability to do the test in a full range of conditions, versus GVF (Gas Volume Fraction) and WLR (Water Liquid Ratio), is not possible most of the time. Therefore, the best option is a third-party laboratory, using the lowest possible uncertainty with a two-step analysis that uses (1) pure flow meter performance and (2) compatible equations of state with the associated uncertainty.

How do we address the in situ flow meter performance?

Two methods can be used to address this. The first is to take the manufacturer's statement, literature, and the laboratory's knowledge to establish the performance of the water, oil, and gas at line conditions. To ensure estimates are correct, a unique analysis based on the Monte Carlo simulation is developed and the uncertainty is established on the total mass flow rate and total volumetric flow rate so that the

Image Credit : TÜV SÜD National Engineering Laboratory

Dr. Bruno Pinguet, multiphase domain senior advisor at TÜV SÜD National Engineering Laboratory

performance of the liquid, gas, water, and oil is established clearly. This innovative algorithmic computation gives a unique vision of the response of the MFMs based on a small set of industry-available recorded data.

This performance analysis should then be coupled with the PVT uncertainty performance; using PVT software developed by the UK's Designated Institute for Flow Measurement over the last 40 years. This is based on a huge database of composition that is unique, as it is based on physical and real measurements collected over time, the opposite of many PVT simulators which aggregate the equations of state (EOS) with little consideration of the validity. This is the benefit of the Designated Institute for Flow Measurement developing a commercial solution for end-users and leading the development of industry standards.

The third step is then to combine both uncertainties from the MFM performance and the EOS and propagate this to the standard conditions. This allows us to establish with no ambiguity the performance and how the meter will behave in field conditions.

The second MFM performance review method is at the well site, either by remote or physical witnessing. This is usually done if there is some doubt about the performance that requires secondary equipment to verify it, or when advice is required on the best metering solution to be defined as a reference. As indicated earlier, in field conditions, the uncertainty is much higher than what can be delivered in well-controlled conditions such as in third-party facilities.

After meter selection, a test programme is established and a specific procedure is defined to validate the response of the MFM, using engineering expertise and some statistical evaluation. It is then possible to understand the typical response of the MFM in the specific field conditions, and identify the sweet spot and what should be avoided. This could result in a new manufacturer maintenance programme, the MFM's replacement, or the installation of a complementary device following the end-user's expectation.

Overall, the work to be done to state the uncertainty accurately, and therefore the performance of MFMs, requires expertise and precise calculations. Thorough mapping of MFM performance against its in situ application should be established by either oil and gas operators, or third-party multiphase flow meter experts – and validated when possible at a calibration facility. ■

TÜV SÜD National Engineering Laboratory www.tuvsud.com/en-gb/nel is part of the TÜV SÜD Group. The company is a global centre of excellence for flow measurement and fluid flow systems and is the UK's Designated Institute for Flow and Density Measurement.

Setting off the alarm bells before it is too late

Fire safety in the oil and gas sector must be taken seriously to avoid major explosions and uncalled-for accidents. Madhurima Sengupta reports.

INCIDENTS OF OIL rig explosions may be rare, but when they happen, they are nothing short of an apocalypse. However, rig owners can avoid such catastrophes if only they take the right safety protocols.

For that, it is important to take the issue of fire safety seriously. Johnson Controls says that the primary fire hazards in oil and gas facilities are typically fuel in-depth fires involving hydrocarbons and/or polar solvent products, with another red flag being pressurised gas leak fires. At-risk functional assets include refineries, fuel tank farms, loading areas, offshore platforms, jetties and shipping berth platforms. Fire hazards also include the potential ancillary risk of explosions and dispersion of hazardous gases and substances.

Suppression of flammable liquid and pressurised gas fires requires high-performing foam concentrates and dry chemicals, says Johnson Controls.

"Our extensive portfolio of non-fluorinated foam concentrates, AR-AFFFs and dry chemicals – coupled with reliable equipment to properly proportion and apply these suppression products – provides effective fire protection solutions for most oil, gas and petrochemical hazards," said Isaac Hawari, business development leader – global products, Johnson Controls.

Naturally occurring gases (benzene, methane, hydrogen sulphide), mineral spirits, compressors and heater treaters also pose risks, says FS, a cable maintenance company. They claim specialisation in providing fire protection to electrical cables, which is "a very sensitive part of an operation, offshore or onshore."

> "Primary fire hazards are typically fuel in-depth fires involving hydrocarbons and/or polar solvent products."

Image Credit: Adobe Stock

Fire and explosions can have catastrophic consequences in the oil and gas industry.

"By protecting vital cables, you will reduce the chance of down time of the facility and at the same time significantly extend the life of electrical cables," they say.

Johnson Controls is also addressing the untapped Lithium-Ion battery monitoring market by launching Lithium-Ion risk prevention systems. Another innovation is its Sapphire Plus gaseous suppression system, which enables flexible clean agent fire protection systems. It provides ideal fire protection for sensitive, high value equipment.

As the pressure to reach net zero emissions mounts, the oil and gas sector is increasingly shifting towards hydrogen fuel from coal/gas. But since flame is almost invisible when hydrogen burns, it is necessary to keep special early-warning gas detectors handy. With a wide range of flammable concentrations in air and lower ignition energy than gasoline or natural gas, hydrogen can ignite more easily.

"When hydrogen is detected, our VESDA ECO system can automatically activate a ventilation system to help prevent a buildup of explosive levels of hydrogen gas. If hydrogen levels continue to increase, an alarm can notify staff," said Hawari.

A few such precautions are all it takes to prevent another Piper Alpha or Deepwater Horizon. ■

A forum to discuss critical issues and the latest trends

The MENA HSE Forum, which took place on 6-7 September at the Grosvenor House, Dubai, was a resounding success.

THE EVENT DELIVERED a well structured programme combining presentations and panel discussions to more than 150 delegates from the HSE community of the UAE, Saudi Arabia, Qatar, Oman and Bahrain.

The programme commenced by exploring various aspects of safety management, including presentations by Saleh Albalushi, head of HSE, Drydocks World, on building shared commitment for safety within an organisation, and on achieving sustainable results through HSE culture transformation strategy by Sultan Karrani, senior engineer – HSE, ADNOC.

To help organisations strategise on occupational safety standards, Eng Mohamed Abdula Almarzooqi, head of Accident Investigation Team – Health & Safety Department, Dubai Municipality, outlined the most common causes of accidents in Dubai industrial sectors, revealing that falls from height accounted for nearly 38% of the accidents in Dubai. The audience also gained access to a case study on the crisis management planning and mitigation strategies adopted by DAMAC Properties that led to optimal recovery from the pandemic.

The panel discussion on Day 1 further examined crisis and business continuity management through a debate on the need for agility and flexibility while having a structured approach in place, supported by clear strategies for communication and escalation in times of crisis.

Digital transformation in the HSE sector was a key area of focus at the Forum, with discussions and presentations continuing into the second day. Lynn Hoballah, head of Health & Safety, Petrofac, demonstrated how her organisation is making use of social media and gamification for greater employee engagement. The impact of disruptive technologies in solving HSE requirements was further debated by a panel that examined how these can be used to improve HSE operational efficiency and help in mitigating risks.

Lessons on occupational health and behavioural safety during the pandemic were addressed by Dipl Ing Peter Michael Hamel, department head OHSE, Be'ah, quoting from his experiences in Oman during the lockdown.

Image Credit: Alain Charles Publishing

The forum focused on ways to cut LTIs and optimise productivity.

The HSE Forum's focus on sustainability and the environment included diverse perspectives such as the value that ESG is creating in the aluminium industry. An update by the Dubai Municipality, delivered by Dr Jasminka Jaksic, senior environmental specialist, gave the audience an insight into how the Dubai Municipality monitors conformance to air quality regulations. Dubai Municipality's interactive display on air quality at the HSE Forum's Technology Showcase Hall invited the attention of delegates.

MILWAUKEE, a gold sponsor of the event, showcased its range of power tools combining innovation with cutting-edge battery technology, providing solutions for diverse trades and applications.

Another gold sponsor, Next World, is a provider of VR training. Their VR Learning Management System (LMS) helps effectively induct, train and up-skill employees through immersive VR training experiences.

The digital sponsors of the Forum included Benchmark ESG, which enables companies to implement Environmental, Social and Governance (ESG) solutions through its software suite for ESG reporting, sustainability and operational compliance; intenseye offering AI solutions for increased workplace safety; and iOmniscient providing AI-based multi-sensor analytics for health, safety and security applications.

The first day of the forum was ably chaired by Dr Rahaf Ajaj, research cluster lead for climate change and public health at Abu Dhabi University. She said, "Thank you to everyone who helped make this event a huge success. The passion and good attitude contributed to this. Special thanks to the organising team for inviting me to chair this important event."

