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Oil Review Africa

Oil · Gas · Petrochemicals

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Gas: Africa's future fuel

Updates from Nigeria, Senegal, Côte d'Ivore and Sierra Leone

Technology: Offshore communications, process automation, floating production, asset integrity management, gas detection

Event previews from Tanzania and Nigeria

The oil and gas operations of the future: How to adapt for long-term success

Adiatu Adeyemi, Managing Director/CEO, Tulcan (p42)

"All our employees are partners who are critical to our success"

LNG installations will be more common in Africa. (Image: Shutterstock/Phonix_a Pk.sarote)

EDITOR'S NOTE

AT OIL REVIEW AFRICA, we seek out the analysis of experts on the African oil and gas industry, and this issue is no exception.

In our cover story (page 16) on the rise of gas exploration and development across Africa, Kurt Davis Jr, an investment banker focusing on the natural resources and energy sectors, shares his views. He sees gas as "the new oil" for the continent.

On page 22, we hear from another expert analysis, Moin Siddiqi, an economist and long-time contributor to *Oil Review Africa*. In this issue, he writes about Nigeria. At the time of going to press, the Nigerian Senate had passed the Petroleum Industry Bill, the cumulation of almost 17 years of amendments and negotiations. The bill will need to pass House of Representatives and the president to become law. As ever, *Oil Review Africa* will keep you updated in the print edition and online at www.oilreviewafrica.com, for news as it breaks. Stay tuned.

Georgia Lewis
Managing Editor

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22-23 **The 8th Ghana Summit**
Accra
www.cwcghana.com

25-27 **International Oil Reserves & Energy Production**
Paris
www.waset.org

JULY

9-13 **World Petroleum Congress**
Istanbul
www.22.wpc.com

31 Jul-2 Aug **Nigeria International Conference and Exhibition**
Lagos
connect.spe.org/spenc/naice/naice2017

AUGUST

16-18 **3rd East Africa Oil & Gas Conference**
Dar-es-Salaam
www.expogr.com

SEPTEMBER

5-7 **Power Nigeria 2017**
Lagos
www.power-nigeria.com

11-12 **Tanzania Oil & Gas Congress**
Dar es Salaam
www.cwctog.com

20-22 **Powering Africa: Nigeria 2017**
Abuja
www.energynet.co.uk

OCTOBER

18-20 **Mozambique Gas Summit**
Maputo
www.mozambique-gas-summit.com

22-25 **The Oil and Trading Logistics Expo 2017**
Lagos
www.otlafrica.com

23-27 **Africa Oil Week 2017**
Cape Town
www.africa-oilweekr.com

NOVEMBER

6-7 **Practical Nigerian Content**
Uyo, Akwa Ubomi
www.cwcpnc.com

13-16 **ADIPEC**
Abu Dhabi
www.adipec.com

FEBRUARY-MARCH 2018

26 Feb-1 Mar **Nigeria Oil & Gas Conference & Exhibition**
Abuja
www.cwcnog.com

14-16 **East Africa Oil & Gas Summit and Exhibition**
Nairobi
http://10times.com/the-east-africa-oil-and-gas-summit

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

Industry players and investors to meet in Tanzania

FROM 11-12 SEPTEMBER, industry players, government leaders and international investors will converge on Dar es Salaam for the Tanzania Oil & Gas Congress. A major theme of the event will be the importance of creating an enabling environment for investors, as well as outlining the opportunities for investment in Tanzania, as well as neighbouring countries in the East African region.

Her Excellency Samia Suluhu Hassan, vice president of Tanzania, will give the opening keynote address.

Eng. Kapuulya Musomba, acting managing director of Tanzania Petroleum Development Corporation, will also be among the senior figures scheduled to speak at the conference.

The conference has a busy agenda with wide-ranging topics to be discussed.

On the government front, short-to-medium-term plans and priorities for the energy sector and increasing government-industry collaboration will be of paramount importance.

In terms of gas issues, delegates will be able to learn more about plans to progress the LNG project, as well as finding out what progress has been made in order to implement the Gas Masterplan.

It will be an outward-looking conference with plenty of sessions having a regional focus. With East Africa emerging as the region to watch in terms of oil and gas development, business opportunities in regard to the Uganda-Tanzania Crude Oil Pipeline will be discussed. Additionally, reviewing regional partnerships within Mozambique, Zanzibar, Uganda and Kenya, and streamlining cross-government processes, will be important elements of the extensive two-day programme.

www.cwctog.com

Nigeria's Petroleum Industry Bill is passed by Senate. Next stop: House of Representatives

LAST MONTH, THE Nigerian oil and gas industry came one step closer to reform with the Petroleum Industry Bill (PIB) passing the West African country's senate.

It still has to pass through the House of Representatives and the president before it becomes law. The progress of the PIB has been slow, with the first version drafted almost 17 years ago.

If the PIB passes as per the latest draft, Nigeria will have five new commercial and governance bodies to replace existing ones, such as the Nigerian National Petroleum Corporation (NNPC) and the Department of Petroleum Resources (DPR). A new regulatory agency, the Nigerian Petroleum Regulatory Commission (NPRC) would, if the bill becomes law, take over the functions of the Petroleum Inspectorate, the DPR, and the Petroleum Products Pricing Regulatory Agency.

Two new companies, Nigeria Petroleum Assets Management Company (NPAMC), and National Petroleum Company (NPC) will be created. The NPAMC would be established with certain assets and liabilities of the NNPC, while the NPC would operate as a fully independent commercial entity. Nigeria's strict local content rules are expected to remain in place.

Image Credit: Wikimedia Commons/Shiraz Chakera

The House of Representatives is the next step for the long-awaited PIB.

OPEC and non-OPEC producers keep the curb

OPEC AND 11 non-OPEC oil producers, including Russia, have agreed to roll over production cuts for a further period of nine months, beginning 1 July 2017, in a bid to stabilise oil prices and reduce oil inventories.

The decision was announced at their meeting in Vienna on 25 May. The alliance of OPEC and non-OPEC producers reached a historic agreement to reduce production by 1.8 mn bpd last December. This took effect on 1 January, and since then the oil price has remained relatively stable, hovering around the US$50/barrel mark.

Libya and Nigeria will continue to be exempt from the cuts.

Practical Nigerian Content Forum moves to Uyo, Akwa Ibom

IN NOVEMBER, THE seventh Practical Nigerian Content Forum will be held, and for the first time, Uyo, Akwa Ibom, is the location. Having previously taken place in Rivers State, Bayelsa State and the Federal Capital Territory, the Uyo, Akwa Ibom location is significant as it is the state with the largest offshore production in Nigeria.

Image Credit: NazaEvans/Wikimedia Commons

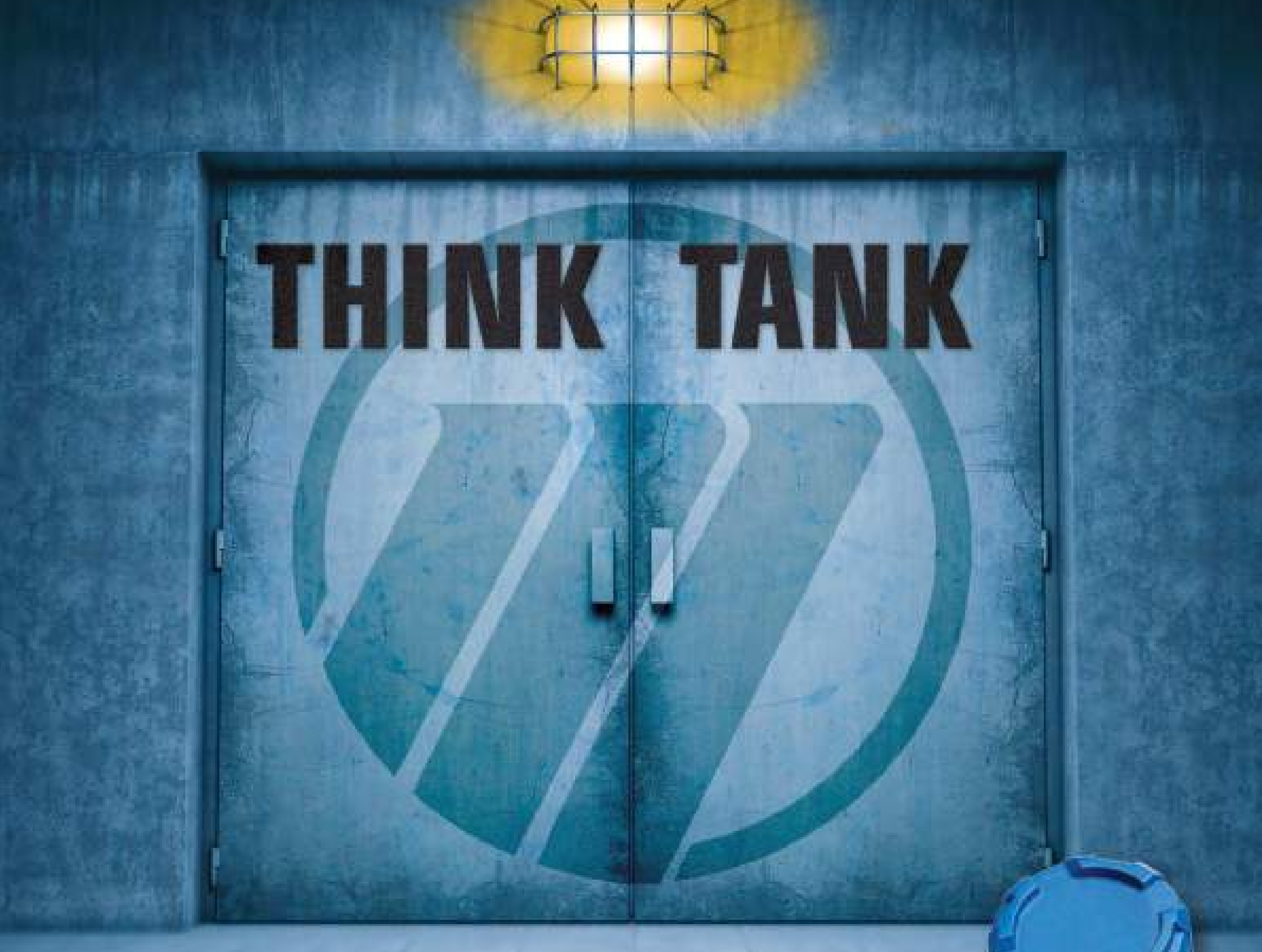
Nigeria's largest offshore production is in Uyo, where the next Practical Nigerian Content Forum will be held.

This event will follow up on progress made earlier this year, when the sixth Practical Nigerian Content Forum was held in Abuja.

Wemimo Oyelana, Vice President – Production, Sub-Saharan Africa for the CWC Group, said the Abuja event discussed implementation challenges as well as celebrating achievement made in terms of boosting local content over the last year.

"Following the recommendations outlined in the PNC 2016 communique, discussions at PNC 2017 will centre around plans to diversify the economy through Nigerian Content implementation across other sectors, the steps being taken to stimulate industry activities, the government and industry strategies to support the development R&D facilities, and in-country manufacturing capabilities," said Ms Oyelana.

www.cwcpnc.com


THINK TANK

Africa Oil announces Emekuya-1 oil discovery in northern Kenya's South Lokichar basin

CANADIAN OIL AND gas company, Africa Oil announced in May that the Emekuya-1 well in Block 13T, located in northern Kenya, has encountered approximately 75 metres of net oil pay in two zones.

Emekuya-1 is located 2.5km north of Etom-2. Africa Oil had the objective of drilling a fault block on the flank of the Greater Etom structure. The well was drilled by the PR Marriott Rig-46 to a total measured depth of 1,356 metres and penetrated reservoir quality Miocene sandstones which correlate to those seen in the successful Etom-2 well.

Downhole pressure measurements and fluid samples suggest that the main oil reservoir is on the same static pressure gradient as the Etom-2 well. This, in turn, demonstrates that a major part of the Greater Etom structure is oil-filled. The reservoir sands encountered also appear to be extensive which further de-risks the northern play area. In a statement, the company said this bodes well for future exploration in the region.

