

Oil Review

Oil · Gas · Petrochemicals

Africa

VOLUME 18 | ISSUE 1 2023

NIGERIA KEEN ON upstream investment

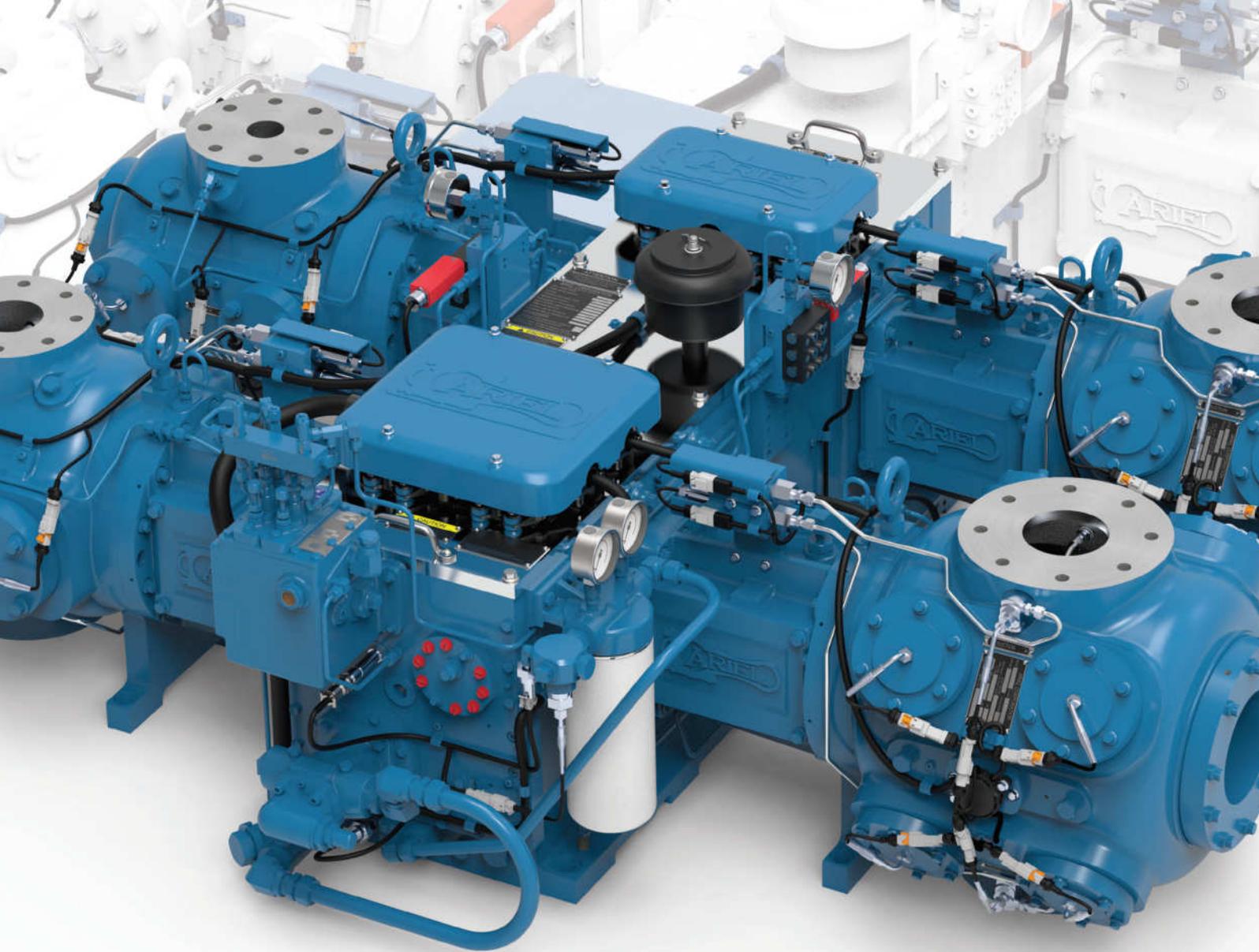
Mauritania's vast gas resources

Likely scenarios for the oil market 2023

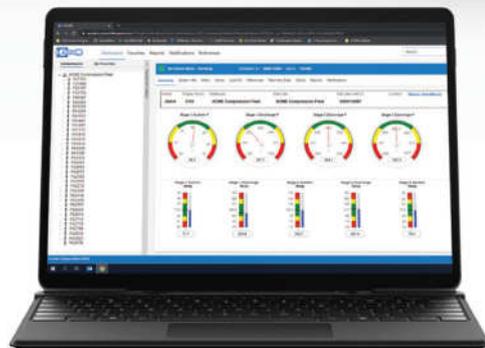
Safety solutions, pipelines, technology



Algeria's energy potential and a platform that offers global access to the entire Algerian subsurface data, Pg 32



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Nigeria is inviting indigenous firms as well as independents.

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Chairman: Derek Fordham

Printed by: Buxton Press

Printed in: February

© Oil Review Africa ISSN: 0-9552126-1-8



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EDITOR'S NOTE

IN THIS ISSUE, we take into account how Nigeria is eager to get back in the game since the country has announced a bidding round for seven offshore blocks. On the other end, Mauritania's rise on the horizon as a potential gas supplier is well eminent as the GTA project gains traction.

Turning up the heat, experts predict that oil prices may go strong inspite of a sluggish world economy.

The industry is pushing digital innovations to newer heights from Big Data to Artificial Intelligence and Machine Learning. The dynamic oil and gas workforce is thinking cross-sector applications in the era of energy transition. Look inside to catch all these developments and much more.

Madhurima Sengupta

Editor

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Executives Calendar 2023

FEBRUARY

- 13-15 EGYPS**
Cairo
<https://egypt.com/>
- 14-16 SAIPEC**
Lagos
<https://saipec-event.com/>
- 28-2 Mar International Energy Week**
London
<https://www.iweek.co.uk/>

APRIL

- 16-20 Nigeria International Energy Summit**
Abuja
<https://nigeriaenergysummit.com/>

MAY

- 1-4 Offshore Technology Conference**
Houston
<https://2023.otcnet.org/>
- 16-18 Africa Energies Summit**
London
<https://www.africaenergiessummit.com/>
- 18-20 Oil & Gas International Trade Exhibition**
Nairobi
<https://www.expogr.com/kenyaoil/>

JULY

- 2-6 NOG Energy Week**
Abuja
<https://www.nogenergyweek.com/>

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

EGYPS 23 to pick up where COP27 left off

THE OIL AND gas industry in Egypt has been facing increasing pressure to adapt and improve operational efficiencies as prices continue to fluctuate. Under the Modernisation Project, Egypt has been preparing the foundations of a modernised oil and gas sector based on leveraging digitalisation to respond to market challenges.

The Egypt Petroleum Show (EGYPS) 2023 is back in Cairo to reflect all such exciting updates in the industry. Held under the patronage of the President of Egypt, Abdel Fattah El Sisi, it will unite the international oil, gas, and energy community from 13-15 February at the Egypt International Exhibition Centre. “EGYPS has become a business and investment catalyst for the regional energy market and as such has evolved into a core pillar of the African and Mediterranean energy ecosystem. Each year we see tremendous growth, more interest and more partnerships generated which is accelerating Egypt’s position as a regional energy hub,” says Tarek El Molla, Minister of Petroleum and Mineral Resources, Egypt.

The exhibition will span over 35,000 sq m of floor space with more than 500 exhibitors. Egypt has significant natural energy

resources, both in traditional fossil fuels and renewable energy. However, as the population and domestic energy demands continue to grow, the importance of diversifying energy sources to enhance the country’s energy security is highlighted. The country’s energy diversification strategy, known as the Integrated Sustainable Energy Strategy (ISES) 2035, was introduced as a means of redeveloping its oil and gas operations, diversifying the energy mix and decarbonising the economy.

Today, the entire landscape has changed and continues to evolve with the involvement of the private sector. There has been an increase in climate-conscious, traditional fossil-fuelled energy projects and energy transition initiatives, with an inflow of investment that is enabling Egypt to continue increasing its energy exports. EGYPS 2023 will also play a vital role in continuing critical discussions addressed at COP27 in Sharm El Sheikh, around the industry’s transition and commitment to decarbonisation.

EGYPS 2023 Conferences are an important enabler of engagement from government and policy level to industry leaders and influencers and engineers providing technical enrichment. It drives the

conversations that address sustainable climate-conscious production of oil and gas and the growing commitment to energy transition and a net-zero future.

“EGYPS has positively changed the way that we engage and communicate in Egypt. It is a statement from the government that is showing great support for the sector,” says Mathios Rigas, CEO, Energean.

There is the Technical Conference for engineers, technical experts and digital champions. Sustainability in Energy Conference aims to address ESG, CSR and HSE across the industry. Finance and Investment in Energy Conference will take a deep dive on how countries and businesses are stimulating industry growth and transformation through new sustainable models of investment across the entire energy value chain.

The Equality in Energy Conference provides the ultimate platform to drive inclusive discussion, creating a more sustainable energy future.

As for recognition, the Global Sustainability in Energy Awards celebrate outstanding and impactful ESG, CSR and HSE projects. Global Equality in Energy Awards recognise businesses and outstanding people in the global energy industry.

TACKLING PROCESS SAFETY

Salus Technical has launched an offshore safety guidance that can prevent major accidents.

Statistics show that pipelines safety compliances have improved.

SAFETY SOLUTIONS IN the oil and gas industry are often not given as much time and attention. A process safety software and consultancy firm called Salus Technical raises some very common situations, which one may often miss in broad daylight. “Perhaps the hazards were not fully identified, the risks were not understood, or the controls that were supposed to be in place were not being managed. It may be that lessons were not being learned from previous events, there were gaps in the management of competency, deviations from procedures and safe working practices had become normalised, management systems weren’t effectively implemented, or changes weren’t being managed,” reads a research paper by them that involves incident investigations into major accidents.

The inspections based on safety compliance cover a wide range of offshore aspects from maintenance management, operational risk assessment, pipelines and mechanical handling and crane ops to workforce engagement, well integrity, well competence and structural integrity, among others.

Statistics in the report goes on to show that operational risk

“ The inspection covered a wide range of offshore aspects from operational risk assessment to well integrity”

management and pipelines safety compliances – though still a long way to go – have improved in 2019 by 20% and 16% respectively from 2016.

On the other hand, risk potentiality in loss of containment has shot up by 56% in 2019 from 29% in 2016.

The report takes readers through the minutest details that can be heeded to during a safety compliance procedure, while also showing where companies go wrong. For example, an operational risk assessment (ORA) process should detail the timing of usage, shortcomings/impairments, following clear methodology, roles and responsibilities, action tracking, monitoring, review and close out, and an assesment of cumulative risk.

The findings said that the process of identifying the risks

associated with faulty safety critical equipment and the identification of applicable Major Accident Hazards (MAHs) are not understood by the personnel undertaking ORAs.

“We have worked hard to produce an engaging, interesting document that shares valuable information and encourages taking action – it’s not a dull safety tome that will gather dust on a shelf! Ultimately, we want to make process safety as straightforward as possible. With that in mind we have tried to make it easy for people to implement changes: we have created a one-page summary for leaders within the industry, and also written assurance checklists, so that any duty holder can easily perform an audit against our findings,” said David Jamieson, founder and managing director, Salus Technical. ♦

Major gas development project is launched in Libya

INTEGRATED ENERGY COMPANY, Eni, and the National Oil Corporation of Libya (NOC) have agreed on the development of 'Strategic A&E' – a strategic project aimed to increase gas production in order to supply the Libyan domestic market as well as exports to Europe.

Structures A&E is the first major project in the country since the early 2000s. It consists of the development of two gas fields, Structures 'A' and 'E', located in the contractual area D, offshore Libya. The combined gas production from the two structures will start in 2026 and reach a plateau of 750 mmcfd.

Eni CEO, Claudio Descalzi, said, "This agreement will enable important investments in Libya's energy sector, contributing to local development and job creation,



A map of the agreed 'Structures A&E' gas development project in Libya.

while strengthening Eni's role adds a leading operator in the country."

Production will be ensured through two platforms tied-in to the existing treatment facilities at the Mellitah Complex. The project will also include the construction of a Carbon

Capture and Storage (CCS) facility in Mellitah to significantly reduce the overall carbon footprint in line with Eni's decarbonisation strategy. The overall estimate investment will amount to US\$8mn and will heavily contribute to the Libyan economy.

MCB to act as Mandated Lead Arranger in Apex's natural gas investment

APEX INTERNATIONAL ENERGY (Apex) has announced it has acquired interests in four concessions in the Western Desert oil producing region of Egypt from IOEC Production B.V. Two

additional concessions will be acquired in Q1 2023, bringing Apex's total concessions up to eight.

The acquisitions are being financed in part through a senior secured borrowing base facility with the Mauritius Commercial Bank Limited (MCB) acting as Mandated Lead Arranger, Modelling Bank and Hedging Bank.

The head of Specialised Finance, Zaahir Sulliman, said, "This landmark transaction further demonstrates the ability of MCB to develop and offer adapted solutions through a wide range of products and services to suit the needs of its clients. We are delighted to support Apex's strategy and continue its ongoing rapid growth in the Egyptian energy landscape and to become part of the exciting Egyptian natural gas success story in line with MCB's gradual energy transition strategy."