Dr Eng Hani Hossni, EHS director, Abu Dhabi Waste Management Centre – Tadweer commented, "The HSE Forum provided immense opportunities for networking and sharing knowledge as well as ideas."

Naveen GV, global development officer and managing director, Benchmark Digital Partners LLC, who chaired the second day, summed it up well when he said, "The MENA HSE Forum 2022 covered all aspects of the HSE spectrum, discussing critical issues and the latest trends." ■

Image Credit: Adobe Stock

The transition to green hydrogen and the acceleration of renewable energy must work together.

The role of green ammonia in the hydrogen fuel economy

Collin Hamilton, chief operating officer and head of engineering at Verano Energy, says green ammonia has the potential to be the fossil-free 'crude' of the hydrogen fuel economy.

HYDROGEN HAS THE potential to decarbonise a wide range of heavy industries including energy, chemicals, steel and cement, which means demand is going to be huge. In its Net-Zero Emissions scenario, the IEA expects demand to increase fivefold from 2020 to 2050. However, there are a few important limitations to overcome for hydrogen to become competitive. The first challenge is to produce sufficient supply of renewable 'green' hydrogen; the next is to be able to store it in large quantities; and then to establish the required infrastructure to trade and transport hydrogen. This is where ammonia comes into play. Consisting of one nitrogen and three hydrogen atoms, the ammonia molecule (NH_3) has the potential to support the hydrogen fuel economy in all three domains.

Making hydrogen competitive

Today, most hydrogen is produced from fossil fuels through steam methane reforming, generating 830 Mt of annual CO_2 emissions. Carbon-free 'green' hydrogen is produced using electrolysers to split water molecules to separate the hydrogen from the oxygen. It is an expensive and energy intensive process, but when the energy used is from renewable sources (hydro, wind or solar), then it provides a versatile, fossil-free energy carrier.

How can hydrogen be made more competitive? Firstly, by using renewable energy rich sources such as solar PV in Chile, Saudi Arabia, and Australia, where it will be extremely competitive to produce. Secondly, by ramping up renewable energy production and deploying electrolysers to produce hydrogen with 'excess' or 'curtailed' renewable energy. In other words, it will allow for a higher percentage of renewable energy to enter the market by reducing renewable curtailment.

> "The ammonia molecule has the potential to support the hydrogen fuel economy in all three domains."

Reducing renewable energy curtailment

The intermittence of renewable energy means that there are periods of very high energy production which do not match demand. The supply from renewables, particularly solar, becomes so high that the amount of electricity generated threatens to overwhelm the grid capacity. Although battery energy storage systems are being developed, they are not yet capable of capturing and storing this amount excess energy. The result is curtailment. This is where grid operators shut down access to the grid or adopt pricing mechanisms to generate

negative pricing to reduce production. Some estimates put renewable energy curtailment as high as 20% of capacity.

Rather than curtailing excess renewable energy, the solution would be to use this excess to produce green hydrogen. By installing electrolysers at major substations that are connected to renewable plants, green hydrogen production can act as a load balance. It would be cost competitive, because the renewable energy would otherwise be wasted, and it allows renewable operators to be paid for every megawatt hour they produce. No energy is lost.

In this way, green hydrogen production would incentivise further growth in renewables. However, it must not detract from the availability of electricity for other essential and more effective uses – it must be additional. The transition to green hydrogen and the acceleration of renewable energy generation must work together.

Hydrogen could also play a useful complimentary role to current energy storage solutions. Batteries are a cost-effective way to store energy on a daily or potentially weekly basis but because curtailment is usually seasonal, it will never be cost effective to store six months' worth of energy in the batteries, at least the ones we know exist of today. If renewable energy is going to replace fossil fuels, we will need seasonal or even annual storage as well as international trade of renewable energy. Green molecules are perfect for this.

Green ammonia as a key enabler of the hydrogen revolution

While most of the hydrogen produced will be fed into existing pipelines and traded regionally, some regions such as Latin America, the Middle East and North Africa have the potential to produce more clean hydrogen than needed. Other regions such as Japan, Korea or Hawaii will have insufficient renewable sources and will need to import hydrogen.

But transporting hydrogen over long distances is not efficient and does not make much economic sense. The transportation of hydrogen in large quantities from one continent to another would require a whole new liquefaction and distribution infrastructure of ports, terminals and storage. This is where ammonia provides a competitive solution.

A recent report published by IRENA estimates that over half of the global trade in hydrogen will be in the form of ammonia. This is because hydrogen is liquefied at -252°C. It is extremely reactive, requiring specific corrosion-resistant materials which makes storage and transportation excessively expensive. Ammonia, on the other hand, can be condensed to liquid at -33°C, making it much easier to store and transport. The infrastructure already exists, with terminals at 120 ports around the world.

Collin Hamilton, chief operating officer and head of engineering at Verano Energy.

Image Credit: Verano Energy

Moreover, the process technology to condense hydrogen and transform it into ammonia has a very high efficiency rate. Installing ammonia crackers alongside centres of green hydrogen production and consumption will support the development of a hydrogen fuel economy. These crackers are still not commonly available, but their theoretical efficiency is high. Efforts should be made to develop them quickly at scale.

Energy storage is another benefit, the relevance of which has been highlighted in the energy crisis caused by the war in Ukraine.

> "Some regions, such as Latin America, the Middle East and North Africa, have the potential to produce more clean hydrogen than needed."

Ammonia can be stored for as long as necessary, providing an important reserve of energy security. Cheap large storage tanks remove the need to have production and consumption closely aligned.

Continued research and development opens up additional uses for ammonia. On top of its role as a hydrogen carrier, ammonia can also be used as a fuel, especially for shipping. Although it is less flammable, the energy density of ammonia is 1.5 times higher than liquid hydrogen. Collaborative efforts are underway to develop safe, reliable and environmentally friendly marine engine technology. A European consortium aims to have a zero-emissions vessel running on ammonia fuel by 2025.

Power generation offers another application, where ammonia could be used as a fuel to replace coal, heavy fuel oil or diesel. Admittedly, this is not the most efficient way to use ammonia and hydrogen. The only valid reason we would do this is to accelerate the adoption of green hydrogen and take advantage of existing infrastructure. Japan is looking to develop a co-firing coal- and ammonia- fired power plant. Direct ammonia turbines using hydrogen as an accelerant to improve firing are currently under development. Ammonia turbines could provide a more cost-effective net-zero alternative to carbon capture or battery storage, especially for nations which currently operate diesel turbines. Research in this field, to resolve the issue of NOx emissions, needs to be rapidly ramped up.

Finally, green ammonia can be used as a building block to produce other chemicals including fossil-free fertilisers. Various projects are underway which consider alternative ways of combining carbon and hydrogen to build plastics. These could involve carbon capture and utilisation to produce hydrocarbons rather than releasing CO_2 into the atmosphere.

Green ammonia can be a cornerstone of a net zero future

Green ammonia's role in the energy transition is going to be huge. In summary, renewable energy, hydrogen and ammonia will all work together as we transition away from fossil fuels to meet our net-zero targets. But capacity needs to be massively scaled up to reduce costs and be more competitive. Once this is achieved, ammonia becomes the global renewable energy commodity, with the flexibility to be used as an energy carrier, as a fuel and as a building block for other chemicals. Just like crude oil today. ■

Verano Energy is developing over 30 GW of hydrogen projects in Chile and Peru, one of the largest project pipelines in the world.

Unlocking the value of IIOT-
connectivity is key

Alastair MacLeod, CEO of remote connectivity provider Ground Control, argues that despite the myriad of measurable benefits IIoT offers, everything will fall at the first hurdle if connectivity isn't addressed as a priority.

Satellite connectivity delivers accurate, real-time data for full operation visibility.

Image Credit: Adobe Stock

GLOBALLY, THE OIL and gas industry has been in the spotlight in recent months, arguably more so than ever before. While there is a mutual drive for nations to reduce reliance upon hydrocarbons, energy security has climbed the agenda, not least because of the conflict in Ukraine. This has meant a shift – even if it's a temporary one – in strategy, which has impacted economies and upstream suppliers significantly.

What is evident however, is that the industry continues to innovate to meet challenges like these head on, and IIoT is at the heart of this. Given the often hostile and remote nature of the environments oil and gas plants are situated, the ability to monitor and analyse data, enabling quick, effective business decisions, and automation would not be possible without edge computing and the rapid, real-time delivery of data.

However, the biggest challenge is how that data is carried. Despite enhanced roll-out of faster wireless 4G / 5G services, a tenth of the population in the Middle East is not covered by cellular connectivity – even before accounting for the more remote areas – and there are issues of speed and congestion which need to be addressed

Connecting the dots

In a recent report, analysts McKinsey & Co, suggested that advanced connectivity "could add up to US$250bn of value to the industry's upstream operations by 2030." In addition, the report also recommends that technology to improve connectivity needs to be leveraged. And that's where satellite comes in.

