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Oil Review Africa

Oil · Gas · Petrochemicals

VOLUME 14 | ISSUE 1 2019

The global oil outlook

What lies ahead in 2019?

Michael Dumbi Amaeshike, Managing Director, West African Ventures (p34)

West Africa: Updates from the oil and gas industry in Nigeria and Ghana

Corrosion management and maintenance

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Our economist analyses the world oil market on page 14.
Image Credit: Adobe Stock

EDITOR'S NOTE

The new year has started out with much activity – South Africa's oil discoveries have the potentail to be a game changer for the country's energy sector, major companies such as Total and Eni, have been busy across the continent and licensing rounds for Congo and Somalia could be the start of some exciting development in those emerging markets.

On page 14, we take a global perspective with Moin Siddiqi, our economist, offering his analysis on the world's oil markets and, in particular, the impact of the US market under the Trump administration.

Elsewhere in this issue, we give you updates from West Africa, an exclusive interview with a leading Ghanaian employee advocate and an extended technology section, including the latest developments in a range of sectors such as autmoation, digitalisation, big data, corrosion management and pipeline security.

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MARCH

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Oran
www.napec-dz.com

10-13 **North Africa Petroleum Exhbition & Conference**
Houston, Texas
www.artificial-lift-conference.com

26-28 **StocExpo Europe**
Rotterdam, The Netherlands
www.easyfairs.com/stocexpo-europe-2019/

27-29 **OMC 2019**
Ravenna, Italy
www.omc2019.it

APRIL

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www.africaoilandpower.com/event/appo-cape-vii/

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www.igu.org/events

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Houston, Texas
www.2019.otcnet.org

JUNE

4-5 **Offshore Well Intervention Conference West Africa 2019**
Accra
www.interventionwca.offsnetevents.com

4-6 **Angola Oil & Gas 2019**
Luanda
www.africaoilandpower.com/event/angola-oil-gas-2019/

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

Africa E&P Summit to connect upstream leaders in London

THE AFRICA E&P Summit will again bring together Africa's upstream industry in London at an event for companies active in Africa's dynamic oil and gas industry. The agenda promises to provide exclusive insights into the continent's fast-changing exploration sector.

The speakers list includes major players and decision-makers representing a wide range of stakeholders, including corporate players active in Africa through to fast-moving independents, finance, legal and service and supply companies, and African governments and NOCs seeking investors.

Among the companies represented are Impact Oil & Gas, Africa Oil Corp, Kosmos Energy, Galp Energia, AMNI International Petroleum Resources, FAR Limited, Cairn Energy, AziNam and TGSy. Confired exhibitors include Woodside, Africa Oil, TGS, Kosmos, Stellar Energy Advisors and RPS Group.

Last year's event was well-attended and well-received.

"An exceptionally well organised event with attention to detail, in first rate venue with generally high quality presentation," said Peter Dolan of Dolan & Associates. "The mood was positive, admittedly helped by a strengthening oil price."

Image Credit: IET

The regal IET building will again be home to the Africa E&P Summit.

Rebecca Jones of PwC said the event offered "valuable technical and market insight into investment and opportunities in Africa."

As well as hearing from speakers and meeting exhibitors, the event will include networking opportunities, such as a gala dinner and networking reception.

The event will be held from May 22-23 at IET London. For more information or to book, go to www.africaepsummit.com

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Important oil discoveries in South Africa for Total and Africa Oil

TOTAL AND AFRICA Oil have announced a major oil discovery off the coast of South Africa. Total, the operator of the block with Africa Oil as a partner, has announced that it has made a 'significant' gas-condensate discovery on the Brulpadda prospects, located on Block 11B/12B in the Outeniqua Basin offshore South Africa. According to Total, the Brulpadda well encountered 187 feet of net gas condensate pay in the Lower Cretaceous reservoirs. The well, which was drilled to a final depth of 11,919 feet, was described as 'successful' in the Brulpadda-deep prospect.

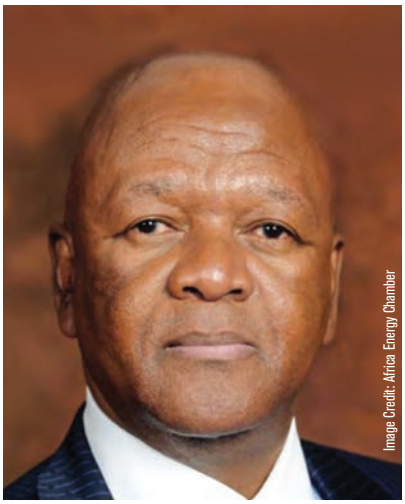
Image Credit: Africa Energy Chamber

Jeff Radebe, South Africa's energy minister, is excited about the discovery.

Kevin McLachlan, senior vice-president exploration at Total, commented, "With this discovery, Total has opened a new world-class gas and oil play and is well positioned to test several follow-on prospects on the same block."

The country's energy minister, Jeff Radebe, described the find as a "game changer".

The African Energy Chamber said this discovery will help open a new hydrocarbon province in South Africa, prove the presence of billions of barrels of oil equivalent in South African waters, and will change the course of the country's economy, helping to reduce import dependency.

NJ Ayuk, executive chairman at the chamber, noted, "The oil industry hopes this will be a catalyst and encouragement for all policymakers to work on an enabling business environment for exploration and drilling activities in South Africa."

BP's West Nile Delta project goes into production off the coast of Egypt

BP HAS ANNOUNCED the first gas production from the second stage of its West Nile Delta development offshore Egypt.

The project, which produces gas from the Giza and Fayoum fields, was developed as a deepwater, long-distance tie-back to an existing onshore plant.

The production from all three phases of the West Nile Delta project is expected to reach up to almost 1.4 billion cubic feet per day (bcf/d), equivalent to around 20 per cent of Egypt's current gas production, the company said in a statement.


Image Credit: BP

Bob Dudley, BP chief executive, hailed the safety of the West Nile Delta project.

Bob Dudley, BP chief executive, said, "With the second stage of West Nile Delta now online, BP has now safely brought 21 new upstream major projects into production over the last three years, keeping us on track to deliver 900,000 boepd by 2021."

The West Nile Delta development includes a total of five gas fields across the North Alexandria and West Mediterranean Deepwater offshore concession blocks. The development is being delivered in three stages. The first stage started in 2017, with the company producing gas production from the first two fields, Taurus and Libra. Stage two consists of the Giza and Fayoum development and the third stage of the West Nile Delta project will develop the Raven field.

Hesham Mekawi, regional president, BP North Africa, added, "Production from Giza and Fayoum will sustain local energy supply and keep us on track to triple our net production from Egypt by 2020."

Seismic survey boost for Sierra Leone

UK-BASED CONSULTANCY COMPANY GeoPartners has announced a new 2D seismic survey offshore Sierra Leone.

In partnership with the Petroleum Directorate of Sierra Leone, this survey will support the fourth offshore petroleum licensing round planned for later this year, the company said in a statement.

The company added that the survey will consist of more than 9,000 km of new data and cover the full extent of the offshore area available in the licensing round.

It stated that the acquisition is scheduled to begin after the necessary regulatory approvals have been completed and a subset of the data will be available for companies participating in the licensing round.

Jim Gulland, director of GeoPartners, said: "We are proud to have been awarded this contract by the Petroleum Directorate to support their ongoing exploration efforts and specifically the forthcoming licence round."

"The new survey is the first to cover the entire offshore area from shallow to ultradeep water, providing ties to all existing wells and allowing a complete evaluation of the available acreage. Sierra Leone has proven oil discoveries, and this new long offset survey will highlight the potential of this underexplored area," he added.

The 2D survey is a boost for the Sierra Leone exploration sector after the announcement in November last year that African Petroleum was going to relinquish its two operated ultra-deepwater licences off the coast of the west African country.

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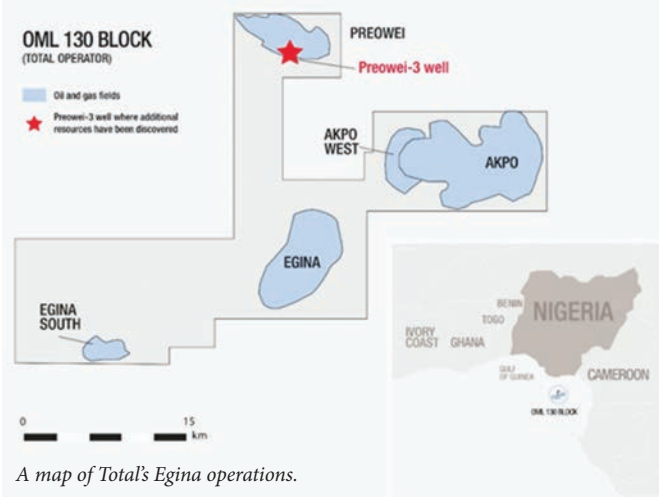
Total starts production at Nigeria's Egina field with 200,000 bopd expected

AT THE END of 2018, Total started production from the Egina field, 150 km off the coast of Nigeria. The oil and gas company said in a statement that the Egina oilfield, which is located in 1,600 meters of water depths, is expected to produce 200,000 bopd, which represents around 10 per cent of Nigeria's production.

Arnaud Breuillac, president exploration and production, commented, "Egina will significantly boost the group's production and cash flow from 2019 onwards, and benefit from our strong cost reduction efforts in Nigeria where we have reduced our operating costs by 40 per cent over the last four years."

Image Credit: Total



A map of Total's Egina operations.

This project has involved a record level of local contractors. Six of the 18 modules on the FPSO were built and integrated locally and 77 per cent of hours spent on the project were worked locally, Total reported.

The company noted that startup has been achieved close to 10 per cent below the initial budget, which represents more than one billion dollars of capex savings, with drilling time per well reduced by 30 per cent.

Initially discovered in 2003, the Egina field is the second development in production on the Oil Mining Lease (OML) 130 following the Akpo field, which started up in 2009. Total stated that the Preowei field is another large discovery made on this prolific block, for which an investment decision is scheduled for 2019.

Nigeria reports an upswing in crude production for 2018

NIGERIA'S DAILY CRUDE oil production recorded an upward swing of around 2.09 mmbbl in 2018, translating to a nine per cent increment, compared with the 2017 average daily production of 1.86 mmbbl.

Maikanti Baru, group managing director of Nigerian National Petroleum Corporation (NNPC), said the nation had maintained a line of consistent year-on-year improvement. Baru, who made the submission in a comprehensive end of year message to the staff of the corporation, cited the new business models his team has placed in the national oil company's business entities as reasons for the giant strides.

Image Credit: Adobe Stock

Nigeria has reported encouraging production figures to kick off 2019.

A statement issued in Abuja by NNPC group general manager, of the Public Affairs Division, Ndu Ughamadu, said the Nigerian Petroleum Development Company (NPDC), Nigerian Gas Company (NGC), Petroleum Products Marketing Company (PPMC), Duke Oil, NIDAS and Integrated Data Services Limited (IDSL), were among the re-engineered companies listed.

Progress on the Nigeria-Morocco pipeline

PENSPEN HAS ANNOUNCED that it has been awarded a contract by the Office National des Hydrocarbures et des Mines (ONHYM) and the Nigerian National Petroleum Corporation (NNPC) to execute the first phase of the FEED (FEED Phase I) of approximately 5,700 km gas pipeline proposed to run from Nigeria to Morocco.

Penspen said in a statement that the award is a follow-up on the feasibility study completed by the company in July 2018.

The FEED Phase I consists of a detailed review of the feasibility study results and in-depth evaluation of the gas demand and supply study. The further design of the pipeline system, in addition to the execution of an Environmental and Social Impact Assessment (ESIA), will then be carried out with the aim of optimising the proposed pipeline route and project economics.

At the end of the study, the outcomes will help the client prepare for the second phase of the FEED (FEED Phase II) which is expected to lead to a Final Investment Decision (FID).

Peter O'Sullivan, chief executive officer of Penspen, said, "Following Penspen's successful execution of the feasibility study, we consider it a huge privilege to be selected by both clients for the next stage of the project definition i.e. FEED Phase I, where we will continue to provide our renowned world class services towards realisation of this strategic project."