This transition will increase Apex's production by 65% to become the eighth leading oil producer in Egypt, and looks to commence with its first natural gas production during Q2 2023.

Oil and gas exploration sector boasts decade-high

THE GLOBAL OIL and gas exploration sector has recorded its strongest year in more than a decade. By adding lower-carbon and lower-cost advantaged hydrocarbons, the sector created at least US\$33bn of value and achieved full-cycle returns of 22% at US\$60 per barrel (Brent prices), according to a report conducted by Wood Mackenzie.

The 'Oil and gas exploration: 2022 in review' report states that exploration well numbers were less than half than those during pre-pandemic years, yet the total volume of 20 billion boe matched the average between 2013-2019.

"2022 was a standout year for exploration. Volumes were good, but not stellar. However, explorers were able to drive very high value through strategic selection and focusing on the best and largest prospects," said Julie Wilson, director of global exploration, Wood Mackenzie.

"The highest value came from world-class discoveries in a new deepwater play in Namibia, as well as resource additions in Algeria and several new deepwater discoveries in Guyana and Brazil. The average discovery last year was more than 150 million boe, more than double the average of the previous decade."

The exploration sector continues to be dominated by national oil companies (NOCs) and Majors, with TotalEnergies, QatarEnergy and Petrobras leading the way in net-new discovered resources in 2022. In total, they accounted for almost three-quarters of the new resources discovered. For the third time in 20 years, liquids made up the majority of new discoveries at 60%.



Zaahir Sulliman, head of Specialised Finance, MCB.

Expro to deliver LNG pre-treatment facility in Congo

EXPRO GROUP HOLDINGS N.V., an energy services provider, has secured a long-term production solutions contract with Eni Congo S.A. for a liquified natural gas (LNG) pre-treatment facility in Congo.

Expro will design, construct, operate and maintain a fast-track onshore LNG pre-treatment facility (OPT), part of the Marine XII development offshore Congo. The facility will be built near to the Litchendjili gas plant and will enable the production of LNG to significantly increase from the West Africa area.

The facility is designed to allow incremental gas production for low carbon electricity generation. It will link to Eni Congo's offshore floating LNG (FLNG) operations and will support both the local energy market and increased global demands for LNG to support secure energy supplies.

The OPT facility is designed to process approximately 80mn cu/ft of gas a day. The ten-year contract is expected to generate more than US\$300mn of revenue for Expro.

Colin Mackenzie, Expro's regional vice president for Europe and sub-Saharan Africa, commented, "We are delighted to be able to extend our long-standing partnership with Eni and our activity in West Africa through securing this highly prestigious contract."

Oil Dynamics eyes North African expansion after successful pumping in Algeria

OIL DYNAMICS GMBH, a German-based pump specialist, has completed one year of a trouble-free operation with its first pumping systems in Algeria.

The custom-made pump systems were designed by Oil Dynamics' engineering office to match the required application. After manufacturing, the components were tested at the company's own facilities in Hockenheim before heading to Algeria.

In the country, an experienced Oil Dynamics field service engineer supported the local partner, Atlas Fluides & Services, with installation and commissioning of the pumps for the customer Sonatrach. On this occasion, a complete field service container with Oil Dynamics ESP tools was



The custom-made pump systems were designed by Oil Dynamics engineering office.

permanently placed in Algeria to realise this and future projects.

Besides the successful Algerian project, Oil Dynamics GmbH is also active in other North African countries – the

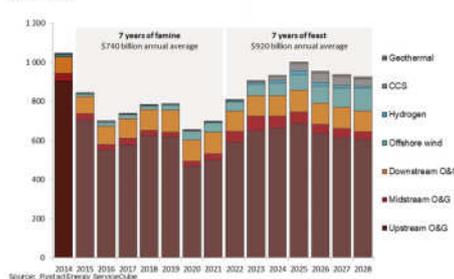
company is currently preparing further installations across oil fields in Tunisia and Libya – and has expressed it is looking forward to commissioning more systems soon.

Rystad predicts substantial growth in energy services sector

RYSTAD ENERGY HAS predicted that the global market for oil and gas contractors will rise to a peak of US\$1 trillion in 2025 and remain at this level for several years.

According to the company's research, the strong growth is helped by a healthy midstream part of the industry to liquefy, transport and re-gasify natural gas, overall oil and gas spending will stay about

Service purchases for energy sectors targeted by oil and gas suppliers USD Billion



Rystad expects the next seven years to provide a strong market for energy services, but companies still have to improve their economics to make it a 'feast'.

US\$920bn annually between 2022-2028. With further expansion into other energy areas (which Rystad advises oilfield service suppliers to do) the US\$1 trillion market for suppliers could be unlocked by 2025 with all segments growing in nominal terms, led by suppliers targeting equipment and materials and those providing operations and maintenance services.

Overall utilisation is improving rapidly as suppliers are careful not to overinvest in more capacity as rigs, vessels, plants, and other units in the supply chain are affected by natural wear and tear. The result is better pricing for suppliers – the past 12 months have driven up prices for offshore rigs, land rigs, frac fleets, proppant, OCTG, vessels, and subsea infrastructure to levels not seen in a decade.

This expansion follows a turning point in the post-pandemic recovery last year with record high gas prices and strong oil prices allowing companies to lift their oil and gas investments by 20%. After the rebound in 2022, Rystad noted, the industry is entering into a very promising 2023, with potential for a 13% growth both for oil and gas investments and 10% for low-carbon investments.

United Oil and Gas Plc issues FY 2022 trading and operations update and guidance for 2023

UNITED OIL & GAS Plc, the full-cycle oil and gas company with a portfolio of production, development, exploration and appraisal assets, issued a trading and operations update summarising recent operational activities, providing trading guidance in respect of the financial year to 31 December 2022, and initial guidance for 2023.

2022 operational and financial summary

Group full-year 2022 production averaged 1,312 boepd net in line with revised 2022 guidance of 1,300-1,325 boepd. Group revenue for the entire year 2022 is expected to be amount to approximately US\$16mn.

2023 outlook

1H 2023 production guidance from Abu Sennan is 700-900 bopd net. The development drilling planned in the first half of the year has the potential to have a positive impact on production levels in 2H 2023. Moreover, the proposed 2023 Egypt work programme consists of two firm wells and eight workovers, with the potential to add additional wells to the programme later in the year.



Workovers in Q1 2023 are targeting enhanced production from multiple reservoirs across numerous wells.

Despite 2022 being a challenging year for the Egyptian economy, recent developments including a US\$3bn funding from the IMF have increased the stability to the EGP/USD exchange rate, thereby supporting fund inflows and increased USD liquidity since the beginning of 2023.

Predator Oil & Gas announces update on MOU-2 well drilling in Morocco

PREDATOR OIL & GAS, the Jersey based oil and gas company with near-term gas operations focussed on Morocco, has announced an update on the drilling of the MOU-2 well in the Guercif Petroleum Agreement onshore Morocco.

The MOU-2 well has been suspended with an option to re-enter after reaching a depth of 1,260 metres measured depth. The debris flow potentially forms a highly effective seal on the underlying Moulouya Fan. The thickness of the Moulouya Fan

reservoir interval is expected to increase between MOU-1 and MOU-2 based on the sand content of the debris-flow penetrated in MOU-2 allowed an extrapolation across to MOU-1 to be made.

As a result of this the MOU-1 perforating and testing programme will be more focussed and extensive in the principal zone of interest to determine potential connectivity with the seismically defined area of the Moulouya Fan between MOU-1 and MOU-2 that is interpreted as potentially gas-bearing. A re-entry and deepening of MOU-2 will be fully evaluated once a solution to optimising the drilling mud programme and mud properties has been completed.



The MOU-1 testing programme is being revised to gather as much information as possible.

Digital solutions for efficiency and clean energy

AT ITS ANNUAL meeting in Florence, Italy, Baker Hughes announced the introduction of multiple new digital solutions and investments to advance more intelligent and energy-efficient operations.

A detailed research conducted with oil and gas, heavy industry and broader industrial customers and partners have resulted in solutions focusing on improving efficiency and performance while reducing emissions, and helping to drive the long-term sustainability of customer operations.

Leucipa, a public and private cloud-based automated field production software solution has been designed to help oil and gas operators to proactively manage production and reduce carbon emissions. Pan American Energy Corp, a leading energy company in Argentina, has agreed to be the launch customer of Leucipa, which will be released to the global market by mid-2023.

Cordant is an integrated suite of solutions supporting industrial asset performance management and process optimisation. Building on Baker Hughes' broad and established rotating equipment, critical sensors, valves, pumps, gears, and inspection service domain expertise, Cordant will combine existing digital offerings for hardware, software and services capabilities into one integrated and simplified user interface.

In addition, Baker Hughes also announced its collaboration with Corva, which offers an open solution for well construction digital offerings to enhance rig visualisation and decision making in the oil and gas industry.

Sasol signs renewables deal with Enel in South Africa

AIR LIQUIDE AND Sasol have signed two power purchase agreements (PPA) with Enel Green Power for the long-term supply of a total capacity of 220 MW of renewable power to Sasol's Secunda site, in South Africa, where Air Liquide operates the biggest oxygen production site in the world.

They will significantly contribute to the decarbonisation of the Secunda site, and in particular to the targeted reduction by 30-40 % of the CO2 emissions associated with the oxygen production by 2031.

Within the framework of these agreements with Air Liquide and Sasol, two local majority owned wind projects will be created by Enel Green Power, the Enel Group subsidiary dedicated to the development and management of power generated from renewable resources worldwide. The 220 MW wind powered renewable electricity production capacity is scheduled to be operational in 2025. This agreement is subject to regulatory and financial approvals.

Ronnie Chalmers, vice president and executive committee member of the Air Liquide Group, in charge of Africa Middle East & India, said, "By signing these long-term PPAs with Enel Green Power, Air Liquide and Sasol actively support the development of renewable energies in South Africa, for the benefit of the South African electrical power system and the fight against global warming. This will also contribute to the South African social transformation and a 'just transition'."

bp releases Energy Outlook 2023 to strategise transition

THIS YEAR'S BP Energy Outlook explores the key trends and uncertainties surrounding the energy transition out to 2050. The three main scenarios considered in the Outlook – Net Zero, Accelerated, and New Momentum – have been updated to take account of two major developments over the past year: the Russia-Ukraine war and the passing of the Inflation Reduction Act in the US.

The scenarios are designed to explore the range of possible outcomes for the global energy system over the next 30 years. Understanding this range of uncertainty helps bp to shape a strategy which is resilient to the different speeds and ways in which the energy system may transition. bp's chief economist, Spencer Dale, said, "Global energy policies and discussions in recent years have been focused



It explores Net Zero, Accelerated and New Momentum.

Image Credit: Adobe Stock

on the importance of decarbonising the energy system and the transition to net zero. The events of the past year have served as a reminder to us all that the transition also needs to take account of the security and affordability of energy. Any successful and enduring energy transition needs to address all three elements of the so-called energy trilemma: secure,

affordable and lower carbon.'

The events of the past year have highlighted the complexity and interconnectedness of the global energy system." He said that relatively small disruptions to energy supplies can lead to severe economic and social costs, highlighting the importance that the transition away from hydrocarbons is orderly.

Tullow Oil shares expectations for 2023

TULLOW OIL HAS issued a statement in advance of the Group's 2022 Full Year Results scheduled for 8 March. The information contained in the release has not been audited and may be subject to further review

and amendment.

Rahul Dhir, CEO, Tullow Oil plc, commented, "Strong operational delivery, rigorous focus on costs and capital discipline, the increased equity in our key operated fields in Ghana

and higher oil prices drove material, expectation-beating free cash flow generation in 2022, accelerating the Group's deleveraging towards a net debt to EBITDAX ratio of 1.3 times by the year-end.

"In 2023, we expect Jubilee production to exceed 100 kbopd once the new wells drilled in the southeast of the field are brought on stream. Our capital investment this year, in particular in Ghana, is expected to support production growth through to 2025 and material free cash flow generation."

For 2023, the Group forecast a capital expenditure of US\$400mn, of which US\$300mn in Ghana, and decommissioning spend of US\$90mn.



Image Credit: Adobe Stock

The Group shares the results of 2022 as well.

The NUPRC recently unveiled its mini bid round, offering seven offshore blocks.

Image Credit: Adobe Stock

NIGERIA BID ROUND LAUNCHED TO BOOST UPSTREAM SECTOR

Seven offshore blocks up for grabs as Nigeria courts new investment to bolster flagging oil and gas production, writes Martin Clark.

DESPITE MARKET VOLATILITY and economic uncertainty globally, Nigeria continues to underpin much of sub-Saharan Africa's oil and gas production, as it has done for decades.

It means officials remain receptive to new upstream investment, as evidenced by the launch of the 2022 mini bid round, the first in over a decade, offering a range of offshore and deepwater opportunities.

The emphasis on offshore openings perhaps also reflects some of the difficulties being experienced onshore.

Nigeria's production and exports have been hobbled for

years by crude oil thefts and pipeline vandalism, no more so than in 2022.