> "There are data challenges at every stage of the well lifecycle."

There are data challenges at every stage of the well lifecycle, and while for many operators, satellite has been deemed an expensive option in the past, it is reducing in cost as more providers diversify their offering. In addition, and crucially, the cost of an 'always on' connectivity solution is a drop in the ocean when compared to the potential costs and repercussions of having no data to support operations. Especially when you consider the bandwidth required for such data is relatively low – we are not livestreaming HD video here.

The challenge in the Middle East

If we take a closer look at the specific

challenges in the Middle East, which still has some of the largest oil and gas companies in the world, an ageing workforce coupled with a skills shortage has been exacerbated by the uncertain economic climate caused by Covid-19 and recommendations following COP26.

In a report produced by MEED in November of 2021 – *Delivering Energy Transition, The digital transformation of Middle East oil and gas* it says for plant owners IIoT has, "the capability to improve data collection, storage, integration, and analytics" – as well as strengthening the ability to operate in harsh, remote environments. However, "the benefits IIoT can deliver ultimately depend on the plant's communications network's speed and performance."

The report continues to suggest that 5G will play a crucial role in the Middle East's digital transformation. But the roll-out has been uneven across the region. In contrast, Europe for example, has accelerated the deployment of 5G infrastructure due to strong financing provided by the Next Generation EU Plan – a temporary measure to help support the economic and social damage caused by Covid-19 to the tune of €750bn (US$868bn).

The dichotomy here is that the mass roll-out of a terrestrial network is great on one hand as it meets most requirements. But it doesn't offer backhaul or redundancy, for when terrestrial infrastructure is compromised, nor does it offer connectivity for remote areas which often cannot economically be reached.

So vital is energy as a world resource and so important the Middle East to meeting global demand, that resilient connectivity has shifted from being desirable to being a prerequisite in the smooth uninterruptible supply of all forms of energy.

Satellite is currently the only fail-safe option to ensure connectivity is not compromised. It enables companies to retrieve real-time data, from previously unreachable sites, and provides a robust failover should anything happen. Satellite connectivity, including the new low earth orbit (LEO) satellites – which offer improved speed and ultralow latency to transmit sensor data back to SCADA software, is reliable, effective, and capable of bridging the gap between legacy technology and digital service evolution. What is more, it can be implemented at a far lower cost than many might think, particularly in the case of devices which support exception reporting.

Alastair MacLeod, CEO of Ground Control.

> "Satellite allows timely delivery of critical information."

The impact of no connectivity

Without consistent, reliable connectivity, and subsequently the ability to manage vast streams of data, oil and gas companies not only become operationally hamstrung, but the impacts will be felt in performance and on the bottom line.

Robust connectivity is crucial for all the reasons so far outlined. But crucially, it keeps an oil and gas company efficient and operational – critical in the turbulent times we now face.

Satellite allows timely delivery of critical information, negating the requirement for employees to make frequent and costly onsite visits in areas not serviced by 4G / 5G, and provides the ability to diagnose problems online before any production time is lost and costly breakdowns occur.

From exploration through to drilling, hydraulic fracturing, flowback well testing production, artificial lift and enhanced oil recovery, satellite connectivity delivers accurate, real-time data for full operation visibility. Not just when it is needed, but autonomously.

We have supported oil and gas production for decades, and we have never been more excited about the potential of new IIoT-based satellite services. From edge computing devices to artificial intelligence and machine learning, the oil and gas industry has never had more sophisticated capabilities to optimise data capture and automate processes. But that comes with a caveat – without the connectivity infrastructure to transfer sensor data from anywhere in the world, regardless of location, the value of IIoT falls dramatically. Data gaps and interruptions can ultimately lead to very poor business decisions.

Over the coming decade, potentially thousands of satellites, including NanoSats for remote surveillance around the world, will be launched into Earth's orbit and this will alter how all industries operate, providing even greater opportunity at more affordable costs for oil and gas companies to maximise their data, and operations. ■

For further information about Ground Control, its products and services, visit: https://www.groundcontrol.com/en/

Hiber debuts satellite-powered pipeline monitoring solution

HIBER, THE IOT-AS-A-SERVICE provider that serves the oil and gas sector, has expanded the capabilities of its HiberHilo solution to transform remote pipelines into continuous digital streams of operational data. HiberHilo pipeline monitoring makes it economically feasible to include constant monitoring of even the most remote pipelines to reduce risk, increase uptime and lower operational and maintenance costs.

"Our oil and gas customers have been extremely satisfied with the capabilities of HiberHilo on wellheads, and challenged us to deliver a more comprehensive network view of their extraction and distribution operations – especially those situated in remote areas where it's economically unfeasible to implement an over-the-air digital connection," said Hiber CEO Roel Jansen.

Pipelines present potentially enormous environmental and reputational risk to oil and gas operators, but until now, monitoring them has been expensive. For example, the pigging of a pipeline is important for maintenance and to optimise flow, but it is costly. By monitoring the pressure, flow, or temperature of a pipeline and its contents at strategic points, HiberHilo helps optimise the operation of pipelines at a low price. This is especially valuable for pipelines in gathering networks or remote parts of transmission networks.

"With HiberHilo's new, expanded capabilities, we can deliver reliable monitoring services to remote pipelines at a breakthrough price. This means operators gain access to efficient and economical operation of more of their pipelines, enabling higher throughput, improved pipeline integrity and safety across more of their pipeline networks, while meeting risk management and sustainability goals," added Jansen.

Advancing digital ambitions

Sarfaraz Ahmed, chief information officer, Asia, Middle East and Africa (AMEA), ENGIE, discusses the company's digital transformation initiatives.

How is digital transformation helping ENGIE to achieve more efficient and sustainable operations in the face of current industry challenges?

At ENGIE, digitalisation is one of the key pillars of our global strategy. By pursuing digital transformation, we can deliver higher efficiency, greater reliability of our products and services, shortened time to market, and most critically, advance our decarbonisation objectives to reach net-zero by 2045.

For example, digitalisation is key to making power generating assets more efficient and the electric grid more secure and resilient, and helping to reduce waste. It will be critical to minimising operating costs while maximising effectiveness, especially in the case of renewable energy sources such as biofuels, renewable hydrogen, wind, and solar. Moreover, with over one-third of global CO_2 emissions related to the power grid, greater efficiency driven by digitalisation will contribute significantly to climate action goals.

Digitalisation is more relevant than ever in the context of smart cities, as local governments worldwide look to implement digital green initiatives that support efficiency across urban infrastructure and services in addition to helping energy efficiency and cost savings.

How are ManageEngine solutions helping ENGIE to have visibility and control over its operations?

ManageEngine provides ENGIE with tools for IT infrastructure management. We are using ManageEngine solutions extensively in the Middle East region, mainly for IT service monitoring, reporting, and compliance requirements. Using ManageEngine Endpoint Central, the time it took to patch our systems was reduced from five to two days. ManageEngine ADSelfService Plus helped reduce our IT help desk calls by 15%. ManageEngine ServiceDesk Plus has helped us greatly when it comes to IT inventory management.

Image Credit: ENGIE

Sarfaraz Ahmed, chief information officer, Asia, Middle East and Africa (AMEA), ENGIE.

To what extent is cyber security a concern, and how can digital solutions promote secure operations?

Cybersecurity is a major challenge for a group the size of ENGIE. We are at the heart of energy transition, so it is critical that our industrial and business assets remain secure.

As cybersecurity threats increase due to geopolitical situations across the globe, it is becoming vital for ENGIE to use contemporary digital technologies to combat cybersecurity threats.

We have several systems in place to counter the risk of a cyberattack including a cybersecurity monitoring centre, which keeps a constant eye on our networks and critical infrastructure, and helps monitor online attacks. All of these systems are regularly updated to adapt to new cyberattacks.

> "ENGIE sees technology moving from purely a support function into a key business enabler."

What are your future ambitions in terms of digital transformation?

ENGIE is undergoing significant digital transformation and sees technology moving from purely a support function into a key business enabler in a market increasingly focused on digital technologies and data management.

For example, looking to the future, more energy will be produced by decentralised, renewable sources, adding complexity to energy grids across the globe. The IT infrastructure of these decentralised energy-producing sources needs to be monitored in real time for reliability and availability, ensuring compliance to contractual and regulatory requirements.

In this context, we expect the scope and utilisation of ManageEngine solutions to grow in the areas of IT service management, compliance and reporting, supporting ENGIE's purpose to accelerate the transition towards a low-carbon world. ■

Combatting climate change with AI

A new report titled How AI Can Be a Powerful Tool in the Fight Against Climate Change, reveals a strong appetite for using AI to tackle climate change, as well as obstacles to achieving impact at scale.

