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Oil · Gas · Petrochemicals

## Africa

VOLUME 14 | ISSUE 2 2019

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## Angola and Namibia

### Neighbouring countries with big plans

APPO Cape VII conference news

The latest developments from Tanzania and Uganda

Event previews: OTC and Upstream West Africa

Technology: Offshore logistics, seismic data, remote vehicles, valves, artificial intelligence, measurement

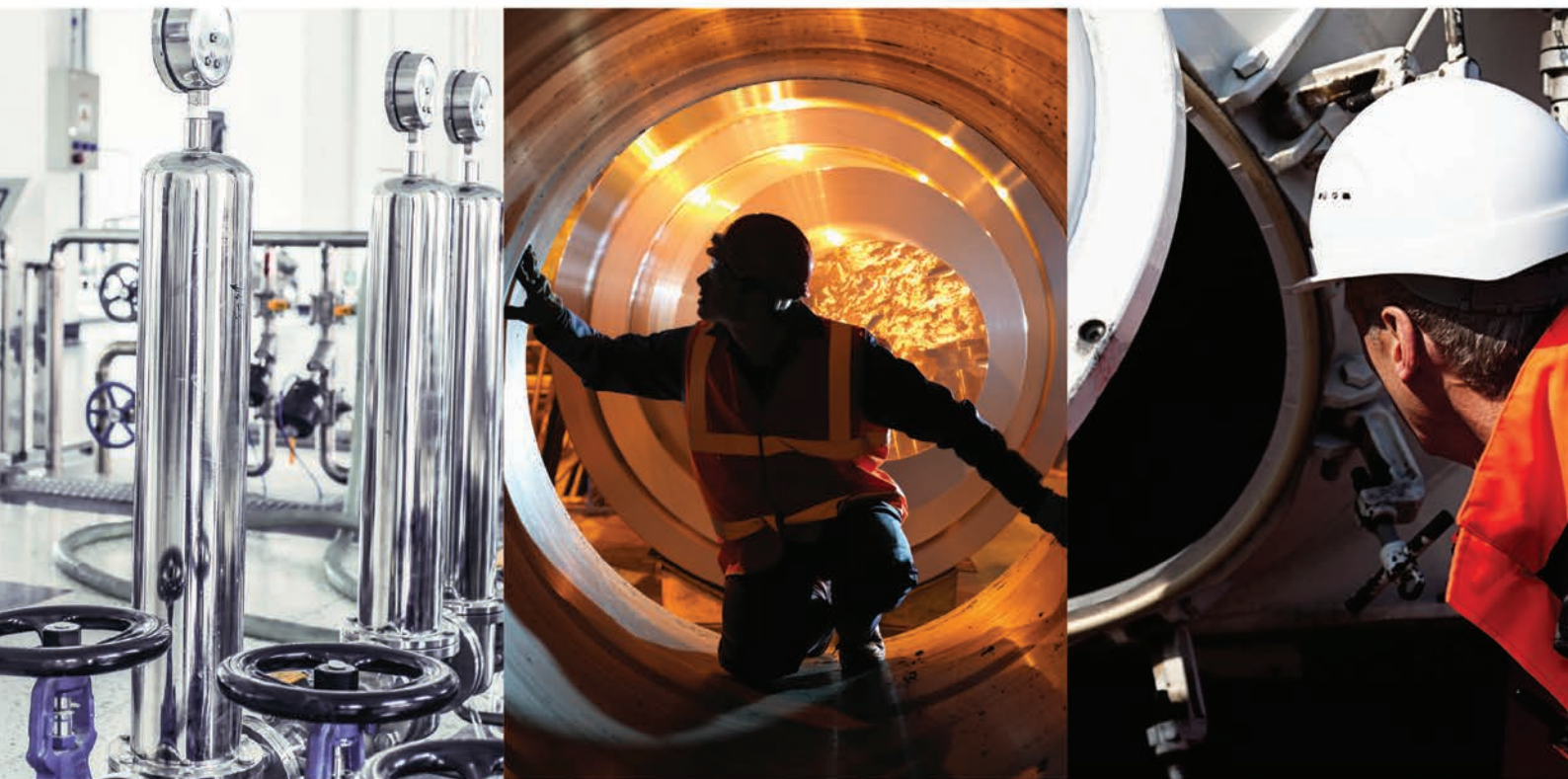


Marisol Ovono Nchama,  
managing director, Elite  
Construcciones (p34)



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An oil platform off the coast of Angola. For more, turn to page 16. (Adobe Stock)

## EDITOR'S NOTE

IT WAS AN absolute privilege to attend APPO Cape VII in Malabo, the island capital of Equatorial Guinea. The mood was largely optimistic and there was plenty of talk about improving trade and knowledge-sharing across borders in Africa in the oil and gas industry. It reflects the ongoing drive towards making business between neighbours much easier on the continent, particularly in light of the ratification of the African Continental Free Trade Agreement.

In this issue, our news pages cover some of the highlights of APPO Cape VII and you can read more about the event on our website at [www.oilreviewafrica.com](http://www.oilreviewafrica.com). Do look out for our next issue, where we will feature a special interview with Equatorial Guinea's petroleum minister, Gabriel Mbanga Obiang Lima after we interviewed him in Malabo.

Elsewhere in this issue, as well as plenty of technology updates, we take a look at the latest developments from Angola, Namibia, Tanzania and Uganda.

**Georgia Lewis**  
Managing Editor

## CONTENTS

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### NEWS AND EVENTS

- 4 Calendar of oil and gas events**  
Plus Upstream West Africa preview.
- 6 African oil and gas news**  
Special focus on APPO Cape VII, held in Malabo, Equatorial Guinea.
- 14 NOGOF report**  
Local content and investment.
- 21 OTC preview**  
What to expect in Houston.
- 32 Rig count**  
Checking on the health of the industry.

### SPECIAL REPORTS

- 16 Angola and Namibia**  
Neighbouring nations at different stages of oil and gas development
- 18 Tanzania**  
LNG and economic growth.
- 20 Uganda**  
Plans for downstream development.

### TECHNOLOGY AND OPERATIONS

- 22 Offshore logistics**  
A case study from Panalpina.

- 23 Geophysical data**  
Seismic for Somalia and Madagascar.
- 24 Software**  
Big data and machine learning.
- 25 Remote vehicles**  
Accessing unexplored areas.
- 26 Artificial intelligence**  
AI-powered analytics.
- 27 Fabrication**  
Pioneering work on FLNG projects.
- 28 Valves**  
The global ball valve market.
- 29 Digital oilfield**  
The role of digital twins.
- 30 Metering**  
Smart meter advances.
- 31 Corporate social responsibility**  
A case study from Bureau Veritas.
- 32 Innovations**  
Game-changing technology.

### INTERVIEW

- 34 Marisol Ovono Nchama**  
Meet the managing director of Elite Construcciones, Equatorial Guinea.

# Executives Calendar 2019

## JUNE

- 18-20 Upstream West Africa Summit**  
Dakar  
[www.upstreamwestafrica.com](http://www.upstreamwestafrica.com)
- 19-22 Africa Energy Forum**  
Mauritius  
[www.africa-energy-forum.com](http://www.africa-energy-forum.com)
- 20-21 5th East Africa Oil & Gas Summit & Exhibition**  
Nairobi  
[www.eaogs.com](http://www.eaogs.com)
- 20-22 Upstream West Africa**  
Dakar  
[www.upstreamwestafrica.com](http://www.upstreamwestafrica.com)
- 25-26 East Med Gas Summit**  
London  
[www.newsbaseeastmed.com](http://www.newsbaseeastmed.com)

## JULY

- 2-5 Nigeria Oil & Gas Conference & Exhibition**  
Abuja  
[www.cwcnog.com](http://www.cwcnog.com)

## OCTOBER

- 7-9 MSGBC Summit & Exhibition**  
Dakar  
[www.oilandgascouncil.com/event-events](http://www.oilandgascouncil.com/event-events)
- 9-11 ECOWAS Mining & Petroleum Forum & Exhibition**  
Abidjan  
[www.ametrade.org/ecomof](http://www.ametrade.org/ecomof)

## NOVEMBER

- 5-9 Africa Oil Week**  
Cape Town  
[www.africa-oilweek.com](http://www.africa-oilweek.com)
- 12-15 ADIPEC**  
Abu Dhabi  
[www.adipec.com](http://www.adipec.com)
- 21-22 Ghana Summit**  
Accra  
[www.cwcghana.com](http://www.cwcghana.com)
- 27-29 Valve World Expo**  
Dusseldorf  
[www.valveworldexpo.com](http://www.valveworldexpo.com)

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

## Emerging market of Senegal the backdrop to upstream event

SENEGAL, AN EXCITING new hotspot for African hydrocarbons development, will be the host nation for Upstream West Africa 2019. Held at Dakar's Radisson Blu resort from 18-20 June, the organisers are looking to move away from the traditional trade show and exhibition format with a closed-door event allowing delegates excellent access to leading decision-makers in the West African upstream sector.

Along with its neighbours, Senegal is part of a projected boom in this region of Africa, thanks to recovering oil prices, growth in the global gas market, ongoing licensing rounds, deepwater drilling, FLNG development and oil exploration with a view to going into production in new locations during 2019 and beyond.



*The Greater Tortue project will be transformative for West Africa.*

Image Credit: BP

BP and its partners will move towards the FID on the Mauritania & Senegal cross-border offshore Tortue/Ahmeim gas project. Cairn Energy & Woodside Energy have submitted the development plans to the Senegalese Government for the world class SNE Field which aims to bring the first FPSO into Senegal. FAR and Petronas are

drilling the SAMO prospect which can open the MSGBC basin beyond the confirmed discoveries in Mauritania and Senegal into The Gambia.

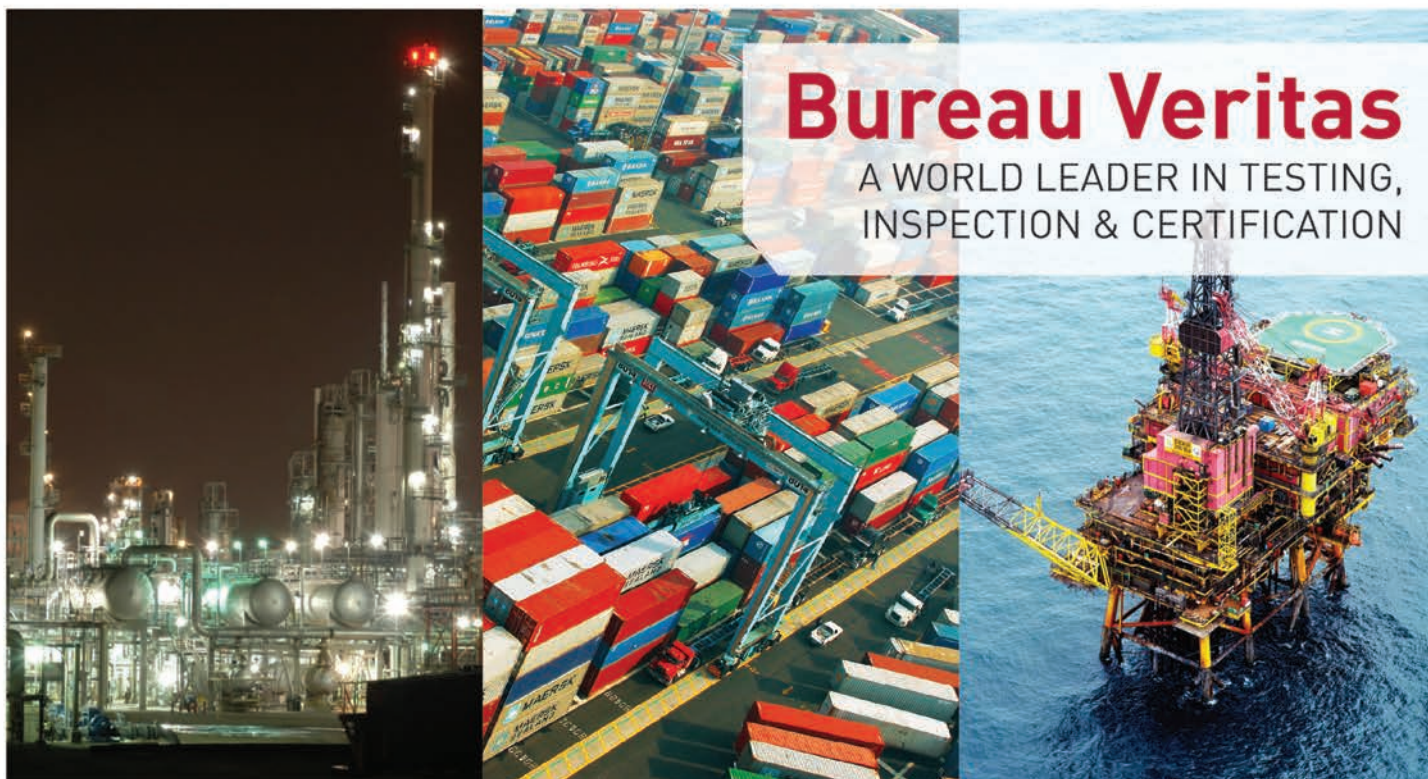
Additionally, the Sierra Leone Petroleum Directorate is set to launch the fourth bid licensing round of deep and ultra-deep blocks; Côte d'Ivoire is aiming to double its oil and

gas output to 200,000 BOE per day by 2020; Ghana has launched its inaugural competitive bid round with three blocks in its offshore Central Basin; and Nigeria, the stalwart of the region, is also eyeing increased oil and gas output over the next couple of years.