Crude oil production fell below 1 mn barrels per day (bpd) in August last year because of pipeline theft and following years of chronic underinvestment.

It also meant falling behind

“ Nigeria aims to restore production to 1.6 mn bpd during the first quarter of 2023.”

Angola as Africa's largest exporter — a further decline for a nation with a theoretical production capacity of around 2 million bpd.

The country aims to restore production to 1.6 mn bpd during the first quarter of 2023, according to Minister of Finance Zainab Ahmed, which would mark a return to the highest levels recorded at other times last year.

If that is to be achieved, and consistently, then it would mean tackling some of the massive theft and vandalism issues that have long plagued the West African country.

Oil production and export losses have had a big impact on

public finances, as well as dampened enthusiasm among the investment community.

It arguably makes the lure of the offshore segment more appealing to would-be investors.

The Nigerian Upstream Petroleum Regulatory Commission recently unveiled its mini bid round offering seven offshore blocks, covering an area of 6,700 sq km, in water depths ranging from 1,150m to 3,100m.

All of the areas are covered by extensive 2D and 3D seismic.

The hope is to build on the results of the last bid round, in April 2007, which was held under a different regulatory regime.

In that round, a total of 45 blocks were put on offer, drawn

from the inland basins of Anambra, Benue and Chad; the Niger Delta continental shelf; onshore Niger Delta and deep offshore.

Officials hope to have contracts in place for the new offshore concessions by May 2023.

As the first bid round in years, it illustrates Nigeria's clear desire to bring in fresh investment.

However, while no one doubts the country's immense resource potential, major Western oil companies are facing up to their own challenges as they grapple with sustainability and environmental pressures.

Norway's Equinor is the latest major foreign company to downsize its position in Nigeria's upstream sector, after putting its 20% stake in the Agbami field up for grabs.

The prolific deepwater field is operated by US heavyweight Chevron and sits 70 miles off the coast of the central Niger Delta region.

The rumoured sale follows news that other major companies, including Exxon, Shell and TotalEnergies are also keen to dispose of some of their upstream assets.

All of these companies are under intense glare at home to transition to more progressive, green energy businesses, moving away from fossil fuels towards cleaner alternatives.

In May 2022, TotalEnergies even put up for sale its prized 10% stake in its Nigerian joint venture, Shell Petroleum Development Company of Nigeria (SPDC), which operates over 1,000 producing wells, among many other assets.

It is a trend that has been gathering momentum for some time, however, with asset disposal by these and others ongoing for more than decade, reflecting longer-term dynamics.

In 2015, for example, Total netted around US\$1bn from the

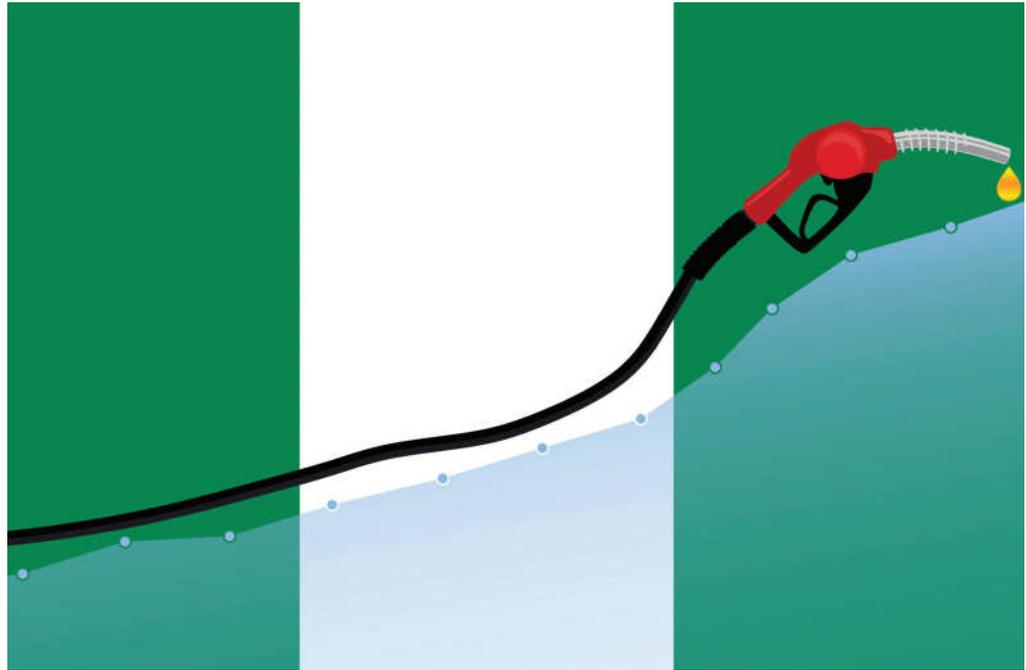


Image Credit: Adobe Stock

The Dangote Refinery could potentially transform Nigeria's fuel situation.

sale of three onshore Nigerian blocks, allowing it to focus more on offshore priorities. Indeed, the French group has shown that it still remains focused on the right opportunities.

Last year, it launched first production from the Ikike field, 20 km offshore, which will deliver peak production of 50,000 barrels of oil equivalent per day (boepd).

The Ikike platform is tied back to the existing Amenam offshore facilities through a 14 km multiphase pipeline.

While the partial retreat of the foreign majors presents a bit of a headache for Nigeria — which remains heavily dependent on its oil and gas sector to prop up the economy — it has nonetheless opened up opportunities for indigenous firms and independents.

Many of these have been quick to snap up marginal fields and onshore opportunities left behind in the wake of the super majors.

It has also brought with it a build-up of talent and expertise among the indigenous energy industry, from exploration engineering through to

downstream data management.

Indeed, the long-awaited launch of the Dangote oil refinery — reportedly now almost complete, according to the company itself — will be a showcase for Nigeria's energy industry, bringing together a small army of contractors and expertise, both local and international.

The 650,000 bpd refinery could potentially transform Nigeria's own fuel situation too, with the country long dependent on imported petrol products despite its abundance of crude oil and gas. While the refinery has been repeatedly delayed, its launch would be a huge boost for the nation.

One of the country's other flagship projects, Nigeria Liquefied Natural Gas (LNG),

“ Nigeria has opened up opportunities for indigenous firms and independents.”

has faced problems of its own, after declaring force majeure last year as a result of reduced gas supply.

It has resulted in multiple cargoes being cancelled, casting a shadow over a project that has been successfully supplying Western gas markets for over 20 years.

It underlines the ongoing problems that blight much of the country's oil and gas industry right now, and perhaps highlights how important raising deepwater product might be.

As Nigeria heads into a crucial election year, these are likely to be major issues calling for the attentions of the new leadership.

Still, potential investors will no doubt take heart from forecasts predicting healthy demand for oil and gas in the years ahead, even in the face of net zero and climate change targets.

With its undoubted reserves in the ground, both onshore and offshore, Nigeria will continue to attract interest despite the challenges, whether that's from big, traditional investors or the emergence of a new and hungry local breed of entrepreneurs. ♦

MAURITANIA IN GLOBAL LIMELIGHT

The country is prioritising the exploitation of its vast gas resources over the next seven years.

AS EUROPE IS weighing the options to meet its gas needs, Mauritania has started attracting considerable interest. While the country is better known for its mineral (54% of exports) and fish (46% of exports) reserves, owing to its richest water resources in the world, global geopolitical tensions have shot its gas assets to limelight as well.

Covering 33,000 sq km, Mauritania's gas reserves are estimated at 1400 bn cu/m. In its first phase, lasting until 2025, the field will produce 2.5 mn tonnes per year. Discussions are on to double that in the second phase, and rise to 10 mn tonnes per year in its third phase. "In this 10-year period, from today to 2030, priority is given to exploiting the country's full gas potential," said Abdessalam Ould Mohamed Saleh, Mauritania's Minister of Oil, Mines and Energy, in June 2022 at the African Energy Forum in Brussels.

Greater Tortue Ahmeyim

One of the recent developments in Mauritania garnering international attention is the Greater Tortue Ahmeyim (GTA) project. Project partners bp and Technip Energy have announced that the floating production, storage and offloading (FPSO) vessel has officially left China, heading towards the GTA development on the maritime border of Senegal and Mauritania.



Image Credit: Energy Capital & Power.

The FPSO vessel has officially left China, heading towards the GTA.

The FPSO's departure on 20 January follows three years of construction and successful sea trials, with the facility –

“ The FPSO will enable the processing of gas and LNG as part of the GTA's first phase of development.”

comprising eight processing and production modules and measuring 270 m in length, 54m in width and 31.5 m in depth – set to accommodate 140 people onboard while processing gas for the GTA's associated Floating Liquefied Natural Gas (LNG) facility.

The vessel will enable the processing of up to 500 mn standard cu/ft of gas, as well as the production of 2.3 mn tons of LNG per annum (mtpa) as part of the GTA's first phase of development.

Speaking to the achievement, Gordon Birrell, executive vice

president of production and operations of bp, said, "This is a fantastic milestone for this important project, which is a great example of bp's resilient hydrocarbon strategy in action. The team has delivered this in a challenging environment, including through Covid-19, always keeping safe operations at the heart of what they do. With the continued support of our partners, Société Mauritanienne des Hydrocarbures (SMHPM) in Mauritania, Petrosen in Senegal and Kosmos Energy, we remain committed to helping both

countries to develop their world-class resources in a sustainable way.”

MSGBC Oil, Gas and Power

Events in Mauritania like MSGBC Oil, Gas and Power advances such developments through wider engagement while maintaining regional focus. It is organised annually under the aegis of Mohamed Ould Cheik Ghazouani, President of the Republic of Mauritania, in partnership with Ministry of Petroleum, Energy and Mines, the société Mauritanienne des Hydrocarbures et de Patrimoine Minier (SMHPM), Petrosen, Cos Petrogaz and the African Energy Chamber. This year, the event will be happening in Nouakchott on 21 and 22 November, under the theme ‘Scaling Energy Opportunities in Africa’s New Frontier’.

MSGBC countries (Mauritania, Senegal, Gambia, Guinea-Bissau and Guinea-Conakry) are revamping their respective policy frameworks, forging partnerships with global energy companies, investors and service providers, and maximising infrastructure rollout across the entire oil and gas value chain.

Underpinning this agenda are efforts to achieve universal energy access and enhance energy security, reliability and affordability, while driving GDP growth and fostering environmental sustainability.

Besides GTA coming online in 2024 and final investment decisions for other large-scale projects such as bp’s Yakaar-Teranga in Senegal and Bira Allah field in Mauritania anticipated in the short-term, the MSGBC region’s hydrocarbon industry is poised for growth. The development of the 1.2 tn cu/ft Banda gas field between 2023 and 2026, as well as Phase 2 of the GTA project from 2026, will also usher in a new era of

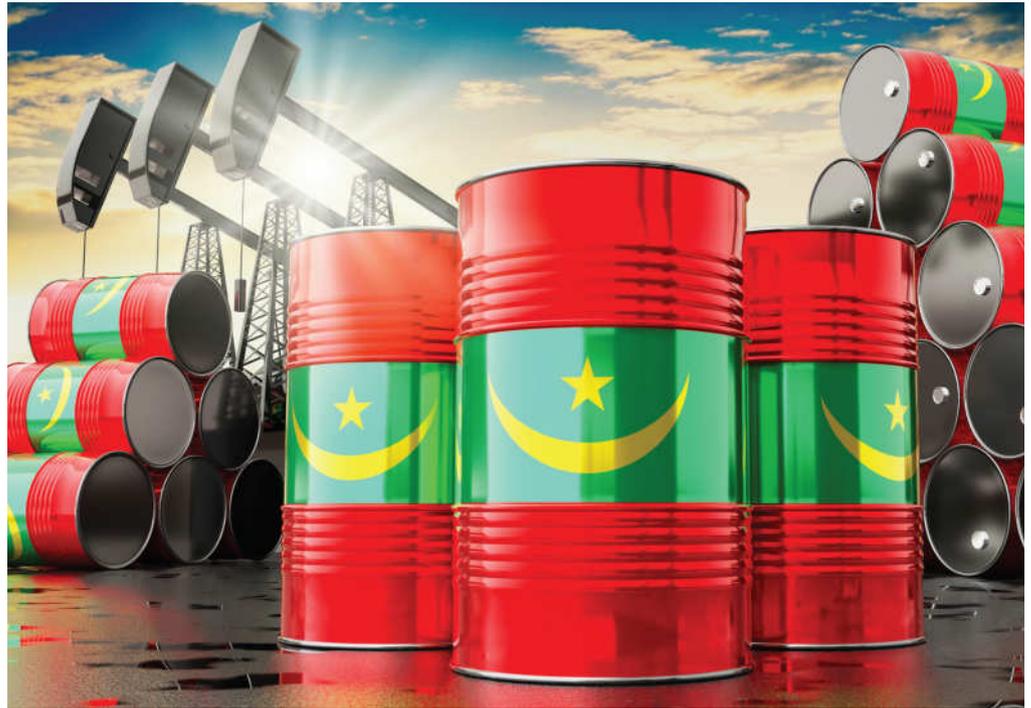


Image Credit: Adobe Stock

MSGBC region’s NOCs are shaping the current and future energy workforce.

industry expansion.