Next, the rig will be moved to drill an up-dip appraisal well on the Etom structure. Tullow Oil operates blocks 13T and 10BB with 50 per cent equity, and is partnered by Africa Oil and Maersk Olie og Gas A/S, both with 25 per cent.


Image Credit: CIAT/Flickr

The northern regions of Kenya are proving to be very successful for hydrocarbons.

GE signs agreement to upgrade gas turbines at Songas power plant in Tanzania

A MULTI-YEAR AGREEMENT has been signed betweem GE and Songas to upgrade the gas turbines at Songas' Ubungo power plant in Dar es Salaam, Tanzania.

"Songas owns six gas turbines, including four GE LM6000 gas turbines which it has been operating at Ubungo Power Plant since 2004" said Nigel Whittaker, managing director, Songas. "Songas and GE have been working together for several years to ensure high performance of these turbines. Songas is very pleased about this new initiative with GE to help increase the efficiency and reliability of the plant throughout the duration of its agreement."

The upgrades will help Songas increase the efficiency and the plant's capacity at the Ubungo plant by approximately 10 MW. Today the power plant provides nearly 25 per cent of the power in Tanzania.

"As the Government of Tanzania continues to pursue the expansion of generation capacity and extend the capability of its power grid, upgrading existing power plants to improve operation and efficiency is a must" said Elisee Sezan, general manager, GE Power Services for Sub-Saharan Africa.

Image Credit: GE

A worker at the Dar es Salaam gas-fired power plant.

LEKOIL receives first payment from Otakikpo

LEKOIL HAS RECEIVED payment for its first cargo lifted from the Otakikpo Marginal Field in OML 11, it announced in May. The high quality Otakikpo crude blend helped the company realising a small premium to Brent Crude pricing before marketing and related costs over the given period.

The field went into commercial production this year with the first crude cargo produced from the field lifted from the FSO Ailsa Craig by Shell Trading, as announced by LEKOIL on 10 May. The first cargo was made up of 120,000 barrels.

Current production at the Otakikpo field is approximately 5,500 bpd. With production gradually ramping up, the company is now looking to establish more frequent regular liftings as it focuses on increasing production through year end.

The field is in a coastal swamp adjacent to the shore in the south-eastern Niger Delta.

The Otakikpo Field Development Plan consists of two phases. Phase 1 comprises the recompletions of two wells, Otakikpo-002 and Otakikpo-003, with the installation of an early production facility of 10,000 bpd capacity and export via shuttle tanker. Phase 2 covers incremental development of the rest of the field with a new central processing facility and new wells expected.

LEKOIL Nigeria exercises the rights and benefits of its 40 per cent participating and economic interest in Otakikpo via a farm-in agreement and joint operating agreement with Green Energy International, the operator.

Equatorial Guinea set to transform as an energy hub with Bioko Oil Terminal

TO REFORM EQUATORIAL Guinea's energy production sector and establish the country as a trading hub for the entire West Africa, the government of Equatorial Guinea and Arabian Energy DMCC have signed an agreement for the development of Bioko Oil Terminal, which aims to become West Africa's largest oil and petroleum products storage facility.

Image Credit: Embassy of Equatorial Guinea/Flickr

The Bioko Oil Terminal is a first of its kind storage facility for West Africa.

According to the agreement signed on 11 May 2017, the two parties will collaborate on the development, implementation, construction and financing of this mega project worth US$500mn.

Bioko Oil Terminal will comprise of 22 storage tanks with a total capacity of 1.2mn cubic metres. The terminal will be built in two phases, with the first phase consisting of refined production and the second capable of storing, handling and blending middle distillates and light ends such as diesel, jet fuel, gasoline and naphtha and crude oil.

The terminal infrastructure will be operated on a 'first come, first serve' basis. The facility will create an African centre for the distribution of petroleum products and crude oil and is expected to stimulate the west and central African industry through job creation and the reduction of imports.

The project is expected to attract investment, build local financial capacity and increase shipments to important export markets.

Tanzania's natural gas sector on rise as AfDB approves US$29.8mn loan

THE AFRICAN DEVELOPMENT Bank (AfDB) has approved a US$29.8mn loan to the Tanzanian government to help increase the potential of its natural gas resources by leveraging domestic markets and local content initiatives.

This approval will benefit Tanzania by mobilising the domestic gas resources through having a sound regulatory framework to manage natural gas reserves and attract investment.

Image Credit: David Stanley/Flickr

AfDB approved the loan on 20 March 2017 at a workshop in Dar Es Salaam.

It will also support government negotiating teams to ensure that the country gets the best deals and local content policy formulation to create employment.

Chidozie Emenuga, country manager of AfDB for Tanzania (OIC), reported that the project will contribute to designing strategies for domestication of natural gas, so that the gas resources can be utilised nationally and regionally to develop the energy and industry sectors.

AfDB stated that local content and gas domestication are key priorities for Tanzania while developing gas sector, attracting foreign investment, developing regional infrastructure and private sector participation.

Total to expand exploration activities in Mauritania

WITH AN AIM of expanding exploration activities in West African region, Total SA, the French oil and gas company, signed an exploration and production contract with Mauritania to commence operations on Block C7, which covers an area of 7,300 square kilometres.

As per the agreement, Total will operate the offshore block with a 90 per cent stake. Société Mauritanienne des Hydrocarbures et de Patrimoine Minier (SMHPM), Mauritanian national oil company will hold the remaining 10 percent.

Guy Maurice, senior vice president, Africa at Total Exploration and Production, met with Mohamed Abdel Vetah, minister of Petroleum, Energy and Mines of the Islamic Republic of Mauritania.

Following the meeting, Maurice said, "This agreement is part of Total's strategy to explore new deepwater basins in Africa. The addition of the C7 block to our existing C9 deepwater license creates a contiguous exploration area of around 17,000 square kilometres in a high-potential zone in offshore Mauritania."

Total holds a 90 per cent stake in the C9 exploration licence spread across 10,150 square kilometres in deep offshore area.

In addition, the company operates the onshore Ta29 exploration licence spread across 2,500 square kilometres in the Taoudenni Basin. Total has its presence for nearly 20 years in Mauritania, and is the only major active oil and gas company in the marketing of petroleum products, having 38 service stations in the country.

Force majeure lifted by Shell on Forcados oil terminal in Nigeria after 16 months of inactivity

THE FORCE MAJEURE on the Shell-operated Forcados oil terminal has been lifted after 16 months, providing a boost to Nigeria's oil industry.

After a militant attack on the Trans Forcados Pipeline in February 2016, the terminal was placed under force majeure. There was a brief resumption last year 2016 but militants attacked the facility again and the force majeure remained.

Force majeure is a legal declaration, meaning that an operator cannot honour a contract due to circumstances outside its control in order escape any liability.

Forcados usually exports up to 240,000 bpd, bring the West African country back to around the 1.8mn bpd level which the government wanted to achieve prior to joining the OPEC output cuts. However, Nigeria is now exempt from these cuts and production is on the rise. According to Reuters, Shell issued a loading programme for June exports that lifted planned exports from Nigeria to at least a 15-month high.

Image Credit: Seplat

Productivity has improved for Seplat since the force majeure was lifted.

Following the lifting of the force majeure, indigenous Nigerian oil company Seplat issued a statement saying it has been able to "successfully reinstate gross production at OMLs 4, 38 and 41 to pre-force majeure levels of around 75,000 bpd and 290 MMscfd."

Austin Avuru, Seplat's Chief Executive Officer, said: "The resumption of exports at the Forcados terminal has enabled us to very quickly de-constrain production, and in doing so once again demonstrate Seplat's strong underlying fundamentals. Our focus now is on restoring production and cash flow momentum whilst also establishing longer-term access to multiple export routes.

"Whilst the lifting of force majeure is welcome news we continue to monitor the situation closely and, dependent on performance in the interim period, will seek to resume formal production guidance at our half-yearly results to be released on 27 July 2017," he added.

Ghanaian company achieves oil and gas logistics success

OFFSHORE FREIGHT, A GHANAIAN freight forwarding company, has achieved what industry players consider their most strategic oil and gas project yet.

The project took place in Takoradi and the client was Workstrings International. The scope of work required Offshore Freight to demobilise more than 1,000 drill pipes and its accessories for shipment in enclosed containers to Houston. The project design and execution was handled by Offshore Freight's oil and gas team. The customer expressed his appreciation and said Offshore Freight executed the project safely and it was completed earlier than expected.

Incorporated in 2015, the company provides logistics solutions for multiple sectors including: oil and gas, energy, engineering and construction and mining. The founders of the company have a combined experience of more than 20 years in oil and gas and logistics, working with leading global oil and gas and international freight-forwarding companies.

Image Credit: Offshore Freight

Offshore Freight project team on site.

As an oil and gas and project logistics-focused company, their core services include project cargo handling, airfreight and ocean freight, customs clearance, trucking and engineered heavy lift services.

Projects logistics require complex engineering and detailed project planning to deliver successful projects; and this is what Offshore Freight delivers. Hazardous cargo handling is another core service that the company provides. Their dangerous goods team is certified and can handle all classes of hazardous cargo successfully.

The health and safety of their people, customers, and subcontractors is a top priority in their operations.

"We continually strive to extend our reach in order to serve our customers better and to remain a strong force in the oil and gas logistics market" says Mr Philemon Kweku Ankah, CEO. To achieve this, the company has partnered with Crane Worldwide Logistics to give their customers global support within the region.

Image Credit: Dave Crosby/Flickr

The storage market is not without its challenges but terminal businesses are looking for new streams of revenue.

TAKING STOCK OF THE STORAGE SECTOR IN THE MIDDLE EAST AND AFRICA

April's StocExpo Middle East Africa, which was held in Dubai, revealed a storage sector looking for some relief. Stuart Matthews reports from the event.

TERMINAL STORAGE COMPANIES may have to wait until the second half of the year before they start to see relief from current high inventory levels, sluggish global demand and suppressed storage leasing rates.

Speaking on the sidelines of StocExpo Middle East Africa – a bulk liquid storage event – Muthukrishnan Prabakaran, global head – Terminals for Gulf Petrochem, suggested that it was not going to be that busy this year for the storage business, reflecting the wait-and-see mood of exhibitors at the event, which took place in Dubai in late April. "Fresh demand will come on only when existing inventories start getting liquidated, which we expect to start come June," explained Prabakaran.

The challenging market climate may encourage innovation as terminal businesses look for new streams of revenue. Prabakaran suggests these may include blending, to help fuel oil meet the International Maritime Organisation's new sulphur emission limits, or facilitating access for smaller traders who may take off small volumes of product via trucks. "When the going is tough you need to see how you will keep your head above water," he said.

While supporting businesses in the sector have been impacted by the constraints felt in the storage industry, they too have found some strength in diversity by being able to reach into other fields to find opportunity. "In the last five years we've seen incredible growth but in the last six months it has quietened down," explained Alec Keeler, managing director of Loadtec Engineered Systems. "Storage companies are concerned about profit levels and are cutting back on expenditure. But I'm still staggered by the amount of opportunity there is."

Loadtec provides methods of accessing tankers, including fall prevention systems and equipment to enhance operator safety during fluid transfer. While such systems are key for the oil and gas sector, they also play a huge role in other areas where bulk liquid transfers are made via tanker, such as the food and beverage industry.

"The primary risk for loading tankers, not necessarily just in oil and gas, is accessing the top of the tanker to fill or empty," said Keeler. "Actually the risks that face the oil and gas sector are much same as in all the others, but are heightened by the risk of explosion."

Applying its know-how to multiple industries has meant Loadtec has been able to find applications in a wider share of the regional market, bolstering revenue opportunities. "We're not constrained by selling into a tiny market because the Middle East is diversifying incredibly," said Keeler.

This economic diversity, especially prevalent in the UAE, is a key factor in attracting the investment that could underpin the region's future potential. In StocExpo's opening address Patrick Kulsen, managing director of PJK International, sounded a note of confidence on this theme, pointing to the Middle East's continuing importance as a "global hotspot for investment, not only by the tank storage industry…but other downstream sectors too". AT Kearney's FDI Confidence Index, published in April, drove the point home, ranking the UAE among the top 25 countries in the world as a preferred target for foreign direct investment, while bond sales from Saudi Arabia and Qatar have attracted global investor attention measured in the billions of dollars.