The Upstream West Africa Summit will bring industry leaders together from the region for three days. Selected delegates gather to share knowledge and discuss best practices through thought leadership presentations and workshops, take meetings and network. The event is now in its fifth year.

*For more information about the event and to register, go to [www.upstreamwestafrica.com](http://www.upstreamwestafrica.com)*





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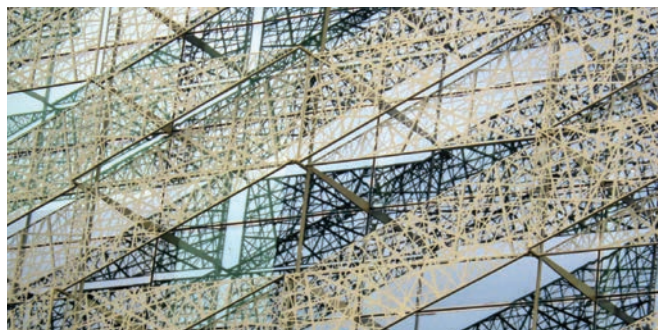


## Pan-African co-operation focus at APPO Cape VII conference in Equatorial Guinea

APPO CAPE VII, the conference for the African Petroleum Producers Organisation (APPO), was held in Malabo last month. The mayor of Malabo, Maria Coloma Edjang Mbengono, set the tone for the conference's pan-African focus by saying the commercial opportunities should be shared across the continent.

Mahaman Laouan Gaya, secretary-general for APPO, called for "the highest authorities" of Africa's countries to work together to ensure energy security. Next, Mohammed Sanusi Barkindo, secretary-general of OPEC, praised the progress made by Equatorial Guinea's oil and gas industry, particularly the one-stop-shop process for setting up a new business in a week.

Mr Barkindo was optimistic



*The Sipopo Congress Hall was the conference's spectacular venue.*

about returned buoyancy to the world oil industry following measures taken by 24 OPEC and non-OPEC countries to limit production after the turbulence of 2013-2016.

The Equatorial Guinea petroleum minister, Gabriel Mbagha Obiang Lima, said hydrocarbons development was vital for countries at the event.

The minister described local content development as "the central spine of the industry" and urged for the "harmonising of legislation and national content policies in all our jurisdictions".

President Teodoro Obiang Nguema Mbasogo said he hoped the conference would be a "turning point" for the industry across Africa.

## South Sudan is keen to open up to international investors

SOUTH SUDAN'S PETROLEUM minister, Ezekiel Lol Gatkuoth, told *Oil Review Africa* the new nation is open for investment in oil and gas development. In an interview at the APPO Cape VII conference, he said Blocks B1 and B2 are open, after the government terminated contracts with Total and Tullow in 2017. New

contract terms are expected to have a duration of three to five years, and a cost recovery limit between 49 and 51 per cent.

He said South Sudan is encouraging service companies to bid for tenders and is seeking investment in a new pipeline project. Currently, the only pipeline runs through neighbouring Sudan with a

capacity of 500,000 bpd. A second pipeline would boost capacity and offer a more direct route to the export market.

Infrastructure development is important, the minister said. The major investors in South Sudan are Chinese companies, such as Shendong High Speed, which is building roads as part of China's Belt & Road project. The payment for this project is in crude oil which is purchased by a Chinese offtaker.

Mr Gatkuoth vowed that production would increase, with short-term ambitions of producing up to 45,000 bpd. He said that while South Sudan is the only East African oil-producing country, current production levels are not enough to meet domestic needs.



*Infrastructure development is important for South Sudan's economic growth.*

## Gabon focuses on new code and licensing

AT APPO CAPE VII in Malabo, DGH, Gabon's hydrocarbons ministry, reminded delegates of the terms of the 12th licensing round, which was launched last year, as well as giving an update on the country's petroleum code.

The Gabonese government has reviewed the code and it is now before parliament for ratification. A spokesperson for DGH said it is hoped that the new code is "more objective to the oil and gas industry".

Bids for the 12th licensing round close on 30 September - there are 35 blocks on offer for exploration, 12 conventional offshore and 23 deepwater offshore blocks. There are 2D and 3D seismic data available from DGH. Delegates were told that Gabon has good existing infrastructure including export terminals, five FPSOs and one refinery for the local market.

Bidders will need to make a technical offer and an economic and financial offer, with local content as a priority. Fiscal terms include zero corporation tax and reductions in the government take for shallow and deepwater concessions. For shallow blocks, royalties are down from 13 per cent to 7 per cent and down from 9 per cent to 5 per cent for deepwater. State profit has been reduced, down from 55 per cent to 45 per cent for shallow blocks, and down from 50 per cent to 40 per cent for deepwater. The cost recover limit is up from 65 per cent to 70 per cent for shallow blocks and from 70 per cent to 75 per cent for deepwater. State participation is down from 20 per cent to 10 per cent. The NOC can acquire a maximum of 15 per cent at market conditions.



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## Nigerian minister updates APPO Cape VII delegates on PIB and refinery progress

DR EMMANUEL IBE Kachikwu, Nigeria's minister of state for petroleum, held a press conference at APPO Cape VII in which he gave an update on the progress of the Petroleum Industry Bill (PIB). Following incumbent president Muhammadu Buhairi's win in this year's elections, Dr Kachikwu confirmed that the bill was with the president and could receive assent by next month, when the ninth assembly of the Nigerian parliament convenes.

However, if the president sends the bill back for further amendments, it will again become unclear as to when the PIB will be passed into law.

The minister was asked about the progress of refinery development in Nigeria and told the press conference that the Dangote refinery is scheduled to go onstream in 2021. As well as the development of private sector



The minister with Dangote's Engr Mansur Ahmed in Abuja.

refineries, Dr Kachikwu said it was important that the four state-owned refineries became operational again.

He was critical of some production sharing contracts (PSCs) and joint ventures which favour private companies heavily over the NNPC. Dr Kachikwu said he would like to see private companies doing more in terms

of local content development and ensuring profits benefit the people of Nigeria, and vowed to "challenge" some of the PSCs and joint ventures which he did not think were mutually beneficial: "I will consider a review of PSCs and [in regard to joint ventures] there is no government policy to sell NNPC interests."

## CGG completes broadband 2D survey in the Gabon South Basin

CGG, A FRENCH marine seismic acquisition company, has completed the 9,800 km long-offset broadband 2D multi-client seismic survey in the Gabon South Basin. Fast-track data sets will be delivered in batches from the end of April, giving interested oil companies sufficient time to understand offshore petroleum systems and appraise blocks offered in Gabon's 12th offshore licensing round planned for September this year.

The company stated that the data set will help define the full extent of existing and new plays in the region. It will help understand thickness variations



CGG CEO Sophie Zurquiyah is optimistic about the value of the latest data.

in the sediment overburden for source rock and maturity analysis. Broad bandwidth data will aid resolution and improve characterisation of the turbidite systems that represent potential exploration sites, and provide deep imaging penetration with low frequencies to help describe the nature of the crust.

Sophie Zurquiyah, CEO, CGG, said, "The vast offshore acreage of Gabon includes unexplored areas with good potential for a hydrocarbon system. However, there is often not enough high-quality geological and geophysical data to effectively reduce the exploration risks."

## Equatorial Guinea's Alen development approved

NOBLE ENERGY HAS approved the Alen natural gas development which is located off the coast of Equatorial Guinea, via its subsidiary Noble Energy EG.

The company first discovered gas condensate in 2005, its Alen field development plan was approved by the Equatorial Guinea government in 2011 and production started in 2013.

"The Alen development is the first step towards creating an offshore natural gas hub in Equatorial Guinea, which will open the potential for future monetisation of additional discovered resources through existing infrastructure," said Noble Energy's senior vice president, offshore, Keith Elliott. "Noble Energy has discovered three trillion cubic feet of gross natural gas resources in the Douala Basin, which positions us well for LNG sales exposure over the coming decade."

Meanwhile, at APPO Cape VII, delegates were updated on the EG Ronda licensing round, in which 26 blocks are available. Bids close on 27 September with a decision expected on 27 November. Gabriel Mbaga Obiang Lima, the country's petroleum minister, promised "very flexible terms" for interested operators, provided drilling takes place within a one-year period.

The blocks comprise a mix of oil and gas concessions, with some shown to have discoveries. In regard to blocks with gas potential, the minister highlighted the Punta Europa gas plant as a drawcard for investors.

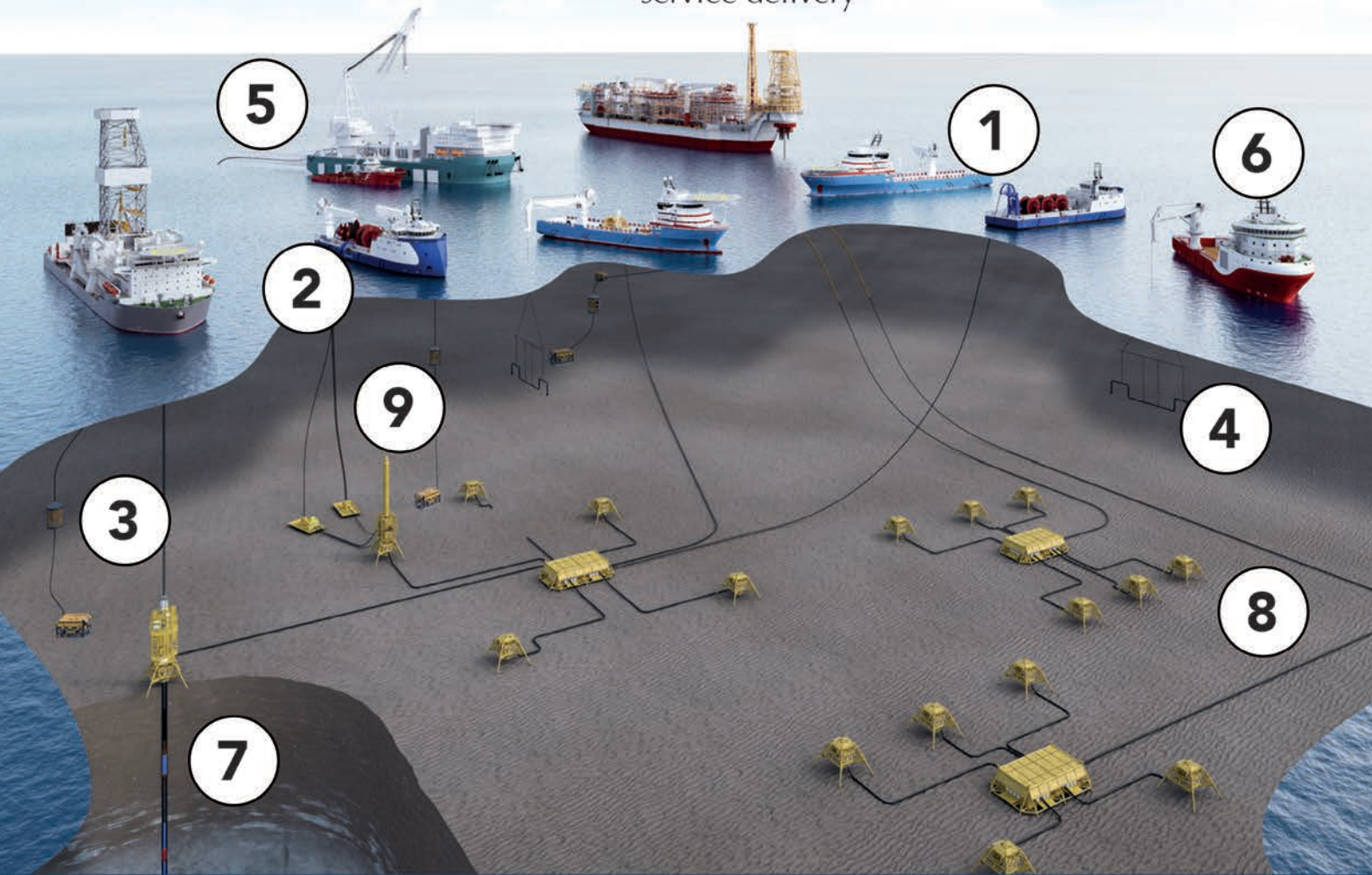
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## Chariot wins Moroccan offshore license

CHARIOT OIL & GAS Limited has won a 75 per cent interest and operatorship of the Lixus offshore licence in Morocco.