The work on the first phase has already started and is being executed from Penspen's Abu Dhabi office, the company confirmed.

SDX to expand exploration presence in Morocco

SDX Energy has won additional licenses in Morocco, Moulay Bouchta Ouest and Lalla Mimouna Sud. The Moulay Bouchta Ouest exploration licence (SDX 75 per cent working interest and operator), covering an area of 458 km^2, has been awarded to SDX for eight years.

Image Credit: Adobe Stock

SDX is optimistic about Moroccan prospects.

SDX aims to reprocess 150 kilometres of 2D seismic data, acquire 100 km^2 of new 3D seismic and drill one exploration well within the first three-and-a-half-year period.

SDX has abeen re-awarded the Lalla Mimouna Sud licence (SDX 75 per cent working interest and operator), which covers an area of 857 km^2, for eight years. The company has to acquire 50 km^2 of 3D seismic and drill one exploration well within the first three-year period.

Somalian government opens first offshore licensing round

SOMALIA'S INAUGURAL OFFSHORE hydrocarbon licensing round officially opened on 7 February in London. Deputy Speaker of the House of the People, Abdiwali Sheikh Ibrahim Muudeey and Minister of Petroleum and Mineral Resources, Abdirashid Mohamed Ahmed, were in attendance to introduce industry experts who outlined the tender process and fiscal terms.

Fifteen offshore blocks were unveiled, ranging in area up to 5,000 sq km, spanning much of the south-east coastline. Interested parties were asked to submit bids in early November 2019. Successful bidders will be notified shortly after.

Oil companies are being asked to evaluate the acreage using modern seismic images offered by Norwegian seismic services company Spectrum Geo. Spectrum has completed acquisition and processing of 20,185 km of 2D long-offset seismic data. This complements 20,500 km of existing seismic data acquired in 2014.

In the last decade several large gas discoveries have been made in East Africa. The new seismic data offshore Somalia has revealed what has been missing from the East African margin – the potential for oil.

IP Week brings together senior execs from around the world

HOSTED BY THE Energy Institute and put together by leading industry experts, International Petroleum (IP) Week is one of the most important events in the international oil and gas calendar.

More than 1,500 senior executives from all over the world will gather in London for three days of conferences, seminars, round tables and social events, bringing together the knowledge, experience and expertise of the most senior figures from across the energy world.

Delegates will be able to hear the latest news and updates, debate strategic issues, share new ideas and network to form partnerships with oil and gas operators, clients and investors.

Topics range from upstream and downstream oil and gas, technology, finance and investment, to specific regions.

This year shines a spotlight on the themes shaping the current global oil and gas markets and investment: geopolitics, sustainability and developments in technology.

A diverse line-up from the international oil and gas industry is confirmed, including Bob Dudley, chief executive BP; HE Suhail Al Mazrouei, Minister of Energy & Industry, UAE; Amin Nasser, president and CEO, Saudi Aramco; Dr Pratima Rangarajan, CEO, OGCI Climate Investments; Andy Brown, Upstream director, Shell; Arnaud Breuillac, president, Exploration and Production, Total; and Datuk Mohd Anuar Taib, executive vice president and CEO Upstream, Petronas.

Image Credit: Energy Institute

UAE Minister of Energy, HE Suhail Mohamed Faraj Al Mazrouei, spoke at last year's event and will return this year.

The event will include a Middle East Summit on 28 February examining the outlook for the Middle East oil and gas industry, as well as its critical role as a supply and demand hub. While a session on 27 February entitled 'The new frontier for Africa's oil and gas' will look at unlocking opportunities in Nigeria; the changing exploration and production landscape; financing African upstream; the continent's next hotspots; and the region's downstream potential.

IP week takes place from 26-28 February at InterContinental Park Lane, London.

For further information, see the website at www.ipweek.co.uk

Congo makes first licensing round awards for 2019

RESULTS FROM THE Republic of Congo's first licensing round have been announced, with the award of blocks to Kosmos Energy and Perenco and the provisional allocation of a block to Total.

Alessandro Bacci, oil and gas analyst at GlobalData, said, "Much of the fiscal burden under new contracts is linked to negotiable terms and may, therefore, depend on the levels of investor interest. The results of the first round appear encouraging, though, after the closing of the first licensing round, it took a long time to award the blocks to the IOCs. Five blocks on offer through the second licensing round were already unsuccessfully offered during the first round."

He added that the new hydrocarbons code has improved gas terms, but with most gas projects in the early design stages, a clear government policy and regulatory environment will be needed to attract investment.

The second licensing round will close in June 2019.

Eni announces increased activity in Angola's busy Block 15/06

FOLLOWING THE DECEMBER 2018 announcement by Eni of a new oil discovery in the Afoxé exploration prospect located in Block 15/06, offshore Angola, last month the company launched a new production well, VAN-102, in the Vandumbu field, which is located in the west hub of Block 15/06. Block 15/06 is developed by a joint venture formed by Eni, Sonangol, P&P and SSI Fifteen.

The Afoxé discovery is estimated to contain between 170 and 200 mmbbl of light oil in place, according to Eni.

Eni stated that the start-up of the VAN-102 well, which follows the start-up of the second Subsea Multiphase Boosting System, took place through the N'Goma FPSO, achieving a performance of around 13,000 bbl.

Eni is preparing for a busy 2019 off the coast of Angola.

Aker Energy announces successful appraisal of Pecan field offshore Ghana

AKER ENERGY HAS announced that it is about to complete a successful drilling operation of the Pecan-4A assessment well offshore Ghana. The company stated that based on subsurface data from seismic, wells drilled and an analysis of the Pecan-4A well result, the discoveries are estimated to contain gross contingent resources of 450–550 mmboe.

Aker Energy estimated that with the next two evaluation wells to be drilled, the total volumes to be included in the Plan of Development could increase to 600–1000 mmboe.

Jan Arve Haugan, CEO at Aker Energy, said, "There is still a lot of work to be done, including to conclude the phasing of the development, the size of first phase and detailing of the concept. Our most important priority going forward is to deliver a robust field development plan to the Ghanaian authorities."

Aker Energy is the operator of the DWT/CTP block, with a 50 per cent stake. The partners of Aker Energy are LUKOIL (38 per cent), Ghana National Petroleum Corporation (GNPC 10 per cent) and Fueltrade (two per cent).

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Solo Oil optimistic about Tanzanian project funding

SOLO OIL IS confident about project funding in Tanzania. This statement was made after its partner Aminex, a gas exploration firm, updated the progress of the Ruvuma and Kiliwani North projects.

At Ruvuma PSA, Aminex has selected service companies to drill the Chikumbi-1 well. It has also signed a conditional rig sharing agreement with Heritage Oil Ltd in order to reduce mobilisation and demobilisation costs. At Kiliwani North-1 well, the firm hired Schlumberger SEACO Inc to remediate a faulty sub surface safety valve.

Managing Director Dan Maling said, "We have been working closely with Aminex on reviewing the forward operational programmes at both Ruvuma and Kiliwani. There are now detailed cost estimates with operational plans in place."

"While the work programme commitments remain contingent on governmental approvals at Ruvuma, with our recent monetisation efforts we are in a strong cash position with a liquid balance sheet and are confident of being fully funded for next year's planned well programme and G&A," he added.

Solo holds a 25 per cent beneficial interest in the Ruvuma PSA and 8.3918 per cent interest in Kiliwani North-1.

South Sudan partners with AEC to boost oil sector

Image Credit: UNMISS

Oil could aid South Sudanese development.

THE AFRICAN ENERGY Chamber has entered into a technical assistance cooperation agreement with the Ministry of Petroleum of South Sudan to strengthen the country's capacity to manage its hydrocarbon sector. Under the agreement, the chamber will conduct a needs assessment and outline the institutional and policy reforms needed to strengthen capacity across the value chain. The chamber will also work on energy access and mobilise funding.

Ezekiel Lol Gatkuoth, minister of petroleum in South Sudan, said, "We continue to do a remarkable job when it comes to oil field resumption. We are seeing an increase in production. However, capacity building programmes are needed to have our citizens work and manage our oil resources properly."

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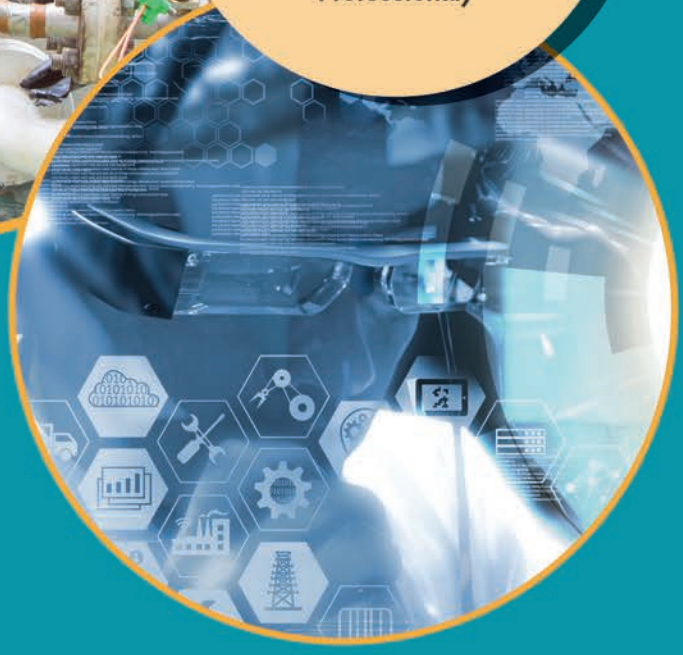

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The global oil industry is at a crossroads and much depends on the performance of the US shale oil sector.

Image Credit: Steven Polunsky/Flickr

TOP TRENDS TO WATCH IN THE WORLD OIL MARKET FOR 2019

Economist Moin Siddiqi shares his analysis on the prospects for the global oil market in 2019. Will muted global output curtail fuel consumption, and what impact will shale production in the USA continue to have across the world?

THERE ARE PLENTY of variables that have the potential to inject a ton of uncertainty into the annual US$2 trillion global petroleum industry as we enter 2019.

The Brent futures curve flattened significantly in the last quarter of 2018 as oil prices slumped to mid-US$50/barrel by the end of the year, compared with four-year highs in early October, when the price hit US$86/bbl, as US sanctions on Iran came into force.

At the time of writing, the global market remains in 'contango' – where forward prices exceed spot prices – on anticipation of supply glut or rising levels of inventories for crudes and petroleum products.

The latest OPEC+ agreement, which cuts output by 1.2mn in the first half of 2019 (Iran, Libya and Venezuela exempted), should at least put a 'floor' under prices and lead to a 'balanced' rather than 'tight' market.

Although cuts might prevent inventory build-up, perhaps not visible until mid-year, this could force extending cuts until the end of 2019.

"The global supply surplus is not resolved, and would likely reemerge if OPEC+ let up on its production cuts," noted the International Energy Agency (IEA) in a statement.

Meanwhile, Emirates NBD Bank said in a statement: "If the cartel really wanted to change the market and re-establish its dominance, there would have been a production cut agreement to the tune of 1.4-1.8mn bpd.

Saudi Arabia's oil minister, Khalid al-Falih, tried to reassure the market that the world would not see a repeat of the 2014-16 market meltdown.

> **"We remain focused on fundamentals, I can tell you we will achieve balance between supply and demand in 2019"**

"We remain focused on fundamentals, I can tell you we will achieve balance between supply and demand in 2019," the minister said.

However, much depends on relentless growth in non-OPEC supply (notably the USA).

The Energy Information Administration (EIA) expects US output to surge by 10 per cent to 12mn bpd in 2019. But the question remains: Can the shale boom continue in a protracted bear market?

Shale producers need US$40-$50/bbl to pay the high-yield bonds used for financing.

"If WTI crude remains around current levels (around $50/bbl), US growth should start to slow," reckons Morgan Stanley.

Major trends to watch in the oil market over coming months include: whether muted global output growth is curtailing fuel consumption; whether US shale production can maintain its incredible pace; whether chronic decline in Venezuelan output will continue; whether full-blown US sanctions will affect Iranian exports; and if OPEC+ partners (notably Russia) can satisfactorily enforce output discipline.