CLIMATE CHANGE WILL have significant impacts on environmental, social, political and economic systems around the world. Climate change mitigation, along with adaptation and resilience, is therefore crucial. Efforts to achieve net-zero emissions by 2050 will be essential, as will efforts to prepare for the consequences of climate change and to minimise the resulting harm. Applying advanced analytics and artificial intelligence (AI) to climate challenges provides a vital way to make meaningful change at this critical moment.

According to the new report from the AI for the Planet Alliance, produced in collaboration with Boston Consulting Group (BCG) and BCG GAMMA, 87% of public- and private-sector leaders who oversee climate and AI topics believe that AI is a valuable asset in the fight against climate change.

Based on survey results from more than 1,000 executives with decision-making authority on AI or climate-change initiatives, the report finds that roughly 40% of organisations can envision using AI for their own climate efforts. However, even among these experts, there is widespread agreement that significant barriers to broad adoption remain in place: 78% of respondents cite insufficient AI expertise as an obstacle to using AI in their climate change efforts, 77% cite limited availability of AI solutions as a roadblock, and 67% point to a lack of confidence in AI-related data and analysis.

"Beyond residences and offices using smart meters to monitor and control power usage, every sector, from manufacturing to real estate, can go green with AI. Integrating AI to track and reduce carbon footprint will enhance overall operations' efficiency and reduce resource usage," said Elias Baltassis, partner & director and BCG GAMMA lead for the Middle East. "The deployment of machine learning models, focused on greenhouse gas (GHG) emissions abatements optimisation, will accelerate initiatives for achieving net-zero emission targets across sectors."

"There is very significant potential in leveraging digital technologies to reduce emissions. The World Economic Forum estimates that 15% of global emissions can be reduced, and even up to 20% in high-emitting sectors. BCGs own experience shows that using AI alone can deliver 5-10% of the required emission reduction – and save costs in the process. This is particularly important in the Middle East, where countries have high technology aspirations and are rapidly accelerating climate commitments and actions," added Simon Birkebaek, Middle East climate & sustainability topic lead and partner, BCG.

> "AI alone can deliver 5-10% of the required emission reduction – and save costs in the process."

Uses of AI in combatting climate change

Global leaders can use AI to achieve their goals in multiple ways:

- **Mitigation:** One of the most critical uses of AI is in the measurement, reduction, and removal of emissions and GHG effects. More than 60% of public- and private-sector leaders see the greatest business value for their organisations in the reduction and measurement of emissions. According to BCG, use of AI can drive reductions of 5% to 10% GHG emissions, or 2.6 to 5.3 gigatons of CO_2e if applied globally.
- **Adaptation and resilience:** Adapting to climate change is a critical undertaking for policy makers and the public, as it boosts resilience to the effects of both long-term climate trends and extreme weather events. AI is well suited to help project climate-related hazards, whether by improving long-term projections of localised events such as sea-level rise or by upgrading early warning systems for extreme phenomena such as hurricanes or droughts.
- **Fundamentals:** AI can be used to support research and education efforts about climate change, helping stakeholders understand the risks and implications involved and encouraging them to share what they learn. These efforts support and magnify ongoing work toward mitigation and adaptation and resilience.

Need for meaningful support

A multitude of critical uses for AI exist in the climate change arena, but any successful AI solution must be user-friendly and readily accessible. It must offer tangible benefits to the user and provide clear recommendations that are easy to act on. AI solutions therefore need much more meaningful support, including access to capital investment, decision makers, and trained practitioners.

"AI has strong promise to help solve the climate crisis, but AI alone is not enough. It depends on the will of decision makers to act and make necessary changes – supported in part by AI and other emerging technologies," said Damien Gromier, founder of AI for the Planet and a coauthor of the report. ■

AI for the Planet has invited all interested parties to participate in its call for solutions, with proposals in any stage of maturity (if ready for a first pilot, at a minimum) and from any sector, whether private, public, academic, or nonprofit. Support for each solution chosen will be tailored to its needs and may range from customised commercial or technical support to investor relationships and network development. To learn more about the call for solutions or to apply, please see https://www.aifortheplanet.org/en/registration/call-for-solutions

See detailed survey findings and information about the report at www.bcg.com

LED technology for control room applications

Barco gives five reasons to choose TruePix direct-view LED for your control room.

MORE AND MORE control rooms are choosing direct-view LED technology for their video wall. With the introduction of Barco's TruePix platform, finally there is an LED solution that easily meets the most stringent requirements of the control room market.

LED technology has been used for many years, mainly for advertising and the live entertainment industry. As LED manufacturers continued to reduce the size of LEDs, direct-view LED also became more suitable for control room applications. The reduced pixel pitch now allows operators to see content from a shorter distance. Another reason why direct-view LED has become more attractive for control room applications is the price reduction of LED modules.

Barco's new TruePix platform builds on our 25 years of LED manufacturing and recent achievements in video wall innovation, but it also goes a few steps further. Thanks to a number of game-changing Barco developments, it has become more attractive than ever to invest in LED.

Here are five reasons why TruePix LED technology is a great idea for your control room.

LED has become more attractive for control room applications.

Image Credit: Adobe Stock

1. Accurate visualisation of critical content

Control room operators need to be able to view their video wall content with full confidence. Barco's TruePix LED platform ensures accurate visualisation of critical content in impeccable image quality through a combination of smart engineering and advanced image processing:

- A flat wall and seamless image, thanks to perfectly aligned LED modules and a self-regulating wall structure
- A high-performance processing platform Infinipix Gen2, which ensures colour accuracy and contrast at any brightness level
- Colour-critical accuracy in both dimmed mode and at full brightness with the same colour tone, colour bit depth, grayscale and level of detail

2. Improved operator well-being

Control room staff need a video wall that is designed for operator well-being and visual comfort. Driven by Barco's InfiniPix Gen2 processing platform, TruePix allows operators to see bright and sharp images for all types of content, with uniformed colours across the overview display. This offers the highest viewer comfort, prevents eye fatigue, and reduces stress levels.

3. Ready for 24/7 operations

Today's control rooms need a video wall that is up and running 24/7. TruePix offers:

- Redundancy of several critical components to maximise uptime in case one component fails
- A smart failover system to ensure an uninterrupted data flow
- High serviceability and easy module replacement, reducing service downtime to a minimum

4. Easy, risk-free installation

The installation of a video wall is critical because it defines what the video wall will look like for many years. TruePix is the first LED video wall platform that pays so much attention to a seamless, risk-free installation. TruePix offers:

- A smart mounting structure that neutralises imperfections of the underlying wall surface
- A camera-guided module placement, reducing the risk of LED damage
- Full front and rear access, which makes installation easier and less intrusive.

5. Long-term supportability

A video wall is an investment for the long haul. Barco has been investing continuously in technologies and services that make LED a safe choice for many years. TruePix is future ready, thanks to:

- 10 years of dedicated support for your system
- Fast resolution with fully batch-compatible modules
- Remote video wall management
- Barco's EssentialCare and SmartCare Services
- Solid network of regional service partners ■

AMETEK Magnetrol offers 80 GHz radar transmitter

AMETEK MAGNETROL'S NEW Pulsar Model R80 radar level transmitter exemplifies the famous line, "simplicity is the ultimate sophistication". Building upon the company's leading radar technology portfolio, Magnetrol now offers an 80 GHz radar transmitter for the industrial market.

FMCW technology and an 80 GHz operating frequency allow for superior performance, smaller antennas, better accuracy and enhanced resolution. Additionally, the company's configuration wizards and proactive diagnostics make commissioning and troubleshooting easier than ever. As is typical with Magnetrol loop-powered devices, the transmitter housing may be separated from the antenna without disrupting the process seal.

Image Credit: Magnetrol

FMCW technology and an 80 GHz operating frequency allow for superior performance.

As for applications, the Model R80 is minimally affected by turbulence, foam or excessive vapours as is often the case with ultrasonic transmitters and some radar products. The smaller antennas and narrower beam angles allow it to be installed into vessels with smaller process connections and those with internal obstructions that must be avoided.

Some highlights of the new Model R80 include 80 GHz signal with beam angles as narrow as four degrees; process connections down to ¾ inch NPT; measuring range of 30 m (100 ft); software wizards to walk a new user through the commissioning process; proactive diagnostics to not only advise what the problem is but also offers troubleshooting tips; replaceable transmitter head without breaking the process seal (i.e., pressure boundary); SIL 2 compliant with 92.3% SFF; global hazardous location approvals, and FCC, ETSI, and ISED communications approvals for use on both indoor and outdoor vessels.

For more information, visit radar.magnetrol.com.

Expro's iTONG cuts up to 146 tons of CO_2

ENERGY SERVICES PROVIDER Expro is leading industry efforts to meet environmental targets with the development of a digital technology that can help drilling contractors and operators cut an estimated 146 tons of CO_2 emissions annually – the equivalent of 58 transatlantic flights.

Image Credit: Expro

The iTONG system is one of the industry's most technologically advanced solutions.