GLOBAL WOMEN'S EVENT LED BY TULLOW'S SANDY STASH

The 8th Global Women Petroleum & Energy Luncheon concluded the Africa Independents Forum in lovely style. Sandy Stash from Tullow Oil was the guest speaker. *Oil Review Africa* editor, Georgia Lewis, was at the event.

THE GLOBAL WOMEN Petroleum & Energy Luncheon has become a highlight in the events calendar for female executives in the oil and gas industry. The eighth edition of this lunch was no exception, and it proved to be a lively conclusion to the Africa Independents Forum, held in May in London.

The guest speaker, Sandy Stash, executive vice president – safety, operations, engineering and external affairs, for Tullow Oil, was introduced by another female leader in the industry. Fiona MacAulay, chief operating officer, Rockhopper Exploration, introduced Stash with her own anecdotes and advice about rising high in the still male-dominated oil and gas industry.

The three buzzwords for Stash's presentation were: "Inclusion, influence, impact."

"I graduated with a petroleum engineering degree, there were three women studying the course – and the top three were women," she said.

Stash emphasised the importance of technological training for credibility in the business world: "You need to be in the field."

She took a summer job on an oilfield in Louisiana and said the men on the rig were "shocked to see a woman".

But Stash took on challenging roles over the course of her career, including an exploration project on a Cheyenne reservation.

Image Credit: ITE

Sandy Stash gave a lively and entertaining address to the 8th Global Women Petroleum & Energy Luncheon in London.

"We were not just putting pipe in the ground, the interaction with the tribal council and government agencies was important," she told the event. "It's about collaboration and I think women get that more naturally."

> **"We were not just putting pipe in the ground. It was about collaboration and I think women get that more naturally"**

Her work with the Anaconda Mining Company was another challenge. She took on the general manager role at a time of mass layoffs and during a toxic waste clean-up – and at the age of 32: "There isn't one single answer [to the problems faced by Anaconda at the time]. The company was sinking so I had to use all the levers. The general counsel wanted to litigate their way out of it [but we] managed the liability down to US$1.5bn from US$3bn ... We cleaned the place up ... I grabbed all the levers."

The importance of confidence was another strong theme of Stash's talk, and she offered some advice for anyone experiencing self-doubt: "None of these other people know what they are talking about either."

THE RISE AND RISE OF AFRICAN GAS

With new discoveries being developed, mature markets keen to avoid complacency, and access to energy a critical issue for multiple countries, this is an exciting era for gas markets across Africa. Georgia Lewis reports on how Africa is developing the cleanest-burning of the fossil fuels.

Image Credit: warrenski/Flickr

LNG activities off the South African coast from 2008. Since then, LNG development across Africa has been reasonably steady.

AS THE CLEANEST-BURNING of the fossil fuels, it is not surprising that many operators across Africa are looking to gas as a source of revenue as well as a way to improve access to energy across the continent. Independents are leading the way with pioneering projects across the continent.

Expert analysis: Gas to push oil to the side in Africa

Kurt Davis Jr, an investment banker focusing on the natural resources and energy sectors, with private equity experience in emerging economies, writes:

Gas is the new oil in Africa. According to consultancy PricewaterhouseCoopers (PWC), "the continent has proven natural gas reserves of 513 tcf with 91 per cent of the annual natural gas production of 7.1tcf coming from Nigeria, Libya, Algeria and Egypt."

Nearly 50 per cent of Africa's gas blocks are open, subject to force majeure or in application phase, according to the same report, with only an estimated 30 per cent of the sub-Saharan African blocks licenced.

Beyond being a home to a massive supply of gas, the region will also be the major player for LNG projects, specifically floating LNG (FLNG) projects. Cameroon's GoFLNG will be sub-Saharan Africa's first FLNG project to come online, with first shipping in late 2017 and Russia's Gazprom as the sole off-taker. The Fortuna FLNG project in Equatorial Guinea is expected to get approval in the first half of 2017, backed by a joint operating company under guidance of Ophir, Schlumberger and Golar.

Other local buyers for LNG may arise too. For example, Ghana is struggling to push forward its LNG import projects. Unreliable supplies from Nigeria and domestic pipeline constructions pose issues. Other African countries will see similar problems in 2017 and beyond, potentially expanding the pool of LNG buyers in a limited market.

> **"Gas will gain a more prominent place in the African energy mix, mostly in Nigeria. Near-term growth is focused on western and central Africa"**

Outlook for independent gas operators

Jean-Baptiste Bouzard, senior analyst for Sub-Saharan Africa upstream at Wood Mackenzie, addressed the Africa Independents Forum on the future upstream landscape.

"Gas will gain a more prominent place in the energy mix, mostly in Nigeria" he told the conference. "Gas production is 20 per cent of Sub-Saharan Africa's output in 2017. Near-term growth is focused on western and central Africa."

Despite large gas reserves in East Africa, particularly in Tanzania and Mozambique,

The Saaol gas pipeline, shown here at Temane, is a long-time part of Mozambique's developing gas infrastructure.

Image Credit: SASOL/Wikimedia Commons

Bouzard said that large-scale LNG projects in the region are "unlikely to materialise before 2022."

Echoing Kurt Davis Jr's sentiments, Bouzard said the three FLNG projects to watch in Africa are Cameroon's GoFLNG, Fortuna FLNG and a possible FID on Congo-Brazzaville's Marine XII project.

He said that independents are quicker to return to exploration and create value: "There is a timid exploration revival in 2017 [and] smaller players will take the lead."

Nigeria continues to be a prolific producer of oil and gas and it can be the smaller operators benefiting. Seplat bought six oil and gas blocks in the Niger Delta from Shell in 2010 as part of the major's divestment programme. It is part of the company's plan to buy assets from majors and their projects are currently split 60 per cent gas/40 per cent oil.

Mozamabique, Tanzania and Ethiopia

Geoff Bury, managing director of Wentworth Resources, gave an upbeat presentation at the Africa Independents Forum in regard to the company's gas prospects in Mozambique and Tanzania. It is estimated that the two countries have more than 200tcf of recoverable gas.

Wentworth Resource's Mozambican gas interests are mainly onshore in the country's north-east, bordering the Rovuma River and extending into the Indian Ocean. There is also a concession area west of and adjacent to Anadarko's Offshore Area 1, which has estimated resources of 45-70tcf. Four wells have been drilled to date with oil and gas shows in Mocimboa-1, tertiary gas shows in Mecupa-1, gas and condensate shows in Tembo-1, and no economic reservoir found in Kifaru-1. Appraisal began last year, including reprocessing of extensive seismic data.

The Tembo-1 well is considered to be the company's landmark well. It was drilled to a total depth of 4,553m into Upper Jurassic rocks and natural gas and some condensate was recovered.

"A high impact appraisal is underway that will result in proving up significant resources … [there is] potential for commercial development of oil and gas, and there is sufficient running room to fully appraise the Tembo discovery," Bury told the conference. "Drilling of an appraisal well is anticipated for 2018."

> **"Ethiopia has taken a bold step forward for gas infrastructure with the opening of the Doraleh Multipurpose Port in Djibouti this year"**

Looking ahead, Bury said that large-scale LNG, GTL and petrochemical refineries are part of the plan for when gas comes onstream in Mozambique, describing the East African country as "the place to be and Wentworth is already there."

In Tanzania, Wentworth Resources has coastal interests, on and offshore, in south-eastern Tanzania between the Ruvuma and Offshore Block 1 concessions. In 2014, the company signed a gas sales agreement with partners in Mnazi Bay to deliver up to 130mmcf/day of natural gas from the Mnazi Bay concession to a government-owned transnational pipeline. First gas was delivered in October 2015.

Additionally, the African Development Bank has approved a loan of US$29.8mn to help Tanzania develop its natural gas resources via domestic markets and local content initiatives.

Elsewhere in East Africa, Ethiopia has taken a bold step forward in terms of downstream infrastructure for gas, as well as oil. In May this year, the Doraleh Multipurpose Port (DMP) was opened in Djibouti.

DMP is the latest in a series of mega projects in Djibouti. These projects include four new ports, a Liquefied Natural Gas facility, an oil terminal, and two brand new airports. Together they will dramatically expand Djibouti's ability to serve as a platform and trade hub for the region.

The new 690 hectare facility is equipped with ultra-modern facilities that can accommodate 100,000 dwt vessels. The US$590m project was started in 2015, and jointly financed by Djibouti Ports and Free Zones Authority (DPFZA) and China Merchant Holding (CMHC). The state-of-the-art port equipment was all manufactured by the Chinese firm ZPMC. Vessels have already begun using the facility.

Senegal and Mauritania

The West African countries continue to provide big news stories for hydrocarbons in light of massive discoveries. Rogers Beall, executive chairman of Fortesa, describes the company's oil and gas exploration in Senegal as "high impact".

"We are a leading gas producer - we are the only gas producer – in Senegal," Beall told the Africa Independents Forum. He said that Fortesa has sold more than 2mmscfd of gas to industry.

"We are trying to serve a very large domestic gas market," he said. "All hydrocarbons in Senegal are not coming from under the sea."

Fortesa's gas production has dropped to 3mcf/day but Beall says the company plans to add 75bcf to its reserves by re-entering five wells, deepening two more and introducing a step-out programme on four shallow wells.

The Diender concession is also looking promising for Fortesa. The company has acquired 2D seismic data and will de-risk the play fairways before deeper exploration wells are considered.

Meanwhile, BP and Kosmos are making great inroads into the Mauritanian gas sector with Marsoun, Tortue, Guembuel and Teranga projects.

Image Credit: liz west/Flickr

Helium could be a growing part of Africa's gas market. One of its many uses is liquefied helium in MRI scanners.

Botswana gas-to-power

Botswana's gas reserves, extracted from coal beds, could play an important role in the southern African country's energy security

This is according to Anthony Gilby, CEO and managing director of Tlou Energy, when he addressed the Africa Independents Forum. He said that Botswana has a "very attractive power market", and that the country's coal bed methane (CBM) reserves could also be used to help South African residents, industries and businesses access electricity.

> **"Botswana is a good, stable democracy with low levels of corruption. Developing CBM will help diversify the economy away from diamonds"**

Botswana has independently certified gas reserves in place and Gilby believes that the first gas-to-power plant could be online "potentially by 2019". He said he expects drilling to commence in the second half of 2018. Power grid infrastructure already in place in Botswana is "world class", he said.

"This will replace expensive power, including imports and diesel generation," said Gilby. Tlou Energy has 100 per cent ownership of Lasedi, an 8,300km² licence area in which drilling for CBM at depths between 400m and 1,000m has taken place. Fracking is not required to release the gas, according to Gilby.

He added that as well as the impressive CBM reserves, Botswana is a "good, stable democracy with low levels of corruption".

"[Extracting CBM for gas-to-power] will help diversify the economy away from diamonds," he said. "It is a reliable source of clean energy."

As well as having full ownership of the licence area, Tlou retains the right to hold up to 50 per cent in power generation assets.

Opportunities with helium

Helium has multiple uses, has a high price, is inert and therefore safe, and currently there are very few sources of this gas – as such, it has become an attractive prospect for African operators. Tanzania is set to benefit from helium development.

Its uses include medical applications, such as MRI scans and breathing apparatus, welding, magnet production, rocket fuel, and dating rocks containing uranium and titanium.

Solo Oil has acquired a 10 per cent interest in Helium One Limited and announced plans to progress further with the Ruvuma gas field, increasing its presence in Tanzania.

Helium One is Tanzania's pure play helium exporter, and the helium is expected to become a bigger player in the African oil and gas industry in coming years. As well as the newly acquired 10 per cent interest, Solo has an additional call option to acquire a further 10 per cent interest within 90 days. This second investment is expected to close on or before the end of June with a long stop date of 31 July 2017 in case of any delays in regulatory approval in Tanzania.

Helium One has also completed the acquisition of an airborne gravity and magnetics survey and has approved more soil and groundwater sampling surveys, following the successful results of the first phase of sampling work. It is expected that drilling will commence in the Rukwa project area in 2018, where it is estimated that approximately 99bcf of helium is present. Global demand for helium is at around 6bcf so this makes Rukwa an important strategic project for the future of the sector. New helium supplies coming onstream are limited and the US Federal helium reserve will be shut down in 2021, so this positions Tanzania as a potential major player in the world helium market.