The company secured the Lixus offshore license through its subsidiary Chariot Oil & Gas Holdings (Morocco). The remaining 25 per cent stake will be held by the Office National des Hydrocarbures et des Mines (ONHYM).

Located 30 km north of the existing Moroccan acreage of Chariot, the Lixus license contains the Anchois-1 well gas discovery. It is estimated that the discovery holds 307 bcf of 2C contingent resources. The initial licence commitment, for which the company is fully funded, includes a technical programme of 3D seismic reprocessing and evaluation to access Lixus' additional exploration potential.

The company stated that it will further evaluate the gas market, test development concepts through a feasibility study, and seek partnerships and alliances to advance the project development

## Consultancy calls for responsible development of Brulpadda gas play

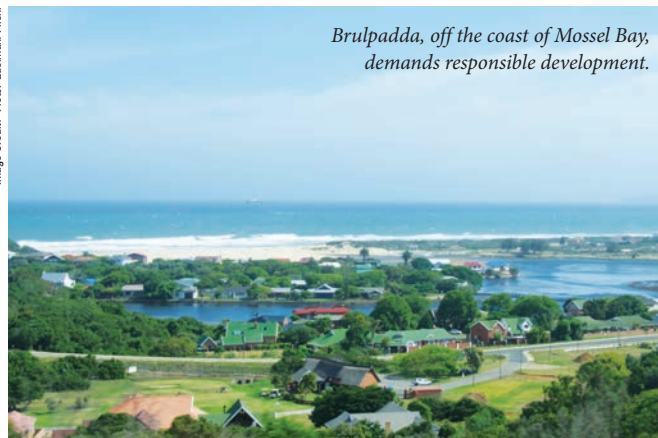
SUE REUTHER, SRK

Consulting's environmental consultant, said that in regard to the development of the large Brulpadda gas off the southern coast of South Africa, all environmental risks need to be properly mitigated in the process of exploiting these resources.

She added that the country has access to considerable environmental expertise and experience in this field.

If the project were to be completed, it would greatly contribute to national efforts to reduce carbon emissions as

Image Credit: Pieter Edelman/Flickr



*Brulpadda, off the coast of Mossel Bay, demands responsible development.*

natural gas emits about 50 per cent less carbon dioxide when

combusted compared to coal, said Ms Reuther.

## Aker Energy pledges US\$4.5mn in capacity-building support for Ghana

AKER ENERGY, THE operator of the Deepwater Tano Cape Three Points block, has pledged US\$4.5mn in support for the Accelerated Oil and Gas Capacity-Building (AOGC) programme in Ghana.

The programme is designed to enhance the competencies and expertise of Ghanaians in the oil and gas sector. Established in November 2017, the AOGC

programme is the latest phase of several capacity-building initiatives in Ghana.

The Petroleum Commission-led programme, set to run for five years, will train individuals in vocational and technical areas, as well as to build the capacity of educational institutions to be able to train students and award internationally recognised training certificates.

"Aker Energy will support the Petroleum Commission to certify vocational and technical experts, preparing them for jobs in the industry. Under AOGC, we will also seek support from, and utilise, Ghanaian educational institutions to increase competency levels through training of local trainers' programme," said Jan Helge Skogen, manager of Aker, Ghana.



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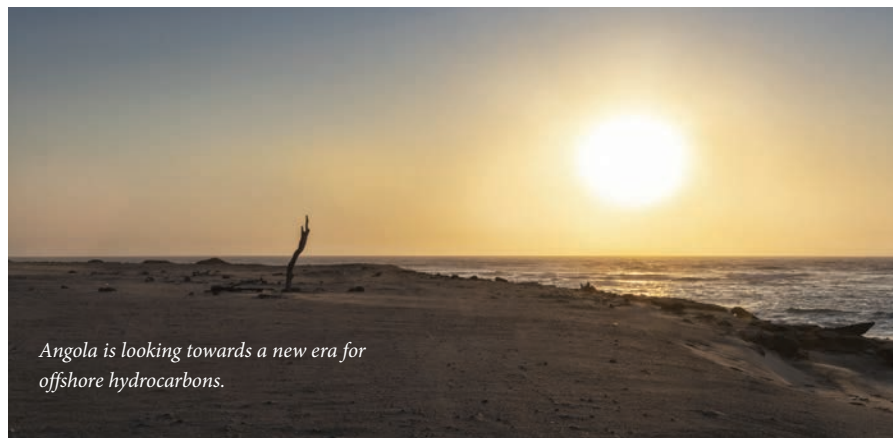
## Angola Oil & Gas 2019 to bring together industry leaders and government officials with a strong investment focus

THE INAUGURAL ANGOLA Oil & Gas 2019 Conference and Exhibition, hosted by Africa Oil & Power, will be held from 4-6 June in Luanda. Officially endorsed by the Ministry of Mineral Resources and Petroleum of the Republic of Angola, the conference will gather top government officials and C-level executives from across the entire spectrum of the country's energy industry for keynote presentations, moderated panel discussions, exhibitions, networking gatherings and investment facilitation.

Angola, under a new leadership, is ambitious and keen to revive and transform its oil and gas industry. The event will put a premium on dealmaking and relationship-brokering as Angola aims to attract investment spanning the whole energy value chain.

With a production of 1.6 million barrels of oil per day, Angola is the second-largest oil producer on the African continent and has been a member of OPEC since 2007.

Under the new political leadership of H.E. João Manuel Gonçalves Lourenço, President of the Republic of Angola, and with oil prices



*Angola is looking towards a new era for offshore hydrocarbons.*

Image Credit: Adobe Stock

stabilising after an extended period of volatility and industry uncertainty, Angola's oil and gas industry, with its proven deepwater reserves is being put forward as an attractive destination for investment.

As well as the focus on investment, the conference will give delegates the opportunity to learn more about the role of the newly established National Oil and Gas Agency and the privatisation of some Sonangol

subsidiaries; acquisition of new licenses and continued exploration and development of the offshore basins; Angola's 2019 licensing round and its push to attract small and mid-cap oil and gas companies to near-shore and marginal field acreages; and new marginal field legislation and strategies.

For more information about the event, go to [www.angolaoilandgas2019.com](http://www.angolaoilandgas2019.com)

## Comment: DTN urges African energy markets to meet social and economic responsibility challenges

ENGR DOZIE OBI (MNSE, COREN, ChPMC), managing director, DTN Integrated Services, writes: One indispensable input for economic growth and social development is energy. And two-thirds of required global energy is met with oil and gas supply. If this is used strategically, Africa's oil and gas resources can help accelerate growth on the continent.

Oil, natural gas and coal are three non-renewable energies that constitute about 90 per cent of commercial energy consumed globally. Africa is said to have about 15 per cent of the world's population, yet it consumes only 3 percent of global commercial energy.

On the contrary, Africa shares 12 per cent of global commercial energy, and this is rising. Oil- and gas-producing countries in Africa get an inadequate share of large rent from oil and gas production, which is a result of contracts and regimes designed to extract poor rents from the oil market. One major challenge faced by oil-producing countries in Africa is



*Engr Dozie Obi makes a strong case for responsible operations.*

Image Credit: DTN International

attaining and maintaining a sufficient, reliable and environmentally responsible supply of oil at prices that reflect market basics. In our view, contracts should reflect state interest and support sustainable extraction and principles, which is a responsibility of government.

Additionally, social responsibilities of oil and gas companies should be well expressed in contracts in order to ensure communities benefit.

Furthermore, it is of great importance that local companies become more heavily involved in contracts and investing back into the economy.

In conclusion, enlightenment on the role of oil and gas energy in the continent's development should be used as a tool to encourage local companies and individuals to invest in the sector, which will expand the sector, create job opportunities, and help in social growth and development globally.

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# NOGOF EVENT PUTS NIGERIAN PEOPLE IN THE SPOTLIGHT

Nigerian Oil and Gas Opportunity Fair (NOGOF) 2019 offered a wide range of opportunities for indigenous companies to operate in the Nigerian oil and gas sector and attract much-needed investment.

**T**HE SECOND EDITION of the NOGOF “Maximising Investments in the Nigerian Oil and Gas for the Benefit of the Nigerian People,” was held at the new Nigerian Content Development and Monitoring Board (NCDMB) headquarters at Oxbow Lake, Yenogoa, Bayelsa, Nigeria, from 4-5 April.

The two-day conference started with a welcome barbecue, 13 opportunity presentations, seven panel sessions, 98 exhibiting companies and an awards ceremony to honour companies which are succeeding with local content strategies.

The conference was visited by His Excellency, Seriake Dickson, Governor of Bayelsa state, who commended the efforts of the host, NCDMB, in driving local content in the Nigerian oil and gas industry.

In his keynote address, Minister of State for Petroleum, Dr Ibe Kachikwu, advised participants to urgently refocus efforts on innovative solutions to deliver investment opportunities. He encouraged indigenous oil companies to take over IOC operations. Dr Kachikwu said the changes in the global oil and gas industry are challenging exploration and investment strategies. He commended the executive secretary of NCDMB for its achievements, especially the construction of the new headquarters.

Executive Secretary of NCDMB, Engineer Simbi Wabote, told delegates that the board had identified more than 80 oil and gas opportunities that would be developed by major international and indigenous operating companies, with the estimated cumulative value of projects exceeding US\$100bn.

Engineer Wabote launched the *Compendium of Nigerian Content Opportunities* for the oil and gas industry – the compendium contains projects and



*The high-level panel discussions at NOGOF 2019 proved to be very insightful.*

opportunities that cover the upstream, midstream and downstream sectors of the Nigerian oil and gas sectors. It has been created to provide a database of Nigerian content opportunities to help indigenous and potential investors prepare, improve their capacities to participate in available and upcoming projects. He added that the compendium gives the industry a five-year outlook and will enable stakeholders to access opportunities.

Many speakers pointed out that infrastructure development is a vital element of the oil and gas industry and it affects the extent to which the value chain in the sector can be properly harnessed.

NOGOF 2019 showcased a plethora of opportunities for indigenous companies to operate in the oil and gas industry along the entire value chain, such as logistics, repair and maintenance, engineering, spare parts, servicing, and operations at oil service stations.

The fair highlighted that local content can be developed by auditing the capacity of fabrication yards in Nigeria and, in turn, such content can be utilised through collaborative action of government and stakeholders, with action as well as decisive control of the upstream, downstream and midstream sectors. This commitment is required by all players to harness the potential of the value chain within the sector.

NOGOF 2019 attracted more than 1,500 participants; delegates, exhibitors, speakers, and media. It was hosted by NCDMB and organised by Jake Riley. Sponsors include NNPC, Samsung Heavy Industries Nigeria, Dangote Group, Marine Platforms Limited, Aiteo Eastern Exploration & Production Company Limited, Shell Petroleum Development Company, Nigeria Agip Oil Company, OES/ODENL Energy, UBA Group and Exxon Mobil. ♦

*The next Nigerian Oil and Gas Opportunity Fair is slated for 8-9 April, 2021.*



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# ESTABLISHED AND EMERGING MARKETS:

## ANGOLA AND NAMIBIA

Angola and Namibia share a border but the southern African nations are at very different places in their respective hydrocarbons journeys. Will a change of leadership have a positive impact on Angola, and will Namibia reach its potential after mixed fortunes in early exploration?