While the oil and gas industry has introduced many digital innovations, tubular running services (TRS) is an area which has historically lagged. Expro, however, is driving greater rig floor automation thanks to its iTONG system. In addition to cutting emissions, the system is designed to help protect personnel and is estimated to save operators nearly 50 hours of rig time and US$2mn annually, per installation.

The iTONG system is the industry's most technologically advanced, single-push button tubular make-up solution which allows the operator to control, execute, verify and validate every connection make-up via a tablet or their control chair. It ensures joints of casing and tubing can be made to a specific torque, or broken out in an automated sequence, with the single push of a button.

With a reduction in the number of personnel required for tubing operations, a rig using iTONG can reduce annual emissions from rig time, travel and accommodation by an estimated 146 tons a year – the equivalent of removing 58 10-hour flights from Oslo to Houston over the course of a year.

Jeremy Angelle, vice-president, Well Construction, said, "iTONG offers seamless integration into existing automated rig operations and marks a key step toward fully autonomous tubular running. Digital solutions are increasingly being deployed to enhance operations, improve reliability for well integrity, and reduce personnel on the rig floor, which is resulting in improved safety and efficiency, with lower operational costs across the industry."

The technology has undergone significant field trials on a high-efficiency jack-up rig in the North Sea, taking part in 22 jobs, resulting in more than 1,600 connections being made.

For more information, visit: expro.com

Zalux showcases super-resistant luminaires range at Gastech

INDUSTRIAL LIGHTING SOLUTIONS provider, Zalux, launched a new addition to its innovative Strongex range of luminaires at this year's Gastech Exhibition & Conference.

The STRONGEX G2 offers exceptional resistance to harsh environmental conditions, is available with options for Ex Zone 1 or Zone 2 installation and is an ideal solution for applications across the oil & gas, chemical, petrochemical and energy sectors.

The STRONGEX G2 is designed to promote sustainability with low energy consumption, extended lifecycle, low maintenance overheads, and a recyclable PMMA profile. The G2 model further incorporates an openable to enable access for maintenance, easy change of the emergency battery, increased flexibility for installation, and even though the luminaire offers an exceptional 100,000-hour lifetime, the ability to replace internal components to further extend life and promote a circular economy. The unit's superb energy efficiency and lifetime can be further enhanced the availability of DALI dimmable versions and optional emergency kit. A wireless control version is also available for the Ex Zone 2 model.

A high-quality plastic housing protects the luminaire from even extreme weather conditions, including corrosive salty environments, and provides high resistance to chemicals that may be present. The unit has no external aluminium parts, further promoting its resistance to corrosion, and can work in a wide temperature range. Its profile incorporates a heatsink with fins that helps improve heat dissipation within the luminaire and ensure excellent performance throughout its lifetime.

Designed for flexible application and installation, the STRONGEX G2 is available in lengths from 300 to 1,500 mm with high-efficiency. Optics can also be fitted to adapt to the specific needs of each space. The luminaire offers four cable entries, two on each side of the unit, to enable through wiring on the same or opposite sides of the fitting. And it incorporates and Ex-certified push-wire internal connectors, with up to eight poles.

Mounting accessories use 301 stainless steel and, for areas exposed to chemicals, fixing clips and locking screws can also be provided in 316 stainless steel to increase resistance to corrosion. A variety of mounting options, including pole mounting, are available to ensure versatility and ease of installation.

Nidec Leroy-Somer provides alternator for demanding application

WHEN DUBAI-BASED Precision Industries LLC (PI) won a bid for a very high capacity – 3000 kVA (Medium Voltage 3.3 KV) – generating set for a diversified and integrated group of energy companies in Abu Dhabi, it tasked Nidec Leroy-Somer with providing the required alternator. As a leading manufacturer of diesel power generating sets, PI has been working with Nidec Leroy-Somer as an OEM for other projects. Nidec Leroy-Somer is a French company with more than 100 years of experience in manufacturing high output industrial alternators, along with the supporting peripherals.

Image credit: Nidec Leroy-Somer

The 3000 kVA genset.

The project

The project site – an onshore oil & gas installation – located in Abu Dhabi, UAE, has an ambient temperature range up to 55°C and high humidity above 95%, and is also marred by sandstorms. The requirement was for three customised generating sets of varying power capacity with tight delivery schedules.

The power generation requirement for the largest of these three units is 3000 kVA Prime-rated generating set with 10% overloading – a 3300V, 50Hz, IP55 alternator with a matching prime mover mounted in a totally enclosed, customied heavy-duty enclosure (IP55). The current and voltage transformers used in this generator are equipped with highly advanced protection including differential protection (Class PX), restricted earth fault protection and short circuit protection, advanced digital AVR, and customised terminal boxes to accommodate oversized armoured power cables.

The alternator

Engineers at Nidec Leroy-Somer studied the requisition for the customised alternator: LSA 56 BL75 / 4p 3000KVA 3,3KV 50Hz Class H/B @ 55°C IP55 CACA totally enclosed machine with very special options.

After detailed deliberation with PI and the end user, Nidec Leroy-Somer finalised the design. Once built, the alternator was subjected to the Factory Acceptance Test at the Nidec Leroy-Somer works in France, on a unique special test platform, where it is subjected to a closed loop test at full load. The acceptance test was witnessed by customer representatives and other parties. The Nidec Leroy-Somer alternator was then shipped to the UAE for the assembly of the generating set.

"This alternator is not something that many companies can deliver. We are proud that Nidec Leroy-Somer is one of the few companies who can meet such stringent specifications for an alternator. This also applies to Precision Industries, who then took over the job and put in a lot of effort in integrating the alternator in the generator set. There is a huge amount of engineering that has gone into this project," said Nawar Shubbar of Nidec Leroy-Somer.

The generating set

Precision Industries went through a complete project management process that included engine sizing and selection, alternator sizing, cooling system, containerisation, fire detection and suppression and complete integration of control and protection systems.

The engine is equipped with after treatment for emission control with Selective Catalytic Reduction (SCR) system – an advanced active emissions control technology – as the customer insisted on emission control in view of environmental concerns.

The fully welded, totally enclosed drop over type enclosure – rated IP 55 on standby, and IP 44 in operation condition – with dimensions (LxWxH) 16m x 4m x 4m was designed and fabricated in-house by PI in the UAE.

The fire detection and suppression system are IG-541 inert gas protection system, which is a complete autonomous system without human intervention.

A complete genset control and protection system with a local control panel located in the generator unit and a remote-control panel in the sub-station with an interface between the two, with connectivity with the SCADA system of the site, was manufactured in-house by PI. This system includes high-end parameters for control, complex operation philosophy based on site requirement, high-end protections with redundant serial communication and complete controls over the generator unit.

"We are very proud to be working with Precision Industries, a local partner in this highly specialised field of generating sets. It is very important for us to support UAE enterprises in their plans to localise the industry, and transfer the knowhow," concluded Shubbar.

Schlumberger launches Digital Platform Partner Program

SCHLUMBERGER LAUNCHED ITS Digital Platform Partner Program at the Schlumberger Digital Forum 2022. It will allow independent software vendors (ISV) to leverage the openness and extensibility of Schlumberger's digital platform to build new applications and software and offer them to the market. Schlumberger customers will access a broad range of interoperable digital solutions, enabling data-driven decision making across the energy value chain and rapidly accelerating the time to value from digital transformation, at global scale.

"The Schlumberger Digital Platform Partner Program brings together digital solutions from Schlumberger and a growing number of ISVs, substantially increasing the choice of artificial intelligence (AI) and data science-enriched domain workflows for customers," said Trygve Randen, director, Digital Subsurface Solutions, Schlumberger. "Our digital platform has become an open ecosystem of connected digital solutions, enabling customers to extract maximum value from their data, helping them innovate faster and drive business performance improvements at scale."

At launch, nine ISVs are offering software solutions to Schlumberger customers, and the platform has been designed with an open framework to quickly onboard new partners.

The solutions are built and deployed through the DELFI digital E&P platform and integrate seamlessly with industry-standard data platforms. This enables unprecedented value creation due to the interoperability across workflows and organisations. The ISV apps and solutions are targeting workflows across data operations, reservoir engineering, well planning and optimisation, process engineering, production optimisation, carbon capture, utilisation, and storage (CCUS), and decarbonisation technologies.

One of the current apps, Resoptima's ResX software, works seamlessly with Schlumberger solutions to deliver ensemble-based modelling of reservoirs, while continuously conditioning data. Another app, LogQA, a cloud application from RoQC, rapidly identifies sub-standard log data and uses machine learning to fix log quality issues. In the production domain, the Tachyus Aqueon App helps customers make data-driven decisions in waterflood development, management, and optimisation, quickly and easily.

Enteq launches XXT-Hop series realtime communications solution for drilling

ENTEQ, THE ENERGY services technology and equipment supplier, has announced the launch of the XXT-Hop series, its latest innovation in downhole drilling technology.