Heritage Oil is in the early stages of exploration for helium in Tanzania. At the Africa Independents Forum, Jim Baban, the company's managing director, described the project as a "high impact exploration with a very defined deadline".

OIL & GAS

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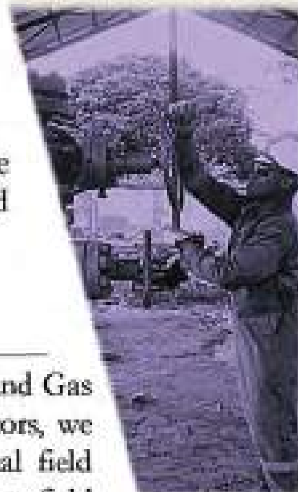

As there is an ever increasing global demand for petrochemical based products, this of course implies a global increase in exploration, drilling, completion, as well as production cycles.
More need for products means more drilling and production support structures are required to be put in place.
However, there is also an ever present need to utilize competent personnel equipped with both the skills and expertise necessary for handling such processes in order to keep working safely and achieving job tasks with greater to near perfect effectiveness and efficiency.

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HAZARDOUS AREAS COMMUNICATIONS TO PREVENT EXPLOSIONS

Working in the hydrocarbons industry is inherently dangerous. In the cramped confines of an offshore rig, where oil and gas is being produced in huge quantities, safety is the number one priority. It's something that the industry has to get right every time. Martin Clark reports.

Image Credit: EPI2oh/Flickr

Lessons have been learned and communications processes improved after the Deepwater Horizon disaster in 2010.

OPERATORS SUCCEED IN meeting high safety standard only because of the intense focus, procedures, and planning that they and their teams put in place to making it happen – and by using the right equipment.

In areas where there may be gas or flammable vapours, the right communications devices are vital to prevent explosions or fire. That extends to the protection of electrical apparatus used in flammable areas.

All hazardous area communications solutions are designed for explosive atmospheres or other harsh industrial and marine environments. Products to support operators include signalling equipment, communications technology, including mobile phones, and surveillance systems. And to ensure the highest safety standards, all products must be certified to the most stringent international rules.

South Africa-based Extech has provided instrumentation, especially intrinsic safety, for hazardous area operations across southern Africa for almost 30 years. It is expanding its business across the continent after signing new distribution and reseller deals with international hazardous communications equipment makers.

Earlier this year, it was named as an authorised distributor for sub-Saharan Africa by CorDEX, which makes explosion-proof digital cameras and other products for hazardous areas. It also became a reseller for Aegex Technologies and its "intrinsically safe" Windows 10 tablets that bring real-time communications to the world's most hazardous industrial sites.

Such products are finely tuned to eliminate triggering an explosion in sensitive areas. For an explosion, all three of gas or dust, oxygen, and a source of ignition (a spark or heat), need to be present. The concept of "intrinsic safety" works on the principle of removing a source of ignition, which can be achieved by various ways.

Wireless technologies such as LTE, WLAN, and WWAN are also becoming increasingly available in hazardous areas, bringing new possibilities and options to operators.

Push-to-Talk over Cellular (PoC) is gaining momentum as a cost-effective and feature-rich alternative to existing land mobile radio installations, where instant communication is essential. Leading providers include the likes of Ecom.

Such technology can yield other safety benefits. Generally, the less time workers spend offshore on a rig, the less they are exposed to hazardous areas.

PoC applications now make it possible to notify team leaders in real-time about plant changes and abnormalities, providing real-time information and support while working in remote locations. In the quest for safety, there's no end in the search for new solutions or products that could, ultimately, save lives.

NIGERIA'S SEVEN BIG WINS: MYTH OR REALITY?

Moin Siddiqi analyses the latest attempts to revive Nigeria's hydrocarbons sector, including the effectiveness of the country's "Seven Big Wins" programme, aimed at improving upstream and downstream operations.

REVIVING NIGERIA'S hydrocarbons sector remains the government's chief priority. President Muhammadu Buhari stated: "As important as it is to ensure that agriculture, solid minerals and other critical sectors of the economy are supported to grow and contribute more to the nation's economy, we still need a virile and efficient oil and gas industry to take care of our foreign exchange requirements."

The sector remains dogged by lack of enabling legislation, conflict, inadequate financing, mismanagement and vested interests. Nigeria ranked 40th out of 58 countries surveyed in the 2015 edition of the Resource Governance Index, which measures the quality of oversight powers for natural resources created by the National Resources Governance Institute (NRGI).

Goals of boosting reserves and output to 40bn barrels and 4mn bpd, respectively, were unachievable. Exploration has slowed mainly due to the stalled Petroleum Industry Bill (PIB). However, at the time of writing, it had passed the Nigerian Senate. Proven oil reserves are static at 37.1bn barrels, while production (excluding condensates) dipped to 1.5mn bpd in the first-quarter 2017, compared to the 2014-2015 average of 2mn bpd – still below productive capacity.

Nigeria needs to revive its hydrocarbons sector so that the country's people, the end users, benefit.

Image Credit: Jordi C/Shutterstock.com

New momentum

The launch of the "Seven Big Wins" programme last year is geared towards improving upstream and downstream facilities. The plan (2015-19) targets: policy/regulation; business environment and investment; gas; refineries and local production capacity; transparency/efficiency; Niger Delta security; and stakeholder management and international co-ordination. The petroleum minister, Dr Ibe Kachikwu, said: "The Seven Big Wins are not like any other roadmap as we have never been in short supply of roadmaps. It has very specific time-focused targets and we are committing to taking unprecedented steps and making dramatic shifts in order to grow, deepen and open business opportunities in the oil and gas sector."

The government hopes to raise US$20bn in the medium term and US$5bn short term through concessioning of pipelines, fuel depots, refineries, divesting equity stakes in joint ventures with IOCs, and ensuring payments of outstanding royalties from later. This year, Nigeria may launch a new licensing round for oil block allocations and marginal field awards – the first time since 2007.

Roadmap in focus

The main objectives of Seven Big Wins are as follows:

- Pursuing an enabling environment for foreign direct investment (FDI) across the energy sector and facilitating sustainable financing for exploration/ production activities. "We have the capacity to increase production by three million barrels. The problem has been funding; we are working very collaboratively with the oil sector to find solutions to our cashflow problems," said Minister Kachikwu. A new arrangement will replace cash-calls. Capex over several decades is shared in proportion to equity stakes, with profits/losses similarly shared. The Nigerian National Petroleum Corp; (NNPC), which holds equity in six joint venture operations with IOCs (60 per cent Chevron, Elf, ENI, ExxonMobil and Total while 50 per cent with Shell) accumulated cash-call arrears of US$6.8bn between 2010-15, reflecting slow payment processes and red tape.

The new mechanism – approved by the National Economic Council - allows private financing whereby banks can recoup their monies and the government collects dividends from profits in JVs. According to estimates, US$15bn of fresh investment could flow into the industry. Net payment from oil production to the Federation Account is expected to peak under the new arrangement to about US$18bn by year 2020, Minister Kachikwu explained.

- Leveraging natural gas resources (estimated at 180.1 tcf) to develop a gas-based industrial economy, while boosting electricity generation. The plan seeks co-funding from IOCs to install new gas gathering facilities to monetise associated gas, which is mostly flared. The monetisation programme entails building energy-intensive industries for export and domestic markets, chiefly aluminium, iron-steel, gas-to-liquids and petrochemicals plants. NNPC intends acquiring equity in some gas-based industries. The bulk of gas produced is exported as LNG. Nigeria LNG currently has six liquefaction trains with annual capacity of 22mn tons.

The official target is achieving power-generating capacity of 20GW by 2020, mainly through higher gas supply, gas-fired power plants, efficient transmission/distribution networks and raising tariffs. Nigerian gas is ideal power station feedstock. About half of future power-capacity could be met by tapping into stranded gas.

- Addressing the decrepit state of four refineries that produce just one-tenth of domestic petrol consumption. Nigeria imports over four-fifths of oil-product needs. In early 2016, NNPC entered into talks with Chevron, ENI, and Total to revamp existing refineries with a nameplate capacity of 445,000bpd. Upgrades could cost US$700mn to increase combined utilisation rate to 90 per cent of total capacity, which fell to 14.4 per cent in 2014.

The roadmap aims to cut fuel imports by three-fifths by 2018 and stop importing petroleum products by 2019. Private refineries will be built, the largest of which is the Dangote Group's US$15bn, 0.65mn bpd complex.

- Forging robust dialogue with the Niger Delta aimed at restoring peace and prosperity. Over the last decade, Nigeria incurred 'unearned' income losses of between US$50-100bn due to vandalism in the Delta, according to Minister Kachikwu. This estimate was verified by the 2016 Fiscal Liquidity Assessment Committee Report, which showed the industry losing over US$7bn in 2016. The US Energy Information Administration estimates that militancy has curbed Nigeria's daily output by 200,000 to 300,000 barrels. The priorities include economic empowerment, infrastructure inter-connection and eradicating oil pollution. Specific targets are curbing incident rate by 90 per cent by 2018 and ensure a zero militant level. A US$20bn plan for the region was unveiled, focused on developing an industrial park to turn the delta into a regional gas hub. Shell has committed US$1bn.
- Instilling a new culture of transparency and efficiency, complying with best global practices, and streamlining operations of NNPC. The plan targets cost savings of one-third and lowering the technical cost of oil production currently US$27- to US$18 per barrel.

Sector outlook

Reforms and improved security could attract investment, mainly in deepwater that requires higher capex, while adding value in terms of monetising flared gas and domestic refining. Huge infrastructure development is needed to hit 2019 production targets for crude oil (2.8mn bpd) and gas (10bn standard cubic feet/day). The roadmap envisages US$100bn of private sector financing across upstream, midstream-to-downstream and refineries in the long term.

President Buhari said: "If we are able to plug the leakage and tighten loose systems that characterised this industry in the days of high oil prices, we are convinced we can do even more with the little that we are getting at the moment than we did even in the time of plenty." ♦

SENEGAL AND CÔTE D'IVOIRE:
STRIVING TO MEET GOALS

The emerging oil and gas markets of Senegal and Côte d'Ivoire are among the fascinating stories of the west African hydrocarbons sector. Georgia Lewis examines the fortunes of the two countries.

IT IS EXPECTED that Senegal will become a major force in African oil and gas production thanks to major discoveries, Côte d'Ivoire has ambitions of its own to ramp up output.

Senegal and Côte d'Ivoire are at different stages of their respective hydrocarbons journeys but they do share some parallels. In particular, both countries are involved in border disputes with neighbours in regard to hydrocarbon plays.

Kurt Davis Jr, an investment banker specialising in the natural resources and energy sectors, wrote that Senegal "is in an ideal situation with Kosmos Energy and Cairn Energy holding significant gas and oil reserves respectively in Senegalese territory."

Hydrocarbons exploration in Senegal has been taking place for more than 50 years but neither oil or gas has been exported at a significant level.

"The Senegalese President Macky Sall rightfully emphasised infrastructure spending when he first entered office in 2012 and thus the new discoveries will benefit from this spending," Davis observed.

Davis said that the Senegalese government will have to decide how much it is willing to spend now to capitalise on future oil price rises, balancing this with the risk of undercutting growth spending elsewhere. More spending, either directly or via tax subsidies from the government, will be at the centre of discussions, according to Davis. Economic growth for Senegal is forecast to approach seven per cent, enhanced by the agricultural sector.

Image Credit: Cairn

The supply base for Cairn's Senegalese operations in Dakar. The company's latest results are very promising.

> **"The Senegalese government will have to decide how much it is willing to spend now to capitalise on future oil price rises"**

The Senegalese hydrocarbons sector received a boost in May 2017 with Cairn announcing a successful appraisal well result with the SNE-6 well. The SNE-6 results are in line with the previous SNE wells, all of which have revealed oil.

Simon Thomson, chief executive of Cairn is upbeat about this latest result and the company's future plans for Senegal's offshore plays.

"This is our ninth successful well in Senegal in three years," Thomson said in a statement. "The results from this latest well together with SNE-5 and VR-1 provide essential data as we move towards submitting a development plan for the SNE field to the Government of Senegal in 2018."