**THE ESTABLISHED MARKET** of Angola has a long history – it first drilled for oil in 1915 but it wasn't until 1956 that the Benfica oilfield, near Luanda, went into production. Malongo, the country's first offshore oilfield, located in the Cabinda province, was discovered in 1968 by Gulf Oil. The discovery of oil has been a double-edged sword for Angola, providing immense wealth for certain groups and companies, but not necessarily contributing to an overall economic boom with wide-reaching benefits.

In 1996, Elf Petroleum discovered the Girassol oil field about 140km off the coast of Angola, which turned out to be a giant oilfield. This led to more discoveries of a similar nature and, as a result, around 75 per cent of Angola's production now comes from such reservoirs.

LNG is also playing a major role in Angola's hydrocarbons mix with the Soyo LNG plant commencing production in 2013. The first LNG shipment was to a Petrobras LNG deliquifacation plant in Rio de Janeiro, and four shipments from Angola have been delivered to Asian customers.

The end of José Eduardo dos Santos' government in 2017 after 38 years in office – albeit not the end of MPLA rule of Angola – has heralded changes to the country's oil and gas industry.



*President João Lourenço has been seeking to reform the Angola hydrocarbons sector.*

This has been part of wider drive by President João Lourenço to reform the Angolan economy and stamp out corruption. A new oil-licensing strategy has been put in place up to 2025.

### **A look at Angola's new oil-licensing strategy (2019 – 2025)**

*Adriano Rioja Ciprian, associate attorney, Centurion Law Firm writes:* Angola's oil production has been decreasing since its peak of almost 1.9 mn bpd in 2008 to reach 1.478 mn bpd last year.

In yet another landmark reform for its hydrocarbons

sector, Angola released in February 2019 a new Presidential Decree detailing the country's oil licensing strategy for the next six years.

Published in February 2019, Presidential Decree No. 52/19 is a continuation of the Lourenço administration's efforts to incentivise investments into exploration and arrest declining output. Angola's oil production has been decreasing since its peak of almost 1.9 mn bpd in 2008 to reach 1.478 mn bpd last year.

With the objective of "increasing the production of oil and gas" and "ensuring the

substitution of reserves to replace the evident decline in production in recent years," the new decree hence defines the country's new general strategy for the attribution of its petroleum concessions up until 2025.

Under the terms of the decree, petroleum concessions are to be awarded under three different modalities: public bidding, limited public bidding and direct negotiation.

The public tender and bidding avenue follows the legally established procedure for the award of oil concessions under a competitive auction, as detailed in Presidential Decree 86/18.



Under such an auction, state-owned Sonangol is entitled to a 20 per cent stake in research operations in the case where it is not operator of the block.

In 2019, Blocks 11, 12, 13, 27, 28, 29, 41, 42 and 43 in the Namibe Basin, and Block 10 in the Benguela Basin are to be awarded under public bidding. In 2020, blocks CON1, CON5 and CON6 in the Congo Basin (onshore) and blocks KON5, KON6, KON8, KON9, KON17 and KON20 of the Cuanza Basin (onshore) are proposed to be awarded. Finally, blocks CON2, CON3, CON7 and CON7 of the Congo Basin (onshore) and blocks KON1, KON3, KON7, KON10, KON13, KON14, KON15 and KON19 of the Cuanza Basin (onshore) are proposed to be subject to public bidding in 2023.

For reasons of national strategic interest, a second modality will be a limited public bidding, restricted to a number of previously-selected companies. The modality applies to the blocks and contract areas that have been returned to the State, and eligible bidders will be selected from companies that have demonstrated knowledge, expertise and both technical and technological competence operating in Angola. The procedure will follow the rules set out in Presidential Decree No. 86/18 and will apply in 2021 to maritime blocks 7, 8, 9, 16, 33 and 34, and to free area blocks 31 and 32, and in 2025 to blocks 22, 24, 25, 26, 35, 36, 37, 38, 39 and 40. Finally, blocks 6, 30, 44, 45, 46 and 47 are open to direct negotiations, which must be concluded before the end of the first semester of 2019. Successful companies must enter into a Service-at-Risk Contract and demonstrate relevant proven experience, expertise, technical and technological capabilities operating in Angola or other oil provinces.

The legislation is in line with President Lourenço's implementation of a bullish



Image Credit: Adobe Stock

*All Namibian industry eyes will be on Walvis Bay when drilling starts in earnest this year.*

reformist agenda that is drastically transforming the governance of sub-Saharan Africa's second largest producer since the 2017 elections.

In May 2018, Angola had already released three presidential decrees related to the governance and regulation of its oil and gas sector: Presidential Decree No. 5/18 establishing the framework for the exploration activities of the Development Areas; Presidential Decree No. 6/18 regulating the development of marginal fields; and Presidential Decree No. 7/18 regulating the prospection, research, evaluation, development, production and sale of natural gas.

The clarity provided by the new oil licensing strategy, and its promulgation by Presidential Decree are expected to provide sufficient incentives to raise interest of African, independent and international majors in exploring Angolan acreages.

It will be coupled with the country's first Marginal Fields Bidding Round, set to be launched at the Angola Oil & Gas Conference in Luanda on 4-6 June, 2019.

### The emergence of Namibia

Namibia's exploration scene is lively, with a range of companies investing – Total, ExxonMobil, Eco Atlantic, Tullow, Chariot Oil & Gas and Serica Energy are all active in Namibia. There is a lot

of interest in the results from the Walvis Basin, where drilling is expected to start later this year, starting with Tullow in September. Tullow is hoping for better results after the Cormorant wildcat well did not encounter any hydrocarbons when it was drilled in September last year.

"The Cormorant-1 frontier exploration well was a bold attempt to open a new oil play in this area of Tullow's offshore Namibia acreage," said Angus McCoss, Tullow's exploration director. "Gas readings while drilling continue to support the concept that there is a working oil system in the area. As a result, following the conclusion of operations, we will analyse the data gathered before deciding on any future activity."

Eco Atlantic holds licences to four blocks in the Walvis Basin. Promising results have been interpreted from 3D seismic surveys. The company is working in Namibia in partnership with Azinam, Amxor, ONGC Videsh and Spectrum Geo.

Total joins Impact and Namcor, the national oil and gas company, in deepwater block 2913B, located 300km offshore, with a water depth of 3000m. NAMCOR holds a 10 per cent carried interest in Block 2913B. The acreage lies along the western toe of the Orange River delta, where deep marine fan sands are contained within large structural traps. While Block

2913B is located 150km west of the Kudu Gas field, recent exploration wells along the outer fringes of the Orange Basin have shown a rich oil prospective zone running through the block.

Chariot Oil & Gas, meanwhile, has had mixed results in Africa – it decided to withdraw from two Namibian offshore blocks last year and had disappointing drilling outcomes in Morocco, but is planning to drill an offshore well in S Prospect this October in partnership with Azinam. Serica holds an interest in the Luderitz basin and is seeking exploration partners.

As well as a busy exploration scene, the Kudu Gas project is part of a government-mandated response to averting an energy crisis in Namibia, involving Namcor, the national hydrocarbons company and private partners. The Kudu Development Project aims to develop the Kudu Gas Field located offshore. The gas produced from Kudu will be transported through a 170km pipeline to a power station that will be built at Uubvlei, 25km north of Oranjemund in southern Namibia. Namcor and its partners will be responsible for drilling of production wells, installation of subsea equipment, installation of the floating production system, gas production, conditioning and transportation of the gas to the power plant. ♦

# A BRIGHT GAS FUTURE FOR TANZANIA

Tanzania is well-placed to be a major player in the African gas industry, with major progress being made in the LNG and helium sectors. Overall, it is promising news for a country with an economy that is projected to expand this year.

**A**CCORDING TO THE January edition of the 2019 Global Economic Prospects (GEP), published by the World Bank, Tanzania's economy is expected to accelerate at a rate of 6.8 per cent in 2019.

PwC, meanwhile, tipped that hydrocarbons are expected to continue to play a major role in the energy mix that will satisfy Africa's growing energy needs in its outlook for the continent's oil and gas industry, released at the end of 2018. In the report, Tanzania was cited as one of the countries with major gas resources that could be leveraged to augment the strategic position of gas as an energy source for Africans.

LNG is set to play a significant role in Africa's energy mix, as well as in terms of export revenue, in the years ahead and, again, Tanzania is one of a number of countries, along with Congo, Cameroon, Equatorial Guinea, Ghana, Mozambique, Rwanda and Sudan, that is showing potential as future LNG powerhouses. Tanzania is, therefore seeking investment in its burgeoning gas industry. Germany is one such country which has taken an interest in African investment, including Tanzania, with companies such as ABB, Siemens, Allianz, Voith, Lucas Nülle, Inzag, Gauf Engineering, Andritz and



Image Credit: Lichinga/Wikimedia Commons

*The Rukwa region could provide Tanzania with lucrative helium development.*

Tractebel looking to the continent for energy industry opportunities to leverage their technologies.

**“ Helium and LNG could do great things for the Tanzanian economy, with LNG, in particular, set to play an important role in the African energy mix”**

Helium is the other gas which could do great things for the Tanzanian economy. Helium One's Rukwa project is based on estimations from Netherland Sewell and Associates, which has reported unrisks prospective recoverable helium volume of 98.9bn standard cubic feet, occurring in 28 leads, based on 2D seismic and is supported by data from two legacy exploration wells. Oxford University's Department of Earth Sciences has confirmed migration within the basin through their own geochemical analysis of surface gas emanations. The company is undertaking a programme to convert this resource into reserves and seek out

extra prospects. Last year, Helium One, which is part-owned by Solo Oil, raised US\$2mn in a pre-IPO funding round with investment from Australia, Asia and Africa.

According to a report by market.us, “Global Helium Market By Type (Gaseous and Liquid), By Application (Cryogenics, Aerostatics, Welding and Others), By Region and Key Companies – Industry Segment Outlook, Market Assessment, Competition Scenario, Trends and Forecast 2019-2028”, the global helium market was valued at US\$6,066.2mn in 2018 and is projected to increase significantly at a CAGR of 6.2 per cent from 2019 to 2028. ♦



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# DOWNSTREAM MAJOR PROJECT FOCUS FOR UGANDA

With a new refinery expected to commence operations in 2023 and plans afoot for expanded hydrocarbons storage, the downstream sector is becoming increasingly important to Uganda. Georgia Lewis reports.

## PROJECT FRAMEWORK

**A**greement (PFA) was signed last year for the development of a 60,000-bpd refinery in Uganda, located in Kabaale, Hoima District. The agreement was signed between the Ugandan government, represented by the minister for energy and mineral development, Irene N. Muloni and the Uganda National Oil Company (UNOC).

In this PFA, the parties agreed that Albertine Graben Refinery Consortium (AGRC) comprised of YAATRA, Saipem SpA, LionWorks Group and Baker Hughes General Electric (BHGE) would develop and propose a final refinery configuration that would provide the best technical and economic results for government approval.

Last month, a Ugandan government team led by Ms Muloni spent two days meeting with the AGRC leadership in Milan to review the final refinery configuration presented by SAIPEM SpA. The minister informed the AGRC that the Ugandan government is happy with the final refinery configuration proposed.

Speaking on behalf of the AGRC leadership, Rajakumari Jandhyala, CEO of YAATRA, said the consortium is “fully committed” to completing all commercially viable pre-FID activities on time in collaboration with the Ugandan government.



Image Credit: BHGE

*Irene N. Muloni (centre-right) with Ado Oseragbaje, CEO BHGE Sub-Saharan Africa (centre) and. Rajakumari Jandhyala CEO YAATRA Africa, hosted by Maurizio Coratella, COO Saipem On-Shore Engineering and Construction (centre-left) in Milan.*

The next step is for the AGRC to look to the formal launch of the FEED process which is expected to be concluded at the end of 2019 and then take Final Investment Decision (FID) before construction commences. Following a successful FID, the refinery is expected to be completed by the end of 2023.