Furthermore, other factors such as geopolitics, particularly in countries with ongoing civil and political unrest; global trade risks (for example, the ongoing US-China trade war); emerging markets' currencies crises; higher US interest rates relative to other OECD economies; the stronger US dollar; and renewed supply outages amid shrinking global spare capacity (well below 2mn bpd), can all weigh on market's sentiment, thus causing greater price volatility.

Image Credit: 禁书 [冈] / Flickr

The ongoing US-China trade war is one of many factors which will influence the oil market this year.

"The IEA foresees supply outpacing demand in 2019 as a rise in output swamps growth in consumption"

The cost of oil imports becomes more expensive because oil is priced in dollars. Hence, a surging US dollar hits fuel demand in countries with weaker currencies and, as a result, oil prices are pushed down.

Fitch Solutions Macro Research (Fitch Group) reported: "Loss of exports from Iran, low inventories, limited spare capacity and continued under-investment in the sector will drive the market into deficit from 2019. That said, we note rising risks to demand, as emerging markets start to feel the pain of a stronger dollar, tighter liquidity, higher oil prices."

The IEA foresees supply continuing to outpace demand throughout 2019, as a "relentless" rise in output swamps growth in consumption that is at risk from a slowing economy. This poses challenges for OPEC to sanction even deeper cuts to production levels.

The return of market stability, along with lower development and project costs, led to resumption of exploration and production (E&P) activity during the past year – and this may well continue into 2019.

Energy companies are expected to spend a total of US$425bn in the upstream sector in 2019, up from US$400bn in 2016-17, but this is significantly below the US$770bn capital expenditure in 2014, before prices crashed from the heady days of US$100/bbl, according to Wood Mackenzie.

After collapsing between 2014-16 by more than 40 percent amid the downturn, an upstream recovery that saw four percent growth in 2017 accelerated five percent last year, accounting for projects worth US$472bn, the IEA said in World Energy Investment 2018 Report. In terms of conventional discoveries, Wood Mackenzie sees 2019 as a promising year, with hotspots to include Brazil, USA, the Gulf of Mexico and South Africa.

The 2019 predictions indicate a price range of US$60-65 rather than US$70-80/bbl.

For market upturn, crude futures will have to move back into a stronger 'backwardation' where near-term prices are higher versus those for later delivery – making it unprofitable to store crudes. That, in turn, reduces global oil stocks. OECD commercial inventory totalled 2,872mn barrels last October (IEA data), which is broadly in line with the five-year average.

Oil price projections, 2019*

	US$/bbl
Bank of America Merrill Lynch	70
Barclays	72
Citi Research	60
Goldman Sachs	62.5
JP Morgan Chase	72.6
RBC Capital Markets	68
UBS	68.5
Energy Information Administration	60.52
Standard & Poor's	65
Morgan Stanley	61

**Brent benchmark for global crude prices.*

FROM POTENTIAL TO PROFIT IN NIGERIA AND BEYOND

There are differences between the oil-producing nations of West Africa but they can be united by the opportunities available. Stuart Maxwell, technical director at Aquaterra Energy, comments.

IT RARELY PAYS to generalise in the global oil and gas industry, where profit can be found in even the smallest differences of geology or infrastructure. Nowhere is this more true than in West Africa, where mature producing nations like Nigeria or Angola resist easy comparison with each other, never mind their neighbours in earlier stages of development.

Even the idea of countries being on a spectrum from frontier nation to mature market is misleading. For Nigeria and Angola, a patchy history of investment and politics have created a diverse picture. Sporadic investment and delays following up on exploration have decelerated developing skills needed to maintain momentum.

There is no such thing as a West African rulebook. International codes apply, but each African country has different requirements. That could change as the Regional Economic Communities, and the African Economic Community push for greater harmonisation, but the current picture is far from homogeneous. What unites West Africa is opportunity. Mature countries are extending the life of existing platforms and exploiting hard-to-access sites; for frontier countries, it's the race to achieve first oil. For investors, operators, financiers, engineers and manufacturers, the potential is there, if differences are understood and challenges overcome. Perhaps the greatest hurdle is absent or inadequate infrastructure.

Image Credit: IndustriALL Global Union/Flickr

Nigeria has developed a strong skills base for oil and gas operations.

As the region's most developed market, Nigeria is home to yards that between them can produce any fabrication, plus the country has a well-established and talented core of people with the skills and experience in analysis, engineering and HSE to sustain a wide-reaching and multi-faceted industry, whereas emerging countries struggle. Even Angola relies on domestic fabrication facilities that do not have world-class capabilities.

Cue the law of unintended consequences – each producing country in West Africa may be at a different stage of maturity, but they all want to develop indigenous capabilities. But policies intended to boost local industry by specifying local content can work against these goals. The financial incentives of stakeholders are often misaligned, and policy supposed to encourage a thriving local industry inadvertently stifles development. Even in Nigeria, with its advanced fabrication yards, consumables for manufacture of platforms, drilling or production-based activities often have to be imported. So while the country's world-class engineers are assembling sophisticated platforms, the steel, valves, and pipes are shipped in.

In places such as Cabinda or Cameroon, the yards don't yet have the capability to handle large fabrication. In frontier countries, local content may only amount to a small amount of fabricating or machining, doing little to upskill local engineers, create jobs or build a sustainable industry. Breaking this cycle while respecting national independence is no easy task. But one of the answers is designing offshore platforms so that they are less dependent on larger fabrication capability or transportation.

A modular offshore platform approach suits existing and emerging capabilities. The manufacture can be split between a number of smaller yards, or laid out in a way that it fits a smaller space – or domestic yards can build certain parts of the platform, such as the subsea structure, while the topside equipment that requires more complex fabrication can be produced elsewhere. This allows for a significant degree of local content, while building local capability over time.

Modular design offers a bespoke solution, taking into account the differences that make each market unique. A site-specific solution designed around available resources will reduce costs – a route to first oil for smaller operators.

Aquaterra's Sea Swift platform has been deployed four times off the coast of Africa, with a contract in place to deliver two more platforms offshore Nigeria, both to reach first oil in 2019.

There are huge possibilities in West Africa, for operators, producers and countries. But turning potential into profit requires an approach of individuality, specificity and expertise. This isn't the narcissism of small differences. It's the proven path to success.

WORKERS' ASSOCIATION OFFERS ADVICE TO THE GHANAIAN GOVERNMENT

Jonathan Kotoku, Chairman of Rig Workers Association (RWA) talks to Emmanuel Yartey about what Ghana needs to do to ensure reliability and profitability in the country's oil and gas industry.

Tell us about the RWA.

The purpose for its establishment was to reinforce the idea of enabling only Ghanaian rig workers to work on the rig. A petition was delivered by the Association to Ghana National Petroleum Corporation (GNPC) to that effect which was accepted and signed by the latter. We are professionals who had worked with Ghana's Ministry of Lands and Minerals Resources, the decommissioned Saltpond Oil Company Limited and GNPC for decades and constituted ourselves into an association to assist in our nascent oil and gas industry. But we still have some expatriates occupying certain positions, particularly in engineering departments. We have been advocating that the government recruits more Ghanaian youth who are willing to be trained as riggers and production platform workers. The Petroleum Commission has agreed to our request for a comprehensive salary structure, promising that the training programme will cover existing workers and prospective applicants.

How can Ghana boost local content in the petroleum industry?

Local content can yield dividends if government genuinely accepts professional contributions from oil and gas experts – I am talking about stakeholders such as Tullow Ghana Limited, Kosmos, Ministry of Energy, Petroleum Commission, GNPC among others. Cross-fertilisation of ideas shall eventually lead to crystalisation of a practical document to act as a guide in achieving maximum local content. Organising seminars, conferences and exhibitions on oil and gas is not enough. Government must set aside an account dedicated to giving practical training to Ghanaian engineers. It was heartwarming and refreshing that Mr Amin Adam, deputy minister of Energy in charge of petroleum, said at the Ghana Summit that government was seriously working toward establishing a school for Ghanaians to broaden their horizons on the technicalities in oil and gas.

Image Credit: Eni/Flickr

Boosting local content in Ghana is a major priority for the RWA.

How is the government using oil and gas revenues in Ghana?

So far, government is doing well in terms of using oil and gas proceeds. The fact of the matter is Ghana's percentage of revenue in the sale of oil is just 13 per cent. The country has invested heavily in getting its own gas plant at Atuabo. It will take time before all those expenses can be recouped into the economy, so Ghanaians must be patient. However, I want government to make known to the public receipts and expenditures to clear doubts in the minds of people.

What is the latest on the Accra/Voltain basin?

Exploration has been going on since early 2015. In April 2016 Swiss African Oil Company and PET Volta Investments were awarded an E&P licence by GNPC for the Keta Delta Block, constituting Ghana's first onshore oil exploration in recent history. Indeed, the Voltaian Basin stretches into neighbouring Togo and Benin, offering new exploration prospects. Historical surveys identified potential deposits in the northern part of the basin, and GNPC is continuing its five-year exploration activities to find out the area's potential. The project is the first onshore oil exploration project in Ghana managed by GNPC, indicating many joint venture opportunities.

What does the future hold for Ghana's oil and gas industry?

Resources of oil and gas are finite, so the government must find intelligent ways of using the proceeds judiciously. The government must embark upon multiple seismic acquisitions, and such a responsibility rests upon the GNPC to execute it to perfection. This is important because without seismic acquisition, exploration cannot take place, let alone exploitation of the resources. It is a process – and it needs to be activated on a regular basis.

ENGINEERING OUT HUMAN ERROR WITH AUTOMATION TECHNOLOGIES

New drilling and well construction automation technologies are engineering out human error for bringing cost, efficiency and safety benefits. Well Construction and ENSCO are leading the way.

WEATHERFORD LAUNCHED VERO automated connection integrity at ADIPEC. Dean Bell, the company's president of Well Construction, said, "We're taking what was the current status quo in that product line and bringing AI, automation and digitalisation into this space. In this industry we often haven't done that as well as we should.

"There are two things that enable Vero. One is Automakeup, that autonomously controls the tubulars that are permanently installed in the well. So the make-up is done with automation, rather than using human judgement to decide whether those connections are made up properly.

"The evaluation of the torque when it's completed is also done autonomously with automation, engineering out human error. That's where digitalisation comes in, because a lot of data analytics went into evaluating all the types of connections.

"Vero ... reduces the risk associated with well failure from improperly made up connections, saving non-productive time and avoiding huge remediation costs which can run into tens or even hundreds of millions of dollars if it involves the workover of an offshore well.

"Because we automate the process, we eliminate people from that high risk environment on the rig floor. That has value everywhere, regardless of the cost of the operating environment.

"Vero also offers cost savings in terms of reducing wasted pipe, which can be very expensive. Here in the Middle East, a number of operators run high strength chrome, where the cost of a string of completion pipe could be US$15mn dollars. Many of the operators send as much as 15-20 per cent extra pipe to the site, with the logistics expenses and risks of damage and loss that entails.

> **"Vero reduces the risk associated with well failure from improperly made up connections."**

"A crew doing things the traditional way can run a connection as fast as Vero, if it's properly made up. But there is always variance in behaviour. By simply eliminating the variance in human behaviour we can save 10 per cent makeup time.

"With existing systems in the market the variance from the original equipment manufacturer (OEM) specification is 20 per cent. Vero stops perfectly at the torque and reduces the variance from 20 to two per cent away from the OEM-specified torque.

"The point about Vero is it's all about the connection, not the types of equipment used to make up the connection. We have various types of make-up system that are going to be Vero-enabled."

Vero has been trialled in Saudi Arabia, Azerbaijan, Qatar and the North Sea, with jobs soon to take place in Oman, Brazil and the Gulf of Mexico.

"We were able to tweak the algorithm associated with the automatic make-up through testing in real time. Record run rates were recorded in the North Sea, with more than 1,200 connections in completions made up, and a rate of zero rejected connections, zero laid down joints and zero damaged connections have been achieved on recent jobs following the test period, said Bell.