Pressure data from this latest well has confirmed that the upper reservoir is connected with SNE-5, which is around 1.6km away. Work is now taking place to integrate this new data and to estimate the extent to which water flood secondary recovery can be applied to these upper reservoirs. Cairn is now moving operations to FAN South to test further productivity.

Meanwhile, in Côte d'Ivoire, Davis offers the following analysis of the country's prospects: "The head of the state oil and gas company Pétroci consistently tells international oil and gas companies that 2017 and 2018 are big years for pushing the country's growth in the sector right before prices potentially rise in 2019."

While Senegal has generated much optimism in recent years, the country's petroleum minister, Thierno Alassane Sall, was sacked earlier this year and a new petroleum code is still a work in progress. The energy portfolio is now managed by Prime Minister Mahammed Boun Abdallah Dionne. Operators are expecting first oil between 2021 and 2023 and, with a huge variety of play types at various stages of exploration, the overall outlook is optimistic.

The Senegalese petroleum code dates back to 1998 and a new code is being prepared, while multiple operators continue to push ahead with development. As well as Kosmos, Cairn and FAR being actively involved in bringing Senegalese hydrocarbons onstream, Atlas Oranto is to acquire seismic data for the St Louis offshore shallow basin and Fortesa is focusing on onshore drilling.

However, FAR is currently in a dispute with Woodside in regard to Woodside's US$446mn stake in the SNE discovery off the coast of Senegal. FAR claims this entry into the Senegalese market is not 100 per cent secure and is challenging Woodside's 35 per cent acquisition from ConocoPhillips. FAR claims that it had the right to pre-empt the deal and this was not upheld, which is disputed by Woodside.

Côte d'Ivoire, meanwhile has experienced mixed results.

Image Credit: Citizen 59/Flickr

Despite setbacks, operators and the national government remain hopeful about future offshore discoveries in Côte d'Ivoire.

Existing oil production has remained at around the 30,000bpd mark since January 2016. Anadarko has three wells planned for drilling but Ophir and African Petroleum have already reported disappointing results this year with the Ayame-1X well.

Jens Pace, African Petroleum CEO commented on this result: "The well results are obviously not what we were hoping for; however, as an exploration company, we are always pragmatic about the chances of success when it comes to drilling exploration prospects."

The production-sharing contract (PSC) that Ophir and African Petroleum signed with the Ivorian government in 2015 covered the CI-513 licence area and required that an exploration well be drilled within two years. This PSC became effective in March 2016.

Following the unsuccessful Ayame-1X result, Pace said the data from that venture will be analysed "particularly the oil shows that were encountered in the target reservoirs, in order to establish the next steps with regards to the licence."

The African Petroleum-Ophir Energy partnership will focus heavily on concluding farm-outs in Senegal and Gambia.

Military unrest in the country has also added to uncertainty. Bouake, Côte d'Ivoire's second-biggest city, has been the scene of soldiers rebelling against the government. The capital, Abidjan, and northern city of Korhogo have also been affected.

Both countries are involved in border disputes in regard to rights to hydrocarbon plays. Senegal and Mauritania are tussling over the offshore Chinguetti gas field, which is split almost exactly in half by the border between the two countries. To resolve this dispute, cooperation in regard to costs of development, revenue sharing, environmental protection, security and social issues will be essential. The sharing model for the Frigg gas field between the UK and Norway could be a potential template for an agreement between Senegal and Mauritania. Overall, there is much optimism about a positive and mutually beneficial resolution to the drawing up of this particular border.

> **"The results in Côte d'Ivoire were not what we were hoping for but we are always pragmatic when it comes to drilling prospects"**

Côte d'Ivoire and Ghana are set to move forward with offshore drilling next year. This is expected to follow a ruling later this year by the International Tribunal for the Law of the Sea in regard to a border in the Gulf of Guinea. Tullow Oil has already announced plans to resume drilling next year on behalf of its Ghanaian operations.

The Senegalese and Ivorian hydrocarbons players have certainly exercised caution in regard to the low oil price environment and other operational and geopolitical challenges. However, the governments of both countries are motivated to make their markets as attractive as possible for investment.

SIERRA LEONE: PLAYING THE WAITING GAME

Sierra Leone is looking to play catch up once again after watching drillers target other promising plays across the rest of this emerging sub-region, at the far western edge of the Gulf of Guinea. Martin Clark reports.

SIERRA LEONE'S OIL hopes, following a series of offshore finds between 2009 and 2013, were then checked by the outbreak of the ebola virus, which wreaked havoc across much of West Africa. However, while there has been a resumption in activity across the area, notably in Liberia, Senegal and Côte d'Ivoire, much of it has passed Sierra Leone by.

That is likely to change given the presence of hydrocarbons offshore. Five years ago, Anadarko Petroleum unveiled a flurry of offshore discoveries with the Jupiter (2012), Mercury (2010) and Venus (2009) finds, followed by successful appraisals. It fuelled interest across the Sierra Leone and Liberia basins, drawing in super majors including the mighty Exxon Mobil. At the end of 2016, Exxon drilled its first well off Liberia but drew a blank.

Yet the potential is clearly there, as Anadarko has shown. The company's first find was the Venus discovery in block SL 6/07, which was closely followed by Mercury. It encountered 135 net feet of oil pay in two Cretaceous-age fan systems, drilled to a depth of 15,950 feet in about 5,250 feet of water. The Mercury-2 appraisal, located 12 km northwest, then intersected more than 885 feet of reservoir-quality sandstones. These were later followed by Jupiter-1, drilled in water depths of 2,199 metres on block SL-07B-11. Anadarko operates all of these blocks in partnership with Repsol and Tullow Oil.

Sierra Leone's offshore discoveries could boost the country's economy but for now, a waiting game is being played.

Image Credit: S Martin/Flickr

These discoveries were followed in 2013 by Lukoil's Savannah discovery (block SL-05B-11) in water depths of 2,153 metres, although the Russian company is thought to have since withdrawn from the country.

However, soon after these exploration successes the region was ravaged by the ebola epidemic, bringing to a halt all major oil and gas exploration. It is only in the past year or so that activity has resumed, albeit away from Sierra Leone. Senegal and Côte d'Ivoire have continued to excite drilling interest.

Yet it seems only a matter of time before attention returns to Sierra Leone. In total, eight wells have been drilled so far offshore, of which six were spudded between 2009 and 2013, with four discoveries made. That's a track record that won't be lost on the wider industry.

And there is certainly competition for space in this frontier territory among major regionally focused investors. These include Australia's African Petroleum, which holds two offshore licences (SL-03 and SL-4A-10). These blocks contain untested basin-floor plays in the ultra deepwater, with promising prospects including Sirius, Altair, Aquilae, Regel, Leo, Vega and Spica.

The hope is that some of these constellation-themed targets can one day emulate Anadarko's stellar discoveries and transform Sierra Leone's offshore into a genuine new production hub. There are big challenges, of course: these offshore resources will be costly to develop in the absence of any major infrastructure. But one important test - the discovery of oil – has already been passed.

OIL AND GAS ASSET INTEGRITY MANAGEMENT: WHO CARES?

Enyioma Opurum, an oil and gas engineer, explains why asset integrity management is important and why neglecting this aspect of operations is a false economy.

Once a hydrocarbons facility has been built, it is essential to follow up with maintaining all assets.

Image Credit: Shell/Flickr

THE PRIMARY DETERMINANTS of the value of an oil and gas company are its reserves, level of production and commodity price at the time of assessment. Linking these three factors are the facilities and infrastructure deployed to lift oil and gas from reservoir through initial processing, transportation, storage, refining and final distribution to end users.

These equipment and associated enabling facilities from upstream to downstream of the industry make up the physical assets of oil and gas companies, and their availability and performance play a critical role in the cashflows and earnings of the company, and also on the revenue of oil-dependent countries like Nigeria. In other words, companies and oil-dependent countries would not make money if there is no infrastructure to lift oil and gas from reservoirs, no tanks for storage, and no facilities to process and distribute refined products to end users.

> **"Investment must take into account life-cycle costs of equipment as well as the initial cost of procurement and installation"**

The nature of the industry, which typically features hazardous environments, demands strict compliance to safety regulations – spills can cause environmental damage, expensive clean-ups, compensation payouts, and fires which could result in widespread damage to equipment, and injury or death to workers.

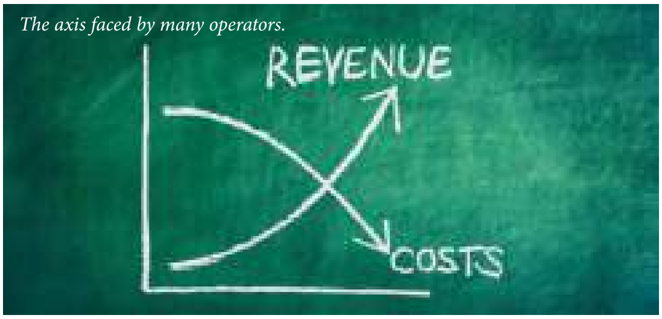
It is in the interest of oil and gas companies, regulatory agencies, communities and all stakeholders not only to ensure safe operation of all oil and gas installation, but to ensure availability and efficient operation of assets. Investment in infrastructure must take into account life-cycle costs of equipment, including cost of ensuring availability and efficient performance of the equipment (maintenance costs and operating expenditure) over its lifespan, in addition to initial cost of procurement and installation.

Oil and gas companies and oil-dependent nations lose revenue when these process systems fail or equipment breaks down. Worse, it can cost the company its reputation and money in compensation and clean-up costs if there is loss of primary containment. More importantly, loss of primary containment could lead to loss of lives and environmental damage.

It is in the interest of oil and gas companies, governments, communities, wider society and every stakeholder to ensure that oil and gas assets are well looked after. Everyone loses whenever there is loss of primary containment, therefore, we should all care.

Performance at a sustainable cost for Nigerian operations

OVER THE PAST decade, asset integrity management (AIM), operational excellence and productivity optimisation have been the strategic focus areas in the Nigerian oil and gas industry. As oil prices continue to stammer, asset owners and organisations try to cut costs, maintain operational efficiency and try to achieve a balanced and sustainable performance over ageing assets. AIM systems require risk-based, systemic, systematic and sustainable approaches and procedures to assets, from commission through to operations and maintenance, modification and life extension to decommissioning.



The axis faced by many operators.

Image Credit: PFL

The AIM market in Nigeria is driven by increased investments to meet the escalating energy demand. Uncertain regulatory framework, ageing assets, taxation, low oil prices, corruption, operational costs, pressure from stakeholders and manpower issues rank at the top of Nigeria's challenges to achieving operational efficiency.

As the momentum to move to green energy gathers pace, Nigerian operators need to review their long-term strategies, recognising that oil could suffer a similar fate to coal in the coming decades, sooner rather than later. However, maximising profitability from brownfield assets is the major reason for adaptation of AIM services while observing containment, reliability, health, safety and environmental concerns, and utilising risk-based thinking practices in high-risk industrial environments. With decision-makers under pressure to reduce asset downtime and minimise operating costs in an erratic market, AIM services providers increasingly consider new technologies to improve asset reliability, boost throughput and optimise field recovery at good margins.

Emerging, sustainable AIM practices will emphasise design, technology, quality assurance and operational integrity issues for splitting issues into manageable segments and measuring organisational alignment for sustainable performance.

JEE EXPANDS OIL AND GAS TRAINING IN WEST AFRICA

Ensuring staff are properly trained is an essential investment for oil and gas operators. Smart West African oil and gas companies are taking advantage of courses that are conducted either on the continent or via the latest e-learning technology.

Image Credit: Jee Ltd

High quality training courses help empower employees across African oil and gas companies to reach their potential.

WEST AFRICA, ALONG with other oil and gas regions such as the UK, is a maturing basin with assets being operated close to or even past their design life, meaning maintenance becomes an ever increasing challenge. In the low oil price environment, improved maintenance and operating techniques are required to maximise the economic benefits for the companies and nations. Part of this journey starts with developing the knowledge and skills of the workforce to better manage these challenges.