As well as refinery development, UNOC is keen to expand storage capacity in the downstream sector. The 30mn-litre capacity Jinja Storage Terminal (JST) is operated by UNOC and the NOC has started a phased development of the 240mn-litre capacity Kampala Storage Terminal (KST), located in the north-west of the region.

KST is slated to receive, store and serve as a central distribution terminal for refined petroleum products from the proposed refinery based in Kabaale in the Western Region. Additionally, it will be a central hub for the development of regional pipeline infrastructure for refined products. The process of selecting a strategic investment partner for the project is still a work in progress. These terminals are expected to serve as trading hubs for bulk petroleum products and provide hospitality storage.

The development of Uganda's oil and gas industry is seen by the government as an opportunity for job creation, particularly for young people. Speaking from Hoima at

the Inter Secondary School Debating Competition, in which students debated the challenges and opportunities in regard to developing oil and gas deposits in the Albertine region, he described the country's youth as “Uganda's decision-makers in the future”.

“If you don't involve the youth in this [oil and gas] sector, we are sitting on a time bomb,” he said.

He went on to reiterate the importance of other sectors growing to support oil and gas projects, such as food production: “Oil workers and other players will not come with food to the region. This means that if young people are guided to produce food, they will indirectly benefit financially,” he said. ♦



# OTC 2019 CELEBRATES 50 YEARS IN HOUSTON

Offshore Technology Conference – or OTC – celebrates 50 years of serving the global oil and gas industry with a full programme for delegates, including the Spotlight on New Technology Award.

**T**HE 2019 EDITION of the Offshore Technology Conference (OTC) will be a landmark year for event organisers and delegates as it marks half a century of providing the global oil and gas industry with a forum for discussion, knowledge-sharing, doing business and finding out about the latest innovations for offshore operators.

This year, 18 technologies will receive the 2019 Spotlight on New Technology Award, which showcases the latest advances in hardware and software for the industry. The companies which will be honoured at the event will be AFGlobal (for two products); BHGE; Dril-Quip; FutureOn; HYTORC; NOV; Oceaneering International; Saipem; Schlumberger (for two products); Siemens (for two products); Stress Engineering Services; Technip-FMC; Green Pin, Weatherford; and XSEBS AS.

Judges followed five criteria when selecting the winners – the technology has to be on the market for less than two years; original innovation; proven technology; broad interest across the industry; and provide significant impacts exceeding existing technologies.

For a fifth year running, OTC will support and recognise the innovative technologies being developed by small businesses with the programme's Spotlight on Small Business Award.

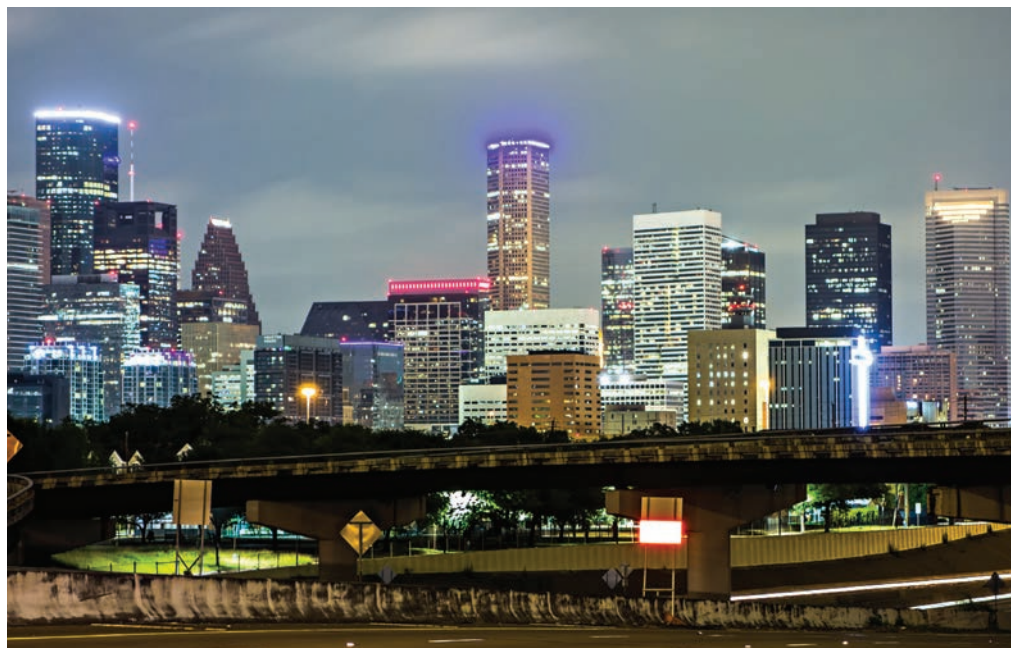


Image Credit: Adobe Stock

*Oil and gas industry leaders will descend on Houston for the 50th OTC.*

In addition to meeting the above criteria, a small business honoree must be independently-

**“ The New Technology Award winners are proof that the highway of the future in offshore development is being paved by innovations ”**

owned and operated or a not-for-profit concern and have no more than 300 employees for the 12 months preceding the application deadline.

“Each Spotlight on New Technology Award submission is reviewed and rated by several subject matter experts, providing a sound and fair scale,” said OTC 2019 board of directors chairman Wafik Beydoun. “This year more than 450 ratings were submitted, and the best of some incredible submissions were chosen. We are very proud, at this special Golden Anniversary of OTC, to present these 18 Spotlight on New

Technology Award outstanding winners. They are proof that the highway of the future in offshore development is being paved by innovations.”

Meanwhile, the gala dinner will recognise Carlos Mastrangelo with the Distinguished Achievement Award for Individuals and the ExxonMobil-operated Hebron Offshore Project with the OTC Distinguished Achievement Award for Companies, Organisations, and Institutions. ♦

*For information about the programme, go to [www.otcnet.org](http://www.otcnet.org)*

# OFFSHORE LOGISTICS: AN AFRICAN CASE STUDY

Panalpina was able to help a client avoid a production platform shutdown off the Cabinda coast thanks to its energy and project solutions team, when critical cargo needed to be moved from Malabo in Equatorial Guinea to Angola in a port-to-port operation.

**A**NGOLA HAS COME a long way since it first produced oil from the Benfica oilfield in the Cuanza Basin in 1955. With a population of around 28.4 million and located on the south Atlantic coast of Africa, the country is the second largest oil producer in the continent and a member of the OPEC. Angola survived a civil war from 1975 to 2002. Today, the country is the 65th largest export economy in the world, and its economic growth is being driven by the energy sector. Oil production and its supporting activities contribute about 50 per cent of the country's GDP and around 92 per cent of exports.

Entire stretches of the Angolan offshore horizon are populated by oil platforms, many of which are operated by international oil companies. The logistics of operating these production platforms and drilling rigs are very complex, and a halt in production would result in millions of dollars in losses.

Panalpina was called in for help by one of its largest customers in Angola producing oil and gas with multiple offshore facilities. The request was urgent as one of their main platforms, located about 25km off the Cabinda coast in 60m of water, is in the middle of a production ramp-up to reach a target output of 150,000 barrels of oil and



*Panalpina completed an intensive port-to-port logistics operation between Malabo and Cabinda.*

Image Credit: Panalpina

nearly 10 million cubic metres of natural gas per day.

A critical cargo of specialised pipes, bundles and racks had to be moved from Malabo in Equatorial Guinea to Cabinda, Angola in a port-to-port operation. Panalpina deployed its energy and project solutions experts in Angola to send the company's Merlin III vessel to collect and deliver the cargo.

Although the Merlin III had to stand by to discharge at the destination due to poor weather conditions, the entire load of 312 tons of pipes was delivered to the platform in record time, saving the client money.

In a parallel transaction for the same customer, Panalpina was entrusted with a shipment of critical geotubes by air freight from Aberdeen in Scotland to Pointe-Noire, in the Republic of the Congo. The Panalpina Charter Network made short

work of the charter flight from Europe and the dedicated trucks for overland transportation to Cabinda in Angola. The combined weight of all the shipments reached 321 tons.

The Merlin III sailed from Luanda to pick up the cargo at Malabo and back to waters of Cabinda for delivery in just eight days. On pick-up day, she set her first line ashore at Malabo at 7:55am. Cargo loading, lashing and customs clearance were completed the same day by 16:30, and the ship cast off at 16:45.

As a shallow-draft landing craft purpose-built for the oil industry, the Merlin III is suited to perform offshore platform deliveries. Classified for unrestricted navigation, the ship is equipped with bow ramps that allow cargo runs, roll-on/roll-off and feeder services as well as beach landings in remote areas.

Panalpina's African Star

solution brings together the West African countries with a combined and cost-efficient air/sea/land transport concept.

The Merlin III is a vital part of this coastal link for customers operating in the region. Currently, the ship performs cargo runs on a weekly firm scheduled rotation between the Congo and Angola. Pointe-Noire, Soyo Kwanda, and Luanda Sonils are some of the shore bases she frequents. The vessel connects with the weekly air bridge Panalpina runs between its main airfreight hub in Luxembourg and Pointe-Noire.

Shipments from Houston, Europe and elsewhere are centrally managed in Luxembourg and flown to Pointe-Noire in Congo. From there, the cargo can be delivered by truck to Cabinda or sail along the coast on the Merlin III. Customers in Luanda benefit from the vessel's ability to reach the oil and gas base directly, which saves time and money.

"We run the African Star to support the demanding rotations of the oil industry – we know capacity on the market is scarce, in particular, the main deck, and we know energy companies operate 24/7. And so do we," says Matthias Frey, global head of the Panalpina Charter Network. ♦

*Article contributed by Panalpina.  
www.panalpina.com*



# OPPORTUNITIES IN THE EAST SEEN ON SEISMIC

Somalia and Madagascar are in the midst of exciting licensing rounds with great prospects, thanks largely to the revelations of extensive seismic data. Georgia Lewis reports.

**T**HE ECONOMIES OF Somalia and Madagascar could be significantly boosted if the results of seismic surveys can be converted into serious exploration and production. Both east African countries are in the midst of licensing rounds as a result of seismic data, with deadlines set for later this year.

In February, the Somalia licensing round was launched in London with the Ministry of Petroleum and Mineral Resources with the final block delineation, based on 2D seismic data interpreted by Spectrum Geo across the 15 open blocks. Following a co-operation agreement with the Somali government, Spectrum completed the acquisition and processing of 20,185km of 2D long-offset seismic data. This programme complements 20,500km of existing seismic data acquired in 2014.

Spectrum's survey design, which covers water depths of 30 m to 4,000m, has allowed for seismic coverage over the shelf, slope and basin floor with dip, strike and recording time intervals suitable for defining a range of leads and prospects. Streamer lengths of 10,050m have been used to record information at all offsets, aiding imaging of the underlying syn-rift geometries. Modern



Image Credit: Adobe Stock

*Significant quantities of seismic data from offshore Somalia have been acquired and processed.*

processing algorithms were applied to the raw data to achieve optimal imaging of steeply-dipping extensional and compressional features and illumination of subtle amplitude anomalies. The Somali round is due to close on 11 July, after additional roadshows in Houston and Dubai.

Meanwhile, Madagascar announced their 2018-2019 licensing round during Africa Oil Week, held at the end of last year in Cape Town. There are 44 blocks in Morondava Basin, which are located on the western margin of the island nation.

Again, Spectrum has signed an agreement with the Madagascan agency OMNIS (Office des Mines Nationales et des Industries Stratégiques) granting the company exclusive brokerage rights to the vast majority of legacy seismic data situated both offshore and onshore Madagascar. The data available adds up to 69,000km. This is in addition to 3,622km of data from Spectrum's existing library which includes reprocessed Pre-Stack Time Migration (PSTM) data over the Morondava and Majunga basins to the West, the Ile Ste Marie area

in the East, as well as 2015 reprocessed data from Ankoba/Copetma areas, and a further 1,503km in the South over the Cape Ste Marie. Madagascar is still considered a frontier hydrocarbon province although it could move to emerging market status once exploration takes place, with the data indicating the blocks are analogous with Kenya and Mozambique.