It allows drilling contractors to access real time data during live operations and offers a more efficient solution for operating equipment, which can significantly improve drilling performance, efficiency and return on investment.

Image Credit: Enteq

The XXT-Hop series allows drilling contractors to access real time data during live operations.

The communications device can be used in conjunction with Enteq's innovative rotary steerable system (RSS), the SABER Tool, or configured to work with existing RSS and measurement while drilling (MWD) systems. It offers seamless integration to send real-time drilling data to the surface.

Neil Bird, VP advanced drilling systems at Enteq Technologies, said, "The XXT-Hop series uses existing concepts and trusted technology to provide operators assurances on the reliability of the equipment, the value of the data being received and peace of mind that they have the right tools in place. Its implementation also negates the need to delay decision-making following analysis of data or downhole testing and will lead to significant reductions in downtime caused by unnecessary wear to equipment.

"This system's readiness to be used with other RSS and MWD systems on the market, and integrate with existing fleets seamlessly, offers enhanced performance without the need for significant turnover of equipment. The XXT-Hop series is also ready for renewable or environmental applications, such as geothermal drilling and methane abatement, adding to its flexibility and versatility - a key consideration for operators in a new market landscape."

The XXT-Hop series has been developed to meet market demand with an initial range of 5m / 16ft for standard equipment set up, and Enteq is currently developing a future version that will be suitable for ranges up to 25m / 80ft.

Armstrong Fluid Technology launches mobile app to optimise pump performance

ARMSTRONG FLUID TECHNOLOGY, a leading innovator in the design, engineering and manufacturing of intelligent fluid-flow and control solutions, has announced the launch of a new mobile app that brings all of the value and benefits of the Pump Manager subscription service to users of Android and iOS mobile devices.

By enabling predictive maintenance, the service reduces and mitigates risks of equipment failure, resulting in nearly 51% in savings, in addition to maintaining optimum occupant comfort. Pump Manager can be optimised in line with data-based learnings to achieve energy savings of up to 30%.

Tunji Asiwaju, global manager, cloud services at Armstrong Fluid Technology, commented, "With this new app, service technicians, facility managers and operators can receive real-time alerts and performance data, wherever they are. Service contractors may have a service level agreement for a set retainer fee, so they can really benefit from efficiency improvements in service processes. They can check a mobile device and know immediately what issue a pump is experiencing."

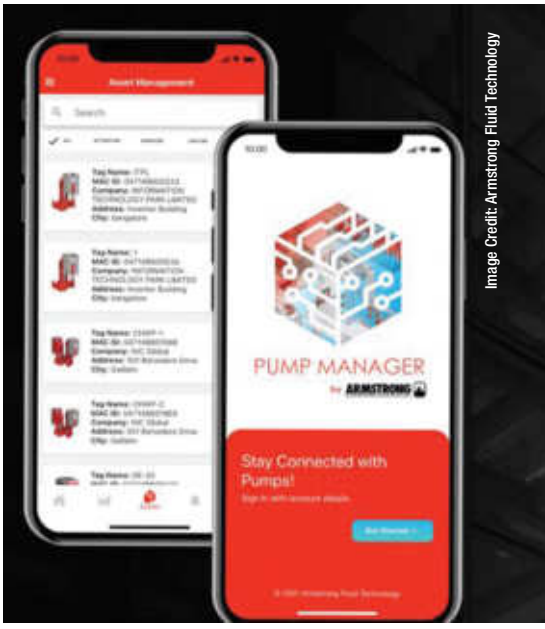

Image Credit: Armstrong Fluid Technology

The service reduces and mitigates risks of equipment failure.

Parker's new bent-axis motor series provides enhanced speed capability

THE PUMP AND Motor Division Europe (PMDE) of Parker Hannifin, provider of motion and control technologies, launched the variable displacement, bent-axis motor series, the V16. The new V16 is an evolution of the V12 and V14 motor series, and offers unique speed performance and pressure ratings for increased productivity and higher safety margins in construction, marine and offshore, oil and gas, and agriculture applications.

Image Credit: Parker Hannifin

The V16 provides flexible porting options.

The new motors are available in two sizes V16-220 and V16-270, and are designed for both open and closed-circuit transmissions with a focus on high-performance machines. Due to the V16's innovative differential piston control system, along with a three-way valve and best-in-class displacement ratio (5.5:1), the V16 offers smooth and precise control. The patented spherical piston design with laminated piston rings provides a high shaft speed capability, up to 30% higher than competitors. In combination with the high-pressure level, up to 550 bar, the V16 offers enhanced performance and long service life.

The spherical piston design also enables high volumetric efficiency of up to 99%. With the ability to downstroke motors to zero-displacement and idle, significant fuel savings can be achieved. "The new V16 is probably the most efficient variable bent-axis motor on the market," states Christian Bengtsson, product leader at Pump & Motor Division Europe. "We can significantly reduce operating costs by lowering power consumption and support OEMs' goals to reduce emissions and comply with future environmental regulations."

The V16 is available in both ISO and SAE versions along with flexible porting options, including standard axial and radial ports. Parker also offers monitoring with the addition of a new position sensor and plug-in speed sensor.

Learn more about the new bent axis motor series V16 at https://discover.parker.com/V16 or https://ph.parker.com/gb/en/axial-piston-variable-motors-series-v16

Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS, KUWAIT

Project Name	City	Facility	Budget	Status
KOC - North Kuwait/Mina Al-Ahmadi Refinery Gas Export Pipeline	Northern Kuwait	Seamless, Gas Pipeline	480,000,000	Construction
KIPIC - The Petrochemical Refinery Integration Project (PRIZe)	Al Zour	Polyethylene, Polypropylene	10,000,000,000	Feasibility Study
KOC - Al Zour New Refinery Crude Oil Pipelines	Ahmadi	Welded, Oil	845,000,000	Commissioning
KOC - Jurassic Production Facilities (JPF-4 & JPF-5)	Northern Kuwait	Gas Field, Development Drilling & Production	1,884,000,000	Construction
KOC - Jurassic Production Facilities (JPF) - JPF-4 and JPF-5	Northern Kuwait	Gas Field, Development Drilling & Production	980,000,000	Construction
KIPIC - Al Zour New Refinery - Overview	Al Zour	Exploration & Production	16,000,000,000	Commissioning
KOC - Jurassic Production Facilities (JPF) - JPF-4 & JPF-5 Off-Plot Works	Northern Kuwait	Gas Field, Development Drilling & Production	884,000,000	Construction
Al Khafji Joint Operations (KJO) - Dorra Gas Field Development	Neutral Zone	Offshore Gas Field	3,000,000,000	Project Announced
KOC - Wara Pressure Maintenance Project - Train 3	Southeast Kuwait	Development Drilling & Production	187,000,000	Construction
KIPIC - Al Zour New Refinery - Package 2 - Support Process Plant	Al Zour	Petroleum Oil	3,800,000,000	Commissioning
KNPC - New Local Marketing Depot At Matlaa Area	Northern Kuwait	Offsite & Storage Tanks	1,040,000,000	FEED
KOC - North Kuwait Gathering Center (GC) 32	Northern Kuwait	Gathering Centre	1,650,000,000	Construction
KOC - Installation of New Desalter Trains	Various	Crude Oil Distillation Unit	250,000,000	Commissioning
KOC - Water Management Project - Overview	Various	Gathering Centre	681,000,000	Commissioning
KOC - Water Management Project - Gathering Centers 9, 10, 20, 22	East Kuwait	Gathering Centre	196,000,000	Commissioning
KOC - Water Management Project - Gathering Centers 6, 8, 11, 19	Southeast Kuwait	Gathering Centre	240,000,000	Commissioning
KOC - Water Management Project - Gathering Centers 3, 4, 7, 21	South Kuwait	Gathering Centre	245,000,000	Construction
KIPIC - Al Zour New Refinery - Package 4 - Tankage	Al Zour	Storage Tanks	1,600,000,000	Commissioning
KOC - Southeast Kuwait BS-140 & BS-150 Upgrade	Southeast Kuwait	Gas Processing	300,000,000	FEED
KOC - West Kuwait BS-171 Gas Sweetening Facility	West Kuwait	Gas Processing	300,000,000	Feasibility Study
KIPIC - Al Zour New Refinery - Package 3 - Utilities and Offsites	Al Zour	Offsites & Utilities	2,100,000,000	Commissioning
KOC - Kuwait Bay Exploration	Various	Development Drilling & Production	904,500,000	Engineering & Procurement
KNPC - Mina Abdulla Debottlenecking of Coker Unit 20	Mina Abdullah	Exploration & Development	93,700,000	Commissioning
KOC - New 48'' Crude Transit Line From North Kuwait To CMM (TL-5)	Northern Kuwait	Welded, Oil Pipeline	395,000,000	Commissioning
KOC - Jurassic Production Facilities Off-Plot Works	Northern Kuwait	Development Drilling & Production	254,000,000	Construction
KOC - East Kuwait Gas & Condensate Pipeline Modernisation	East Kuwait	Gas, Gas Pipeline	75,000,000	Engineering & Procurement
KOC - South Kuwait Gas & Condensate Pipeline Modernisation	South Kuwait	Gas, Gas Pipeline	95,000,000	Engineering & Procurement
KOC - Jurassic Light Oil Export Facilities Upgrade	Jurassic	Oil Pipeline	150,000,000	Feasibility Study
KNPC - Mina Al-Ahmadi Refinery - LPG Trains - Heating Furnace Modification Project	Mina Al Ahmadi	Liquefied Petroleum Gas (LPG), Refinery	30,000,000	Engineering & Procurement