Jee Ltd, a leading independent subsea engineering and training firm, is building on its experience of tackling operational and integrity management challenges across the globe to meet the growing demand for its services in West Africa. Jee has trained more than 7,000 engineers in more than 30 countries over the past 20 years, and has a proven track record in Africa having delivered in-house courses for clients in the region.

Trevor Jee, Managing Director at Jee Ltd, said: "Over the past year, we have worked on a variety of projects in Africa with several international operators. Although there are unique challenges associated with the region, we have been able to leverage our global engineering experience to identify efficiencies, improve operating conditions and maximise production. There is also an increasing focus on training the African workforce to support local content for the oil and gas sector, and keep engineering work in-country, rather than importing."

"Our aim is to contribute to the upskilling of the local workforce to help meet current and future operational requirements and assist in the standardisation of engineering knowledge across the global industry."

As such, Jee has introduced public courses in Nigeria into its training schedule. Jee will be hosting a course on Integrity management of subsea pipelines in Lagos from 25-28 September 2017, with more courses planned for 2018. Teaching the engineering principles behind successful integrity management, this course is recommended for anyone involved in the maintenance and integrity of subsea assets and pipelines.

In addition to public courses, Jee offers in-house training allowing clients to create bespoke programmes from Jee's learning materials of over 200 topics, and access to its substantial knowledge library of case-studies, videos, worked examples, assessments and quizzes.

Jee also offers online courses which allow learners to develop their knowledge around work and life commitments, without incurring travel costs and time out of the office. With expert tutor support, interactive quizzes and exercises to reinforce learning, Online courses are ideal for those with busy schedules or when offshore or travelling.

For more information on Jee's engineering services or to book a place on a course, please visit www.jee.co.uk or contact training@jee.co.uk .

Oil and gas companies can benefIt from the myriad advances in satellite technology.

Image Credit: Johan Swanepoel/Shutterstock

AT THE CUTTING EDGE OF SATELLITE COMMUNICATIONS

Vaughan O'Grady examines the latest developments in satellite communications and outlines how the sector will grow to the benefit of oil and gas operators.

SATELLITE TECHNOLOGY IS changing fast. For many oil rigs, the option is now not only Ku and C band communications, but the promising Ka band, a relatively plentiful and powerful source of bandwidth that is making inroads worldwide, albeit sensitivity to extreme weather conditions means it is not always ideal for offshore.

The distance satellites transmit from is changing too. A few geostationary satellites can cover the globe from around 36,000km above the earth. However, a transmission round trip of many tens of thousands of kilometres brings delays during voice and data calls. The arrival of medium earth orbit (MEO) and low earth orbit (LEO) satellites will change that.

LEO satellites, at an altitude of as little as 160 to 2,000km, don't come cheap; you need a lot of them for good coverage. But that is what a number of initiatives are planning to offer. One Web plans 648 LEO satellites,LeoSat Enterprises 108 and SpaceX thousands, all offering high-speed communications services for everything from airline communications and disaster relief to consumer broadband.

> **"The distance satellites transmit from is changing but a transmission with a long round trip can still bring delays in voice and data calls"**

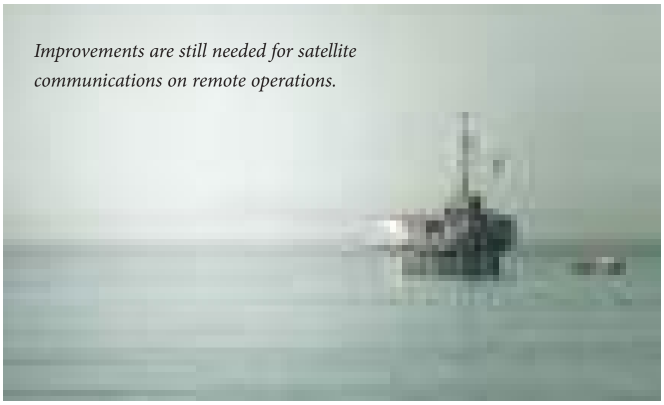
These may still be in the future but here and now there is O3b, a MEO (about 8,000km from the earth) constellation of, initially, 12 satellites. O3b is targeting energy among its customers, although its big win so far is the supply of fast Internet for ships in the Royal Caribbean Line cruise fleet.

Martin Coleman, director of the Satellite Interference Reduction Group, an industry association that, as its name implies, aims to keep interference under tight control, suggests that, if successful, some LEO services could be the equivalent of "fibre in the sky". But, he adds, "It will be interesting to see how the business cases evolve, as this IS in its infancy."

For oil and gas at least, much of this innovation may be too costly or require new equipment. That said, oil and gas companies will benefit from another revolution. High throughput satellites (HTS) are the much-discussed new breed of high-performance broadband satellites that often use Ka but in some cases also Ku and C band frequencies and will provide more new bandwidth capacity that will deliver higher speeds at lower cost. An example is

Inmarsat's upgrade to its global service – Global Xpress – which is now available through three Ka-band, high-speed, mobile broadband communications satellites. Equally relevant to oil and gas is the transformation in ground equipment infrastructure. The possibility of a teleport in the cloud, built-in interference mitigation and ever-increasing processing power are the hallmarks of many modern satellite modems and VSAT systems. Add to that mix new antenna technology and the development of flat panel versions, and you can clearly see the extent and speed of the product development cycle.

Coleman cites Newtec's Dialog, a multiservice satellite communication platform that supports multiple satellites, multiple frequency bands and regular and spot beam satellite coverage, and includes Carrier ID and interference mitigation. Or the VT iDirect product portfolio, which includes hub and network management systems and IP-based satellite communications systems .Comtech, offering satellite bandwidth and link optimisation and Harris CapRock One, a communications service with a multi-band antenna, are some of a large number of innovations helping end users to make the most of satellite connectivity.



Improvements are still needed for satellite communications on remote operations.

Image Credit: wsquared photography/Flickr

Ironically, oil and gas here and now has the much more prosaic problem of slow data connections. Much of the slow performance associated with satellite Internet is because IP has overhead, thus slowing the transmission of raw data.

Coleman says: "Obviously on the rig and back at HQ, you have fast network infrastructure already. But to get data back in a hurry it's still IP: lots of packets, lot of overheads. The bit cost is always the problem — the cost of getting that data through." This is why ways of sending out raw compressed data, but securing it at the start and endpoints are now being seriously discussed.

HTS notwithstanding, oil and gas is not necessarily going to be at the cutting edge ow satellite developments. But, as Coleman puts it: "They still need data. Rigs still run. I think the oil and gas companies will pick up the benefits of the ever-growing plethora of technology innovation."

TRENDS FOR THE OIL AND GAS OPERATORS OF THE FUTURE

Today's oil and gas organisations were developed during resource scarcity. Complex, centralised organisations met great technical challenges. But the rise of innovative independents has led to game-changing trends for the industry. Analysis by Christopher Handscomb from McKinsey.

OLD, COMPLEX MODELS let organisations to tackle technical challenges, manage risks, and deploy scarce talent. But this led to complexity, adding cost, stifling innovation, and slowed decisions. At the same time, independents succeded in exploration and unconventional plays, but struggled to scale operations without copying the majors' bureaucracy. But game-changing trends are reshaping the industry.

- Resource abundance is leading to lower oil prices and a focus on cost, efficiency, and speed. Talent is no longer scarce, exploration capability is less of a differentiator, megaprojects are not the only way to grow. Opportunities may only be economical for early movers. Meanwhile, conventional, deepwater, unconventional, and renewable assets require a distinct operating model that cannot be delivered optimally from a single corporate centre.
- Technological advances disrupt old ways of working, enabling step changes in productivity. Jobs are being replaced by automation on a large scale, and those that remain require increased human-machine interaction. Data generation grows exponentially, as equipment connects with the cloud. This data explosion, along with advanced analytics and machine learning, means opportunities to reimagine how and where work is done.
- Demographic shifts mean that employees demand changes in the working environment and express concerns about the role of oil and gas companies. Millennials will constitute a majority of the US workforce by the early 2020s and are already moving into senior roles. "Digital natives" in the driver's seat will bring their own expectations of technology, collaboration, pace, and accountability. Oil and gas companies may need more profound changes to meet demands for meaningful work and social responsibility to attract the next generation.

Image Credit: McKinsey

Christopher Handscomb.

How to adapt:

1. ***Organisational agility:*** The pace of change puts a premium on adapting quickly to changing conditions. Agility combines dynamic capabilities, such as rapidly forming cross-functional teams, and a backbone of core value-adding processes and cultural norms that provide resilience, reliability, and relentless efficiency.
2. ***Digital organisation:*** It has been happening for decades, but the digital revolution is just starting. Soon, the Internet of Things will consist of more than a trillion sensors that generate and share data. Artificial intelligence and machine learning will result in a step-change in safety and productivity with automation of 60 to 90 per cent of routine manual activity, new classes of jobs emerging and new ways of managing people and performance.
3. ***Millennial management:*** Millennials are no longer a small group; in many companies, they occupy managerial roles. As they rise, they bring their own ideas about collaboration, accountability and tech. Leading companies will design environments to meet their expectations.
4. ***The decentralised company:*** In the last 15 years, corporate centres of most oil and gas companies grew to manage risk, leverage scale, and share talent. But many forces underpinning the drive to centralise have eroded. Low oil prices made large overheads unaffordable, and slow decision-making is a threat to viability. In parallel, the rise of lower-risk assets changed the thinking about the role of the corporate centre. Success in unconventional and late-life operations requires local coordination and integrated decision-making at the front line, not layers of corporate review. Decentralising business and technical work creates a radically smaller corporate core.
5. ***Redefining what's core:*** Companies are rethinking what activities to control in-house versus partnerships and supply-chain relationships. We believe the future oil and gas company will more closely resemble today's industrial manufacturers, with a move away from tactical contractual arrangements, toward long-term strategic partnerships with a network of tier-one and tier-two suppliers. In a world of plentiful resources, access is no longer a strategic differentiator, and majors may rely more on specialised explorers rather than in-house teams for reserve replacement.

Adapted from "The Oil & Gas Organization of the Future", published via McKinsey Insights, September 2016 by Christopher Handscomb, Scott Sharabura & Jannik Woxholth

PROCESS AUTOMATION CHANGE DRIVEN BY TECHNOLOGY

Oil and gas companies like everything to run smoothly, but in such a complex and hazardous environment, that's quite a task. Martin Clark reports on how technology is improving process automation for the industry.

EVERY PLATFORM, RIG or downstream site knits together a complex web of technology, systems and processes, all typically drawn from different suppliers and contractors.

Process automation is therefore a critical part of making things flow, using state-of-the-art technology to ensure everything is running correctly, and triggering warnings when threats emerge. It is a trusted part of the production process and the endless quest for maximum return and efficiency on assets and resources.

And Africa's energy sector relies on it as much as any other region. Swiss automation experts Endress + Hauser said that the Africa region experienced "solid growth" during 2016 when announcing its full-year results.

But this already complex set of processes looks set to become more sophisticated with the increasing convergence of new digital technologies in the market and ever larger amounts of data produced from upstream fields and installations.

A report by Frost & Sullivan says the convergence of algorithms, cloud, data, devices and networks will "drive a creative destruction and expansion of traditional business models", ultimately creating new, more efficient solutions for the sector. Another trend, it notes, is the industry preference towards "solution integration", to offer a broader insight into the whole enterprise.

This will drive further collaboration between information technology and operational technology, which flattens the traditional layered hierarchical architectures present in process industries.

Expect traditional automation companies to re-position and re-brand to better serve customers. This has already led to the emergence of several digital industrial platform offerings such as Ability from ABB, PlantWeb Digital Ecosystem from Emerson, Predix from GE Digital, Lumada from Hitachi and Watson from IBM.

Another is Mindsphere from Siemens, an open, cloud-based system that lets operators connect their physical infrastructure to the digital world. The technology lets users harness big data from countless intelligent devices for insights across the whole business.

"Digital industrial platforms will emerge as the cornerstone to unlock value and generate alternative revenue monetisation streams from existing products and solutions across the automation solutions market," says Ticaram Ramakrishnan, a Frost & Sullivan analyst.

Of course, there are other considerations for African operators. More efficient tech solutions may improve operations and, profits, but could undermine job prospects for locals. At a time when Nigeria and others are committed to boosting employment it may not be a win-win situation for all.