The Madagascan round will close on 30 May and it is expected that awards will be announced within the following three months. ♦

# THE DEEP LEARNING CURVE FOR AFRICAN OPERATORS

In the era of big data, geoscientists at CGG are utilising machine and deep learning initiatives to help the industry make better decisions faster.  
Martin Clark reports.

**A**FRICA MAY WELL be an ideal testing ground for new geoscience technologies. Some of these new ideas were presented at an industry briefing in early April in London by industry experts CGG, as part of its digitalisation campaign and its so-called machine and deep learning initiatives.

Science-fiction utopias aside, the company says it is expecting machines to do a lot more of the industry heavy lifting when it comes to sifting through data. While machine learning and 'artificial intelligence' have been around for decades, the advent of big data means there has been an acceleration in its uptake with a host of new techniques now widely available.

CGG's GeoSoftware experts have handpicked the most effective machine and deep learning technologies to put them at the oil and gas industry's fingertips.

These include PowerLog native Python extensions and HampsonRussell applications, featuring the latest neural network technologies, to enable scientists to gain deeper insight into any data.

In challenging deepwater environments like West Africa, and now offshore southern and Eastern Africa too, as well as in the Mediterranean, this insight can make all the difference.

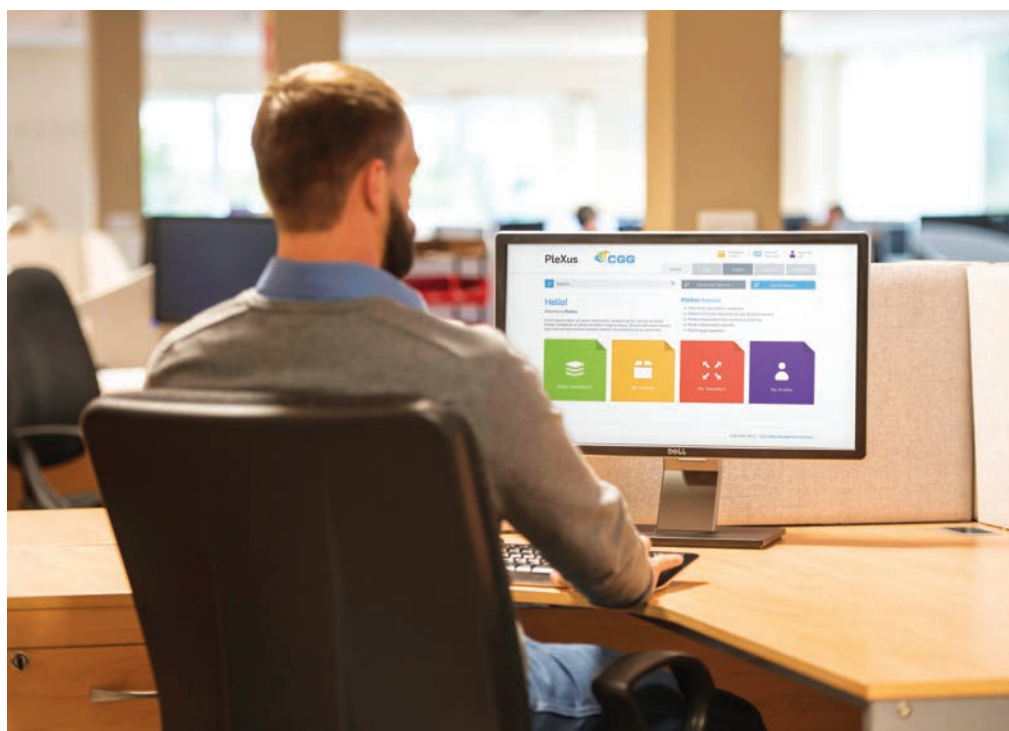


Image Credit: CGG

*Machine learning and effective software make it easy to analyse data from the office.*

According to a CGG spokesperson, Jasmine Tran, deep learning powers more accurate prospect prediction. She says CGG GeoSoftware is expanding its machine learning technology to put the power of a new generation of analytic and prediction techniques into the hands of geoscientists in intuitive and accessible ways so they can more accurately characterise hydrocarbon reservoirs.

"HampsonRussell Emerge software, part of the GeoSoftware portfolio, has added deep

learning in the form of a deep feed forward neural network (DFNN), which offers new opportunities for predicting reservoir properties," she says. "The new technology is easy to implement in reservoir workflows thanks to flexible parameterisation and the usual attention to user-friendliness."

She adds, "Deep learning in Emerge helps geophysicists predict reservoir property volumes from seismic attributes and well data with greater detail than conventional approaches by

revealing more subtle variations than previously possible."

In high cost exploration environments offshore, and especially reaching out into every more challenging ultra deepwater areas, these techniques and assets can save drillers and operators both time and money.

Powerful machine learning automates the mundane and provides a new toolkit to create better and more accurate reservoir models, thereby enhancing the potential for success. 🔥



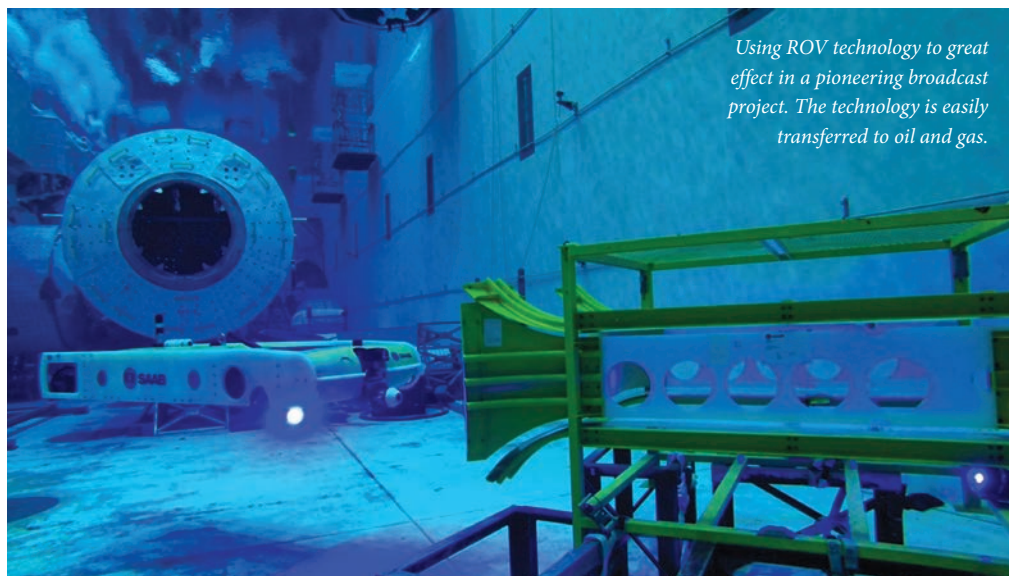
# HIGH-TECH KIT FOR REMOTE VEHICLES

Remotely operated vehicles, or ROVs, have become an integral part of the offshore industry, and they are growing in sophistication, with African projects making use of the latest advances. Martin Clark reports.

**T**HE FUTURE IS remote, unmanned, autonomous and all about data – that’s the view of UK-based innovator Sonardyne. The company is playing a major role in equipping remotely operated vehicles (ROVs) with technologies for collecting data that oil and gas companies can use for exploration, mapping and inspections. It is pioneering in other areas, such as subsea communications technology. Sonardyne kit was used to stream the first live broadcast to global audiences from an underwater submersible. Associated Press used the BlueComm wireless through-water optical modem technology for a live YouTube broadcast from a submersible operating in waters off the Seychelles, in the Indian Ocean.

The broadcast was part of the Nekton Deep Ocean Research Institute’s First Descent expedition, which is exploring

**“A live YouTube broadcast off the Seychelles used the latest wireless through-water optical modem technology”**



*Using ROV technology to great effect in a pioneering broadcast project. The technology is easily transferred to oil and gas.*

Image Credit: NASA

some of the world’s least explored areas of the ocean.

In the offshore energy sector, the company is already well established in major markets in Africa. Sonardyne sold US\$1.3mn worth of its 6G acoustic positioning technology to Seatronics, an Acteon company, experts in marine electronic equipment, to support the survey and construction phases of an offshore West African upstream field. The multi-functional Compatt 6 transponders and Ranger 2 USBL (Ultra-Short BaseLine) positioning systems were used for subsea operations including structure installation, pipeline metrology, ROV tracking and touchdown monitoring.

As well as new field development projects, the company is playing a vital role in maintaining the integrity of existing offshore assets.

Asset monitoring is increasingly critical to oil and gas companies’ ongoing safe and profitable operation of offshore infrastructure, which, in a growing number of cases, is operating for longer than it was originally designed for.

Sonardyne’s portfolio of acoustic positioning, sonar imaging, data logging and wireless communications technologies serves the offshore industry across a range of applications, from leak detection, riser monitoring, reservoir surveillance and pipeline creep.

“Subsea asset monitoring is a growing market,” said Stephen Auld, Sonardyne’s global business manager for subsea asset monitoring. “Our technology is being used for a whole range of projects in this area that are diverse both geographically – from Brazil to Australia via West Africa – and in terms of how our technology is used.”

The Sentry product is a great example, added Auld. “It’s a sonar that is able to detect and classify oil or gas seeps down to 0.1 barrels per day in depths of up to 500 metres. We can take the first in class results that we’ve had with these technologies further, helping clients to operate safely and cost-effectively.” ♦

# THE RISE AND RISE OF AI IN THE OIL AND GAS INDUSTRY

The growth of the artificial intelligence (AI) market across the oil and gas industry offers powerful possibilities for operational excellence. However, DNV GL is urging a cautious and responsible approach moving forward.

**A**RTIFICIAL INTELLIGENCE (AI) is making its presence felt across a wide range of industries, and oil and gas is no exception. It is certainly a growing market for AI companies keen to win more hydrocarbons-related business – market research from Mordor Intelligence found that AI in the oil and gas industry will demonstrate a compound annual growth rate of 12.14 per cent between 2018 and 2023, with a range of applications including streamlining the production process and controlling wastage.

For example, NVIDIA and Baker Hughes, a GE Company (BHGE) have joined forces to use AI to help oil and gas operators distill data in real time with the aim of cutting the costs involved with finding, extracting, processing and distributing oil and petroleum products.

However, safety is paramount and to this end, DNV GL published a position paper, 'Can we trust artificial intelligence to keep the oil and gas industry safe?', to uphold the safe and responsible use of AI, in response to its growing prevalence across the industry. The report was published in August last year and it asserts that data-driven models alone may not be enough to ensure safety. The paper outlines the advances in AI and the increasing reliance on them for



Norway is aiming to be a leader in AI development for oil and gas.

Image Credit: Adobe Stock

making safety-critical decisions. It concludes that a combination of data and causal models should be used to mitigate risk.

"The emergence of AI and digital-based solutions is the next natural step for the oil and gas sector to drive efficiencies and 40 percent of senior oil and gas

**“As the sector accelerates its digital ambitions, confidence and trust will be a huge step forward in its adoption and implementation”**

professionals say that digitalisation has improved safety over the past three years," said Simen Eldevik, author of the position paper and a principal research scientist with DNV GL Risk & Machine Learning. "The industry is already developing and working with autonomous robots capable of performing a plethora of complex actions, including reading dials and gauges and navigating around obstacles on offshore assets. However, a combination of data-driven models and the causal and physics-based knowledge of industry experts is essential when AI and machine learning are used to inform or make decisions in safety-critical systems."

To continue this work, DNV GL is working with Norway's

largest universities and companies, including Equinor, Kongsberg Group and Telenor, to establish an AI powerhouse. The Norwegian Open AI Lab aims to improve the quality and capacity for research, education and innovation in AI, machine learning and big data.

"We are supporting the industry to confidently make use of the most appropriate modelling and analytical approaches to better understand AI and reduce the high-risk scenarios we have pledged to safeguard against. As the sector accelerates its digital ambitions, confidence and trust in AI will be a huge step forward in its adoption and implementation," said Liv A. Hovem, CEO, DNV GL – Oil & Gas. 🔴



# AFRICA PIONEERS FLNG CONVERSIONS

Some of the world's biggest oil and gas developments are underway in Africa, meaning plenty of opportunity for the construction industry. Ingenuity will be vital in the latest crop of projects, which see the region push the limits in the FLNG space. Martin Clark reports.