Efficient pipe tripping

ENSCO launched its Continuous Tripping Technology™ in December 2018, a solution that provides efficient, safer pipe tripping, lowering project costs.

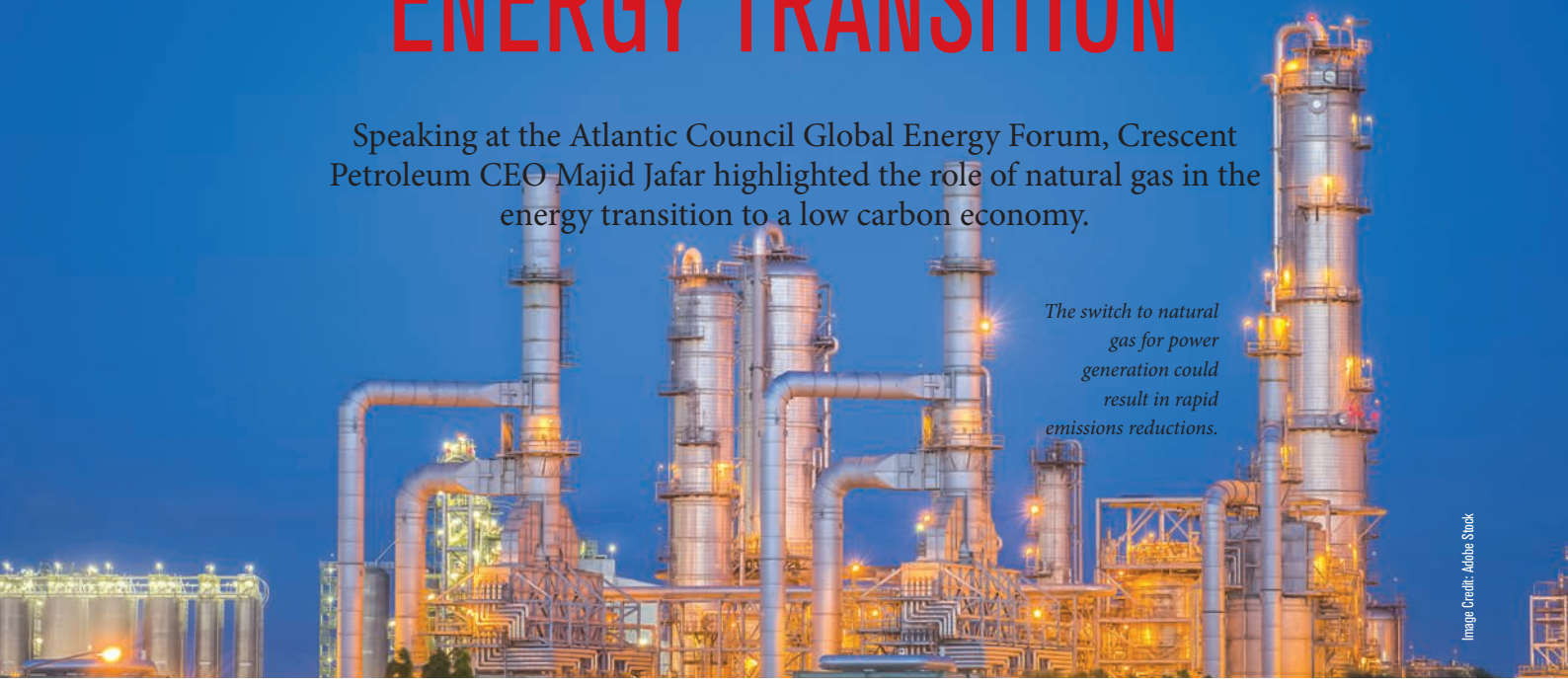
The patented Continuous Tripping Technology, in concert with other vital equipment, sensors and process controls, fully automates the movement of the drill string into or out of the well at a constant controlled speed. When deployed during offshore activities, it enables pipe-tripping speeds of up to 9,000 feet per hour – up to three times faster than tripping times achieved by current conventional stand-by-stand methods. Continuous Tripping Technology can be retrofitted to floaters and jackups, and is well-suited for ultra-deepwater drillships and larger jackups. Ensco completed the installation of Continuous Tripping Technology on ENSCO 123, and commissioning of this system is underway. Upon completion of the system's commissioning and the rig's acceptance testing, ENSCO 123 is expected to be delivered in March 2019.

President and CEO Carl Trowell said, "Continuous Tripping Technology is a step-change efficiency improvement that uses automation and innovative technology to address a repetitive, time-consuming process that is ubiquitous in offshore projects today. Tripping pipe is on the critical path for all drilling and workover activities and, as a result, meaningful time is spent performing this process over the life cycle of every offshore well."

Continuous Tripping Technology makes the pipe-tripping process safer by using automation to eliminate human error and personnel exposure associated with the conventional stand-by-stand method. The constant speed that the technology delivers minimises surge and swab pressure on the wellbore by eliminating intermittent stopping and starting, and excessive peak speeds that can occur with current industry practices.

THE ROLE OF NATURAL GAS IN THE ENERGY TRANSITION

Speaking at the Atlantic Council Global Energy Forum, Crescent Petroleum CEO Majid Jafar highlighted the role of natural gas in the energy transition to a low carbon economy.



The switch to natural gas for power generation could result in rapid emissions reductions.

Image Credit: Adobe Stock

AS GLOBAL DEMAND for energy rises, natural gas is emerging as a fuel of choice for power generation in the 21st century, serving as a central ingredient in a more sustainable energy mix in combination with renewable energy sources such as solar and wind, Majid Jafar, CEO of Crescent Petroleum, said.

"The switch to natural gas from coal and oil for baseload power generation could result in the kind of rapid emissions reductions that are needed and could have a definitive impact on the global carbon footprint," he commented. "The growing use of natural gas has is estimated to have avoided over two billion metric tonnes of carbon dioxide between 2005 to 2016, and its impact will only increase as gas adoption expands in growing regions like Asia."

Speaking on a panel entitled "Setting the Energy Agenda for 2019", Jafar joined HE Suhail Al Mazrouei, Minister of Energy of the UAE, as well as Lisa Davis, managing board member and CEO, Energy, of Siemens AG in discussing the future of energy, OPEC and the latest developments and outlook for the industry worldwide.

> **"The Middle East and North Africa region contains almost half the world's proven reserves of natural gas."**

"The Middle East and North Africa region contains almost half the world's proven reserves of natural gas but still only one sixth of global production, so the potential for growth is clear. Almost every government in the region and across Asia is looking to boost its gas supplies, much of it for internal consumption, as natural gas becomes synonymous with electricity generation and fuelling industry for economies with growing populations and energy needs."

Forward-looking governments embrace the switch from coal or oil to gas as an opportunity. He cited, for example, the UAE's announced national energy strategy – by 2050, it is expected that the power generation needs of the country will be supplied around 40 per cent each by natural gas and renewables.

Policymakers around the world will continue to grapple with slowing, if not reversing carbon levels. To be truly sustainable, energy solutions must be affordable, reliable and scalable, while contributing to lowering global carbon emissions. And oil and gas companies must confidently show the way forward and embrace their role as central players in the debate.

"In a rapidly changing world, this transition must be approached as an opportunity and not a threat," he said. "The future of the industry, and indeed that of sustainable energy supply worldwide, depends upon it."

The Atlantic Council Global Energy Forum, in partnership with the Ministry of Energy & Industry of the United Arab Emirates, Abu Dhabi National Oil Company (ADNOC), and Mubadala Investment Company, with Crescent Petroleum as Platinum Co-Chair, took place in January as part of Abu Dhabi Sustainability Week. It saw regional and global policymakers and industry leaders discuss the geopolitical and economic impact on the energy agenda.

Thes forum focused on four themes: the future of oil, digitisation of energy, diversification within energy companies and countries, and a regional focus on east and southeast Asia.

Marsol International has developed engineering solutions for the fabrication, commissioning and operation of offshore terminals and infrastructures.

Image Credit: Marsol International

COMPLETE LIFETIME EFFICIENCY FOR OFFSHORE TERMINALS

Mike Young, director of Marsol International, argues for a full lifecycle approach involving all stakeholders to optimise costs and efficiency.

WHEN IT COMES to designing and constructing offshore terminals, investors and owners have traditionally appointed EPC contractors. The natural assumption was that this would be the optimal cost management incentive for construction contractors. However, those responsible for constructing the terminal will not be the ultimate operators, so it is fair to ask:

- Have the interests of all stakeholders been considered?
- Does it not stand to reason that those who will use and regulate the facility are involved in the process to ensure capital costs and operating expenses are optimised, while the ongoing integrity of the system is maintained?

It became obvious through the years, and the development process, that there were inconsistent contractual priorities when converting the FEED concepts into reality.

We have to keep in mind that the owners, or financiers, will not be the operators of the terminal. "This means that by the time these facilities are completed, the contracting structure, from FEED through to project champion will consist of investors' consultants, the EPC contractor, contractors' consultants, subcontractors and vendors. The 'Missing Man' here is the future operator, who will, inevitably take full care and custody of the facility under the O&M contract," says Young. He continues, "The needs and vulnerabilities of the other stakeholders will not have been considered by any of the preceding contractors, as it's not the scope of any individual participator. However, this very important consideration must be integrated into the design, engineering, fabrication, installation and operation processes right at the start of the project design. It should be addressed by creating an operating philosophy document that deals with the entire value chain and lifecycle of the project."

Focusing on the operational costs

For any project there needs to be a minimum viable product (MVP) with a focus on OPEX optimisation. "This is in part achieved through the conversion of the operating philosophy into a basis of design, thus ensuring that operability is considered and catered for in the end design," Young adds.

OPEX optimisation is best achieved by influencing the facility's design and engineering at the early stages of the project; changes can then be made with the lowest cost impact while, at the same time, maximising the design effect on long term OPEX. This is Marsol's operational engineering approach.

There are numerous components involved in ensuring the integrity of the system throughout its operating life including design life realisation, life expectancy and possible life extension. "All of these factors are considered as part of our basis of

> **"OPEX optimisation is best achieved by influencing the facility's design and engineering at an early stage."**

design inputs," Young explains. "As an operating company, we are not only focused on sound design principles in order to optimise OPEX, but also to ensure sound design and component inputs to offer an underwritten long-term integrity management service."

This is where Marsol's Advanced Systems Integrity Management (ASIM) comes to the fore. ASIM uses data collection, analysis, holistic field condition data and methodologies (both physical and operational) to arrive at the optimum design for the site and service.

A continuous process of improvement should be present throughout the lifecycle of the project and not just at the design and engineering stages, as the Deming Cycle suggests. The Deming Cycle (also known as PDSA Cycle) is a continuous quality improvement model consisting of a logical sequence of four repetitive steps for continuous improvement and learning: Plan, Do, Study (Check) and Act). The old cliché of the only constant we have is change is very relevant here, as one needs to fully understand the implications of the changes, and adjust accordingly, as part of the integrity management regime.

"Over the last 50 years, Marsol International has developed engineering solutions for the fabrication, commissioning and operation of offshore terminals and infrastructures," Young continues. "During that period, we have increasingly identified and reengineered points of failure in many different systems. Some were generated by design and engineering, but many by the changing environmental conditions and by operational practices not suited to that particular facility."

> **"A full lifecycle approach should result in optimised costs and operational efficiency over the life of a facility."**

Controlling CAPEX

Although operating expenditure is crucial to a project's success, the up-front capital expenditure (CAPEX) is equally important. Young explains, "It is true to say that a sound OPEX MVP is maximised by sound design and engineering at the CAPEX stage. However, if CAPEX is considered in isolation, OPEX can be negatively affected."

This being the case it is vital to focus on design and engineering optimisation that not only takes into account the end goal and client requirements, but also considers expediency and cost-effective fabrication, material and component selection and installation methodologies.

Within the CAPEX there are separate cost drivers that should be identified and accommodated. Right from the outset, during the FEED process design, decisions should not be governed simply by minimising the design and fabrication costs. Consideration should include the cost of installation and operation, including preventative, and corrective and preservation maintenance principles. Young continues, "Assigning the responsibility for design and installation to an EPC contractor may facilitate the first step, but not the second; generally, the design has been approved already by the client before issuing the tender."