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Project Databank

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Project Focus

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KOC - New Strategic Gas Export Pipeline From North Kuwait To Mina Al-Ahmadi Refinery

Name of Client	KOC - Kuwait Oil Company
Estimated Budget (US$)	480,000,000
Contract Value (US$)	477,000,000
Award Date	2019-Q1
Main Contractor	Joint Scientific Group Larsen & Toubro
Facility Type	Seamless, Gas Pipeline
Status	Construction
Location	Northern Kuwait, Kuwait
Project Start	2017-Q1
End Date	2022-Q4

Background

The Kuwait Oil Company (KOC) plans to build a gas pipeline from North Kuwait to Mina Al-Ahmadi Refinery. The pipeline is expected to have a capacity of at least 900mn cubic feet per day of gas.

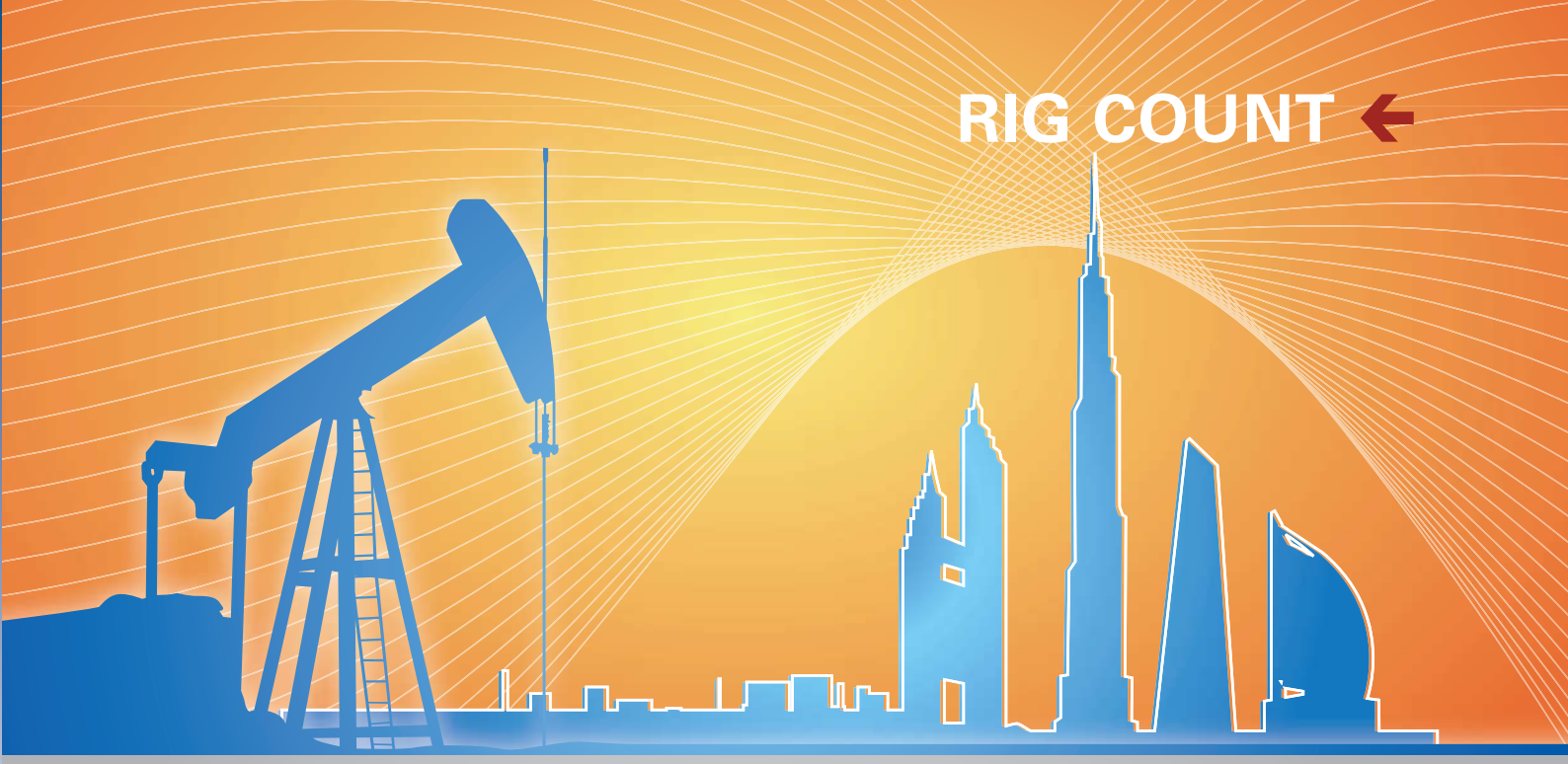
Project Status

Date	Status
Sep 2022	KOC has requested CAPT for the extension of the main contract for 242 days from April 29, 2022, to December 26, 2022.
Jun 2022	The pipeline is 96% complete and will enter the commissioning phase later in 2022.
Oct 2020	Construction work, engineering and procurement are underway.

Project Scope

The project scope includes:

- Construction of a 48-inch seamless pipeline that will extend for 160 km
- 30-40-inch helical welded pipes
- Spiral welded pipes
- Construction of a compressor station



Middle East & North Africa

The Baker Hughes Rig Count tracks industry-wide rigs engaged in drilling and related operations, which include drilling, logging, cementing, coring, well testing, waiting on weather, running casing and blowout preventer (BOP) testing.

	AUGUST 2022			VARIANCE	JULY 2022		
Country	Land	Offshore	Total	From Last Month	Land	Offshore	Total
Middle East							
ABU DHABI	37	12	49	+2	35	12	47
DUBAI	0	1	1	0	0	1	1
IRAQ	54	0	54	0	54	0	54
JORDAN	0	0	0	0	0	0	0
KUWAIT	27	0	27	-1	28	0	28
OMAN	47	0	47	+2	45	0	45
PAKISTAN	12	0	12	-3	15	0	15
QATAR	3	8	11	0	2	9	11
SAUDI ARABIA	58	10	68	-4	61	11	72
SUDAN	0	0	0	0	0	0	0
SYRIA	0	0	0	0	0	0	0
YEMEN	1	0	1	0	1	0	1
TOTAL	239	31	270	-4	241	33	274
North Africa							
ALGERIA	33	0	33	0	33	0	335
EGYPT	21	8	33	+3	24	6	30
LIBYA	2	0	2	0	2	0	2
TUNISIA	2	0	2	0	2	0	2
TOTAL	62	8	70	+3	61	6	67

Source: Baker Hughes

هذا المزيج من الأجهزة القديمة وأنظمة التحكم المتباينة ونماذج البيانات غير المتوافقة وواجهات الاتصال في الحد من قدرة الشركة على جمع بياناتها ووضعها في سياقها.

وقد واجهت شركة «كوجنايت» هذا التحدي بنفسها حين كانت تعاون إحدى شركات النفط والغاز، التي تدير 30 منصة نفطية بأكثر من 300 بئر، ولم يكن لديها نظرة موحدة لأنشطة الصيانة داخل جميع الأصول وبينها؛ وهي طريقة عمل مكلفة وعديمة الجدوى في نهاية المطاف. وحين وصل فريق البيانات للتصدي لهذا التحدي، انصب تركيز «كوجنايت» على أن تضمن أن هذه الشركة لا تستخدم الكثير من أنظمة التحكم المتباينة التي تستخدم نماذج بيانات واتصال مسجلة الملكية. وتمكنت هذه الشركة العاملة في قطاع النفط والغاز، من خلال دمج هذه الأنظمة معا في نظام أساسي مشترك، من الارتقاء بمنظومة الجداول الزمنية وتحسين التواصل بين الوحدات التنظيمية المنعزلة واتخاذ قرارات مستنيرة بالبيانات.