Meanwhile, Senegal’s Sangomar Oil Field Development will produce the country’s first oil this year, with additional investments expected in the sector.

With over nine billion barrels of oil equivalent discovered in the region to date – and companies such as FAR, Shell, TotalEnergies, ExxonMobil, bp, Harbour Energy, PetroNor, Star Oil, Addax Petroleum, Petronas, Kosmos Energy, Sonatrach, Capricorn Energy and Tullow Oil having engaged in upstream activities – all eyes are set on the MSGBC region. Heightened exploration will bring in new players, with a view to yielding discoveries and expanding the block’s total hydrocarbon reserves. Policy enactments such as Senegal’s New Gas Master Plan and Guinea-Conakry’s Precept 3 of the Natural Resource Charter are also directing the region’s development agenda. By cutting tax rates and introducing incentives for energy companies exploring Senegal’s gas-rich basins, the country’s New Gas Master Plan is paving the way for

gas exploitation and monetisation.

Meanwhile, local content and capacity building campaigns undertaken by the MSGBC region’s NOCs are shaping the current and future energy workforce and will ensure sustainable development of the industry for decades to come. During the 2022 edition of MSGBC Oil, Gas & Power, for example, Senegal’s NOC Petrosen signed a local content agreement with French engineering and technology company, Technip Energies, to cooperate on skills development in the areas of the

energy transition, liquefied natural gas, decarbonisation, and safety and process engineering.

Mauritania also comes under the purview of the Nigeria-Morocco gas pipeline. It will line the West African coast from Nigeria to Morocco, passing through, among others, Senegal and Mauritania, where it will be connected to the Maghreb Europe Pipeline.

Late last year, along with other African countries which are a part of the project, Mauritania signed one of the several memoranda of understanding (MoU) to pledge their contribution to fulfilling domestic gas needs too. The Mauritanian Company of Hydrocarbons had signed the MoU with Morocco’s National Office of Hydrocarbons and Mines (ONHYM), and the National Nigerian Petroleum Company Limited (NNPC).

Mauritania’s gradual prominence in not only the regional, but international, gas market can potentially contribute to an estimated 6.5% to the country’s GDP growth for 2023-24. ♦

“MSGBC countries are revamping policy frameworks and maximising infrastructure rollout across the entire oil and gas value chain.”

WHERE IS THE OIL MARKET HEADING IN 2023?

Moin Siddiqi, economist, assesses likely scenarios for the oil market this year, examining the upside potential and downside risks.

THE OIL MARKET still faces multiple headwinds, after a volatile year. Several factors are at play, which impact supply and demand dynamics, notably Europe's energy crisis; tightening monetary policy globally; expectations of a material slowdown in economic growth and/or possible recessions in developed markets; Covid fears in China (the world's top oil importer); the loss of Russian supply; and the likelihood of further Opec+ output cuts.

Crude oil futures exhibited significant swings over 2022 from 'backwardation' (typically occurs at times of supply deficit) to a 'contango' structure (signalling a sluggish demand or an oversupply). The Russian invasion of Ukraine drove backwardation to its steepest in history – Brent crude hitting US\$140/barrel (bbl.) briefly in March 2022. Expectations of a global slowdown, or worse, a looming recession, pulled oil in different directions (contango), with prices steadily falling to the mid-US\$80s at the time of writing.

Backwardation is where [near-term] crude futures trade at a premium to long-dated delivery, whereas a contango market occurs when future price is more expensive than spot price. The current situation indicates oil could drop further because of well-supplied markets in the



Image Credit: Adobe Stock

The oil market still faces multiple headwinds after a volatile year.

Atlantic Basin and north-west Europe.

Likely market scenarios:

Upside potential: soft landing in

“Crude oil futures exhibiting significant swings over 2022.”

the USA. and Europe; full reopening in China; Russian sanctions; OPEC+ restrictive supply management plus low spare capacity; declining U.S. shale oil supply and escalating geopolitical tensions in Eastern Europe and the Middle East.

“We expect the sanctions on petroleum products (effective from 5 February) will cause greater disruptions to Russia's oil production and exports, because finding alternative buyers as well

as transportation and other services to reach those buyers is likely to be more challenging than for crude oil,” the U.S. Energy Information Administration (EIA) said.

According to U.S. Treasury Secretary Janet Yellen, G7 economies plus Australia-led oil-price cap on Russian oil could save the 17 largest African net oil-importing countries US\$6bn/year.

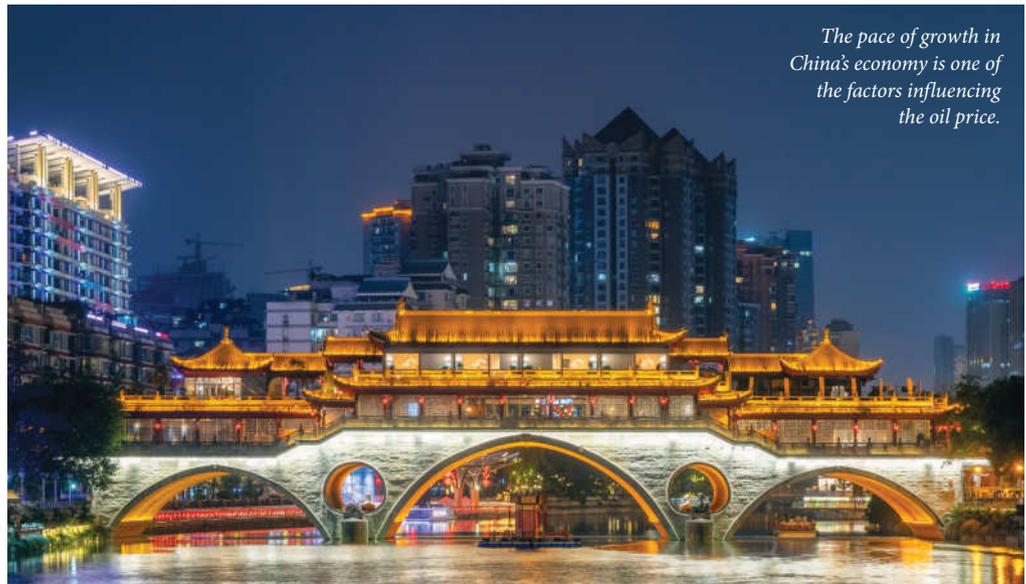
The catalyst is China, where

demand is poised for a medium-term rebound as authorities are resolved to boosting consumption recovery. S&P Global noted: China is “one big wild-card on the upside that hangs over the oil market.” China’s pro-growth policy alone could prevent global recession fears.

Spare capacity globally is currently minimum – mostly confined to Saudi Arabia and the United Arab Emirates. Moreover, global oil inventory is at the lowest level since 2004. Both factors, plus reduced refining capacity and investment, mean current global output capacity may be inadequate to cope with an unexpected buoyant consumption later in Q4 or early 2024 – hence an oil price rally.

Fuel-switching is oil supportive; natural gas prices are exceptionally high in Europe and Asia, pushing industrial users to switch from more expensive natural gas to petroleum products such as fuel oil or diesel, increasing demand for crudes. The risk of production outages from five fragile producers – Iran, Iraq, Nigeria, Libya, and Venezuela, with combined output of 9.88mn bpd in 2022 (OPEC data), all struggling with domestic problems – could lead to a tighter oil balance.

Downside risks: hard landing (i.e., prolonged recession) across the industrialised world, plus tepid growth in emerging Asia, thus less energy usage; Covid resurgent in China; a resolution of the Russia-Ukraine conflict; and the peaking of the U.S. dollar – making dollar-denominated



The pace of growth in China's economy is one of the factors influencing the oil price.

Image Credit: Adobe Stock

crude oil less expensive.

In a recent note, Barclays cautioned in the event of a slump in global manufacturing activity (such as the 2008-09 crisis), oil demand estimate would fall by 1-2mn bpd, which in turn, would reduce oil prices by US\$15-25/bbl. from its current forecast of US\$98.

“The cyclical demand trends are pointing south for oil,” Barclays said. Manufacturing activities globally are in contraction territory.

This year’s average forecast for Brent (global benchmark) from 1,000 energy professionals compiled by Reuters (as of January 16 2023) is US\$87/bbl. Major investment banks are also bullish, seeing oil at US\$80-90 in 2023 (see footnote).

Global supplies could experience some tightness over the coming months if the ‘three big’ economies – the USA,

Eurozone and China – return to durable growth in the second half of the year, coupled with OPEC+ supply cuts and sustained Russian sanctions. The International Energy Agency (IEA) expects a tighter market balance, with demand surging by 1.9mn bpd versus supply growth of 1mn bpd in 2023 (see footnote).

In sum, oil fundamentals are far more positive than in early 2020. There are no threats of price wars by producers, collapsing demand due to COVID-related economic doldrums or/and major supply expansion in pipelines. The OPEC+ alliance seems resolved to defend a US\$80 floor under oil prices. That said, a cheaper oil scenario (below US\$70) would play out in the case of severe economic headwinds.

The general expectation is that, despite the sluggish world

“ The general expectation is that, despite the sluggish world economy, prices will strengthen.

economy, prices will strengthen based on the Opec+ decision, the ongoing Ukraine-Russia war and China’s robust recovery.

Footnotes:

- Oil price predictions, 2023 (Brent crude), US\$/bbl. Morgan Stanley (100); Barclays (98); Goldman Sachs (98); Fitch Solutions (95); The Bank of America (90); S&P Global (90); JP Morgan Chase & Co. (90); World Bank (88); U.S. EIA (83); Citi Group (76); and Credit Suisse (63). The uncertainty around projections is high given geopolitical variables and the direction of the global economy.
- 2023 global demand forecasts range from 1.05mn bpd (EIA); 1.9mn bpd (IEA) and 2.2mn bpd (OPEC), of which 50% will be driven by China. 🔥

Global oil demand and supply balance (mn bpd)

	2020	Projections		
		2021	2022	2023
Total production *	93.84	95.70	99.98	101.10
Total petroleum consumption	91.81	97.56	99.43	100.48
Global oil balance	2.03	-1.86	0.55	0.62
OECD commercial inventories (Mn barrels)	3,025	2,640	2,786	2,892
Brent spot (average) US\$/bbl.	40.84	70.89	100.94	83.10

Source: EIA, Short-term Energy Outlook, January 2023

*Crude oil, lease, condensate, shale oil, oil sands, natural gas liquids & biofuels.

SAFETY FIRST FOR AFRICA'S OIL & GAS INDUSTRY

Safety practices are embedded throughout all aspects of the oil and gas chain, both in Africa and around the globe, reports Martin Clark.

SAFETY REMAINS THE number one priority for the oil and gas industry. Across Africa, operators and contractors have embedded safety practices along every step of what is a very hazardous production chain, from upstream drilling right through to transportation and downstream processing. That is not going to change, despite the long-term shift to alternative fuels and renewables, with hydrocarbons remaining integral to Africa's economy. More than half of African oil and gas producing countries rely on their energy exports for more than 50% of their total export revenues, according to analysts at McKinsey. It means safety will continue to be a dominant thread for a long time to come, from fire protection through to high-tech data monitoring software to ensure asset safety and integrity.

Last year, ExxonMobil shut down some of its production from its ageing Zafiro platform offshore Equatorial Guinea amid safety concerns after water entered the floating production unit. The field

“ Safety will continue to be a dominant thread for a long time to come.”



Image Credit: Adobe Stock

Safety is top priority for oil and gas companies.

is now in need of significant investment to bring it up to scratch in terms of safety and performance. Safety and asset security is a necessary investment and one that can yield savings and benefits over the lifecycle of a project in terms of reduced downtime arising from accidents.

Last October, Shell Nigeria Exploration and Production Company Limited (SNEPCo) announced turnaround maintenance (TAM) work at its offshore Bonga field. Elohor Aiboni, SNEPCo's managing director, said safety was her top priority at what is a critical national economic asset. "But more important is carrying out the turnaround safely. It is our top priority as a company and we promote this by encouraging our staff and contractors to speak up

and work only if it is safe," Aiboni said. She also challenged others to embrace the culture of encouraging workers to speak up and stop work if safety is being compromised. "It is the only way your organisations can thrive as they work to ensure the safe delivery of services for Bonga's rebirth."

Both onshore and offshore, infrastructure security is another important aspect, with pipelines routinely sabotaged in certain areas, notably Nigeria's restive Niger Delta region. Besides, it is also necessary for safety reasons, with fuel thefts from working pipelines resulting in numerous deaths and injuries over the years.

Canada's Senstar, a leading provider of sensing and information management solutions for the protection of critical infrastructure, was

recently handed a major project to reinforce the security of a big oil pipeline in Africa.

"Senstar will provide a comprehensive perimeter intrusion detection system with the aim of equipping multiple sites with innovative fibre optic technologies. Together with local partners, we will work on a multi-layered solution that maximises safety and security," said Senstar managing director, Fabien Haubert.

Last year, 100 people were killed at an illegal oil bunkering site in southern Nigeria, while in 2006, 200 died after fuel thieves caused a huge pipeline blast.

Haubert also said that his company will be providing a range of support services to ensure a smooth, ongoing operation at the undisclosed pipeline site. ♦

GROWING IN LINE WITH MAJOR DEALS

Africa's booming oil and gas activities this year and in the near future look good for the pipelines market.