An example of the above is the pipeline design: a pipeline needs specialist equipment, which in itself will require significant mobilisation and operating costs; at this stage, the advantages that could be gained by acquiring a more robust and costlier pipe (one that could eventually result in savings in installation costs and have potential for a longer lifespan) will have been forsaken.

Image Credit: Marsol

A full lifecycle approach should result in optimised costs and operational efficiency over the life of a facility.

It is the same principle as the OPEX optimisation model: First we need to take the operational philosophy, and resultant basis of design inputs, and then create a design, engineering and installation regime that encompasses all the requirements. It must optimise fabrication and installation costs while at the same time supporting the long-term integrity management service. "When all is said and done, a facility that has a reduced risk of failure allows the parties to offer and underwrite such a service," Young says. "This approach then addresses not only the client's requirements, but also the needs of the other stakeholders, as regards operability."

Minimum Viable Product (MVP)

Marsol have developed a holistic approach to CAPEX optimisation that has been established with a focus on SPM integrity management. This means that by combining the two skills sets the client can be offered a full turnkey solution from FEED to operations. This supports the owner, EPC contractor, OEMs and future operators.

"This approach allows the smooth transition from FEED to long-term operations and protects all parties' interests," Young adds. "This avoids costly and reputation damaging contractual discussions and disputes and replaces the blame game with sound technical solutions."

ASIM was originally developed to address similar criteria at brownfield installations without the benefit of being involved at FEED or basis of design phase. "The principle of ASIM is to enter an existing field with the intent of establishing a holistic picture of the field and its operations," Young says. "Then through the assessment of design criteria, historic information, new data and using experience gained on multiple sites, at different geographic locations, over extended periods of time, arrive at a site-specific integrity protocol."

By adopting a rounded, full lifecycle approach it is possible to ensure that all stakeholders take an approach that optimises both cost and operational efficiency at the minimum acceptable risk level over the entire life of a facility. The result is a win-win situation for all concerned.

EXTENDING ASSET LIFE FOR OIL AND GAS OPERATIONS

Tackling tank base corrosion requires innovative solutions to prevent costly repairs and replacements at a later date, Marina Silva, marketing supervisor at Belzona, writes.

WHY IS TANK base corrosion an issue for operators? Corrosion at the base of a heavy structure is obviously bad news for the asset owner or operator. Regulations have been set in place designed to prevent the escape of hazardous media into the environment. And while it would take years for any significant loss of integrity to occur, those years would be remembered for frequent, costly maintenance and inspection.

It is important to understand when and why tank base corrosion occurs. The industry has learned to protect the base of the tank from corrosion using cathodic protection and rectifying existing problems by installing a new floor if needed. With the base protected, the rim could at times be neglected.

The crevice at the interface between a steel tank and its base is where we see corrosion set in, at the chime angle. The main cause of corrosion is water ingress, sometimes exacerbated by poor drainage and sloping of the foundation towards the tank.

A sealant would prevent this water penetration. However, it is difficult to seal a steel tank to its foundation, typically concrete, as these dissimilar materials are subject to movement, expansion and contraction at differing rates.

Are all solutions worth investigating – or can some solutions cause more problems? Tank cement, bitumen, asphalt, caulks and other sealants have been tried for many years, typically proving to be temporary solutions due to poor adhesion and rigidity while the tank is in operation. In some cases, this tank base "protection" can do more harm than good. Localised failures can effectively seal the moisture in, thus exacerbating the corrosion. As well as this, inspection of these systems can prove difficult as devices cannot "see" the remaining steel thickness through the sealant.

Corrosion prevention extends the life of valuable assets.

Originally developed for water- and weatherproofing roofs, tank maintenance engineers started noticing some features of microporous membranes, which could prove useful on tank bases.

In regard to tank base sealing with a flexible membrane, application of the membrane system is straightforward, without the need for hot work or any specialist tools. Conditioner/primer is applied first to enhance adhesion, followed by the membrane with a reinforcement sheet, applied by brush. A two-coat system ensures there are no misses.

Unlike sealants, membranes prevent water ingress but do not trap moisture. Similar to human skin, their microporous nature allows the vapour to escape, leaving the underlying substrate dry and firm.

Membranes adhere well to different substrates and are used on many roofing materials with great success. Most carry globally recognised approvals, such as BBA, which tells the specifiers that they can expect a 25-year service life from their membrane system.

We know that most tank base protection systems fail due to their rigidity, however, membranes can accommodate the natural movement of the substrate and move in sympathy. For example, Belzona 3111 (Flexible Membrane) has been tested for elongation against BS 2782. After seven-day cure at 20C/68F, the elongation of a reinforced system will be 20 per cent lengthwise and 100 per cent crosswise. The same system will exhibit tear strength tested in accordance with ASTM D624 (seven days cure at 20C/68F) of 188 pli/ 33 N/mm.

Tanks at a refinery in France were suffering from water ingress. They had a polyester tank base sealing system in place, which was failing due to its rigidity. The failed system had resulted in water ingress, causing corrosion at the base of the tank. Belzona 3111 was used to waterproof the tank base in 2004. The annular ring was subsequently inspected in 2004 and 2017, using non-destructive methods, and found to be in excellent condition.

These days we have a combination of ageing structures that need preserving and new tank farms, where we are focusing on corrosion prevention. The industry needs to keep looking for alternatives to common maintenance techniques, such as the use of membranes over sealants. What aids progress in corrosion management is conversation. Material manufacturers, contractors, asset owners and operators, engineering design houses, testing houses and classification societies among others can jointly facilitate continuous progress.

www.belzona.com

SURVEY FOUND THAT OIL PRICE DOWNTURN AFFECTED SAFETY

A survey from Petrotechnics, a Sphera company, reveals the low oil price is impacting operational risk and process safety management in hazardous industries, such as oil and gas.

INSIGHTS FROM MORE than 100 senior industry leaders globally reveal 72 per cent believe the oil price has had a moderate or significant impact on process safety risk, characterised by major job cuts, loss of corporate memory, cost-cutting and overall belt-tightening brought on by the downturn.

The good news is 83 per cent of survey respondents agree safety is part of their corporate value structures and is supported by the highest levels of management, including the company president or CEO. However, more than half of industry leaders admit there is resource tension between safety-related projects and other capital allocation.

The budgetary squeeze is directly impacting operations, maintenance and safety performance. Seventy-five per cent say conflicting priorities are a top reason for shortfall in scheduled maintenance completion, 72 per cent agreed it was due to limited resources, and another 40 per cent said it was due to limited budget.

> **“With less budget and staff, firms are facing difficult decisions about which tasks to complete – safety maintenance may get lost in the squeeze”**

Image Credit: Lindsey G/Flickr

Even in a downturn, neglecting essential maintenance is a false economy and can impact on safety.

Simon Jones, head of professional services at Petrotechnics, said, “With less budget and staff available, firms are facing difficult decisions about which tasks to complete and when. The risk here is that maintenance and upkeep of essential safety systems may get lost in the budgetary squeeze, leaving firms vulnerable.”

Industry leaders suggest the gap between process safety intent and reality is widening. In 2017, 70 per cent of survey participants said there were gaps between how process safety was intended and what actually happens at the plant or asset. In 2018, the number has risen to 86 per cent. In addition, they suspect only 38 per cent are proactively managing process safety risk.

When asked about the challenges of delivering effective process safety management, respondents identify their top three challenges as ‘developing safety culture’ (46 per cent) followed by training and competency (34 per cent) and leadership support (30 per cent).

Jones added, “While the majority of respondents agree safety is integral to their corporate values, there is clearly room for leadership teams to do more to empower decision-making throughout the organisation and enable better risk management. Following a very tumultuous period for the industry, this could do much to improve safety culture.”

ADVANCED SURFACE LOGGING FOR WELL PLACEMENT

Michael Macdonald and Rabie Ali, GEOLOG, discuss the benefits of advanced surface logging, using the latest data technology, and its applications in well placement.

THE MEASUREMENT AND monitoring of mud gas data and the collection of drill cuttings while drilling is a standard practice in mud logging during the drilling of exploration and development wells. Continuous gas monitoring enables operators, to indicate the presence of hydrocarbon bearing intervals in addition to safety purposes. The collection of cuttings allows for a basic geological study to be completed on-site while preserving the cuttings for additional potential analysis in the future. A suite of services which extend beyond conventional mud logging to more advanced analysis, inclusive of: gas while drilling (GWD), cuttings while drilling (CWD), real-time isotopic analysis, flow monitoring and drilling optimisation, is available. These services are enabled by innovations in surface acquisition technology and have shown huge potential in improving the characterisation of reservoirs while providing operators with direct cost savings. The results, validated by correlation and comparison with other data such as downhole logs, well tests and PVTs, have allowed for a new set of applications:

> **"These surface datasets have proved to be major components of the integrated data model used in optimal well placements."**

- Well placement and geo-steering
- Gas/oil and hydrocarbon/water contact identification
- Vertical and horizontal heterogeneity in organic tight rock formations
- Reservoir zonation, fluid characterisation and maturity

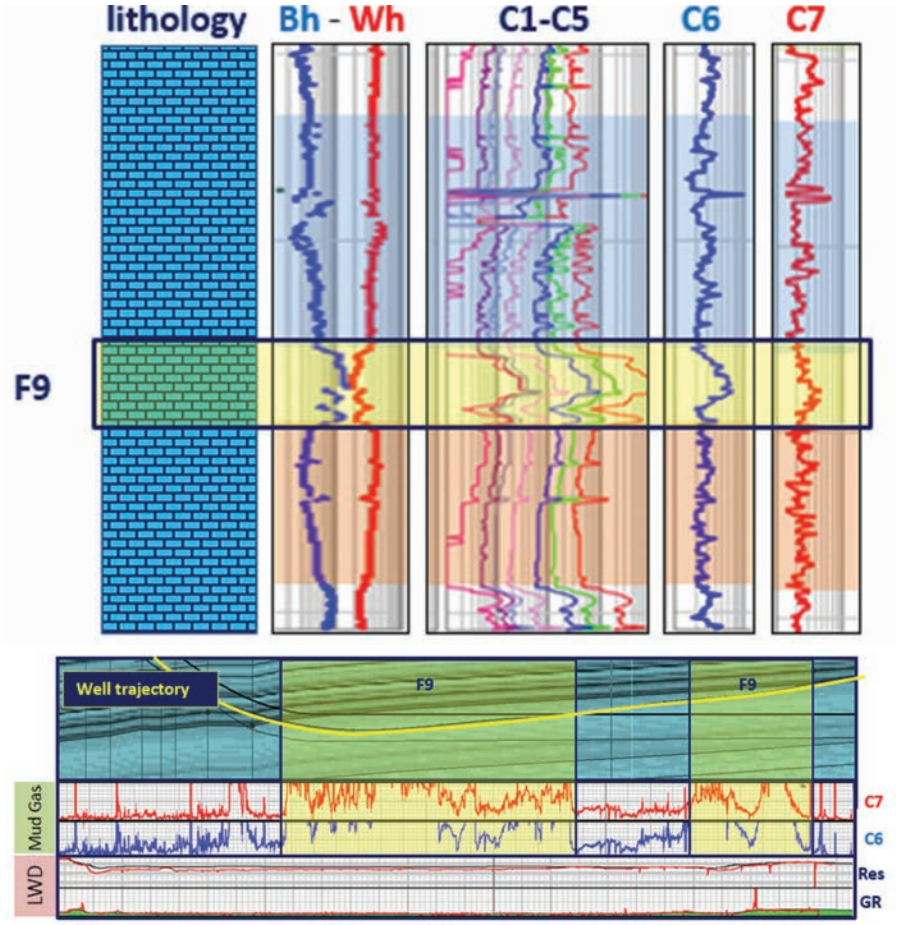


Image Credit: GEOLOG

Figure 1. Geosteering, using the mud gas data, along with LWD GR and Resistivity. Advanced Gas Detection System from GEOLOG, the G8.™

- Vertical changes in fluid over a thick mono-layer pay zone
- Drilling optimisation (ILT), risk mitigation (NPT) and optimising well delivery.