التركيز على احتياجات المستخدم

تكمن الوصفة السرية لكوكبة من الشركات الناجحة في شدة تركيزها على مستخدميها ورفع كفاءة عملياتها، هذا فضلا عن قدرتها على اتخاذ قرارات سريعة بقدر أكبر من الثقة واليقين. وللبيانات دورٌ هنا، ويمكن أن يضفي العمل على هيكلة بيانات المؤسسة قيمة للكثير من المستخدمين. ويكمن السر في فهم صور تفاعل الناس مع البيانات في عمليات الشركة والوعي بسبل تقديم البيانات لمختلف أدوار الشركة. ومن خلال هذا التركيز المنصب على المستخدم ووجود أساس متين من البيانات القابلة للتوسع، تستطيع الشركات التعجيل بتحقيق القيمة.

كما تنطوي العمليات الصناعية على قدر كبير من التركيز على تحليل البيانات لدعم اتخاذ القرار الأمثل ورفع كفاءة العمليات. ويمكن أن يؤدي ذلك في قابل الأيام إلى الاستعانة بالذكاء الاصطناعي والتعلم الآلي للتدخل في تشغيل المنشآت الصناعية في حالات الاستخدام المعقدة، كمواطن استخدام موارد الطاقة الموزعة (توليد الطاقة الموطّنة).

كذلك تتزايد أهمية الأثر البيئي للمستخدمين. ومن أمثلة ذلك شركة «إيكر بي بي»، وهي عميلٌ آخر من عملاء «كوجنايت». إذ استخدمت هذه الشركة ـ العاملة في قطاع النفط والغاز ـ أنظمة مراقبة ذكية تعمل بتقنيات التعلم الآلي لجمع صورة عن جميع البيانات المجدية لحل مشكلات تلوث المياه وتحديد العوامل المتعلقة بارتفاع تركيزات النفط في الماء. وهذا ساعدها على تقليل الوقت الذي كانت تقضيه في إجراءات التخفيف، فوفرت موارد تعادل عائداً سنوياً يمكنها تحصيله، وقدره 6 ملايين دولار أمريكي. وهكذا فإن التركيز على احتياجات المستخدم لا يقتصر على إطلاق العنان لقوة البيانات، ولكن يساهم كذلك في زيادة مرونة العمليات.

استخدام مصادر بيانات موثوقة

تساهم البيانات الصناعية في تمكين كل من يستغلها. غير أن التحليلات والتطبيقات، التي تستفيد من هذه البيانات، ستأتي من المستخدمين النهائيين وموفري البرامج ومصنعي الأجهزة والمعدات. فحين تستعين بمصدر بيانات موثوق بأصول مشتركة، يصبح لديك أساسٌ متينٌ للغاية لاستخدام ترميز قليل لابتكار التطبيقات الداخلية، هذا فضلا عن الذكاء الاصطناعي لتعزيز دقة القرارات المتخذة. وفي ظل المشهد الصناعي الحالي، علاوة على متطلبات السوق الأكبر، كإجراءات الإبلاغ عن الكربون شديد الاعتماد على البيانات ونماذج الأعمال المتطورة بفضل الاعتماد على التكنولوجيا الرقمية، فإن الشركات التي لا تركز على البيانات كأصل من أصولها الأساسية ستحرم نفسها من ميزة تنافسية كبيرة.

ولحسن الحظ، تدرك معظم الشركات أنها إذا بدأت عملياتها اليوم، وفي ظل التكنولوجيا المتوفرة لدينا حاليا، فإن عملياتها وفرقها ستبدو مختلفة تمام الاختلاف مقارنة بالفرق والعمليات الحالية المبنية على التكنولوجيا القديمة. ولسوف تتمتع الشركات التي يمكنها تطوير كوادرها وعملياتها بميزة المبادرة في هذا العصر الجديد القائم على البيانات. أما الشركات التي لم تزل متمسكة بالاستثمارات القديمة، فستضطر في النهاية إلى تحمل ضعف ديون التكنولوجيا.

وفي هذه المرحلة من المجال الصناعي، يكثر التركيز على التحليل لمساندة عملية اتخاذ القرار الأمثل ورفع كفاءة العمليات. وسيشهد المستقبل الاستعانة بالذكاء الاصطناعي والتعلم الآلي لتشغيل المنشآت الصناعية في حالات الاستخدام الأعقد كمفاهيم المدن الذكية. ولسوف يكون إطلاق العنان لقوة البيانات ركيزة أساسية تكفل قدرة الشركات على الحفاظ على استمرارية الأعمال وزيادة مرونة العمليات والاستفادة مما تزخر به التقنيات الناشئة.

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عدد من العوائق لا بد من التغلب عليها للاستفادة التامة من البيانات

إطلاق العنان لقوة البيانات

في هذا المقال يبين المهندس جير إنجدال، المؤسس المشارك لشركة «كوجنايت» ورئيس قسم التكنولوجيا بها، أن إطلاق العنان لقوة البيانات سيكون ركيزة أساسية تكفل قدرة الشركات على الحفاظ على استمرارية الأعمال وزيادة مرونة العمليات والاستفادة من التقنيات الناشئة. إذ أن أي نوع من الشركات يكاد يزخر بكنز دفين من البيانات. والشركات التي تعي سبل تعظيم قيمة تلك البيانات وتستغلها لتحسين عملية صنع القرار وتسريع الابتكار والارتقاء بتجربة العملاء ورفع كفاءة العمليات، هي التي ستتمتع بميزة تنافسية تتفوق بها على غيرها. ولكن ما أسهل القول، وما أصعب العمل. إذ تجد الشركات أن استخراج تلك القيمة عملٌ لا يخلو من تحديات جسام.

تعتبر البيانات عديمة السياق والأدوات القديمة وتكنولوجيا المعلومات الهامشية من أبرز العراقيل التي تعترض الشركات الصناعية، وتمثل العقبات التي يجدر بالشركات التغلب عليها إذا كانت ترنو إلى إضفاء الطابع الديمقراطي على البيانات والتحليلات، وتيسير التعاون، والإسراع بتشكيل الرؤى الثاقبة القابلة للتطبيق. ويشكل شح المهارات على مستوى العالم عقبة أخرى، ومن الجلي أنها عقبة تستوجب تذليلها إن أرادت الشركات استغلال المواهب المناسبة للاستفادة من تلك البيانات. فقد كشفت دراسة أجرتها شركة «دي إن في» أن نسبة 91 في المائة من شركات الطاقة تقول إن التدريب على المهارات الرقمية بات ضرورة واجبة في قطاع النفط والغاز.

وكشفت وزارة استراتيجية الأعمال والطاقة والصناعة بالمملكة المتحدة أن قطاع الطاقة أيضا يعاني من تقدم القوة العاملة في العمر. ذلك لأن نسبة 43 في المائة من العاملين تتجاوز سن الخمسين. وهذا يجعل تعظيم الاستفادة من البيانات ووضعها في سياقها من الأهمية بمكان لضمان وصول فرق الصيانة والعمليات إلى الرؤى التي ربما تُحرم الشركات منها في ظل اقتراب شريحة كبيرة من القوة العاملة من سن التقاعد. وهذا سببٌ آخر يبرز أهمية الارتقاء باستمرارية الأعمال ومرونة العمليات من خلال قوة البيانات الصناعية.

حل مشكلة بروتوكولات البيانات مسجلة الملكية

عند النظر إلى الصناعات القائمة على العمليات الثقيلة، يعتبر التركيز على تقنيات العمليات الأساسية محوراً جوهرياً. فيمكن حجب البيانات بسبب الأنظمة المشتراة من عدة بائعين، ويقترن كلّ منها ببروتوكولات مسجلة الملكية، ويبلغ متوسط عمر هذه الأنظمة نحو 20 عاماً. ويمكن أن يتسبب تأثير

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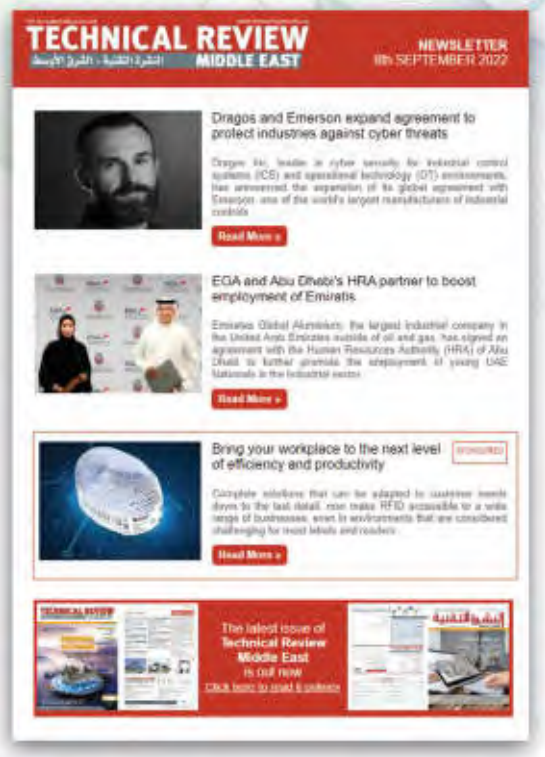

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