**FLAGSHIP DEVELOPMENTS INCLUDE** Mozambique's Coral South FLNG development, estimated to cost in the region of US\$5bn.

Steel cutting commenced last September at Samsung Heavy Industries' (SHI) yard in Geoje Island, South Korea, for the mega project that is led by Eni and Exxon Mobil.

It will become the very first ultra-deepwater FLNG project in the world, providing a real test for all involved. The project is expected to commence production in 2022 from a site that sits 80 km offshore in water depths of 2,000 metres.

To construct the pioneering FLNG vessel, Eni has bought together the expertise of a host of leading industry names. That includes the TJS consortium, which is responsible for the hull, gas production equipment, risers and flowlines. This groups SHI with France's TechnipFMC and Japan's JGC. Other participants include the UK's BHGE for the subsea production systems, Norway's Aker for the umbilicals and Italy's Saipem for the wells. It means the project team is split across a truly global work site.

Another major development is the Tortue project offshore Mauritania and Senegal, which is led by BP and Kosmos Energy, and was sanctioned at the tail end of 2018. One integral player here



*The Greater Tortue field, off the coastlines of Senegal and Mauritania, involves players as far afield as Singapore.*

Image Credit: BP

is Golar LNG working with Singapore's Keppel Offshore, which has been commissioned to commence early conversion works for the Gimi FLNG, which

**“ The Coral FLNG and Tortue offshore projects are truly global, highlighting international confidence in African ventures ”**

will support the first phase of the Greater Tortue /Ahmeyim project. The Moss LNG carrier Gimi is now being converted into an FLNG vessel at Keppel's yard.

It previously successfully worked with Golar LNG on the Hilli Episeyo, the world's first FLNG conversion project, which is now deployed and operational offshore Cameroon.

Golar's FLNG solution is based on the conversion of a Moss-type LNG carrier fitted with tried-and-tested Black & Veatch liquefaction technology and connected to a client-specified mooring system. The FLNG Hilli Episeyo — built in

1975 and converted in 2017 — took 15 million man-hours for completion and boasts a whopping 250 megawatts of power on board.

The FLNG Gimi, built in 1978, is designed to produce an average of approximately 2.5 million tonnes of LNG per year, using the same process.

The projects together highlight growing confidence in the FLNG segment and indeed Africa's leadership in the area. “The potential of Golar's floating LNG solution was reinforced by FLNG Hilli Episeyo's proof of concept,” said Golar's chief executive Iain Ross. ♦

# SIGNIFICANT GROWTH TIPPED FOR THE GLOBAL VALVES MARKET

While North America and the Asia-Pacific region may be predicted to lead the way in valve market growth in the next five years, there are plenty of opportunities in Africa, as well as new innovations.

**T**HE GLOBAL BALL valves market in particular, is expected to grow in the next five years, according to a report by Markets & Markets. The report forecasts that the ball valves market will be worth US\$12.6bn this year, reaching US\$15.2bn by 2024, at a CAGR of 3.75 per cent over that period. Oil and gas is the leading industry contributing to this growth, followed by energy and power, and water and wastewater. While the geographical markets slated for the highest growth are North America and Asia Pacific, it is expected that established and emerging African markets will contribute to the expanding global market.

Markets & Markets attributed the rise in North America to the latest shale gas discoveries, along with increasing demand for cleaner fuels and increased production of crude oil in the Middle East.

With South Africa, Algeria and Tanzania emerging as players in the helium market, albeit at different stages of development in this potentially lucrative sector of the gas industry, these countries could contribute to the growth of the ball valves market for cryogenic materials – this is the sector which Markets & Markets have earmarked as the one expected to witness the highest growth between now and 2024.

This growing market gives valve manufacturers the impetus



*The helium sector represents a sky-high opportunity for valve manufacturers.*

Image Credit: Adobe Stock

to launch new innovations onto the global market. For example, AWH has launched butterfly valves with RFID transponders. This allows operators to read all relevant data directly on the valve. A special in-metal transponder stores all relevant data on the valve. The information can be updated or overwritten up to 10,000 times. It saves inspection intervals, item numbers, type of sealing, order numbers and further data in the memory. The transponder can be retrofitted, is waterproof and immediately ready for use. Each transponder is unique as it has an ID number that cannot be overwritten. They can store the

item number from their P&ID on the chip. This means that the chip and valve can be assigned multiple times.

Also in the butterfly valve segment, AVA has expanded its warehouse with "Triple Eccentric Process Valves" and it now offers triple offset butterfly valves (TOBV) in the economic short face-to-face dimension. These valves offer a bidirectional zero leakage gas tightness according to "Leakage Rate A" of ISO 5208 and EN12266-1 standards. A Stellite 21 body seat overlay (HF) in combination with a Duplex & Graphite lamella ensures leakage free sealing under difficult conditions and higher cycles.

All valves are Firesafe tested according to API607. The proven packing system meets the highest tightness requirements according to TA-Luft VDI 2440 as well as ISO 15848-1 even at critical pressures. On request, AVA is able to take over any automation of this valve, it could be electric, pneumatic or hydraulic. The interface is according to ISO 5211. Main applications of these process valves are media in the fields of oil and gas, petrochemical, chemical and power plant applications. ♦

*For information on the valve report, log on to:*  
[www.marketsandmarkets.com](http://www.marketsandmarkets.com)



# THE EVOLUTION OF DIGITAL TWINS IN SUBSEA OPERATIONS

As digitalisation takes over the oil and gas industry, digital twinning is widely discussed. But for a technology that is the talk of the industry, there is confusion about what it is. The definition of a digital twin depends on who you talk to. Alan Whooley, subsea manager, Wood, explains.

**O**NE OF THE most widely deployed definitions is that digital twinning is a multi-faceted engineering model that enables design collaboration across all disciplines – this is the accepted definition in the construction sector, where 3D models have evolved to become 4D and 5D models incorporating time and cost dimensions respectively. Construction firms develop central models that are digital representations of all systems, processes and information of each project. Rather than a workflow that relies on completed documents and reports being exchanged, the digital twin transmits data to where it needs to be.

Since the construction and hydrocarbons sectors interact most frequently in building onshore facilities, the application of these principles has crossed over, journeying to the offshore sector in the past 18-24 months.

At a basic level, a digital twin is a computer simulation that represents a physical or statistical model of a given asset, system or facility. This virtual replica allows companies to manage the operation or integrity of the modelled asset from inception to decommissioning. But the definition gives room to incorporate different approaches that are still grounded in the familiar. For example, smaller

independent firms without robust data management systems could deploy a cloud-hosted system that would allow all users to access and use live information to make effective decisions.

There are two main use cases for digital twins in subsea:

**Simulation:** digital twins can be used to plan, investigate, and train individuals using ‘what if’ scenarios. The integrated processes of a subsea pipeline and facility can be simulated for training or to understand the system response to changed operating conditions.

**Asset performance and integrity monitoring:** Digital twins can be used in real time, or near-real time, to determine an asset’s physical response to operating conditions and the output of decision-ready monitoring and advisory data.

A digital twin of a subsea spool that is subject to vibration caused by unstable flow can calculate the rate of fatigue based on real-time production data. Eventually, a large, sophisticated digital twin could combine all these and more, allowing operators to manage their system through a remote digital replica.

Subsea’s unique challenges lend themselves to a digital twin solution. With an established, robust, and proven digital twin of the asset in place, traditional inspections can be transformed. Rather than sending an inspector



Alan Whooley, subsea manager, Wood.

offshore to operate an ROV, an inspector can pilot the ROV from an onshore office building, using a digital model of the field. Early estimates show that a digital twin can improve inspector efficiency by up to 30 per cent.

Digital twins could enable autonomous inspection. With a digital twin, soon an autonomous vehicle that is resident at the facility or deployed from a vessel will be able to navigate a pre-defined inspection path.

With life extension of assets that are approaching or past their expected decommissioning date, levels of fatigue, corrosion and erosion may have been accurately anticipated during the planned lifecycle, but many assets are now far less predictable. The time dimension in a robust digital twin, combined with the advanced analytics that are a critical component of any digital

model, give operators a more accurate predictive capability. Operators can therefore look at leading indicators and accurately predict issues and put remedial measures in place proactively.

The digital twin concept broadly fits into two trends technological and operational. Looking at the operational, firms are keen to overcome the historical disconnect between opex and capex and the transition from the design and construction phase to operations. In the traditional IT, systems used to design a field or facility, are typically separate from those used to manage integrity, maintenance or operations. With digital twins, these systems can be joined across the whole lifecycle – with financial and operational benefits.

Digital twins bring together major IT trends: data and advanced analytics; sensors and connectivity; the industrial Internet of Things; robotics, AI and deep machine learning; cloud and utility computing; and augmented and virtual reality.

To date, specialist software houses have not focused on subsea operation.

But as new models become established, with a combination of replicable and bespoke components, we should see some of the entrenched challenges in safe subsea operations broken down. ♦

Image Credit: Wood

# ENSURING OPTIMUM PERFORMANCE FROM FLOW METERS

There are multiple parameters which can be used to help operators decide if flow meters need to be upgraded. Edward Simpson of RS Calibration, on behalf of Bell Flow Systems, explains how being aware of when to upgrade meters can improve operational efficiency.

**ANY INSTRUMENT DETERIORATES** over time – it is a given that to extract the most from it, regular inspection, instrument calibration or an upgrade is mandatory to ensure that the instrument, such as a flow meter, keeps on delivering its best. To ensure that such critical equipment consistently delivers its best, it is important to know the indicators to help determine whether it is time for an upgrade or a new purchase. These parameters can help you decide whether it is the right time to upgrade your flow meter or not:

- ♦ If there is a new development or extension in the current operations within the business, or even a small change in the layout of the existing arrangement of the equipment.
- ♦ Introduction of new piping networks which can alter the fluid dynamics and various compositions of the fluid contents are some of the factors which can affect the monitoring equipment.
- ♦ Any alterations in the computer systems of your business can give rise to the possibility of the obsolete technologies and control systems becoming vulnerable to it. The flow control equipment is the nervous system of an operation and can be affected in such situations.
- ♦ Historic records help identify patterns in the maintenance of the equipment, recurring problems, frequency of services etc. This data can be used to accurately gauge the need for an upgrade.
- ♦ Real-time data is equally important and is utilised to keep a check on the accuracy levels of the flow control equipment and helps decide the correct time for an upgrade in this system.
- ♦ If the flow meter system requires expensive maintenance frequently or its parts are becoming increasingly costly or you need to spend a lot of money to hire a technical specialist, it is time to upgrade the system.
- ♦ Partial upgrades are also cost-effective and easy to implement. A trained engineer should be hired to implement any type of partial or full upgrades in the flow control system to ensure that there are no glitches in the system. Similarly, for flow meter calibration, it's advisable to hire calibration experts of an accredited calibration lab.



*Using the right flow meters ensures accurate measurement and operational efficiency.*

Image Credit: Adobe Stock

Keep in mind these factors before buying a new flow meter:

**Model:** There are various models available which fulfil different applications and purposes. A simple profiling of material which is to be measured can help you understand the material's behaviour when flowing through a pipe. This can help you narrow down on the model of the meter. If you are unsure how to follow this procedure, use a professional.

**Objective:** The type of liquid or gas to be measured, the turndown ratio, required temperatures and whether it will be operated manually or automatically are some of the parameters which can help you zero down on the objective of buying the flow meter.

**Material Compatibility:** It is extremely important to take into account the materials which are to be measured with the help of the flow meter. The model you choose should be compatible with the materials it is supposed to measure. Check each material individually against a reputable chemical compatibility table. Also check your choice of the model with the manufacturer of the fluid to avoid any compatibility issues or problems.

**Cost:** A cheaper device may be tempting, but it can cost you more in the long run. Consider the quality, durability and performance. If it meets your requirements perfectly, even a slightly expensive flow meter will be cost-effective in the long term.

**Fitting:** Consider the fitting or the installation of the flow meter. Keep in mind the exact location of where it is to be installed as this parameter can highly affect the device's efficiency and accuracy. Is it likely to be affected by any obstructions in the pipelines such as bends, valves or joints? These aspects can hinder the flow of the materials to be measured hence consider them before making the purchase.