Well placement traditionally refers to the real-time positioning of wellbores using measurements acquired mainly downhole. The term is often used in reference to directional or horizontal wells that are oriented to maximise contact with the most productive parts of reservoirs. Due to the economic advantages of maximising reservoir contact, horizontal and multi-lateral development programmes have become the new norm globally.

GEOLOG contributes to the challenge of well placement by providing near real-time analysis of either advanced mud gas data or the elemental and mineralogical signatures of

the cuttings which return to surface (chemostratigraphy).

In both cases, either through pre-drill analysis of offset wells or analysing the data from a pilot hole, the mud gas and/or mineralogical/elemental signature of the target reservoir(s) are identified. These signatures can then be monitored from surface to ensure the well remains within the target zone. GEOLOG has deployed these methods in the Middle East and has been able to add value by reducing the number of downhole measurements and, in some cases, by providing the sole dataset used to place the well after downhole failures. These surface datasets are vital components of the integrated data model used in optimal well placements in conventional and unconventional reservoirs.

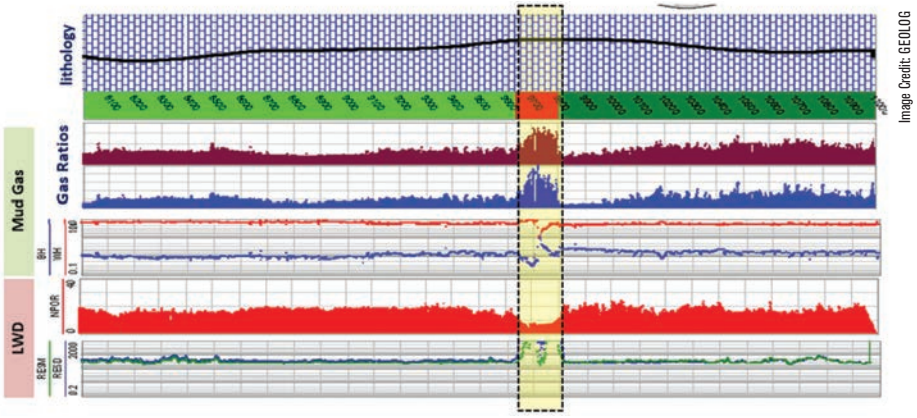


Image Credit: GEOLOG

Figure 2. Geosteering, using the mud gas data, along with LWD Porosity and Resistivity. Advanced Gas Detection System from GEOLOG, the G8.™

> **“Versatile services and advanced technologies utilised in well placement have demonstrated substantial value to operators worldwide.”**

Figure 1 shows an example of one of the potential benefits of utilising mud gas data in well placement. While drilling a lateral well in Kuwait Oil Company’s Middle Marrat carbonate reservoir, GEOLOG’s G8TM service was utilised to complement the LWD resistivity and gamma ray readings. While drilling the pilot hole, the target reservoir was initially identified (F9). Once the lateral section commences, utilising the mud gas data, it is quite clear when the reservoir has been left. This is seen by the sharp drop in the C6 and C7 components of the hydrocarbons in the mud gas (between the highlighted zones in Figure 1). However, looking at the LWD resistivity and gamma ray, there is very little movement. This is due to the increased cementation once the carbonate reservoir has been exited. In this case, the mud gas data geosteers the well back into the zone of interest.

Gas ratio analysis has been used effectively for real-time gas evaluation. These ratios generally compare the relative quantities of the heavier components with the lighter fractions, with different ratios corresponding to different reservoir and fluid types. Analysis of the combinations of gas fractions can lead to fluid type identification and yield other significant information. Ratios bring out these indications by enhancing the aspects that are not easily picked up by visual examination of raw data. Figure 2 shows an example from a well drilled by Chevron in the South Fuwaris field located in the partitioned zone between Saudi Arabia and Kuwait. This lateral section was drilled through a sub-layer of the Rawati Oolite. Again, LWD is on the bottom and the GEOLOG G8TM mud gas can be seen on top. While in the previous example (Figure 1), the LWD resistivity did not provide a good indication that the reservoir had been exited, that is not the case here. When the tight upper ceiling is penetrated, the spike in resistivity is clear. This is matched by an equally large change in the mud gas ratios. The mud gas data gave an independent validation of the LWD data. Seeing this confirms a potential tool failure and ensures that corrective action can be taken.

Chemostratigraphy service provides detailed chemical and mineralogy rock characterisation on drill cuttings and core chips. A combination of X-Ray Fluorescence (XRF) analysis and X-Ray Diffractometry (XRD) measurements are obtained in near real-time at the well site. All key chemical, mineralogy, and geomechanical information are delivered within one to two hours of drilling through a formation, providing a valuable alternative to the conventional long wait times for lab results and associated costs.

Through a thorough pre-drill analysis of the Burgan formation in Kuwait, the elemental signatures of faulted zones were determined. As seen in Figure 3, tracking these signatures supported the geosteering of the well through a relatively homogeneous sandstone sequence. The presence of faults dislocated the target, and the identification of chemical markers with the GeoROXTM service helped identify the faulted zones and isolate them in the production string to optimise production.

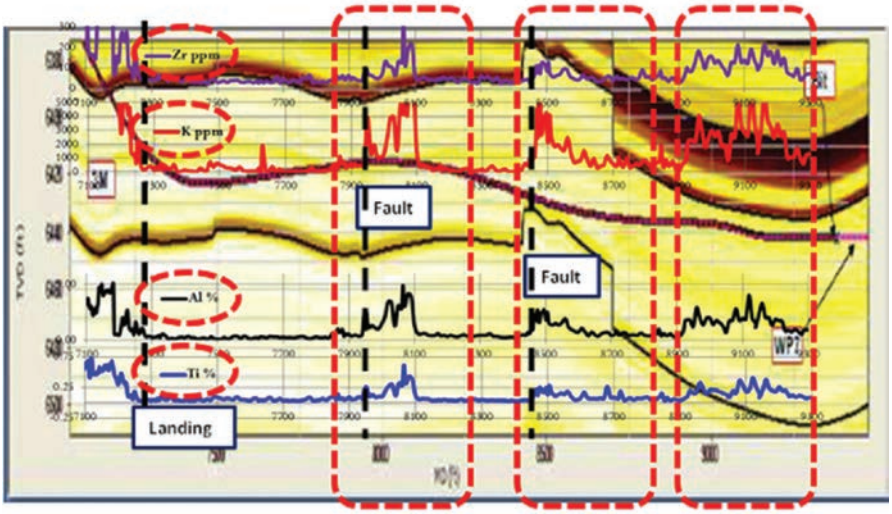


Image Credit: GEOLOG

Figure 3. GeoROX™ Service provides the elemental signatures used to identify the fault zones in the horizontal well.

LEVERAGING BIG DATA TO SAVE MONEY

UPSTREAM

According to a report by Wood Mackenzie's corporate analysis team, digitalisation, including making the most of big data, could add up to total cost savings of US$75bn annually by 2023.

EMBRACING BIG DATA and artificial intelligence (AI) could pay big dividends. *Digitalisation In upstream:* Show Me The Money, a report from consultancy Wood Mackenzie, indicates the upstream sector could see annual savings of US$75bn per annum from digitalisation by 2023, at all stages of the upstream lifecycle.

Greig Aitken, principal analyst in Wood Mackenzie's corporate analysis team, said: "Digitalisation offers multiple prizes in exploration. The biggest would be to uncover new resources. This may be from better processing of seismic, or new understanding of well logs and chemical analysis. Not only would this offer E&P companies the opportunity of finding new resources in existing acreage, but anyone with a competitive advantage in exploration would have a material advantage in licensing or M&A."

While the ultimate goal is for machine learning and AI to process data and spot reservoirs with an almost perfect success rate, secondary benefits include making better, faster decisions on where and how to drill, or whether to drill at all. Aitken said: "By accessing effectively unlimited computing power via the cloud, Cairn Energy, which began its digital transformation in 2015, now has the ability to shave months off its 3D seismic processing. For an exploration-focused company such as Cairn, the improved speed at which it can make drill-or-drop decisions is transformational."

Since 2014, upstream operators have spent, on average, US$50bn annually on exploration. Using the 2014-2017 average activity and spend levels as the base, Wood Mackenzie's analysis shows that over the next five years, cost savings of US$5bn-7bn (10-15%) per year in exploration could be achieved.

Mhairidh Evans, principal analyst, upstream supply chain, said: "The primary financial impact will be to substantially reduce capital costs. Equinor believes its 'field of the future' concept will reduce offshore facility capex by around 30 per cent. Such a dramatic reduction could have a top-line impact, enabling the monetisation of currently sub-commercial reserves."

She added that digital twinning can be potentially transformational. A digital twin is a virtual copy of a physical asset – replicating the dynamics of each valve, pipe and cable, and the structural integrity of facilities. This allows simulation of outcomes on a huge scale.

"Even without automated platforms, digitalisation will lead to cost savings in the pre-FEED and FEED stages of traditional developments," Evans said. "Automated modelling can generate economic outcomes for a field under a range of development concepts and a continuum of variables ... big data analytics infuses these models with real-world experience, allowing data-driven decisions to be made faster, with more confidence."

Image Credit: KamiPhuc/Flickr

Leveraging big data harmonises human experts with AI.

The upstream industry's track record in project execution has been a source of doubt for investors. Wood Mackenzie found that over the past decade, the average project was delivered six months late, with costs up 14 per cent versus the FID forecast. Digitalisation at development will become important for project delivery. The operational phase forms the backbone of the conventional industry's spend, with more than US$340bn spent on opex each year.

Digitalisation can also be implemented at existing fields. Production gains through increased uptime are the other, potentially more valuable, side of the equation. A one per cent increase from each conventional producing asset on stream globally in 2018 would result in an additional 1.3 million barrels of oil equivalent per day in the market – roughly equivalent to the total output from Libya.

Aitken added: "BP claims to have added 30,000 barrels of production last year due to its use of the APEX system and cites an example in the Gulf of Mexico of system optimisation being reduced from 24-30 hours to just 20 minutes."

Wood Mackenzie's research shows that digitalisation is not "just an IT project". Companies that don't get on board will fall behind. While the majors may have more tools at their disposal, digitalisation can help all, even the smallest operators.

www.woodmac.com

NEW AND EMERGING MARKETS TO BENEFIT FROM AIRBORNE INNOVATIONS

Hydrocarbons markets have benefited from airborne technology in the exploration stage of development, as well as being utilised for inspections on established sites. Georgia Lewis reports.

AIRBORNE SURVEYS HAVE become a critical part of the exploration process for oil and gas operators. When combined with other pre-drilling tests such as seismic surveys, operators can get a much clearer idea of where to drill and help reduce the risk of dry holes, and they can be used for inspection purposes on developed projects.

Unmanned aerial vehicles (UAVs), better known as drones, have been part of the oil and gas industry since at least 2006 when the US Federal Aviation Administration authorised BP to use them in its Alaskan oilfields, a region where traditional means of accessing land and undertaking surveys can be difficult or entirely inappropriate.

Cyberhawk is one company that has been active in the African aerial sector for a long time. In April 2017, for example, the company used aerial technology to inspect a flare on an FPSO off the coast of West Africa. The aerial inspection detected critical damage and since then, Cyberhawk has monitored the damage, deferring a costly shutdown until the flare could be safely replaced three months later. Using UAVs to inspect hard-to-reach, remote or high facilities is also a boon for employee safety as it means sites can be inspected remotely rather than requiring staff to undertake often dangerous aerial work.

Image Credit: zeesstof/Flickr

Aerial technology is changing the face of exploration as well as having multiple applications on established projects.

As well as using aerial technology to examine offshore structures, it can be utilised for pipeline security. The Nigerian National Petroleum Company is deploying drones to help protect pipelines from theft. As well as the loss of valuable oil revenue with these thefts, the vandalism results in leaks and spills which have disastrous environmental consequences. In the event of a spill occuring, the drones are used to help quantify the impact, determine the speed with which it is spreading and identify all affected areas.