The rise of demand for pipelines is also reflecting on intelligent pigging services.

Image Credit: Alshie Stock

THE EAST AFRICAN Crude Oil Pipeline, Ajaokuta-Kaduna-Kano Natural Gas Pipeline, Trans-Saharan Gas Pipeline, Niger-Benin Crude Oil Pipeline, Nigeria-Morocco Gas Pipeline – Africa is poised for major oil and gas activities this year and in the near future. Such developments look good for the pipelines market, which is anticipated to expand to US\$12.9bn by 2029 at a compound annual growth rate (CAGR) of 5.9%.

Of the most recent developments in the African market that points towards a healthy pipeline industry is an integrated hydrocarbon strategy in Namibia. In terms of incentivising investors on the project, James Mnyupe, presidential economic advisor of Namibia, has said, “We’ve put

together a blended financing infrastructure platform – possibly the first of its kind in Africa. We are going to build a one-billion-dollar fund that will be investing in all pieces of hydrogen infrastructure – pipelines, transmission lines, and so forth.”

The rise of demand for pipelines is also reflecting on intelligent pigging services as well, reveals a study by Future Market Insights. It gives a global industry analysis for 2014-2018 and opportunity assessment for 2019-2029. According to the

“ The pipelines market is expected to expand to US\$12.9bn by 2029.”

report, the global intelligent pigging services market is anticipated to record prominent progress, due to high advancements in the inspection technologies. The market, which was valued at US\$ 537mn in 2018, is anticipated to expand at a CAGR of 6% during the forecast period of 2019-2029.

The intelligent pigging services market has high potential to develop in regions such as the Middle East and Africa.

The original equipment manufacturers (OEMs) and vendors are constantly investing in research and development to improve the pipeline and maintenance procedures. This is due to the fact that regular supply is the key to ensure stable economic growth.

The advanced intelligent pigging technologies enable

efficient diagnosis of flaws in the pipeline such as deformation and multi data to locate dents, corrosion and seam defects, which are being used by pipeline operators. Rapid industrialisation across the globe is driving the consumption of petroleum, which will simultaneously drive the demand for intelligent pigging services.

Implementation of in-line pigging services based on MFL, UT, and EMAT technologies requires substantial capital investment, which hampers adoption, especially in developing economies.

Some of the industry players on which the report has been based are Baker Hughes Incorporated, Enduro Pipeline Services Inc, NDT Global, OMT Group, Petrobras, Royal Dutch Shell PLC, and ConocoPhillips, among others. ♦

MANAGING AND PREDICTING CORROSION IN PIPELINES

Finding the correct management system in corrosion could save operators from significant downtime and income loss, Minhaj Zia reports.

CORROSION IS A naturally occurring process in which a material (typically metallic alloys) begins to deteriorate as a result of chemical or electrochemical reaction with its surroundings. NACE reports that the effect of corrosion in the oil and gas industries exceeds US\$60bn in terms of global annual cost. However, it is important to note that there are many varying factors when assessing corrosion management which can make it difficult, from humidity, exposure to saltwater on different materials, vicinity to corrosive substances, the life-expectancy of a structure and more. In order to avoid catastrophic damage and loss of income, businesses should look into an effective Corrosion Management System (CMS).

With basic corrosion, both a chemical and electrical process takes place. This is when oxygen and moisture come into contact with steel and begin the reaction process. As the moisture and oxygen combine, they become progressively negatively charged, thus developing a higher level of attraction to the positively charged iron atoms. This produces a chemical known as iron hydroxide which, due to continued exposure to oxygen, develops into hydrated iron oxide (brown rust). This type of corrosion occurs when there is no form of protection in place to



Image Credit: Adobe stock

Corrosion in pipelines can be exacerbated if not regularly maintained.

prevent the exposure of moisture and oxygen with iron, and can typically be attributed to neglecting maintenance, poor design or incorrect material selections in structures.

Environmental corrosion also plays a key factor in metallic structures. This is where pollutants, compounds and toxins in the environment intensify the effects of basic and bimetallic corrosion. Steel which

“ The effects of corrosion in the oil & gas industries exceed US\$60bn in terms of global annual cost.”

has not been coated with protection from corrosion, or the incorrect type of protection with respect to the environment, could fall victim to this type of corrosion. Furthermore, a lack of maintenance, insulation and safeguarding from moisture can increase the rate of corrosion.

In Nigeria, the handling of corrosion in pipelines is paramount to maintaining the economy, particularly concerning the oil and gas industry. In fact, the oil and gas industries make up around 65% of the government revenue and 88% of the country's foreign exchange, according to the International Journal of Industrial and Production Engineering (IJIPE). Underground metallic pipes are utilised for the transportation of hazardous materials from one point to another. These materials

involve hydrocarbons which can be in either liquid or gas form, typically consisting of substances such as crude oil, gasoline or natural gas.

Most of these metallic pipes have been employed for more than five years and therefore would have inevitably experienced some form of corrosion due to the nature of their environment. Being underground yields the constant exposure to moisture and oxygen from the natural soil environment, thus accelerating the corrosion process when combined with possible inconsistencies in maintenance schedules. Of course, these occurrences when left unchecked would eventually give way to erosion which could cause a leakage of materials, halting production and costing a business significant income. Therefore, setting up an appropriate CMS is crucial.

One of the simplest solutions in rust prevention is using protective coatings. Pipeline coatings is one of the first steps taken against erosion in submerged metallic pipes. With this solution, the coating is applied to the exterior of the pipe while the interior is protected with linens. The coatings provide protection by obstructing the electrolyte and shielding the metal. “Usually, dielectric materials that prevent the movement of electrons and ions

are used. To enhance the material and equipment life, protective coatings are used to form a protective layer or barrier on the material to avoid direct contact with the process media,” according to IJIPE.

As mentioned previously, this is only the first step in rust protection. The coating works in conjunction with cathodic protection (CP) systems, where the low electrical currents prevent the corrosion of the structures. Where coatings can sometimes fail due to a number of external reasons, CP picks up the slack and serves as an additional barrier of defence. With these two methods implemented, a pipeline could be considered fully guarded against corrosion. It is for that reason, this method is widely used in the oil and gas industries.

Conventional CP systems do however, require intermittent inspections to be carried out by specialised operators to analyse the data. This process is both a lengthy and expensive procedure which is also susceptible to human error. To combat this, remote CMS can be installed to supply data on pipeline management and identify or predict possible issues. To keep things environmentally friendly, solar panels can be used to supply power as a substitute to electrical power grids.

A Supervisory Control and Data Acquisition system (SCADA), can also be used to observe and manage corrosion in underground pipelines. Similar to how protective coatings and CP systems work together, SCADA systems accumulate information



CMS systems can accurately predict corrosion in pipelines.

from the sensors from a CP system in real-time and then relay that information back. A further benefit to the SCADA system is that depending on the model, they can make predictions on the condition of the pipelines based on existing data using the artificial neural network. This can help operators effectively plan maintenance

schedules and anticipate potential roadblocks.

These solutions do not fully eliminate corrosion in metallic structures. But, with proper implementation and optimisation, they can at the very least, offer strong protection and prepare operators for probable obstacles which would otherwise entirely shut down an operation. ♦

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The industry has pioneered lean engineering models.

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PIONEERING SUSTAINABLE ENGINEERING INNOVATIONS

The O&G industry has amassed abundant insights and expertise that could now drive leaner development and a circular economy, writes Ewen Kerr, chief technical officer, Sparrows Group.

FEW REALISE THAT the accelerating energy transition is enabling a mass shift of fossil fuel skills and expertise that could transform other industries from industrials to renewables. The O&G industry has pioneered lean engineering models that could form a template for sustainable development, from the maintenance of assets beyond their design life to the creation of multi-skilled technical workforces and the seamless integration of design and operations. Further, a recent survey found 82% of oil and gas professionals are now open to transitioning to outside industries such as renewables, which will perpetuate this transition of skills.

Ultimately, this has the potential to be transformative for other industries. Construction supply chain shortages, soaring energy prices, and the need for sustainable development have created cross-sector demand for more cost and carbon-efficient

“ Efficient O&G engineering methods and workforce models are coming up with exciting cross-sector applications.”

infrastructure development. Decades of pressure to reduce costs and carbon emissions means the O&G industry has amassed abundant insights and expertise that could now drive leaner development and a circular economy, lowering the cost of everything from industrial manufacturing to renewable energy.

Legacy of lean engineering innovation

A slowdown in new development due to social and government pressures regarding climate change has driven more efficient O&G engineering methods and workforce models with exciting cross-sector applications. This means the industry has become a pioneer in sustainable

engineering innovations with widespread applications outside the industry.

Mass redundancies during boom-and-bust cycles compelled the industry to create a workforce model of multi-skilled professionals that offers a template for other industries to build lean, adaptable labour pools. Climate change targets also slowed oil and gas development and created a need to keep O&G assets operational beyond their design life and free up resources for reinvestment in renewable projects.

This has spurred lean engineering innovations from predictive maintenance to those that could radically reduce waste, repair, and replacement costs and inspire a sustainable circular

economy across other sectors. Pressure to reduce lifecycle costs and carbon emissions have also driven a consolidation of cradle-to-grave O&G services from design to decommissioning that could help others streamline and refine their manufacturing and maintenance ecosystems and reduce lifecycle costs and emissions.

Consolidation of cradle-to-grave services extend asset lifecycles

The need for more localisation and vertical integration of supplies and services was made acutely apparent during the global Covid-19 pandemic, where the globalisation and fragmentation of supplies was highlighted. Technologies such as offshore wind-to-hydrogen will also require cohesive, cross-sector integration of assets and services from previously separate sectors such as wind, gas, and power.

The O&G industry has pioneered ways of localising, integrating, and consolidating diverse end-to-end ecosystems from design to decommissioning. Some suppliers now provide consolidated one-stop-shop services across entire platform lifecycles from design and manufacture to inspection, refurbishment, replacement and even training of personnel. This reduces the risk of relying on a globally fragmented array of suppliers and service providers for different parts. Streamlining and combining services under one umbrella also creates leaner and more efficient design and operations, and predict and control everything from costs to carbon emissions across entire lifecycles.

This also helps dissolve silos between design and operations and create collaboratively and cohesively designed infrastructure, reducing cost, complexity and overengineering. Whereas manufacturers often



Image Credit: Adhite Stock

The industry has pioneered ways of localising, integrating and consolidating diverse end-to-end ecosystems.

have little incentive to provide aftercare services or avoid replacing assets, end-to-end service providers can find ways of squeezing extra capacity from existing components and avoiding the need for costly replacements.

Circular economy of skills and assets

Demand for sustainable growth is driving a need to reduce manufacturing costs and consumption of raw materials across asset lifecycles. Growing corporate Environmental Social Governance (ESG) commitments are also driving demand for greater control over lifecycle emissions and other environmental impacts. Cumulatively, this is creating cross-sector demand for a circular economy to help retain, repair, refurbish and repurpose existing assets.

Automation of industries

The O&G industry has been a pioneer in this field. Many offshore oil rigs have lasted decades beyond their design life due to innovations in data-driven maintenance and applications

engineering. Many technologies are designed with built-in obsolescence, but this can be overcome. Mechanical components contain data that can offer clues to reverse-engineering them for longer life or even repurposing them for other applications. For example, safe load indicators on cranes record everything from its safe lift limit to the grease condition and the weight of every lift across its lifecycle. This can be matched with expert engineering knowledge to find ways to keep it operational for longer. For example, Sparrows was able to keep an O&G client's crane safely operational for up to 25 years beyond its design life by using structural analysis data to identify and replace obsolete parts from winches to motors. And this type of complex mechanical lifting equipment is in widespread use in other industries from offshore wind to construction.

Applying these techniques could help other industries radically reduce manufacturing and maintenance costs across their lifecycles. Marrying emerging technologies such as

the Internet of Things and data analytics with O&G engineering methods could help spur a sustainable circular economy of assets across industries from renewable energy to industrial manufacturing.

The global engineering skills shortage – exacerbated by the economic slowdown caused by Covid-19, in addition to the gender gap and ageing workforce – has created a cross-sector need for more adaptable, multi-skilled workforces. Project-based industries such as renewables that are experiencing major growth also need a pool of flexible, multi-skilled, globally mobile labour to rapidly scale up their workforce for new projects.

The need to preserve skills in the face of fluctuating oil prices means the O&G industry has long pioneered ways of transitioning workers between multiple sectors or specialisms, creating a multi-skilled workforce. As the world balances demand for faster infrastructure development with the need for cost efficiency and sustainability, the lean engineering techniques learned in O&G are becoming more relevant than ever. ♦

PUSHING INNOVATIONS

Operators can leverage technologies to monitor conditions and collect, store and analyse key data.

Breakthroughs in Artificial Intelligence and Machine Learning keep the oil and gas industry going.

GARNERING THE POWER of Artificial Intelligence (AI) and Machine Learning (ML) can make a huge difference for oil and gas operators. Benefits are diverse, ranging from cost optimisation to embracing sustainability. Predictive maintenance is one of the most prominent digital innovations that keep the industry moving in the 21st century.