Image Credit: Mixabest/Wikimedia Commons

Internet connectivity is now an important and unavoidable part of modern oil and gas operations.

BAYWOOD CONTINENTAL OVERCOMES CHALLENGES

Baywood Continental Limited (BCL) has adopted vital strategic and organisational decisions towards maximising the abundant opportunities in the Nigerian oil and gas industry. This has been essential as the main enabler to position the company as a frontline player.

OVER THE YEARS, BCL, a wholly Nigerian owned and ISO-certified integrated oil and gas servicing company, incorporated in 1989, has achieved wide acclaim for excellence in project deliveries, achieving industry firsts. A flagship project is the OML 58 OUR gas pipeline, which has been handed over to NNPC and TOTAL. The OUR pipeline (42-inch diameter) is the largest onshore pipeline in West Africa, extending for 46km from Obite to Rumuji in Rivers State, Nigeria.

The pipeline was a major component of the OML 58 Upgrade Project, which was designed to meet the objectives of the Nigerian government's Gas Master Plan, providing gas for industrial and domestic use and increased gas delivery to the Nigeria Liquefied Natural Gas Company (NLNG) at the Bonny Island, Rivers State.

The project supports the Nigerian government's embracing of multiple options to solve energy challenges. The gas pipeline provides:

1. A new route for gas export from Obite Treatment Center (OTC) following capacity upgrade up to 15.65 MMCBM/day.
2. De-bottleneck of existing Gas Treatment System Number (GTS) 1-4 NLNG network.
3. Branch of existing Gas Treatment System Number (GTS) 6 to Bonny Island.
4. Important infrastructure for domestic gas delivery feeding the Northern Option Pipeline (NOPL).

Local content is very important to Baywood.

Image Credit: Baywood Continental Limited

"One thing that stands us out is we recorded zero fatalities during the project execution – more than 17mn man-hours were achieved," said Emperor Chris Baywood Ibe, President/CEO.

Environmental protection

To preserve the environment, pipelay by horizontal directional drilling was adopted for the River Sambrero crossing, ensuring no harm to the marine environment. Vehicular movements across major highways were not hindered due to the use of auger boring for road crossings.

There were several Memoranda of Understanding (MOUs) with the more than 20 communities, along the pipeline route. The MOUs provided for environmental restoration, regeneration and rehabilitation wherever the project impacted on the environment. This strategy entailed seeking the input of the communities when designing corporate social responsibility programmes, such as free community healthcare, enterprise development and educational schemes. Emperor Chris Baywood Ibe, president and CEO, BCL, said the result of this effort is a deep sense of ownership of the pipeline project by the people in the communities.

Human capital and local content

BCL engaged more than 3,000 personnel with more than 1,000 of these coming from the host communities for the project execution. Engineering, procurement, supply, construction and commissioning of the pipeline were all done by indigenous contractors, which is a strong testimony to the vast capabilities of these local companies.

Numerous challenges

BCL prides itself on meeting the inherent challenges encountered during project execution. These have ranged from engineering, materials handling and logistics, adoption of in-trench welding and tie-in techniques for the concrete-coated, thick-walled sections (weighing approx. 22 tons per length) as well as the challenging terrain, community hostility, and vast supply chain. The dynamic risk assessments undertaken for the project execution made for a successful completion of the project with an enviable zero fatality record.

MEETING GAS TREATMENT CHALLENGES IN AFRICA

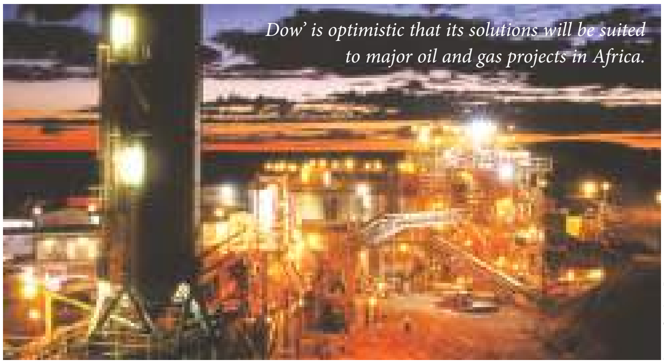
Dow has a presence in Egypt and Libya and hopes to expand into Nigeria. Adriano Gentilucci, commercial director – IMEA for Dow Oil, Gas & Mining, speaks to *Oil Review Africa* about the company's ambitions on the continent.

What is Dow's pedigree in gas treating solutions?
For more than 65 years, Dow has led the way in gas treating. Today we offer one of the broadest and most in-depth portfolios of gas treatment products, services and technologies for natural gas applications in the world.

Our UCARSOL™ solvents, specialty amines and specialised technologies – together with unsurpassed industry expertise – bring you the most advanced solutions available for gas treatment. Dow's core expertise in gas treating also lies in providing engineering consultancy services and simulation capabilities to engineering companies and oil and gas operators backed by more than 1,000 references worldwide dealing with a wide ranges of gas compositions and process conditions.

What is Dow's gas-treating footprint in Africa?
Dow has several gas treating references in Africa, handling a significant number of the plants running on amines in Egypt and Libya.

We also foresee an increase in the demand for amine in Nigeria and the rest of West Africa with the development of the Dangote Oil Refinery in the city of Lagos. This refinery will meet Nigeria's daily requirement of 445,000 to 550,000 barrels of fuel with the extra capacity to export.



Dow' is optimistic that its solutions will be suited to major oil and gas projects in Africa.

Image Credit: Dow

What are the biggest challenges in sour gas treatment in the region?
One of the main challenges facing sour gas processors in Africa today is that of efficient amine management. Amines, a chemical compound used to treat sour gas by removing harmful hydrogen sulphide (H_2S) from the useable gas, works best in cool conditions, which means the added costs of thin fan coolers or chillers to the sweetening process. Dow's amine technology works by allowing the amines to operate efficiently for H_2S removal even at relatively high temperatures. This eliminates the cost for cooling the amines.

How does the Dow AMINE MANAGEMENT™ Program work?
The Dow AMINE MANAGEMENT™ Program is a comprehensive gas-sweetening service program that targets the gas treating amine systems to achieve environmental compliance while improving reliability, reducing energy costs and preserving the integrity of assets. Dow AMP is tailored to each customer's performance objectives, of process optimisation, energy efficiency and asset integrity, ultimately helping them optimise total system costs. The service program uses Dow's proprietary state-of-the-art simulation software, which offers customers best-in-class performance prediction technology.

All Dow's UCARSOLTM™ customers have access to this programme. Our important customers usually have a dedicated technical resource onsite working closely with the facility's operational team to help ensure that the gas plant is operating at optimal performance.

Why are companies moving towards hybrid solvent in place of physical and chemical solvents?
An important trend is the tightening of regulations for controlling emissions that are in line with international standards. As a result, it is no longer sufficient to just remove H2S from natural gas to meet regulation, but the removal of other exotic contaminants, such as mercaptans. The removal of these requires a different approach and more specialised amine technology. To address this need, Dow introduced hybrid solvents, a combination of chemical and physical solvents which are capable of removing organic sulfur compounds from natural gas streams, with reduced hydrocarbon uptake compared to physical solvents, while still reaching the customer's stringent gas specifications on acid gas removal. These hybrid solvents can be applied at natural gas plants and refineries, and be extended to other potential applications in the oil and gas industry.

Over the last few years, Dow has invested in further R&D efforts to develop an accurate simulator tool for hybrid solvents.

AFRICAN RIG COUNT

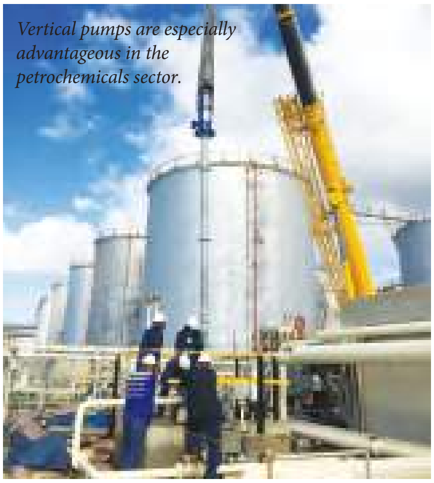
COUNTRY	March 2016	April 2016	March 2017	April 2017
ALGERIA	54	55	80	89
ANGOLA	8	9	2	4
BENIN	0	0	0	0
CAMEROON	2	1	1	1
CHAD	0	0	0	0
CONGO (BRAZZAVILLE)	1	2	1	1
CONGO (DRC)	0	0	0	0
CÔTE D'IVOIRE	2	1	0	0
EGYPT	31	30	30	27
EQUATORIAL GUINEA	0	0	0	1
GABON	1	1	0	1
GHANA	1	1	0	1
KENYA	11	11	11	11
LIBERIA	0	0	0	0
LIBYA	1	1	1	1
MAURITANIA	0	0	0	0
MOZAMBIQUE	0	0	1	1
NAMIBIA	0	0	0	0
NIGERIA	8	6	10	10
SENEGAL	1	1	1	2
SIERRA LEONE	0	0	0	0
SOUTH AFRICA	1	1	0	0
TUNISIA	0	0	1	0
TANZANIA	0	0	0	1
UGANDA	0	0	0	0
Grand Total	**122**	**120**	**139**	**187**

Vertical turbine pumps grow in popularity

A TREND TOWARDS the use of vertical turbine pump (VTP) technology is gaining momentum in the petrochemical sector, based on a number of benefits over traditional options.

According to Kevin Roelofse, Weir Minerals Africa's dewatering product manager, Floway® vertical turbine pumps are advantageous for applications such as booster pumps in bulk water application and condensate extraction in facilities that operate boilers. The reFloway® vertical turbine slurry pump (VTSP) is one such breakthrough.

Any facility that includes boilers – common in the energy generation, paper and petrochemical sectors – will know the challenges facing condensate extraction pumps. This equipment, vital to the movement of condensed steam, faces the danger of cavitation or pitting of impellers leading to inconvenient and costly downtime for replacement.



Vertical pumps are especially advantageous in the petrochemicals sector.

Image Credit: Weir Minerals

"If there is insufficient suction pressure on the hot condensate –then the vacuum existing at the suction of the impeller can exceed the water vapour pressure and can cause it to vaporise, imploding onto the impeller vanes and causing considerable erosive wear on these impeller vanes due to cavitation," Roelofse said in a company statement. "This is devastating for the longevity of a centrifugal pump."

New DNV GL guidlines ensure best practice submarine pipeline soil assessments

DNV GL HAS launched new recommended practice guidelines for submarine pipelines, dedicated to the interaction between the pipeline and the soil. Soil characterisation and pipe-soil interaction assessments are important to any pipeline project, they are often complex and there can be uncertainty regarding the results compared to traditional foundation design. This is due to limitations in soil data along the pipeline route, difficulties in characterisation of the soil close to the seabed, dynamic pipeline installation and subsequent design scenarios involving large displacements.

To manage these uncertainties for improved, safe and cost-efficient pipeline design, geotechnical knowledge and guidance is essential. However, until now a dedicated industry standard on pipe-soil interactions has been lacking. DNV GL has collected, aligned and reviewed existing guidance, considering up-to-date research, and developed the new DNVGL-RP-F114. The RP provides holistic guidance and recommendations within a geotechnical framework.

DNV GL aims to improve soil assessments.

Image Credit: DNV GL

Jens Bergan-Haavik, senior geotechnical engineer, DNV GL – Oil & Gas, says: "Geotechnical competence is required to understand the complex soil behaviour close to the pipe during installation and operational conditions, in addition to managing the inevitable uncertainties related to limited soil data and to simplifications in the engineering models. The pipe-soil RP highlights the value of geotechnical input in projects to ensure robust pipeline design solutions. The RP also provides recommendations on how to safely avoid over-conservatism through specification of state-of-the-art laboratory tests."

DNV GL offers online tool for risk assessment

DNV GL has recently launched MyQRA, an online tool to harness risk information, to develop dynamic risk assessment methods for offshore and onshore oil and gas sector.

A position paper by the researchers in DNV GL shows how risk assessments can be made more powerful to provide improved and real-time decision support during operations.