In South Africa, aerial surveys will play a vital role in exploring for onshore gas reserves, which are needed to reduce reliance on coal-fired power plants and on gas imports from Mozambique. Rhino Oil and Gas Exploration South Africa has lodged an application for an Exploration Right with the Petroleum Agency South Africa (PASA), which includes aerial surveys as well as seismic but does not include drilling. Concerns about exploring for gas in a largely rural area have been raised – this will be a region to watch with interest in 2019.

> **"Aerial surveys will play a vital role in exploring for onshore gas in South Africa as the country moves away from coal-fired power plants"**

INTELLIGENT ARTIFICIAL LIFT PAVES THE WAY FOR THE DIGITAL OILFIELD

Ari Huttunen, product manager for Drives at ABB, explains why modern motor control technology is a vital element in building the digital oilfield.

INTELLIGENT ARTIFICIAL LIFT systems use real-time data provided by variable speed drives (VSDs) and sensors combined with tailored algorithms to make proactive process adjustments. This approach is a step in implementing the digital oilfield concept that will eventually use digital devices and communications to optimise a variety of oil production tasks.

Artificial lift (AL) methods, such as rod pumps, progressing cavity pumps (PCP) and electric submersible pumps (ESP) driven by electric motors are used in approximately 95 per cent of the world's nearly one million oil and gas producing wells.

When these motors and pumps are managed and controlled by new generation VSDs, with built-in oil industry specific programmes, intelligent artificial lift becomes possible. The result is improved process insight and control.

Intelligent artificial lift can address the three main areas of waste found in oilfields. Firstly, the oil that is left in the ground; secondly, inefficient use of electrical energy to run the pumps, and thirdly, damage to equipment that is not being run correctly.

Optimised process management can reduce the number of oil pump strokes and on-off cycles, saving on component wear and energy use.

The increased digitalisation of oilfields has enormous potential for improved yields and cost savings.

Image Credit: ABB

ABB has obtained real-life data from nine oil wells to build a picture of the potential economic benefits of intelligent artificial lift. We found that oil in-flow could be increased by up to 50 per cent, with a 30 per cent reduction in energy consumption. In some cases, downtime due to maintenance and breakdowns has been reduced by 70 per cent. While these results may not apply to every oil well, it is clear that significant improvements are feasible with relatively little effort and investment.

> **"Intelligent artificial lift can increase oil in-flow by up to 50 per cent, with a 30 per cent reduction in energy consumption"**

The detailed real-time data generated and managed by drives is now becoming an important element in the digital oilfield concept. Among the benefits for operators are improved oil pumping based on the well conditions, optimised energy use and the safeguarding of critical equipment against wear and breakage. There is even the capability for remote monitoring and troubleshooting services by experts from across the world.

The digital oilfield will enable operators to improve decision-making with proactive trend spotting. In many cases, potential problems will be identified before they become serious, costly disturbances, even in remote and difficult-to-access locations.

CYBER-ATTACKS: THE NEW THREAT TO PIPELINE SECURITY

A report has found that the market for pipeline security solutions is growing, in particular solutions which meet the challenge of preventing cyber-attacks.

PIPELINE SECURITY IS a critical issue for operators in Africa, particularly in Nigeria. The global pipeline security systems market was valued at US$6.1bn in 2017, and is expected to reach a value of US$10.07bn by 2023, at a CAGR of 8.59 per cent, during a forecast period of 2018-2023. This is according to the "Global Pipeline Security Systems Market - Segmented by Products, Technology and Solutions, and Region - Growth, Trends, and Forecast (2018-2023)"

The market for pipeline security has been boosted by the demand for sustainable use of resources and the rising frequency of breaches and theft of small quantities during transportation. The oil and gas industry has been estimated to be the most vulnerable to attacks – the increased spending by operators to install robust security infrastructure to ensure security to the pipelines has been the primary reason for the growth of the market globally.

> **"The global oil and gas industry is vulnerable to pipeline attacks, and this has led to increased spending in pipeline security"**

Image Credit: Socialistisk Ungdom/Flickr

Physical vandalism has been a major issue for Nigerian pipelines, but cyber-attacks are the latest threat.

And it's not just physical pipeline vandalism that is a concern – according to a study by IT security firm Tripwire, more than 80 per cent of oil and gas companies have reported an increase in the number of cyber-attacks. The survey further reveals the lack of confidence in the present and existing security framework installed within organisations. The need for integrated, exhaustive security solutions has been emphasised by industry experts.

The number of cyber-attack incidents has been growing continuously for the last few years, with the industry quoted to be the most vulnerable sector. The sector has been found to be the most impacted by the robust state-sponsored cyber-espionage campaigns, which can affect the physical infrastructure as well. These vulnerabilities have forced the industry players to divert significant amounts of funds for security. The implementation of holistic security solutions to provide comprehensive security and to protect the system by reducing the number of threat actors or points of entry to the infiltrators is the need of the hour in this industry.

The rising number of illegal connections to petroleum and oil products pipeline is a major factor affecting the market for crude oil in the global pipeline security market.

When there is a lack of effective monitoring and compliance to design specifications, there have been several major hazardous accidents in the past.

Pipelines are major target for extremist groups, as even a simple explosion can lead to a blackout, affecting supply for several weeks in some cases. Hence, crude oil companies are increasingly looking for robust security systems to enhance their existing mechanism.

The use of supersensitive seismic monitoring devices, in particular, could provide early warnings if saboteurs were to approach a protected area.

There has been a huge increase in the number of large-scale production projects in the oil and gas industry globally and this, along with many economic and geopolitical factors, affects the pipeline security industry.

For more on the report, log on to www.researchandmarkets.com – the analysis includes contributions from industry leaders such as ABB, Honeywell International, Siemens, BHGE, Schneider Electric, Optasense, Senstar Corporation, Huawei, ESRI and Thales SA.

GLOBAL RECRUITMENT SURVEY RESULTS URGE EVOLVING APPROACHES

The third annual Global Energy Talent Index (GETI), the world's largest energy recruitment and employment trends report, reveals that oil and gas businesses must continue evolving their approach to attracting and recruiting talent.

Image Credit: Eni/Flickr

Despite issues with a skills shortage, there is plenty of optimism in the African oil and gas industry.

THE MAJOR FINDINGS of a survey by Airswift and Energy Jobline of more than 17,000 energy professionals from across the world, including 13 per cent from Africa, include:

- 48 per cent of oil and gas professionals are concerned about an impending talent emergency.
- 40 per cent of survey respondents believe the sector to already be in the grips of a crisis, with a further 28 per cent expecting one to hit within the next five years.
- Having cut graduate schemes, apprenticeships and training during the downturn, the sector is playing catch-up, but it's making good progress.
- 81 per cent aged 25 and under remain enthusiastic about a career in oil and gas.
- Remuneration is up. 41 per cent of non-hiring professionals report pay increases the last year.

> **"In Africa, there is optimism about salary increases in the oil and gas industry – along with concerns about skills shortages"**

- Two-thirds of non-hiring professionals anticipate further pay increases in 2019.
- 92 per cent of professionals would consider relocating to another region for their job, with career progression opportunities the number one factor attracting talent to a region.
- Renewables remains the biggest source of competition for talent, with 42 per cent of those open to switching sectors attracted to the industry.
- When asked whether they would pursue a career in the sector if they were entering the energy industry now, a large majority of oil and gas professionals said yes.
- 81 per cent of those aged 25 and under remain enthusiastic about a career in oil and gas.

Professionals in Africa, Asia and South America are most optimistic, with at least seven in 10 anticipating a rise in salaries, whereas those in Europe, CIS and Australasia are far lower, at around half. The flipside to rising salaries is a skills shortage, and this is being keenly felt by African respondents, with professionals in North America and Africa most likely to say that their regions are being impacted at by skills shortages now, while those in Asia feel that the issue is less acute.

AFRICAN RIG COUNT

COUNTRY	December 2017	November 2018	December 2018	Annual change
ALGERIA	50	46	50	N/A
ANGOLA	2	5	5	+3
CONGO (BRAZZAVILLE)	2	4	4	+2
GABON	2	4	4	+2
KENYA	8	8	8	N/A
LIBYA	1	9	9	+8
NIGERIA	9	9	11	+2
SOUTH AFRICA	0	0	0	N/A
TUNISIA	0	3	2	+2
OTHER AFRICA	3	15	15	+12
OVERALL AFRICA	77	103	108	+31

Source: EnergyEconomist.com

BHGE launches advanced methane detection and reduction system

BHGE HAS LAUNCHED a new digital integrated platform, LUMEN, which provides continuous methane monitoring for oil and gas operators using both wireless ground-based and aerial drone-based technology.

"Methane leak detection is one of the most pressing needs in the oil and gas industry, and we believe LUMEN is a game-changer for highly-effective methane emission monitoring," said Diarmaid Mulholland, CEO of BHGE's Measurement & Sensing business.

"Using advanced sensors and industrial software, LUMEN helps operators to protect the environment by detecting harmful methane leaks, and by using advanced data analysis, this technology helps to identify and reduce emissions while also increasing safety for operators."

The platform includes a full-suite of methane monitoring and inspection solutions capable of streaming live data from sensors to a cloud-based software dashboard for real-time results. The platform consists of two connected formats – a ground-based solar-powered wireless sensor network, and a drone-based system for aerial monitoring.

Image Credit: BHGE

LUMEN uses both wireless ground-based and aerial drone-based technology.

LUMEN provides methane concentration data (PPM), as well as the location and rate of the leak, and gives trend analysis. The data is available in real-time at the touch of a button via a computer or smartphone, giving operators the ability to make quicker, more reliable decisions for their operations.

Speaking to *Oil Review Africa*, Glen Parkes, the company's general manager, Sensor Solutions commented that while the initial drive behind the development of the platform was conformity with US emissions regulations, it is now the industry and corporate governance rather than regulation that is driving it.

"This is a really interesting turn of events in the last 12 months or so," he remarked, adding that the technology has attracted interest from operators worldwide.

"The next phase we're working on is predictive analytics, so with machine learning, we can predict where leaks could occur," he added.

The platform was launched at the BHGE Annual Meeting in Florence, Italy in January, where reducing the industry's carbon footprint was a strong theme.

Tracerco launches solution for bulk level and density measurements

TRACERCO HAS LAUNCHED Hyperion, the latest addition to its nucleonic instrumentation portfolio. Hyperion is a non-contact, no-moving-parts measurement solution that provides bulk level and density measurements.

Externally mounted, Hyperion is not affected by adverse process conditions such as high pressures, extreme temperatures, fouling or corrosive fluids. it also comes with unrivalled stability and automatically compensates for the effects of ambient temperature changes, allowing for sustained accuracy and virtually no age-related drift in its measurements.

Housed in 316L stainless steel as a standard, Hyperion is highly ruggedised, ensuring that vibrations or dust settling have no impact on its operation. Internal sealing safeguards its condition. With a self-diagnostics capability and built-in condition monitoring, Hyperion can monitor health status and relative humidity, predict component failures, and provide an end-of-life estimation. This allows operators to diagnose why errors in measurement may be occurring, providing a proactive approach to maintenance planning.

New screw pumps from KRAL for tank farms and tank terminals

AUSTRIA-HEADQUARTERED KRAL AG has launched its Z Series, a new line of two screw pumps specifically designed for use in tank farms and tank terminals for the oil and gas industry.

These new screw pumps feature an unlimited variability to arrange inlet/outlet connections and thus offer maximum flexibility for connections. Existing systems often have limited options for arranging the pump. Using the KRAL Z Series, the user can freely choose how to arrange both suction and pressure flanges. All the connections can be arranged either for horizontal or vertical installation inline at several angles.

The innovative delta shape of the pump housing allows a very good suction performance and dry running properties, even with a gas content of up to 80 per cent. The housing is standardised, simplifying warehousing and speeding up spare parts delivery. The series Z screw pumps by KRAL feature significant advantages in service. Thus, multipart rotors can be braced with little effort and without loss of quality on site, which reduces the downtime of the systems and saves costs. Due to the type of bracing, the rotor can be loaded higher.

Image Credit: KRAL

The KRAL Z series is specifically designed for the oil and gas tank farm and tank terminal market.