Predictive maintenance

Timely predictive maintenance can provide operators immunity to unprecedented situations such as factory shutdowns or equipments failures among other things, while maximising asset life extension.

Through predictive maintenance, operators can

leverage technologies to monitor conditions and collect, store, and analyse the structural and operational data of key equipment. That allow operators to get a fair idea regarding the health of the equipment and an estimate of how long it can serve safely.

The common predictive maintenance technologies include vibration monitoring, thermography, lubricant oil

“ Predictive Maintenance gives a fair idea regarding the health of an equipment.”

analysis, and ultrasonic testing. Visual inspection, motor current analysis, ferrography, spectrography, and wear particle analysis are others.

Oil analysis

Oil analysis, as a type of predictive maintenance, takes into account the signs of wear and tear in a machine, and how vulnerable they make it to field situations. Nowadays, data analysts can leverage algorithms to detect potential abnormalities from samples right at the start of operation. The amount of accidental damage that gets saved thus can only be imagined! Also referred to as oil condition monitoring (OCM), the process begins with sample analysis of wear, fluid condition and contamination. With the

application of AI, thousands of data points can be efficiently analysed within a given time, which is not possible through traditional methods.

Companies like ExxonMobil hasten the oil analysis process and bring down clients' labour costs using proprietary laboratory software combined with ML – Serv Lubricant Analysis service which the company claims can reduce scheduled downtime, lubricant consumption, and costs while enhancing equipment reliability. According to the software's website, the lab tests use two AI-assisted components that include logic algorithms and an engine that weighs model output against user-provided equipment data to produce actionable recommendations. ♦

UNLOCKING THE POTENTIAL



Image Credit: Adobe Stock

Numerous sites across West Africa and North Africa will witness enhanced oil recovery.

Squeezing more oil out of Africa's mature fields has always made good economic sense, but also carries with it with key environmental benefits, says Martin Clark.

ENHANCED OIL RECOVERY, or EOR, has become an important aspect in maintaining production levels out of some of Africa's more mature fields and basins.

These include numerous sites across West Africa and North Africa, which have together yielded steady production over many decades.

The three primary EOR techniques — gas injection, thermal injection and chemical injection — all essentially provide artificial lift to raise hydrocarbons at better flow rates out of the well.

In value terms, it can extend the life of fields, raising overall production and profitability. It can also yield an environmental benefit too, a key concern in the modern era, potentially reducing

“ Gabon will increasingly turn to EOR this year.”

the need for costly additional drilling and wells.

In 2021, Nigeria even launched an awards programme for companies, projects, or individuals that add value to the nation's oil and gas industry through EOR and other techniques.

Mature oil and gas provinces such as Gabon will increasingly turn to EOR and solutions providers to maintain output and offset natural field declines.

The country's oil production is expected to grow during 2023 with the commissioning of new wells, higher oil prices and the resumption of projects after a Covid-linked economic hiatus, according to Fitch Ratings.

“However, production will start to decline by 2024, as oil output levels are on a decreasing trend due to maturing fields and the high cost of production.”

This is where EOR expertise will be essential, as it has been in Gabon for some years.

Artificial gas lift is integral to successful operations at BW Energy's Dussafu license offshore Gabon, which includes six discovered oil fields.

One of them, Tortue, which averaged 10,600 barrels of oil per day (bpd) in 2022, down slightly from 2021, is set to have a second gas lift compressor installed in the near future.

The compressor equipment will support production from the six existing Tortue wells in water depths of about 116 metres.

Commissioning and start-up is expected to commence right after first oil from another field on the license area, Hibiscus/Ruche, which has priority during a current high-activity period onboard the floating production storage and offloading (FPSO) vessel.

The second compressor for Tortue was lifted onboard the BW Adolo in December, with installation work ongoing.

The initial Hibiscus/Ruche drilling is expected to add approximately 30,000 bpd when all wells are completed in early 2024, a further boost for Gabon's ageing oil industry.

Algeria is another mature province where EOR techniques are becoming increasingly relevant.

State-owned energy group Sonatrach signed a US\$4bn production-sharing contract (PSC) with Eni, TotalEnergies and Occidental Petroleum (Oxy) in 2022 for blocks 404 and 208 in the prolific Berkine Basin that highlights the crucial role EOR will play.

The work will include the drilling of 100 new oil wells, plus the conversion of 46 wells, mainly into WAG (water alternating gas) process wells, and will ultimately unlock the additional recovery of more than 1 billion barrels of oil equivalent.

It will also entail the implementation of two EOR pilot projects.

The use of high-density 3D seismic, oilfield digitalisation solutions and other advanced technologies are expected to boost average ultimate recovery rates from the area to 55%.

As well as huge economic gains, the project knits well with current environmental trends, unlocking more oil and maximising yield potential from known reservoirs. ♦

GETTING TO GRIPS WITH VAST INFORMATION

The oil and gas industry is heavily reliant on Big Data to efficiently manage operations from upstream to downstream.



THE OIL AND gas industry is increasingly incorporating Big Data into its day to day operations.

This advanced technology takes many forms: sensory from systems, volumes measured in production processes, or even weather forecasts that allow AI models to discover patterns that can highlight the risk of disruption. Sensorisation

“ Velocity characteristic of Big Data is especially prominent in O&G.”

facilitates remote monitoring and managing field operations by an oil and gas company.

When it comes to monitoring pipelines, which operate continuously outside of scheduled maintenance windows, the flow rate of materials should be kept in check to preemptively diagnose possible safety and/or productivity issues. This can be all the more challenging as a pipeline infrastructure is mostly placed in remote areas where wired Internet connectivity is not available.

As 4G LTE took over global connectivity, it became easier for companies to install flow meters and chart data by industry protocols. It is then obtained and forwarded to control centres, SCADA systems to aggregate and

interpret centrally. These are vast datasets that make up the entire upstream and downstream sectors. Once those have been processed efficiently, operators can gain access to underlying engineering challenges.

Velocity characteristic of Big Data is especially prominent in O&G. The data generation velocity in this sector is huge, as a data of five exabyte can be processed in just 48 hours! That is equivalent to the entire manual data accumulated over the years till 2003!

Seismic data acquisition is one of the biggest areas in oil and gas that thrive on the application of Big Data. When it comes to offshore seismic studies, narrow-azimuth towed streaming (NATS)

uses the accumulated data to develop images of the underlying geology. A further updated version of that is the wide azimuth (WAZ), which is able to capture even more data and produce images of higher quality.

Innovations in terms of drilling tools include logging while drilling (LWD) and measurement while drilling (MWD) concepts that can transmit a wide range of data to the surface real time. Another aspect of Big Data involve sensors-imbibed optical fibres for well tubular analysis. Big Data tools thus serve in smoothly navigating operators out of the challenging maze of data that makes the complex oil and gas industry. ♦

EFFICIENTLY OVERSEEING EVERY STEP

Advanced CTRM solutions can handle all the factors from processing to final destination.

WHILE COMMODITY TRADING and risk management (CTRM) needs capable handling in any industry, it holds special significance in the oil and gas sector — all upstream, midstream and downstream activities — as the risk is even higher. CTRM responsibilities for items like crude oil or liquefied natural gas (LNG) has to consider the immensely volatile nature of the market (drastic price spikes/drops), let alone unpredictable weather, natural or man-made disasters, among others, to add to the risk.

Oil and gas companies, therefore, should select the most effective digital technologies and solutions for these purposes in the face of declining revenues and corporate budget restraints. An ideal CTRM software has the whole process covered from processing, loading, terminaling, transit to final destination.

CTRM can also handle trading, valuation, risk management, logistics and scheduling, inventory, accounting and settlement functions that are standard to the crude oil and natural gas industries. Its benefits include increased visibility, effective hedging strategies, capture and confirmation of trades, in-depth data analysis, and full trade-to-cash tracking for accurate profit and loss reporting.

CTRM can thus make traders' lives easier by breaking down the nuances of commodity trading,



Image Credit: Adobe Stock

An ideal CTRM software has the whole process covered.

The technology aids in commodity traders' day-to-day activities, such as risk management or logistical oversight, among other things. The software also supports a variety of other purposes for traders such as planning,

“Single-integrated CTRM solution can eliminate the risks of manual error.”

calculating logistics, and storing important data.

In addition, it can also deal with an infinite amount of data every day, as well as the logistical hurdles of getting products from the factory to the market, all while seeking to cut down prices. Installing a single-integrated CTRM solution can eliminate the risks of manual error that is otherwise almost impossible to avoid while optimising an entire portfolio across front, middle and back office operations. As the time-consuming manual tasks go out of the process, organisations can focus on

productivity and profitability.

An advanced CTRM solution allows retaining proprietary analytics knowledge. The single platform can give data-driven decision support to efficiently manage position visibility, risk management, controls, and regulatory compliance — on one platform.

As the present scenario of risk management in the oil and gas industry has changed drastically owing to new challenges, such systems must be capable of meeting the demands of today's front, middle and back office oil and gas professionals. 🔥

Egypt's gas resources are a mainstay of its economy.



FROM HYDROCARBONS TO HYDROGEN

Image Credit: Adhine Stock

Despite Egypt's gas sector roaring back to life in recent years it is other innovative niches, such as hydrogen, that may offer the greater potential long-term. Martin Clark reports.

EGYPT'S GAS ECONOMY has roared back to life in the past few years, driven by a series of big offshore discoveries in and around the prolific Nile Delta area. This has powered the local economy and also revived exports, including the reboot of the North African country's liquefied natural gas (LNG) facilities. Eni, bp and other leading firms have poured billions of dollars in investment to unearth and harness Egypt's new-found natural gas deposits.

The new year started with a bang as well after Eni and Chevron announced a new offshore find in January with their Nargis-1 well. It is still only early days in terms of development, but the new find builds on multiple other

discoveries in the Eastern Mediterranean in recent years. The latest wave of investment and excitement was triggered by Eni's discovery of the giant Zohr field back in 2015. The new Nargis-1 well encountered 200 net ft of gasbearing sandstones and will be developed utilising other facilities and infrastructure nearby, Eni said in a statement, without mentioning any timescale.

“The new year started with a bang after Eni and Chevron announced a new offshore find.”

Hydrogen hopes

It is more good news for Egypt's gas sector, but officials are looking beyond hydrocarbons too. The government has made it a priority to explore alternative energy sources, in keeping with global plans to reduce carbon emissions, especially after hosting the COP27 climate conference in Sharm el-Sheikh at the end of 2022. Egypt has been proactive in rolling out utility-scale solar and wind farms to complement gas-fired power generation, though attentions are now turning to more advanced energy technologies, including hydrogen. There appears to be a lot of momentum in this area too, with development finance groups pledging large sums of money and even some of the big oil names showing an interest. At the

COP27 summit, Egypt signed eight framework agreements to develop green hydrogen and ammonia projects with a number of well-known industry partners. Green hydrogen is produced by the electrolysis of water, powered by renewable energy. The agreements signed were with companies including AMEA Power, Alfanar, TotalEnergies, Globeleq, EDF, Fortescue Future Industries, ReNew and Scatec, and are mainly concentrated around the Red Sea port of Ain Sokhna and the Suez Canal Economic Zone. Going forward, Egypt hopes to position itself as a regional hub for the nascent hydrogen sector.

Egypt Green

Egypt looks to have plenty of support behind its ambitions too.

The European Bank for Reconstruction and Development (EBRD) is supporting the decarbonisation drive with a US\$80mn loan to Egypt Green to develop the country's first green hydrogen facility. Egypt Green is owned, built and operated by Fertiglode, one of the largest seaborne exporters of combined urea and ammonia, Scatec ASA, a Norwegian power producer, Orascom Construction, and the state-owned Sovereign Fund of Egypt. The cash will be used to build a 100MW electrolyser facility to be powered by renewable energy. When developed, it will deliver up to 15,000 tonnes of green hydrogen annually. This, in turn, will be used as an input for the production of

green ammonia to be sold on the Egyptian and international markets. Ammonia production is energy intensive and responsible for around 1.8% of global carbon dioxide (CO₂) emissions. At full capacity, the facility's green hydrogen production could save more than 130,000 tonnes of CO₂ emissions per year.

"We see a massive green hydrogen demand driven by strong policy support globally, and Africa is perfectly positioned to take advantage of its low-cost renewables and strategic position," said Mikkel Tørud, chief financial officer at Scatec ASA.

bp's diversification drive

The major oil companies in Egypt have also shown similar intent. In December, bp signed a memorandum of understanding (MoU) with the government to explore the potential for establishing a green hydrogen facility. Under the MoU, the energy giant will carry out studies to evaluate the technical and commercial feasibility of developing a multiphase, large scale green hydrogen export hub in Egypt, including exploring possible sites and locations. The



Egypt is pursuing new opportunities in hydrogen.

MoU was signed with Egypt's New and Renewable Energy Authority (NREA), the Egyptian Electricity Transmission Company (EETC), the General Authority for Suez Canal Economic Zone (SCZONE), and the Sovereign Fund of Egypt for Investment and Development (TSFE). Hydrogen is one of bp's five energy transition growth engines, and the group is working on a portfolio of options for the development of green and blue hydrogen projects globally.