Choose a flow meter which suits the needs of your business. Keep in mind that the flow meter should be upgraded and calibrated as required at the right time for optimal outcome. ♦

*This is an abridged version of an article from [www.bellflowsystems.co.uk](http://www.bellflowsystems.co.uk) reprinted with kind permission.*



# BUREAU VERITAS AND ITHEMBA TRUST: EMPOWERING WOMEN

The Ithemba Trust, a women's empowerment body, with Bureau Veritas Southern Africa, celebrated their inaugural International Women's Day at Ntsikana Primary School in Gauteng. The trust was launched in June 2018 and works with girls and young women in South Africa.

**T**HE ITHEMBA TRUST chairperson, Yvonne Busisiwe Kgame, a leader with a 30-year career in education and television underpinned by a powerful desire to make a difference, used her renowned story-telling style to address 30 educators at the school. Embodying the ethos of International Women's Day to encourage action and change, Ms Kgame acknowledged women's achievements throughout history and across nations to motivate those taking care of the education of our next generation, future leaders and gamechangers.

She said, "As teachers you need to teach with purpose. Passion and purpose lead to greatness. Be a bold teacher and empower your students to become great."

Sisanda Mamanzi, an employee of Bureau Veritas and former pupil at the school, addressed the educators after which they sang together with Ms Kgame and the learners. In acknowledgement of this auspicious occasion, the Ithemba Trust provided gifts for attendees. Before closing the event, the Principal thanked Mam Yvonne, as she is known, and shared the value of empowering words shared through storytelling.

Aligned to Bureau Veritas Southern Africa's social awareness ethos, the trust



Image Credit: Bureau Veritas

*It was an inspiring first-ever International Women's Day celebration for the Ithemba Trust and Bureau Veritas.*

focuses on empowering females from previously disadvantaged backgrounds with a focus on education of young black women in the STEM disciplines of science, technology, engineering and mathematics. After graduation, the company will absorb the young women into the business and upskill them with soft skills on work readiness. Enterprise development assistance will be provided to those who wish to launch businesses and work will be subcontracted to them to ensure they can sustain their businesses and achieve success. The trust will focus on beneficiaries hailing from areas in which BVSA employees live

and work. So far, the trust has provided two full bursaries for students Keletso Moekona and Sanelisiwe Mabaso to study a BEng Mining at the University of Johannesburg and BSC Biological Sciences at Wits University respectively.

The independent trustees include Yvonne Busisiwe Kgame and Zwelakhe Onwell Msomi, longstanding members of the South African business communities. The trustees have enjoyed leadership roles in local and international corporates and the education sector; bringing a powerful combined experience set to the trust. They have been heavily involved in non-profit organisations and charities on

local and global scales. Sal Govender, vice president of Bureau Veritas Southern Africa is also a trustee.

District HR manager for Bureau Veritas Southern Africa, Beatrice Scharneck said, "Bureau Veritas South Africa is committed to making a difference in the lives of others through the Ithemba Trust. It is our goal and ambition to create empowered and well-schooled females within the STEM disciplines through education and enterprise development. We are passionate about creating legacies and ultimately building a nation. We are poised to improve the lives of women, the backbone of society." ♦

# AFRICAN RIG COUNT

COUNTRY	January 2018	February 2018	January 2019	February 2019
ALGERIA	50	53	44	44
ANGOLA	1	4	5	5
CÔTE D'IVOIRE	0	0	1	1
EQUATORIAL GUINEA	0	0	0	0
GABON	0	0	0	3
GHANA	0	0	1	1
KENYA	8	8	8	8
MAURITANIA	0	0	2	2
MOZAMBIQUE	1	1	0	0
NIGERIA	12	16	15	14
SENEGAL	0	0	2	2

## Downhole progressing cavity pump prevents blowout

A GERMAN ENERGY supplier had initially used a geological horizon for gas storage, but then decided to extract crude oil from the same deposit. Therefore, a suitable extraction system had to be acquired for transporting the multi-phase mixture with a high gas content to the surface from 1,200 m below, while eliminating the twin risks of blowouts and leaks above the ground.

Additionally, the solution had to be economically viable, with a detailed production and profitability analysis taking place to facilitate the purchase decision. This showed that a conversion from gas to oil production for this bed would make the most financial sense.

Due to the extreme conditions at the site, a special pump technology was required.

It was concluded that centrifugal pumps with submersible drive were not suitable due to the high risk of failure from gas lock, while the progressing cavity pumps with above-ground drive – as commonly used in Central Europe – posed the risk of a blowout on the surface.

NETZSCH Pumpen & Systeme GmbH offered a progressing cavity pump system with submersible drive which prevents these problems.

As all moving parts are positioned deep down in the well, there risk of environmental impact from leaks at the surface is eliminated.

The progressing cavity pumps, which are normally used in Central Europe until now, have been systems with above-ground drive.



*The pump stops leaks above ground and prevents blowouts.*

These units have a dynamic seal on the surface which has a significant disadvantage in case of extreme pressure increase on the intake side: the seal can become overloaded and trigger a blowout.

To exclude this risk, NETZSCH decided on a progressing cavity pump which is driven underground – the NETZSCH ESPCP.

The special feature of this pump is that the rotor is not driven via a very long rod, but rather the rotor-stator combination and the motor are sunk into the well. The motor is connected directly to the rotor via a short flexible rod. All radial and axial forces of the

rotor are absorbed by a special underground bearing housing.

In addition to this, the dynamic seal is also located in the 1,200 m deep well. This moved all critical components of the pumping solution below ground, precluding environmental impact from leaks above ground. The final result was a sound purchasing decision and operations which were safe for workers and the surrounding environment.

*For more information about the company's pump solutions, go to [www.netsch.com](http://www.netsch.com)*



# Crowcon's new gas detection technology successfully tested in England and Wales, with applications beyond the UK

WALES AND WEST UTILITIES (WWU) wanted to observe different gas detection technologies in action and understand how they could deliver the best new technology to support existing methods and conducted a trial.

This involved three technologies from Crowcon: Optical gas imaging camera technology which gives a visual representation of the leakage point; laser detection which uses laser technology to detect methane concentration from a distance; and infrared technology to detect leaks and potentially reduce bar holing.

WWU carried out seven scenario surveys to detect leakage and monitor quality.

The scope of trial was to test the three products in different scenarios to gain an understanding of the products strengths, weaknesses and how each performs against the existing devices. This helped WWU identify individual capabilities and how they could achieve 'increased timesaving and safety'.

The outcome of the trial was a win for laser detection with Crowcon's LaserMethane mini (LMm) found to be the best overall fit for WWU's specific gas



Image Credit: Crowcon

Laser-guided technology was the most effective.

detection requirements. Its main strengths were: the ability to be used within any current leakage survey or inspection being carried out; the ability to be used on MOB Surveys and special crossing surveys (due to its ability to improve safety by detecting a leak from a safe distance); technology that quickly detected and quantified gas leaks in real time and at a distance; and the fact that it could be used as a tool to confirm leakage with incumbent devices being used to quantify leakage with stable readings.

[www.crowcon.com](http://www.crowcon.com)

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Magnetrol International N.V. ....	13
Marine Platforms Ltd .....	9
SGS Inspection Services Nigeria Ltd.....	2
Shree Steel Overseas FZCO.....	10
Tolmann Allied Services Company Ltd .....	35

# GREAT AMBITIONS FOR EQUATORIAL GUINEA AND BEYOND

Marisol Ovono Nchama, managing director, Elite Construcciones, talked exclusively to *Oil Review Africa* at APPO Cape VII about the company's challenges and ambitions for expanding within Africa and to Europe.

**ELITE CONSTRUCCIONES** HAS only been in business for six years, focusing on onshore and offshore construction projects for the Equatorial oil and gas industry, but in that time the company has faced the challenge of the oil price downturn and emerged from it stronger and more ambitious than ever.

Before she launched Elite Construcciones with her husband, Tony Meakin, who works alongside her as the company's joint managing director, Marisol Ovono Nchama worked in administration and management for Incat and Sogeco. SOGECO decided to withdraw from the oil and gas sector, leaving an opening and requirement for a new company to come in and take SOGECO's place, Marisol with her husband made the decision to strike out on their own.

"Why can't we start our own company, I said," she recalls. "So we got the loan from the bank and started the company. It has been a struggle – it still is a struggle – but we are still here."

The oil price downturn affected Elite but Marisol Ovono Nchama is proud to report that even though there were tough times, all 450 staff were kept on.

Currently, 325 staff members are from Equatorial Guinea with Marisol Ovono Nchama citing



Image Credit: Elite Construcciones

Marisol Ovono Nchama is determined to grow her business across borders from its base in Equatorial Guinea.

the importance of meeting and exceeding local content requirements as a strategy for success.

"We try to be the best in the market," she said when asked

about how the company survived and thrived during the downturn, despite many oil and gas companies cutting costs and seeking the cheapest deals wherever possible.

**“Come to Equatorial Guinea and meet the right people and get advice from existing companies – it is a beautiful country with so much potential”**

"We are all hopeful that 2019 will be the year of talking new contracts and new players in the oil and gas sector, 2020 will be the year of growth and we all need to be ready for it," she said. "We have had to diversify and expand to ensure long-term survival."

As part of the diversification strategy, the company is working on building an LNG storage and regasification plant for the Equatorial Guinea government in Akonikien, a project which will be used to support a cement plant. It is slated for completion by late 2019/early 2020.

As well as operating in Equatorial Guinea, Marisol Ovono Nchama told *Oil Review Africa* that the company has long-term ambitions to expand to other parts of Africa and into Europe.

"We already operate to European standards so there is no reason why we can't do business in Europe," she said.

Her determination to expand into Europe is clear and she has been looking into this already.

This attitude to international expansion reflects her own advice for companies looking to invest in Equatorial Guinea: "Just come to the country – meet the right people and get advice from existing companies. Business can be difficult in any country if you don't look into it properly, Equatorial Guinea is a beautiful country with so much potential". ♦



# Tolmann Allied Services Company Limited



L-R: Engr. Umar Moriki (Asst. Director, DPR);  
Engr. Ebi Ogionwo (DPR), Engr. Chidi Ike (DPR)  
Isioma Nwabueze (Tolmann)

As a follow-up to the OPITO DIGITAL BOSIET presentation at the Department of Petroleum Resources (DPR), the department nominated three of its officers, namely: Engr. Umar Moriki, Engr. Ebi Ogionwo and Engr. Chidi Ike to undergo the Digital Bosiet delivery at Tolmann. High point of the training was a one day practical session, having successfully completed the online theoretical aspect. In the words of the Assistant Director, DPR

*"If I have to do it again, I will choose the **OPITO DIGITAL BOSIET**"*  
- Engr. Umar Moriki (Asst Director, DPR)

## We offer the following OPITO courses:

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- \* OPITO THUET
- \* OPITO HUET WITH CAEBS
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# CORROSION RATE MONITORING PERMANENT - AUTOMATIC - WIRELESS



## Statistics have it that Nigeria, Algeria, Angola, Libya and Sudan provide about ninety percent (90%) of the continent's oil reserves.

About ninety percent (90%) of the upstream oil and gas facilities are located in remote areas making integrity checks and maintenance of assets difficult.

Asset integrity and preventive maintenance is key to reduce the risk of pipeline failure and maximize uptime. Predictive maintenance based on high resolution thickness data and wear rate analysis is the current best practice..

For issues of Permanent corrosion monitoring in pipelines, PIP360 provides 24 sensor UT thickness array sensors with corrosion rate analysis as a reliable technology that provides a true data-to-desk system for Asset Integrity and Maintenance departments.

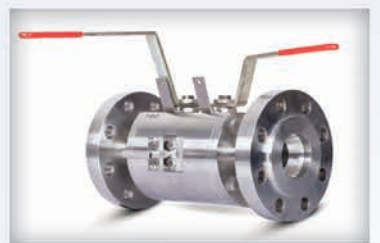
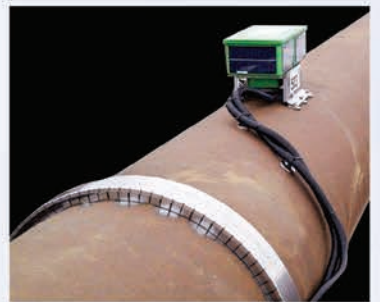
- ◆ A system with 24 sensors per instrument provides high resolution data, which clearly shows the wear rates and any changes that occur in the profile.
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