The KRAL Z Series offers adjustable screw design, enabling the pumps to be used in a broad range of applications.

The KRAL Z series can be designed with one-piece or multi-piece screws. One-piece screws offer considerable cost benefits, whereas multi-piece screws have the advantage that combinations of different metals can be used. For example, a combination of steel and bronze can be used to convey salt water.

Forum Subsea Technologies introduces electric ROV

FORUM SUBSEA TECHNOLOGIES has launched XLe Spirit, the first observation-class remotely operated vehicle (ROV) to utilise Forum's Integrated Control Engine (ICE) to bring greater functionality commonly only found in larger work-class vehicles. The advanced control electronics pod fitted to all Forum XLe observation class vehicles enables superior connectivity and expansion capabilities. Ethernet interfacing allows for seamless integration with other industry sensors using common IP architecture and ease of remote data transfer.

Image Credit: Forum Subsea Technologies

The XLe Spirit electric ROV

Kevin Taylor, VP of Subsea commented, "As the subsea market continues to recover from a sustained downturn, cost-efficiency is high on the agenda for the industry. Forum Subsea Technologies recognised the opportunity to apply our leading software to a more compact vehicle to enhance capabilities and meet the changing demands of the sector. By utilising the same system across all vehicles, pilots only have one interface to learn as the skills are transferrable between the smallest observation vehicle and the largest trenchers."

The XLe Spirit incorporates a number of features to maximise its stability for use as a sensor platform, including regulated propulsion power, optimised thruster orientation and location, accurate thruster speed control and a wide range of auto-functions for positioning and flying.

The XLe Spirit will be sent for sea trials in the first quarter of 2019.

Blockchain-based oil and gas trading platform

PERMIANCHAIN TECHNOLOGIES HAS launched the prototype of its platform for trading potential oil and gas reserves that have yet to be developed. The platform, developed on IBM's Hyperledger Fabric, takes a blockchain-based approach using the PermianToken (XPR) to put a value on potential oil and gas reserves and a market where tokens can be traded securely and transparently. By digitising oil reserves, it becomes easier to get a comprehensive understanding of a project's viability and status. This may reduce administrative costs of trade, creating savings that could change the status of marginal fields. The Permian platform is built around five integrated pillars tailored to support different aspects of oil well development, investment and trading.

"The crypto asset-class has inevitably become an integrated part of the global financial markets, and the blockchain economy is becoming more and more important ... The oil and gas industry has reached a critical point where it needs to find new efficiencies and ways of assigning value," says Mohamed El-Masri, Co-Founder of PermianChain Technologies. "The introduction of new sources of energy from shale gas, tight oil or coal seam gas creates an opportunity to examine how we trade before the current inefficiencies become entrenched. PermianChain will help generate early revenues for suppliers, provide higher discounts to buyers and increase value ... complementing rather than disrupting the way that businesses currently operate."

Cut-and-lift solution for decommissioning projects

SPECIALIST SUBSEA PROJECT delivery firms James Fisher Offshore (JFO) and First Subsea have joined forces to launch a revolutionary cut-and-lift product that promises to streamline decommissioning projects worldwide, simplifying operations while reducing costs and risk.

The collaboration has led to the development of a one-component system, Internal Cut-and-Lift Technology (ICLT), which merges market-leading cutting and lifting tooling, optimised with Ballgrab gripping technology, to provide a flexible, quick mechanism to remove retired subsea assets and tubulars.

ICLT offers a simple solution that streamlines the number of contractors, operations and personnel required on offshore platform operations.When fully commercialised early in 2019, it will offer significant HSE, time, operational and cost benefits to customers ready to decommission late-life assets.

Jack Davidson, managing director of James Fisher Offshore, said,"We see this technology as a significant move forward in our decommissioning and demolition capability."

BP invests in AI technology

BP VENTURES, A venture capital firm, has invested US$5mn in Belmont Technology's Series A financing to boost BP's artificial intelligence (AI) and digital capabilities in its upstream business. The investment supports BP's ongoing work exploring opportunities to apply machine learning and cognitive computing in its global oil and gas business.

The Houston technology start-up has developed a cloud-based geoscience platform using AI, which can intuitively link geology, geophysics, reservoir and historic project information together, identifying new connections and workflows, and creating a robust knowledge-graph of BP's subsurface assets. BP experts can then interrogate the data. The technology uses AI neural networks to interpret results and perform simulations. Aimed at accelerating project lifecycles, from exploration through to reservoir modelling, the technology is targeting a 90 per cent time reduction in data collection, interpretation and simulation.

David Eyton, BP's group head of technology, said, "This AI-based platform, which we've nicknamed Sandy, is expected to unlock critical data for our subsurface engineers at a much accelerated pace."

ADVERTISER'S INDEX

COMMITTED, AMBITIOUS AND PROUDLY NIGERIAN

Michael Dumbi Amaeshike, managing director, West Africa Ventures, talks to *Oil Review Africa* about being a proudly Nigerian company with big ambitions for 2019 and beyond.

Local content is important to your company. How did you meet and exceed the 85 per cent local content target with your workforce?

West African Ventures (WAV) has consistently lived up to our commitment to remain the 100 per cent Nigerian partner to our clients, and this can be seen in our very indigenous workforce, starting at executive and management levels.

Our unique positioning within inland Nigeria has been our major strategy to meet and exceed the 85 per cent local content target for workforce. Our marine support base in Warri and dry dock and fabrication facilities in Onne Oil & Gas Free Zone enable us successfully to engage local communities in our operations. This has earned WAV the NCD AA categorisation. Similarly, our in-country vessel building capabilities earned us the AAA categorisation with the regulatory bodies. In human capital development, WAV has maintained the mandatory 85,000-man hours in collaboration with OGTAN registered trainees in various operational aspects such as offshore crane operations, document control, HSE and QAQC.

WAV remains committed to ensuring that we operate fully in compliance to the NCD policies as engraved in our daily activities.

What were the company's proudest achievements in 2018?

The industry experienced several challenges in 2018 on the Nigerian and international stages and is recovering from the low oil price-induced economic downturn, as well as issues with OPEC members, which contributed to a very turbulent business atmosphere. Most business forecasts in the industry could therefore not come to reality within the year. However, WAV ensured that we remained resolute to the delivery of quality services to our clients, especially in our marine support services. Today, we are positioned to continue the delivery of excellent EPC and general marine support services.

WAV has big plans for 2019, according to managing director, Michael Dumbi Amaeshike.

What are the company's ambitions for 2019?

In the current year, we hope to take advantage of the growth in the oil and gas industry, and actively participate in providing quality EPC and marine services. We hope to strongly expand our marine fleet along current demands in the industry and focus on providing turnkey solutions to challenges recorded over the past years in support services in general.

Tell us about your CSR projects.

Our company has been extremely active on CSR activities for a long time. Apart from maintaining a healthy relationship with all our host communities, we have partnered with government agencies in providing various social services in Nigeria. Our CSR activities include sponsorship of sports tournaments, provision of customised vehicles to the physically challenged members of the society, building living quarters for educational institutions, and donations of operational vehicles to the Nigerian Police Force. We are committed to giving adequate attention towards supporting members of our operating environment, and beyond.

Is Nigeria an easy place to do business and how could it be improved?

With a population in the region of 200 million, Nigeria remains a major attractive destination for investors coming from all over the world. The federal government recognises the importance of an enabling environment for business to our nation. In line with this, there have been constant efforts towards ensuring that business activities in Nigeria are improved upon. In this regard, we believe that the continued commitment to higher capital expenditure in infrastructure development is the right way to go.

Recently, the government of Nigeria has introduced steps to ease the issuance of business visas to internationals who wish to come to the country to do their legitimate business. It is now possible to obtain a business visa to Nigeria a few minutes upon arrival to our shores.

Also, the long process of business registration in Nigeria has improved. It is possible to commence and conclude online real-time business registration at a cost of less than US$15.

Our country has remained a friendly host to foreign nationals who desire to do legitimate business, and our warm climate and people will always make it a conducive environment for them.

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Group Managing Director, Nigerian National Petroleum Corporation

Amin Nasser
President and CEO, Saudi Aramco

Jonathan Evans
VP Africa New Ventures, BP

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President, Exploration and Production, Total

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Director, Fujairah Oil Industry Zone and Member, FedCom

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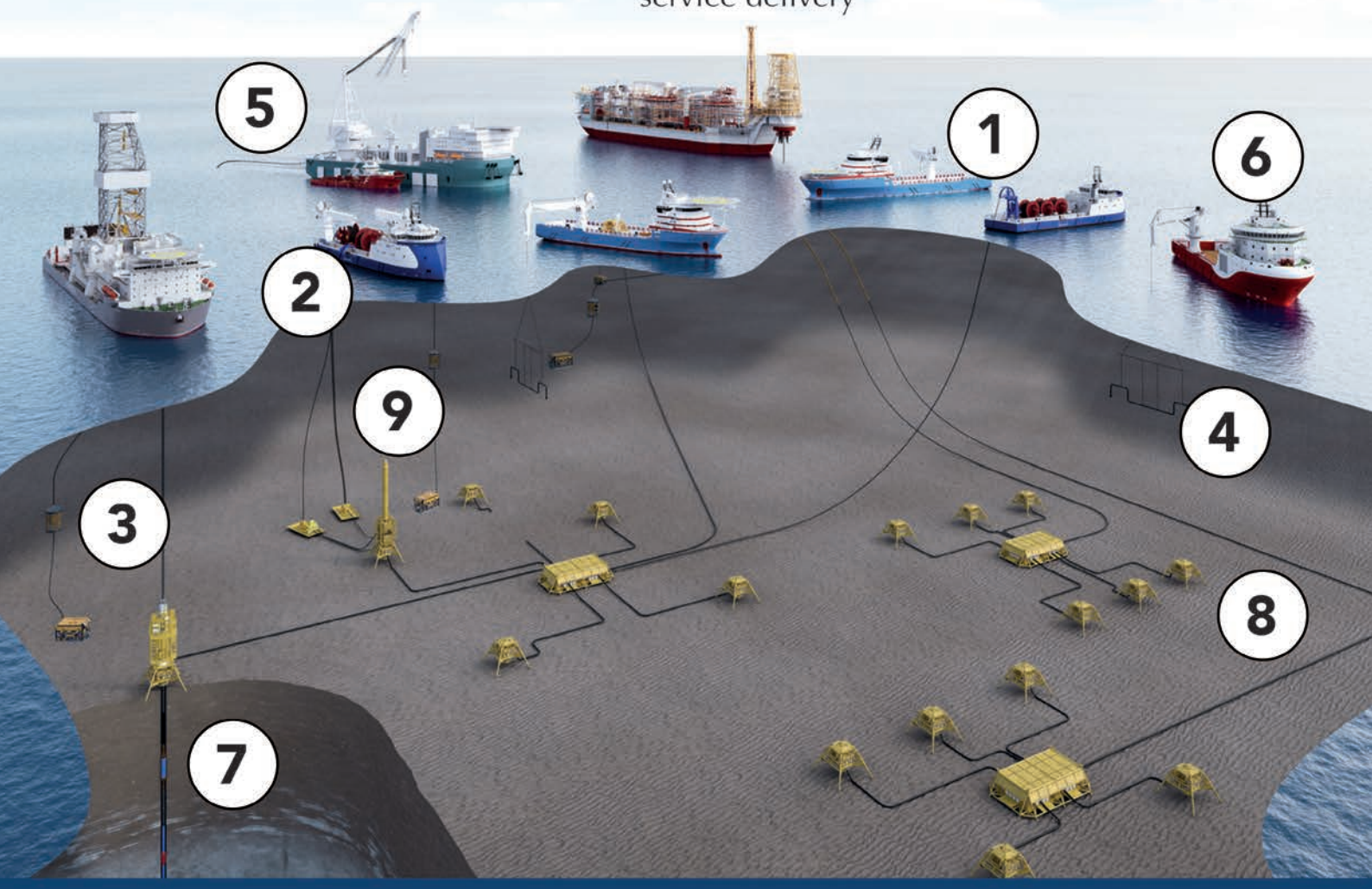

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