"Expanding the remit of our business in Egypt is testament to bp's long-term commitment to Egypt," said Nader Zaki, BP's regional president, Middle East and North Africa. "This MoU builds upon Egypt's endeavours to be a regional energy hub, and we are glad to be able to be a strategic partner to support the country's green energy transition plans."

The move into hydrogen builds on bp's long-established presence in the country, where it has over US\$35bn in investment already. It operates the West Nile Delta development, which includes five gas fields across the North Alexandria and West

Mediterranean Deepwater blocks, and produces around 900 million cubic feet per day (mmcf/d) of gas and 27,000 barrels per day (bpd) of condensate.

Gas search continues

While hydrogen may bring with it hopes for a new era in energy long-term, it is a niche that is still in its infancy, with high associated costs. For now, it is Egypt's oil and gas that continue to keep the lights on in homes and businesses, and to keep the money rolling in.

Upstream, there remains plenty of excitement in the field as drillers prepare to test new acreage. Among them is Shell,

which is preparing a multi-well drill programme on frontier acreage this year. Two Shell companies, BG Delta and BG International, in January signed a contract with Stena Drilling for the mobile offshore rig, Stena Forth, for an exploration project that will see a further three wells drilled in the Eastern Mediterranean. On 12 January, Wintershall Dea announced that it had also found gas in its East Damanhour exploration block in the onshore Nile Delta. It will now assess the discovery as a possible tie-back development towards the nearby infrastructure at Disouq, which is operated by DISOUCO, a joint venture between Wintershall Dea and Egyptian Gas Holding Company (EGAS). Wintershall Dea started exploration at East Damanhour in November 2021.

"Wintershall Dea wants to grow in Egypt and this discovery is a positive sign," said Sameh Sabry, senior vice president and managing director BU Egypt. "Egypt, the wider region and the world badly need additional energy resources, and Wintershall Dea is doing all it can to deliver additional volumes." 🔥

“ For now, it is Egypt's oil and gas that continue to keep the lights on in homes and businesses, and to keep the money rolling in.

C-KORE SIMPLIFYING SUBSEA TESTING OPERATIONS

C-Kore Systems gives a glimpse of the challenges involved in the industry and its approaches to simplifying them.

OIL AND GAS operations are not as complicated as they used to be, thanks to innovative companies like C-Kore Systems.

An active player in the subsea-testing market, C-Kore explained in an interview to Oil Review Africa, the challenges in the industry and the company's approaches to simplifying them.

What are some of the major risks involved in subsea operations? How does C-Kore Systems reduce these risks?

Testing the electrical lines in an offshore subsea oil & gas network is inherently risky due to many factors. One being the difficult environment where the testing is performed, often far offshore and in deep water.

Secondly, having to gather all the required equipment and specialised personnel, and sending them to a very remote location. If the mobilisation has to be performed quickly under an emergency situation, the operation can also become extremely costly.

We at C-Kore decided to tackle some of these problems by designing sophisticated subsea testing tools that are easy for operators and contractors to use. Our tools are small and automated to perform the complex task of subsea testing. We pre-programme the units according to the customer's requirements before dispatching from the United Kingdom. Since



C-Kore units installed subsea.

the tools are so simple to use, no additional offshore personnel are required to accompany them. We provide an online interactive training programme to teach the remotely operated vehicles

“ C-Kore provides an online interactive training programme to teach ROV crews how to use the units.”

(ROV) crew how to use the C-Kore units.

How do C-Kore products contribute to simplifying operations?

Historically, performing electrical testing operations subsea is a complex process. Highly qualified personnel and equipment need to be acquired, often on short notice. Everything must then be transported to the quayside and secured onboard a vessel large enough to handle all this equipment and personnel. C-Kore has simplified this process by putting all of the functions required for the high-

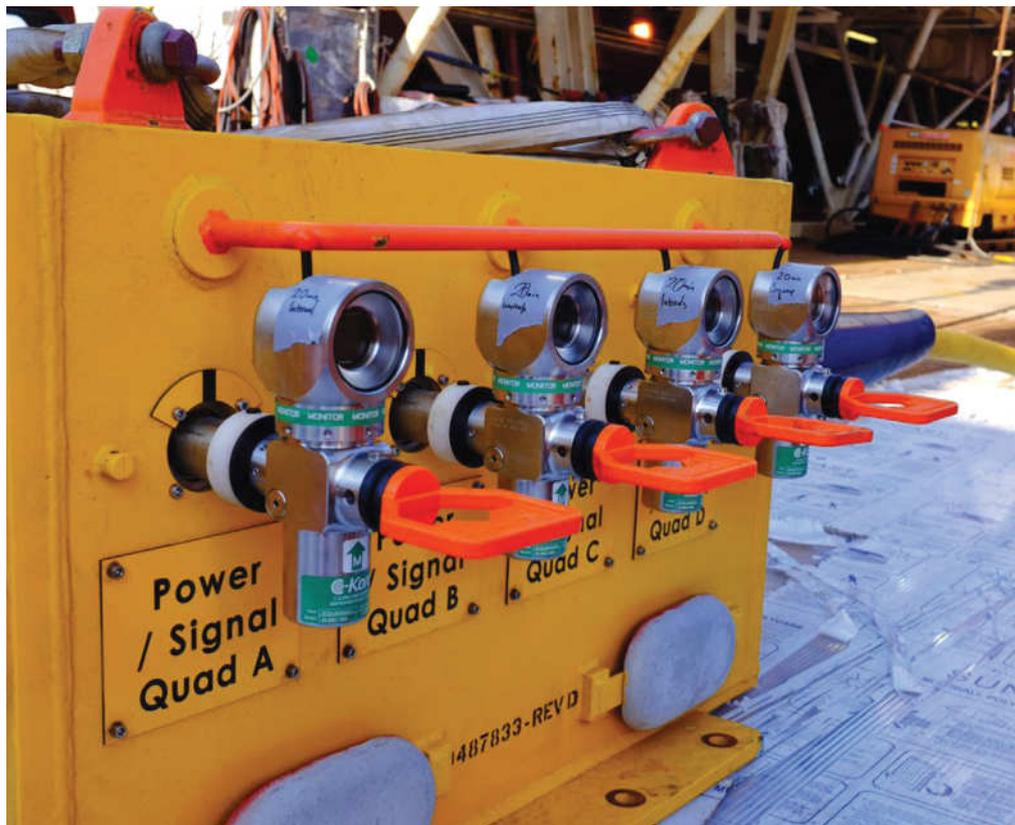
tech testing equipment into a small hand-held unit with a wet-mate connector. The equipment can be quickly flown anywhere in the world and even helicoptered onsite, not requiring the support vessel to be quayside. No cranes are needed to load the equipment onto the vessel. The units connect directly onto the equipment subsea and only require triggering from the ROV operator to initiate a test sequence. The results are shown on the unit's display for instant feedback and are also stored on the internal memory for later analysis if required.

In what ways does C-Kore help customers cut down on operational costs?

C-Kore customers greatly reduce their operational costs by using the C-Kore tools to simplify the subsea testing process on both fault-finding operations for existing oil & gas fields and also on new installation operations for greenfield projects. For both operations, no extra personnel are required to accompany the C-Kore units. This is a great advantage especially in pandemic situations when complicated traveling restrictions and quarantine regulations quickly drive up operational costs.

For existing subsea oil fields, C-Kore engineers are happy to work with the operator's engineers to determine the optimised testing strategy to quickly and safely find the electrical fault. The C-Kore tools come in a small peli case, making it easy to quickly dispatch to the location. Once the field is isolated and the units are taking subsea in the ROV tooling tray, testing can commence independent of the platform – one of the huge time-saving advantages with the C-Kore technology. By comparison, traditional platform-led testing requires involvement by the platform for every step of the testing process, often taking hours to complete a single subsea test. One of our customers shaved five days off their testing time

“ C-Kore testing tools greatly benefit new installation operations by monitoring umbilicals during the entire installation process.”



C-Kore units installed on umbilical termination assembly.

using C-Kore tools! With current vessel pricing this is a significant cost savings.

C-Kore testing tools greatly benefit new installation operations by monitoring umbilicals during the entire installation process. They are installed at the umbilical manufacturer's facility right after completion of the factory acceptance test (FAT) where the C-Kore units gather a baseline reading. The tools are then set to monitor the umbilical at set intervals during the entire installation process, from off-spooling to transport to installation, even through wet-storage, up to the moment of hook-up into the system. During this whole period, the C-Kore units continue to monitor the condition of the umbilical without any human intervention.

Traditionally, installation contractors installed in-field umbilicals blind once the second end was submerged because no other monitoring equipment can get wet. However the C-Kore

units can remain installed on the umbilical during the entire process. Now once the second end of an infield umbilical touches down on the seabed, it only takes a few minutes to check the condition of the umbilical with the C-Kore units, instead of the hours required with traditional testing equipment, such as testing via topside equipment and deploying a downline.

How well established is the company in Africa? Does it have any expansion plans in the African market?

C-Kore Systems has worked on many deployments in African waters, both fault-finding operations on brownfields and also new installation projects for greenfields. Some of the operations run through the engineering offices in London, Paris or Houston. But we also work with local agents who bring our technologies to the engineering teams in Africa. One such example of good

cooperation is with Cranium Engineering in Nigeria, who have introduced our technology to many of the operators in Nigeria. We recently deployed on a complex fault-finding operation in Nigeria where our cable monitor tools were used to quickly measure the insulation resistance and continuity of the electrical network subsea.

Is the company planning on launching any new product?

We recently brought out a Subsea Optical TDR product that allows customers to now test their optical fibres subsea. This year we are also launching our Topside Wireless Modem. This will allow the data from multiple C-Kore units monitoring an umbilical while on deck to be shown on the monitoring system in the cabin of the installation vessel. ♦

Learn more about our state-of-the-art subsea testing technology at: www.c-kore.com, or drop us an email at: sales@c-kore.com.

Fugro to showcase remote sensing technology at EGYPS

FUGRO, THE LEADING global geo-data specialist, will exhibit its innovative and patented remote sensing technology QuickVision®, a smart camera combined with QR code like patterns, that assists in subsea structure installation and drilling operations, at the sixth edition of the Egypt Petroleum Show (EGYPS), which is held from 13-15 February in Cairo.

Attendees at Fugro's stand (Hall 2, Stand 2H74) will get an opportunity to see a demonstration of QuickVision®, a smart subsea camera technology, designed to provide real-time touchless inspection and monitoring technology that offers a much safer, more efficient, and sustainable solution



The technology offers a more efficient and sustainable solution for offshore operations.

to offshore operations.

QuickVision®, offers unique features which reduce offshore personnel needs, vessel time and carbon emissions. Furthermore, by eliminating requirements for

the installation of expensive and huge peripheral sensors on subsea structures, it further aids in the cost reduction of projects.

David Washbrook, director Marine Asset Integrity Middle

East and India said, "Our innovative vision-based subsea camera solution coupled with the power of augmented reality has revolutionised subsea installation programmes by reducing the need for manual time-consuming positioning. With this we achieve significant risk mitigation, vast improvement in environmental sustainability of operations and reduced costs as opposed to the conventional sensor method. We're proud and determined to be delivering solutions that ensure safe and sustainable offshore operations. Our passion for innovation will continue advancing technology and effectively implement it in partnership with our clients."

N'GENIUS launches new stainless steel technology for the oil, gas and LNG industry

N'GENIUS MATERIALS TECHNOLOGY has developed an innovative range of high strength austenitic stainless steels which it says has the potential to revolutionise the design and construction of onshore and offshore facilities in the oil, gas and LNG sector.

Patent protected in 30 countries around the world, the N'GENIUS Series is a complete 'family' of high strength austenitic stainless steels possessing major improvements compared to 300 Series stainless steels, and a highly economical alternative to various nickel-alloys.

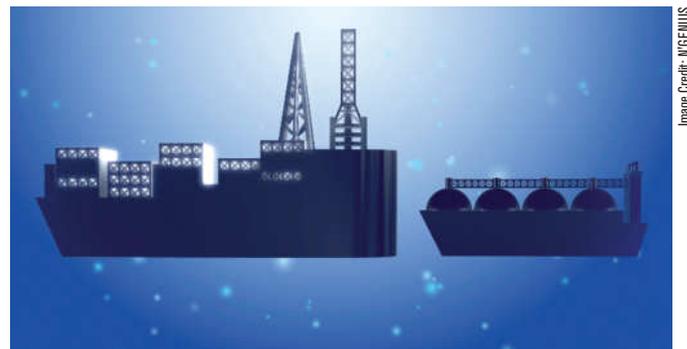
As with conventional austenitic stainless steels, the N'GENIUS Series has excellent ductility and toughness at sub-zero and cryogenic temperatures, but also offers even higher strength and vastly superior corrosion resistance.

LNG piping systems, engineered products, fabricated products and equipment can be developed and manufactured with reduced wall thicknesses, offering the potential to make products and equipment lighter and smaller, significantly reducing topside weight and helping facilities overcome space and height restrictions.

In particular, large facilities with extremely heavy topsides including floating production storage offloading (FPSO) vessels, FLNGs and upstream fixed platforms, would greatly benefit from the design and construction advantages that the N'GENIUS Series can provide.