The paper states that merely re-computation of risk measures based on current situations is not enough. Static quantitative risk assessment (QRA) reports evaluate only safety and activities of the system. But, in operation, the risk picture changes based on degradation of safety-critical barriers, changing production conditions and modifications to assets etc. Besides, with the use of digitisation to get insights from big data, it is challenging to make sense of the data to improve risk management.

Hence, dynamic risk assessment by real-time tools is very useful in projecting an updated risk picture and adapting to new situations. In this regards, DNV GL's MyQRA will harness risk information by unlocking detailed information from QRA studies that were not possible in a static QRA report.

MyQRA is designed to help both technical and non-technical professionals to understand the risk hazards and to make day-to-day decisions more effectively through filtering, drill-down functionalities and 3D visualisation. MyQRA also improves risk communication across multiple stakeholders in a project or asset, at each stage of its lifecycle.

Emerson's new Roxar Salinity Measurement System helps maximise oil and gas production

EMERSON AUTOMATION SOLUTIONS has launched its new Roxar Salinity Measurement system based on microwave resonance (MW) technology to provide sensitive, accurate and real-time measurement of saline water in gas production well streams.

The new salinity system consists of a salinity sensor mounted flush with the wall of the meter to instantly identify changes in the flow stream and spot the smallest amount of saline water.

The MW resonance technology ensures an instant response to changes to conductivity of the flow stream within seconds, with the ability to measure water conductivity down to ± 0.1 S/m and up to 99.99 per cent GVF and sensitivity in the range of ± 0.004 S/m.

Through this new technology, the operators can immediately take remedial action to prevent various types of production threats, such as scaling, hydrate formation and corrosion.

The new system has been designed as part of the Roxar Subsea Wetgas Meter which provides highly accurate water, gas and condensate flow rates, helping to reduce risk and improve flow assurance.

The new system has extensively been tested by Emerson both internally and at Colorado Experience Engineering Station in the USA, demonstrating a high level of precision.

Image Credit: Emerson Automation Solution

The Roxar Salinity Measurement System consists of a salinity sensor mounted flush with the wall of the meter. The MW resonance technology ensures an instant response to changes to conductivity of the flow stream.

Hempel launches new coating solutions for splash zone areas

HEMPEL'S NEW COATINGS Hempadur Multistrength 35840 and 35842 will more efficiently protect the vulnerable 'splash zone' areas than conventional coatings. These are almost solvent free and contain a much higher percentage of reactive diluents making them harder, and reducing the maintenance cost for the offshore assets. NORSOK M-501 System 7A and 7B has tested and pre-qualified the coatings.

The new coatings have been designed with smarter cross-linking properties to protect the offshore assets from both atmospheric and immersion-type corrosion.

Hempel's new coatings contain overlapping glass flakes that will enhance the coatings' resistance to water permeation and strengthen them against physical damage. In addition, the new coatings are environment friendly, comprising high solids (99 per cent) and low volatile organic compounds (VOC). The speciality of the two coatings is that they offer identical performance in different levels of thickness.

The new coatings also have an advanced surface finish, making them very easy to handle, says the company.

Image Credit: Hempel

The new coatings are highly protective, especially in areas around boat landings.

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NAICE 2017

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CONFIRMED SPEAKERS

GUEST SPEAKER CONFERENCE OPENING CEREMONY	KEYNOTE SPEAKER PANEL SESSION 1	KEYNOTE SPEAKER PANEL SESSION 2	GUEST OF HONOUR AND MINISTERIAL ADDRESS	SPECIAL GUEST AND INDUSTRY ADDRESS	KEYNOTE SPEAKER SPECIAL WORKSHOP ON COMMINGLING	MODERATOR SPECIAL WORKSHOP ON COMMINGLING	HOST
Janeen Judah 2017 SPE International President	**Bello Rabiu** COO Upstream, NNPC	**Mr. Egbert Imomoh** 2013 SPE International President	**Dr. Ibe Kachikwu** Honorable Minister of State for Petroleum Resources	**Dr. Maikanti Baru** Group Managing Director, NNPC	**Mr. Modecai Ladan** Director, DPR	**Dr. Emmanuel O. Egbogah, OON** Chairman, Emerald Energy	**Dr. Sola Matemilola** Chairman, SPE Nigeria Council

- **Mrs. Ajayi Olajumoke** MD Asharami Energy Ltd. (Upstream company of Sahara Group)
- **Dr. Nneka Jacob** PTDF
- **Mr. Tomide Togun** Central Africa Manager, Landmark Halliburton Software & Services
- **Mr. Alek Musa** MD/CEO, Flowgrid
- **Engr. Lucky Akhiwu** MD, Oilflow
- **Ayodele Oti** Advisor, Integrated Production Technology, Baker Hughes Exploration and Petroleum Engineering
- **Prof. Wumi Iledare** Director of Emerald Energy Institute, University of Port Harcourt
- **Mr. Kunayo Adesina Odeo** MD, NPDC
- **Mr. Ndiana Mathew** MD, PetroD Strategy Consultancy
- **Mr. Olalekan Abiola** Technical Assistant, (Upstream) to GMD, NNPC
- **Henry Oki** MD Halliburton Companies in Nigeria
- **Ifeanyi Nwagbogu** Group Managing Director, Schlumberger Group Nigeria
- **Mr. Felix Amieyeofori** MD/CEO, Energia Company Limited (Rapporteur for Commingling Workshop)
- **Prof. Joseph Ajienka** Emmanuel Egbogah Chair of Petroleum Engineering, UNIPORT
- **Ifeanyi Nwagbogu** GMD, Schlumberger
- **Hon. Emmanuel Armah-Kofi Buah** Ghanaian Ministry of Energy
- **Mrs. Oritsemeyiwa Eyesan** GM Planning NNPC NAPIMS
- **Mr. Osayande Igiehon** President Director General (PDG) Country Chair, Shell Gabon
- **Engr. (Mrs.) Nneli Akpedeye** FNSE, FNICE, PMP, FMP MD/CEO, Perfectus Loandi
- **Mrs. Olajumoke Adenowo** Principal Consultant, AO Consulting Limited
- **Ms. Efundayo Akinyanju** CEO, GE Oil & Gas West and Central Africa
- **Mr. Akin Akintemiwa** Group MD/CEO, Forte Oil PLC
- **Dr. Adeola Bamgboye** Director of Laboratory Services Light House Petroleum
- **Mr. Okey Okoli** Business Development Manager Halliburton Energy Services
- **Mr. Bayo Ojulari** MD, SNEPCo
- **Engr. Simbi Wabote** Executive Secretary, NCDMB
- **Mr. Gbenga Onadeko** Senior Vice President, Africa Weltec
- **Mrs. Cecilia Umoren** MD/CEO Millenium Oil & Gas Company Limited
- **Dafe Stephen Sejebor** GGM NAPIMS, FSAPE, FNMCS

Confirmed speakers as at May 15, 2017

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HIGHLIGHTS OF NAICE 2017

Topical Issues Workshop (Monday July 31, 2017 >> 1.00pm)
Topic: Attaining Optimal Production and Profitability in the Development of Marginal Fields
Spotlight on Commingling, Challenges and Best Practices for Hydrocarbon Management

Young Professionals Workshop (Monday, July 31, 2017 >> 1.00pm)
Topic: Thriving in Boom and Bust Cycles: Strategies and Options for the Young

Panel Session1 (Tuesday Aug 01, 2017 >> 10.00am)
Topic: Transforming Africa's Petroleum Industry for Operational Excellence

Women Development Programme (Tuesday Aug. 01, 2017 >> 1.00pm)
Topic: Women in Leadership: Aspire, Invest, Achieve

Panel Session 2 (Wednesday Aug 02, 2017 >> 10.00am)
Topic: Impact of Cycle of Oil & Gas Boom & Glut: Economic Imperatives and Opportunities

Technical Sessions - 150+ technical papers in 24 technical disciplines/session

Pre-Conference Short Courses (Saturday 29 and Sunday 30, July 2017)

1. Petroleum Economics: Revenue Forecasting, Fiscal Systems, Profitability and Risk Analysis By Prof. Wumi Iledare
2. Petroleum Resource Volume and Reserves Evaluation and Reporting By Dr. Sola Matemilola & Mr Osa Igiehon
3. Strategic Leadership in E&P By Dr. Mason Oghenejobo
4. Hole Problems and Unscheduled Events Management for Well Construction and Optimization By Professor Adewale Dosunmu
5. Well, Reservoir and Facility Management By Mr. Akande Adebisi
6. Fundamentals of Reservoir Engineering By Mrs. Rita Okoroafor
7. Enhanced Oil Recovery Processes: Theoretical and Practical Approach By Prof. Olafuyi. A. (Engr.)

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Better resistance to corrosion with peelable encapsulating membrane

BELZONA HAS LAUNCHED its latest creative solution for industry – an encapsulating membrane, Belzona 3412. This coating can be brush or spray applied onto complex surfaces to protect them from corrosion. When used in conjunction with Belzona 8411, a release agent/corrosion inhibitor, Belzona 3412 can be cut and peeled back during required maintenance or to check the status of the substrate, before being fully resealed with an extra layer.

According to the company, Belzona 3412 provides outstanding protection to a range of machinery and equipment, from the smallest bearings to the risers of offshore platforms. Its elasticity and adhesion properties allow it to encapsulate and bond effectively to many types of metallic and painted surfaces.

Image Credit: Belzona

Belzona 3412 can be cut and peeled back during maintenance.

Belzona offers the coating in two colours, grey and orange. The grey blends into metallic substrates whereas for safety purposes, the bright orange enhances the visibility of Belzona 3412 and highlights areas that can be peeled and inspected.

Belzona 3412 is easy to use and can be simply applied by either spray or brush. Spray applying is a quick process, resulting in a longer working life for the material and brush applying the membrane is a simple method that requires no specialist tools. Depending on the temperature and humidity of the environment, the material takes between one and four hours to become touch-dry, meaning minimal downtime for the coated equipment.

The company commented that owing to its water-excluding corrosion inhibitors, Belzona 3412 provides a durable layer of protection against many types of corrosion, such as galvanic and crevice.

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SUCCESS THROUGH ENGAGEMENT IN THE DOWNSTREAM SECTOR

Adiatu Adeyemi, managing director of Tulcan, talks to *Oil Review Africa* about the company's successes, including engaging in Nigeria's downstream sector and choosing investments wisely.

What have been Tulcan's biggest successes?

Our biggest success has been our ability to establish integrity and credibility in the industry. This has helped garner goodwill and patronage from oil majors, IOCs and Nigerian banks. We have excellent relationships with all these parties. At any point in time, we have four or five banks which are willing to partner with us on transactions. Also, we have good offtakers in oil majors such as Forte Oil, Conoil, and Sahara Energy. These partners have been quite strategic in our business operations.

How does Tulcan stand out from its competitors?

Our core values are not just preached but practiced. We define and conduct business optimally. We consider all our employees as partners who are critical to the successful functioning of Tulcan.

> "We choose our transactions very carefully, drawing from a broad knowledge of the market and industry, and we effectively manage risks"

Adiatu Adeyemi says Tulcan has diversified in order to succeed in difficult economic conditions.

Image Credit: Tulcan

What strategies have helped you succeed in the recession?

We choose our transactions very carefully, drawing from a broad knowledge of the market and industry. We settle for strictly confirmed offtakers' transactions, meaning we have offtakers ready to take most of our products in bulk form upon importation. We ensure minimum operating cost is maintained in all transactions, effectively managing risks throughout the process chain.

What services will provide growth for Tulcan?

Having been able to successfully engage in the downstream sector of the oil and gas industry in Nigeria, we have begun to build and establish our offshore presence through product supply, EPC projects as well as profitable contracts and ventures with the government and IOCs. These we believe, although quite difficult to break into, are more sustainable in the long run, with few manageable risks. We have also diversified into mining to earn foreign exchange and mitigate risks to our portfolio. At the moment, we are processing our mining licences.

What regions have the greatest potential for Tulcan?

Ghana, although new in the oil market, has huge potential. Part of our business model is to either own, run or co-own a marginal field. So we are considering investment opportunities in Nigerian or Ghanaian marginal fields – being an extension of our work in Nigeria as we see it. Also, Equatorial Guinea is a country of choice.