Dr C.V. Roscoe, the inventor of the N'GENIUS Series, said, "Some of these larger facilities can have topsides weighing more than 50,000 metric tonnes, which has a major impact on the design and construction cost of oil, gas and LNG projects.

"The N'GENIUS Series has an infinite range of alloy types, variants and grades and is perfectly suited for all the different material



FPSO vessels, FLNGs and upstream fixed platforms, could greatly benefit from the design and construction advantages that the N'GENIUS Series can provide.

specifications, scopes of work and products including piping systems, pumps, valves, modules, vessels and tanks. Therefore, the potential to optimise the weight and space of all these components, and in turn reduce costs, could be invaluable."

The N'GENIUS Series can be manufactured in both wrought and cast forms, in an extensive range of products for the oil, gas and LNG industries. These include pipe, tube, fittings, flanges for piping systems, modules, heat exchangers, umbilicals and line pipe for risers, flowlines, pipelines and manifolds. N'GENIUS technology can also be applied to engineering products including pumps and valves, fabricated products such as vessels and tanks, and specialist products including casing and tubing for Oil Country Tubular Goods (OCTG).

FLIR's cameras ensure safety from harmful gasses

SK ENERGY, KOREAN refining corporation, uses FLIR optical gas imaging (OGI) and thermal imaging cameras for safety inspections at the Ulsan CLX plant, one of its key refineries. To the Ulsan CLX inspection team, this FLIR technology is critical to maintaining safety throughout the plant.

Given the massive scale of the Ulsan CLX, its inspection team uses an impressive array of equipment for a wide range of purposes: from portable thermal imaging cameras, such as the FLIR ExxSeries and T-Series, to FLIR GF320 and GF346 OGI cameras. In particular, the FLIR GF320 has become an integral part of the inspection process, and the Ulsan CLX plant has added more than 10 cameras to its arsenal of inspection equipment.

"FLIR's optical gas imaging cameras and thermal imaging cameras ensure the safety of our workers from harmful gases that cannot be seen with the naked eye. They protect the entire facility and the complex from hidden dangers." The inspection team deploys a range of FLIR products, but their most highly-rated device in terms of usability and reliability is the GF320.

Introduced first at the Ulsan CLX in 2012, this gas-finding camera is used to scan the entire facility for hydrocarbon or VOC leaks in valve connections after major maintenance projects. Lee says using the GF320 to scan the entire facility after maintenance is considered virtually mandatory at the Ulsan CLX.

IMI's EroSolve MMT reduces risk of damage and clogging

THE OIL AND gas sector is losing significant sums annually to valve reliability issues in harsh environments. The introduction of self-cleaning components combining multi-stage labyrinth and cascade technology could prove a gamechanger in terms of plant safety, productivity, and profitability.

IMI Critical Engineering has developed EroSolve Metamorphic Trim (MMT), which uses a unique self-cleaning design and velocity control methodology throughout the whole fluid passage, reducing the risk of damage and clogging. The trim, which is custom-designed to fit existing valve bodies and actuators, also benefits from the gradual divided pressure drops associated with cascade-style solutions, as well as reduced



Image Credit: Adobe Stock

IMI uses unique self-cleaning design and velocity control methodology.

installation costs.

With the implementation of the EroSolve MMT, the high pressure drops, and small flow rates hampering performance can be mitigated.

"Maximising asset production efficiency is a key priority across says all industries," says Karl Wonisch, head of Europe Control Valves at IMI Critical

Engineering. "This includes reducing the amount of maintenance required on site assets such as valves, especially in severe applications. EroSolve MMT has already proven itself in this arena, saving organisations millions in total cost of ownership costs by reducing clogging and cavitation concerns."

Fine Tubes to supply high-performance tubes to Qatargas

PRECISION METAL TUBING manufacturer, Fine Tubes, has been granted official approval by Qatargas to supply high performance tubes in MONEL alloy 400 for critical oil and gas applications.

Oil and gas applications demand materials with excellent strength, high pressure, and corrosion-resistant properties. MONEL alloy 400 tubes from Fine Tubes deliver advanced resistance to corrosion in subsea

instrumentation systems which receive constant exposure to seawater. The already corrosive nature of the salt water is exacerbated in the Middle East region due to the high temperatures of water and air, making Fine Tubes' products particularly suitable.

Fine Tubes works closely with major oil and gas companies worldwide to custom-engineer tubes with higher corrosion resistance that deliver extended product life, as well as reducing downtime and maintenance costs. Critical applications include control lines in subsea umbilicals, control and instrumentation, and pressure housings.

The tubes are used across global sectors.



Image Credit: Adobe Stock

They deliver advanced resistance to corrosion in subsea instrumentation systems.

DEVELOPING ALGERIA'S HYDROCARBONS POTENTIAL

Nour Eddine Daoudi, president of ALNAFT, Algeria's National Agency for the Development of Hydrocarbon Resources, and Redha Kelkouli, managing director of SLB North Africa, speak to *Oil Review Africa* about Algeria's energy potential, the new hydrocarbons law and the launch of EXALT, a new digital platform developed by SLB that offers global access to the entire Algerian subsurface data and "evergreening" products.

THAT ALGERIA HAS massive hydrocarbons potential cannot be denied. The country has the 10th largest proven natural gas reserves globally with the third largest unconventional gas reserves, is the largest producer of natural gas in Africa and a major supplier to Europe. It also holds 12 trillion barrels of proven oil reserves, ranking 16th worldwide. However, it is fair to say that Algeria has not yet harnessed the full potential of its energy resources.

That could all be set to change, following the promulgation of Algeria's new Hydrocarbons 19-13 Law in December 2019, which offers significantly improved terms for investors, and the drive to deploy cutting edge technology and international expertise to maximise the potential of its resources, as exemplified by the launch of the EXALT fully integrated digital platform. The new measures and associated flexibility aim to promote sustainable and optimal development and exploitation of the national hydrocarbon resources, to satisfy the needs of both the national and international energy market.

Explaining the background to the new law, Daoudi explains that the international bid round launched under the old Law 05-07 had been unsuccessful, one of the reasons being the fiscal pressures. The new law aims to develop the institutional framework and introduce a simplified and competitive tax regime in order to promote foreign partnership in the sector. Taxes have been reduced to 60-65% compared with 85% under the old law, and a number of new incentives have been introduced, for example reducing taxes if the project is technically difficult and geologically more complex, to make it



Image Credit: ALNAFT/SLB

Nour Eddine Daoudi, president, ALNAFT and Redha Kelkouli, managing director SLB North Africa.

economically viable. The new law also offers more flexibility in terms of contract between the national oil company and partners, offering three types – participation contract, risk services contract and production sharing contract.

"The main aim with this new law is to attract more investors into Algeria's oil and gas sector; for that we are working with our partners to get the new way to work. Today we launched the new digital platform, EXALT, which stands for 'Explore Algeria Today'. With the technology and legal support and an attractive hydrocarbon mining domain, we think we will have in the new future more investors in Algeria in the oil and gas business," Daoudi says.

According to ALNAFT, the launch marks an "unprecedented opportunity" for Algeria's energy market, for investors to explore new plays, prospects and evaluate the national hydrocarbon potential.

With the current energy crisis in Europe, does Algeria see an opportunity to expand its gas supplies to the continent?

"One of our attributes is our geographic position in close proximity with Europe," says Daoudi. "Algeria produces around 100bn cubic metres a year of gas, of which 45-50% is dedicated for domestic consumption. We also have to honour our long-term contracts with our various partners, especially our European partners. We are looking to bring additional volumes on to the market, and to do this we

need to develop our fast track delivery processes to increase production and develop fields more efficiently, as it takes time. We need to replace our reserves, to enhance and develop the exploration side. It is getting more difficult to find oil and gas in our reservoirs, hence the need for technology and expertise.”

Not only is Algeria looking to develop its hydrocarbon resources, it is also has its eye on new energies, mindful of the energy transition.

“Algeria has huge potential for solar and hydrogen. One of Algeria’s goals is to produce green hydrogen; the challenge is to produce hydrogen not from gas, but from solar energy,” Daoudi says.

Expanding on the development of the EXALT digital platform, launched at ADIPEC 2022, Kelkoui explains that SLB has operated in Algeria for decades across the entire oilfield services spectrum, and this new venture with ALNAFT is a continuation of its historical partnership.

“We have worked with ALNAFT in the past to develop the national data repository. Algeria and ALNAFT have one of the most advanced data repositories in the region, so this is the foundation of this partnership,” continues Kelkoui. Algeria’s long history of oil and gas exploration and production activities dating back to the 1950s, has yielded a vast amount of E&P digitised data.

“The EXALT digital platform structures the entire architecture of the Algerian subsurface dataset in a modern and accessible way, where we with the ALNAFT teams, using technical expertise from both SLB and ALNAFT, do what we call ‘evergreening’, ie maintaining this dataset as up to date as possible in real time, so it has value for any potential investor or operator coming to Algeria. The platform has the most advanced processes and digital protocols which enable this.

“The aim of both parties is to allow

operators and potential investors to derisk their investment as early as possible in the financial investment decision, and diversify the operator base in Algeria,” continues Kelkoui.

“As Mr Daoudi shared last year, 60% of subsurface domain in Algeria is either unexploited or underdeveloped. So the potential is huge, in both conventional and unconventional plays.”

Kelkoui concludes, “As Mr Daoudi mentioned, in terms of the energy mix, and supply and demand, both internally and externally from the international market, Algeria is in a pivotal position in terms of gas supply, but also has potential beyond gas, if you talk about decarbonised oil as well as new energy sources. With hydrogen, solar and geothermal potential, the energy mix is there, the ambition is there, the political leadership is there, for all of this to be successful for Algeria as a country, for the region and hopefully the world.” ♦

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Eni and Sonatrach sign energy agreements

ENI AND SONATRACH have signed two agreements which outline future joint projects on energy supply, energy transition and decarbonisation. The agreements were signed in the presence of the Prime Minister of Italy, Giorgia Meloni, and the President of the People’s Democratic Republic of Algeria, Abdelmadjid Tebboune.

Through these agreements, Eni and Sonatrach will identify opportunities for the reduction of greenhouse gas and methane gas emissions and will define energy efficiency initiatives, renewable energy developments, green hydrogen projects and carbon dioxide capture and storage projects, to support energy security and at the same time a sustainable energy transition.

In addition, the companies will conduct studies to identify possible measures to improve Algeria’s energy export capacity to Europe.

Eni CEO Claudio Descalzi commented, “These agreements bear witness to our commitment to ensuring Italy’s security of supply while at the same time pursuing our decarbonisation objectives. The partnership between Italy and Algeria gets stronger today, and Algeria’s key role as one of Europe’s main energy suppliers is confirmed.”

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LEVERAGING EDGE COMPUTING

The medium is aiding offshore organisations with highly reliable compute infrastructure capabilities right at the edge of operations, says Stratus Technologies.

DIGITAL TRANSFORMATION IN oil and gas remains paramount in managing mission-critical operations, gaining valuable business insights, improving worker safety, reducing costs, and more.

This is especially true for offshore oil and gas production, presenting a unique set of circumstances including – but not limited to – often inhospitable geographically remote locations, 24/7/365 operations, and around-the-clock rotating equipment required to move oil and gas and generate power to simply keep the lights on.

So, where does Edge Computing fit in this digital transformation equation?

Gone are the days of difficult communications and archaic two-way radios. Technology advancements over the years have brought an exciting digital revolution to the oil and gas industry, not only impacting the offshore production setting but also significantly improving the lives of those who leave their families for weeks at a time just to do their jobs.

According to McKinsey and Company, “Technology has

“ Technology advancements over the years have brought an exciting digital revolution to the oil and gas industry.”



Image Credit: Adobe Stock

Real-time data analysis is one of the key components that make edge computing a trusted ally in digitising the oilfield.

potential to boost performance across the entire upstream oil and gas value chain by enabling optimisation and automation.”

Many offshore oil and gas organisations have chosen to leverage edge computing, providing highly reliable compute infrastructure capabilities right at the edge of operations. This is especially important as many offshore oil and gas companies reside in harsh environments without easy access to IT teams should a problem arise.

Some of the key components that make edge computing a trusted ally in digitising the oilfield and to those working in the industry include accurate, real-time data analysis; remote control operation capabilities;

new levels of reliability and availability; and applications with the ability to predict equipment failures before they happen.

It's no secret; offshore oil and gas facilities produce an incredible amount of data daily. According to a Cisco report, an oil rig can create two terabytes of data in one day, but due to the remote nature of the offshore oil and gas industry, this data is rarely analysed and leveraged for decision making without the support from edge computing solutions. In a recent Schneider Electric blog, the reduction of latency is highlighted as one reason many offshore organisations are turning to edge platforms.

With edge computing, those working in offshore oil and gas

production have enhanced visibility of operations from a distance – especially with extremely limited support staff and access. Operators require it to manage and remotely run software and equipment continuously. They can also remotely handle health monitoring, alerting, patching, and issue resolution.

The platform is simple to install, deploy, and manage across applications and infrastructure. It protects physical assets, data and security, reducing both operational and financial risk.

The edge computing platform operates autonomously – at the edge – with constant availability, even in the harshest offshore production environments. ♦

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